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REVIEW OF SEMISUBMERSIBLE AND TENSION LEG PLATFORM ANALYSIS TECHNIQUES

APPENDIX I - SOFTWARE SURVEY

F. Rajabi and S. Ghosh
Brown & Root Development, Inc.

D. R. Shields
Naval Civil Engineering Laboratory

Prepared for:

Naval Civil Engineering Laboratory
Ocean Structures Division
Port Hueneme, California 93043

and

Minerals Management Service
Technology Assessment and Research Branch
Reston, Virginia 22091

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TECNOMARE

FREQUENCY DOMAIN USING MORISON'S EQUATION

BOSS 82 — TECNOMAT

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	DIFAN	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"			June 84	
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM	"		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"	X			Linearization of the formulation in item 20
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	"		X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"		X		
7		: : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
8	E	: : : MEMBER	VERTICAL MEMBER	"	X			
9	N	: : : MEMBER	HORIZ. MEMBER	"	X			
10	V	: : : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		X		
11	I	: : : X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"		X		Use of box shape sections with assigned Cd and Cm coefficients
	R							

						Program Name	Yes	No		Comments
12	ONMENTAL FORCES	WAVE FORCES	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	DIFAN		X		
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY	"		X		
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		
16					COLUMN AND PONTOON	"		X		
17					PONTOON AND PONTOON	"		X		
18			FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		X		
19					IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY	"		X		
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	X			
21					IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"	X			
22			SECO	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"		X		
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		X		
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"		X		
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"		X		
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X		

					Program Name	Yes	No		Comments
27	*****	: : : ...	ND ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	DIFAN		X		
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"	X			A constant term, due to wave and current, derives from linearisation method.
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"	X			As for item 28.
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	X			
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	"		X		
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	"		X		
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"	X			
34	**** EQUATION OF MOT	FREQUENCY DO		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"	X			
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS	"	3D			
36				DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"		X	V.	
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X	Fall 82.	
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"		X		
39					IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X		
40					IS THE RADIATION DAMPING CONSIDERED	"	X			
41					IS THE STRUCTURAL DAMPING CONSIDERED	"		X		

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	DIFAN		X	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"	X		
44				IS THE STIFFNESS MATRIX COMPUTED	"		X	
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	"	X		
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	"			June 84
47	*			DAVENPORT	"			June 84
48	ENV	D		SIMIU	"		X	
49		**		OTHERS (SPECIFY)	"		X	
50	IRON		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"		X	
51	MENTAL			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X		
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT	"		X	Calculation is performed for each single frequency
53		*		MEAN SPECTRAL PERIOD	"		X	
54		*		WAVE SCATTER DIAGRAM	"		X	
55		*	...	LINEAR WAVE	"	X		Airy wave theory
56				STRETCH LINEAR	"		X	

					Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	DEAN		X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN	"		X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND	"		X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH	"		X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY	"		X	
62		V		EXTENDED VELOCITY POTENTIAL	"		X	
63		E		CNOIDAL WAVE THEORY	"		X	
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"		X	
65	D			ISSC	"		X	
66	E			JONSWAP	"		X	
67	S			BRETSCHNEIDER	"		X	
68	C			SCOTT	"		X	
69	R	*		OCHI (SIX PARAMETER)	"		X	
70	I	*		INPUT SPECTRA	"		X	
71	P	*		OTHERS	"		X	
	T	*						
	I	*						
	O	*						
	N	*						

				Program Name	Yes	No		Comments
72	* *	* *	DIRECTIONAL SPECTRA	DIFAN		X		
73	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X		
74	* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X		
75	SOLUTION TECHNIQUE	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"	6			
76	SOLUTION TECHNIQUE	STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"		?		
77	SOLUTION TECHNIQUE	STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"		X		
78	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	6			
79	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"		?		
80	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY	"	X			Energy balance in a wave period
81	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"		X		
82	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY	"	X			Pivot method.
83			MEAN OFFSET OF THE PLATFORM	"	X			
84			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	"	X			
85	* *** ***** *******		PLATFORM MOTION RESPONSE SPECTRA	"		X		
86	PLATFORM RESPONSE OUTPUT		RESPONSE STATISTICS .. MEAN VALUE	"		X		

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	DIFAN		X	
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"		X	
89		RESPONSE STATISTICS .. OTHERS; SPECIFY	"		X	
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	NASTA	X		
91	** ****	MODEL TEST - INDICATE SCALE	DIFAN	X		Yes ?
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X		CARGON3 DISTIAR2
93		OTHER PUBLISHED MATERIAL - SPECIFY	"		X	
94	**** **	OTHERS (SPECIFY)	"		X	
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)	ANCOR3 ANCOR4	X		Programs used to carry out the stiffness matrix as input to DIFAN
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X		
97		VERTICAL (TAUT) MOORING	"	X		
98		HYBRID/OTHER COMBINATION .... SPECIFY Lumped buoy	"	X		
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X		
100	M MATERIA	CHAIN (STEEL)	"	X		
101	O	WIRE ROPE (STEEL)	"	X		

					Program Name	Yes	No	Comments
102	MOORING SYSTEM			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	ANCOR 3 ANCOR 4	X		
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		
104				IS IT BASED ON CATENARY EQUATION	"	X		
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
106				OTHERS (SPECIFY)	"		X	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X	
108			VERTICAL MOORING	IS THE MASS OF THE MOORING CONSIDERED	MFAN		X	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"		X	
111				IS GEOMETRIC NON LINEARITY CONSIDERED	"		X	
112				IS MATERIAL NON LINEARITY CONSIDERED	"		X	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	
114				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"		X	
116				IS IT BASED ON FINITE EL-EMENT METHOD.W/ OR W/O	"		X	

						Program Name	Yes	No	Comments
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD	DIFAN		X	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X	
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"		X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	
121			M O D		IS THE MOORING HYDRODYNAMIC MODEL 2D	"		X	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D	"		X	
123	C	M, O	E L		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCTL)	"	X		
124	A	O			IS THE MOORING MODEL THREE DIMENSIONAL (STRUCTL)	"		X	
125	P A B I L I T I E S	R I N G	. . . . .		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"		X	
126					IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"		X	
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"		X	
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		X	
129				DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X	
130		* ** **		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	"		X	
131		** ****			MEAN LOAD OF THE MOORING LINE	"		X	

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	DIFAN		X		
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	"		X		
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	"		X		
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	"		X		
136		* ***	WITH MODEL TESTS - INDICATE SCALE	"		X		
137	* * * * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS	"		X		
138			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		X		
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	DWRSR	X		September 84	Frequency domain option
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL	"	X			
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL	"		X		
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD	"	X			
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"		X		
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY	"	X			Small deflection around an assigned static offset
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"		X		
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	X			Item 2a

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	DWRSR	X		
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	
149			IS THE RISER HYDRODYNAMIC MODEL 2D	"	X		
150			IS THE RISER HYDRODYNAMIC MODEL 3D	"		X	
151	S	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	"	X		
152	Y	**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS	"	X		
153	S	* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	"	X		
154	T		IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	"		X	
155	E	*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	"		X	
156	M	PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	"		X	
157	* * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	"		X	
158	*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		X	
159	* ***	I N T A C T	INTACT FREE FLOATING	FLOSTA NASTA	X		
160	STABILITY		INTACT WITH VERTICAL TAUT TENDONS	"	X		
161	ANALYSIS	D A M	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X		

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	FLOSTA NASTA	X		
163	* **		HYDRODYNAMIC LOADING CONSIDERED	DIFAN	X		
164	**	LOADING	IS INERTIA LOADING CONSIDERED	"	X		
165	S T R U C T U R A L A N A L Y S I S		IS DYNAMIC LOADING CONSIDERED	"	X		
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
168		* ***	BEAM ELEMENT	SAP 5 NASTRAN	X		
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT	"	X		
170			PLATE ELEMENT	"	X		
171			STIFFENED PLATE ELEMENT	"		?	Stiffened plate element non-existing but easy to be simulated.
172		*** *	OTHERS .... SPECIFY	"		X	
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"	?		Dof limits depending on structural model and computing techniques (e.g. superelements, cyclic symmetry,
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	"	X		
175			MODAL ANALYSIS	"	X		
176	* **		FATIGUE LIFE ANALYSIS	FASTAN	X		

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	PLOT2, FROSP, MENTAT, ...	X			
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	& NASTRAN	X			SPERRY O.S. RESTART CAPABILITIES
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	As for item 177 plus NASTRAN	X			
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	NAISC3, NAISC4, PUNSHE, DNV77	X			AISC code for I.R. API code for Hyd. Coll. and P.S. DNV for P.S.
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE 77 FORTRAN (ASCII) SPECIFY THE VERSION		X			
182		.... BASIC			X		
183		.... PASCAL			X		
184		.... OTHERS; SPECIFY			X		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU		?			Strongly depending on model dimensions and convergence tolerance
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	For all the mentioned programs	X			
187		IS THEORETICAL MANUAL AVAILABLE	"	X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X			
189		IS ANY TRAINING OFFERED	"	X			
190	** ****	IBM	"		X		
191		CDC	"		X		

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	"		X		
193		VAX	"		X		
194		MICRO .. SPECIFY	"		X		
195	**** **	OTHERS .... SPECIFY SPERRY O.S. EXEC 8	"	X			
196	** ****	LEASE (PRICE $ .00)	"	X			Apart NASTRAN.
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	"		X		
198		CONSULTANCY BASIS	"	X			
199	**** **	OTHERS .... SPECIFY	"		X		
200	REMARKS AND NOTES						
201							
202							

TECNOMARE

FREQUENCY DOMAIN USING DIFFRACTION THEORY

TECHNADE

TABLE II QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	DINDIF		X		
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"		X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	"		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"		X		
5			CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES	"		X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"		X		
7		. MEMBER ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"		X		
8	E	.	VERTICAL MEMBER	"		X		
9	N	.	HORIZ. MEMBER	"		X		
10	V	. MEMBER X-SECT	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	"		X		
11	I R		DOES IT USE EQUIVALENT CIRCULAR X-SECTION	"		X		

					Program Name	Yes	No		Comments
12	ONMENTAL	NAVE	: : IOH	IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	DINDIF	X			3-D sink-source technique is used associated to a surface panel
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	DINDIF MFFOS	X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	DINDIF	X			Partial derivative vs forme of the global potential
15			MEMBER INTER-ACTION	IS THE INTERACTION DET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X			
16				COLUMN AND PONTOON	"	X			
17				PONTOON AND PONTOON	"	X			
18			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X			Boundary integral method for Laplace equation solution
19				IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON	DINDIF DRAGON	X			Linearized drag force considered.
20				DIFFRACTION & FLUID FINITE ELEMENT	DINDIF		X		
21				OR ANY OTHER COMBINATION, PLEASE SPECIFY	"		X		
22	FORCES	FORCE	SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	DINDIF plus Utility routine	X			

					Program Name	Yes	No	Comments
27	* * * * * EQUATION OF MOT…	: : : : : : : : : : : :	ORDER	VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	DINDIF		X	
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"		X	
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X	
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"		X	
31				FORCES	DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	"		X	
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	"		X	
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"		X	
34	* * * *	FREQUENCY		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
35					CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE); OTHERS	"	3-D		
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"		X	
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X	
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"		X	
39	OF			COEFFICIE…	IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X	
40					IS THE RADIATION DAMPING CONSIDERED	"	X		
41	MOT…	D…			IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	DINDIF		X	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"	X		
44				IS THE STIFFNESS MATRIX COMPUTED	"		X	
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	"		X	
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	"		X	
47	*			DAVENPORT	"		X	
48	ENVI			SIMIU	"		X	
49	RONM	**		OTHERS (SPECIFY)	"		X	
50	ENTA	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"		X	
51	L			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"		X	
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT	"		X	Calculation is performed for each single frequency
53		*		MEAN SPECTRAL PERIOD	"		X	
54		*		WAVE SCATTER DIAGRAM	"		X	
55		*	....	LINEAR WAVE	"	X		
56				STRETCH LINEAR	"		X	

				Program Name	Yes	No	Comments
57			WAVE THEORIES ..... STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	DINDIF		X	
58			STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN	"		X	
59			STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND	"		X	
60			STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH	"		X	
61			STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY	"		X	
62			EXTENDED VELOCITY POTENTIAL	"		X	
63			CNOIDAL WAVE THEORY	"		X	
64			SEA SPECTR ... IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"		X	
65			ISSC	"		X	
66			JONSWAP	"		X	
67			BRETSCHNEIDER	"		X	
68			SCOTT	"		X	
69			OCHI (SIX PARAMETER)	"		X	
70			INPUT SPECTRA	"		X	
71			OTHERS	"		X	

WAVES DESCRIPTION

					Program Name	Yes	No	Comments
72	* *	*	A	DIRECTIONAL SPECTRA	DINDIF		X	
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X	
74	* *			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X	
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"	6		
76				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?		
77				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"		X	
78		DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	6		
79				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?		
80				WHAT METHOD OF LINEARIZATION USED .... SPECIFY	DRAGON	X		Energy balance in a wave period
81				MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS .. GAUSSIAN ELIMINATION	BINDIF		X	
82				OTHERS .... SPECIFY	"	X		Pivot method in complex domain.
83				MEAN OFFSET OF THE PLATFORM	"		X	
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	"	X		
85	* *** ***** *******			PLATFORM MOTION RESPONSE SPECTRA	"		X	
86	PLATFORM RESPONSE OUTPUT			RESPONSE STATISTICS .. MEAN VALUE	"		X	

				Program Name	Yes	No		Comments
87	******* ***** *** *		RESPONSE STATISTICS .. R.M.S. VALUE	DINDIF		X		
88			RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"		X		
89			RESPONSE STATISTICS .. OTHERS; SPECIFY	"		X		
90			EIGEN VALUES (SYSTEM NATURAL PERIODS)	"		X		
91	** ****		MODEL TEST - INDICATE SCALE	"	X			1/55?
92	PROGRAM VERIFICATION ',		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X			NV459 (VERITAS)
93			OTHER PUBLISHED MATERIAL - SPECIFY	"		X		
94	**** **		OTHERS (SPECIFY)	"		X		
95	* * * * * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	ANCOR3 ANCOR4	X			Programs used to carry out the diffuse matrix as input to DINDIF
96			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X			
97			VERTICAL (TAUT) MOORING	"	X			
98			HYBRID/OTHER COMBINATION .... SPECIFY	"	X			
99		MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X			
100	M		CHAIN (STEEL)	"	X			
101	0		WIRE ROPE (STEEL)	"	X			

					Program Name	Yes	No		Comments
102	MOORING SYSTEM	ANALYSES	STATICS	COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	ANCOR3 ANCOR4	X			
103				USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X			
104				IS IT BASED ON CATENARY EQUATION	"	X			
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE	"		X		
106				OTHERS (SPECIFY)	"		X		
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X		
108		***** VERTICAL SYSTEM	MOORING	IS THE MASS OF THE MOORING CONSIDERED	DINDIF		X		
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X			
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"		X		
111				IS GEOMETRIC NON LINEARITY CONSIDERED	"		X		
112				IS MATERIAL NON LINEARITY CONSIDERED	"		X		
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X		
114				IS THE STRUCTURAL DAMPING CONSIDERED	"		X		
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"		X		
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE	"		X		

						Program Name	Yes	No	Comments
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD	DINDF		X	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X	
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"		X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	
121			M O D		IS THE MOORING HYDRODYNAMIC MODEL 2D	"		X	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D	"		X	
123	C A P A B I L I T I E S	M O O R I N G	E L		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)	"	X		
124					IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)	"		X	
125					IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"		X	
126					IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"		X	
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"		X	
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		X	
129				DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X	
130		* *		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	"	X		Up to four rigid bodies connected by elastic springs (linear dynamics)
131		** ****			MEAN LOAD OF THE MOORING LINE	"		X	

				Program Name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	DINDIF		X	
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	"		X	
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	"		X	
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	"		X	
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE	"		X	
137	* * * * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS	"		X	
138	*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		X	
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			X	
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL			X	
141		S T R U C T U R A L M O D E L * *	IS THE RISER MODEL THREE DIMENSIONAL			X	
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD			X	
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			X	
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY			X	
145			IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			X	
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
149			IS THE RISER HYDRODYNAMIC MODEL 2D			X	
150			IS THE RISER HYDRODYNAMIC MODEL 3D			X	
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			X	
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			X	
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			X	
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			X	
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			X	
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			X	
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS			X	
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			X	
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING			X	
160			INTACT WITH VERTICAL TAUT TENDONS			X	
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			X	

				Program Name	Yes	No	comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	/		X	
163	* **	LOADING	HYDRODYNAMIC LOADING CONSIDERED	DINDIF DIFPOS	X		
164	*	LOADING	IS INERTIA LOADING CONSIDERED	"	X		
165	S T R U C T U R A L A N A L Y S I S	LOADING	IS DYNAMIC LOADING CONSIDERED	"	X		
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	DINDIF DIFPOS DIFGRDG	X		
167		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
168	, * ***	FINITE ELEMENT ANALYSIS	BEAM ELEMENT	NASTRAN	X		
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT	"	X		
170		FINITE ELEMENT ANALYSIS	PLATE ELEMENT	"	X		
171		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT	"		?	
172	*** *	FINITE ELEMENT ANALYSIS	OTHERS .... SPECIFY	"	X		
173		FINITE ELEMENT ANALYSIS	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"		?	
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	"	X		
175		OTHER ANALYTICAL CAPABILITY	MODAL ANALYSIS	"	X		
176	* ** *	OTHER ANALYTICAL CAPABILITY	FATIGUE LIFE ANALYSIS	SHELFA	X		

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	PROSP	X		
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	NASTRAN	X		
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	PROSP NASTRAN			
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	ANV77			
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE 7.7. FORTRAN (AISC) SPECIFY THE VERSION		X		
182		.... BASIC			X	
183		.... PASCAL			X	
184		.... OTHERS; SPECIFY			X	
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU		?		
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	For all the mentioned programs	X		
187		IS THEORETICAL MANUAL AVAILABLE	"	X		
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X		
189		IS ANY TRAINING OFFERED	"	X		
190	** ****	IBM	"		X	
191		CDC	"		X	

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	"		X		
193		VAX	"		X		
194		MICRO .. SPECIFY	"		X		
195	**** **	OTHERS .... SPECIFY SPERRY D.S. EXEC8	"	X			
196	** ****	LEASE (PRICE $ .00)	"	X			Apart NASTRAN
197		PURCHASE (PRICE $ .00)	"		X		
198	ACCESSIBILITY ARRANGEMENT	CONSULTANCY BASIS	"	X			
199	**** **	OTHERS .... SPECIFY	"		X		
200							
201	REMARKS AND NOTES						
202							

TECNOMARE

TIME DOMAIN USING MORISON'S EQUATION

TECHMAR

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	CARGON3 DISMAR2	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"			June 84	
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	"		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"	X			
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES	"		X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"		X		
7		. : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
8	E	. : MEMBER	VERTICAL MEMBER	"	X			
9	V	. : MEMBER	HORIZ. MEMBER	"	X			
10	I	. : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		X		
11	R	. : X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"		X		Use of box shape sections with assigned Cd and Cm coefficients

					Program Name	Yes	No		Comments
12	ON		: : ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	CARGON3 DISMAR2		X		
13	MEMBER			IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14		WAVE		ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"		X		
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		
16				COLUMN AND PONTOON	"		X		
17				PONTOON AND PONTOON	"		X		
18			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		X		
19				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	"		X		
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	X			
21	FORCES	FORCES		IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X		
22			. . . . DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		X		
24			SECON	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"		X		
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"		X		
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X		

						Program Name	Yes	No	Comments
27				VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	CARGON3 DISTAR2	X		
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"	X		
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X	
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"		X	
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	"		X	
32					IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"		X	
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"		X	
34				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS	"	2D		
36				DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X	Buss 82
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		9
39					IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X	
40					IS THE RADIATION DAMPING CONSIDERED	"	X		
41					IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Program Name	Yes	No	Comments
42	I	E	V	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	CARGO13 DASHAR2		X	
43	O		E	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
44	N		S		IS THE STIFFNESS MATRIX COMPUTED	"		X	Hydrostatic restoring is computed and matrix lines are supplied as input
45		D	x	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
46	O	O	x		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS	"	2D		
47	F	M	I	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
48		,	R		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X	
49	M	A	R		IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		B05 82
50	O	I	E		IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X	
51	T	N	G		IS THE RADIATION DAMPING CONSIDERED	"	X		
52	I		U		IS THE STRUCTURAL DAMPING CONSIDERED	"		X	
53	O		L		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	"		X	
54	N	x	A	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
55	x	x	R		IS THE STIFFNESS MATRIX COMPUTED	"		X	
56	x	x	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	"	X		

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	CARTON3 BISHAR2			June 84
58				DAVENPORT	"			June 84
59				SIMIU	"		X	
60				OTHERS (SPECIFY)	"		X	
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"		X	
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X		
63			WAVE THEORIE	SIGNIFICANT WAVE HEIGHT	"	X		
64				MEAN SPECTRAL PERIOD	"	X		
65				WAVE SCATTER DIAGRAM	"	X		
66				LINEAR WAVE	"	X		
67				STRETCH LINEAR	"		X	
68				STOKE'S 2ND, 3RD OR (5TH) ORDER .... PLEASE CIRCLE ...	"	X		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN	"		X	
70		W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND	"		X	
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH	"		X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	CARGONJ DISHARQ		X	
73		E	.	EXTENDED VELOCITY POTENTIAL	"		X	
74		S	.	CNOIDAL WAVE THEORY	"		X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	X		
76	D		E	ISSC	"		X	
77	E S C		A	JONSWAP	"	X		
78	R I		S	BRETSCHNEIDER	"		X	
79	P T	X X	P	SCOTT	"		X	
80	I O	X X	E C	OCHI (SIX PARAMETER)	"		X	
81	N	X X X	T	INPUT SPECTRA	"		X	
82	X	X	R	OTHERS	"		X	
83	X X		A	DIRECTIONAL SPECTRA	"		X	
84	X X	O T		DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X	
85	X X	H E R S		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X	
86	X X X	S T A		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	CARGONJ	6		

				Program Name	Yes	No	Comments
87	SOLUTION TECHNIQUE	DYNAMICS	TIME DOMAIN	CARGON3	?		
88				"	?		
89				NSMARQ	6		
90				"	?		
91				"	?		
92				"		X	
93				"		X	
94				"		X	
95				"	X		step by step integration of non linear equation of motion (prediction/correction)
96				"	X		
97				"		X	
98				"		X	
99				"		X	
100				"		X	
101				"	X		

WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY

IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM

NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY

WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY

IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM

METHOD OF INTEGRATION USED
.... HOUBOLT

.... WILSON - θ

.... NEWMARK - β

OTHERS
.... PLEASE SPECIFY

HOW THE TRANSIENT IS HANDLED
.... RAMP FUNCTION

.... VARIABLE INTEGR -ATION TIME

OTHERS
.... PLEASE SPECIFY

MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS.
.. GAUSSIAN ELIMINATION

OTHERS
.... PLEASE SPECIFY

PLATFORM MOTION TIME HISTORY

			Program Name	Yes	No	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	HARMAN	X		
103		... R.M.S. VALUE	"	X		
104		... (SIGNIFICANT)1/3	"	X		
105		... EXPECTED MAXIMUM	"	X		
106		... OTHERS, SPECIFY	"	X		2one-up crossing period
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	DISMAR2		X	
108	PROGRAM VERIFICATION ** ****	MODEL TEST - INDICATE SCALE	DISMAR2	X		Yes?
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"		X	
110		OTHER PUBLISHED MATERIAL - SPECIFY	"		X	
111		OTHERS (SPECIFY)	"		X	
112	DESCRIPTION * * * *	SPREAD MOORING (CATENARY)	ANCOR3 ANCOR4	X		Programs used to compute the non-linear elastic characteristics of the mooring lines
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X		
114		VERTICAL (TAUT) MOORING	"	X		
115	M	HYBRID/OTHER COMBINATION ... SPECIFY Lumped buoy	"	X		
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X		

					Program Name	Yes	No	Comments
117	O	MATERIAL		CHAIN (STEEL)	ANCOR3 ANCOR4	X		
118	R			WIRE ROPE (STEEL)	"	X		
119	I			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"	X		
120	N	CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		
121	G			IS IT BASED ON CATENARY EQUATION	"	X		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
123				OTHERS (SPECIFY)	"		X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	ANCOR3 ANCOR4 DISMAR2	X		
125	S	******	****	IS THE MASS OF THE MOORING CONSIDERED	DISMAR2		X	
126	Y			IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"		X	
127	S			IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X		
128	T			IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
129	E		MOORI	IS MATERIAL NON LINEARITY CONSIDERED	"	X		
130	M			IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Program Name	Yes	No	Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	DISHAR2	X		
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STIFFNSS, CIRCLE	"		X	
134					IS IT BASED ON FINITE DIFFERENCE METHOD	"		X	
135	C		MODEL	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X	
136	A				IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER	"		X	
137	P				IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING	"		X	
138	A	',			IS THE MOORING MODELLED AS TWO DIMENSIONAL	"	X	?	
139	B		*		IS THE MOORING MODELLED AS THREE DIMENSIONAL	"		X	
140	I		***		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)	"	X		
141	L		*		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)	"	X		
142	I	M			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	"	X		Directional spring
143	T	O			IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING	"		X	
144	I	R			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES	"		X	
145	E	N			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"			September 84
146	S	G	**	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X		

				Program Name	Yes	No	Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	DISNAR2	X		
148			MOORING LINE LOAD TIME HISTORY	DISNAR2	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	HARMAN	X		
150		MOORING SYSTEM OUTPUT	... R.M.S. VALUE	"	X		
151			... (SIGNIFICANT)1/3	"	X		
152			... EXPECTED MAXIMUM	"	X		
153			... OTHERS, SPECIFY	"	X		Zero up-crossing period.
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	ANCOR3 ANCOR4	X		Yes?
155	* * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	"		X	
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		X	
157	* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	DINTUB DWRSR	X		
158		* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL	"	X		
159	R		IS THE RISER MODEL THREE DIMENSIONAL	"	X		
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD	"	X		
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"		X	

				Program Name	Yes	No		Comments
162	R	MODEL **	DOES THE PROGRAM USE SMALL DEFLECTION THEORY	DINTOB DWRSR	X			
163			IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"	X			
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	X			Item 20
165	S		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	DWESE	X			
166	Y		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	DWESE	X			
167	S		IS THE RISER MODELLED AS TWO DIMENSIONAL	DINTOB DWRSR	X			
168	T		IS THE RISER MODELLED AS THREE DIMENSIONAL	"		X		
169	E	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM "	"	X			
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS	"	X			
171	M	* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	DWRSR	X			
172			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	DWRSR	?			
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	DWRSR	?			
174		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	DINTOB DWRSR		X		
175	* * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	"		X		
176			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	X			A.P.I. publications

				Program Name	Yes	No	Comments
177	STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING	FLOSTA NASTA	X		
178			INTACT WITH VERTICAL TAUT TENDONS	"	X		
179		DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X		
180			DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	"	X		
181	STRUCTURAL ANALYSIS	LOADING	HYDRODYNAMIC LOADING CONSIDERED	CARGO N3	X		
182			IS INERTIA LOADING CONSIDERED	"	X		
183			IS DYNAMIC LOADING CONSIDERED	"	X		
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
185			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
186		FINITE ELEMENT ANALYSIS	BEAM ELEMENT	SAP5 NASTRAN	X		
187			SHELL ELEMENT	"	X		
188			PLATE ELEMENT	"	X		
189			STIFFENED PLATE ELEMENT	"	?		
190			OTHERS .... SPECIFY	"		X	
191			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"	?		

				Program Name	Yes	No	Comments
192	I S * * * * *	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	SAPS NASTRAN	X		
193			MODAL ANALYSIS	"	X		
194			FATIGUE LIFE ANALYSIS	VIFAN3	X		
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	PLOTR, PROSP, MENTAT	X		
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	NASTRAN	X		
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	As for item 195	X		
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	NAISC3, NAISC4, PUNSHE, DNV77	X		Aisc code for I.R. API code for Hyd. coll. and P.S. DNV for P.S
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE 77 FORTRAN (ASCII) SPECIFY THE VERSION		X		
200			.... BASIC			X	
201			.... PASCAL			X	
202			.... OTHERS SPECIFY			X	
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU		?		
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE	For the mentioned programs	X		
205			IS THEORETICAL MANUAL AVAILABLE	"	X		
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X		

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	11	X		
208	XX XXXX	IBM	11		X	
209		CDC	11		X	
210	HARDWARE SYSTEM	PRIME COMPUTER	11		X	
211		VAX	4		X	
212	XXXX XX	MICRO .... SPECIFY	4		X	
213		OTHERS .... SPECIFY SPERRY O.S. EXECS	4	X		
214	XX XXXX	LEASE (PRICE $ .00)	11	X		Mark MASTRAN
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	4		X	
216		CONSULTANCY BASIS	4	X		
217	XX XXXX	OTHERS .... SPECIFY	11		X	
218	REMARKS AND NOTES					
219						
220						

TECNOMARE

TIME DOMAIN USING DIFFRACTION THEORY

TECNOMARE

TABLE IV QUESTIONAIRE FOR SOFTWARE CAPABILITIES (TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ** ** ** ** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	DIFCARG DISTAR3 SEAOFF	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	SEAOFF	X			
	*			DISTAR3			June 84	
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	DIFCARG DISTAR3 SEAOFF		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	DIFCARG DISTAR3	X			
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	SEAOFF	X			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	DIFCARG DISTAR3 SEAOFF		X		
7		. : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	DIFCARG DISTAR3	X			Wave forces, either diffraction or Morison's type, are input for SEAOFF. For DIFCARG and DISTAR3 forces on large elements are transmitted from DINDIF program and transformed in the time domain; the Morison forces are calculated at any time step considered. Use of box shape sections with assigned C_m and C_d coefficients
8	E	. : MEMBER : ORIENTATION	VERTICAL MEMBER	"	X			
9	N	. : MEMBER : ORIENTATION	HORIZ. MEMBER	"	X			
10	V	. : MEMBER : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		X		
11	R		DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"		X		

					Program Name	Yes	No		Comments
12	ON MENTAL FORCES	WAVE FORCES	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	DIFCARG DISMAR3		X		
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	DIFCARG DISMAR3 SEAOFF	X			It is calculated by DINDIF in frequency domain for large elements.
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X			"
16				COLUMN AND PONTOON	"	X			"
17				PONTOON AND PONTOON	"	X			"
18			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X			"
19				IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON	"	X			
20				DIFFRACTION AND FLUID FINITE ELEMENT	"		X		
21				OR ANY OTHER COMBINATION	"		X		
22			SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	DISMAR3 SEAOFF	X			Transmitted by DINDIF program.
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	X			

						Program Name	Yes	No	Comments
27				VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	DIFFARG DIFFAR3 SEAOFF	X		
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"	X		
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	SEAOFF	X		Based on model test results for tankers.
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	DIFFARG DIFFAR3 SEAOFF		X	
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	"		X	
32					IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"		X	
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"		X	
34				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"	X		The mass matrices relevant to large elements are directly
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS	"	3D		transmitted from DIFFDF
36				DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"	?		
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		Boss 82
39					IS THE CURRENT FRICTION DAMPING CONSIDERED	"	?		
40					IS THE RADIATION DAMPING CONSIDERED	"	X		The SEAOFF convolution method is used for frequency dependent
41					IS THE STRUCTURAL DAMPING CONSIDERED	SEAOFF	X		damping and added mass matrices.

						Program Name	Yes	No		Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	DIFCARG DISMAR3 SEAOFF	X			The damping matrices relevant to large elements
43				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	SEAOFF	X			are directly transmitted from DINTSIF.
44			XXX		IS THE STIFFNESS MATRIX COMPUTED	DIFCARG DISMAR3		X		Hydrostatic restoring is computed and mooring lines are
45	O F	D	XXX	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	DIFCARG DISMAR3 SEAOFF	X			fulfilled as input. see item 34
46		O	I		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	"	3D			
47		M	R R E G U L A R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
48	M O T I O N	A I N			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"	?			
49					IS THE CURRENT DRAG DAMPING CONSIDERED	"	X			
50					IS THE CURRENT FRICTION DAMPING CONSIDERED	"	?			
51					IS THE RADIATION DAMPING CONSIDERED	"	X			see item 40
52			W A V E S	COEFFICIENTS	IS THE STRUCTURAL DAMPING CONSIDERED	SEAOFF	X			
53	XXXXXX				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	DIFCARG DISMAR3 SEAOFF	X			see item 42
54		XXXX		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	SEAOFF	X			
55			XXX		IS THE STIFFNESS MATRIX COMPUTED	DIFCARG DISMAR3		X		see item 44
56	X	XX	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	DIFCARG DISMAR3 SEAOFF ?	X			

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	DIFCARG BISHAR3 SEAOFF			June 84
58				DAVENPORT	〃	X		June 84
59				SIMIU	〃		X	
60				OTHERS (SPECIFY)	〃		X	
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	〃		X	
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	〃	X		
63			WAVE THEORY	SIGNIFICANT WAVE HEIGHT	〃	X		
64				MEAN SPECTRAL PERIOD	〃	X		
65				WAVE SCATTER DIAGRAM	〃	X		
66				LINEAR WAVE	〃	X		
67				STRETCH LINEAR	〃		X	
68				STOKE'S 2ND, 3RD OR (5TH) ORDER .... PLEASE CIRCLE ...	〃	X		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN	〃		X	
70				STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND	〃		X	
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH	〃		X	

					Program Name	Yes	No	Comments
72			S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	DIFCARG DISMAR3 SEAOFF		X	
73			E	EXTENDED VELOCITY POTENTIAL	"		X	
74			S	CNOIDAL WAVE THEORY	"		X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	X		
76			E	ISSC	"		X	
77			A	JONSWAP	"	X		
78			S	BRETSCHNEIDER	"		X	
79		*	P	SCOTT	"		X	
80		*	E	OCHI (SIX PARAMETER)	"		X	
81		*	T	INPUT SPECTRA	"		X	
82		*	R	OTHERS	"		X	
83		*	A	DIRECTIONAL SPECTRA	"		X	
84		*	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X	
85		*		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X	
86		*	STA	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	DIFCARG	6		

DESCRIPTION

				Program Name	Yes	No	Comments
87	*	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	DIFCARG	?		
88	SOLUTION		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"		?	
89		DYNAMICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	DISMAR3 SEAOFF	6		
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?		
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"	?		
92			METHOD OF INTEGRATION USED .... HOUBOLT	"		X	
93			.... WILSON - θ	"		X	
94			.... NEWMARK - β	SEAOFF	X		
95	TECHNIQUE		OTHERS .... PLEASE SPECIFY	DISMAR3	X		Step by step integration of non linear motion equation (prediction - correction)
96		TIME DOMAIN	HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	DISMAR3 SEAOFF	X		
97			.... VARIABLE INTEGR-ATION TIME	"		X	
98			OTHERS .... PLEASE SPECIFY	"		X	
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"		X	
100	****		OTHERS .... PLEASE SPECIFY	"	X		Pivot method
101			PLATFORM MOTION TIME HISTORY	"	X		

			Program Name	Yes	No	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	HARMAN	X		
103		... R.M.S. VALUE	"	X		
104		... (SIGNIFICANT)1/3	"	X		
105		... EXPECTED MAXIMUM	"	X		
106		... OTHERS, SPECIFY	"	X		zero up-crossing period
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	"		X	
108	** **** PROGRAM VERIFICATION	MODEL TEST - INDICATE SCALE	DISMAR3 SEAOFF	X		1/55
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	SEAOFF		X	MOSS (NSTF)
110		OTHER PUBLISHED MATERIAL - SPECIFY	"		X	
111	** ****	OTHERS (SPECIFY)	"		X	
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)	ANCOR3 ANCOR4	X		
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X		
114		VERTICAL (TAUT) MOORING	"	X		
115	M	HYBRID/OTHER COMBINATION .... SPECIFY lumped buoy	"	X		
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X		

					Program Name	Yes	No	Comments
117		MATERIAL		CHAIN (STEEL)	ANCOR 3 ANCOR4	X		
118				WIRE ROPE (STEEL)	"	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"	X		
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		
121				IS IT BASED ON CATENARY EQUATION	"	X		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
123				OTHERS (SPECIFY)	"		X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	ANCOR3 / ANCOR4 → DISMAR3 / SEAOFF	X		
125				IS THE MASS OF THE MOORING CONSIDERED	DISMAR3 SEAOFF		X	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"		X	
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X		
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
129				IS MATERIAL NON LINEARITY CONSIDERED	"	X		
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	SEAOFF DISMAR3	X	X	
131				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

ORING SYSTEM

						Program Name	Yes	No	Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	DISMAR3 SEAOFF	X		
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
134					IS IT BASED ON FINITE DIFFERENCE METHOD	"		X	
135	C		MODEL	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	SEAOFF DISMAR3	X	X	Item 20
136	A				IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"		X	
137	P				IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL	"	X		
139	B				IS THE MOORING MODELLED AS THREE DIMENSIONAL	"		X	
140	I		XXXX		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)	"	X		
141	L				IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)	"	X		
142	I	MOORING			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	"	X		Directional spring
143	T				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"		X	
144	I				IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"		X	
145	E				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"			September 84
146	S		XX	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X		

				Program Name	Yes	No	Comments
147		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	DISMAR3 SEAOFF	X		
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	"	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	DISMAR3 HARTIAN	X		
150			... R.M.S. VALUE	"	X		
151			... (SIGNIFICANT)1/3	"	X		
152			... EXPECTED MAXIMUM	"	X		
153			... OTHERS, SPECIFY	X	X		Zero up-crossing period
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	ANCOR3 ANCOR4	X		Yes
155			WITH OTHER SOFTWARE - LIST PROGRAMS	"		X	
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		X	
157			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	DINTUB DWRSR	X		
158		STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL	"	X		
159	R		IS THE RISER MODEL THREE DIMENSIONAL	"	X		
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD	"	X		
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"		X	

				Program Name	Yes	No		Comments
162	R	MODEL *	DOES THE PROGRAM USE SMALL DEFLECTION THEORY	DINTUB DWRSR	X			
163		*	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"	X			
164		HYDRODYNAMIC	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	X			Item 1a
165	S		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	DWRSR	X			
166	Y		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"	X			
167	S	MODEL	IS THE RISER MODELLED AS TWO DIMENSIONAL	DINTUB DWRSR	X			
168	T		IS THE RISER MODELLED AS THREE DIMENSIONAL	"		X		
169	E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	"	X			
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS	X	X			
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	DWRSR	X			
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	"	?			
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	"	?			
174		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	DINTUB DWRSR		X		
175	*		WITH OTHER SOFTWARE - LIST PROGRAMS	"		X		
176	*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	X			A.P.I. publications

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING	FLOSTA NASTA	X		
178	STABILITY	INTACT	INTACT WITH VERTICAL TAUT TENDONS	"	X		
179	ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X		
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	"	X		
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	DIFFARC	X		
182	S	LOADING	IS INERTIA LOADING CONSIDERED	"	X		
183	T	LOADING	IS DYNAMIC LOADING CONSIDERED	"	X		
184	R U C	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
185	T	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
186	U R A L	* ***	BEAM ELEMENT	SAP5 NASTRAN	X		
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT	"	X		
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT	"	X		
189	A N	FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT	"	?		
190	A L	*** *	OTHERS .... SPECIFY	"		X	
191	Y S	*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"	?		

				Program Name	Yes	No	Comments
192	S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	SAP5 NASTRAN	X		
193			MODAL ANALYSIS	"	X		
194			FATIGUE LIFE ANALYSIS	VIFAN3	X		
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	PLOT2, PROSP, MENTAT	X		
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	NASTRAN	X		
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	As for item 195	X		
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	NAISC3, NAISCH, PUNSHE, DNV77	X		Aisc code for T.L. API code for Hyd. coll. and P.S. DNV for P.S.
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE ?? FORTRAN (ASCII) SPECIFY THE VERSION		X		
200			.... BASIC			X	
201			.... PASCAL			X	
202			.... OTHERS SPECIFY			X	
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE	For the mentioned programs	X		
205			IS THEORETICAL MANUAL AVAILABLE	"	X		
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X		

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	"	X		
208	** ****	IBM	"		X	
209		CDC	"		X	
210	HARDWARE SYSTEM	PRIME COMPUTER	"		X	
211		VAX	"		X	
212	**** **	MICRO .... SPECIFY	"		X	
213		OTHERS .... SPECIFY SPERRY O.S. EXEC 8	"	X		
214	** ****	LEASE (PRICE $ .00)	"	X		Apart Nasbaw
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	"		X	
216		CONSULTANCY BASIS	"	X		
217	** ****	OTHERS .... SPECIFY	"		X	
218	REMARKS AND NOTES					
219						
220						

PMB SYSTEMS ENGINEERING INC.

TIME DOMAIN USING MORISON'S EQUAITION

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	INTRA -WACS2		✓		
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			✓		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM		✓			As user-input nodal loads.
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED		✓			surface current modifies wave length. Current, wave kinematics added vectorially
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES			✓		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM			✓		
7		. : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		✓			
8	E	. : MEMBER	VERTICAL MEMBER		✓			
9	N V I R	. : ORIENTATION	HORIZ. MEMBER		✓			
10		. BE : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION			✓		circular, rectangular and non-cylindrical elements are possible
11		. R :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION			✓		

					Program Name	Yes	No	Comments
12	ONMENTAL WAVE FORCES	: : SECTION		OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	INTRA -WACS 2		✓	
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		✓		
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY			✓	Axial forces are from dynamic pressures
15			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN			✓	
16				COLUMN AND PONTOON			✓	
17				PONTOON AND PONTOON			✓	
18			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION		✓		either, optionally
19				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY		✓		
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT		✓		
21				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION			✓	
22			DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION		✓		
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY			✓	
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY		✓		Kinematics are evaluated at displaced position of body.
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY		✓		"
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			✓	

						Program Name	Yes	No		Comments
27		S		VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		✓			
28			ORDER		DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL		✓			wave & current kinematics are added explicitly.
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			✓		
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE		✓			
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION		✓	✓		during iteration, this is updated, if requested
32					IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM			✓		
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE		✓			
34				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			✓		computed by program both axially and transversely (vanes with submergered)
35					CIRCLE / COMPUTING METHOD : 2D, 3D, ARBITRARY SHAPE), OTHERS					
36			REGULAR WAVE	DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			✓		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			✓		
38	EQUAT	T			IS THE CURRENT DRAG DAMPING CONSIDERED			✓		
39		I			IS THE CURRENT FRICTION DAMPING CONSIDERED			✓		
40					IS THE RADIATION DAMPING CONSIDERED		✓			
41		M			IS THE STRUCTURAL DAMPING CONSIDERED		✓			

						Program Name	Yes	No	Comments
42	I O N	E D M A I N	VES * * *	TS STIFFNS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			✓	damping can be stiffness-or mass - proportional
43					IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			✓	
44					IS THE STIFFNESS MATRIX COMPUTED		✓		
45	U F O T I O N		* * * I R R E G U L A R W A V E S	ADDMASS DAMPING COEFFICIENTS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			✓	computed by program, axially and transversely
46					CIRCLE / COMPUTING METHOD : 2D, 3D (ARBITRARY SHAPE), OTHERS				varies with submergence
47					IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			✓	
48					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			✓	
49					IS THE CURRENT DRAG DAMPING CONSIDERED			✓	
50					IS THE CURRENT FRICTION DAMPING CONSIDERED			✓	
51					IS THE RADIATION DAMPING CONSIDERED		✓		
52					IS THE STRUCTURAL DAMPING CONSIDERED		✓		
53	* * * * *				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			✓	mass - or stiffness - proportional damping used
54		* * * *	* * *	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			✓	
55					IS THE STIFFNESS MATRIX COMPUTED		✓		
56	*	* *	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			✓	

					Program Name	Yes	No	Comments
57	* * *	W I N D	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			✓	
58				DAVENPORT			✓	
59				SIMIU			✓	
60	E	* *		OTHERS (SPECIFY)			✓	
61	N V I R O N M E N T A L		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			✓	
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE		✓		
63		* *	WAVE	SIGNIFICANT WAVE HEIGHT			✓	
64		* *		MEAN SPECTRAL PERIOD			✓	
65		* *		WAVE SCATTER DIAGRAM			✓	
66		* *		LINEAR WAVE		✓		
67				STRETCH LINEAR		✓		
68				STOKE'S 2ND, 3RD OR (5TH) ORDER .... PLEASE CIRCLE ...		✓		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN			✓	
70		W	THEORIE	STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND			✓	
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH			✓	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY		✓		Multi-linear current (similar to Dalrymple) being added now
73		E	.	EXTENDED VELOCITY POTENTIAL			✓	
74		S	.	CNOIDAL WAVE THEORY			✓	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			✓	
76	D		E	ISSC			✓	
77	E		A	JONSWAP			✓	
78	S		S	BRETSCHNEIDER			✓	
79	C	*	P	SCOTT			✓	
80	R	*	E	OCHI (SIX PARAMETER)			✓	
81	I	*	C	INPUT SPECTRA			✓	
82	P	*	T	OTHERS			✓	
83	T	*	R	DIRECTIONAL SPECTRA			✓	
84	I	*	A	DOES IT CONSIDER EARTH QUAKE SPECTRA		✓		
85	O	*		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE		✓		MWL can be varied.
86	N	*	STA	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY				Any nodes can be slaved to follow a master to a rigid body

				Program Name	Yes	No		specified comments
87	*	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY					all dof's coupled to master node dof's.
88	SOLUTION		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM					UNLIMITED
89		DYNAMICS TIME DOMAIN	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY					as for dynamic
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY					as for dynamic
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM					UNLIMITED
92			METHOD OF INTEGRATION USED .... HOUBOLT			✓		
93			.... WILSON - θ			✓		
94			.... NEWMARK - β		✓			
95	TECHNIQUE		OTHERS .... PLEASE SPECIFY			✓		
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION					
97			.... VARIABLE INTEGR-ATION TIME					
98			OTHERS .... PLEASE SPECIFY		✓			RAMP DAMPING COEF. *
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION		✓			
100	****		OTHERS .... PLEASE SPECIFY			✓		
101			PLATFORM MOTION TIME HISTORY		✓			

			Program Name	Yes	No		Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE			✓		
103		... R.M.S. VALUE			✓		
104		... (SIGNIFICANT)1/3			✓		
105		... EXPECTED MAXIMUM			✓		
106		... OTHERS, SPECIFY		✓			SPECTRAL CURVES, ENVELOPE VALUES
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS			✓		
108	** **** PROGRAM VERIFICATION	MODEL TEST - INDICATE SCALE			✓		
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS			✓		
110		OTHER PUBLISHED MATERIAL - SPECIFY		✓			
111	** ****	OTHERS (SPECIFY)			✓		Mainly hand calculations.
112	**** MO DESCRIPTION	SPREAD MOORING (CATENARY)		✓			Moorings can be modelled by large deflection truss or beam elements, explicitly.
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT		✓			
114		VERTICAL (TAUT) MOORING		✓			
115		HYBRID/OTHER COMBINATION .... SPECIFY			✓		
116		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR		✓			MATERIAL PROPERTIES CAN BE SPECIFIED BY TH SER

					Program Name	Yes	No	Comments
117	ORING SYSTEM	MATERIAL		CHAIN (STEEL)		✓		
118				WIRE ROPE (STEEL)		✓		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY		✓		
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE		✓		non-linear elements can model this
121				IS IT BASED ON CATENARY EQUATION			✓	can model as non-linear beam or truss elements explicitly
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE		✓		
123				OTHERS (SPECIFY)		✓		
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		✓		
125				IS THE MASS OF THE MOORING CONSIDERED		✓		
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING			✓	although it could be
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING		✓		explicit modelling
128				IS GEOMETRIC NON LINEARITY CONSIDERED		✓		of mooring is available
129				IS MATERIAL NON LINEARITY CONSIDERED		✓		
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED		✓		
131				IS THE STRUCTURAL DAMPING CONSIDERED		✓		

					Program Name	Yes	No	Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	✓		
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	✓		
134					IS IT BASED ON FINITE DIFFERENCE METHOD		✓	
135	C		M	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	✓		MODIFIED WITH RESULTS FROM ANALYSES WITH DIFFRACTION THEO
136	A		O		IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER		✓	
137	P		D		IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING		✓	
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL	✓		
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL	✓		
140	I		*		IS THE MOORING MODEL TWO DIMENSIONAL	✓		
141	L		*		IS THE MOORING MODEL THREE DIMENSIONAL	✓		
142	I	M	*		IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	✓		If desired
143	T	O	*		IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING	✓		"
144	I	O	*		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES	✓		
145	E	R	*		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	✓		ASSOCIATED WITH "FATPRO" which post processes results from INTRA WACS 2
146	S	I	*	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	✓		
		N	*					
		G	*					

				Program Name	Yes	No	Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING		✓		
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY		✓		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE			✓	
150			... R.M.S. VALUE			✓	
151			... (SIGNIFICANT)1/3			✓	
152			... EXPECTED MAXIMUM			✓	
153			... OTHERS, SPECIFY		✓		SPECTRAL CURVES, ENVELOPE VALUES
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			✓	
155	* * * *		WITH OTHER SOFTWARE - LIST PROGRAMS				hand computations mainly.
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
157	* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES		✓		
158		* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL		✓		
159	R		IS THE RISER MODEL THREE DIMENSIONAL		✓		
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD		✓		
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			✓	

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY		✓		
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY		✓		
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		✓		basic + structural motion and current velocity
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			✓	
166	S Y		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			✓	
167	S		IS THE RISER MODELLED AS TWO DIMENSIONAL		✓		
168	T		IS THE RISER MODELLED AS THREE DIMENSIONAL		✓		
169	E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM		✓		A MOTION RECORD CAN BE INPUT BY THE USER TO BE APPLIED AT THE STRUCTURE
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS		✓		
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS		✓		
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END		✓		
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE		✓		
174			WITH MODEL TESTS - INDICATE SCALE			✓	
175		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING		✓		CAN SPECIFY THE MODEL EXPLICITLY, + CHECK FOR STABILITY AS DYNAMIC ANALYSIS
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS		✓		=
179		DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED		✓		=
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING		✓		=
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED		✓		
182		LOADING	IS INERTIA LOADING CONSIDERED		✓		
183	STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED		✓		
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS		✓		
185		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS		✓		
186		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT		✓		LINEAR, NONLINEAR, LARGE OR SMALL DISPLACEMENT.
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT			✓	
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT		✓		2-D PLANE STRESS ELEMENT
189		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT			✓	
190		*** * FINITE ELEMENT ANALYSIS	OTHERS .... SPECIFY		✓		TRUSS, STRUT, CABLE, SOIL (linear, non-linear geom and materials)
191		*** * FINITE ELEMENT ANALYSIS	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM		✓		6 ~ 12 DOF FOR DIFFERENT ELEMENT TYPES UNLIMITED.

			Program Name	Yes	No	Comments
192	I S	SPECTRAL ANALYSIS			✓	
193	OTHER ANALYTICAL CAPABILITY	MODAL ANALYSIS		✓		RESPONSE SPECTRAL ANALYSIS TIME HISTORY ALSO
194		FATIGUE LIFE ANALYSIS		✓		WITH "FATPRO" (COMPATIBLE POST-PROCESSOR)
195	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)			✓	
196		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		✓		Can continue dynamic analyses from restart
197		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		✓		plots undeformed deformed structure, response history, response spectra etc
198		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)				various, under development.
199	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (IV) SPECIFY THE VERSION		✓		
200		.... BASIC			✓	
201		.... PASCAL			✓	
202		.... OTHERS SPECIFY			✓	
203		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU		✓		
204	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		✓		PROPRIETORY
205		IS THEORETICAL MANUAL AVAILABLE		✓		
206	SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		✓		

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED		✓		
208	** ****	IBM		✓		
209		CDC		✓		
210	HARDWARE SYSTEM	PRIME COMPUTER			✓	
211		VAX			✓	
212	**** **	MICRO .... SPECIFY			✓	
213	'	OTHERS .... SPECIFY CRAY		✓		
214	** ****	LEASE (PRICE $ .00)			✓	LICENSEE MUST ALREADY HAVE A LICENSE TO THE BASIC INTRA PROGRAM FROM SHELL OIL CO
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ 5000 .00)		✓		
216		CONSULTANCY BASIS			✓	
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					See attached comments
219						
220						

Further Comments

WACS 2.1 is a wave loading module for the program INTRA. It was specifically written for TLP analysis, under diretion from C.O.F.R.C. It uses Morison's equation axially and transversely on members but the kinematics are modified to recognize the effects of the member diameter being not small relative to the wavelength of the wave

Tendons, risers and moorings systems can be modelled by large displacement beam or truss systems (or by equivalent non-linear springs). Drawdown effects are included, if desired.

Fatigue life can be estimated from a specteral procedure using program FATPRO which uses envelope values of members forces from INTRA, user-specified stress concentration factors and wave climate defined by the user.

J.R. PAULLING INC.

FREQUENCY DOMAIN USING MORISON'S EQUAITION

J. R. PAULLING, INC.

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	EUREKA	X			EUREKA IS A PURELY HYDROSTATIC PROGRAM
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		FOR INTACT AND DAMAGED STABILITY
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM	SPLASH D	X			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"	X	X		CURRENT FORCE CALCULATION IS NOT DESCRIBED IN THE MANUAL IT IS AVAIL. IN
5			CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES			X		LATEST VERSION OF PROG
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM		X			
7		: : ORIENTATION :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	SPLASH D	X			
8	E	: : : MEMBER :	VERTICAL MEMBER	"	X			
9	N	: : : MEMBER :	HORIZ. MEMBER	"	X			
10	V	: : : BEER : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"				EQUIV. ELLIPTICAL CROSS SECTION
11	I R		DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"	X			

						Program Name	Yes	No		Comments
12	ONMENTAL FORCES	WAVE FORCES	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	SPLASHD		?		
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY	"		?		
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		SPLASH ACCEPTS COEFFS. FROM 2-D OR 3-D
16					COLUMN AND PONTOON	"		X		SOURCE PROGRAM TO INCLUDE THESE EFFECTS
17					PONTOON AND PONTOON	"		X		↓
18			FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		X		
19					IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY	"	X			
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	X			
21					IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"				
22			SECO	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			SEE ↑ ABOVE
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	?			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	?			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		?		↓

No.					Question	Program Name	Yes	No	Comments
27	* *	: :	N D	VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	SPLASHD	?	X	
28	* *	: :			DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"		X	
29	*	: :			IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"	X		
30		: :	ORDER		IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	X		
31		: :		FORCES	DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	"	2D		
32		: :			IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	"	?		DEFAULTS BUILT IN
33		: :			DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"		?	USER MAY OVERRIDE
34	* * * *		F	ADDED MASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	MATRICES ARE COMPUTED BY PROGRAM
35			R E		CIRCLE / COMPUTING METHOD : (2D) 3D(ARBITRARY SHAPE); OTHERS	"	2D		
36	EQUATION		Q U	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		ALL CAN BE INCLUDED
37			E N		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"	X		↓
38			C Y		IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		↓
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED	"	X		↓
40					IS THE RADIATION DAMPING CONSIDERED	"	X		↓
41	MOT.		D O		IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

					Program Name	Yes	No	Comments
42	ION ****	MAIN	STIFFNS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	SPLASHD		X	
43				IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
44				IS THE STIFFNESS MATRIX COMPUTED	"	X		
45	ENVIRONMENTAL **	WIND **	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	EUREKA	X		
46	*		DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	"		?	NO MENTION ABOUT WIND SPECTRA
47	*			DAVENPORT	"		?	EUREKA IS STATIC
48				SIMIU	"		?	
49		**		OTHERS (SPECIFY)	"		?	
50		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	SPLASHD ?	X		
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	?		X	
52		**	STATISTICS	SIGNIFICANT WAVE HEIGHT	SPLASHD	X		
53		**		MEAN SPECTRAL PERIOD	"	X		
54		**		WAVE SCATTER DIAGRAM	"			
55		*	...	LINEAR WAVE				
56				STRETCH LINEAR		?	X	

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...		X	PROGRAM USES CONSISTENT LINEAR WAVE THEORY.
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN		X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND		X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH		X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY		X	
62		V		EXTENDED VELOCITY POTENTIAL		X	
63		E		CNOIDAL WAVE THEORY		X	
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	SPLASHD	X	
65	D			ISSC	1	X	
66	E			JONSWAP	1	X	
67	S			BRETSCHNEIDER	1	X	
68	C			SCOTT	1	X	
69	R	*		OCHI (SIX PARAMETER)	4	X	
70	I	*		INPUT SPECTRA	1	X	
71	P	*		OTHERS	4	?	
	T	*					
	I	*					
	O	*					
	N						
		*					

				Program Name	Yes	No		Comments
72	* *	* *	A	DIRECTIONAL SPECTRA	SPLASHD	X		
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA	?		X	
74	* *	OTHERS		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?		X	
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	SPLASHD	six		
76	SOLUTION TECHNIQUE	STATICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	〃	?		SIX - COUPLED DOF
77	SOLUTION TECHNIQUE	STATICS		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	〃	?		
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	〃	six		
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	〃	?		
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY	〃	?		LEAST SQUARES ERROR MINIMIZATION
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	〃	?		GAUSS - JORDAN REDUCTION
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY	〃	?		
83				MEAN OFFSET OF THE PLATFORM	〃	X		
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	〃	X		
85	* *** ***** *******			PLATFORM MOTION RESPONSE SPECTRA	〃	X		
86	PLATFORM RESPONSE OUTPUT			RESPONSE STATISTICS .. MEAN VALUE	〃	Y		

			Program Name	Yes	No		Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	SPLASH	?			
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3	〃	X			
89		RESPONSE STATISTICS .. OTHERS; SPECIFY	〃	?			
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	〃				
91	** ****	MODEL TEST - INDICATE SCALE	〃	X			* PROPRIETORY INFO
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	〃	?			
93		OTHER PUBLISHED MATERIAL - SPECIFY	〃	?			
94	**** **	OTHERS (SPECIFY)	〃	?			
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)	〃	X			
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	〃		X		
97		VERTICAL (TAUT) MOORING	〃	X			
98		HYBRID/OTHER COMBINATION .... SPECIFY	〃	SLANTED TAUT			
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	〃		X		
100	M	CHAIN (STEEL)	〃	X			
101	O MATERIA	WIRE ROPE (STEEL)	〃	X			

					Program Name	Yes	No		Comments
102	MOORING SYSTEM	LOADS		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	SPLASHD	?			
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	//	?	X		
104				IS IT BASED ON CATENARY EQUATION	//	X			
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE	//	?	X		
106				OTHERS (SPECIFY)	//	?			
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	//		X		
108			VERTICAL MODOR	IS THE MASS OF THE MOORING CONSIDERED	//		X		
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	//	X			
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	//		X		
111				IS GEOMETRIC NON LINEARITY CONSIDERED	//	?			
112				IS MATERIAL NON LINEARITY CONSIDERED	//		X		
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	//		X		
114				IS THE STRUCTURAL DAMPING CONSIDERED	//		X		
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	//		X		
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE	//		?		

						Program Name	Yes	No		Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD	SPLASH D		?		
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	//	X			BASIC
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	//	?			
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	//		X		
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D	//	X			
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D	//		X		
123	C	M	D		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCTL)	//	X			
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCTL)	//	X			
125	P	R	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	//	X			
126	A	I			IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	//	?			
127	B	N			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	//		X		
128	I	G			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	//	?			
129	T		DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	//		X		
130	I	* ** *	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	//		X		
131	E S	** ****			MEAN LOAD OF THE MOORING LINE	//	X			

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	SPLASHD	X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	"	?			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	"	X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	"	?			
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE	"	?			
137	* * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS	"	?			
138	*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	?			
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	?	?			No mention about RISER PROGRAM MLTPIP
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL	MLTPIP		X		MODELS RISER OR TLP TENDONS
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL	"	X			
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD	"	X			
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"		X		
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY	"	X			
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"		X		
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		?			

				Program Name	Yes	No		Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	MLTPIP	X			
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"	X			
149			IS THE RISER HYDRODYNAMIC MODEL 2D	"		X		
150			IS THE RISER HYDRODYNAMIC MODEL 3D	"	X			
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	"	X			
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS	"	X			
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	"	X			
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	"	X			
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	"	X			
156			WITH MODEL TESTS - INDICATE SCALE	"	X			
157	* * * * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	"	X			
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	X			AT SEA TESTS
159	* ***	INTACT	INTACT FREE FLOATING	EUREKA	X			
160	STABILITY ANALYSIS		INTACT WITH VERTICAL TAUT TENDONS	"	?			
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X			

				Program Name	Yes	No		Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	EUREKA	?			
163	* * * *		HYDRODYNAMIC LOADING CONSIDERED	SPLASH/STRAN	X			NO INFORMATION RELATED TO STRUCTURAL ANALYSIS
164		LOADING	IS INERTIA LOADING CONSIDERED	"	X			
165	S T R U C T U R A L A N A L Y S I S		IS DYNAMIC LOADING CONSIDERED	"	X			
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"	X			
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X			
168		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT	"	X			
169			SHELL ELEMENT	"		X		
170			PLATE ELEMENT	"	X			
171			STIFFENED PLATE ELEMENT	"	X			
172		*** *	OTHERS .... SPECIFY	"				
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"				
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	"	X			
175			MODAL ANALYSIS	"		X		
176	* *		FATIGUE LIFE ANALYSIS	"	X			

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)					
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)					
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)					
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)					
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (~~IV~~) SPECIFY THE VERSION	SPLASH	X			
182		.... BASIC	〃		X		
183		.... PASCAL	〃		X		
184		.... OTHERS; SPECIFY	〃		X		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	4	?			VARIES WITH MACHINE TYP. $10 TO $20 CY176.
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	〃	X			FOR NORMAL PLATFORM AND WAVES
187		IS THEORETICAL MANUAL AVAILABLE	〃	X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	〃				
189		IS ANY TRAINING OFFERED	〃	?			CONSULTING BASIS.
190	** ****	IBM	〃				
191		CDC	〃				

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	SPLASHD	X			
193		VAX		X			
194		MICRO .. SPECIFY					A CP/M VERSION OF EUREKA IS IN SERVICE
195	**** **	OTHERS .... SPECIFY					HONEYWELL UNIVAC
196	** ****	LEASE (PRICE $ .00)	SPLASHD	X			
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $2500.00)	"	X			
198		CONSULTANCY BASIS	"	X			
199	**** **	OTHERS .... SPECIFY		?			
200	REMARKS AND NOTES						SEE LETTER
201							
202							

J.R. PAULLING INC.

TIME DOMAIN USING MORISON'S EQUAITION

J. R. PAULLING, INC.

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	EUREKA	X			
	*							
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"		X		
	*							
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	"	?			WIND OR OTHER EXTERNAL FORCE MAY BE INPUT TO TDSIM6
	*							
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	TDSIM6	X			
	*							
5			CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES	"		X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"		X		
7		. : MEMBER ORIENTATION :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
8	E	. : MEMBER ORIENTATION :	VERTICAL MEMBER	"	X			
9	N V	. : MEMBER ORIENTATION :	HORIZ. MEMBER	"	X			
10	I	. : MEMBER X-SECT :	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"	X			
11	R	. : MEMBER X-SECT :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"	X			

					Program Name	Yes	No		Comments
12	O N		: :	I O N	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	TDSIM6		?		
13	M				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14	E	W			ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"		?		
15	H T	A V			IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		
16	A	E	MEMBER INTER-ACTION		COLUMN AND PONTOON	"		X		
17	L				PONTOON AND PONTOON	"		X		
18			F I R S T O R D E R		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		X		
19					IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	"		X		
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	X			
21	F	F			IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X		
22	O R	O R	. . . .	D R I F T	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23	C	C			DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		X		
24	E	E	S	F O R C E S	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"		X		
25	S	S	E C		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"		X		
26			O N		DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X		

						Program Name	Yes	No	Comments
27	x	S	O R D E R	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	TDSIM6	?		
28	x				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	//	X		
29	x				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	//	X		
30	x				IS ITERATION OF RESPONSE USED FOR CONVERGENCE	//		X	
31	x				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	//		X	
32	x				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	//		X	
33	x				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	//		X	
34	x	x	x	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	//		X	
35	x	x	x		CIRCLE / COMPUTING METHOD : ~~2D~~,3D(ARBITRARY SHAPE), ~~OTHERS~~	//	2D		OPTION EXISTS TO INPUT THE HYDRODYNAMIC COEFF
36	x	x	x	DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	//	X		
37	x	x	x		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	//		?	
38	E	T	R		IS THE CURRENT DRAG DAMPING CONSIDERED	//	X		
39	Q	I			IS THE CURRENT FRICTION DAMPING CONSIDERED	//		X	
40	U	M	W		IS THE RADIATION DAMPING CONSIDERED	//		X	
41	A T		A		IS THE STRUCTURAL DAMPING CONSIDERED	//		X	

						Program Name	Yes	No	Comments
42	I O N	E	VES	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	TDSIM6		X	ALL MATRICES ARE COMPUTED WITHIN PROGRAM
43			xxx	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	〃		X	
44					IS THE STIFFNESS MATRIX COMPUTED	〃	X		
45	O F	D	xxx	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	〃		X	OPTION TO INPUT HYDRODYNAMIC COEFFICIENTS EXISTS
46		O	I		CIRCLE / COMPUTING METHOD ; ~~2D~~, 3D(ARBITRARY SHAPE), OTHERS	〃	2D		
47		M	R	DAMPING COEFFICIENTS	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	〃	X		
48	M	,	REGULAR WAVES		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	〃		X	
49	O T I O N	A			IS THE CURRENT DRAG DAMPING CONSIDERED	〃	X		
50		I			IS THE CURRENT FRICTION DAMPING CONSIDERED	〃		X	
51		N			IS THE RADIATION DAMPING CONSIDERED	〃		X	
52					IS THE STRUCTURAL DAMPING CONSIDERED	〃		X	
53	xxxxxx				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	〃		X	
54		xxxx		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	〃		X	
55			xxx		IS THE STIFFNESS MATRIX COMPUTED	〃	X		
56	x	xx	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	〃		X	

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	TDSIMG			NOTHING MENTIONED ABOUT WIND SPECTRA
58				DAVENPORT	〃			EXTERNAL FORCE CAN BE INPUT
59				SIMIU	〃			
60				OTHERS (SPECIFY)	〃			
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	〃	?		
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	〃	?		
63		WAVE THEORIES		SIGNIFICANT WAVE HEIGHT	〃	X		
64				MEAN SPECTRAL PERIOD	〃	X		
65				WAVE SCATTER DIAGRAM	〃		?	
66				LINEAR WAVE	〃			
67				STRETCH LINEAR	〃			
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	〃	?	X	WAVE INPUT IS MODULAR ANY OF THESE THEORIES
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN	〃	?	X	MAY BE EASILY ADDED.
70				STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND	〃	?	X	
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH	〃	?	X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	TDSIM6	?	X	
73		E	.	EXTENDED VELOCITY POTENTIAL	〃	?	X	
74		S	.	CNOIDAL WAVE THEORY	〃	?	X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	〃	X		SPECTRUM IS NOT INPUT
76	D		E	ISSC	〃	X		RANDOM WAVE TRAIN IS SYNTHESIZED BY A SERIES OF COMPONENT
77	E		A	JONSWAP	〃	X		ELEMENTARY WAVES.
78	S		S	BRETSCHNEIDER	〃	X		
79	C	x	P	SCOTT	〃	X		
80	R	x	E	OCHI (SIX PARAMETER)	〃	X		
81	I	x	C	INPUT SPECTRA	〃	X		
82	P	x	T	OTHERS	〃	?		
83	T	x	R	DIRECTIONAL SPECTRA	〃	X	↓	EACH COMPONENT CAN HAVE AN INDEPENDENT DIRECTION
84	I	x	A	DOES IT CONSIDER EARTH QUAKE SPECTRA	?	?	X	
85	O	x		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO. TIDE	?	?	X	
86	N	x	STA	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	〃	SIX		

				Program Name	Yes	No		Comments
87	*	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	TDSIM6	7			6 COUPLED DOF
88	SOLUTION		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	4	7			
89			NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	11	SIX			
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	4	7			ALL RIGID BODY
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	11	2			
92		DYNAMICS	METHOD OF INTEGRATION USED .... HOUBOLT	11				
93			.... WILSON - θ	4				
94			.... NEWMARK - β	4				
95	TECHNIQUE		OTHERS .... PLEASE SPECIFY	4				RUNGE-KUTTA 4TH ORDER NUMERICAL INTEGRATION SCHEME W/ CONST TIME STEP
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	11	7			COSINE RAMP
97			.... VARIABLE INTEGR-ATION TIME	4	7			
98			OTHERS .... PLEASE SPECIFY	4	7			
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	4	7			
100	****		OTHERS .... PLEASE SPECIFY	4	7			
101		TIME DOMAIN	PLATFORM MOTION TIME HISTORY	4	X			

				Program Name	Yes	No		Comments
102			PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	TDSIM6	X			TIME HISTORY IS PRODUCED WHICH CAN BE PROCESSED BY STANDARD TIME SERIES METHODS AND/OR PLOTTED.
103			... R.M.S. VALUE	〃	?			
104	PLATFORM RESPONSE OUTPUT		... (SIGNIFICANT)1/3	〃	?			
105			... EXPECTED MAXIMUM	〃	?			
106			... OTHERS, SPECIFY	〃	?			
107			CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	〃		X		
108	** ****		MODEL TEST - INDICATE SCALE	〃	X			PROPRIETORY
109	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	〃	?			
110			OTHER PUBLISHED MATERIAL - SPECIFY	〃	?			
111	** ****		OTHERS (SPECIFY)	〃	?			
112	* * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	〃	X			MOORING INPUT IS MODULAR AND CAN BE EASILY CUSTOMIZED TO MODEL, E.G., DYNAMIC POSITIONING
113			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	〃		X		
114			VERTICAL (TAUT) MOORING	〃	X			
115	M		HYBRID/OTHER COMBINATION .... SPECIFY	〃	SLANTED TAUT			
116	O		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	〃		X		

					Program Name	Yes	No	Comments
117	ORING SYSTEM	MATERIAL		CHAIN (STEEL)	TDSIM6	X		
118				WIRE ROPE (STEEL)	"	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"		X	
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"		?	
121				IS IT BASED ON CATENARY EQUATION	"	X		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
123				OTHERS (SPECIFY)	"		X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X	
125				IS THE MASS OF THE MOORING CONSIDERED	"		X	ONE PROPRIETARY VERSION HAS BEEN
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		PRODUCED HAVING FULL DYNAMIC
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	?		MOORING/RISER CAPABILITY
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"		X	
129				IS MATERIAL NON LINEARITY CONSIDERED	"		X	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	
131				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Program Name	Yes	No	Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	TDSIM6		X	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	〃		X	
134					IS IT BASED ON FINITE DIFFERENCE METHOD	〃		X	
135	C		MODEL	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	〃	X		BASIC
136	A				IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	〃	?		
137	P				IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	〃		X	
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL	〃	X		
139	B		*		IS THE MOORING MODELLED AS THREE DIMENSIONAL	〃	X		
140	I		* * *		IS THE MOORING MODEL (STRUCTL) TWO DIMENSIONAL	〃	X		
141	L		*		IS THE MOORING MODEL (STRUCTL) THREE DIMENSIONAL	〃	X		
142	I	M			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	〃	X		
143	T	O			IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	〃	?		
144	I	R			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	〃		X	
145	E	I			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	〃		?	
146	S	NG	DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	〃		X	

				Program Name	Yes	No	Comments
147		INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	TDSIM6		X	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	〃	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	〃	?		
150			... R.M.S. VALUE	〃	?		
151			... (SIGNIFICANT)1/3	〃	?		
152			... EXPECTED MAXIMUM	〃	?		
153			... OTHERS, SPECIFY	〃	?		
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	〃	X		PROPRIETORY INFO
155			WITH OTHER SOFTWARE - LIST PROGRAMS	〃	?		
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	〃	?		
157			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	〃		?	NO MENTION ABOUT RISER
158		STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL	〃			
159	R		IS THE RISER MODEL THREE DIMENSIONAL				
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD				
161	S		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				
	E						

				Program Name	Yes	No	comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		*	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING	EUREKA	X		
178	STABILITY	INTACT	INTACT WITH VERTICAL TAUT TENDONS	↓	?		
179	ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	↓	X		
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	↓	?		
181	***		HYDRODYNAMIC LOADING CONSIDERED				NO INFORMATION ABOUT STRUCTURAL ANALYSIS
182	***	LOADING	IS INERTIA LOADING CONSIDERED				STRUCT. LOADS MAY BE O/P BY TDSIMG
183	S		IS DYNAMIC LOADING CONSIDERED				
184	T R U C T U R A L A N A L Y S	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186	* ***	FINITE ELEMENT ANALYSIS	BEAM ELEMENT				
187			SHELL ELEMENT				
188			PLATE ELEMENT				
189			STIFFENED PLATE ELEMENT				
190	*** *		OTHERS .... SPECIFY				
191	*** *		NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

				Program Name	Yes	No	Comments
192	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
193			MODAL ANALYSIS				
194			FATIGUE LIFE ANALYSIS				
195	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES		VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	?	?		
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		?		
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		?		
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)		?		
199	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON		PROGRAMMING LANGUAGE .. FORTRAN (~~IV~~) SPECIFY THE VERSION	TDSIMG	X		
200			.... BASIC			X	
201			.... PASCAL			X	
202			.... OTHERS SPECIFY			X	
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU		?		
204	DOCUMENTATION		IS USERS' GUIDE AVAILABLE	?	X		
205			IS THEORETICAL MANUAL AVAILABLE	?	X		
206	SUPPORT		ARE THE PROGRAMS SUPPORTED AND MAINTAINED	?	X		

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	TDS1M6	X		
208	** ****	IBM		X		
209		CDC		X		
210	HARDWARE SYSTEM	PRIME COMPUTER		X		
211		VAX		X		
212	**** **	MICRO .... SPECIFY				
213		OTHERS .... SPECIFY				HONEYWELL UNIVAC
214	** ****	LEASE (PRICE $ .00)		X		
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ 20000.00)		X		
216		CONSULTANCY BASIS		X		
217	** ****	OTHERS .... SPECIFY		X		
218	REMARKS AND NOTES					
219						
220						

SCIENCE APPLICATIONS INC.

FREQUENCY DOMAIN USING DIFFRACTION THEORY

This program is applicable to any plat form configuration (only frequency domain computations).

TABLE II

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

SCIENCE APPLICATIONS, INC.
* SAI Hybrid-Finite-Element Method
* THERE IS NO NAME (HFEM)
THE PROGRAM. COMPANY NAME HAS BEEN ENTERED IN THE SPACE FOR PROGRAM NAME.

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	?		X		No reference to wind force calculation
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	?		X	Note that current & wind are included in the time domain & therefore not in the frequency domain.	
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	?		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	?		X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	?		X		
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	?		X		
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	* SAI (?)	X			
8	E	. : : MEMBER	VERTICAL MEMBER	h	X			
9	N	. E M	HORIZ. MEMBER	i	X			
10	V	. B E	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	k	X			
11	I R	. R : X-SECT	DOES IT USE EQUIVALENT CIRCULAR X-SECTION	k		X		

				Program Name	Yes	No	Comments
12			IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	SAI	X		
13			IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X		
14			ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X		
15		MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X		
16			COLUMN AND PONTOON	"	X		
17			PONTOON AND PONTOON	"	X		
18		FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X		3D- HYBRID FINTIE ELEMENT METHOD Yes!
19			IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON	"	X		
20			DIFFRACTION & FLUID FINITE ELEMENT	"		X	
21			OR ANY OTHER COMBINATION, PLEASE SPECIFY	"		X	
22		SECOND ORDER DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X		
23			DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X		
24			DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X		
25			DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X		
26			DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	✓		

UNENTAL FORCES — WAVE FORCES — I/O

						Program Name	Yes	No		Comments
27	*****	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		SAI	X			
28				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY		"	~~X~~	X		
29				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT		"		X		This is included in our time domain program
30				IS ITERATION OF RESPONSE USED FOR CONVERGENCE		"	?	X		These questions are
31				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION		"	?	X		not aplicable to
32				IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM		"	?	X		the frequency domain
33				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE		"	?	X		computations
34	*****	FREQUENCY	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM		"		X		
35				CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS		"	3D			
36	EQUATION		DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		"	X			
37				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED		"		X		Yes in the time domain program
38				IS THE CURRENT DRAG DAMPING CONSIDERED		"		X		
39	OF			IS THE CURRENT FRICTION DAMPING CONSIDERED		"		X		
40				IS THE RADIATION DAMPING CONSIDERED		"	X			
41	MOT	DO		IS THE STRUCTURAL DAMPING CONSIDERED		"		X		Considered in our springing program

					Program Name	Yes	No		Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	SAI		X		
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X		
44				IS THE STIFFNESS MATRIX COMPUTED	"	X			
45	*	** WIND	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	?				NO REFERENCE TO WIND FORCE CALCULATIONS
46	***		DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	?				All of this is part of time domain
47				DAVENPORT	?				
48	ENVIRONMENTAL			SIMIU	?				
49		**		OTHERS (SPECIFY)	?				
50		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	?				
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	?				
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT	SAI	X			
53		**		MEAN SPECTRAL PERIOD	"	X			
54		***		WAVE SCATTER DIAGRAM	"	X			Only Linear wave in frequency domain
55		*	...	LINEAR WAVE	"	X	X		
56				STRETCH LINEAR	"		X		Part of time domain

					Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	SAI	?	X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN	"	?	X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND	"	?	X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH	"	?	X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY	"	?	X	
62		V		EXTENDED VELOCITY POTENTIAL	"	?	X	
63		E		CHOIDAL WAVE THEORY	"	?	X	
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	X		NO REFERENCE TO SEA SPECTRA TYPE
65	D			ISSC	"	X		
66	E			JONSWAP	"	X		
67	S			BRETSCHNEIDER	"	X		
68	C			SCOTT	"	X		
69	R	x		OCHI (SIX PARAMETER)	"	X		
70	I	x		INPUT SPECTRA	"	X		
71	P	x		OTHERS	"	~~X~~		
	T	x						
	I	x						
	O	x						
	N	x						

					Program Name	Yes	No		Comments
72	* *	* *	A	DIRECTIONAL SPECTRA	SAI	X			
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X		
74	* *	OTHERS		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X		
75	SOLUTION	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"	SIX			
76	SOLUTION	STATICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	X			6-degrees of freedom all degrees coupled.
77	SOLUTION	STATICS		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"	X			6-degrees
78	TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	SIX			
79	TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	X			6-degrees coupled
80	TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY	"	X			Linearized wrt small wave slope and small responses. Standard way.
81	TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"	X			
82	TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY	"	?			
83	* *** ***** ******* PLATFORM RESPONSE OUTPUT			MEAN OFFSET OF THE PLATFORM	"	X			
84	* *** ***** ******* PLATFORM RESPONSE OUTPUT			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	"	X			
85	* *** ***** ******* PLATFORM RESPONSE OUTPUT			PLATFORM MOTION RESPONSE SPECTRA	"	X			
86	* *** ***** ******* PLATFORM RESPONSE OUTPUT			RESPONSE STATISTICS .. MEAN VALUE	"	X			

(*) Users Manual: "A Hybrid Finite-Element Method (HFEM) For Computing Water Wave Diffraction of Three Dimensional Bodies" by D. Yue. SAI Report #463-82-333-LJ (includes validation)

87	******* ***** *** *		RESPONSE STATISTICS .. R.M.S. VALUE	SAI	X			
88			RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"	X			
89			RESPONSE STATISTICS .. OTHERS; SPECIFY	"	X			They statistical value can be printed out
90			EIGEN VALUES (SYSTEM NATURAL PERIODS)	"	X			
91	** ****		MODEL TEST - INDICATE SCALE	"	X			NO COMPARISON MAT'L WAS REC'D. THOUGH
92		PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X			THERE IS AN EXISTENCE OF COMPARISON DOCUMENT
93			OTHER PUBLISHED MATERIAL - SPECIFY	"	?		(*) Users Manual:	
94	**** **		OTHERS (SPECIFY)	"	?			
95	* * * * * * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	"	(X)	~~X~~		Nonlinear
96			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	?	(X)		Mooring included in finite domain
97			VERTICAL (TAUT) MOORING	"	(X)	~~X~~		
98			HYBRID/OTHER COMBINATION .... SPECIFY	"	?	(X)		
99		MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X	~~X~~		Only linear.
100	M		CHAIN (STEEL)	"	X			
101	O		WIRE ROPE (STEEL)	"	X			

					Program Name	Yes	No	Comments
102	ORIGINAL SYSTEM	ANALYSES	STATICS	COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	SAI		X	
103				USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		
104				IS IT BASED ON CATENARY EQUATION	"	X		
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STIFFNSS, CIRCLE	"		X	
106				OTHERS (SPECIFY)	"		X	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X	X	
108		VERTICAL MOORING		IS THE MASS OF THE MOORING CONSIDERED	"	X	X	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X	X	Not in frequency domain ~~which is a linear method~~
111				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
112				IS MATERIAL NON LINEARITY CONSIDERED	"		X	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	In time domain only!!
114				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	Not spinning code
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"	X	X	
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STIFFNSS, CIRCLE	"		X	

						Program Name	Yes	No	Comments
117			I	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD	SAJ		?	
118			N		IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	~~X~~	X	~~NOT~~ Based on Diffraction theory!
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"	X		
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	In time domain
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D	"	X		
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D	"		X	
123	C	M	D		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCTURAL)	"	X		
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCTURAL)	"	X		
125	P	R	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"	X		
126	A	I			IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"	X		
127	B	N			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"		X	
128	I	G			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"	X	X	The spooling program does this.
129	L		DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X	X	
130	I	* ** *	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	"	X	X	
131	E	** ****			MEAN LOAD OF THE MOORING LINE	"	X		
	S								

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	SAI	X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE		X			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3		X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY		?			
136	******	* ***	WITH MODEL TESTS - INDICATE SCALE		X			PROGRAMS ARE VALIDATED, BUT THE MATERIAL WAS NOT REC'D
137		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS		X			
138		*** *	WITH OTHER PUBLISHED MATERIAL .... SPECIFY		?			
139	*****		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			X		NO REFERENCE TO RISER, HENCE ITEMS
140		**	IS THE RISER MODEL TWO DIMENSIONAL			X		(139 – 158) NOT FILLED IN
141		STRUCTURAL	IS THE RISER MODEL THREE DIMENSIONAL			X		
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD			X		
143	RISER		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			X		
144		MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY			X		
145		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			X		
146		***	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X		

				Program name	Yes	No		Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER					
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING					
149			IS THE RISER HYDRODYNAMIC MODEL 2D					
150			IS THE RISER HYDRODYNAMIC MODEL 3D					
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM					
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS					
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS					
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END					
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE					
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE					
157	* * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS					
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY					
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING					NO REFERENCE TO THE CAPABILITY OF STABILITY ANALYSIS
160			INTACT WITH VERTICAL TAUT TENDONS					
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED					

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
163	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				NO REFERENCE TO STRUCTURAL ANALYSIS CAPABILITIES
164			IS INERTIA LOADING CONSIDERED				
165	S T R U C T U R A L A N A L Y S I S		IS DYNAMIC LOADING CONSIDERED				
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
168		* ***	BEAM ELEMENT				
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
170			PLATE ELEMENT				
171			STIFFENED PLATE ELEMENT				
172		*** *	OTHERS .... SPECIFY				
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				
174			SPECTRAL ANALYSIS				
175		OTHER ANALYTICAL CAPABILITY	MODAL ANALYSIS				
176	* * * *		FATIGUE LIFE ANALYSIS				

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)					
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)					
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)					
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)					
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (V) SPECIFY THE VERSION	SAI	X			
182		.... BASIC					
183		.... PASCAL					
184		.... OTHERS; SPECIFY					
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	SAI	?			
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	"	X			
187		IS THEORETICAL MANUAL AVAILABLE	"	X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X			
189		IS ANY TRAINING OFFERED	"	X			
190	** ****	IBM	"	X			Can be used on any Standard Computer.
191		CDC	"	X			

			Program Name	Yes	No		Comment
192	HARDWARE SYSTEM	PRIME COMPUTER					
193		VAX		X			
194		MICRO .. SPECIFY					
195	**** **	OTHERS .... SPECIFY					
196	** ****	LEASE (PRICE $ .00)	SAI	X			
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	4	X			
198		CONSULTANCY BASIS	1	X			
199	**** **	OTHERS .... SPECIFY	11	7	X		
200	REMARKS AND NOTES						
201							
202							

SCIENCE APPLICATIONS INC.

TIME DOMAIN USING DIFFRACTION THEORY

SAI's TLP Motion and Loads Computer Code System.

SCIENCE APPLICATIONS, INC.

TABLE IV — QUESTIONAIRE FOR SOFTWARE CAPABILITIES (TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA FOR FIXED AND MOORED OCEAN STRUCTURES

This time domain program is for TLP motions and loads, (including) nonlinear high-frequency springing loads in the tendons!!!

* THERE IS NO NAME OF THE PROGRAM. COMPANY NAME HAS BEEN ENTERED IN THE SPACE ~~FOR~~ PROVIDED FOR PROGRAM NAME.

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	(*)	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION		X			
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM		X			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED		X			
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES		X			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM		X			
7		. MEMBER: ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	* SAI (?)	X			
8	E	.	VERTICAL MEMBER	11	X			
9	N	.	HORIZ. MEMBER	11	X			
10	V	.	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	11	2	X		
11	I R	. X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	11	X	4		

						Program Name	Yes	No		Comments
12	OTHER METHODS	WAVE FORCES	IOH		OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	SAI	X			DIFFRACTION THEORY
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			DIFFRACTION THEORY
15				MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X			
16					COLUMN AND PONTOON	"	X			
17					PONTOON AND PONTOON	"	X			
18				FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X			SEE ITEM 19
19					IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON	"	X			3D-HYBRID FINITE ELEMENT METHOD
20					DIFFRACTION AND FLUID FINITE ELEMENT	"		X		
21					OR ANY OTHER COMBINATION	"		X		
22				SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	X			

						Program Name	Yes	No	Comments
27				VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	SAI	X		
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"	X		
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"	X	?	
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	X		
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	"	X		
32					IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"	X		
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"	X		Specified by user !!
34				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
35					CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	"	3D		
36				DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"	X		
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		
39					IS THE CURRENT FRICTION DAMPING CONSIDERED	"	X		
40					IS THE RADIATION DAMPING CONSIDERED	"	X		
41					IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Program Name	Yes	No	Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	SAI		X	
43				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
44			X X X		IS THE STIFFNESS MATRIX COMPUTED	"	X		
45	O F	D	X X X	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
46		O	I		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	"	3D		
47		M	R R E G U L A R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
48	M O T I O N	A I N			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"	X		
49					IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		
50					IS THE CURRENT FRICTION DAMPING CONSIDERED	"	X		
51					IS THE RADIATION DAMPING CONSIDERED	"	X		
52			W A V E S	COEFFICIENTS	IS THE STRUCTURAL DAMPING CONSIDERED	"		X	
53	X X X X X X				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	"		X	
54		X X X X		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
55			X X X		IS THE STIFFNESS MATRIX COMPUTED	"	X		
56	X	X X	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				NO REFERENCE TO WIND FORCE CALCULATIONS Wind force coefficient is input to prog

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	?	X		
58				DAVENPORT	?			
59				SIMIU	?			
60				OTHERS (SPECIFY)	?			
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	?	X		
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	?	X		
63		WAVE THEORIE		SIGNIFICANT WAVE HEIGHT	SAI	X		
64				MEAN SPECTRAL PERIOD	"	X		
65				WAVE SCATTER DIAGRAM	"	X		
66				LINEAR WAVE	"	X		
67				STRETCH LINEAR	"	X		
68				STOKE'S 2ND, 3RD OR 5TH ORDER ... PLEASE CIRCLE ...	"	X	X	
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN	"	?	X	
70				STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND	"	?	X	
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH	"	?	X	

					Program Name	Yes	No		Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	SAI	?	X		
73		E	.	EXTENDED VELOCITY POTENTIAL	"	?	X		
74		S	.	CNOIDAL WAVE THEORY	"	?	X		
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	X			NO REFERENCE TO SEA SPECTRA TYPE
76	D		E	ISSC	"	X			
77	E		A	JONSWAP	"	X			
78	S		S	BRETSCHNEIDER	"	X			
79	C	x	P	SCOTT	"	X			
80	R	x	E	OCHI (SIX PARAMETER)	"	X			
81	I	x	C	INPUT SPECTRA	"	X			
82	P	x	T	OTHERS	"	?	X		
83	T	x	R	DIRECTIONAL SPECTRA	"	?	X		
84	I	x	A	DOES IT CONSIDER EARTH QUAKE SPECTRA	?		X		
85	O	x		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?		X		
86	N	x		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	SAI	SIX			• Surge & Yaw Coupled for Slowly Varying Motion • Heave & Pitch for High Frequency Springing.

			Program Name	Yes	No	Comments
87	* SOLUTION TECHNIQUE *****	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	SAI	?	
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"	?	
89		DYNAMICS TIME DOMAIN	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"	SIX	Coupled Heave + Pitch for Springing Problem
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?	Coupled Surge + Yaw for Slowly Varying Wave
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"	?	
92			METHOD OF INTEGRATION USED .... HOUBOLT	"	?	
93			.... WILSON - θ	"	?	
94			.... NEWMARK - β	"	?	
95			OTHERS .... PLEASE SPECIFY	"	?	
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	"	?	
97			.... VARIABLE INTEGR-ATION TIME	"	?	
98			OTHERS .... PLEASE SPECIFY	"	?	
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"	?	
100			OTHERS .... PLEASE SPECIFY	"	?	
101			PLATFORM MOTION TIME HISTORY	"	X	

			Program Name	Yes	No	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	SAI	X		
103		... R.M.S. VALUE	"	X		
104		... (SIGNIFICANT)1/3	"	X		
105		... EXPECTED MAXIMUM	"	?		
106		... OTHERS, SPECIFY	"	?		
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	"		X	
108	** ****	MODEL TEST - INDICATE SCALE	"	X		COMPARISONS ARE DOCUMENTED, BUT WERE NOT SENT
109	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X		
110		OTHER PUBLISHED MATERIAL - SPECIFY	"	X		*OTC Paper #4394 1982
111	** ****	OTHERS (SPECIFY)	"	?		
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)	"	X		
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	?	X	
114		VERTICAL (TAUT) MOORING	"	X		
115	M	HYBRID/OTHER COMBINATION .... SPECIFY	"	?	X	
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"		X	

					Program Name	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)	SAI	X		
118				WIRE ROPE (STEEL)	"	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"		X	
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"		X	
121				IS IT BASED ON CATENARY EQUATION	)	X		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
123				OTHERS (SPECIFY)	"		X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X	X	
125				IS THE MASS OF THE MOORING CONSIDERED	"	X	X	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X		
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
129				IS MATERIAL NON LINEARITY CONSIDERED	"		X	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"	X	X	
131				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

					Program Name	Y/y	Y/o	Comments
132		RTICAL	HG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	SAI	X	X
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STIFFNSS, CIRCLE	〃		X
134					IS IT BASED ON FINITE DIFFERENCE METHOD	〃		X
135	C		M	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	〃	X	BASIC (?)
136	A		O		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	〃	X	
137	P		D		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	〃	X	X
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL	〃	X	
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL	〃		X
140	I		X		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT)	〃	X	
141	L		X		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT)	〃	X	
142	I	M	X		IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	〃	X	
143	I	O			IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	〃	X	X Diana
144	I	R			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	〃		X
145	E	I			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	〃	X	Springy loads
146	S	NG	DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	〃	X	X

				Program Name	Yes	No	Comments
147		INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	SAI		X	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	"	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	"	X		
150			... R.M.S. VALUE	"	X		
151			... (SIGNIFICANT)1/3	"	X		
152			... EXPECTED MAXIMUM	"	?	X	
153			... OTHERS, SPECIFY	"	?	X	
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	"	X		DOCUMENTATION FOR VALIDATION EXIST BUT THE MATL WAS NOT SEAIT
155			WITH OTHER SOFTWARE - LIST PROGRAMS	"	X		
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	?	X	
157			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES		X		NO REFERENCE TO RISER; ITEMS (152-170) ARE NOT FILLED IN
158		STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL				
159	R		IS THE RISER MODEL THREE DIMENSIONAL				Part of the riser dynamics can be includes in same way as tendons are included with spring loads.
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD				
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167	Y		IS THE RISER MODELLED AS TWO DIMENSIONAL				
168	S	MODEL	IS THE RISER MODELLED AS THREE DIMENSIONAL				
169	T	**	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	E	SOLUTION MODE **	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS		###		
171	M	* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173	M	*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* *** *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

			Program Name	Yes	No		Comment
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	SAI	X			
208	** ****	IBM	"	X			
209		CDC	"	X			
210	HARDWARE SYSTEM	PRIME COMPUTER	"	VAX			
211		VAX	"	X			
212	**** **	MICRO .... SPECIFY	"	?	X		
213		OTHERS .... SPECIFY	"	X	X		Prey Standard Computer
214	** ****	LEASE (PRICE $ " .00)	"	X			
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	"	X			
216		CONSULTANCY BASIS	"	X			
217	** ****	OTHERS .... SPECIFY	"	X	X		
218	REMARKS AND NOTES						
219							
220							

W.S. ATKINS

FREQUENCY DOMAIN USING MORISON'S EQUATION

WSA

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	AQWA-LIBRUM	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	AQWA-DRIFT	X			
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM	AQWA-LIBRUM	X	X		optional
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	AQWA-LINE	X		To be developed 1984 – 1985.	
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	AQWA-LINE	X	X	"	optional
7		: : : ORIENTATION :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X		"	
8	E	: : :	VERTICAL MEMBER	"	X		"	
9	N	: MEMBER :	HORIZ. MEMBER	"	X		"	
10	V	: : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		X	"	
11	I R	: : :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"	X		"	

					Program Name	Yes	No	Comments
12	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	Aqwa-Line		X	TO BE DEVELOPED IN 1984-1985.	
13	IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X		"	
14	ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY	"		X	"	
15	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X		"	
16	MEMBER INTER-ACTION — COLUMN AND PONTOON	"	X		"	
17	PONTOON AND PONTOON	"	X		"	
18	FIRST ORDER — IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"	X		"	
19	IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY	"	X		"	
20	IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	X		"	
21	IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION			X	"	
22	SECOND ORDER FORCES — DRIFT — DOES IT CONSIDER THE WAVE ELEVATION			X	"	
23	DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY		X		"	
24	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			X	"	
25	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY			X	"	
26	DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			X	"	

No.				Question	Program Name	Yes	No		Comments
27	****	2ND ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	AQWA-LINE	X		To be developed 1984 – 1985.	
28				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"	X		"	
29				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X	"	
30				IS ITERATION OF RESPONSE USED FOR CONVERGENCE		—	—		
31				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION		—	—		
32				IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM		—	—		
33				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE		—	—		
34	**** EQUATION OF MOT	FREQUENCY DO	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	AQWA-LINE	X	X	"	optional
35				CIRCLE / COMPUTING METHOD : 2D, (3D(ARBITRARY SHAPE)), OTHERS	"	X		"	
36			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		"	
37				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X	"	
38				IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		"	
39			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
40				IS THE RADIATION DAMPING CONSIDERED	"	X			
41				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	"	

					Program Name	Yes	No		Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	AQUA-LINE	X	X		optional
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"	X	X		"
44				IS THE STIFFNESS MATRIX COMPUTED	"	X	X		"
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	AQUA-FER.	X			
46	*	W	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			X		
47	*	I		DAVENPORT			X		not in frequency domain.
48	E	D		SIMIU			X		
49	N	**		OTHERS (SPECIFY)			X		
50	V		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	AQUA-LINE		X	TO BE DEVELOPED 1984 - 1985.	
51	I R O N M E N T A L			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	~	X			
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT	AQUA-FER	X		"	
53		*		MEAN SPECTRAL PERIOD	"	X		"	
54		*		WAVE SCATTER DIAGRAM			X		
55		*	...	LINEAR WAVE	"	X		"	
56				STRETCH LINEAR					

					Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	AQUA-FER AQUA-LINE		X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN			X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			X	
62		V		EXTENDED VELOCITY POTENTIAL			X	
63		E		CNOIDAL WAVE THEORY			X	
64		S	SEA SPECTRA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	AQUAFER	X		
65				ISSC	"	X		
66	D			JONSWAP	"	X		
67	E			BRETSCHNEIDER	"		X	
68	S			SCOTT	"		X	
69	C	*		OCHI (SIX PARAMETER)	"		X	
70	R	*		INPUT SPECTRA	"	X		
71	I	*		OTHERS	"			
	P	*						
	T							
	I							
	O							
	N							
		*						

					Program Name	%	%	Comments
72	* *	*	A	DIRECTIONAL SPECTRA	Aqua-Fer.		X	
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
74	* *	OTHERS		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	Aqua-Fer Aqua-Line	X		10 Bodies with 6 d.o.f ∴ 60 d.o.f.
76	SOLUTION TECHNIQUE	STATICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	X		∴ 60 d.o.f
77	SOLUTION TECHNIQUE	STATICS		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	X		
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	X		Acc 60.
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY				
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	Aqua-Fer Aqua-Line	X		
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY			X	
83				MEAN OFFSET OF THE PLATFORM	Aqua-Quorum	X		
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	Aqua-Suite	P		
85	* *** ***** *******	PLATFORM RESPONSE OUTPUT		PLATFORM MOTION RESPONSE SPECTRA	Aqua-Fer	X		
86				RESPONSE STATISTICS .. MEAN VALUE	"	X		

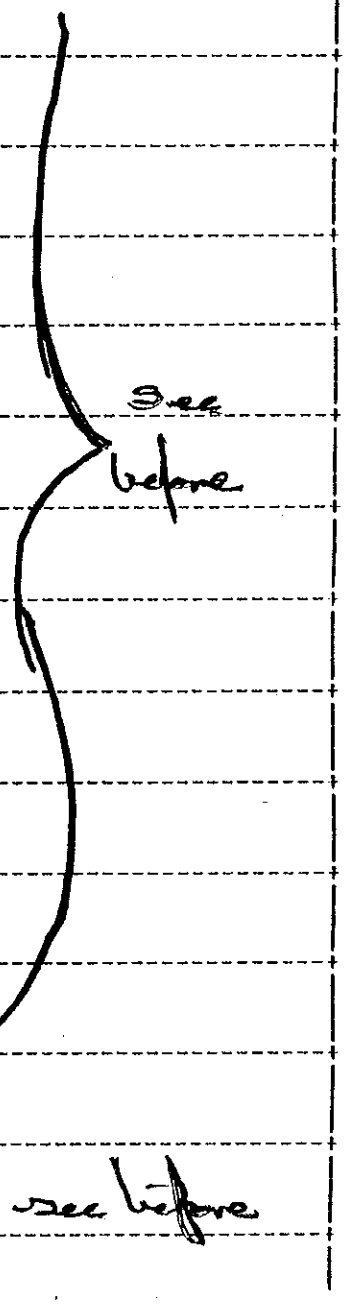
			Program Name	Yes	No		Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	AQWA-FER	X			
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"	X			
89		RESPONSE STATISTICS .. OTHERS; SPECIFY	"	X			Extreme.
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	"	X			
91	** ****	MODEL TEST - INDICATE SCALE	"	X			1/40 → 1/100
92	PROGRAM	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X			DNV, NMI WAVE.
93	VERIFICATION	OTHER PUBLISHED MATERIAL - SPECIFY	"	X			standing, Fulteuren, etc
94	**** **	OTHERS (SPECIFY)	"	X			Full scale.
95	****** DESCRIPTION	SPREAD MOORING (CATENARY)	AQWA-FER	X			
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X			
97		VERTICAL (TAUT) MOORING	"	X			
98		HYBRID/OTHER COMBINATION .... SPECIFY	"	X			composites.
99	MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X			
100	M	CHAIN (STEEL)	"	X			
101	O	WIRE ROPE (STEEL)	"	X			

					Program Name	Yes	No	Comments
102	MOORING SYSTEM	ANALYSES	STATICS	COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	AQUA-FER.	X		
103				USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		
104				IS IT BASED ON CATENARY EQUATION	"	X		
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE			X	
106				OTHERS (SPECIFY)			X	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	AQUA-FER	X		Via stiffness
108		XXXX VERTICAL	MOORING	IS THE MASS OF THE MOORING CONSIDERED			X	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X		
111				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
112				IS MATERIAL NON LINEARITY CONSIDERED	"	X		
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED			X	
114				IS THE STRUCTURAL DAMPING CONSIDERED			X	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"	X		
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE			X	

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD			X	
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	STIFFNESS INFLUENCES ONLY.
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D			X	
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D		X		
123	C	M,	D		IS THE MOORING MODEL TWO DIMENSIONAL			X	
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL	AQWA-FEA	X		
125	P	R	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			X	
126	A	I	.		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
127	B	N	.		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"	X		
128	I	G	.		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
129	L		.	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X		
130	I	*	*	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	"	X		
131	T	**	****		MEAN LOAD OF THE MOORING LINE	"	X		
	I								
	E								
	S								

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	AQWA-FER.	X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	"	X			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	"	X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	"	X			Extreme
136	*****	* ***	WITH MODEL TESTS - INDICATE SCALE	AQWA-FER	X			1/40 → 1/100 sipne tests
137		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	"	X			NMI & DNV programs.
138		*** *	WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	X			Pinkster, etc.
139	*****		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES					
140		* *	IS THE RISER MODEL TWO DIMENSIONAL					
141		STRUCTURAL	IS THE RISER MODEL THREE DIMENSIONAL					
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD					see before
143	RISER		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD					
144		MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY					
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY					
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM					

				Program Name	Yes	No	Comments
		*					
147			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
149		HYDRODYNAMIC	IS THE RISER HYDRODYNAMIC MODEL 2D				
150			IS THE RISER HYDRODYNAMIC MODEL 3D				
	S						
151	Y	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
152	S	**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS				
	T	*					
153		***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
	E						
154		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
	M						
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
156			WITH MODEL TESTS - INDICATE SCALE				
	*						
157	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
	*						
	*						
158	*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
159	* ***	I N T A C T	INTACT FREE FLOATING				
160	STABILITY		INTACT WITH VERTICAL TAUT TENDONS				
	ANALYSIS						
161		D A M	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				



				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
163	* ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
164			IS INERTIA LOADING CONSIDERED				
165	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED				
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
168		FINITE ELEMENT ANALYSIS * ***	BEAM ELEMENT				
169			SHELL ELEMENT				see
170			PLATE ELEMENT				
171			STIFFENED PLATE ELEMENT				
172		*** *	OTHERS .... SPECIFY				
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
175			MODAL ANALYSIS				
176	* ** *** *		FATIGUE LIFE ANALYSIS				

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)				
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)				
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)				
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)				
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION				
182		.... BASIC				
183		.... PASCAL				see below
184		.... OTHERS; SPECIFY				
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE				
187		IS THEORETICAL MANUAL AVAILABLE				
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED				
189		IS ANY TRAINING OFFERED				
190	** ****	IBM				
191		CDC				

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER					
193		VAX					
194		MICRO .. SPECIFY					
195	**** **	OTHERS .... SPECIFY					
196	** ****	LEASE (PRICE $ .00)					
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)					
198		CONSULTANCY BASIS					
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES						
201							
202							

VERITAS TECHNICAL SERVICES

FREQUENCY DOMAIN USING MORISON'S EQUATION

DnV

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
FREQUENCY DOMAIN USING MORISON'S EQUATION

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES			X	OPERATIVE	
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM	SESTRA (SESAM '80)	X			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES			X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	SESTRA (SESAM '80)	X			
7		: : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	WAMLOS (SESAM 80)	X			
8	E	: :	VERTICAL MEMBER	WAMLOS (SESAM '80)	X			
9	N V	: MEMBER	HORIZ. MEMBER	"	X			
10	I	: BER : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"	X			
11	R		DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"	X			

						Program Name	Yes	No		Comments
12	ON	WAVE	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					
13	MEN				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER			X		
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY	WAMLOS (SOSAM"RD)	X			USER CAN CHOOSE BETW. MORISON AND SINK-SOURCE IN SAME PROG.
15	TAL		MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X			IF SINK-SOURCE ELEM. USED
16					COLUMN AND PONTOON	"	X			— " —
17					PONTOON AND PONTOON	"	X			— " —
18		FORCES	FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION					
19					IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY	"	X			
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT					
21	FORCES				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"	X			
22			SECO	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION					
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26	*	: :			DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			X		

						Program Name	Yes	No		Comments
27	* * * * *	: : : : : : : : : : : :	N D O R D E R	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	WAMLOS (SESAM '80)		X		
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"		X		
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X		
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"		X		
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION					
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM					
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE					
34	* * * *	F R E Q U E N C Y		ADD MASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS	"	X			
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"		X		
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X		
40					IS THE RADIATION DAMPING CONSIDERED	"	X			IF SINK-SOURCE ELEMENTS USED
41	MOT	DO			IS THE STRUCTURAL DAMPING CONSIDERED	SESTRA (SESAM '80)	X			

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	WAMLOS (SESAM'80)		X	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	4	X		MOORING LINES (LINEAR SPRINGS)
44				IS THE STIFFNESS MATRIX COMPUTED	4		X	HYDROSTATIC
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
47	*			DAVENPORT				
48	ENV			SIMIU				
49	IRON	**		OTHERS (SPECIFY)				
50	MENT	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
51	AL			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT	POSTFRAME (SESAM'80)	X		
53		*		MEAN SPECTRAL PERIOD	4	X		
54		*		WAVE SCATTER DIAGRAM	4	X		
55		*		LINEAR WAVE	4	X		
56				STRETCH LINEAR			X	

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...		X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN		X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND		X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH		X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY		X	
62		V		EXTENDED VELOCITY POTENTIAL		X	
63		E		CNOIDAL WAVE THEORY		X	
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	POSTFRAME (SESAM'82) X		
65	DESCRIPTION			ISSC			
66				JONSWAP	X		
67				BRETSCHNEIDER			
68				SCOTT			
69		*		OCHI (SIX PARAMETER)			
70		*		INPUT SPECTRA			
71		*		OTHERS			

					Program Name	Yes	No		Comments
72	* *	* *	A	DIRECTIONAL SPECTRA	POSTFRAME (SBSAM180)	X			
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X		
74	* *	OTHERS		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X		
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	WAMLOS (SESAM180)	6			
76	SOLUTION TECHNIQUE	STATICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	6			
77	SOLUTION TECHNIQUE	STATICS		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	SESTRA				UNLIMITED
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"				"
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"				"
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY					
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"		X		
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY	"				CHOLESKY'S
83				MEAN OFFSET OF THE PLATFORM			X		
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	WAMLOS	X			
85	* *** ***** *******			PLATFORM MOTION RESPONSE SPECTRA			X		
86	PLATFORM RESPONSE OUTPUT			RESPONSE STATISTICS .. MEAN VALUE	POSTFRAME	X			

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	POSTFRAME	X		
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"	X		
89		RESPONSE STATISTICS .. OTHERS; SPECIFY				
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	SESTRA	X		
91	** ****	MODEL TEST - INDICATE SCALE				PROGRAMS INDIVIDUALLY VERIFIED ON OTHER MODELS (NO TLP's YET)
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
93		OTHER PUBLISHED MATERIAL - SPECIFY				
94	**** **	OTHERS (SPECIFY)				
95	* * * * * * *	SPREAD MOORING (CATENARY)				
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
97		VERTICAL (TAUT) MOORING				
98		HYBRID/OTHER COMBINATION .... SPECIFY				
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				
100	M	CHAIN (STEEL)				
101	O	WIRE ROPE (STEEL)				

DESCRIPTION

MATERIA

					Program Name	Yes	No	Comments
102	MOORING SYSTEM	ANALYSES	STATICS	COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
103				USER SPECIFIED LOAD DISPLACEMENT TABLE		X		
104				IS IT BASED ON CATENARY EQUATION				
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE				
106				OTHERS (SPECIFY)				
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		X		
108		***** VERTICAL *****	MOOR	IS THE MASS OF THE MOORING CONSIDERED				
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING				
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING				MOORING PROG.
111				IS GEOMETRIC NON LINEA-RITY CONSIDERED				ONLY IN TIME DOMAIN
112				IS MATERIAL NON LINEA-RITY CONSIDERED				
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED				
114				IS THE STRUCTURAL DAMPING CONSIDERED				
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM				
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE				

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD				
118			N G	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
121			M O D		IS THE MOORING HYDRODYNAMIC MODEL 2D				
122					IS THE MOORING HYDRODYNAMIC MODEL 3D				
123	C	M,	E		IS THE MOORING MODEL TWO DIMENSIONAL				
124	A	O O	L		IS THE MOORING MODEL THREE DIMENSIONAL				
125	P A	R I N G	. . . . .		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING				
126	B	G	. . . . .		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING				
127	I		. . . . .		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES				
128	L I		. . . . .		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS				
129	T		DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
130	I	* * *	INSTAL-LATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING				
131	E S	** ****			MEAN LOAD OF THE MOORING LINE				

				Program Name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)				
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE				
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3				
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY				
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE				
137	* * * * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS				
138			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			X	NOT IN FREQUENCY DOMAIN
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL				
141		STRUCTURAL	IS THE RISER MODEL THREE DIMENSIONAL				
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD				
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				
144		MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECT-ION THEORY				
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				

				Program Name	Yes	NO	Comments
147		*	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
148		HYDRODYNAMIC	IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
149			IS THE RISER HYDRODYNAMIC MODEL 2D				
150			IS THE RISER HYDRODYNAMIC MODEL 3D				
151	S	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
152	Y S	**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS				
153	T	* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
154	E M	SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
156			WITH MODEL TESTS - INDICATE SCALE				
157	* * * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
159	* ***	INTACT	INTACT FREE FLOATING	MV223	X		
160	STABILITY		INTACT WITH VERTICAL TAUT TENDONS	"	X		
161	ANALYSIS	DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X		

				Program Name	Yes	No		Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	NV223		X		
163	* **		HYDRODYNAMIC LOADING CONSIDERED	SESTRA	X			
164	*	LOADING	IS INERTIA LOADING CONSIDERED	"	X			
165	S T		IS DYNAMIC LOADING CONSIDERED	"	X			
166	R U	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"	X			
167	C T		THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X			
168	U R	* ***	BEAM ELEMENT	"	X			
169	A L	FINITE ELEMENT ANALYSIS	SHELL ELEMENT	"	X			
170			PLATE ELEMENT	"	X			
171	A N		STIFFENED PLATE ELEMENT	"		X		
172	A L	*** *	OTHERS .... SPECIFY	"				CABLE, TRUSS, BAR SOLID, AXISYMM.
173	Y S		NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM					
174	I S		SPECTRAL ANALYSIS	"	X			
175		OTHER ANALYTICAL	MODAL ANALYSIS	"	X			
176	* ** *	CAPABILITY	FATIGUE LIFE ANALYSIS	"	X			

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)		X			
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		X			
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		X			PREFEM, PREFRAME POSTFEM WAMLOS
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)		X			POSTFRAME POSTFEM
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION		X			FORTRAN 77
182		.... BASIC					
183		.... PASCAL					
184		.... OTHERS; SPECIFY					
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X			
187		IS THEORETICAL MANUAL AVAILABLE		X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		X			
189		IS ANY TRAINING OFFERED		X			
190	** ****	IBM		X			
191		CDC			X		AVAILABLE LATER

			PROGRAM NAME	YES	NO		COMMENTS
192	HARDWARE SYSTEM	PRIME COMPUTER			X		AVAILABLE LATER
193		VAX		X			
194		MICRO .. SPECIFY			X		
195	**** **	OTHERS .... SPECIFY		X			UNIVAC
196	** ****	LEASE (PRICE $ .00)		X			
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)		X			
198		CONSULTANCY BASIS		X			
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES						ALL PROGRAMS EXCEPT NV223
201							BELONG TO THE SESAM'80
202							SYSTEM

VERITAS TECHNICAL SERVICES

FREQUENCY DOMAIN USING DIFFRACTION THEORY

DnV

TABLE II

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES			X	OPERATIVE	
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	SESTRA (SESAM'80)	X			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES			X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	SESTRA (SESAM'80)	X			
7		. : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	WAMCOS (SESAM'80)	X			
8	E	. :	VERTICAL MEMBER	"	X			
9	N	.	HORIZ. MEMBER	"	X			
10	V	.	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	"	X			
11	I R	. X-SECT	DOES IT USE EQUIVALENT CIRCULAR X-SECTION	"		X		

					PROGRAM NAME	YES	NO		COMMENTS
12	OHNEHTAL	NAVE	I O H	IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	WAMLOS (SESAM'80)	X			
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			FALTINSEN & MICHELSEN (75)
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X			
16				COLUMN AND PONTOON	"	X			
17				PONTOON AND PONTOON	"	X			
18		FORCES	FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X			SEE ABOVE
19				IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON	"	X			
20				DIFFRACTION & FLUID FINITE ELEMENT	"		X		
21				OR ANY OTHER COMBINATION, PLEASE SPECIFY					
22			SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION					
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X		

					PROGRAM NAME	YES	NO	Comments
27	*	:		VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	WAMLOS (SESAM'80)	X	
28	*	:			DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY		X	
29	*	:			IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT		X	
30		:	ORDER		IS ITERATION OF RESPONSE USED FOR CONVERGENCE		X	
31		:			DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION			
32		:			IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM			
33		:			DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			
34	*		FREQUENCY	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	〃	X	
35	*				CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE); OTHERS	〃		ARBITRARY SHAPE (3D)
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	〃	X	
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	〃	X	
38					IS THE CURRENT DRAG DAMPING CONSIDERED	〃	X	
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED	〃	X	
40					IS THE RADIATION DAMPING CONSIDERED	〃	X	
41	NUT		DO		IS THE STRUCTURAL DAMPING CONSIDERED	SESTRA (SESAM'80)	X	

					PROGRAM NAME	YES	NO	COMMENTS
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	WAMLOS (SESAM'80)		X	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"	X		MOORING LINES (LIN. SPRINGS)
44				IS THE STIFFNESS MATRIX COMPUTED	"	X		HYDROSTATIC
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
47	*			DAVENPORT				
48	ENV			SIMIU				
49	IRON	**		OTHERS (SPECIFY)				
50	MENT	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
51	AL			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT	POSTFRME (SESAM'80)	X		
53		*		MEAN SPECTRAL PERIOD	"	X		
54		*		WAVE SCATTER DIAGRAM	"	X		
55		*	.....	LINEAR WAVE	"	X		
56				STRETCH LINEAR	"		X	

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...		X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN		X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND		X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH		X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY		X	
62		V		EXTENDED VELOCITY POTENTIAL		X	
63		E		CNOIDAL WAVE THEORY		X	
64		S	SEA SPECTRA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	POSTFRAME (SESAM'80) X		
65				ISSC			
66				JONSWAP	〃 X		
67				BRETSCHNEIDER			
68				SCOTT			
69		*		OCHI (SIX PARAMETER)			
70		*		INPUT SPECTRA			
71		*		OTHERS			

DESCRIPTION

*

				Program Name	Yes	NO	Comments
72	* *	* *	DIRECTIONAL SPECTRA	POSTFRAME (SESAM180)	X		
73	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X	
74	* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X	
75	SOLUTION TECHNIQUE	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	WAMLOS (SESAM180)	6		
76	SOLUTION TECHNIQUE	STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	6		
77	SOLUTION TECHNIQUE	STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	SESTRA			UNLIMITED (SUPERELEM, TECHNIQUE)
78	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"			"
79	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"			"
80	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY				
81	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS, .. GAUSSIAN ELIMINATION	"		X	
82	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY	"			CHOLESKY'S
83			MEAN OFFSET OF THE PLATFORM			X	
84			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	WAMLOS	X		
85	* *** ***** ******* PLATFORM RESPONSE OUTPUT		PLATFORM MOTION RESPONSE SPECTRA			X	
86			RESPONSE STATISTICS .. MEAN VALUE	POSTFRAME	X		

			Program Name	Yes	NO	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	POSTFRAME	X		
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"	X		
89		RESPONSE STATISTICS .. OTHERS; SPECIFY				
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	SESTRA	X		
91	** ****	MODEL TEST - INDICATE SCALE				PROGRAMS INDIVIDUALLY VERIFIED ON OTHER MODELS (NO TLPIS YET)
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
93		OTHER PUBLISHED MATERIAL - SPECIFY				
94	**** **	OTHERS (SPECIFY)				
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)				
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
97		VERTICAL (TAUT) MOORING				
98		HYBRID/OTHER COMBINATION .... SPECIFY				
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				
100	M MATERIA	CHAIN (STEEL)				
101	O	WIRE ROPE (STEEL)				

					Program Name	Yes	No	Comments
102	MOORING SYSTEM	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE				
104				IS IT BASED ON CATENARY EQUATION				
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE				
106				OTHERS (SPECIFY)				
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		X		
108		VERTICAL MOORING		IS THE MASS OF THE MOORING CONSIDERED				
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING				MOORING PROG. ONLY IN TIME DOMIN
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING				
111				IS GEOMETRIC NON LINEA-RITY CONSIDERED				
112				IS MATERIAL NON LINEA-RITY CONSIDERED				
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED				
114				IS THE STRUCTURAL DAMPING CONSIDERED				
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM				
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE				

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD				
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D				
122			O D E L		IS THE MOORING HYDRODYNAMIC MODEL 3D				
123	C	M			IS THE MOORING MODEL TWO DIMENSIONAL				
124	A	O	L		IS THE MOORING MODEL THREE DIMENSIONAL				
125	P	R	.		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING				
126	A	I	.		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING				
127	B	N	.		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES				
128	I	G	.		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS				
129	L			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
130	I	* * *		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING				
131	T I E S	** ****			MEAN LOAD OF THE MOORING LINE				

				Program Name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)				
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE				
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3				
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY				
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE				
137	* * * * *	PROGRAM VERIFICATN ***	WITH OTHER SOFTWARE - LIST PROGRAMS				
138	* *	*	WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			X	NOT IN FREQUENCY DOMAIN
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL				
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL				
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD				
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				

				Program NAME	YES	NO	COMMENTS
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
149			IS THE RISER HYDRODYNAMIC MODEL 2D				
150			IS THE RISER HYDRODYNAMIC MODEL 3D				
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS				
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
156			WITH MODEL TESTS - INDICATE SCALE				
157	* * * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING	NV223	X		
160			INTACT WITH VERTICAL TAUT TENDONS	〃	X		
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	〃	X		

				PROGRAM NAME	YES	NO		COMMENTS
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	NV223		X		
163	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	SESTRA	X			
164			IS INERTIA LOADING CONSIDERED	"	X			
165	S T R U C T U R A L A N A L Y S I S		IS DYNAMIC LOADING CONSIDERED	"	X			
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"	X			
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X			
168		, * *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT	"	X			
169			SHELL ELEMENT	"	X			
170			PLATE ELEMENT	"	X			
171			STIFFENED PLATE ELEMENT	"		X		
172		*** *	OTHERS .... SPECIFY	"				CABLE, TRUSS, BAR SOLID, AXISYM.
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM					
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	"	X			
175			MODAL ANALYSIS	"	X			
176	* * * *		FATIGUE LIFE ANALYSIS	"	X			

			Program NAME	YES	NO		COMMENTS
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)		X			
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		X			
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		X			PREFEM, PREFRAME POSTFEM, WAMLOS
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)		X			POSTFRAME POSTFEM
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION		X			FORTRAN 77
182		.... BASIC					
183		.... PASCAL					
184		.... OTHERS; SPECIFY					
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X			
187		IS THEORETICAL MANUAL AVAILABLE		X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		X			
189		IS ANY TRAINING OFFERED		X			
190	** ****	IBM		X			
191		CDC			X		AVAILABLE LATER

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER			X		AVAILABLE LATER
193		VAX		X			
194		MICRO .. SPECIFY			X		
195	**** **	OTHERS .... SPECIFY		X			UNIVAC
196	** ****	LEASE (PRICE $ .00)		X			
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)		X			
198		CONSULTANCY BASIS		X			
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES						See Table I
201							
202							

VERITAS TECHNICAL SERVICES

TIME DOMAIN USING MORISON'S EQUATION

DnV

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	FENRIS/ WAJAC		X	BEING DEVELOPED OPERATIVE 84/85	
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	FENRIS/ WAJAC	X			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES			X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"	X			
7		. : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
8	E	. : M	VERTICAL MEMBER	"	X			
9	N	. E M	HORIZ. MEMBER	"	X			
10	I	. B E	X-SECT DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"	X			
11	R	. R :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"	X			

				PROGRAM NAME	YES	NO		COMMENTS
12	OTHER METHODS			OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION				
13	NAVE FORCES			IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY				
15			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN		X		NOT WITH MORISON
16				COLUMN AND PONTOON		X		
17				PONTOON AND PONTOON		X		
18			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION		X		
19				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY		X		
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	X			
21				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION		X		
22			SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION				
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY				
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY				
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY				
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES				

						PROGRAM NAME	YES	NO		COMMENTS
27	*	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		X			
28	*				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL		X			
29	*				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT					
30	*				IS ITERATION OF RESPONSE USED FOR CONVERGENCE					
31	*				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION					
32	*				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM					
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE					
34	*	*	*	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X		
35	*	*	*		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS		X			Circular, eq. diam.
36		*	REGULAR	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X			
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X		
38	E	T			IS THE CURRENT DRAG DAMPING CONSIDERED		X			
39	Q				IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
40	U	I		COEFFICIEN	IS THE RADIATION DAMPING CONSIDERED			X		
41	A	M	WA		IS THE STRUCTURAL DAMPING CONSIDERED		X			
	T									

						Program NAME	YES	NO	COMMENTS
42	I O N	E	VES	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
43				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
44			xxx		IS THE STIFFNESS MATRIX COMPUTED		X		
45	O F	D O M , A I N	xxx	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X	
46			I R R E G U L A R		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS		X		Circular, eg. diam.
47				DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X		
48	M O T I O N				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X	
49					IS THE CURRENT DRAG DAMPING CONSIDERED		X		
50					IS THE CURRENT FRICTION DAMPING CONSIDERED			X	
51					IS THE RADIATION DAMPING CONSIDERED			X	
52			W A V E S	COEFFICIENTS	IS THE STRUCTURAL DAMPING CONSIDERED		X		
53	x x x x x x				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
54		x x x x		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
55			xxx		IS THE STIFFNESS MATRIX COMPUTED		X		
56	x	xx	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				

					PROGRAM NAME	YES	NO	COMMENTS
57	* * *	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
58				DAVENPORT				
59				SIMIU				
60	E	* *		OTHERS (SPECIFY)				
61	N		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
62	V I R O N M E N T A L			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
63		* *	WAVE THEORIES	SIGNIFICANT WAVE HEIGHT		X		
64		* *		MEAN SPECTRAL PERIOD		X		
65		* *		WAVE SCATTER DIAGRAM		X		
66		* *		LINEAR WAVE		X		
67				STRETCH LINEAR		X		
68				STOKE'S 2ND, 3RD OR (5TH) ORDER .... PLEASE CIRCLE ...		X		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN		X		
70		W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND				
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH				

					PROGRAM NAME	YES	NO	COMMENTS
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY				
73		E	.	EXTENDED VELOCITY POTENTIAL				
74		S	.	CNOIDAL WAVE THEORY		X		
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		X		
76	D		E	ISSC				
77	E S C R I P T I O N		A	JONSWAP		X		
78			S	BRETSCHNEIDER				
79			P	SCOTT				
80			E C	OCHI (SIX PARAMETER)				
81			T	INPUT SPECTRA				
82			R A	OTHERS				
83				DIRECTIONAL SPECTRA		X		
84		OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA		X		
85				DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
86		STA		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6		

				Program NAME	YES	NO	Comments
87	SOLUTION TECHNIQUE ****	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6		
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				UNLIMITED ?
89		DYNAMICS TIME DOMAIN	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6		
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6		
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				UNLIMITED ?
92			METHOD OF INTEGRATION USED .... HOUBOLT				
93			.... WILSON - θ				
94			.... NEWMARK - β		X		
95			OTHERS .... PLEASE SPECIFY				
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION				
97			.... VARIABLE INTEGR-ATION TIME		X		
98			OTHERS .... PLEASE SPECIFY				
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION				
100			OTHERS .... PLEASE SPECIFY				Cholesky
101			PLATFORM MOTION TIME HISTORY		X		

			Program name	YES	NO	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE				
103		... R.M.S. VALUE				
104		... (SIGNIFICANT)1/3		X		
105		... EXPECTED MAXIMUM		X		
106		... OTHERS, SPECIFY				
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS				
108	** ****	MODEL TEST - INDICATE SCALE				
109	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
110		OTHER PUBLISHED MATERIAL - SPECIFY				
111	** ****	OTHERS (SPECIFY)				
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)		X		
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT		X		
114		VERTICAL (TAUT) MOORING		X		
115	M	HYBRID/OTHER COMBINATION .... SPECIFY				
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR		X		

					Program name	YES	NO		Comments
117	ORING SYSTEM	MATERIAL		CHAIN (STEEL)		X			
118				WIRE ROPE (STEEL)		X			
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY		X			ANY COMB.
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE		X			
121				IS IT BASED ON CATENARY EQUATION			X		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			X		
123				OTHERS (SPECIFY)					
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		X			
125		**********	**********	IS THE MASS OF THE MOORING CONSIDERED		X			
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING			X		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			X		
128				IS GEOMETRIC NON LINEARITY CONSIDERED		X			
129				IS MATERIAL NON LINEARITY CONSIDERED		X			
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED		X			
131				IS THE STRUCTURAL DAMPING CONSIDERED		X			

					Prgrm NAME	YES	NO	Comments
132		RTICAL	HG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM		X	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STIFFNSS, CIRCLE		X	
134					IS IT BASED ON FINITE DIFFERENCE METHOD		X	
135	C		MODEL	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X	
136	A				IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER		X	
137	P				IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING		X	
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL		X	
139	B				IS THE MOORING MODELLED AS THREE DIMENSIONAL		X	
140	I				IS THE MOORING MODEL TWO DIMENSIONAL		X	
141	L				IS THE MOORING MODEL THREE DIMENSIONAL		X	
142	I	M			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING		X	User's choice
143	T	O			IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING		X	
144	I	R			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES		X	
145	E	G			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS		X	
146	S		DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			

				Program Name	YES	NO	Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING		X		
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY		X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE				
150			... R.M.S. VALUE				
151			... (SIGNIFICANT)1/3				
152			... EXPECTED MAXIMUM				
153			... OTHERS, SPECIFY				
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE				
155	*		WITH OTHER SOFTWARE - LIST PROGRAMS				
156	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
157	* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES		X		
158		* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL				
159	R		IS THE RISER MODEL THREE DIMENSIONAL		X		
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD		X		
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				

				Program name	YES	NO	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY		X		
164		HYDRODYNAMIC	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X		REL. MOTION + CURRENT
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER		X		
166	S Y		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
167	S	MODEL	IS THE RISER MODELLED AS TWO DIMENSIONAL				
168	T		IS THE RISER MODELLED AS THREE DIMENSIONAL		X		
169	E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM		X		
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS		X		
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS		X		
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END		X		
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE		X		
174			WITH MODEL TESTS - INDICATE SCALE				
175	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	YES	NO	Comments
177	* ***	INTACT	INTACT FREE FLOATING				See Table I
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179		DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* *** *		HYDRODYNAMIC LOADING CONSIDERED		X		
182		LOADING	IS INERTIA LOADING CONSIDERED		X		
183	S T R U C T U R A L A N A L Y S		IS DYNAMIC LOADING CONSIDERED		X		
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				User's Choice
185			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		* ***	BEAM ELEMENT		X		
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT		X		
188			PLATE ELEMENT		X		
189			STIFFENED PLATE ELEMENT				
190		*** *	OTHERS .... SPECIFY				See Table I
191		*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

	I			Program Name	YES	NO		Comment
192	S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS		X			
193			MODAL ANALYSIS					
194			FATIGUE LIFE ANALYSIS		X			
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)		X			PREFRAME, PREFEM
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)					
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		X			PREFRAME, PREFEM POSTFEM
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)		X			POSTFRAME POSTFEM
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION					FORTRAN 77
200			.... BASIC					
201			.... PASCAL					
202			.... OTHERS SPECIFY					
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X			
205			IS THEORETICAL MANUAL AVAILABLE		X			
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		X			

			PROGRAM NAME	YES	NO		Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED		X			
208	** ****	IBM					
209		CDC					
210	HARDWARE SYSTEM	PRIME COMPUTER					
211	**** **	VAX		X			
212		MICRO .... SPECIFY					
213		OTHERS .... SPECIFY		X			UNIVAC
214	** ****	LEASE (PRICE $ .00)		X			
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)		X			
216		CONSULTANCY BASIS		X			
217	** ****	OTHERS .... SPECIFY					
218	REMARKS AND NOTES						
219							
220							

VERITAS TECHNICAL SERVICES

TIME DOMAIN USING DIFFRACTION THEORY

DnV

TABLE IV

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	FENRIS/ WAMLOS		X	BEING DEVELOPED OPERATIVE 84/85	
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM		X			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES			X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM		X			
7		. : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		X			
8	E	. :	VERTICAL MEMBER		X			
9	N	.	HORIZ. MEMBER		X			
10	V	. X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION		X			
11	I R		DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION		X			

				PROGRAM NAME	YES	NO		COMMENTS
12	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION							
13	IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER					X		
14	ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY							
15	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	MEMBER INTER-ACTION			X			
16	COLUMN AND PONTOON				X			
17	PONTOON AND PONTOON				X			
18	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE		FIRST ORDER		X			FALTINSEN & MICHELSEN
19	IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON				X			
20	DIFFRACTION AND FLUID FINITE ELEMENT							
21	OR ANY OTHER COMBINATION							
22	DOES IT CONSIDER THE WAVE ELEVATION							
23	DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY		SECOND DRIFT FORCES		X			
24	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY				X			
25	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY				X			
26	DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES					X		

OMEHTAL FOR WAVE FORCES

						PROGRAM NAME	YES	NO		COMMENTS
27	* * *	S		VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		X			
28	* * *				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL					
29	* * *		ORDER		IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT					
30	* * *				IS ITERATION OF RESPONSE USED FOR CONVERGENCE					
31	* * *				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION					
32	* * *				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM					
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE					
34	* * * * *	* * * * * * *	* * *	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X		
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS		X			Arbitrary shape
36			REGULAR	DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X			
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X		
38	EQUAT	TIM			IS THE CURRENT DRAG DAMPING CONSIDERED			X		
39					IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
40					IS THE RADIATION DAMPING CONSIDERED		X			
41			WA		IS THE STRUCTURAL DAMPING CONSIDERED		X			

						Program Name	YES	NO	Comments
42	I	E	V	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
43	O		E	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
44	N		S		IS THE STIFFNESS MATRIX COMPUTED		X		
45		D	X	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				
46	O	O	X		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS				
47	F	M	I	DAMPING COEFFICIENTS	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
48	M	A	R		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
49	O	I	R		IS THE CURRENT DRAG DAMPING CONSIDERED				
50	T	N	E		IS THE CURRENT FRICTION DAMPING CONSIDERED				
51	I		G		IS THE RADIATION DAMPING CONSIDERED				
52	O		U		IS THE STRUCTURAL DAMPING CONSIDERED				
53	N		L		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
54	X	X	A	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
55	X	X	R		IS THE STIFFNESS MATRIX COMPUTED				
56	X	X	WAVES	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				

					Program Name	YES	NO	Comments
57	* * *	W I N D	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
58				DAVENPORT				
59				SIMIU				
60	E	* *		OTHERS (SPECIFY)				
61	N		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
62	V I R O N M E N T A L			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
63		* *	WAVE THEORIES	SIGNIFICANT WAVE HEIGHT		X		
64		* *		MEAN SPECTRAL PERIOD		X		
65		* *		WAVE SCATTER DIAGRAM		X		
66		* *		LINEAR WAVE		X		
67				STRETCH LINEAR				
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...				
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN				
70		W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND				
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH				

					Program Name	YES	NO		Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY					
73		E	.	EXTENDED VELOCITY POTENTIAL					
74		S	.	CNOIDAL WAVE THEORY					
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		X			
76	D		E	ISSC					
77	E S C		A	JONSWAP		X			
78	R		S	BRETSCHNEIDER					
79	I P T	x x	P	SCOTT					
80	I O	x x	E C	OCHI (SIX PARAMETER)					
81	N	x x	T	INPUT SPECTRA					
82		x x	R	OTHERS					
83	x x		A	DIRECTIONAL SPECTRA					
84	x x	O T H E R S		DOES IT CONSIDER EARTH QUAKE SPECTRA					
85	x x			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE					
86	x x x	S T A		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6			

					Program Name	YES	NO	Comments
87	* SOLUTION TECHNIQUE ****	TICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6		
88				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				UNLIMITED
89		DYNAMICS	TIME DOMAIN	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6		
90				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6		
91				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				UNLIMITED
92				METHOD OF INTEGRATION USED .... HOUBOLT				
93				.... WILSON - θ				
94				.... NEWMARK - β		X		
95				OTHERS .... PLEASE SPECIFY				
96				HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION				
97				.... VARIABLE INTEGR -ATION TIME		X		
98				OTHERS .... PLEASE SPECIFY				
99				MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION				
100				OTHERS .... PLEASE SPECIFY				Cholesky
101				PLATFORM MOTION TIME HISTORY		X		

			Program Name	YES	NO	Comments
102		PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE				
103		... R.M.S. VALUE				
104	PLATFORM RESPONSE OUTPUT	... (SIGNIFICANT)1/3		X		
105		... EXPECTED MAXIMUM		X		
106		... OTHERS, SPECIFY				
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS				
108	** ****	MODEL TEST - INDICATE SCALE				
109	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
110		OTHER PUBLISHED MATERIAL - SPECIFY				
111	** ****	OTHERS (SPECIFY)				
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)				
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT		As Table III		
114		VERTICAL (TAUT) MOORING				
115	M	HYBRID/OTHER COMBINATION .... SPECIFY				
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				

					Program Name	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)				
118				WIRE ROPE (STEEL)				
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE				
121				IS IT BASED ON CATENARY EQUATION				
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE				
123				OTHERS (SPECIFY)				
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		As Table III		
125		**		IS THE MASS OF THE MOORING CONSIDERED				
126		**	*	IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING				
127		**	*	IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING				
128				IS GEOMETRIC NON LINEARITY CONSIDERED				
129			MOORI	IS MATERIAL NON LINEARITY CONSIDERED				
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED				
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED				

					Program Name	Yes	No	Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM			
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			
134					IS IT BASED ON FINITE DIFFERENCE METHOD			
135	C		MODEL	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			
136	A				IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER			
137	P				IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING			
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL	As Table III		
139	B		*		IS THE MOORING MODELLED AS THREE DIMENSIONAL			
140	I		*		IS THE MOORING MODEL TWO DIMENSIONAL			
141	L		*		IS THE MOORING MODEL THREE DIMENSIONAL			
142	I	M			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING			
143	T	O			IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING			
144	I	R			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES			
145	E	N			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			
146	S	G	DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			

				Program Name	Yes	No	Comments
147		* * *	INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			
148			MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY			
149				MOORING LINE LOAD STATISTICS ... ... MEAN VALUE			
150				... R.M.S. VALUE			
151				... (SIGNIFICANT)1/3			
152				... EXPECTED MAXIMUM			
153				... OTHERS, SPECIFY	As Table III		
154			PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			
155	* * * *			WITH OTHER SOFTWARE - LIST PROGRAMS			
156				WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
157	* * * *			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			
158		* *	S T R U C T U R A L	IS THE RISER MODEL TWO DIMENSIONAL			
159	R			IS THE RISER MODEL THREE DIMENSIONAL			
160	I			DOES THE PROGRAM USE FINITE ELEMENT METHOD			
161	S E			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY	X			
163		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL		As	Table III	
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175	* * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING				
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179		DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
182		LOADING	IS INERTIA LOADING CONSIDERED				
183	STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED				
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS			As	Table III
185		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT				
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT				
189		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT				
190		*** *	OTHERS .... SPECIFY				
191		*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

			Program Name	Yes	No	Comments
192	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS			
193			MODAL ANALYSIS			
194			FATIGUE LIFE ANALYSIS			
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)			
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)			
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)			
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION			
200			.... BASIC	As Table III		
201			.... PASCAL			
202			.... OTHERS SPECIFY			
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU			
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE			
205			IS THEORETICAL MANUAL AVAILABLE			
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED			

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED				
208	** ****	IBM				
209		CDC				
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	**** **	MICRO .... SPECIFY			As Table III	
213		OTHERS .... SPECIFY				
214	** ****	LEASE (PRICE $ .00)				
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
216		CONSULTANCY BASIS				
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					
219						
220						

W.S. ATKINS

FREQUENCY DOMAIN USING DIFFRACTION THEORY

WSA

TABLE II QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	AQWA-LIBRIUM	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	AQWA-DRIFT	X			
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	AQWA-LIBRIUM	X			optional
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	AQWA(SUITE)		X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	AQWA-DRIFT AQWA-LIBRIUM	X			
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	AQWA-LIBRIUM	X			optional
7		. : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	AQWA-LINE	X			
8	E	. :	VERTICAL MEMBER	AQWA-LINE	X			
9	N	.	HORIZ. MEMBER	AQWA-LINE	X			
10	V	.	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	AQWA-LINE	X			
11	I R	X-SECT	DOES IT USE EQUIVALENT CIRCULAR X-SECTION			X		

						Program Name	Yes	No		Comments
12	OFFSHORE STRUCTURES	WAVE FORCES	: :	IOH	IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	AQWA-LINE	X			
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	AQWA-LINE	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	AQWA-LINE	X			Singularities at free-surface
15				MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	AQWA-LINE	X			
16					COLUMN AND PONTOON	AQWA-LINE	X			
17					PONTOON AND PONTOON	AQWA-LINE	X			
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	AQWA-LINE	X			Singularity distribution technique.
19					IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON	AQWA-LINE	X			optional inclusion of morison elements.
20					DIFFRACTION & FLUID FINITE ELEMENT	—		X		
21					OR ANY OTHER COMBINATION, PLEASE SPECIFY	.		X		
22			SECOND ORDER	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	AQWA-LINE		X		Airy Wave Theory.
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	AQWA-LINE	X			Far field formulation
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"		X		
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"		X		
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X		

					Question	Program Name	Yes	No		Comments
27	*****	:		VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG			X		See other AQWA Suite programs for this facility.
28		:			DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY			X		
29		:			IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X		
30		:	ORDER		IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X		
31		:		FORCES	DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION			X		
32		:			IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM			X		
33		:	....		DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			X		
34	****	FREQUENCY		ADD MASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	AQWA-LINE	X	X		optional for calculation or specification.
35					CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE); OTHERS	AQWA-LINE	X			3D
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X		
38					IS THE CURRENT DRAG DAMPING CONSIDERED			X		
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
40					IS THE RADIATION DAMPING CONSIDERED	AQWA-LINE	X			
41	MOT	DO			IS THE STRUCTURAL DAMPING CONSIDERED	AQWA-LINK		X		Depends on F.E. package

					Program Name	Yes	No		Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	AQWA-LINE	X	X		optional.
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	AQWA-LINE	X	X		optional — additional stiffness may be input eg mooring, wind, etc.
44				IS THE STIFFNESS MATRIX COMPUTED	AQWA-LINE	X			hydrostatic stiffness
45	*	** WIND	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	AQWA-LINE		X		
46	*	W	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			X		See Time Domain
47	*	I		DAVENPORT			X		Analysis AQWA-DRIFT
48	ENVI	N		SIMIU			X		
49	RONM	**		OTHERS (SPECIFY)			X		
50	ENTA	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE					
51	L			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE					
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT	AQWA-FER	X			
53		*		MEAN SPECTRAL PERIOD	AQWA-FER	X			
54		*		WAVE SCATTER DIAGRAM			X		
55		*	.....	LINEAR WAVE	AQWA-LINE	X			
56				STRETCH LINEAR			X		

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...			
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN			
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			Not Relevant To Diffraction Theory (See AQWA-NAUT Time History Regular Wave Program)
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			
62		V		EXTENDED VELOCITY POTENTIAL			
63		E		CNOIDAL WAVE THEORY			
64		S	SEA SPECTRA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	AQWA-FER	X	
65	D			ISSC	AQWA-FER	X	
66	E			JONSWAP	AQWA-FER	X	
67	S			BRETSCHNEIDER		X	
68	C			SCOTT		X	
69	R	*		OCHI (SIX PARAMETER)		X	
70	I	*		INPUT SPECTRA	AQWA-FER	X	
71	P	*		OTHERS		X	
	T	*					
	I	*					
	O	*					
	N	*					
		*					

				PROGRAM NAME	YES	NO		COMMENTS
72	* *	* *	DIRECTIONAL SPECTRA			X		
73	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA			X		
74	* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X		
75	SOLUTION TECHNIQUE	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	AQWA-FER AQWA-LINE	X			6 d.o.f. per Body Max of 10 Bodies ∴ 60 d.o.f.
76		STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	AQWA-FER AQWA-LINE	X			
77		STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	AQWA-LINE To ASAS	X			Depends on Elements defined in structural Line.
78		DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	AQWA-LINE AQWA-FER	X			6 d.o.f per body Max of 10 bodies ∴ 60 d.o.f.
79		DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	AQWA-LINE AQWA-FER	X			Full coupling.
80		DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY	AQWA-FER	X		KROLIKOWSKI & GAY — 1984/AIS	
81		DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS .. GAUSSIAN ELIMINATION		X			GAUSS.
82		DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY			X		
83			MEAN OFFSET OF THE PLATFORM	AQWA-LIBRUM	X			
84			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	AQWA-LINE AQWA-FER	P			
85	* *** ***** *******	PLATFORM RESPONSE OUTPUT	PLATFORM MOTION RESPONSE SPECTRA	AQWA-FER	X			
86		PLATFORM RESPONSE OUTPUT	RESPONSE STATISTICS .. MEAN VALUE	AQWA-FER	X			

				Program NAME	Yes	No		Comments
87	******* ***** *** *		RESPONSE STATISTICS .. R.M.S. VALUE	AQWA-FER	X			
88			RESPONSE STATISTICS .. (SIGNIFICANT)1/3	AQWA-FER	X			
89			RESPONSE STATISTICS .. OTHERS; SPECIFY	AQWA-FER	X			
90			EIGEN VALUES (SYSTEM NATURAL PERIODS)	AQWA-FER				
91	** ****		MODEL TEST - INDICATE SCALE	AQWA-LINE AQWA-FER	X			
92	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	A "	X			
93			OTHER PUBLISHED MATERIAL - SPECIFY	"	X			
94	**** **		OTHERS (SPECIFY)	"	X			In house Full scale measurements
95	* * * * * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	AQWA-FER	X			
96			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X			
97			VERTICAL (TAUT) MOORING	"	X			
98			HYBRID/OTHER COMBINATION .... SPECIFY	"	X			
99		MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X			
100	M		CHAIN (STEEL)	"	X			
101	O		WIRE ROPE (STEEL)	"	X			

					Program Name	Yes	No		Comments
102				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	AQUA-FER	X			
103				USER SPECIFIED LOAD DISPLACEMENT TABLE	AQUA-FER	X			
104				IS IT BASED ON CATENARY EQUATION	"	X			
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STIFFNSS, CIRCLE	"	X		finish 1984/1985	
106				OTHERS (SPECIFY)			X		
107			DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	AQUA-FER	X			Note:- STIFFNESS EFFECTS ONLY.
108				IS THE MASS OF THE MOORING CONSIDERED	AQUA-FER		X		
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	AQUA-FER	X			
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	AQUA-FER	X			
111				IS GEOMETRIC NON LINEARITY CONSIDERED	AQUA-FER	X			
112				IS MATERIAL NON LINEARITY CONSIDERED	AQUA-FER	X			
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED			X		
114				IS THE STRUCTURAL DAMPING CONSIDERED			X		
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	AQUA-FER	X			
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STIFFNSS, CIRCLE			X		

ANALYSES: STATICS
VERTICAL: MOOR

						Program Name	Yes	No		Comments
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD	"		X		
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X		
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"		X		
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X		
121			M O D E L		IS THE MOORING HYDRODYNAMIC MODEL 2D	"		X		
122					IS THE MOORING HYDRODYNAMIC MODEL 3D	AQUA-FER.	X			
123	C	M,			IS THE MOORING MODEL TWO DIMENSIONAL	"		X		
124	A P A B I L I T I E S	O O R I N G			IS THE MOORING MODEL THREE DIMENSIONAL	AQUA-FER	X			
125					IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"		X		
126					IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"		X		
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	AQUA-FER	X			
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		X		
129		*	DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	AQUA-FER	X			STIFFNESS ONLY.
130		* * *	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	AQUA-FER	X			
131		** ****			MEAN LOAD OF THE MOORING LINE	AQUA-FER	X			

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	AQWA-FER	X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	AQWA-FER	X			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	"	X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	AQWA-FER	X			Extreme statistics.,
136		* ***	WITH MODEL TESTS - INDICATE SCALE	AQWA	X			The complete suite of programs.
137	* * * * * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS	AQWA	X			
138			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	X			
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	AQWA-RISER	X			
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL	"	X			
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL	"		X		
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD	"	X			
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			X		
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY	"	X			
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"		X		
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	X			

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	AQUA-RISER	X		
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	
149			IS THE RISER HYDRODYNAMIC MODEL 2D	"	X		
150			IS THE RISER HYDRODYNAMIC MODEL 3D	"		X	
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	"	X		
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS	"	X		
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	"		X	
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	"	X		
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	"	X		
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	AQUA-RISER	X		
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	"	X		Both the programs is range of freq. & time domain.
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY		X		
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING	AQUA-LIBRIUM	X		
160			INTACT WITH VERTICAL TAUT TENDONS	"	X		
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X		

				Program Name	Yes	No		Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	AQWA-LIBRIUM	X			
163	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	AQWA-LINE	X			Structural link program
164			IS INERTIA LOADING CONSIDERED	"	X			
165	S T R U C T U R A L A N A L Y S I S		IS DYNAMIC LOADING CONSIDERED	"	X			
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"		X		
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"		X		
168		, , * *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT	"		X		
169			SHELL ELEMENT	"		X		
170			PLATE ELEMENT	"	X			
171			STIFFENED PLATE ELEMENT	"	X			
172		*** *	OTHERS .... SPECIFY	"	X			
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"	X			Shell 8,9,6 & 3 node with 3 nodal dof.
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	ASAS	X			
175			MODAL ANALYSIS	ASAS - Dynamics	X			
176	* * * *		FATIGUE LIFE ANALYSIS	FAT STACK	X			

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	AQWA-Suite ASAS-Suite	X			
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	ASAS-Suite AQWA-Suite	X			
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	ASDIS, CGUL, AQWA-PLANE	X			
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	ASAS, -BEAMST.	X			
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION	ASAS suite AQWA "	X			Fortran 66.
182		.... BASIC			X		
183		.... PASCAL			X		
184		.... OTHERS; SPECIFY			X		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					Far to many programs to document in question hr.
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	AQWA Suite ASAS Suite	X			
187		IS THEORETICAL MANUAL AVAILABLE	AQWA Suite	X			to some programs only
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	AQWA ASAS	X			
189		IS ANY TRAINING OFFERED	"	X			
190	** ****	IBM	AQWA & ASAS	X			
191		CDC	"	X			

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	"	X			
193		VAX	"	X			
194		MICRO .. SPECIFY	AQWA	X			IBM p.c.
195	**** **	OTHERS .... SPECIFY	AQWA.	X			ICL,
196	** ****	LEASE (PRICE $ .00)		X			
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)		X			
198		CONSULTANCY BASIS	AQWA ASAS.	X			
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES	PLEASE NOTE THAT THE 'AQWA' SUITE AND 'ASAS' SUITE ARE					
201		COMPOSED OF A NUMBER OF PROGRAMS: (DETAILS ATTACHED)					
202							

W.S. ATKINS

TIME DOMAIN USING MORISON'S EQUATION

WSA

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	AQWA-LIBRIUM	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	AQWA-NAUT	X			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5			CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES	AQWA-NAUT	X			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"	X	X		optional
7		. : ORIENTATION : MEMBER :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
8	E	. : : M	VERTICAL MEMBER	"	X			
9	N V	. E M	HORIZ. MEMBER	"	X			
10	I	. B E	X-SECT DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION			X		
11	R	. R :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"	X			

					Program Name	Yes	No		Comments
12	ON		ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	[illegible]		X		
13	M			IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER					
14	E	W		ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"		X		
15	H	A		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		
16	T	V	MEMBER INTER-ACTION	COLUMN AND PONTOON	"		X		
17	A	E		PONTOON AND PONTOON	"		X		
18	L		FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"	X			
19				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	"	X			
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	X			
21	F	F		IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X		
22	O	O	DRIFT	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23	R	R		DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY			X		
24	C	C		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25	E	E	SECON FORCES	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26	S	S		DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X		

						Program Name	Y/S	NO	COMMENTS
27	*	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	AQWA-NAUT	X		
28	*				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"	X		
29	*				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X	
30	*				IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X	
31	*				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	AQWA-NAUT	X		
32	*				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM			X	
33	*	,,			DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	AQWA-NAUT	X		
34	*	*	*	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"	X	X	optional
35	*	*	*	ADDMASS	CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	"	X		
36	*	*	REGULAR WAVE	DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
37	*	*			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X	
38	EQUAT	T			IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		
39		I			IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X	
40		M			IS THE RADIATION DAMPING CONSIDERED	"	X		
41					IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Program Name	Yes	No	Comments
42	I	E	V	T	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	AQWA-WAVE	X	X	optional
43	O		E	S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"	X	X	optional
44	N		S	STIFFNS	IS THE STIFFNESS MATRIX COMPUTED	"	X		
45		D	X	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"	X		optional
46	O	O	X		CIRCLE / COMPUTING METHOD : 2D (3D(ARBITRARY SHAPE) OTHERS	"	X		
47	F	M	I	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
48	M	,	R		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
49	O	A	E		IS THE CURRENT DRAG DAMPING CONSIDERED				
50	T	I	G		IS THE CURRENT FRICTION DAMPING CONSIDERED				
51	I	N	U		IS THE RADIATION DAMPING CONSIDERED				
52	O		L		IS THE STRUCTURAL DAMPING CONSIDERED				
53	N		A		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
54	X	X	R		IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
55	X	X	W	STIFFNS	IS THE STIFFNESS MATRIX COMPUTED				
56	X	X	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	AQWA-WAVE	X		

					Program Name	Yes	No	Comments
57	* * *	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			X	
58				DAVENPORT			X	
59				SIMIU			X	
60	ENVIRONMENTAL			OTHERS (SPECIFY)			X	
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			X	
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	AQUA-NAUT	X		
63		*	WAVE	SIGNIFICANT WAVE HEIGHT			X	
64		* *		MEAN SPECTRAL PERIOD			X	
65		* *		WAVE SCATTER DIAGRAM			X	
66		* *		LINEAR WAVE	AQUA-NAUT	X		
67				STRETCH LINEAR			X	
68				STOKE'S (2ND) 3RD OR 5TH ORDER ... PLEASE CIRCLE ...	AQUA-NAUT	X		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN			X	
70		W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND			X	
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH			X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY			X	
73		E	.	EXTENDED VELOCITY POTENTIAL			X	
74		S	.	CNOIDAL WAVE THEORY			X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ				
76	D		E	ISSC				
77	E		A	JONSWAP				
78	S		S	BRETSCHNEIDER				
79	C	*	P	SCOTT				
80	R	*	E	OCHI (SIX PARAMETER)				
81	I	*	C	INPUT SPECTRA				
82	P	*	T	OTHERS				
83	T	*	R	DIRECTIONAL SPECTRA				
84	I		A	DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
85	O		O	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
86	N		S	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	AQUA-NAUT	X		10 bodies with 6 d.o.f.

				Program Name	Yes	No	Comments
87	*	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	AQUA-PLANE	X		ALL dof is 60
88	SOLUTION		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
89	SOLUTION	. . . . .	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"	X		10 bodies & each with 6 dof ie 60 dof
90	SOLUTION	. . . . .	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	X		ALL 60 if required
91	SOLUTION		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
92		DYNAMICS	METHOD OF INTEGRATION USED .... HOUBOLT			X	
93			.... WILSON - θ			X	
94			.... NEWMARK - β			X	
95	TECHNIQUE		OTHERS .... PLEASE SPECIFY	AQUA-PLANE	X		2 stage predictor/corrector
96		TIME DOMAIN	HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	"		X	
97			.... VARIABLE INTEGR-ATION TIME	"	X		
98			OTHERS .... PLEASE SPECIFY	"	X		Motion filtering
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"	X		
100	****		OTHERS .... PLEASE SPECIFY	"		X	
101			PLATFORM MOTION TIME HISTORY	"	X		

			Program Name	Yes	No		Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	AQUA-LINE	X			
103		... R.M.S. VALUE	"	X			
104		... (SIGNIFICANT)1/3	"	X			
105		... EXPECTED MAXIMUM	"	X			
106		... OTHERS, SPECIFY			X		
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	"	X			
108	PROGRAM VERIFICATION ** ****	MODEL TEST - INDICATE SCALE	"	X			1/40th → 1/200th
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X			Tritive (I.F.P.)
110		OTHER PUBLISHED MATERIAL - SPECIFY	"	X			B. Molin papers.
111		OTHERS (SPECIFY)			X		
112	DESCRIPTION * * * *	SPREAD MOORING (CATENARY)	AQUA-LINE	X			
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X			
114		VERTICAL (TAUT) MOORING	"	X			
115	M	HYBRID/OTHER COMBINATION .... SPECIFY	"	X			Hawsers.
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X			

					Program Name	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)	AQUA-WAVE	X		
118				WIRE ROPE (STEEL)	"	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"	X		
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		
121				IS IT BASED ON CATENARY EQUATION	"	X		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			X	
123				OTHERS (SPECIFY)			X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	AQUA-WAVE	X		
125				IS THE MASS OF THE MOORING CONSIDERED			X	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X		
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
129				IS MATERIAL NON LINEARITY CONSIDERED	"	X		
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	
131				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

					Program Name	Yes	No	Comments
132			NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	AQWA-NAUT	X	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			X
134					IS IT BASED ON FINITE DIFFERENCE METHOD			X
135	C		M	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X
136	A		O		IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER			X
137	P		D		IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING			X
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL			X
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL	AQWANAUT	X	
140	I				IS THE MOORING MODEL TWO DIMENSIONAL	"		X
141	L				IS THE MOORING MODEL THREE DIMENSIONAL	"	X	
142	I	M			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	"		X
143	T	O			IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING	"		X
144	I	O			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES	"		
145	E	R			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		X
146	S	I	DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	AQWA-NAUT	X	via Stiffness

				Program Name	Yes	No		Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	AQUA-VAULT AQUA-LIBRIUM	X			
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	"	X			
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	"	X			
150			... R.M.S. VALUE	"	X			
151			... (SIGNIFICANT)1/3	"	X			
152			... EXPECTED MAXIMUM	"	X			
153			... OTHERS, SPECIFY			X		
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	"	X			1/40 → 1/200th scale
155	* * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	"	X			Tritin (IFP)
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	X			Full scale
157	* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES					
158		* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL					
159	R		IS THE RISER MODEL THREE DIMENSIONAL					see before
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD					
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD					

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167	S		IS THE RISER MODELLED AS TWO DIMENSIONAL				
168	T E M	, , L	IS THE RISER MODELLED AS THREE DIMENSIONAL				
169	M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				see above
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175	*	PROGRAM VERIFICATH	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Lee No		Comments
177	* ***	INTACT	INTACT FREE FLOATING				
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179	STABILITY ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* * * *		HYDRODYNAMIC LOADING CONSIDERED				
182		LOADING	IS INERTIA LOADING CONSIDERED				
183	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED				
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		* ***	BEAM ELEMENT				
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT				
189		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT				
190		*** *	OTHERS .... SPECIFY				
191		*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

				Program Name	Yes	No	Comments
192	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
193	*		MODAL ANALYSIS				
194	* * * *		FATIGUE LIFE ANALYSIS				
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)				
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)				
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)				
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)				
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION				
200			.... BASIC				
201			.... PASCAL				
202			.... OTHERS SPECIFY				
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE				
205			IS THEORETICAL MANUAL AVAILABLE				
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED				

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED				
208	** ****	IBM				
209		CDC				
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	**** **	MICRO .... SPECIFY				User Friendly
213		OTHERS .... SPECIFY				
214	** ****	LEASE (PRICE $ .00)				
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
216		CONSULTANCY BASIS				
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					
219						
220						

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	x		CALCULATES STATIC WIND					

TIME DOMAIN USING DIFFRACTION THEORY

W.S. ATKINS

					Program Name	Yes	No		Comments
12	ON MENTAL FORCES	WAVE FORCES	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION			X		
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER			X		
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY			X		not in time domain.
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	AQWA-LINE +AQWA-DRIFT	X			
16				COLUMN AND PONTOON	"	X			
17				PONTOON AND PONTOON	"	X			
18			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	AQWA-LINE	X			
19				IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON	AQWA-DRIFT	X			
20				DIFFRACTION AND FLUID FINITE ELEMENT			X		
21				OR ANY OTHER COMBINATION			X		
22			SEC DRIFT FO	DOES IT CONSIDER THE WAVE ELEVATION	AQWA-NAUT				REGULAR WAVES.
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	AQWA-LINE.	X			
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			X		

						Program Name	Yes	No		Comments
27	*	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	AQWA-DRIFT AQWA-NAUT	X			
28	*				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"	X			
29	*				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X		
30	*				IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X		
31	*				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	AQWA-DRIFT AQWA-NAUT	X			
32	*				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"	X			
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"	X			
34	*	*	*	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	AQWA-NAUT	X	X		OPTIONAL
35	*	*	*	ADDMASS	CIRCLE / COMPUTING METHOD : 2D, 3D, ARBITRARY SHAPE, OTHERS	"	X			
36		*	REGULAR WAVA	DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
38	E	T			IS THE CURRENT DRAG DAMPING CONSIDERED	"	X			
39	Q				IS THE CURRENT FRICTION DAMPING CONSIDERED	"	X			
40	U	I			IS THE RADIATION DAMPING CONSIDERED	"	X			
41	A	M			IS THE STRUCTURAL DAMPING CONSIDERED	"	X			w structural hydro-elastic analysis at ASAS

						Program Name	Yes	No		Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	AQWA-NAUT	X	X		optional
43				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"	X			"
44			x x x		IS THE STIFFNESS MATRIX COMPUTED	"	X			"
45	O F	D	x x x	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	AQWA-DRIFT	X			"
46		O	I		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	AQWA-DRIFT	X			
47		M	R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
48	M	A	E G U L A R		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
49	O T I O N	I			IS THE CURRENT DRAG DAMPING CONSIDERED	"	X			
50					IS THE CURRENT FRICTION DAMPING CONSIDERED	"	X			
51		N			IS THE RADIATION DAMPING CONSIDERED	"	X			
52			W A V E S	COEFFICIENTS	IS THE STRUCTURAL DAMPING CONSIDERED	-		X		
53	x x x x x				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM		X	X		optional
54		x x x x		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM		X	X		optional
55			x x x		IS THE STIFFNESS MATRIX COMPUTED		X	X		optional.
56	x	x x	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	AQWADRIFT	X			

					Program Name	Yes	No	Comments
57	*	W	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	AQWA-DRIFT	X		
58	*	I		DAVENPORT "	AQWA-DRIFT	X		
59		N		SIMIU	AQWA-DRIFT	X		
60	E	D		OTHERS (SPECIFY)	"	X		ESDU — spectra,
61	N		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"		X	
62	V			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X		
63	I	*		SIGNIFICANT WAVE HEIGHT	"	X		
64	R	*		MEAN SPECTRAL PERIOD	"	X		
65	O	*		WAVE SCATTER DIAGRAM			X	
66	N	*	WAVE	LINEAR WAVE	AQWA-NAUT AQWA-DRIFT	X		
67	M	*		STRETCH LINEAR			X	
68	E			STOKE'S (2ND) 3RD OR 5TH ORDER ... PLEASE CIRCLE ...	AQWA-NAUT			
69	N			STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN			X	
70	T	W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND			X	
71	A	A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH			X	
	L							

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY			X	
73		E	.	EXTENDED VELOCITY POTENTIAL			X	
74		S	.	CNOIDAL WAVE THEORY			X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	AQUA-DRIFT	X		
76	D		E	ISSC	"	X		
77	E S C R I P T I O N		A S P E C T R A	JONSWAP	"	X		
78		x		BRETSCHNEIDER	"		X	
79		x		SCOTT	"		X	
80		x		OCHI (SIX PARAMETER)	"		X	
81		x		INPUT SPECTRA	"	X		
82	x	x		OTHERS	"		X	
83	x			DIRECTIONAL SPECTRA	"		X	
84	x		OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
85	x			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
86	x		STA	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	AQUA-DRIFT	X		10 BODIES WITH 6 d.o.f each hence 60 d.o.f.

				Program Name	Yes	No	Comments
87	*	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	AQWA-DRIFT	X		ALL 60 d.of
88	SOLUTION		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
89	SOLUTION	DYNAMICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	~~AQWA-NAUT~~ AQWA-DRIFT	X		10 bodies with 6 d.o.f. ∴ 60 dof
90	SOLUTION	DYNAMICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		X		ALL 60 dof
91	SOLUTION	DYNAMICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
92		DYNAMICS	METHOD OF INTEGRATION USED .... HOUBOLT			X	
93		DYNAMICS TIME	.... WILSON - θ			X	
94		DYNAMICS TIME	.... NEWMARK - β			X	
95	TECHNIQUE	DYNAMICS	OTHERS .... PLEASE SPECIFY	~~AQWA-NAUT~~ AQWA-DRIFT	X		2 STAGE predictor/corrector
96	TECHNIQUE	DOMAIN	HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION			X	
97	TECHNIQUE	DOMAIN	.... VARIABLE INTEGR-ATION TIME	"	X		
98	TECHNIQUE	DOMAIN	OTHERS .... PLEASE SPECIFY	"	X		Filtering
99	TECHNIQUE	DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	~~AQWA-NAUT~~ AQWA-DRIFT	X		
100	****	DOMAIN	OTHERS .... PLEASE SPECIFY			X	
101			PLATFORM MOTION TIME HISTORY	"	X		

			Program Name	Yes	No	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	AQWA-DRIFT	X		
103		... R.M.S. VALUE	"	X		
104		... (SIGNIFICANT)1/3	"	X		
105		... EXPECTED MAXIMUM	"	X		
106		... OTHERS, SPECIFY			X	
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	"	X		
108	** **** PROGRAM VERIFICATION	MODEL TEST - INDICATE SCALE	AQWA-DRIFT	X		1/40 th.
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X		DNV etc.
110		OTHER PUBLISHED MATERIAL - SPECIFY	"	X		SPM publications
111	** ****	OTHERS (SPECIFY)	"	X		FULL SCALE DATA. OF SPM & TRANSPORTATION
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)	"	X		
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X		
114		VERTICAL (TAUT) MOORING	"	X		
115	M	HYBRID/OTHER COMBINATION .... SPECIFY	"	X		Hawsers between vessels.
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	X		

					Program Name	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)	AQWA-DRIFT	X		
118				WIRE ROPE (STEEL)	"	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"	X		Wire / synthetic rope
120			CATENARY STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		optional.
121				IS IT BASED ON CATENARY EQUATION	"	X		optional
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
123				OTHERS (SPECIFY)	"	X		analytical formulation.
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X		via STIFFNESS
125				IS THE MASS OF THE MOORING CONSIDERED	"		X	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		optional
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X		
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
129				IS MATERIAL NON LINEARITY CONSIDERED	"	X		
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	
131				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Program Name	Yes	No	Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	AQWA-DRIFT	X		
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
134					IS IT BASED ON FINITE DIFFERENCE METHOD	"		X	
135	C		M	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X	STIFFNESS INFLUENCE only.
136	A		O		IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER	"		X	
137	P		D		IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING	"		X	
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL	"		X	
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL	"	X		
140	I		x x x		IS THE MOORING MODEL TWO DIMENSIONAL	"		X	
141	L				IS THE MOORING MODEL THREE DIMENSIONAL	AQWA-DRIFT	X		
142	I	M			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	"		X	
143	T	O			IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING	"		X	
144	I	R			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES	"	X		
145	E	N			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		X	
146	S	G	x x	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X		stiffness only.

				Program Name	Yes	No	Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	AQUA-NAUT	X		
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	AQUA-DRIFT AQUA-NAUT	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	"	X		
150			... R.M.S. VALUE	"	X		
151			... (SIGNIFICANT)1/3	"	X		
152			... EXPECTED MAXIMUM	"	X		
153			... OTHERS, SPECIFY	"		X	
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	AQUA-DRIFT AQUA-NAUT	X		1/40th → 1/100th.
155	* * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	"	X		D.N.V. software, NMI software.
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	AQUA-NAUT	X		Noble Denton Banga Study.
157	* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	AQUA-RISER	X		
158		* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL	"	X		FREQUENCY DOMAIN PROGRAM.
159	R		IS THE RISER MODEL THREE DIMENSIONAL	"		X	
160	I S		DOES THE PROGRAM USE FINITE ELEMENT METHOD	"	X		
161	E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"		X	

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY	AQWA-RISER	X		
163		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"		X	
164		HYDRODYNAMIC	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	X		
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"	X		
166	S Y		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	
167	S	MODEL	IS THE RISER MODELLED AS TWO DIMENSIONAL	"	X		
168	T		IS THE RISER MODELLED AS THREE DIMENSIONAL	"		X	
169	E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	"	X		
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS	"		X	
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	"		X	
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	"	X		
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	"	X		
174			WITH MODEL TESTS - INDICATE SCALE	"	X		
175	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	"	X		Battelle 2D time history program. + others.
176	* * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	X		International study of various riser programs.

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING	AQWA-DRIFT AQWA-NAUT	X		
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS	"	X		
179	STABILITY ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X		
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	"	X		
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	AQWA-LAUNCH	X		AQWA-DRIFT & AQWA-NAUT Link To Be DEVELOPED 1985
182	STRUCTURAL ANALYSIS	LOADING	IS INERTIA LOADING CONSIDERED	"	X		
183	STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED	"	X		
184	STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"		X	
185	STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	"		X	
186	STRUCTURAL ANALYSIS	* ***	BEAM ELEMENT	"	X		
187	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	SHELL ELEMENT		X		To be developed 1985
188	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	PLATE ELEMENT		X		
189	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT		X		
190	STRUCTURAL ANALYSIS	*** * FINITE ELEMENT ANALYSIS	OTHERS .... SPECIFY		X		
191	STRUCTURAL ANALYSIS	*** * FINITE ELEMENT ANALYSIS	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM		X		

	I S			Program Name	Yes	No		Comments
192		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	FATSACK (in AsAs suite)	X			
193			MODAL ANALYSIS	"	X			
194			FATIGUE LIFE ANALYSIS	"	X			
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	AsAs & AQWA suite	X			
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	"	X			
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	ASBIS c-GUL AQWA-PLAWE	X			
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	BEAMST (ASAS suite)	X			
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION	ASAS + AQWA suite	X			
200			.... BASIC			X		
201			.... PASCAL			X		
202			.... OTHERS SPECIFY			X		
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU		X			Depends on many factors. eg problem type, size, etc.
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE	AQWA ASAS	X			
205			IS THEORETICAL MANUAL AVAILABLE	AQWA ASAS	X			For certain programs.
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	ASAS AQWA	X			

			Program Name	Yes	No		Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	AqwAt ASAS.	X			
208	** ****	IBM	"	X			
209		CDC	"	X			
210	HARDWARE SYSTEM	PRIME COMPUTER	"	X			
211		VAX	"	X			
212	**** **	MICRO .... SPECIFY	"	X			IBM P.C., Decpop.
213		OTHERS .... SPECIFY	"	X			Ich
214	** ****	LEASE (PRICE $ .00)		X			
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)		X			
216		CONSULTANCY BASIS		X			
217	** ****	OTHERS .... SPECIFY					
218	REMARKS AND NOTES						
219							
220							

LONDON CENTER FOR MARINE TECHNOLOGY
IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY

FREQUENCY DOMAIN USING MORISON'S EQUATION

UCL

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	WINDFORCE	X		COMPLETE 1984	
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM			X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		: : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	UCLRIG UCLTBP	X		COMPLETE 1980	
8	E	: : : MEMBER	VERTICAL MEMBER	//	X			
9	N	: : : MEMBER	HORIZ. MEMBER	//	X			
10	V	: : : MEMBER	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	//		X		
11	I R	: : : MEMBER	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	//	X			

						Program Name	Yes	No		Comments
12	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION									
13	IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER					UCLRIG, UCLTBP	X			
14	ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY					"	X			Linear wave pressure at cylinder bases
15	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN							X		
16	COLUMN AND PONTOON							X		
17	PONTOON AND PONTOON							X		
18	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION					"	X			
19	IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY					"	X			
20	IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT							X		
21	IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION					"	X			
22	DOES IT CONSIDER THE WAVE ELEVATION							X		
23	DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY							X		
24	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY							X		
25	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY							X		
26	DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES							X		

						Program Name	Yes	No	Comments
27	* * * *	: : : :	N D	VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG			X	
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY			X	
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X	
30			O R D E R	FORCES	IS ITERATION OF RESPONSE USED FOR CONVERGENCE	11	X		
31					DOES IT USE PREVIOUS ~~STEP~~ STEP RESULTS IN PRESENT STEP SOLUTION	11	X		
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	11	X		
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			X	
34	* * * *	F R E Q U E N C Y		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X	
35					CIRCLE / COMPUTING METHOD : (2D) 3D(ARBITRARY SHAPE); OTHERS	11	2D		
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X	
38					IS THE CURRENT DRAG DAMPING CONSIDERED			X	
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			X	
40					IS THE RADIATION DAMPING CONSIDERED			X	
41	MOT	D O			IS THE STRUCTURAL DAMPING CONSIDERED			X	

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
44				IS THE STIFFNESS MATRIX COMPUTED		X		
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	WINDFORCE	X		
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			X	
47	*			DAVENPORT			X	
48	ENVIRONMENTAL			SIMIU			X	
49		**		OTHERS (SPECIFY)			X	
50		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	DRIFT	X		COMPLETE 1983
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	DRIFT	X		
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT			X	
53		*		MEAN SPECTRAL PERIOD			X	
54		*		WAVE SCATTER DIAGRAM			X	
55		*	.....	LINEAR WAVE		X		
56				STRETCH LINEAR			X	

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...		X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN		X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND		X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH		X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY		X	
62		V		EXTENDED VELOCITY POTENTIAL		X	
63		E		CNOIDAL WAVE THEORY		X	
64		S	SEA SPECTRA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	JONSWP	X	
65	DESCRIPTION			ISSC		X	
66				JONSWAP		X	
67				BRETSCHNEIDER		X	
68				SCOTT		X	
69		*		OCHI (SIX PARAMETER)		X	
70		*		INPUT SPECTRA		X	
71		*		OTHERS		X	

				Program Name	Yes	No		Comments
72	* *	* *	A	DIRECTIONAL SPECTRA			X	
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
74	* *	OTHERS		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY				
76	SOLUTION TECHNIQUE	STATICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				
77	SOLUTION TECHNIQUE	STATICS		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	UCLRIG UCLTBP	6 Plus		6 Rigid body d. of. f. plus additional d. of. f. if applicable
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	1/			All coupling included whereas applicable
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY	K			Linearised damping dissipates same energy at resonance as non-linear damping
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. Form of GAUSSIAN ELIMINATION	11	X		
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY				
83				MEAN OFFSET OF THE PLATFORM			X	
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	UCLRIG UCLTBP CURV	X P		
85	* *** ***** *******			PLATFORM MOTION RESPONSE SPECTRA	DOWSWP	X P		COMPLETE 1983/84
86	PLATFORM RESPONSE OUTPUT			RESPONSE STATISTICS .. MEAN VALUE			X	

				Program Name	Yes	No		Comments
87	******* ***** *** *		RESPONSE STATISTICS .. R.M.S. VALUE			X		
88			RESPONSE STATISTICS .. (SIGNIFICANT)1/3			X		
89			RESPONSE STATISTICS .. OTHERS; SPECIFY			X		
90			EIGEN VALUES (SYSTEM NATURAL PERIODS)	〃	X			
91	** ****		MODEL TEST - INDICATE SCALE	UCLRIG	X			Scales: 1:78, 1:100 1:32, 1:64
92	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	〃				NMI WAVE & see below
93			OTHER PUBLISHED MATERIAL - SPECIFY					
94	**** **		OTHERS (SPECIFY)	UCLRIG			To be published	17th ITTC Ocean Eng. Committee Comparison of Semi Submersible Drilling Rig Motion Calculations
95	* * * * * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	MOOR	X		COMPLETE SEPT 1982	
96			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			X		
97			VERTICAL (TAUT) MOORING	MOOR UCLTBP	X			
98			HYBRID/OTHER COMBINATION .... SPECIFY			X		
99			SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	MOOR	X			
100	M	MATERIA	CHAIN (STEEL)	〃	X			
101	0		WIRE ROPE (STEEL)	〃	X			

					Program Name	Yes	No		Comments
102	O R	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	MOOR	X			
103	I	A	S	USER SPECIFIED LOAD DISPLACEMENT TABLE			X		
104	N	N	T	IS IT BASED ON CATENARY EQUATION	MOOR	X			
105	G	A	A	IS IT BASED ON FINITE EL -EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE			X		
106		L Y	T I	OTHERS (SPECIFY)			X		
107		S E	C S	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X		
108		*	.	IS THE MASS OF THE MOORING CONSIDERED	UCLTBP	X			
109		* *	.	IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X			
110			.	IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			X		
111	S	V		IS GEOMETRIC NON LINEA-RITY CONSIDERED			X		
112	Y	E R		IS MATERIAL NON LINEA-RITY CONSIDERED			X		
113	S	T I		IS THE HYDRODYNAMIC DAMPING CONSIDERED	"	X			
114	T E	C A L	M	IS THE STRUCTURAL DAMPING CONSIDERED	"		X		
115	M		O	IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"	X			
116			O R	IS IT BASED ON FINITE EL -EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE	"	X			

						Program Name	Yes	No	Comments
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD			X	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	4	X		Basic Form
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
121			M O D		IS THE MOORING HYDRODYNAMIC MODEL 2D	4	X		
122					IS THE MOORING HYDRODYNAMIC MODEL 3D			X	
123	C	M,	E		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCTL)	11	X		
124	A	O	L		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCTL)			X	
125	P A B I L I T I E S	O R I N G	. . . . .		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			X	
126					IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES			X	
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
129			DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		X		
130		* ** **	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			X	
131		** ****			MEAN LOAD OF THE MOORING LINE	UCLTBP MOOR	X		

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	UCLTBP MOOR	X			
133		***** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE			X		
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3			X		
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY			X		
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE	UCLTBP	X			Scale 1:60
137	* * * * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS	UCLTBP MOOR	X			UCLRIG NHL
138			WITH OTHER PUBLISHED MATERIAL .... SPECIFY		X			NHL
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	UCLRISER	X		COMPLETE 1980	
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL	"	X			
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL	"		X		
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD	"	X			
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"		X		
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY	"	X			
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"	X			
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	X			Relative velocities and current

				Program Name	Yes	No		Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"	X			
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X		
149			IS THE RISER HYDRODYNAMIC MODEL 2D	"	X			
150			IS THE RISER HYDRODYNAMIC MODEL 3D	"		X		
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	"	X			
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS	"	X			Frequency and Time Domain Solutions
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	"		X		
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	"	X			
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	"	X			
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	"	X			Scale 1:20 (500ft. Water Depth)
157	* * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	"	X			DYN: RISER
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	X			API Tests
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING	ARCHIMEDES	X		COMPLETE DEC 1983	Pressure Integration Method
160			INTACT WITH VERTICAL TAUT TENDONS			X		
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X			

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING			X	
163	* ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
164			IS INERTIA LOADING CONSIDERED				
165	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED				
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
168		* ***	BEAM ELEMENT				
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
170			PLATE ELEMENT				
171			STIFFENED PLATE ELEMENT				
172		*** *	OTHERS .... SPECIFY				
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
175			MODAL ANALYSIS				
176	* ** *		FATIGUE LIFE ANALYSIS				

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	ALL PROGRAMS	X			All UCL Programs have pre & post - some processing capabilities
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	"	X			
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	"	X			
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	"	X			
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (IV & V) SPECIFY THE VERSION	ALL PROGRAMS	X			
182		.... BASIC					
183		.... PASCAL					
184		.... OTHERS; SPECIFY					
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	ALL PROGRAMS	X			
187		IS THEORETICAL MANUAL AVAILABLE	"	X			Some in published papers
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED			X		
189		IS ANY TRAINING OFFERED			X		
190	** ****	IBM		X			
191		CDC		X			

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER		X			
193		VAX		X			
194		MICRO .. SPECIFY					
195	**** **	OTHERS .... SPECIFY	PDP 11 GEC4190	X			
196	** ****	LEASE (PRICE $ .00)	ALL PROGRAMS	X			PRICES AND
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)		X			TERMS CAN BE
198		CONSULTANCY BASIS		X			NEWTIATED WHEN A FIRM REQUEST IS RECEIVED
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES						
201							
202							

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FREQUENCY DOMAIN USING DIFFRACTION THEORY

University College of L ...

THE MATL RECD DOES NOT INDICATE THE EXISTENCE OF CAPABILITY BASED ON DIFFRACTION THEORY. SO, THE TABLES II & IV ARE NOT FILLED IN.

TABLE II

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

For information on program DYHANA please contact Dr. R.EATOCK TAYLOR, UNIVERSITY COLLEGE LONDON

ROW #		**** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	E N V I R	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	DYHANA		X		
2			CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"		X		
3			IS THE WIND FORCE AN INPUT TO THE PROGRAM	"		X		
4		CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"		X		
5			CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	"		X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"		X		
7		MEMBER ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	✓			
8			VERTICAL MEMBER	"	✓			
9			HORIZ. MEMBER	"	✓			
10		MEMBER X-SECT	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	"	✓			
11			DOES IT USE EQUIVALENT CIRCULAR X-SECTION	"		X		

						Program Name	Yes	No		Comments
12	OFFSHORE	NAVIGATION			IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	DYHANA	✓			
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"		✗		
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	✓			Direct solution for velocity potential.
15				MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	✓			
16					COLUMN AND PONTOON	"	✓			
17					PONTOON AND PONTOON	"	✓			
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	✓			First order diffraction + radiation
19					IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON	"		✗		
20					DIFFRACTION & FLUID FINITE ELEMENT	"	?			
21					OR ANY OTHER COMBINATION, PLEASE SPECIFY	"	✓			Finite element + Boundary element
22	FORCES		SECOND DRIFT FORCES		DOES IT CONSIDER THE WAVE ELEVATION	"	✓			
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	✓			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	✓			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	✓			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	✓		To be completed July 85	

					Program Name	Yes	No	Comments
27			VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	DYHANA		X	
28				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	〃		X	
29				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	〃		X	
30		ORDER		IS ITERATION OF RESPONSE USED FOR CONVERGENCE	〃		X	
31				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	〃		X	
32				IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	〃		X	
33				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	〃		X	
34			ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	〃		X	
35		FREQUENCY		CIRCLE / COMPUTING METHOD : 2D (3D) ARBITRARY SHAPE); OTHERS	〃	3D		
36	EQUATION		DAMPING COEFFICIENT	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	〃		X	
37				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	〃		X	
38				IS THE CURRENT DRAG DAMPING CONSIDERED	〃		X	
39	OF			IS THE CURRENT FRICTION DAMPING CONSIDERED	〃		X	
40				IS THE RADIATION DAMPING CONSIDERED	〃	✓		
41	NUMBER	DOF		IS THE STRUCTURAL DAMPING CONSIDERED	〃	✓		

					Program Name	Yes	No	Comments
42	IOH	MAIN	IS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	DYHANA		X	
43	IOH	MAIN	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"	✓	X	Hydrostatics calculated Tethers etc input
44	IOH	MAIN	STIFFNS	IS THE STIFFNESS MATRIX COMPUTED	"	✓		See above
45	ENVIRONMENTAL	WIND STATIC		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	"		X	
46	ENVIRONMENTAL	WIND DYNAMIC		IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	"		X	
47	ENVIRONMENTAL	WIND DYNAMIC		. DAVENPORT	"		X	
48	ENVIRONMENTAL	WIND DYNAMIC		SIMIU	"		X	
49	ENVIRONMENTAL	WIND DYNAMIC		OTHERS (SPECIFY).	"		X	
50	ENVIRONMENTAL	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"		X	
51	ENVIRONMENTAL	CURRENT		IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"		X	
52	ENVIRONMENTAL		STATISTICS	SIGNIFICANT WAVE HEIGHT	"		X	
53	ENVIRONMENTAL		STATISTICS	MEAN SPECTRAL PERIOD	"		X	
54	ENVIRONMENTAL		STATISTICS	WAVE SCATTER DIAGRAM	"		X	
55			...	LINEAR WAVE	"	✓		
56			...	STRETCH LINEAR	"		X	

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	DHANA	X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN	"	X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHMIND	"	X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH	"	X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY	"	X	
62		V		EXTENDED VELOCITY POTENTIAL	"	X	
63		E		CNOIDAL WAVE THEORY	"	X	
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	X	
65				ISSC	"	X	
66				JONSWAP	"	X	
67				BRETSCHNEIDER	"	X	
68				SCOTT	"	X	
69		X		OCHI (SIX PARAMETER)	"	X	
70		X		INPUT SPECTRA	"	X	
71		X		OTHERS	"	X	

DESCRIPTION

X X X X X

				Program Name	Yes	No	Comments
72		OTHERS	DIRECTIONAL SPECTRA	DYHANA		X	
73			DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
74			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE		✓		can be input
75	SOLUTION TECHNIQUE	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6		
76			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		Any		
77			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
78		DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		24		24 rigid or distortion modes (for more bodies)
79			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		Any		
80			WHAT METHOD OF LINEARIZATION USED .... SPECIFY		None		
81			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS .. GAUSSIAN ELIMINATION				
82			OTHERS .... SPECIFY		Modal		
83	PLATFORM RESPONSE OUTPUT		MEAN OFFSET OF THE PLATFORM			X	
84			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'		P		
85			PLATFORM MOTION RESPONSE SPECTRA			X	
86			RESPONSE STATISTICS .. MEAN VALUE			X	

			Program Name	Yes	No		Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	DYNAMA		X		
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"		X		
89		RESPONSE STATISTICS .. OTHERS; SPECIFY	"		X		
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	"	✓			
91	** ****	MODEL TEST - INDICATE SCALE	"	✓			1/36 and 1/100
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	✓			HYDRA, NMIWAVE, AXID etc
93		OTHER PUBLISHED MATERIAL - SPECIFY	"	✓			Results by Garrison, Faltinsen, van Oortmerssen etc.
94	**** **	OTHERS (SPECIFY)	"	✓			Analytical & Numerical for special cases.
95	* * * * * * *	SPREAD MOORING (CATENARY)	M	✓			
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	✓			
97		VERTICAL (TAUT) MOORING	"	✓			
98		HYBRID/OTHER COMBINATION .... SPECIFY	"	✓			Assumed linear
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"	✓			
100	M	CHAIN (STEEL)	"	✓			
101	O	WIRE ROPE (STEEL)	"	✓			

DESCRIPTION

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					Program Name	Yes	No		Comments
102	MOORING SYSTEM	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE -OTHERS, SPECIFY	DYNAMA	✓			Assumed linear
103	MOORING SYSTEM	ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			X		
104	MOORING SYSTEM	ANALYSES	STATICS	IS IT BASED ON CATENARY EQUATION			X		
105	MOORING SYSTEM	ANALYSES	STATICS	IS IT BASED ON FINITE EL -EMENT METHOD W/ OR W/O BENDING STIFFNSS, CIRCLE			X		
106	MOORING SYSTEM	ANALYSES	STATICS	OTHERS (SPECIFY)		✓			Linear stiffnesses
107	MOORING SYSTEM	ANALYSES	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X		
108	MOORING SYSTEM	VERTICAL	MOORING	IS THE MASS OF THE MOORING CONSIDERED			X		
109	MOORING SYSTEM	VERTICAL	MOORING	IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		✓			
110	MOORING SYSTEM	VERTICAL	MOORING	IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING					
111	SYSTEM	VERTICAL	MOORING	IS GEOMETRIC NON LINEA- RITY CONSIDERED					
112	SYSTEM	VERTICAL	MOORING	IS MATERIAL NON LINEA- RITY CONSIDERED					
113	SYSTEM	VERTICAL	MOORING	IS THE HYDRODYNAMIC DAMPING CONSIDERED					
114	SYSTEM	VERTICAL	MOORING	IS THE STRUCTURAL DAMPING CONSIDERED					
115	SYSTEM	VERTICAL	MOORING	IS THE MOORING SYSTEM COUPLED WITH PLATFORM					
116		VERTICAL	MOORING	IS IT BASED ON FINITE EL -EMENT METHOD, W/ OR W/O BENDING STIFFNSS, CIRCLE					

						Program Name	Yes	No	Comments
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD	DYHANA		X	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
121			M O D		IS THE MOORING HYDRODYNAMIC MODEL 2D			X	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D			X	
123	C	M O O R I N G	E L		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)			X	
124	A P A B I L I T I E S				IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)			X	
125					IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			X	
126					IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES		✓		By direct input
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
129			DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X	
130		* * *	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING		✓		
131		** ****			MEAN LOAD OF THE MOORING LINE			X	

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	DYHANA	✓			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	"		X		
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	"		X		
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	"		X		
136	******	* ***	WITH MODEL TESTS - INDICATE SCALE	"		X		
137		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	"		X		
138		*** *	WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		X		
139	******		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	"		X		
140		**	IS THE RISER MODEL TWO DIMENSIONAL	"		X		
141		STRUCTURAL	IS THE RISER MODEL THREE DIMENSIONAL	"		X		
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD	"		X		
143	RISER		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"		X		
144		MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY	"		X		
145		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"		X		
146		***	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X		

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	DYHANA		X	
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	-		X	
149			IS THE RISER HYDRODYNAMIC MODEL 2D	-		X	
150			IS THE RISER HYDRODYNAMIC MODEL 3D	-		X	
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	-		X	
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS	-		X	
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	-		X	
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	-		X	
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	-		X	
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	-		X	
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	-		X	
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	-		X	
159	* ***	I H T A C T.	INTACT FREE FLOATING	-		X	
160	STABILITY		INTACT WITH VERTICAL TAUT TENDONS	-		X	
161	ANALYSIS	D A M	DAMAGED EQUILIBRIUN WITH COMPARTMENT (S) DAMAGED	-		X	

				Program Name	Yes	No	Comments
162	XXXX X	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	DYHANA		X	
163	X XXX X	LOADING	HYDRODYNAMIC LOADING CONSIDERED	✓	✓		
164			IS INERTIA LOADING CONSIDERED	✓	✓		
165	S T		IS DYNAMIC LOADING CONSIDERED	✓	✓		
166	R U C	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	✓	✓		To be completed July 85
167	T		THREE DIMENSIONAL SPACE FRAME ANALYSIS	✓	✓		To be completed July 85
168	U R A	, X XXX	BEAM ELEMENT	✓		X	
169	L	FINITE ELEMENT ANALYSIS	SHELL ELEMENT	✓		X	
170			PLATE ELEMENT	✓		X	
171	A N		STIFFENED PLATE ELEMENT	✓		X	
172	A L	XXX X	OTHERS .... SPECIFY	✓		X	
173	Y S		NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	✓		X	
174	I S		SPECTRAL ANALYSIS	✓		X	
175		OTHER ANALYTICAL	MODAL ANALYSIS	✓	✓		
176	X XXX X	CAPABILITY	FATIGUE LIFE ANALYSIS	✓		X	

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	DYHANA	✓			
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	-	✓			
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	-	✓			
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	-		X		
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (✓) SPECIFY THE VERSION	-	✓			
182		.... BASIC	-		X		
183		.... PASCAL	-		X		
184		.... OTHERS; SPECIFY	-		X		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	-				
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	-	✓			Under appropriate conditions
187		IS THEORETICAL MANUAL AVAILABLE	-		X		
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	-		X		
189		IS ANY TRAINING OFFERED	-		X		
190	** ****	IDN	-				
191		CDC	-	✓			

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	DYHANA				
193		VAX	✓				
194		MICRO .. SPECIFY	✓				
195	**** **	OTHERS .... SPECIFY	✓	✓			Running on HP9000 desktop
196	** ****	LEASE (PRICE $ .00)	✓				
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $15000.00)	✓				Approx price subject to negotiation
198		CONSULTANCY BASIS	✓	✓			
199	**** **	OTHERS .... SPECIFY	✓				
200	REMARKS AND NOTES	For information contact Dr R. CATOCK TAYLOR					
201		UNIVERSITY COLLEGE LONDON LONDON WC1E 7JE					
202		U.K.					

LONDON CENTER FOR MARINE TECHNOLOGY
IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY

TIME DOMAIN USING MORISON'S EQUATION

UCL

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	WINDFORCE	X		COMPLETE 1984	
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM			X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
5			CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		. : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	UCLRIGHT UCLTBPT	X		COMPLETE 1980	
8	E	. : M	VERTICAL MEMBER	"	X			
9	N	. E M	HORIZ. MEMBER	"	X			
10	V	. B E	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		X		
11	I R	. R : X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	4	X			

					Program Name	Yes	No		Comments
12	ONMENTAL FORCES	WAVE FORCES	... ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	UCLRIGT UCLTBPT	X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN			X		
16				COLUMN AND PONTOON			X		
17				PONTOON AND PONTOON			X		
18			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"	X			
19				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	"	X			
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT			X		
21				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X		
22			... SECON DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION			X		
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY			X		
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			X		
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY			X		
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			X		

						Program Name	Yes	No	Comments
27				VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		X		
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL			X	
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X	
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X	
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	〃	X		
32					IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	〃	X		
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			X	
34				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X	
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS	〃	2D		
36				DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	〃	X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X	
38					IS THE CURRENT DRAG DAMPING CONSIDERED			X	
39					IS THE CURRENT FRICTION DAMPING CONSIDERED			X	
40					IS THE RADIATION DAMPING CONSIDERED			X	
41					IS THE STRUCTURAL DAMPING CONSIDERED			X	

						Program Name	Yes	No		Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X		
43				S T I F F N S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X		
44			***		IS THE STIFFNESS MATRIX COMPUTED	"	X			
45	O F	D	***	A D D M A S S	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X		
46		O	I		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS	2D	X			
47		M	R R	D A M P I N G	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X			
48	M	,, A	E G		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X		
49	O T		U L		IS THE CURRENT DRAG DAMPING CONSIDERED			X		
50	I	I	A R	C O E F F I C I E N T S	IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
51	O	N			IS THE RADIATION DAMPING CONSIDERED			X		
52	N		W A		IS THE STRUCTURAL DAMPING CONSIDERED			X		
53			V E		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X		
54	*****	****	S	S T I F F N S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X		
55			***		IS THE STIFFNESS MATRIX COMPUTED		X			
56	*	**	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	WINDFORCE	X			

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			X	
58				DAVENPORT			X	
59				SIMIU			X	
60				OTHERS (SPECIFY)			X	
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	DRIFT	X		COMPLETE 1983
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X		
63			WAVE THEORIE	SIGNIFICANT WAVE HEIGHT			X	
64				MEAN SPECTRAL PERIOD			X	
65				WAVE SCATTER DIAGRAM			X	
66				LINEAR WAVE		X		
67				STRETCH LINEAR				
68				STOKE'S 2ND, 3RD OR (5TH) ORDER .... PLEASE CIRCLE ...		X		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN			X	
70		W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND			X	
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH			X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY			X	
73		E	.	EXTENDED VELOCITY POTENTIAL			X	
74		S	.	CHOIDAL WAVE THEORY			X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	JONSWP	X		
76	D		E	ISSC		X		
77	E		A	JONSWAP		X		
78	S		S	BRETSCHNEIDER			X	
79	C	x	P	SCOTT			X	
80	R	x	E	OCHI (SIX PARAMETER)			X	
81	I	x	C	INPUT SPECTRA			X	
82	P	x	T	OTHERS			X	
83	T	x	R	DIRECTIONAL SPECTRA			X	
84	I	x	A	DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
85	O	x		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
86	N	x		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	UCL RGT UCL TBPT	6 PLUS		

			Program Name	Yes	No	Comments
87	* SOLUTION TECHNIQUE *****	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"			6 Rigid body d. of f. plus additional dof due to structural articulation
88		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
89		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"			All 6 motion plus articulation
90		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"			All of the above
91		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
92		METHOD OF INTEGRATION USED .... HOUBOLT				
93		.... WILSON - θ				
94		.... NEWMARK - β	"	X		
95		OTHERS .... PLEASE SPECIFY				
96		HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION			X	
97		.... VARIABLE INTEGR-ATION TIME	"	X		
98		OTHERS .... PLEASE SPECIFY				
99		MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	UCLTBPT UCLRIGT	X		
100		OTHERS .... PLEASE SPECIFY				
101		PLATFORM MOTION TIME HISTORY		X		

DYNAMICS TIME DOMAIN

			Program Name	Yes	No		Comments
102		PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE		X			
103	PLATFORM RESPONSE OUTPUT	... R.M.S. VALUE		X			
104		... (SIGNIFICANT)1/3		X			
105		... EXPECTED MAXIMUM		X			
106		... OTHERS, SPECIFY					
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS			X		
108	** ****	MODEL TEST - INDICATE SCALE		X			1:60, 1:100, 1:200 Scales.
109	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS			X		
110		OTHER PUBLISHED MATERIAL - SPECIFY			X		
111	** ****	OTHERS (SPECIFY)					
112	* * * * *	SPREAD MOORING (CATENARY)	Moor	X		COMPLETE SEPT 1982	
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			X		
114		VERTICAL (TAUT) MOORING	moor UCLTOOT	X			
115	M	HYBRID/OTHER COMBINATION .... SPECIFY			X		
116	0	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	Moor	X			

DESCRIPTION

No.				Item	Program Name	Yes	No		Comments
117	DRINGS SYSTEM	MATERIAL		CHAIN (STEEL)	"	X			
118				WIRE ROPE (STEEL)	"	X			
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"	X			
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			X		
121				IS IT BASED ON CATENARY EQUATION	"	X			
122				IS IT BASED ON FINITE EL -MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			X		
123				OTHERS (SPECIFY)			X		
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X		
125		******* VE	**** MOORI	IS THE MASS OF THE MOORING CONSIDERED	UCLTBPT	X			
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X			
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"		X		
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"		X		
129				IS MATERIAL NON LINEARITY CONSIDERED	"		X		
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"	X			
131				IS THE STRUCTURAL DAMPING CONSIDERED			X		

						Program Name	Yes	No	Comments
132			H G		IS THE MOORING SYSTEM COUPLED WITH PLATFORM			X	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STIFFNSS, CIRCLE	11	X		
134					IS IT BASED ON FINITE DIFFERENCE METHOD			X	
135	C		M		IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X		RELATIVE VELOCITY FORM
136	A		O		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
137	P		D		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL		X		
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL			X	
140	I				IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)		X		
141	L				IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)			X	
142	I				IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING			X	
143	T				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
144	I				IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES			X	
145	E				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
146	S		DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		X		

HYDRODYNAMIC MODEL

				Program Name	Yes	No	Comments
147		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			X	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY		X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE		X		
150			... R.M.S. VALUE		X		
151			... (SIGNIFICANT)1/3		X		
152			... EXPECTED MAXIMUM		X		
153			... OTHERS, SPECIFY				
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE		X		1:60, 1:80, 1:100 Scale
155			WITH OTHER SOFTWARE - LIST PROGRAMS		X		Norwesian Hydrodynamic Lab Programs
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
157			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	UCLRISERT			See Freqency Domain Questionnaire I
158	R	STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL		X		
159	I		IS THE RISER MODEL THREE DIMENSIONAL			X	
160	S		DOES THE PROGRAM USE FINITE ELEMENT METHOD		X		
161	E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			X	

				Program Name	Yes	No	Comments
162	R	MODEL **	DOES THE PROGRAM USE SMALL DEFLECTION THEORY			X	
163			IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY		X		
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X		RELATIVE VELOCITY FORM
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
167			IS THE RISER MODELLED AS TWO DIMENSIONAL		X		
168			IS THE RISER MODELLED AS THREE DIMENSIONAL			X	
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			X	
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS		X		
171		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			X	
172			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END		X		
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE		X		
174		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE		X		1:20, & full scale
175	* * * *		WITH OTHER SOFTWARE - LIST PROGRAMS		X		DYNRISER, SEARISER API 2J Bulletin
176			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING		X		
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS		X		
179		DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED		X		
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING		X		
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
182		LOADING	IS INERTIA LOADING CONSIDERED				
183	STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED				
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		* ***	BEAM ELEMENT				
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT				
189		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT				
190		*** *	OTHERS .... SPECIFY				
191		*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

				Program Name	Yes	No	Comments
192	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
193			MODAL ANALYSIS				
194			FATIGUE LIFE ANALYSIS				
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)		X		
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)			X	
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		X		
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			X	
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (4.77) SPECIFY THE VERSION		X		
200			.... BASIC				
201			.... PASCAL				
202			.... OTHERS SPECIFY				
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X		
205			IS THEORETICAL MANUAL AVAILABLE		X		
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED			X	

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED			X	
208	** ****	IBM		X		
209		CDC		X		
210	HARDWARE SYSTEM	PRIME COMPUTER		X		
211		VAX		X		
212	**** **	MICRO .... SPECIFY				
213		OTHERS .... SPECIFY	GEC 4190	X		
214	** ****	LEASE (PRICE $ .00)		X		PRICES TO BE NEGOTIATED ON FIRM REQUEST
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)		X		
216		CONSULTANCY BASIS		X		
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					
219						
220						

NATIONAL MARITIME INSTITUTE LTD.

TIME DOMAIN USING DIFFRACTION THEORY

NMI

TABLE II QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	NMISPM	X		under development	will attach to NMIWAVE
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	NMISPM	X		see table 4 "	
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM			X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	NMISPM	X		"	
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM			X		
7		. : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	NMIWAVE	X			
8	E	.	VERTICAL MEMBER	"	X			
9	N V	.	HORIZ. MEMBER	"	X			
10	I	. X-SECT	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	"	X			
11	R		DOES IT USE EQUIVALENT CIRCULAR X-SECTION	"		X		

					Program Name	Yes	No		Comments
12	OFFSHORE STRUCTURES	NAVIGATION		IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	NMIWAVE	X			
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			potential theory
15			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X			
16				COLUMN AND PONTOON	"	X			
17				PONTOON AND PONTOON	"	X			
18			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X			Source / Sink
19				IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON	"	X			3-D diffraction for large members, Morison for small
20				DIFFRACTION & FLUID FINITE ELEMENT	"		X		
21				OR ANY OTHER COMBINATION, PLEASE SPECIFY	"		X		
22			SECOND ORDER DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	X			approximately

					Program Name	Yes	No		Comments
27	****	:		DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	NMIWAVE	X			Linearises the drag
28		:		DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"	X			by linearisation
29		:		IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X		
30		:	ORDER	IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"		X		
31		:		DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	"		X		
32		:		IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	"		X		
33		:		DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"		X		
34	****			IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		not normally. Can be if required
35				CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE); OTHERS	"	3D			
36				IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
37				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
38				IS THE CURRENT DRAG DAMPING CONSIDERED	"	X			by linearisation
39				IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
40				IS THE RADIATION DAMPING CONSIDERED		X			
41				IS THE STRUCTURAL DAMPING CONSIDERED			X		

VISCOUS FORCES

ADDMASS

DAMPING COEFFICIEN

EQUATION OF MOTION

FREQUENCY DO

					Program Name	Yes	No		Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	NMIWAVE		X		can be if necessary.
43	xxxx		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X		
44				IS THE STIFFNESS MATRIX COMPUTED	"	X			
45	x	xx WIND	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	NMISPM		X		under development - see table 4
46	x	W	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	"				"
47	x	I		DAVENPORT	"				"
48	E	N		SIMIU	"				"
49	V	xx		OTHERS (SPECIFY)	"				"
50	I	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	NMIWAVE		X		
51	R			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X			
52	O	x	STATISTICS	SIGNIFICANT WAVE HEIGHT	"	X			
53	N	x		MEAN SPECTRAL PERIOD	"	X			
54	M	x		WAVE SCATTER DIAGRAM	"		X		
55	E	x	.....	LINEAR WAVE	"	X			Airy theory, finite depth
56	N			STRETCH LINEAR	"		X		
	T								
	A								
	L								

					Program Name	Yes	No		Comments
57			WAVE	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	—	X			separate programs available
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN	—	X			"
59			THEORIES	STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND	—		X		"
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH	—		X		"
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY	—		X		"
62		V		EXTENDED VELOCITY POTENTIAL	—		X		"
63		E		CNOIDAL WAVE THEORY	—	X			Keulyan/Patterson
64		S	SEA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	NMIWAVE	X			
65	DESCRIPTION			ISSC	"	X			
66				JONSWAP	"	X			
67			SPECTR	BRETSCHNEIDER	"		X		
68				SCOTT	"		X		
69		*		OCHI (SIX PARAMETER)	"		X		
70		*		INPUT SPECTRA	"	X			
71	*	*		OTHERS	"	X			Darbyshire

				Program Name	Yes	No	Comments
72	X X	X X A	DIRECTIONAL SPECTRA	NMIWAVE	X		
73	X X	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X	
74	X X	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X	
75	SOLUTION TECHNIQUE	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"		X	
76	SOLUTION TECHNIQUE	STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"		X	
77	SOLUTION TECHNIQUE	STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"		X	
78	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	X		Six
79	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	X		all six
80	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY	"	X		equivalent energy dissipation
81	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS .. GAUSSIAN ELIMINATION	"	X		
82	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY	"		X	
83			MEAN OFFSET OF THE PLATFORM	"		X	
84			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	"	P		
85	X XXX XXXXX XXXXXXX	PLATFORM RESPONSE OUTPUT	PLATFORM MOTION RESPONSE SPECTRA	"	X		
86		PLATFORM RESPONSE OUTPUT	RESPONSE STATISTICS .. MEAN VALUE	"	X		due to mean wave drift force

				Program Name	Yes	No		Comments
87	******* ***** *** *		RESPONSE STATISTICS .. R.M.S. VALUE	NAUIWAVE	X			
88			RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"	X			
89			RESPONSE STATISTICS .. OTHERS; SPECIFY	"	X			expected max. response in 3hr & 24hr storms
90			EIGEN VALUES (SYSTEM NATURAL PERIODS)	"	X			approximate values only
91	** ****		MODEL TEST - INDICATE SCALE	"	X			various, around 1/50
92	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X			Garrison, DNV, NSMB
93			OTHER PUBLISHED MATERIAL - SPECIFY	"	X			Paulling, analytic solutions
94	**** **		OTHERS (SPECIFY)	"		X		
95	* * * * * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	"	X			
96			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"		X		
97			VERTICAL (TAUT) MOORING	"	X			
98			HYBRID/OTHER COMBINATION .... SPECIFY	"		X		
99		MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"		X		
100	M		CHAIN (STEEL)	—	X			separate program
101	O		WIRE ROPE (STEEL)	"	X			

					Program name	Yes	No	Comments
102	MOORING SYSTEM			CONDINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	NMIWAVE		X	
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	—		X	
104				IS IT BASED ON CATENARY EQUATION	—	X		separate program
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE	—		X	
106				OTHERS (SPECIFY)	—		X	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	NMIWAVE	X		
108		VERTICAL MOORING SYSTEM		IS THE MASS OF THE MOORING CONSIDERED	—	X		separate program
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	NMIWAVE	X		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	—	X		separate program
111				IS GEOMETRIC NON LINEARITY CONSIDERED	—	X		"
112				IS MATERIAL NON LINEARITY CONSIDERED	—		X	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	—		X	
114				IS THE STRUCTURAL DAMPING CONSIDERED	—		X	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	NMIWAVE		X	
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	

						Program Name	Yes	No	Comments
117			I N G		IS IT BASED ON FINITE DIFFERENCE METHOD	NMIWAVE		X	
118				HYDRDYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X	
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"		X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	
121			M O D E L		IS THE MOORING HYDRODYNAMIC MODEL 2D	"		X	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D	"		X	
123	C	M O O R I N G			IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)	"		X	
124	A P A B I L I T I E S				IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)	"	X		
125					IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"	X		
126					IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"		X	
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"		X	
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		X	
129		*	DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"	X		
130		* *	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	"	X		
131		** ****			MEAN LOAD OF THE MOORING LINE	—	X		Separate program

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	NMIWAVE	X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	"	X			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	"	X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	"	X			max. expected in 3hr & 24hr periods
136	*******	* ***	WITH MODEL TESTS - INDICATE SCALE	"	X			Various, about 1/50
137		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	"	X			Paulling
138		*** *	WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		X		
139	*****		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	"		X		Separate suite available -see table 3
140		**	IS THE RISER MODEL TWO DIMENSIONAL					
141		STRUCTURAL	IS THE RISER MODEL THREE DIMENSIONAL					
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD					
143	RISER		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD					
144		MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY					
145		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY					
146		***	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM					

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
149			IS THE RISER HYDRODYNAMIC MODEL 2D				
150			IS THE RISER HYDRODYNAMIC MODEL 3D				
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS				
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE				
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS				
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING	WAVCAP		X	various checks performed only
160			INTACT WITH VERTICAL TAUT TENDONS	"		X	ditto
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"		X	

				Program Name	Yes	No		Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	NM1WAVE		X		
163	* ** *		HYDRODYNAMIC LOADING CONSIDERED	"		X		No structural analysis
164		LOADING	IS INERTIA LOADING CONSIDERED					
165	S T R U C T U R A L		IS DYNAMIC LOADING CONSIDERED					
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS					
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS					
168		, * ***	BEAM ELEMENT					
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT					
170			PLATE ELEMENT					
171	A N A L Y S I S		STIFFENED PLATE ELEMENT					
172		*** *	OTHERS .... SPECIFY					
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM					
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS					
175			MODAL ANALYSIS					
176	* ** *		FATIGUE LIFE ANALYSIS					

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	NMIWAVE	X			all programs
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	"	X			all programs
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	"	X			facet geometry, unpaxs, tensions, drift bias
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	"		X		
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (77) SPECIFY THE VERSION	"	X			Fortran IV and 77 versions available
182		.... BASIC	"		X		
183		.... PASCAL	"		X		
184		.... OTHERS; SPECIFY	"		X		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	"				not available
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	"	X			
187		IS THEORETICAL MANUAL AVAILABLE	"	X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X			
189		IS ANY TRAINING OFFERED	"	X			
190	** ****	IBM	"	X			
191		CDC			X		

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	NETWARE		X		
193		VAX	"		X		
194		MICRO .. SPECIFY	"		X		
195	***** **	OTHERS .... SPECIFY	"	X			SEL (GOULD), UNIVAC
196	** *****	LEASE (PRICE $ .00)	"	X			
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	"	X			
198		CONSULTANCY BASIS	"	X			
199	***** **	OTHERS .... SPECIFY	"	X			SIA bureau
200	REMARKS AND NOTES						
201							
202							

NATIONAL MARITIME INSTITUTE LTD.

FREQUENCY DOMAIN USING DIFFRACTION THEORY

NMI

TABLE IV QUESTIONAIRE FOR SOFTWARE CAPABILITIES (TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	NMISPM	X		under development	will attach to NMIWAVE
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"	X		-completion date 1984	
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	"		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"		X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	"	X			
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"		X		
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			all hydrodynamic data from NMIWAVE
8	E	. : M	VERTICAL MEMBER					see table 2
9	N	. E	HORIZ. MEMBER					"
10	V	. M B	X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION				"
11	I R	. E R :		DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION				"

						Program Name	Yes	No		Comments
12	ONMENTAL FORCES	WAVE FORCES	:	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	NMISPM				all hydrodynamic data from NMIWAVE - see table 2
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"				"
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"				"
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"				"
16					COLUMN AND PONTOON	"				"
17					PONTOON AND PONTOON	"				"
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"				"
19					IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON	"				"
20					DIFFRACTION AND FLUID FINITE ELEMENT	"				"
21					OR ANY OTHER COMBINATION	"				"
22			SECOND	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"				"
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"				"
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"				"
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"				"
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"				"

						Program Name	Yes	No	Comments
27		S		VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	NMISPM		X	
28			ORDER		DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"		X	
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X	
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"		X	
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	"		X	
32					IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"		X	
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"		X	
34				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"	X		from NMI WAVE
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS	"			"
36			REGULAR	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"			"
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"			"
38	EQUAT	TIM			IS THE CURRENT DRAG DAMPING CONSIDERED	"			"
39					IS THE CURRENT FRICTION DAMPING CONSIDERED	"			"
40			WA	COEFFICIEN	IS THE RADIATION DAMPING CONSIDERED	"			"
41					IS THE STRUCTURAL DAMPING CONSIDERED	"			"

						Program Name	Yes	No		Comments
42	I	E	V	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	NMISPM	X			normally from NMIWAVE
43	O		E	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X		
44	N		S		IS THE STIFFNESS MATRIX COMPUTED	"	X			
45		D	XXX	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"	X			normally from NMIWAVE
46	O	O	IRREGULAR WAVES		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	"	X			as NMIWAVE
47	F	M		DAMPING COEFFICIENTS	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			"
48		,			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
49	M	A			IS THE CURRENT DRAG DAMPING CONSIDERED	"		X		
50	O	I			IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X		
51	T	N			IS THE RADIATION DAMPING CONSIDERED	"	X			"
52	I				IS THE STRUCTURAL DAMPING CONSIDERED	"		X		
53	O				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	"	X			normally from NDRIWAVE
54	N	XXXX		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X		
55	XXXXXX		XXX		IS THE STIFFNESS MATRIX COMPUTED	"	X			
56	X	XX	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	"		X		

					Program Name	Yes	No	Comment
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	NM/SPM	X		
58				DAVENPORT	"	X		
59				SIMIU	"		X	
60				OTHERS (SPECIFY)	"	X		ESDU
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"	X		
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"		X	
63			WAVE THEORIES	SIGNIFICANT WAVE HEIGHT	"	X		
64				MEAN SPECTRAL PERIOD	"	X		
65				WAVE SCATTER DIAGRAM	"		X	
66				LINEAR WAVE	"	X		
67				STRETCH LINEAR	"		X	
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	"		X	may be added later
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN	"		X	"
70		W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND	"		X	
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH	"		X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	NNISPM		X	
73		E	.	EXTENDED VELOCITY POTENTIAL	"		X	
74		S	.	CNOIDAL WAVE THEORY	"		X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	X		
76	D		E	ISSC	"	X		
77	E		A	JONSWAP	"	X		
78	S		S	BRETSCHNEIDER	"		X	
79	C	X	P	SCOTT	"		X	
80	R	X	E	OCHI (SIX PARAMETER)	"		X	
81	I	X	C	INPUT SPECTRA	"	X		
82	P	X	T	OTHERS	"		X	
83	T	X	R	DIRECTIONAL SPECTRA	"		X	
84	I	X	A	DOES IT CONSIDER EARTH QUAKE SPECTRA	"		X	
85	O	X		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"		X	
86	N	X	OTHERS STA	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"	X		May be extended / 3 at present - surge, sway, yaw

				Program Name	Yes	No		Comments
87	* SOLUTION TECHNIQUE ****	DYNAMICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	NMISPM	X			as above
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"		X		
89			NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	"	X		may be extended	3 at present - surge, sway, yaw
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	X			"
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"		X		
92			METHOD OF INTEGRATION USED .... HOUBOLT	"		X		
93			.... WILSON - θ	"		X		
94			.... NEWMARK - β	"		X		
95			OTHERS .... PLEASE SPECIFY	"	X			ADAMS PREDICTOR-CORRECTOR
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	"		X		
97			.... VARIABLE INTEGR-ATION TIME	"		X		
98			OTHERS .... PLEASE SPECIFY	"	X			no precautions taken - initial guess is discarded
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"		X		
100			OTHERS .... PLEASE SPECIFY	"		X		
101			PLATFORM MOTION TIME HISTORY	*	X			

			Program Name	Yes	No		Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	NMISPM	X			
103		... R.M.S. VALUE	"	X			
104		... (SIGNIFICANT)1/3	"	X			
105		... EXPECTED MAXIMUM	"		X		
106		... OTHERS, SPECIFY	"		X		
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	"		X		
108	** **** PROGRAM VERIFICATION	MODEL TEST - INDICATE SCALE	"	X		to be performed in 1984/5	about 1/50
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X			NSMB
110		OTHER PUBLISHED MATERIAL - SPECIFY	"		X		
111	** ****	OTHERS (SPECIFY)	"		X		
112	**** M O DESCRIPTION	SPREAD MOORING (CATENARY)	"	X			separate program
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"		X		
114		VERTICAL (TAUT) MOORING	"	X			
115		HYBRID/OTHER COMBINATION .... SPECIFY	"		X		
116		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"		X		

					Program Name	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)	NMISPM	X		
118				WIRE ROPE (STEEL)	"	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"		X	
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		normal form input
121				IS IT BASED ON CATENARY EQUATION	"	X		separate program
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
123				OTHERS (SPECIFY)	"		X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X	
125		*********	********	IS THE MASS OF THE MOORING CONSIDERED	"	X		
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		can be
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X		
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
129				IS MATERIAL NON LINEARITY CONSIDERED	"		X	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	
131				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

					Program Name	Yes	No		Comment
132	C A P A B I L I T I E S	RTICAL MOORING	NG MODEL XXXX	HYDRODYNAMIC MODEL	IS THE MOORING SYSTEM COUPLED WITH PLATFORM	NMISPM		X	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		X	
134					IS IT BASED ON FINITE DIFFERENCE METHOD	"		X	
135					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X	
136					IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER	"		X	
137					IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING	"		X	
138					IS THE MOORING MODELLED AS TWO DIMENSIONAL	"		X	
139					IS THE MOORING MODELLED AS THREE DIMENSIONAL	"		X	
140					IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)	"	X		may be extended / suitable however only at present
141					IS THE MOORING MODEL THREE DIMENSIONAL (struct'l)	"		X	
142					IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	"	X		
143					IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING	"		X	
144					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES	"		X	
145					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		X	
146			DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X	

				Program name	Yes	No	Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	NMISPM		X	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	"	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	"	X		
150			... R.M.S. VALUE	"	X		
151			... (SIGNIFICANT)1/3	"	X		
152			... EXPECTED MAXIMUM	"		X	
153			... OTHERS, SPECIFY	"		X	
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	"	X		see above
155	* * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	"	X		"
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		X	
157	* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	"		X	separate program — see table 3
158		* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL	"			
159	R		IS THE RISER MODEL THREE DIMENSIONAL	"			
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD	"			
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"			

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				Not available
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYHAMIC	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167		MODEL	IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE				
175	*		WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comment
177	STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING	NMISPM		X	Not available
178			INTACT WITH VERTICAL TAUT TENDONS	"		X	
179		DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"		X	
180			DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	"		X	
181	STRUCTURAL ANALYSIS	LOADING	HYDRODYNAMIC LOADING CONSIDERED	~		X	No structural analysis
182			IS INERTIA LOADING CONSIDERED	"			
183			IS DYNAMIC LOADING CONSIDERED	"			
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	"			
185			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"			
186		FINITE ELEMENT ANALYSIS	BEAM ELEMENT	~			
187			SHELL ELEMENT	"			
188			PLATE ELEMENT	"			
189			STIFFENED PLATE ELEMENT	"			
190			OTHERS .... SPECIFY	"			
191			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"			

				Program Name	Yes	No		Comments
192	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	NAISPM				not available
193			MODAL ANALYSIS	"				
194			FATIGUE LIFE ANALYSIS	"				
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	"		X	not yet	
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	"		X		
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	"	X			time histories of motions & hawser tension
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	"		X		
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (77) SPECIFY THE VERSION	"	X			
200			.... BASIC	"		X		
201			.... PASCAL	"		X		
202			.... OTHERS SPECIFY	"		X		
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	"	X			not available
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE	"		X	not yet	
205			IS THEORETICAL MANUAL AVAILABLE	"		X	not yet	
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X		will be	

			Program Name	Yes	No		Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	NIM/SPRY	X		will be	
208	** ****	IBM	N		X		
209		CDC	N		X		
210	HARDWARE SYSTEM	PRIME COMPUTER	N		X		
211		VAX	N		X		
212	**** **	MICRO .... SPECIFY	N		X		
213		OTHERS .... SPECIFY	N	X			SEL (GOULD)
214	** ****	LEASE (PRICE $ .00)	N		X	ust yet	
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	N		X	not yet	
216		CONSULTANCY BASIS	N	X			
217	** ****	OTHERS .... SPECIFY	N		X		
218	REMARKS AND NOTES						
219							
220							

ULTRAMARINE ENGINEERING

FREQUENCY DOMAIN USING MORISON'S EQUATION

C. W. Ltr III
Alternative

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION) → applies to freq & time domain Ltr

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	OSCAR	✓			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			✓		
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM		✓			Optional 6-D.o.f. externally applied forces.
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			✓		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES		✓			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM		✓			6 D.O.F. force O.K.
7		ENVIR MEMBER ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		✓			
8	E		VERTICAL MEMBER		✓			
9	N		HORIZ. MEMBER		✓			
10	I	X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION		✓			
11	R		DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION			✓		

						Program Name	Yes	No		Comments
12	ONMENTAL FORCES	WAVE FORCES	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	OSCAR	✓			3D-diff 2D-diff
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		✓			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY		✓			Morison, 2-D (strip), 3D-diffr
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN		✓			3D-diff only
16					COLUMN AND PONTOON		✓			"
17					PONTOON AND PONTOON		✓			"
18			FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION					Specified members are Morison type (optional)
19					IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY		✓			
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT			✓		No frequency dependence on current velocity
21					IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION			✓		
22			SECO	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION		✓			
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY		✓			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY		✓			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY		✓			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES		✓			

No.					Question	Program Name	Yes	No		Comments
27	*****	: : : : : : : : : : : :	N D ORDER	VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		✓			
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY		✓			Current not frequency dep. force ie. no stedding
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			✓		
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE		✓			(Picard)
31				FORCES	DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION		✓			
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM		✓			Can be changed at user option
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE		✓			h
34	**** EQUATION OF MOT	FREQUENCY DO		ADD MASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			✓		
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS		✓			2D, 3D, Morison
36				DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		✓			
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			✓		
38					IS THE CURRENT DRAG DAMPING CONSIDERED			✓		
39				COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			✓		
40					IS THE RADIATION DAMPING CONSIDERED		✓			
41					IS THE STRUCTURAL DAMPING CONSIDERED			✓		

					Program None	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			✓	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			✓	
44				IS THE STIFFNESS MATRIX COMPUTED		✓		
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT		✓		
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
47	*			DAVENPORT			✓	
48	ENVIRONMENTAL	D,		SIMIU			✓	
49		**		OTHERS (SPECIFY)			✓	
50		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			✓	
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE		✓		
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT		✓		
53		*		MEAN SPECTRAL PERIOD		✓		
54		*		WAVE SCATTER DIAGRAM			✓	
55		*	.....	LINEAR WAVE		✓		
56				STRETCH LINEAR				? what is this ?

					Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...			✓	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN		✓		
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			✓	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			✓	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			✓	
62		V		EXTENDED VELOCITY POTENTIAL			✓	
63		E		CNOIDAL WAVE THEORY			✓	
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		✓		
65				ISSC		✓		
66				JONSWAP		✓		
67				BRETSCHNEIDER			✓	
68				SCOTT			✓	
69		*		OCHI (SIX PARAMETER)			✓	
70		*		INPUT SPECTRA		✓		
		*						
71	*	*		OTHERS				

DESCRIPTION

				Program Name	Yes	No		Comments
72	* *	* * A	DIRECTIONAL SPECTRA			✓		
73	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA			✓		
74	* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			✓		
75	SOLUTION	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6			6 per rigid body, 3 bodies maximum
76	SOLUTION	STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6			
77	SOLUTION	STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM					
78	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		6			6 per body, 3 bodies max.
79	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6			
80	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY					
81	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION					proprietary
82	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY					"
83			MEAN OFFSET OF THE PLATFORM		✓			
84			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'		P			
85	* *** ***** *******		PLATFORM MOTION RESPONSE SPECTRA		✓			
86	PLATFORM RESPONSE OUTPUT		RESPONSE STATISTICS .. MEAN VALUE		✓			

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE		✓		
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3		✓		
89		RESPONSE STATISTICS .. OTHERS; SPECIFY		1/10 1/100		
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)			✓	
91	** **** PROGRAM VERIFICATION **** **	MODEL TEST - INDICATE SCALE		✓		
92		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS		✓		"OSCAR Comparisons"
93		OTHER PUBLISHED MATERIAL - SPECIFY		✓		"Noble Denton report"
94		OTHERS (SPECIFY)				
95	* ** ** ** ** ** * DESCRIPTION	SPREAD MOORING (CATENARY)		✓		
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT		✓		
97		VERTICAL (TAUT) MOORING		✓		
98		HYBRID/OTHER COMBINATION .... SPECIFY		✓		$ taut - buoy - catenary line
99	MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR		✓		
100	M	CHAIN (STEEL)		✓		
101	O	WIRE ROPE (STEEL)		✓		

					Program Name	Yes	No		Comments
102	O R	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY		✓			Chain, wire, nylon
103	I	A	S	USER SPECIFIED LOAD DISPLACEMENT TABLE			✓		
104	N	N	T	IS IT BASED ON CATENARY EQUATION		✓			
105	G	A	A	IS IT BASED ON FINITE EL -EMENT METHOD W/ OR W/O BENDING STIFFNSS, CIRCLE			✓		
106		L Y	T	OTHERS (SPECIFY)			✓		
107		S E	I C S	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		✓			
108			DYNA-MICS	IS THE MASS OF THE MOORING CONSIDERED			✓		
109		* * * *	. . . . .	IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		✓			for freq. domain only
110			. . . . .	IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING		✓			for static and time domain
111	S	V E		IS GEOMETRIC NON LINEA-RITY CONSIDERED		✓			
112	Y	R T		IS MATERIAL NON LINEA-RITY CONSIDERED		✓			Second order springs on mooring lines
113	S	I C		IS THE HYDRODYNAMIC DAMPING CONSIDERED			✓		
114	T E	A L	M	IS THE STRUCTURAL DAMPING CONSIDERED			✓		
115	M		O	IS THE MOORING SYSTEM COUPLED WITH PLATFORM		✓			restoring force (linear) matrix
116			O R	IS IT BASED ON FINITE EL -EMENT METHOD,W/ OR W/O BENDING STIFFNSS, CIRCLE			✓		

						Program name	Yes	No	Comments
117			I N G	HYDRDYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD			✓	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			✓	
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			✓	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			✓	
121			M O D E L		IS THE MOORING HYDRODYNAMIC MODEL 2D			✓	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D			✓	
123	C	M, O O R I N G			IS THE MOORING MODEL TWO DIMENSIONAL (STRUCTL)			✓	
124	A				IS THE MOORING MODEL THREE DIMENSIONAL (STRUCTL)			✓	
125	P				IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			✓	
126	A				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			✓	
127	B				IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES			✓	
128	I				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			✓	
129	L			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			✓	
130	I	* ** *		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING		✓		
131	T	** ****			MEAN LOAD OF THE MOORING LINE		✓		
	I E S								

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)		✓			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE		✓			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3		✓			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY		✓			
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE		✓			
137	* * * * *	PROGRAM VERIFICATN ***	WITH OTHER SOFTWARE - LIST PROGRAMS		✓			
138	* *	*	WITH OTHER PUBLISHED MATERIAL .... SPECIFY		✓			
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES		✓			not highly sophisticated
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL			✓		
141		S T R U C T U R A L	IS THE RISER MODEL THREE DIMENSIONAL		✓			
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD			✓		
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			✓		
144		M O D E L	DOES THE PROGRAM USE SMALL DEFLECTION THEORY			✓		
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECT-ION THEORY			✓		
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		✓			

				Program Name	Yes	No		Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER		✓			
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			✓		
149			IS THE RISER HYDRODYNAMIC MODEL 2D			✓		
150			IS THE RISER HYDRODYNAMIC MODEL 3D		✓			
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM		✓			
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS		✓			
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS					not for deflected shapes
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END		✓			
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE		✓			
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			✓		
157		* * * * *	WITH OTHER SOFTWARE - LIST PROGRAMS			✓		
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			✓		
159	STABILITY ANALYSIS	* *** INTACT	INTACT FREE FLOATING		✓			
160			INTACT WITH VERTICAL TAUT TENDONS		✓			
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED		✓			

				Program name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING		✓		
163	* ** *		HYDRODYNAMIC LOADING CONSIDERED		✓		
164	*	LOADING	IS INERTIA LOADING CONSIDERED		✓		
165	S T		IS DYNAMIC LOADING CONSIDERED		✓		
166	R U	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS			✓	
167	C T		THREE DIMENSIONAL SPACE FRAME ANALYSIS			✓	
168	U R A	, * ***	BEAM ELEMENT			✓	
169	L	FINITE ELEMENT ANALYSIS	SHELL ELEMENT			✓	
170			PLATE ELEMENT			✓	
171	A N		STIFFENED PLATE ELEMENT			✓	
172	A L	*** *	OTHERS .... SPECIFY			✓	
173	Y S		NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM			✓	
174	I S		SPECTRAL ANALYSIS			✓	
175		OTHER ANALYTICAL	MODAL ANALYSIS			✓	
176	* ** * *	CAPABILITY	FATIGUE LIFE ANALYSIS			✓	

			Program name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)		✓		OTIS plotting,	Echos, Summaries
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		✓			Coefficients saved for later use
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		✓		OTIS	
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			✓		
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION		✓			
182		.... BASIC			✓		
183		.... PASCAL			✓		
184		.... OTHERS; SPECIFY			✓		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					function of # members, time step size
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		✓			
187		IS THEORETICAL MANUAL AVAILABLE			✓		Proprietary
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		✓			
189		IS ANY TRAINING OFFERED		✓			
190	** ****	IBM		✓			
191		CDC		✓			

			Program Name	Ye	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER		✓			
193		VAX		✓			
194		MICRO .. SPECIFY			✓		
195	***** **	OTHERS .... SPECIFY		✓		Univac, Data	General
196	** ****	LEASE (PRICE $ .00)		✓		Total Package	Monthly (4%/month Purchase)
197	ACCESSIBILITY	PURCHASE (PRICE $ .00)		✓		"	$110,000.00
198	ARRANGEMENT	CONSULTANCY BASIS		✓		"	Maintenance/Support (1%/month)
199	**** **	OTHERS .... SPECIFY				Modules Available	for specific functions
200						at lesser	prices
201	REMARKS AND NOTES						
202		Other capabilities				Launch & Upending	Time Domain & Static

ULTRAMARINE ENGINEERING

FREQUENCY DOMAIN USING DIFFRACTION THEORY

ULTRAMARIN
(filled in by Brown & Root)

TABLE II

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	OSCAR	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"		X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	"	?			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"		X		
5			CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	"	X			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"	?			
7		. . . . . MEMBER: ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
8	E		VERTICAL MEMBER	"	X			
9	N V I R		HORIZ. MEMBER	"	X			
10		X-SECT	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	"	X			
11			DOES IT USE EQUIVALENT CIRCULAR X-SECTION	"		X		

						Program Name	Yes	No		Comments
12	O N N E H T A L	N A V E	: :	I O N	IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	OSCAR	X			
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		
16					COLUMN AND PONTOON	"		X		
17					PONTOON AND PONTOON	"		X		
18		, ,	F I R S T O R D E R		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X			STRIP THEORY (SALVESEN, TUCK, FALTINSEN) 3-D DIFFRACTION THEORY
19					IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON	"		X		
20					DIFFRACTION & FLUID FINITE ELEMENT	"		X		
21		F			OR ANY OTHER COMBINATION, PLEASE SPECIFY	"		X		
22	F O R C E S	O R C E S	S E C O N D	D R I F T F O R C E S	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	?			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	?			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	?			

						Program Name	Yes	No		Comments
27	* * * * *	: : : : : : :	ORDER	VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	OSCAR	?			
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"		X		
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X		
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	?			
31				FORCES	DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	"	?			
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	"	?			
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"	?			
34	* * * *	FREQUENCY		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		
35					CIRCLE / COMPUTING METHOD : (2D),(3D)(ARBITRARY SHAPE); OTHERS	"	2D 3D			
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"	?			
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X		
40					IS THE RADIATION DAMPING CONSIDERED	"	?			
41	NOT	DO			IS THE STRUCTURAL DAMPING CONSIDERED	"		X		

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	OSCAR		X	
43	×××××		STIFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	〃		X	
44				IS THE STIFFNESS MATRIX COMPUTED	〃	X		
45	×	××	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	〃	?		
46	×××	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	〃		X	
47	×			DAVENPORT	〃		X	
48	ENVIRONMENTAL			SIMIU	〃		X	
49		××		OTHERS (SPECIFY)	〃		X	
50		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	〃	X		
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	〃	X		
52		×	STATISTICS	SIGNIFICANT WAVE HEIGHT	〃	X		
53		×××××		MEAN SPECTRAL PERIOD	〃	X		
54				WAVE SCATTER DIAGRAM	〃		X	
55		×	...	LINEAR WAVE	〃	?		
56				STRETCH LINEAR	〃	?		

			Program Name	Yes	No	Comments
57		WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	OSCAR	X	
58			STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN	4	X	
59			STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND	4	X	
60			STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH	4	X	
61			STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY	4	X	
62			EXTENDED VELOCITY POTENTIAL	4	?	
63			CHOIDAL WAVE THEORY	4	X	
64		SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	4	X	
65			ISSC	4	X	
66			JONSWAP MEAN SHARP	4	X	
67			BRETSCHNEIDER	4	X	
68			SCOTT	4	X	
69	*		OCHI (SIX PARAMETER)	4	X	
70	*		INPUT SPECTRA	4	?	
71	*		OTHERS	4	X	

WAVES DESCRIPTION

				Program Name	Yes	No		Comments
72	* *	* * A	DIRECTIONAL SPECTRA	OSCAR		X		
73	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA	?				
74	* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?				
75	SOLUTION	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	OSCAR	SIX			
76	SOLUTION	STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?			
77	SOLUTION	STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"	?			
78	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	SIX			
79	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?			
80	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY	"	?			
81	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"	?			
82	TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY	"	?			
83	* *** ***** ******* PLATFORM RESPONSE OUTPUT		MEAN OFFSET OF THE PLATFORM	"	X			
84	* *** ***** ******* PLATFORM RESPONSE OUTPUT		MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	"	X			
85	* *** ***** ******* PLATFORM RESPONSE OUTPUT		PLATFORM MOTION RESPONSE SPECTRA	"	X			
86	* *** ***** ******* PLATFORM RESPONSE OUTPUT		RESPONSE STATISTICS .. MEAN VALUE	"	?			

				Program Name	Yes	No		Comments
87	******* ***** *** *		RESPONSE STATISTICS .. R.M.S. VALUE	OSCAR	?			
88			RESPONSE STATISTICS .. (SIGNIFICANT)1/3	//	X			
89			RESPONSE STATISTICS .. OTHERS; SPECIFY	//	?			
90			EIGEN VALUES (SYSTEM NATURAL PERIODS)	//	?			
91	** ****		MODEL TEST - INDICATE SCALE	//	?			
92	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	//	?			
93			OTHER PUBLISHED MATERIAL - SPECIFY	//	?			
94	**** **		OTHERS (SPECIFY)	//	?			
95	* ***** *	DESCRIPTION	SPREAD MOORING (CATENARY)	//	X			
96			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	//	X			
97			VERTICAL (TAUT) MOORING	//	?			
98			HYBRID/OTHER COMBINATION .... SPECIFY	//		X		
99			SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	//		X		
100	M	MATERIA	CHAIN (STEEL)	//	X			
101	O		WIRE ROPE (STEEL)	//	X			

					Program Name	Yes	No	Comments
102	MOORING SYSTEM	ANALYSES	STATICS	COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	OSCAR	?		
103				USER SPECIFIED LOAD DISPLACEMENT TABLE	〃	?		
104				IS IT BASED ON CATENARY EQUATION	〃	X		
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STIFFNSS, CIRCLE	〃		X	
106				OTHERS (SPECIFY)	〃		X	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	〃		X	
108				IS THE MASS OF THE MOORING CONSIDERED	〃		X	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	〃	?		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	〃	?		
111				IS GEOMETRIC NON LINEARITY CONSIDERED	〃	?		
112				IS MATERIAL NON LINEARITY CONSIDERED	〃		X	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	〃		X	
114				IS THE STRUCTURAL DAMPING CONSIDERED	〃		X	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	〃		X	
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STIFFNSS, CIRCLE	〃		X	

						Program Name	Yes	No	Comments
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD	OSCAR		X	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	4		X	Does it consider the hydrodynamic force in the mooring line?
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	4		X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	4		X	
121			M O D		IS THE MOORING HYDRODYNAMIC MODEL 2D	4		?	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D	4		?	
123	C	M O O R I N G	E L		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)	4	X		
124	A				IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)	4	X		
125	P		.		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	11	?		
126	A		.		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	4	?		
127	B		.		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	11		X	
128	I		.		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	4		X	
129	L		DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	4		X	
130	I	* ** ***	INSTAL-LATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	4		X	
131	E S	** ****			MEAN LOAD OF THE MOORING LINE	4	X		

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	OSCAR	X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	11	?			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	4	X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	4	?			
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE	4	?			
137	* * * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS	4	?			
138	* * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	4	?			
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	?				NO REFERENCE TO RISER ANALYSIS
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL					
141		STRUCTURAL	IS THE RISER MODEL THREE DIMENSIONAL					
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD					
143	R I		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD					
144	S	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY					
145	E R	* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY					
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM					

				Program name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
149			IS THE RISER HYDRODYNAMIC MODEL 2D				
150			IS THE RISER HYDRODYNAMIC MODEL 3D				
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS				
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE				
157		* * * * * *	WITH OTHER SOFTWARE - LIST PROGRAMS				
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
159	STABILITY ANALYSIS	* *** INTACT	INTACT FREE FLOATING	OSCAR	X		
160			INTACT WITH VERTICAL TAUT TENDONS	1		X	
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	4	X		

				Program None	Yes	No		Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	OSCAR		X		
163	* ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	?				NO REFERENCE TO STRUCT'L ANALYSIS
164			IS INERTIA LOADING CONSIDERED					
165	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED					
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS					
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS					
168		, * ***	BEAM ELEMENT					
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT					
170			PLATE ELEMENT					
171			STIFFENED PLATE ELEMENT					
172		*** *	OTHERS .... SPECIFY					
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM					
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS					
175			MODAL ANALYSIS					
176	* ** ** *		FATIGUE LIFE ANALYSIS					

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	OSCAR	?		
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	"	X		
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	"	X		
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	"		X	
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (IV) SPECIFY THE VERSION	OSCAR	X		
182		.... BASIC	"		X	
183		.... PASCAL	"		X	
184		.... OTHERS; SPECIFY	"		X	
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	"	?		
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	"	X		
187		IS THEORETICAL MANUAL AVAILABLE	"	?		
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X		
189		IS ANY TRAINING OFFERED	"	?		
190	** ****	IBM	"	?		
191		CDC	"	?		

			Program Name	Yes	No	Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	OSCAR		X	
193		VAX	"		X	
194		MICRO .. SPECIFY	"		X	
195	*****	OTHERS .... SPECIFY	"		X	
196	** *****	LEASE (PRICE $ .00)	"	?		
197	ACCESSIBILITY	PURCHASE (PRICE $ .00)	"	?		
198	ARRANGEMENT	CONSULTANCY BASIS	"	?		
199	*****	OTHERS .... SPECIFY	"	?		
200	REMARKS AND NOTES					
201						
202						

ULTRAMARINE ENGINEERING

TIME DOMAIN USING DIFFRACTION THEORY

ULTRAMARINE
(filled in by Brown & Root)

TABLE IV QUESTIONAIRE FOR SOFTWARE CAPABILITIES (TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	OSCAR	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	4		X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	4	?			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	4		X		
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES	4	X			
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	4	?			
7		. : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	4	X			
8	E	. :	VERTICAL MEMBER	4	X			
9	N	.	HORIZ. MEMBER	4	X			
10	V	.	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	4	X			
11	I R	X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	4		X		

						Program Name	Yes	No		Comments
12	OTHER METHODS	WAVE FORCES			OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	OSCAR	X			
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			
15			MEMBER INTERACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	↯		X		
16					COLUMN AND PONTOON	↯		X		
17					PONTOON AND PONTOON	↯		X		
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	↯	X			
19					IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON	↯		X		
20					DIFFRACTION AND FLUID FINITE ELEMENT	↯		X		
21					OR ANY OTHER COMBINATION	↯		X		
22			SECOND DRIFT FORCES		DOES IT CONSIDER THE WAVE ELEVATION *	↯	X			
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	↯	X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	↯	?			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	↯	?			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	↯	?			

						PROGRAM NAME	YES	NO		COMMENTS
27	*	S	O R D E R	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	OSCAR	?			
28	*				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"		X		
29	*				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X		
30	*				IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	?			
31	*				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	"	?			
32	*				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"	?			
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"	?			
34	*	*	*	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		
35	*	*	*		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS	"	2D 3D			STRIP THEORY 3D- DIFFRACTION
36	*	*	R E G U L A R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
37	*	*			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
38	E	T			IS THE CURRENT DRAG DAMPING CONSIDERED	"	?			
39	Q				IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X		
40	U	I		COEFFICIEN	IS THE RADIATION DAMPING CONSIDERED	"	?			
41	A T	M	W A		IS THE STRUCTURAL DAMPING CONSIDERED	"		X		

						Program NAME	Yes	No	Comments
42	I	E	V	T	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	OSCAR		X	
43	O		E	S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	〃		X	
44	N		S		IS THE STIFFNESS MATRIX COMPUTED	〃	X		
45	O	D	×	A	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	〃		X	
46	F	O	×	D	CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	〃	2D 3D		
47		M	I	M	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	〃	X		
48	M	,	R	A	IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	〃		X	
49	O	A	R	P	IS THE CURRENT DRAG DAMPING CONSIDERED	〃	?		
50	T	I	E	I	IS THE CURRENT FRICTION DAMPING CONSIDERED	〃		X	
51	I	N	G	N	IS THE RADIATION DAMPING CONSIDERED	〃	?		
52	O		U	G	IS THE STRUCTURAL DAMPING CONSIDERED	〃		X	
53	N		L		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	〃		X	
54	×		A	C	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	〃		X	
55	×	×	R	O	IS THE STIFFNESS MATRIX COMPUTED	〃	X		
56	×	×	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	〃	X		

					Program name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	OSCAR		X	NO REF TO WIND DYNAMICS
58				DAVENPORT	ϟ		X	
59				SIMIU	ϟ		X	
60				OTHERS (SPECIFY)	ϟ		X	
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	ϟ	X		
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	ϟ	X		
63			WAVE THEORIES	SIGNIFICANT WAVE HEIGHT	ϟ	X		
64				MEAN SPECTRAL PERIOD	ϟ	X		
65				WAVE SCATTER DIAGRAM	ϟ		X	
66				LINEAR WAVE	ϟ		X	
67				STRETCH LINEAR	ϟ		X	
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	ϟ		X	
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN	ϟ		X	
70				STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND	ϟ		X	
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH	ϟ		X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	OSCAR		X	
73		E	.	EXTENDED VELOCITY POTENTIAL	〃	?		
74		S	.	CNOIDAL WAVE THEORY	〃		X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	〃	X		
76	D		E	ISSC	〃	X		
77	E S C		A	JONSWAP MCAMJ SHARP	〃	X		
78	R		S	BRETSCHNEIDER	〃		X	
79	P	x	P	SCOTT	〃		X	
80	T I O N	x	E C T R A	OCHI (SIX PARAMETER)	〃		X	
81		x		INPUT SPECTRA	〃	?		
82	x	x		OTHERS	〃		X	
83	x x		A	DIRECTIONAL SPECTRA	〃		X	
84	x x	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA	?			
85	x x			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?			
86	x x x	STA		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	OSCAR	SIX		

				Program Name	Yes	No	Comments
87	*		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	OSCAR	?		
88	S		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	4		?	
89	O		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	4	SIX		
90	L		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	4	?		
91	U		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	4		X	
92	T	D	METHOD OF INTEGRATION USED .... HOUBOLT	4	?		
93	I	Y	.... WILSON - θ	4	?		
94	O	N	.... NEWMARK - β	4	?		
95	N	A	OTHERS .... PLEASE SPECIFY	4	?		
96		M	HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	4	?		
97	T	I	.... VARIABLE INTEGR -ATION TIME	4	?		
98	E	C	OTHERS .... PLEASE SPECIFY	4	?		
99	C	S	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	4	?		
100	H		OTHERS .... PLEASE SPECIFY	4	?		
101	N		PLATFORM MOTION TIME HISTORY	11	X		
	I						
	Q						
	U						
	E						

TIME DOMAIN

			Program Name	Yes	No	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	OSCAR	X		
103		... R.M.S. VALUE	4	?		
104		... (SIGNIFICANT)1/3	4	X		
105		... EXPECTED MAXIMUM	4	?		
106		... OTHERS, SPECIFY	4		X	
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	4		X	
108	** **** PROGRAM VERIFICATION	MODEL TEST - INDICATE SCALE	4	?		
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	4	?		
110		OTHER PUBLISHED MATERIAL - SPECIFY	4	?		
111	** ****	OTHERS (SPECIFY)	4	?		
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)	4	X		
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	4	X		
114		VERTICAL (TAUT) MOORING	4		X	
115	M	HYBRID/OTHER COMBINATION .... SPECIFY	4		X	
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	4		X	

					Program NAME	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)	OSCAR	X		
118				WIRE ROPE (STEEL)	4	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	4		X	
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	4	?		
121				IS IT BASED ON CATENARY EQUATION	4	X		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	9		X	
123				OTHERS (SPECIFY)	4		X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	11		X	
125		******	**	IS THE MASS OF THE MOORING CONSIDERED	9		X	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	4	?		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	4	?		
128				IS GEOMETRIC NON LINEA-RITY CONSIDERED	4	?		
129			MOORI	IS MATERIAL NON LINEA-RITY CONSIDERED	4		X	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	4		X	
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED	4		X	

						Program Name	Yes	No	Comments
132		RTICAL	HG	HYDRODYNAMIC MODEL	IS THE MOORING SYSTEM COUPLED WITH PLATFORM	OSCAR		X	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STIFFNSS, CIRCLE	11		X	
134					IS IT BASED ON FINITE DIFFERENCE METHOD	11		X	
135	C		MODEL		IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	11		X	Does it consider the hydrodynamic force on the mooring line ??
136	A				IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	11		X	
137	P				IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	11		X	
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL	11		?	
139	B		X		IS THE MOORING MODELLED AS THREE DIMENSIONAL	11		?	
140	I		XXX		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)	11	X		
141	L		X		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)	11	X		
142	I	MOORING			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	11	?		
143	T				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	11	?		
144	I				IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	11		X	
145	E				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	11		X	
146	S		XX	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	11		X	

				Program Name	Yes	No	Comments
147		** INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	OSCAR		X	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	11	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	1	X		
150			... R.M.S. VALUE	1	?		
151			... (SIGNIFICANT)1/3	4	X		
152			... EXPECTED MAXIMUM	4	?		
153			... OTHERS, SPECIFY	4	?		
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	4	?		
155	***		WITH OTHER SOFTWARE - LIST PROGRAMS	4	?		
156	***		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	4	?		
157	***		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	?			NO REF TO RISER ANALYSIS
158	***	** STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL				
159	R		IS THE RISER MODEL THREE DIMENSIONAL				
160	I S		DOES THE PROGRAM USE FINITE ELEMENT METHOD				
161	E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				

				PROGram NAME	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE				
175	* ** ** *		WITH OTHER SOFTWARE - LIST PROGRAMS				
176			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				PROGRAM NAME	YES	NO	COMMENTS
177	* ***	INTACT	INTACT FREE FLOATING	OSCAR	X		
178	STABILITY	INTACT	INTACT WITH VERTICAL TAUT TENDONS	4		X	
179	ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	4	X		
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	4		X	
181	* * * * *		HYDRODYNAMIC LOADING CONSIDERED	?			NO REF TO STRUCL ANALYSIS
182		LOADING	IS INERTIA LOADING CONSIDERED				
183	S T R U C T U R A L A N A L Y S		IS DYNAMIC LOADING CONSIDERED				
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		* ***	BEAM ELEMENT				
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
188			PLATE ELEMENT				
189			STIFFENED PLATE ELEMENT				
190		*** *	OTHERS .... SPECIFY				
191		*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

				PROGRAM NAME	Yes	No		COMMENTS
192	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS					
193			MODAL ANALYSIS					
194			FATIGUE LIFE ANALYSIS					
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	OSCAR	?			
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	4	X			
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	11	X			
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	4		X		
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (IV) SPECIFY THE VERSION	4	X			
200			.... BASIC	4		X		
201			.... PASCAL	4		X		
202			.... OTHERS SPECIFY	4		X		
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	4	?			
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE	4	X			
205			IS THEORETICAL MANUAL AVAILABLE	4	?			
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	1	X			

			PROGRAM NAME	YES	NO		COMMENTS
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	OSCAR	?			
208	** ****	IBM	4	?			
209		CDC	4	?			
210	HARDWARE SYSTEM	PRIME COMPUTER	4		X		
211		VAX	4		X		
212	**** **	MICRO .... SPECIFY	4		X		
213		OTHERS .... SPECIFY	4		X		
214	** ****	LEASE (PRICE $ .00)	4	?			
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)		?			
216		CONSULTANCY BASIS		?			
217	** ****	OTHERS .... SPECIFY		?			
218	REMARKS AND NOTES						
219							
220							

BATTELLE PETROLEUM TECHNOLOGY CENTER

FREQUENCY DOMAIN USING MORISON'S EQUATION

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ** ** ** ** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	DWVSL		X		
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM			X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES			X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM			X		
7		: ORIENTATION :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER			X		
8	E	: MEMBER :	VERTICAL MEMBER		X			
9	N	: MEMBER :	HORIZ. MEMBER		X			
10	I	: BER : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION			X		
11	R	: :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION		X			

Geometry { Vertical Members - Circular always
Horizontal Members - Circular or Rectangular

						Program Name	Yes	No		Comments
12	ON	WAVE	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	DWUSL		X		
13	MENTAL				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER			X		
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY			X		
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN			X		
16					COLUMN AND PONTOON			X		
17					PONTOON AND PONTOON			X		
18		FORCES	FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION		X			Considers inertia terms only – No drag
19					IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY			X		
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT			X		
21					IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION			X		
22	FORCES		SECO	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION			X		
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY			X		
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			X		
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY			X		
26	*	: :			DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			X		

No.	Group	Question	Program Name	Yes	No		Comments
27	VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	OWVSL		X		
28	VISCOUS	DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY			X		
29	VISCOUS	IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X		
30	FORCES	IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X		
31	FORCES	DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION			X		
32	FORCES	IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM			X		
33	FORCES	DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			X		
34	ADD MASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X		
35	ADD MASS	CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS					
36	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			X		
37	DAMPING	IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X		
38	DAMPING	IS THE CURRENT DRAG DAMPING CONSIDERED			X		
39	COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
40	COEFFICIEN	IS THE RADIATION DAMPING CONSIDERED			X		
41	COEFFICIEN	IS THE STRUCTURAL DAMPING CONSIDERED			X		

					Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	DWVSL		X	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
44				IS THE STIFFNESS MATRIX COMPUTED		X		
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			X	
46	**	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			X	
47				DAVENPORT			X	
48	ENV	D		SIMIU			X	
49	IRON	**		OTHERS (SPECIFY)			X	
50	MENTAL	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			X	
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			X	
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT			X	
53		**		MEAN SPECTRAL PERIOD			X	
54		**		WAVE SCATTER DIAGRAM			X	
55		*	...	LINEAR WAVE		X		Deep water approximation
56				STRETCH LINEAR			X	

					Program Name	Yes	No	Comment
57	DESCRIPTION *	WAVES *****	WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	OWVSL		X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN			X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			X	
60				STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			X	
61				STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			X	
62				EXTENDED VELOCITY POTENTIAL			X	
63				CNOIDAL WAVE THEORY			X	
64			SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			X	
65				ISSC			X	
66				JONSWAP			X	
67				BRETSCHNEIDER			X	
68				SCOTT			X	
69				OCHI (SIX PARAMETER)			X	
70				INPUT SPECTRA			X	
71				OTHERS			X	

				Name	HS	ILO		Comments
72	* *	* *	DIRECTIONAL SPECTRA	DWVSL		X		
73	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA			X		
74	* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X		
75	SOLUTION TECHNIQUE	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY			0		No static solution
76	SOLUTION TECHNIQUE	STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			—		
77	SOLUTION TECHNIQUE	STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			—		
78	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		3			Surge, Heave & Pitch in wave propagation direction
79	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		ALL			
80	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY			—		No drag considered
81	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION			X		
82	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY		X			3X3 Matrix explicitly inverted
83			MEAN OFFSET OF THE PLATFORM			X		
84			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'		X			
85	* *** ***** *******		PLATFORM MOTION RESPONSE SPECTRA			X		
86	PLATFORM RESPONSE OUTPUT		RESPONSE STATISTICS .. MEAN VALUE			X		

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	OWUSL		X	
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3			X	
89		RESPONSE STATISTICS .. OTHERS; SPECIFY			X	
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)		X		
91	** ****	MODEL TEST - INDICATE SCALE		X		1/64 TLP ? Semisub
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS		X		VOTOP, NMIWAVG, NV409, MOSAS
93		OTHER PUBLISHED MATERIAL - SPECIFY		X		OTC 3899
94	**** **	OTHERS (SPECIFY)			X	
95	* * * * * * * *	SPREAD MOORING (CATENARY)		X		all are possible technically since all moorings are modeled by three linear springs
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			X	
97		VERTICAL (TAUT) MOORING		X		
98	DESCRIPTION	HYBRID/OTHER COMBINATION .... SPECIFY			X	
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			X	
100	M	CHAIN (STEEL)			X	
101	O	WIRE ROPE (STEEL)			X	

MATERIA

					name	FE	LCO	comments
102	MOORING SYSTEM	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	DWUSL		X	
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			X	
104				IS IT BASED ON CATENARY EQUATION			x	
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE			X	
106				OTHERS (SPECIFY)			X	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		X		Keep in mind that it's only a linear spring adding to stiffness
108				IS THE MASS OF THE MOORING CONSIDERED			X	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		X		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			X	
111				IS GEOMETRIC NON LINEARITY CONSIDERED			X	
112				IS MATERIAL NON LINEARITY CONSIDERED			X	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED			X	
114				IS THE STRUCTURAL DAMPING CONSIDERED			X	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM		X		see note above
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE			X	

						PROGRAM NAME	YES	NO	COMMENTS
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD	DWUSL		X	
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D			X	
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D			X	
123	C	M,	D		IS THE MOORING MODEL TWO DIMENSIONAL			X	
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL		X		See note above
125	P	R	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			X	
126	A	I			IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
127	B	N			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES		X		See note above
128	I	G			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
129	L			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		X		See note above
130	I	* ** *		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			X	
131	T	** ****			MEAN LOAD OF THE MOORING LINE			X	
	I								
	E								
	S								

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	DWUSL		X		
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE			X		
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3			X		
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY			X		
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE			X		
137	* * * * *	PROGRAM VERIFICATN ***	WITH OTHER SOFTWARE - LIST PROGRAMS			X		
138	* * *	*	WITH OTHER PUBLISHED MATERIAL .... SPECIFY			X		
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	DWRSR	X			DWRSR consists of DWUSL DWMOD, DWANL, DWOUT, DWFTG
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL		X			DWUSL - Vessel motion DWMOD - Riser model generator
141		STRUCTURAL	IS THE RISER MODEL THREE DIMENSIONAL		X			DWANL - Riser analysis DWOUT - Riser output
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD		X			DWFTG - Riser fatigue
143	R I		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			X		
144	S	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY		X			
145	E	* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY		X			
146	R	* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X			Form is #20

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	DWRSR	X		
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
149			IS THE RISER HYDRODYNAMIC MODEL 2D			X	
150			IS THE RISER HYDRODYNAMIC MODEL 3D		X		
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM		X		Sign conventions, etc. compatible. Data must be manually transferred
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			X	
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS		X		
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END		X		
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE		X		
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			X	
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS		X		MRDAP, MARISE, AQUARISER, MARRS, ANSYS
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY		X		API RP2J
159	* ***	INTACT	INTACT FREE FLOATING	DWVSL		X	
160	STABILITY ANALYSIS		INTACT WITH VERTICAL TAUT TENDONS			X	
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			X	

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	DWUSL		X	
163	* ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED			X	
164			IS INERTIA LOADING CONSIDERED			X	
165	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED			X	
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS			X	
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS			X	
168		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT			X	
169			SHELL ELEMENT			X	
170			PLATE ELEMENT			X	
171			STIFFENED PLATE ELEMENT			X	
172		*** *	OTHERS .... SPECIFY			X	
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM			X	
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS			X	
175			MODAL ANALYSIS			X	
176	* ** *		FATIGUE LIFE ANALYSIS			X	

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	DWUSL		X	
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)			X	
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)			X	
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			X	
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION		X		4
182		.... BASIC			X	
183		.... PASCAL			X	
184		.... OTHERS; SPECIFY			X	
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU		2.3 sec CDC Cyber 74		RAO's : 24 wave periods & 3 wave angles Natural 24 columns Periods 12 pentoons 8 moorings
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X		
187		IS THEORETICAL MANUAL AVAILABLE			X	
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		X		
189		IS ANY TRAINING OFFERED		X		
190	** ****	IBM		X		
191		CDC		X		

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	DWVSL		X		
193		VAX		X			
194		MICRO .. SPECIFY					
195	**** **	OTHERS .... SPECIFY					UNIVAC, PERKIN-ELMER
196	** ****	LEASE (PRICE $ .00)					
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ 40000.00)	DWRSR				Price for DWVSL only ≈ $8000 negotiable
198		CONSULTANCY BASIS	DWRSR DWVSL	X			
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES		DWVSL				This is a very simple program. It was not
201							designed to be a vessel design program. It is only intended to generate
202							reasonable RAO's for TLP's and Semi-subs

VO OFFSHORE LTD.

FREQUENCY DOMAIN USING MORISON'S EQUATION

VO (Offshore) F12

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	VODAS	✓			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION (API)	RANTIM			OCT 85	3 DoF Time domain low damping (zero numerical damping)
3	*		IS THE ~~CURRENT~~ FORCE AN INPUT TO THE PROGRAM					
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	VODAS	✓			Doppler shift
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		: : ORIENTATION : MEMBER :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	VODAS VODYN	✓	✓		
8	E		VERTICAL MEMBER	"	✓			
9	N V I R		HORIZ. MEMBER	"	✓			
10		X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"	✓			
11			DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"	✓			

						Program NAME	Yes	No		Comments
12	ON	WAVE	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION			✓		
13	MENTAL				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		✓			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY					External Diffraction analysis
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	VODAS / VODYN	✓ / ✓			VODAS → Diffraction analysis
16					COLUMN AND PONTOON	"	✓ / ✓			VODYN → Empirical or diffraction Analysis
17					PONTOON AND PONTOON	"	✓ / ✓			
18		FORCES	FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"	✓			
19					IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY	"	✓			
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	✓ / ✗	/ ✓		
21					IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"	✓ / ✓			sinusoidalised, function of wave height.
22	FORCES		SECO	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"		✓		No drift calculation in
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		✓		VODAS/VODYN.
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"		✓		
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"		✓		
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		✓		

					Program Name	Yes	No	Comments
27	****	:	ND	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		✓	
28		:			DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	✓		
29		:			IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT		✓	
30		:	ORDER		IS ITERATION OF RESPONSE USED FOR CONVERGENCE	✓		
31		:			DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	✓		
32		:			IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM		✓	Verify no. of iterations
33		:			DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE		✓	
34	****		FREQUENCY	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM		✓	
35					CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE); OTHERS	3D		
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	✓		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			
38					IS THE CURRENT DRAG DAMPING CONSIDERED			
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			
40					IS THE RADIATION DAMPING CONSIDERED			
41	MOT		DO		IS THE STRUCTURAL DAMPING CONSIDERED			

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
44				IS THE STIFFNESS MATRIX COMPUTED				
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	RANTIM			Development
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
47	*			DAVENPORT				
48	ENV	D		SIMIU				
49	IRON	**		OTHERS (SPECIFY)				
50	MENTAL	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				Hand Calculations
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
52		****	STATISTICS	SIGNIFICANT WAVE HEIGHT	VOPROC	✓		
53				MEAN SPECTRAL PERIOD	"	✓		
54				WAVE SCATTER DIAGRAM	"	✓		
55		*	....	LINEAR WAVE	"	✓		
56				STRETCH LINEAR				

					Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S (2ND) (3RD) OR (5TH) ORDER .... PLEASE CIRCLE ...		✓		Various programs
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN			✓	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			✓	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			✓	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			✓	
62		V		EXTENDED VELOCITY POTENTIAL				?
63		E		CNOIDAL WAVE THEORY			✓	Etoks finite depth
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		✓		
65	DESCRIPTION			ISSC	?		✓	
66				JONSWAP		✓		
67				BRETSCHNEIDER			✓	
68				SCOTT		✓		
69		*		OCHI (SIX PARAMETER)			✓	
70		* * *		INPUT SPECTRA				
71	*	*		OTHERS		✓		to clients specification

					Program Name	Yes	No		Comments
72	* *	* *	A	DIRECTIONAL SPECTRA	VOPROC	✓			VOPROC. constant spread
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA			✓		
74	* *	OTHERS		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE		✓			as mean level change
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .(0). SPECIFY	VODAS VOFORCE VOHYDB VODYN	✓			
76	SOLUTION TECHNIQUE	STATICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY					all coupled non flexible
77	SOLUTION TECHNIQUE	STATICS		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM					
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		6			
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY					all coupled
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY					strict linearization
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION					VECFRAME choleski
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY					
83				MEAN OFFSET OF THE PLATFORM	VODYN	✓			
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	VODYN (P)				nl programs produce RAO's
85	* *** ***** *******	PLATFORM RESPONSE OUTPUT		PLATFORM MOTION RESPONSE SPECTRA	VOPROC				By post processor
86				RESPONSE STATISTICS .. MEAN VALUE					

			Program name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE		✓		
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3		✓		
89		RESPONSE STATISTICS .. OTHERS; SPECIFY		✓		M_4, T_2,
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	VODYN VODAS	✓		
91	** ****	MODEL TEST - INDICATE SCALE	1:64	✓		
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
93		OTHER PUBLISHED MATERIAL - SPECIFY				
94	**** **	OTHERS (SPECIFY)				
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)	MAP	✓		
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT		✓		
97		VERTICAL (TAUT) MOORING		✓		
98		HYBRID/OTHER COMBINATION .... SPECIFY				
99	MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR		✓		
100	M	CHAIN (STEEL)		✓		
101	O	WIRE ROPE (STEEL)		✓		

					Program Name	Yes	No		Comments
102	MOORING SYSTEM	ANALYSES	STATICS	COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	MAP II	✓			by segment.
103				USER SPECIFIED LOAD DISPLACEMENT TABLE	"		✓		
104				IS IT BASED ON CATENARY EQUATION	"	✓			
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR (W/O) BENDING STFFNSS, CIRCLE	"	✓			
106				OTHERS (SPECIFY)	"				
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS					linear spring coupling
108				IS THE MASS OF THE MOORING CONSIDERED	(VORIS)	(✓)	✓		
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		✓			
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	VODAS TIME DOMAIN	✓			VODAS TIME DOMAIN
111				IS GEOMETRIC NON LINEARITY CONSIDERED		✓	✓		depends what you mean
112				IS MATERIAL NON LINEARITY CONSIDERED			✓		
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	(VORIS)	(✓)	✓		
114				IS THE STRUCTURAL DAMPING CONSIDERED			✓		
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM		✓			
116				IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR (W/O) BENDING STFFNSS, CIRCLE	(CABDYN)	(✓)	✓		

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD	MAD (CHBDYW)	(✓)	✓	
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	(")	(✓)	✓	
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	(")	(✓)		
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			(✓)	
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D		✓	(✓)	
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D		(✓)	✓	
123	C	M,	D		IS THE MOORING MODEL TWO DIMENSIONAL		✓	(✓)	
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL		(✓)	✓	
125	P	O	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			✓	
126	A	R	.		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			✓	
127	B	I	.		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES		✓	(✓)	
128	I	N	.		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			(✓)	
129	L	G	.	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			(✓)	
130	I	*	.	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	[Voris]	[✓]	(✓)	
131	T	**	.		MEAN LOAD OF THE MOORING LINE				
	I	***	.						
	E	****	.						
	S		.						

				Program name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)		✓	(✓)	(Time histories)
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE		✓		
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3		✓		
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY				
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE				
137	* * * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS		✓		
138	*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	VORLS			stand alone
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL		✓		
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL			✓	
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD		✓		
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			✓	Difference in time
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY		✓		
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECT-ION THEORY			✓	
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		✓		

				Program Name	Yes	No		Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"	✓			
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		✓		
149			IS THE RISER HYDRODYNAMIC MODEL 2D	"	✓			
150			IS THE RISER HYDRODYNAMIC MODEL 3D			✓		
151	S	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			✓		
152	Y S	**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			✓		
153	T	* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			✓		
154	E M	SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END		✓			
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE		✓			?
156			WITH MODEL TESTS - INDICATE SCALE					
157	* * * * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS		✓			
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY		✓			
159	* ***	I N T A C T	INTACT FREE FLOATING	VODYN VODAS	✓			
160	STABILITY		INTACT WITH VERTICAL TAUT TENDONS		✓			
161	ANALYSIS	D A M	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	LASS	✓			

				Program Name	Yes	No		Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING			✓		Hand Calcs
163	* ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	(VOHVOA) VODAS	✓(V)			
164			IS INERTIA LOADING CONSIDERED		✓(V)			
165	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED		✓(V)			
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS			✓(V)		
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS		✓(V)			
168		* ***	BEAM ELEMENT		✓(V)			
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT		✓	(✓)		
170			PLATE ELEMENT		✓	(✓)		
171			STIFFENED PLATE ELEMENT		✓	(✓)		
172		*** *	OTHERS .... SPECIFY		(✓)	✓		(Substructure)
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM		(12) 6-7?			6 per node
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS		✓			By post processor.
175			MODAL ANALYSIS		✓			
176	* ** *		FATIGUE LIFE ANALYSIS		✓			

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)			✓	
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)				Vostran
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)				Vopmve. Vohydr Votrame
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)		✓		Lots
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION	IV	✓		Vodas Voran Naspost, Vospec
182		.... BASIC		✓		Votrame Vohydr
183		.... PASCAL			✓	
184		.... OTHERS; SPECIFY				
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				1:1 CDC (slow) HP (slow) not really meaningful
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE				Voreable
187		IS THEORETICAL MANUAL AVAILABLE				not normally.
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED				yes.
189		IS ANY TRAINING OFFERED				on as needed basis
190	** ****	IBM				Vodas Voris
191		CDC				Vodas Voris

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER			✓		
193		VAX			✓		
194		MICRO .. SPECIFY		✓			HP, Apple
195	**** **	OTHERS .... SPECIFY			✓		
196	** ****	LEASE (PRICE $ .00)					Response on request
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)					
198		CONSULTANCY BASIS		✓			
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES						Not a commercial computer bureau.
201							May be possible to arrange access for favoured clients
202							

VO OFFSHORE LTD.

TIME DOMAIN USING MORISON'S EQUATION

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

VICKERS

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	?				NO REFERENCE TO WIND FORCE CALCULATIONS
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	?				"
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	?				"
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	VODAS VODYN		?		
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES	"	?			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"	X			
7		. : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			VODYN IS NOT CAPABLE
8	E	. : MEMBER	VERTICAL MEMBER	"	X			
9	N V	. MEMBER	HORIZ. MEMBER	"	X			
10	I	. BER	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		?		
11	R	. R : X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"		?		

						Program Name	Yes	No		Comments
12	ONMENTAL		: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	VODAS VODYN	X			BY OTHER PROGRAMS BASED ON DIFFRACTION THEORY
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14		WAVE			ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"		?		
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		
16					COLUMN AND PONTOON	"		X		
17					PONTOON AND PONTOON	"		X		
18			FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		?		
19					IS THE PROGRAM BASED ON MORISON'S EQUATION FOR-MULATION W/ REL VELOCITY	"	X			
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"		X		
21	FORCES	FORCES			IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X		
22			SECON....	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		?		
24					DOES IT ACCOUNT FOR ADD-ITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25					DOES IT ACCOUNT FOR ADD-ITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FRE-QUENCY 2ND ORDER WAVES	"		?		

						Program Name	Yes	No	Comments
27				VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	VODAS VODYN		?	
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"	X		
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X	
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	?		
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	"	?		
32					IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"	?		
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"	?		
34				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"	X		
35					CIRCLE / COMPUTING METHOD : (2D),3D(ARBITRARY SHAPE), OTHERS *	"	2D		
36				DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"	X		
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"	X		
39					IS THE CURRENT FRICTION DAMPING CONSIDERED	"		?	
40					IS THE RADIATION DAMPING CONSIDERED	"	X		VODYN DOES NOT HAVE RADIATION DAMPING FOR HEAVE
41					IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

					Program Name	Yes	No		Comment
42			VES	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	VODAS VODYN			
43				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	4		X	
44					IS THE STIFFNESS MATRIX COMPUTED	4	X		
45				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	11	X		
46			I		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	4	2D		
47			R		IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	11	X		
48			R		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	11	X		
49			E		IS THE CURRENT DRAG DAMPING CONSIDERED	4	X		
50			G		IS THE CURRENT FRICTION DAMPING CONSIDERED	4		?	
51			U		IS THE RADIATION DAMPING CONSIDERED	4	X		VODYN DOES NOT HAVE HEAVE RADIATION DAMPING
52			L		IS THE STRUCTURAL DAMPING CONSIDERED	11		X	
53			A		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	11	X		
54			R		IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	4		X	
55					IS THE STIFFNESS MATRIX COMPUTED	4	X		
56			STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	?			NO REFERENCE TO WIND FORCE CALCULATION & WIND DYNAMICS

					Program None	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	?			
58				DAVENPORT	?			
59				SIMIU	?			
60				OTHERS (SPECIFY)	?			
61		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	?			
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	?	X		
63		WAVE		SIGNIFICANT WAVE HEIGHT	VOSPEC	X		
64				MEAN SPECTRAL PERIOD	11	X		
65				WAVE SCATTER DIAGRAM	11	?		
66				LINEAR WAVE	VORIS	X		
67				STRETCH LINEAR	?			
68				STOKE'S 2ND, 3RD OR (4TH) ORDER ... PLEASE CIRCLE ...	VORIS	X		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN	?			
70		WAVE	THEORIE	STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND	?			
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH	?			

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	?			
73		E	.	EXTENDED VELOCITY POTENTIAL	?			
74		S	.	CNOIDAL WAVE THEORY	?			
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	NOSPEC	X		
76	D		E	ISSC	〃		X	
77	E		A	JONSWAP	〃	X		
78	S		S	BRETSCHNEIDER	〃		X	
79	C	*	P	SCOTT	〃		X	
80	R	*	E	OCHI (SIX PARAMETER)	〃		X	
81	I	*	C	INPUT SPECTRA	〃		X	
82	P	*	T	OTHERS	〃		X	
83	T	*	R	DIRECTIONAL SPECTRA	〃		X	
84	I	*	A	DOES IT CONSIDER EARTH QUAKE SPECTRA	?			
85	O	*		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?			
86	N	*	STA	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	VODAS	SIX		

				Program NAME	Yes	No	Comments
87	* SOLUTION TECHNIQUE ****	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	VODAS	?		
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	4	3		
89		DYNAMICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	11	SIX		
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	11	?		
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	4	?		
92			METHOD OF INTEGRATION USED .... HOUBOLT	11	?		
93		TIME DOMAIN	.... WILSON - θ	11	?		
94			.... NEWMARK - β	11	?		
95			OTHERS .... PLEASE SPECIFY	4	?		
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	4	?		
97			.... VARIABLE INTEGR -ATION TIME	4	?		
98			OTHERS .... PLEASE SPECIFY	4	?		
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	11	?		
100			OTHERS .... PLEASE SPECIFY	11	?		
101			PLATFORM MOTION TIME HISTORY	11	X		

			Program Name	Yes	No		Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	VODAS	X			
103		... R.M.S. VALUE	VOSPEC	?			
104		... (SIGNIFICANT)1/3	"	X			
105		... EXPECTED MAXIMUM	"	?			
106		... OTHERS, SPECIFY	"	?			
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	"		X		
108	PROGRAM VERIFICATION ** ****	MODEL TEST - INDICATE SCALE	?	?			
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	VODAS	X			NNIWAVE
110		OTHER PUBLISHED MATERIAL - SPECIFY	"	?			
111		OTHERS (SPECIFY)	"	?			
112	DESCRIPTION * * * *	SPREAD MOORING (CATENARY)	VOCAS	X			
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X			
114		VERTICAL (TAUT) MOORING	VOTEN	X			
115	M	HYBRID/OTHER COMBINATION .... SPECIFY	VOCAS VODYN		X		
116	U	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"		X		

					Program Name	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)	VOCAS VODYN	X		
118				WIRE ROPE (STEEL)	"	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"	?		
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"		X	
121				IS IT BASED ON CATENARY EQUATION	VOCAS	X		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STIFFNSS, CIRCLE	"		X	
123				OTHERS (SPECIFY)	"		X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	VODAS VOCAS VODYN		X	
125		**********	**********	IS THE MASS OF THE MOORING CONSIDERED	"		X	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"		X	
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
129			MOORI	IS MATERIAL NON LINEARITY CONSIDERED	"		X	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Program name	Yes	No		Comments
132		RTICAL	HG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	VODAS VOCAS VODYN				
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		?		
134					IS IT BASED ON FINITE DIFFERENCE METHOD	"		?		
135	C		M	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	X			BASIC
136	A		O		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"	?			
137	P		D		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X		
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL	"	X			
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL	"		X		
140	I		*		IS THE MOORING MODEL TWO DIMENSIONAL (struct'l)	"	X			
141	L		*		IS THE MOORING MODEL THREE DIMENSIONAL (struct'l)	"	X			
142	I	M	*		IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	"	X			
143	T	O	*		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"	X			
144	I	R	*		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"		X		
145	E	I	*		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	VODYN VOPRC	X			
146	S	N	*	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	VOCAS VODYN		X		

				Program Name	Yes	No	Comments
147		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	VOCAS VODYN		X	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	11	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	11	?		
150			... R.M.S. VALUE	4	?		
151			... (SIGNIFICANT)1/3	11	X		
152			... EXPECTED MAXIMUM	4	?		
153			... OTHERS, SPECIFY	4	?		
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	VOCAS		?	
155			WITH OTHER SOFTWARE - LIST PROGRAMS	4		?	
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	4		?	
157			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	VORIS	X		
158		STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL	11	X		
159	R		IS THE RISER MODEL THREE DIMENSIONAL	4		X	
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD	4	X		
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	4		?	

				Program Name	Yes	No		Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY	VORIS	?			
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	4	?			
164		HYDRODYNAMIC	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	4	X			BASIC
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	4	?			
166	S Y		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	4		X		
167	S	MODEL	IS THE RISER MODELLED AS TWO DIMENSIONAL	4	X			
168	T		IS THE RISER MODELLED AS THREE DIMENSIONAL	4		X		
169	E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	4		X		
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS	4	X			
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	4		X		
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	4		X		
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	4		X		
174			WITH MODEL TESTS - INDICATE SCALE	4		?		
175	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	4		?		
176	* * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	4		?		

				Program Name	Yes	No		Comment
177	* ***	INTACT	INTACT FREE FLOATING	?				NO REFERENCE TO STABILITY ANALYSIS
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS	?				
179	STABILITY ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	?				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	?				
181	**** STRUCTURAL ANALYSIS	LOADING	HYDRODYNAMIC LOADING CONSIDERED	VOHYDR	X			
182	**** STRUCTURAL ANALYSIS	LOADING	IS INERTIA LOADING CONSIDERED	"	X			
183	**** STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED	"	?			
184	**** STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	VOFRAME NASTRAN STRUDL	X			
185	**** STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X			
186	**** STRUCTURAL ANALYSIS	* ***	BEAM ELEMENT	"	X			
187	**** STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	SHELL ELEMENT	NASTRAN STRUDL	X			
188	**** STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	PLATE ELEMENT	"	X			
189	**** STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT	"	?			
190	**** STRUCTURAL ANALYSIS	*** *	OTHERS .... SPECIFY	"	?			
191	**** STRUCTURAL ANALYSIS	*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"	?			

				Program Name	Yes	No		Comments
192	I S * * * * *	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	?				
193			MODAL ANALYSIS	?				
194			FATIGUE LIFE ANALYSIS	VOFAT	X			
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	?				
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	?				
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	?				
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	?				
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (~~IV~~) SPECIFY THE VERSION	VODAS	X			
200			.... BASIC	VODYN VOFRAME VOHYDR VOTEN, VOTEN	X			
201			.... PASCAL	?		X		
202			.... OTHERS SPECIFY	?		X		
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	?	?			
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE	VODAS, VODYN, VOFAT, VOSPEC, VOTEN, ..	X			
205			IS THEORETICAL MANUAL AVAILABLE	"	X			
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	^	?			

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	VODAS, VODYN VOFAT, VOSPOS VOTEN, ...	?		
208	** ****	IBM	VODAS		X	
209		CDC	4	X		
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	**** **	MICRO .... SPECIFY				
213		OTHERS .... SPECIFY	VODYN VOFRAME VoHYDR	HP		
214	** ****	LEASE (PRICE $ .00)	?			
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	?			
216		CONSULTANCY BASIS	?			
217	** ****	OTHERS .... SPECIFY	?			
218	REMARKS AND NOTES					
219						
220						

NETHERLAND SHIP MODEL BASIN

FREQUENCY DOMAIN USING DIFFRACTION THEORY

NSMB

TABLE II

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES		X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM			X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES		X			
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM		X			
7	E	. . . . MEMBER ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON INCLINED MEMBER					
8	N		VERTICAL MEMBER		X			
9	V		HORIZ. MEMBER		X			
10	I		IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION		X			
11	R	X-SECT	DOES IT USE EQUIVALENT CIRCULAR X-SECTION			X		

					Program Name	Yes	No	Comments
12	OFFSHORE STRUCTURES	NAVAL ARCHITECTURE		IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY				
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER				
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY				
15			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN				
16				COLUMN AND PONTOON				
17				PONTOON AND PONTOON				
18			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE				
19				IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON				
20				DIFFRACTION & FLUID FINITE ELEMENT				
21				OR ANY OTHER COMBINATION, PLEASE SPECIFY				
22			SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION				
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY				
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY				
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY				
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES				

				Program Name	Yes	No	Comments
27	XXXXX	ORDER.....	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		X	
28				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY		X	
29				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT		X	
30				IS ITERATION OF RESPONSE USED FOR CONVERGENCE		X	
31				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	" X		
32				IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	" X		
33				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE		X	
34	XXXX EQUATION OF MOTION	FREQUENCY D..	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM		X	
35				CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS	3D		
36			DAMPING COEFFICIE	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X	
37				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED		X	
38				IS THE CURRENT DRAG DAMPING CONSIDERED	X	X	
39				IS THE CURRENT FRICTION DAMPING CONSIDERED		X	
40				IS THE RADIATION DAMPING CONSIDERED	X		
41				IS THE STRUCTURAL DAMPING CONSIDERED			

					Program name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
43			STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM		X		
44				IS THE STIFFNESS MATRIX COMPUTED		X		
45	ENVIRONMENTAL	WIND	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			X	
46			DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			X	
47				DAVENPORT			X	
48				SIMIU			X	
49				OTHERS (SPECIFY)				
50		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			X	
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			X	
52			STATISTICS	SIGNIFICANT WAVE HEIGHT		X		
53				MEAN SPECTRAL PERIOD		X		
54				WAVE SCATTER DIAGRAM		X	X	
55			...	LINEAR WAVE		X		
56				STRETCH LINEAR				

				Program None	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...			
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN			
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			Not applic. to
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			
62		V		EXTENDED VELOCITY POTENTIAL			
63		E		CHOIDAL WAVE THEORY			
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	X		
65	D			ISSC		X	
66	E			JONSWAP	X		
67	S			BRETSCHNEIDER		X	
68	C			SCOTT		X	
69	R	X		OCHI (SIX PARAMETER)		X	
70	I	X		INPUT SPECTRA	X		
71	P	X		OTHERS		X	

				Program Name	Yes	No	Comments
72	* **	* **	A	DIRECTIONAL SPECTRA		X	
73	* *** **** *****	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA		X	
74				DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE		X	
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	6		
76				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	6		
77				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			
78		DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	12		
79				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	12		
80				WHAT METHOD OF LINEARIZATION USED .... SPECIFY			
81				MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS .. GAUSSIAN ELIMINATION	Direct		
82				OTHERS .... SPECIFY			
83	* *** ***** ******* PLATFORM RESPONSE OUTPUT			MEAN OFFSET OF THE PLATFORM	Diffrac		
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'			
85				PLATFORM MOTION RESPONSE SPECTRA			
86				RESPONSE STATISTICS .. MEAN VALUE			

			Program None	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE		X		
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3		X		
89		RESPONSE STATISTICS .. OTHERS; SPECIFY			X	
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)		X		
91	** ****	MODEL TEST - INDICATE SCALE				
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
93		OTHER PUBLISHED MATERIAL - SPECIFY				"
94	**** **	OTHERS (SPECIFY)				
95	* ******	SPREAD MOORING (CATENARY)		X		
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT		X		
97		VERTICAL (TAUT) MOORING		X		
98	DESCRIPTION	HYBRID/OTHER COMBINATION .... SPECIFY				
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR		X		
100	M	CHAIN (STEEL)		X		
101	O MATERIA	WIRE ROPE (STEEL)		X		

					Program Name	Yes	No		Comment
102	O R	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	[illegible]	X			
103	I	A	S	USER SPECIFIED LOAD DISPLACEMENT TABLE			X		
104	N	N	T	IS IT BASED ON CATENARY EQUATION	[illegible]	X			
105	G	A	A	IS IT BASED ON FINITE EL -EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE	[illegible]	X			
106		L	T	OTHERS (SPECIFY)					
107		Y	I	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		X			
108		S	C	IS THE MASS OF THE MOORING CONSIDERED			X		
109		*		IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		X			
110		*		IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			X		
111	S	V		IS GEOMETRIC NON LINEA-RITY CONSIDERED			X		
112	Y	E		IS MATERIAL NON LINEA-RITY CONSIDERED			X		
113	S	R		IS THE HYDRODYNAMIC DAMPING CONSIDERED			X		
114	T	T		IS THE STRUCTURAL DAMPING CONSIDERED			X		
115	E	I	M	IS THE MOORING SYSTEM COUPLED WITH PLATFORM			X		
116	M	C	O	IS IT BASED ON FINITE EL -EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE			X		
		L	O						
			R						

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD			X	
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D		X		
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D			X	
123	C	M	D		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)				
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)			X	
125	P	R	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING		X		
126	A	I	.		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
127	B	N	.		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES			X	
128	I	G	.		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
129	L			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
130	I	* **		INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING		X		
131	T	** ****			MEAN LOAD OF THE MOORING LINE				
	I								
	E								
	S								

				Program Name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)				
133		*****	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE				
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3				
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY				
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE				
137	*	PROGRAM VERIFICATN ***	WITH OTHER SOFTWARE - LIST PROGRAMS				
138	*	*	WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
139	*		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES				
140	*	*	IS THE RISER MODEL TWO DIMENSIONAL				
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL				
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD				
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
145		*	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
146		*	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				

				Program Name	Yes	No		Comments
147	SYSTEM	* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER					
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING					
149			IS THE RISER HYDRODYNAMIC MODEL 2D					
150			IS THE RISER HYDRODYNAMIC MODEL 3D					
151		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM		?			
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS		?			
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS					
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END					
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE					
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE					
157	******		WITH OTHER SOFTWARE - LIST PROGRAMS					
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY					
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING					[illegible]
160			INTACT WITH VERTICAL TAUT TENDONS					
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED					

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				↓
163	* ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
164			IS INERTIA LOADING CONSIDERED				
165	S T R U C T U R A L A N A L Y S I S		IS DYNAMIC LOADING CONSIDERED				
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
168		, , * ***	BEAM ELEMENT				
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
170			PLATE ELEMENT				
171			STIFFENED PLATE ELEMENT				
172		*** *	OTHERS .... SPECIFY				
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
175			MODAL ANALYSIS				
176	* ** *		FATIGUE LIFE ANALYSIS				

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)				See Table IV
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)			X	
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)				"
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			X	
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION	(FORTRAN)			
182		.... BASIC			X	
183		.... PASCAL			X	
184		.... OTHERS; SPECIFY			X	
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				See Table IV
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X		
187		IS THEORETICAL MANUAL AVAILABLE		X		
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		X		
189		IS ANY TRAINING OFFERED			X	
190	** ****	IBM				
191		CDC				See Table V

			Program Name	Yes	No	Comments
192	HARDWARE SYSTEM	PRIME COMPUTER				
193		VAX				
194		MICRO .. SPECIFY				
195	XXXX XX	OTHERS .... SPECIFY				
196	XX XXXX	LEASE (PRICE $ .00)				
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
198		CONSULTANCY BASIS				
199	XXXX XX	OTHERS .... SPECIFY				
200	REMARKS AND NOTES					
201						
202						

NETHERLAND SHIP MODEL BASIN

TIME DOMAIN USING DIFFRACTION THEORY

NSMB

TABLE IV

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	WWCFORC	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"		X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	"		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"		X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	"	X			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"	X			
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	Diffrac (*)	X			(*) also other programs like Impress/Impress/Semisub
8	E	. . M	VERTICAL MEMBER		X			
9	N	. . E	HORIZ. MEMBER		X			
10	V	. . M	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION		X	X		
11	I	. B X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION			X		
	R	. R :						

						Program Name	Yes	No		Comments
12	ON MENTAL FORCES	WAVE FORCES	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	Semi sub Diffrac	X			- Diffraction theory - pressure integration
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"	X			
16					COLUMN AND PONTOON	"	X			
17					PONTOON AND PONTOON	"	X			
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X			3-D source potentials
19					IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON	"		X		
20					DIFFRACTION AND FLUID FINITE ELEMENT			X		
21					OR ANY OTHER COMBINATION			X		
22			SECOND	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	DBDRIFT/(*) DRIFTP/ Impressive	X			(*) see thesis of J. Pinkster
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	X			

						Program Name	Yes	No		Comment
27	* * *	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG			X		
28	* * *				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	—				Influence of viscous nature is not taken into account in the drift force calculations
29	* * *				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	—				
30	* * *				IS ITERATION OF RESPONSE USED FOR CONVERGENCE	—				However speed effects and damping effects at low frequencies are taken into consideration.
31	* * *				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	—				
32	* * *				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	—				for ref see : ore 1984 J.E.W. Wichers / K.M.M. Huysmans
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	—				
34	* * * * * *	* * * * * * * *	* * * REGULAR WA	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	Hooking (*)		X		(*) In time domain use is made of convolution integrals for the fluid reactive forces.
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS	"				
36				DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"		X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
38	EQUAT	TIM			IS THE CURRENT DRAG DAMPING CONSIDERED		X			
39					IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
40					IS THE RADIATION DAMPING CONSIDERED		X			
41					IS THE STRUCTURAL DAMPING CONSIDERED			X		

						Program Name	Yes	No		Comments
42	ION OF MOTION	E DOMAIN	VES ***	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X		
43				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM		X			
44					IS THE STIFFNESS MATRIX COMPUTED		X			
45			***	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	Hanshin (*)	X			(*) see comment no 34
46			IRREGULAR WAVES		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS		X			
47				DAMPING COEFFICIENTS	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			X		
48					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X		
49					IS THE CURRENT DRAG DAMPING CONSIDERED		X			
50					IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
51					IS THE RADIATION DAMPING CONSIDERED		X			
52					IS THE STRUCTURAL DAMPING CONSIDERED			X		
53					IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	(*)	X			(*) see comment no 34
54	*****	***		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM		X			
55			***		IS THE STIFFNESS MATRIX COMPUTED		X			
56	*	**	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT					

					Program Name	Yes	No	Comments
57	* * *	W I N D	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
58				DAVENPORT				
59				SIMIU				
60	E	* *		OTHERS (SPECIFY)				
61	N V I R O N M E N T A L		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE		X		
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
63		* *	WAVE	SIGNIFICANT WAVE HEIGHT		X		
64		* *		MEAN SPECTRAL PERIOD		X		
65		* *		WAVE SCATTER DIAGRAM		X		
66		* *		LINEAR WAVE		X		
67				STRETCH LINEAR				
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...				
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN				
70		W	THEORIE	STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND				
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH				

					Program Name	Yes	No		Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY					
73		E	.	EXTENDED VELOCITY POTENTIAL					
74		S	.	CNOIDAL WAVE THEORY					
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		X			
76	D		E	ISSC		X			
77	E		A	JONSWAP		X			
78	S		S	BRETSCHNEIDER		X			
79	C	*	P	SCOTT			X		
80	R	*	E	OCHI (SIX PARAMETER)					
81	I	*	C	INPUT SPECTRA		X			
82	P	*	T	OTHERS			X		
83	T	*	R	DIRECTIONAL SPECTRA		X			
84	I	O	A	DOES IT CONSIDER EARTH QUAKE SPECTRA			X		
85	O	T		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X		
86	N	S		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN . SPECIFY	[illegible]				(*) in time domain 6 d.o.f. in freq. domain 18 d.o.f. eg 3 independently moving bodies

				Program Name	Yes	No	Comments
87	SOLUTION TECHNIQUE	DYNAMICS	TIME DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	—		See 86
88				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			
89				NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN . SPECIFY	Nastran 6		See 90
90				WHAT ARE THE COUPLED DEGREES OF FREEDOM .. SPECIFY	6		
91				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			
92				METHOD OF INTEGRATION USED .... HOUBOLT		X	
93				.... WILSON - θ			X
94				.... NEWMARK - β		X	
95				OTHERS .... PLEASE SPECIFY	GEAR	—	used for very large coefficient
96				HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	crash		
97				.... VARIABLE INTEGR-ATION TIME		X	
98				OTHERS .... PLEASE SPECIFY		—	
99				MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION		X	
100				OTHERS .... PLEASE SPECIFY			
101				PLATFORM MOTION TIME HISTORY			

			Program Name	Yes	No		Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	[illegible]	X			
103		... R.M.S. VALUE		X			
104		... (SIGNIFICANT)1/3		X			
105		... EXPECTED MAXIMUM		X			
106		... OTHERS, SPECIFY		X			
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS			X		
108	** **** PROGRAM VERIFICATION ** ****	MODEL TEST - INDICATE SCALE					from 1:40 to 1:82.5
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS					see brochure on programs for [illegible] engineering.
110		OTHER PUBLISHED MATERIAL - SPECIFY					
111		OTHERS (SPECIFY)					
112	**** M O DESCRIPTION	SPREAD MOORING (CATENARY)		X			
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT		X			
114		VERTICAL (TAUT) MOORING		X			
115		HYBRID/OTHER COMBINATION .... SPECIFY					
116		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR		X			

					Program Name	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)	FLASH. FLEXIV. DYNLINE	X		
118				WIRE ROPE (STEEL)		X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY			X	
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			X	
121				IS IT BASED ON CATENARY EQUATION	FLEXIV FLEXIV	X	X	
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	DYNLINE	X		
123				OTHERS (SPECIFY)	—			
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	DYNLINE	X		
125		XXXXXXXX	XXXX	IS THE MASS OF THE MOORING CONSIDERED	"	X		
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"		X	
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X		
129			MOORI	IS MATERIAL NON LINEARITY CONSIDERED	"		X	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"	X		
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Name	Yes	No	Comment
132		RTICAL	NG	HYDRODYNAMIC MODEL	IS THE MOORING SYSTEM COUPLED WITH PLATFORM		X		
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"			
134					IS IT BASED ON FINITE DIFFERENCE METHOD	"	—	X	
135	C		M		IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"	X		
136	A		O		IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER	"	X		
137	P		D		IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING	"		X	
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL	FLEXD	X		
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL	FLEX3D			
140	I		X		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)		X		
141	L		X		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)				
142	I	M	X		IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING				
143	T	O			IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING				
144	I	R			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES				
145	E	N			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS				
146	S	G	XX	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				

				PROGRAM NAME	YES	NO	COMMENTS
147		* * *	INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			
148			MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY			
149				MOORING LINE LOAD STATISTICS ... ... MEAN VALUE			
150				... R.M.S. VALUE			
151				... (SIGNIFICANT)1/3			
152				... EXPECTED MAXIMUM			
153				... OTHERS, SPECIFY			
154			PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			
155				WITH OTHER SOFTWARE - LIST PROGRAMS			
156		* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
157		* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			
158		* *	STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL			
159	R			IS THE RISER MODEL THREE DIMENSIONAL			
160	I			DOES THE PROGRAM USE FINITE ELEMENT METHOD			
161	S E			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		*	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Ys	Rs	Comments
177	* ***	INTACT	INTACT FREE FLOATING				
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179	STABILITY ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	[illegible]	X		
182	STRUCTURAL ANALYSIS	LOADING	IS INERTIA LOADING CONSIDERED		X		
183	STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED		X		
184	STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	[illegible]	X		
185	STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	[illegible]	X		
186	STRUCTURAL ANALYSIS	* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT	"	X	X	
187	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	SHELL ELEMENT			X	
188	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	PLATE ELEMENT		X		
189	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT		X		
190	STRUCTURAL ANALYSIS	*** * FINITE ELEMENT ANALYSIS	OTHERS .... SPECIFY				
191	STRUCTURAL ANALYSIS	*** * FINITE ELEMENT ANALYSIS	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

				Program Name	Yes	No		Comments
192	I S * * * * *	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS		A			
193			MODAL ANALYSIS			X		
194			FATIGUE LIFE ANALYSIS			X		
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	(*)				Several programs for input checking
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)			X		
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		X			
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)					
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (V-) SPECIFY THE VERSION	FIN77				
200			.... BASIC					
201			.... PASCAL			X		
202			.... OTHERS SPECIFY			X		
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	(*)				(*) Depends highly on environment. It varies from (2:1) to (10:1).
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X			
205			IS THEORETICAL MANUAL AVAILABLE		X			
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		X			

			Roman Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED			X	only in house use
208	** ****	IBM			/	
209		CDC		X		see Remark, made by Roman about maintenance
210	HARDWARE SYSTEM	PRIME COMPUTER			/	
211		VAX			X	
212	**** **	MICRO .... SPECIFY			X	
213		OTHERS .... SPECIFY				under development
214	** ****	LEASE (PRICE $ .00)			X	
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)			X	
216		CONSULTANCY BASIS		X		
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					
219						
220						

SHELL DEVELOPMENT COMPANY

TIME DOMAIN USING MORISON'S EQUATION

Blank

SHELL

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

PROGRAM MOSAS/TLP

ROW #		**** ** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES		✓			INPUT WIND VELOCITIES FOR MEMBERS NOT IN CONFIGURATION WIND FORCES AND MOMENTS ARE INPUT AT JOINTS
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM					
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES		✓			CONSTANT CURRENT
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		: ORIENTATION :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		✓			
8	E	: MEMBER :	VERTICAL MEMBER		✓			
9	N	: MEMBER :	HORIZ. MEMBER		✓			
10	V	: BEER :	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION			✓		INCLUDES ELLIPTICAL AND RECTANGULAR MEMBERS
11	I R	X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION					

						Program Name	Yes	No		Comments
12	ON	WAVE	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					
13	MEN				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		✓			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY		✓			PRESSURE DISTRIBUTION OVER THE HULL. CONTRIBUTION DUE TO DIFFRACTION (APPROXIMATE)
15	TAL		MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN			✓		
16					COLUMN AND PONTOON			✓		
17					PONTOON AND PONTOON			✓		
18		FORCES	FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION		✓			
19					IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY					
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT					
21	FORCES				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION					
22			SECO	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION			✓		
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY			✓		APPROXIMATE CORRECTION FOR HIGH FREQUENCIES. Added Mass Coefficients
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			✓		
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY			✓		
26	*	: :			DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			✓		

						Program Name	Yes	No	Comments
27	* *	:	N D	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG			✓	
28	* * *	:			DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY			✓	
29	*	:			IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			✓	
30		:	O R D E R		IS ITERATION OF RESPONSE USED FOR CONVERGENCE			✓	
31		:			DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION			✓	
32		:			IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM			✓	
33		:	. . . .		DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			✓	
34	* * * *		F R E Q U E N C Y	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM		✓		
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS				
36	EQUATION			DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			✓	
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			✓	
38					IS THE CURRENT DRAG DAMPING CONSIDERED			✓	
39	OF				IS THE CURRENT FRICTION DAMPING CONSIDERED			✓	
40					IS THE RADIATION DAMPING CONSIDERED			✓	
41	MOT		DO		IS THE STRUCTURAL DAMPING CONSIDERED			✓	

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM		✓		
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			✓	
44				IS THE STIFFNESS MATRIX COMPUTED		✓		
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT		✓		ABS Rules
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			✓	
47	*			DAVENPORT			✓	
48	ENVI	D'		SIMIU			✓	
49		**		OTHERS (SPECIFY)			✓	
50	RONM	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE		✓		
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			✓	
52	ENTAL	*	STATISTICS	SIGNIFICANT WAVE HEIGHT			✓	
53		*		MEAN SPECTRAL PERIOD			✓	
54		*		WAVE SCATTER DIAGRAM			✓	
55		*	...	LINEAR WAVE		✓		
56				STRETCH LINEAR			✓	

					Program Name	Yes	No		Comments
57			WAVE	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...			✓		
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN			✓		
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			✓		
60		W	THEORIES	STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			✓		
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			✓		
62		V		EXTENDED VELOCITY POTENTIAL			✓		
63		E		CNOIDAL WAVE THEORY			✓		
64		S	SEA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			✓		
65	DESCRIPTION			ISSC			✓		
66				JONSWAP			✓		
67			SPECTR	BRETSCHNEIDER			✓		
68				SCOTT			✓		
69		*		OCHI (SIX PARAMETER)			✓		
70		*		INPUT SPECTRA			✓		
71	*	*		OTHERS			✓		

					Name	Yes	No		Comments
72	* *	* *		A	DIRECTIONAL SPECTRA		✓		
73	* *	OTHERS			DOES IT CONSIDER EARTH QUAKE SPECTRA		✓		
74	* *	OTHERS			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE		✓		
75	SOLUTION TECHNIQUE	STATICS			NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY				(SIX) – SURGE, SWAY, HEAVE ROLL, PITCH, YAW
76	SOLUTION TECHNIQUE	STATICS			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				FULL COUPLING
77	SOLUTION TECHNIQUE	STATICS			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN		HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY				(SIX)
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				FULL COUPLING
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN		WHAT METHOD OF LINEARIZATION USED .... SPECIFY				
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN		MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION				GAUSS-JORDAN WITH COMPLETE MATRIX PIVOTING
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN		OTHERS .... SPECIFY				
83					MEAN OFFSET OF THE PLATFORM		✓		
84					MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	✓			
85	* *** ***** *******				PLATFORM MOTION RESPONSE SPECTRA		✓		
86	PLATFORM RESPONSE OUTPUT				RESPONSE STATISTICS .. MEAN VALUE		✓		

			Program None	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE			✓	
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3			✓	
89		RESPONSE STATISTICS .. OTHERS; SPECIFY			✓	
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)		✓		
91	** ****	MODEL TEST - INDICATE SCALE				
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
93		OTHER PUBLISHED MATERIAL - SPECIFY				
94	**** **	OTHERS (SPECIFY)				
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)				
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
97		VERTICAL (TAUT) MOORING				
98		HYBRID/OTHER COMBINATION .... SPECIFY				
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				
100	M MATERIA	CHAIN (STEEL)				
101	O	WIRE ROPE (STEEL)				

					Program Name	A	B	Comments
102	MOORING SYSTEM			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE				
104				IS IT BASED ON CATENARY EQUATION				
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE				
106				OTHERS (SPECIFY)				
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
108		***** VERTICAL ANALYSES *****	MOORING	IS THE MASS OF THE MOORING CONSIDERED			✓	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		✓		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING		✓		
111				IS GEOMETRIC NON LINEA-RITY CONSIDERED			✓	
112				IS MATERIAL NON LINEA-RITY CONSIDERED			✓	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED			✓	
114				IS THE STRUCTURAL DAMPING CONSIDERED			✓	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM		✓		
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE			✓	

						Program Name	Yes	No		Comments
117			I N G	HYDRDYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD			✓		
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			✓		
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			✓		
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			✓		
121			M O D		IS THE MOORING HYDRODYNAMIC MODEL 2D			✓		
122					IS THE MOORING HYDRODYNAMIC MODEL 3D			✓		
123	C	M,	E		IS THE MOORING MODEL TWO DIMENSIONAL					
124	A	O	L		IS THE MOORING MODEL THREE DIMENSIONAL		✓			
125	P	R I N G			IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			✓		
126	A B I L I T I E S				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			✓		
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES			✓		
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			✓		
129			DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		✓			
130		* ** *	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			✓		
131		** ****			MEAN LOAD OF THE MOORING LINE			✓		

				Program Name	Yes	No	Comment
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)		✓		
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE			✓	
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3			✓	
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY			✓	
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE				
137	* * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS				
138	* * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			✓	
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL				
141		S T R U C T U R A L M O D E L	IS THE RISER MODEL THREE DIMENSIONAL				
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD				
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
145			IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				

				PROGRAM NAME	YES	NO	COMMENTS
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
149			IS THE RISER HYDRODYNAMIC MODEL 2D				
150			IS THE RISER HYDRODYNAMIC MODEL 3D				
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS				
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE				
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS				
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
159	* *** STABILITY ANALYSIS	I N T A C T	INTACT FREE FLOATING		✓		
160			INTACT WITH VERTICAL TAUT TENDONS		✓		
161		D A M	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			✓	

				PROGRAM NAME	YES	NO		COMMENTS
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING		✓			
163	* ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED					
164			IS INERTIA LOADING CONSIDERED					
165	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED					
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS					
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS					
168		* ***	BEAM ELEMENT					
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT					
170			PLATE ELEMENT					
171			STIFFENED PLATE ELEMENT					
172		*** *	OTHERS .... SPECIFY					
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM					
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS					
175			MODAL ANALYSIS					
176	* ** *		FATIGUE LIFE ANALYSIS					

			PROGRAM NAME	YES	NO		COMMENTS
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)					
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)					
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)					
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)					
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION					FORTRAN
182		.... BASIC					
183		.... PASCAL					
184		.... OTHERS; SPECIFY					
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		✓			
187		IS THEORETICAL MANUAL AVAILABLE			✓		
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		✓			
189		IS ANY TRAINING OFFERED			✓		
190	** ****	IBM					
191		CDC					

			PROGRAM NAME	YES	NO		COMMENTS
192	HARDWARE SYSTEM	PRIME COMPUTER					
193		VAX					
194		MICRO .. SPECIFY					
195	**** **	OTHERS .... SPECIFY		✓			UMVAC
196	** ****	LEASE (PRICE $ .00)					
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)					
198		CONSULTANCY BASIS					
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES						
201							
202							

SHELL DEVELOPMENT COMPANY

FREQUENCY DOMAIN USING MORISON'S EQUATION

SHELL

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

PROGRAM MOMOP

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES					
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM		✓			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED		✓			
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		✓			
8	E	. : :	VERTICAL MEMBER		✓			
9	N V	. MEMBER	HORIZ. MEMBER		✓			
10	I	. BEAM X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION			✓		INCLUDES ELLIPTICAL AND RECTANGULAR MEMBERS
11	R	. :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION					

					Program Name	Yes	No		Comments
12	ON		: : ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					
13	MEMBER			IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		✓			
14		WAVE		ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY			✓		
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN			✓		
16				COLUMN AND PONTOON			✓		
17				PONTOON AND PONTOON			✓		
18			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION					
19				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY					
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT		✓			
21	FORCES	FORCES		IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION					
22			. . . . DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION			✓		
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY			✓		APPROXIMATE FACTOR TO ACCOUNT FOR DIFFRACTION EFFECTS
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			✓		
25			SECON	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY			✓		
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			✓		

						Program Name	Yes	No	Comments
27	*	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG			✓	
28	*				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL			✓	
29	*				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			✓	
30	*				IS ITERATION OF RESPONSE USED FOR CONVERGENCE			✓	
31	*				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION			✓	
32	*				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM			✓	
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			✓	
34	*	*	*	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM		✓		
35	*	*	*		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS				
36	*	*	REGULAR WAVE	DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			✓	
37	*	*			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			✓	
38	E	T			IS THE CURRENT DRAG DAMPING CONSIDERED			✓	
39	Q	I			IS THE CURRENT FRICTION DAMPING CONSIDERED			✓	
40	U				IS THE RADIATION DAMPING CONSIDERED			✓	
41	A T	M			IS THE STRUCTURAL DAMPING CONSIDERED			✓	

						Program Name	Yes	No	Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM		✓		
43			S	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			✓	
44			* * *		IS THE STIFFNESS MATRIX COMPUTED		✓		
45		D	* * *	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				
46	F O	O	I		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS				
47		M	R R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
48	M	,	E G		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
49	O	A	U L		IS THE CURRENT DRAG DAMPING CONSIDERED				
50	T I	I	A R	COEFFICIENTS	IS THE CURRENT FRICTION DAMPING CONSIDERED				
51	O	N			IS THE RADIATION DAMPING CONSIDERED				
52	N		W A		IS THE STRUCTURAL DAMPING CONSIDERED				
53	* * * * * *		V E S		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
54		* * * *		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM		✓		Mooring stiffness is an input option
55			* * *		IS THE STIFFNESS MATRIX COMPUTED				
56	*	* *	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT		✓		ABS rules for building and classing offshore mobile drilling units

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			✓	
58				DAVENPORT			✓	
59				SIMIU			✓	
60				OTHERS (SPECIFY)			✓	
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE		✓		
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			✓	
63		WAVE THEORIES		SIGNIFICANT WAVE HEIGHT			✓	
64				MEAN SPECTRAL PERIOD			✓	
65				WAVE SCATTER DIAGRAM			✓	
66				LINEAR WAVE			✓	
67				STRETCH LINEAR		✓		
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...		✓		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN			✓	
70				STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND			✓	
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH			✓	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY			✓	
73		E	.	EXTENDED VELOCITY POTENTIAL			✓	
74		S	.	CNOIDAL WAVE THEORY			✓	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			✓	
76	D		E	ISSC			✓	
77	E S		A	JONSWAP			✓	
78	C R		S	BRETSCHNEIDER			✓	
79	I P	*	P	SCOTT			✓	
80	T I	*	E C	OCHI (SIX PARAMETER)			✓	
81	O N	*	T	INPUT SPECTRA			✓	
82		*	R	OTHERS			✓	
83	*		A	DIRECTIONAL SPECTRA			✓	
84	*	O T		DOES IT CONSIDER EARTH QUAKE SPECTRA			✓	
85	*	H E R S		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			✓	
86	*	S T A		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY				Six, Surge Sway, heave, roll, pitch, yaw

				Program None	Yes	No	Comments
87	* SOLUTION TECHNIQUE ****	TICS DYNAMICS TIME DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				FULL COUPLING
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
89			NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY				SIX: SURGE, SWAY, HEAVE, ROLL, PITCH, YAW
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				FULL COUPLING
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
92			METHOD OF INTEGRATION USED .... HOUBOLT				
93			.... WILSON - θ				
94			.... NEWMARK - β				
95			OTHERS .... PLEASE SPECIFY		✓		RUNGE-KUTTA 4th order
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION		✓		
97			.... VARIABLE INTEGR-ATION TIME			✓	
98			OTHERS .... PLEASE SPECIFY				
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION		✓		GAUSS-JORDAN METHOD WITH COMPLETE MATRIX PIVOTING
100			OTHERS .... PLEASE SPECIFY				
101			PLATFORM MOTION TIME HISTORY		✓		

			Program Name	Yes	No		Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE			✓		
103		... R.M.S. VALUE			✓		
104		... (SIGNIFICANT)1/3			✓		
105		... EXPECTED MAXIMUM			✓		
106		... OTHERS, SPECIFY					
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS			✓		
108	** ****	MODEL TEST - INDICATE SCALE					
109	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS					
110		OTHER PUBLISHED MATERIAL - SPECIFY					
111	** ****	OTHERS (SPECIFY)					
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)			✓		
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			✓		
114		VERTICAL (TAUT) MOORING		✓			
115	M	HYBRID/OTHER COMBINATION .... SPECIFY			✓		
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR					

					Program None	Yes	No	Comments
117	MOORING SYSTEM	MATERIAL		CHAIN (STEEL)				
118				WIRE ROPE (STEEL)				
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE				
121				IS IT BASED ON CATENARY EQUATION				
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE				
123				OTHERS (SPECIFY)				
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
125		**	*	IS THE MASS OF THE MOORING CONSIDERED			✓	
126		**	*	IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		✓		
127		**	*	IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING		✓		
128				IS GEOMETRIC NON LINEARITY CONSIDERED		✓		
129			MOORI	IS MATERIAL NON LINEARITY CONSIDERED			✓	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED			✓	
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED			✓	

						Name	Yes	No		Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM		✓			
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			✓		
134					IS IT BASED ON FINITE DIFFERENCE METHOD			✓		
135	C		M	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			✓		
136	A		O		IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER			✓		
137	P		D		IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING			✓		
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL			✓		
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL			✓		
140	I		*		IS THE MOORING MODEL TWO DIMENSIONAL					
141	L		*		IS THE MOORING MODEL THREE DIMENSIONAL		✓			
142	I	M	*		IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING			✓		
143	T	O	*		IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING			✓		
144	I	R	*		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES			✓		
145	E	I	*		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			✓		
146	S	N G	* *	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS		✓			

				Program Name	Yes	No	Comments
147		* * *	INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING		✓	
148			MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY		✓	
149				MOORING LINE LOAD STATISTICS ... ... MEAN VALUE		✓	
150				... R.M.S. VALUE		✓	
151				... (SIGNIFICANT)1/3		✓	
152				... EXPECTED MAXIMUM		✓	
153				... OTHERS, SPECIFY		✓	
154			PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			
155	*			WITH OTHER SOFTWARE - LIST PROGRAMS			
156	* * *			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
157	* * *			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES		✓	
158	*	* *	STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL			
159	R			IS THE RISER MODEL THREE DIMENSIONAL			
160	I			DOES THE PROGRAM USE FINITE ELEMENT METHOD			
161	S E			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175	* * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Ls	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING				
178	STABILITY	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179	ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
182		LOADING	IS INERTIA LOADING CONSIDERED				
183	S T R U C T U R A L A N A L Y S	LOADING	IS DYNAMIC LOADING CONSIDERED				
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		* ***	BEAM ELEMENT				
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT				
189		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT				
190		*** *	OTHERS .... SPECIFY				
191		*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

			Program Name	Yes	No		Comments
192	IS	SPECTRAL ANALYSIS					
193	OTHER ANALYTICAL CAPABILITY	MODAL ANALYSIS					
194		FATIGUE LIFE ANALYSIS					
195	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)					
196		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)					
197		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)					
198		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)					
199	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION					FORTRAN
200		.... BASIC					
201		.... PASCAL					
202		.... OTHERS SPECIFY					
203		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
204	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		✓			
205		IS THEORETICAL MANUAL AVAILABLE			✓		
206	SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		✓			

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED			✓	
208	** ****	IBM				
209		CDC				
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	**** **	MICRO .... SPECIFY				
213		OTHERS .... SPECIFY				UMVAC
214	** ****	LEASE (PRICE $ .00)				
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
216		CONSULTANCY BASIS				
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					
219						
220						

JOHN HALKYARD

TIME DOMAIN USING DIFFRACTION THEORY

Blank

HALKYARD

TABLE IV QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES					
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM				9/84	
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED		✓			
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		. : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		✓		9/84	
8	E	. : M	VERTICAL MEMBER		✓			
9	N	. E	HORIZ. MEMBER		✓			
10	V	. M B E R : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION					Circular members only. Input diameters and or C_D, C_M would be modified to account for non circular members
11	I R		DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION			✓		C_M & C_D are input except for diffraction effects.

					Program Name	Yes	No		Comments
12	ON MENTAL FORCES	WAVE FORCES	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		✓			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY			✓		
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN			✓		
16				COLUMN AND PONTOON			✓		
17				PONTOON AND PONTOON			✓		
18			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE					
19				IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON		✓			Simplified Macaway Fuchs Model for columns. Diffraction not considered for pontoons/Braces.
20				DIFFRACTION AND FLUID FINITE ELEMENT					
21				OR ANY OTHER COMBINATION					
22			SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION		✓			
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY		✓			
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY		✓			
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY		✓			
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			✓		

						Program Name	Yes	No		Comments
27	*	S	O R D E R	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		✓			
28	*				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL		✓		2/84	
29	*				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT		✓			
30	*				IS ITERATION OF RESPONSE USED FOR CONVERGENCE			✓		Runge - Kutta Method
31	*				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION			✓		
32	*				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM			✓		
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			✓		
34	*	*	*	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			✓		
35	*	*	*		CIRCLE / COMPUTING METHOD : (2D), 3D(ARBITRARY SHAPE), OTHERS					
36		*	R E G U L A R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		✓		9/84	
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED		✓			
38	E	T			IS THE CURRENT DRAG DAMPING CONSIDERED		✓			
39	Q U A T	I M		COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			✓		
40			W A		IS THE RADIATION DAMPING CONSIDERED				9/84	
41					IS THE STRUCTURAL DAMPING CONSIDERED			✓		

						Name	Yes	No	Comment
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			✓	calculated internally.
43				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			✓	Calculated internally. Mooring stiffness is input.
44			* * *		IS THE STIFFNESS MATRIX COMPUTED		✓		
45	O F	D	* * *	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				
46		O	I		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS				Program presently set up for regular waves only.
47		M	R R E G U L A R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
48	M O T I O N	A I N			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
49					IS THE CURRENT DRAG DAMPING CONSIDERED				
50					IS THE CURRENT FRICTION DAMPING CONSIDERED				
51					IS THE RADIATION DAMPING CONSIDERED				
52			W A V E S	COEFFICIENTS	IS THE STRUCTURAL DAMPING CONSIDERED				
53	* * * * * *	* * * * * *			IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
54				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
55			* * *		IS THE STIFFNESS MATRIX COMPUTED				
56	*	* *	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			✓	

					Program Name	Yes	No	Comments
57	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			✓	
58	*			DAVENPORT			✓	
59				SIMIU			✓	
60	*			OTHERS (SPECIFY)			✓	
61	E		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			✓	9/84
62	N			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			✓	9/84
63	V	*	WAVE	SIGNIFICANT WAVE HEIGHT			✓	
64	I	*		MEAN SPECTRAL PERIOD			✓	
65	R	*		WAVE SCATTER DIAGRAM			✓	
66	O	*		LINEAR WAVE		✓		
67	N	*		STRETCH LINEAR		✓		
68	M			STOKE'S 2ND, 3RD OR (5TH) ORDER .... PLEASE CIRCLE ...			✓	9/84 under development
69	E			STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN			✓	
70	N	W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND			✓	
71	T	A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH			✓	
	A							
	L							

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY			✓	
73		E	.	EXTENDED VELOCITY POTENTIAL			✓	
74		S	.	CNOIDAL WAVE THEORY			✓	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			✓	
76	D		E	ISSC			✓	
77	E S C		A	JONSWAP			✓	
78	R I		S	BRETSCHNEIDER			✓	
79	P T	* *	P	SCOTT			✓	
80	I O	* *	E C	OCHI (SIX PARAMETER)			✓	
81	N	* *	T	INPUT SPECTRA			✓	
82	*	* *	R A	OTHERS			✓	
83	* *			DIRECTIONAL SPECTRA			✓	
84	* *	O T H E R S		DOES IT CONSIDER EARTH QUAKE SPECTRA			✓	
85	* *			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			✓	
86	* * *	S T A		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		3		

				Program Name	Yes	No	Comments
87	* SOLUTION TECHNIQUE *****	DYNAMICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				SURGE - PITCH COUPLED HEAVE UNCOUPLED.
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
89		. . . . . TIME DOMAIN	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		3		
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				SURGE - PITCH COUPLED HEAVE UP - COUPLED
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
92			METHOD OF INTEGRATION USED .... HOUBOLT				
93			.... WILSON - θ				
94			.... NEWMARK - β				
95			OTHERS .... PLEASE SPECIFY				RUNGE - KUTTA, 5TH ORDER
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION		✓		
97			.... VARIABLE INTEGR -ATION TIME				
98			OTHERS .... PLEASE SPECIFY				
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION				
100			OTHERS .... PLEASE SPECIFY				FOURIER TRANSFORM OF OUTPUT FILTERS TRANSIENT RESPONSES.
101			PLATFORM MOTION TIME HISTORY				

			Name	Yes	No	Comments
102		PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE				
103		... R.M.S. VALUE				
104	PLATFORM RESPONSE OUTPUT	... (SIGNIFICANT)1/3				
105		... EXPECTED MAXIMUM				
106		... OTHERS, SPECIFY				FOURIER TRANSFORM
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS			✓	
108	** ****	MODEL TEST - INDICATE SCALE				
109	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS		✓		Chevron INTRA-WACS Various Earl & Wright Programs (Results are proprietary)
110		OTHER PUBLISHED MATERIAL - SPECIFY				MONOLF PROJECT, VARIOUS PUBLISHED PAPERS
111	** ****	OTHERS (SPECIFY)				
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)			✓	
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			✓	
114		VERTICAL (TAUT) MOORING			✓	
115	M	HYBRID/OTHER COMBINATION .... SPECIFY			✓	
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			✓	

					Program Name	Yes	No	Comments
117			MATERIAL	CHAIN (STEEL)			✓	
118				WIRE ROPE (STEEL)			✓	
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY			✓	
120			CATENARY STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE		✓		
121				IS IT BASED ON CATENARY EQUATION			✓	
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			✓	
123				OTHERS (SPECIFY)			✓	
124			CATENARY DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			✓	
125				IS THE MASS OF THE MOORING CONSIDERED			✓	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		✓		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			✓	
128				IS GEOMETRIC NON LINEARITY CONSIDERED		✓		
129				IS MATERIAL NON LINEARITY CONSIDERED			✓	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED			✓	
131				IS THE STRUCTURAL DAMPING CONSIDERED			✓	

ORING SYSTEM

CATENARY VE

MOORI

						None	Yes	No		Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM			✓		
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			✓		
134					IS IT BASED ON FINITE DIFFERENCE METHOD			✓		
135	C		M	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			✓		
136	A		O		IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER			✓		
137	P		D		IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING			✓		
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL			✓		
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL			✓		
140	I		*		IS THE MOORING MODEL TWO DIMENSIONAL			✓		
141	L		*		IS THE MOORING MODEL THREE DIMENSIONAL			✓		
142	I	M	*		IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING			✓		
143	T	O	*		IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING			✓		
144	I	R	*		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES			✓		
145	E	I	*		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			✓		
146	S	NG	DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			✓		

				Program Name	Yes	No	Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			✓	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY			✓	
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE		✓	✓	
150			... R.M.S. VALUE		✓		Fourier Transform Output
151			... (SIGNIFICANT)1/3			✓	
152			... EXPECTED MAXIMUM			✓	
153			... OTHERS, SPECIFY				Max/Min. & Fourier Transform.
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			✓	
155	*		WITH OTHER SOFTWARE - LIST PROGRAMS		✓		Chevron Programs
156	* * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY			✓	
157	* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			✓	
158		* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL *				
159	R		IS THE RISER MODEL THREE DIMENSIONAL				
160	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD				
161	S E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				

				Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		* **	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	SYSTEM		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170		**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* ** ** *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	STABILITY ANALYSIS — INTACT	INTACT FREE FLOATING				
178			INTACT WITH VERTICAL TAUT TENDONS				
179			DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *		DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* * * *	STRUCTURAL ANALYSIS — LOADING	HYDRODYNAMIC LOADING CONSIDERED				
182			IS INERTIA LOADING CONSIDERED				
183			IS DYNAMIC LOADING CONSIDERED				
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT				
187			SHELL ELEMENT				
188			PLATE ELEMENT				
189			STIFFENED PLATE ELEMENT				
190		*** *	OTHERS .... SPECIFY				
191		*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

			Name	Yes	No	Comments
192	I S	SPECTRAL ANALYSIS				
193	OTHER ANALYTICAL CAPABILITY	MODAL ANALYSIS				
194	* * * * *	FATIGUE LIFE ANALYSIS			✓	
195	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)		✓		
196		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		✓		
197		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		✓		limited response & Fourier Transform plots on printer
198		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)				
199	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION			✓	
200		.M. BASIC		✓		
201		.... PASCAL			✓	
202		.... OTHERS SPECIFY			✓	CBASIC 6/84
203		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				Runs on OSBORNE I ~ 100:1 Runs on COLUMBIA (IBM PC compatible) ~ 15:1
204	DOCUMENTATION	IS USERS' GUIDE AVAILABLE				9/84
205		IS THEORETICAL MANUAL AVAILABLE				9/84
206	SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		✓		

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED				HAVEN'T DECIDED
208	** ****	IBM				
209		CDC				
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	**** **	MICRO .... SPECIFY				~~CP/M~~ CP/M ~ 9/84 est. MSDOS (IBM PC) ~ 12/84 est.
213		OTHERS .... SPECIFY				
214	** ****	LEASE (PRICE $ .00)				
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				9/84 CP/M 12/84 IBM PC. PRICE TO BE DETERMINED, EST. ON ORDER OF $1000.
216		CONSULTANCY BASIS		✓		PROGRAM RUNNING CONSULTANCY. NOW I WILL USE FOR
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					WILL SELL COMPILED VERSION ONLY.
219						
220						

BROWN AND ROOT

FREQUENCY DOMAIN USING DIFFRACTION THEORY

B & R

TABLE II QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	WIND	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	WINSPEC	X			
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM			X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	CURRENT	X			
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM		X			
7	E	. . . . : : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	TENMOT	X			
8	N		VERTICAL MEMBER	"	X			
9	V		HORIZ. MEMBER	"	X			
10	I	X-SECT	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	"	X			
11	R		DOES IT USE EQUIVALENT CIRCULAR X-SECTION			X		

						PROGRAM NAME	YES	NO		COMMENTS
12	ONE	WAVE	: :	ION	IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	TENMOT	X			
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY		X			
15				MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	TENMOT	X			
16					COLUMN AND PONTOON	"	X			
17					PONTOON AND PONTOON	"	X			
18				FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	4	X			
19					IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON			X		
20					DIFFRACTION & FLUID FINITE ELEMENT			X		
21					OR ANY OTHER COMBINATION, PLEASE SPECIFY					
22	FORCES	FORCES		DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION			X		
23			SECOND		DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY		X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY		X			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY		X			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES		X			

No.					Question	PROGRAM NAME	YES	NO		COMMENTS
27	* * * * *	: : : : : : : : : : : : : :	ORDER	VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG			X		
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY			X		
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X		
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X		
31				FORCES	DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION			X		
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM			X		
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			X		
34	* * * *	FREQUENCY		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X		
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS		X			
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X			
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED		X			
38					IS THE CURRENT DRAG DAMPING CONSIDERED			X		
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			X		
40					IS THE RADIATION DAMPING CONSIDERED		X			
41	MOT	DO			IS THE STRUCTURAL DAMPING CONSIDERED		X			

					PROGRAM NAME	YES	NO	COMMENTS
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
43	ION	MAIN	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
44	ION	MAIN	STIFFNS	IS THE STIFFNESS MATRIX COMPUTED		X		
45	ENVIRONMENTAL	WIND	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT		X		
46	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS		X		
47	ENVIRONMENTAL	WIND	DYNAMIC WIND	DAVENPORT		X		
48	ENVIRONMENTAL	WIND	DYNAMIC WIND	SIMIU			X	
49	ENVIRONMENTAL	WIND	DYNAMIC WIND	OTHERS (SPECIFY)			X	
50	ENVIRONMENTAL	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE		X		
51	ENVIRONMENTAL	CURRENT		IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			X	
52	ENVIRONMENTAL		STATISTICS	SIGNIFICANT WAVE HEIGHT		X		
53	ENVIRONMENTAL		STATISTICS	MEAN SPECTRAL PERIOD		X		
54	ENVIRONMENTAL		STATISTICS	WAVE SCATTER DIAGRAM		X		
55	ENVIRONMENTAL		STATISTICS	LINEAR WAVE		X		
56	ENVIRONMENTAL		STATISTICS	STRETCH LINEAR			X	

					PROGRAM NAME	YES	NO		COMMENTS
57			WAVE	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...			X		
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN			X		
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			X		
60		W	THEORIES	STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			X		
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			X		
62		V		EXTENDED VELOCITY POTENTIAL			X		
63		E		CNOIDAL WAVE THEORY			X		
64		S	SEA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		X			
65	DESCRIPTION		SPECTR	ISSC		X			
66				JONSWAP		X			
67				BRETSCHNEIDER		X			
68				SCOTT		X			
69		*		OCHI (SIX PARAMETER)		X			
70		*		INPUT SPECTRA		X			
71	*	*		OTHERS			X		

				PROGRAM NAME	YES	NO	COMMENTS
72	* *	* *	DIRECTIONAL SPECTRA		X		
73	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
74	* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
75	SOLUTION TECHNIQUE	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		X		
76	SOLUTION TECHNIQUE	STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6		
77	SOLUTION TECHNIQUE	STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
78	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		6		
79	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6		
80	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY		X		Iteration procedure
81	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS, .. GAUSSIAN ELIMINATION			X	
82	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY		X		DIRECT MATRIX INVERSION
83	* *** ***** ******* PLATFORM RESPONSE OUTPUT		MEAN OFFSET OF THE PLATFORM		X		
84	* *** ***** ******* PLATFORM RESPONSE OUTPUT		MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'		X		
85	* *** ***** ******* PLATFORM RESPONSE OUTPUT		PLATFORM MOTION RESPONSE SPECTRA		X		
86	* *** ***** ******* PLATFORM RESPONSE OUTPUT		RESPONSE STATISTICS .. MEAN VALUE		X		

			PROGRAM NAME	YES	NO		COMMENTS
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE		X			
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3		X			
89		RESPONSE STATISTICS .. OTHERS; SPECIFY		X			
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)		X			
91	** ****	MODEL TEST - INDICATE SCALE		X			1:40
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS		X			NMI
93		OTHER PUBLISHED MATERIAL - SPECIFY			X		
94	**** **	OTHERS (SPECIFY)			X		
95	* * * * * * *	DESCRIPTION — SPREAD MOORING (CATENARY)			X		
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			X		
97		VERTICAL (TAUT) MOORING		X			
98		HYBRID/OTHER COMBINATION .... SPECIFY			X		
99		MATERIA — SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			X		
100	M	CHAIN (STEEL)			X		
101	O	WIRE ROPE (STEEL)			X		

					PROGRAM NAME	YES	NO	COMMENTS
102	ORING	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY			X	
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE		X		
104				IS IT BASED ON CATENARY EQUATION		X		
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE		X		
106				OTHERS (SPECIFY)			X	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X	
108		***** VERTICAL	MOORING	IS THE MASS OF THE MOORING CONSIDERED			X	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		X		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			X	
111	SYSTEM			IS GEOMETRIC NON LINEARITY CONSIDERED			X	
112				IS MATERIAL NON LINEARITY CONSIDERED			X	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED			X	
114				IS THE STRUCTURAL DAMPING CONSIDERED		X		
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM			X	
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE			X	

						PROGRAM NAME	Yes	NO	COMMENTS
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD			X	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
121			M O D		IS THE MOORING HYDRODYNAMIC MODEL 2D			X	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D			X	
123	C	M	E		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)			X	
124	A	O	L		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)			X	
125	A	I N G	. . . . .		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING		X		
126	B				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
127	I				IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES			X	
128	I				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS		X		
129	T		DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X	
130	I	* ** *	INSTAL-LATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING		X		
131	E S	** ****			MEAN LOAD OF THE MOORING LINE		X		

				PROGRAM NAME	YES	NO		COMMENTS
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)		X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE		X			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3		X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY			X		
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE		X			1:40
137	* * * * * *	PROGRAM VERIFICATN *** *	WITH OTHER SOFTWARE - LIST PROGRAMS		X			NMI
138	*	, ,	WITH OTHER PUBLISHED MATERIAL .... SPECIFY			X		
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES		X			
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL	FDRISER DWRSR	X			
141		S T R U C T U R A L	IS THE RISER MODEL THREE DIMENSIONAL	DWRSR	X			
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD	DWRSR	X			
143	R I		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	FDRISER	X			
144	S	M O D E L	DOES THE PROGRAM USE SMALL DEFLECTION THEORY	FDRISER DWRSR	X			
145	E	* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECT-ION THEORY	DWRSR	X			
146	R	* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X			No 4 Complete with current & Dir. velocity

				PROGRAM NAME	YES	NO	COMMENTS
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	FORISER DWRSR	X		
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	FORISER	X		
149			IS THE RISER HYDRODYNAMIC MODEL 2D	FDRISER DWRSR	X		
150			IS THE RISER HYDRODYNAMIC MODEL 3D	DWRSR	X		
151	S	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			X	
152	Y S T E M	**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS	FD RISER	X		DW complete Dec. 84
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	FORISER DWRSR	X		
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	FDRISER DWRSR	X		
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	FORISER DWRSR	X		
156			WITH MODEL TESTS - INDICATE SCALE			X	
157	* * * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			X	
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY		X		API RP2J
159	* ***	INTACT	INTACT FREE FLOATING	FROSTAB	X		
160	STABILITY		INTACT WITH VERTICAL TAUT TENDONS	FLOSTAB BALANCE	X		
161	ANALYSIS	DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	FROSTAB	X		

				PROGRAM NAME	YES	NO		COMMENTS
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	FLOSTAB	X			
163	* ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	TENLOAD	X			
164			IS INERTIA LOADING CONSIDERED	"	X			
165	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED	"	X			
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	DAMS	X			
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X			
168		, , * ***	BEAM ELEMENT	"	X			
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT	DAMS F.E.	X			
170			PLATE ELEMENT	"	X			
171			STIFFENED PLATE ELEMENT	X	X			
172		*** *	OTHERS .... SPECIFY	DAMS F.E.				Solid
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM		X			6 Deg. of freedom per node
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS		X			
175			MODAL ANALYSIS	DAMS	X			
176	* ** *		FATIGUE LIFE ANALYSIS	S.D. FATIGUE D. FATIGUE TRAN FATIGUE	X			

			PROGRAM NAME	YES	NO		COMMENTS
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)		X			
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)			X		
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		X			
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			X		
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (77) SPECIFY THE VERSION		X			
182		.... BASIC			X		
183		.... PASCAL			X		
184		.... OTHERS; SPECIFY			X		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					?
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X			
187		IS THEORETICAL MANUAL AVAILABLE		X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		X			
189		IS ANY TRAINING OFFERED		X			
190	** ****	IBM		X			
191		CDC					

			PROGRAM NAME	YES	NO	COMMENTS
192	HARDWARE SYSTEM	PRIME COMPUTER				
193		VAX				
194		MICRO .. SPECIFY				
195	**** **	OTHERS .... SPECIFY				
196	** ****	LEASE (PRICE $ .00)				
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
198		CONSULTANCY BASIS				
199	**** **	OTHERS .... SPECIFY				
200	REMARKS AND NOTES					
201						
202						

BROWN AND ROOT

TIME DOMAIN USING DIFFRACTION THEORY

Blank

B&R

TABLE IV QUESTIONAIRE FOR SOFTWARE CAPABILITIES (TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	WIND	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	WINDSPEC	X			
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM		X			
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	CURRENT	X			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM		X			
7		. : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	TENMOR	X			
8	E	. : M	VERTICAL MEMBER		X			
9	N	. E M	HORIZ. MEMBER		X			
10	V	. B E	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION		X			
11	I R	R : X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION			X		

					Program Name	Yes	No		Comments
12	ONMENTAL FORCES	WAVE FORCES	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION		X		
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		X		
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY		X		
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN		X		
16					COLUMN AND PONTOON		X		
17					PONTOON AND PONTOON		X		
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE		X		
19					IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON		X		
20					DIFFRACTION AND FLUID FINITE ELEMENT			X	
21					OR ANY OTHER COMBINATION			X	
22			SECOND	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION		X		
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY		X		
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY		X		
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY		X		
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES		X		

						Program Name	Yes	No	Comments
27		S		VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG		X		
28			ORDER		DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL			X	
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT		X		
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X	
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION		X		
32					IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM			X	
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			X	
34				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X	
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS		X		
36			REGULAR	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED		X		
38	EQUAT	T			IS THE CURRENT DRAG DAMPING CONSIDERED		X		
39		I		COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED		X		
40					IS THE RADIATION DAMPING CONSIDERED		X		
41		M	WA		IS THE STRUCTURAL DAMPING CONSIDERED		X		

						Program Name	Yes	No	Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
43				S T I F F N S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
44			x x x		IS THE STIFFNESS MATRIX COMPUTED		X		
45	O F	D	x x x	A D D M A S S	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X	
46		O	I		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS		X		
47		M	R R E G U L A R	D A M P I N G	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X		
48	M O T I O N	A			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED		X		
49		I			IS THE CURRENT DRAG DAMPING CONSIDERED		X		
50		N		C O E F F I C I E N T S	IS THE CURRENT FRICTION DAMPING CONSIDERED		X		
51					IS THE RADIATION DAMPING CONSIDERED		X		
52			W A V E S		IS THE STRUCTURAL DAMPING CONSIDERED		X		
53	x x x x x x				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
54		x x x x		S T I F F N S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
55			x x x		IS THE STIFFNESS MATRIX COMPUTED		X		
56	x	x x	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT		X		

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS		X		
58				DAVENPORT		X		
59				SIMIU			X	
60				OTHERS (SPECIFY)			X	
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE		X		
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			X	
63			WAVE THEORIE	SIGNIFICANT WAVE HEIGHT		X		
64				MEAN SPECTRAL PERIOD		X		
65				WAVE SCATTER DIAGRAM			X	
66				LINEAR WAVE		X		
67				STRETCH LINEAR			X	
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...			X	
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN			X	
70		WAVE		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND			X	
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH			X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY			X	
73		E	.	EXTENDED VELOCITY POTENTIAL			X	
74		S	.	CNOIDAL WAVE THEORY			X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		X		
76	D		E	ISSC		X		
77	E		A	JONSWAP		X		
78	S		S	BRETSCHNEIDER		X		
79	C	x	P	SCOTT		X		
80	R	x	E	OCHI (SIX PARAMETER)			X	
81	I	x	T	INPUT SPECTRA		X		
82	P	x	R	OTHERS			X	
83	T	x	A	DIRECTIONAL SPECTRA			X	
84	I	x	O T H E R S	DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
85	O	x		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE		X		
86	N	x	S T A	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6		

				Program Name	Yes	No	Comments
117	ORING	MATERIAL	CHAIN (STEEL)		X		
118			WIRE ROPE (STEEL)		X		
119			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY		X		
120		CA ST	USER SPECIFIED LOAD DISPLACEMENT TABLE		X		

				Program Name	Yes	No	Comments
87	* SOLUTION	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6		
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
89		DYNAMI TIME	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6		
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		6		
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
92			METHOD OF INTEGRATION USED .... HOUBOLT			X	
93			.... WILSON - θ			X	
94			.... NEWMARK - β			X	
							Simpson's Rule

					Program Name	Yes	No	Comments
132		RTICAL	NG	IS THE MOORING SYSTEM COUPLED WITH PLATFORM		X		
133				IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE		X		
134				IS IT BASED ON FINITE DIFFERENCE METHOD		X		
135	C		MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X		
136	A			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER		X		
137	P			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
138	A			IS THE MOORING MODELLED AS TWO DIMENSIONAL		X		

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY		X		
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY		X		
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X		Compute forces
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER		X		
166	S		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
167	Y		IS THE RISER MODELLED AS TWO DIMENSIONAL		X		
168	S		IS THE RISER MODELLED AS THREE DIMENSIONAL		X		
169	T	**	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			X	
170	E	SOLUTION MODE	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS		X		
	M	**					
	M	*	IS IT CAPABLE OF CLEAR-		X		

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING	FLOSTAB			
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS	FLOSTAB BALANCE			
179	STABILITY ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	FLOSTAB			
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	FLOSTAB BALANCE			
181	* *** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	TENLOAD	X		
182	STRUCTURAL ANALYSIS	LOADING	IS INERTIA LOADING CONSIDERED	"			
183	STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED	"			
184	STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	DAMS	X		
185	STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	DAMS	X		
186	STRUCTURAL ANALYSIS	* ***	BEAM ELEMENT	DAMS	X		
187	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	SHELL ELEMENT	DAMS F.E.	X		
188	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	PLATE ELEMENT	DAMS F.E	X		
189	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT	DAMS F.E.	X		
190	STRUCTURAL ANALYSIS	*** *	OTHERS .... SPECIFY	DAMS F.E	X		solid
191	STRUCTURAL ANALYSIS	*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	DAMS	X		6 deg. of freedom per node

				Program Name	Yes	No		Comments
192	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	TENLOAD	X			
193			MODAL ANALYSIS	DAMS	X			
194			FATIGUE LIFE ANALYSIS	S.D. FATIGUE D. FATIGUE TRAN FATIGUE	X			
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)		X			
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		X			
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)		X			
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			X		
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (77) SPECIFY THE VERSION		X			
200			.... BASIC					
201			.... PASCAL					
202			.... OTHERS SPECIFY					
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X			
205			IS THEORETICAL MANUAL AVAILABLE		X			
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED		X			

			Program Name	Yes	No		Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	X				
208	** ****	IBM	X				
209		CDC	X				
210	HARDWARE SYSTEM	PRIME COMPUTER					
211		VAX	TENMOR TENLOAD BALANCE	X			WIND, WINSPEC, etc.
212	**** **	MICRO .... SPECIFY					
213		OTHERS .... SPECIFY					
214	** ****	LEASE (PRICE $ .00)	ALL	X			
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	ALL	X			
216		CONSULTANCY BASIS	ALL	X			
217	** ****	OTHERS .... SPECIFY					
218	REMARKS AND NOTES	Developer	B&R.				
219							
220							

R.T. HUDSPETH

FREQUENCY DOMAIN USING MORISON'S EQUATION

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

R.T. HUDSPETH
AXISYMMETRIC G.F. PLUS
MORISON EQ FOR SMALL
MEMBERS

ROW #		**** ** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	FVRS	X			
	*							
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
	*							
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM			X		
	*							
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
	*							
5			CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES		X			
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM			X		
7		: : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		X			
8	E	: : :	VERTICAL MEMBER		X			
	N	: M						
9	V	: E	HORIZ. MEMBER		X			
	I	: M						
10		: B	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION			X		
	I	: E	X-SECT					
11	R	R :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION		X			

					Program Name	Yes	No	Comments
12	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION				FVRS		X	
13	IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER					X		
14	ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY					X		DIFFRACTION FOR LARGE MEMBERS
15	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN		MEMBER INTERACTION				X	
16	COLUMN AND PONTOON						X	
17	PONTOON AND PONTOON						X	
18	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION		FIRST ORDER				X	
19	IS THE PROGRAM BASED ON MORISON'S EQN FORMULATION W/ REL VELOCITY					X		
20	IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT						X	
21	IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION					X		
22	DOES IT CONSIDER THE WAVE ELEVATION		SECOND ORDER FORCES	DRIFT			X	
23	DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY						X	
24	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY					X		
25	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY					X		
26	DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES						X	

No.			Category	Question	Program Name	Yes	No	Comments
27	*****	ND ORDER	VISCOUS	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	FVRS		X	
28				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY			X	
29				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X	
30				IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X	
31			FORCES	DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION			X	
32				IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM			X	
33				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			X	
34	**** EQUATION OF MOT	FREQUENCY DO	ADD MASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X	
35				CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS			X	
36			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			X	
37				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X	
38				IS THE CURRENT DRAG DAMPING CONSIDERED			X	
39			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED			X	
40				IS THE RADIATION DAMPING CONSIDERED		X		
41				IS THE STRUCTURAL DAMPING CONSIDERED			X	

					Program Name	Yes	NO	Comments
42	I O N	M A I N	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	FVRS		X	
43	* * * *		S T I F F N S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM		X		
44				IS THE STIFFNESS MATRIX COMPUTED		X		
45	*	* * W I N D	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			X	
46	*		DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			X	
47	*			DAVENPORT			X	
48	E	D		SIMIU			X	
49	N V	* *		OTHERS (SPECIFY)			X	
50	I R		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			X	
51	O N			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			X	
52	M E	* *	S T A T I S T I C S	SIGNIFICANT WAVE HEIGHT			X	
53	N T	* *		MEAN SPECTRAL PERIOD			X	
54	A L	* * *		WAVE SCATTER DIAGRAM			X	
55		*	. . .	LINEAR WAVE		X		
56				STRETCH LINEAR			X	

				Program Name	Yes	NO	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	FVRS	+	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN		+	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND		+	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH		+	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY		+	
62		V		EXTENDED VELOCITY POTENTIAL		+	
63		E		CNOIDAL WAVE THEORY		+	
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		T	
65	DESCRIPTION			ISSC		+	
66				JONSWAP		T	
67				BRETSCHNEIDER		T	
68				SCOTT		T	
69		*		OCHI (SIX PARAMETER)		+	
70		*		INPUT SPECTRA		T	
71	*	*		OTHERS		+	

				Program Name	Yes	No		Comments
72	* * *	* *	A	DIRECTIONAL SPECTRA	FURS		X	
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA			X	
74	* *	OTHERS		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		X		6
76	SOLUTION TECHNIQUE	STATICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		X		
77	SOLUTION TECHNIQUE	STATICS		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			X	
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		X		6
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		X		
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY		X		
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION		X		
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY		X		GAUSS JORDAN
83				MEAN OFFSET OF THE PLATFORM		X		
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'			X	
85	* *** ***** *******	PLATFORM RESPONSE OUTPUT		PLATFORM MOTION RESPONSE SPECTRA			X	
86				RESPONSE STATISTICS .. MEAN VALUE			X	

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	FURS		X	
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3			X	
89		RESPONSE STATISTICS .. OTHERS; SPECIFY			X	
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)			X	
91	** ****	MODEL TEST - INDICATE SCALE			X	
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS			X	
93		OTHER PUBLISHED MATERIAL - SPECIFY		X		BLACK DDT TLP
94	**** **	OTHERS (SPECIFY)			X	
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)			X	
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			X	
97		VERTICAL (TAUT) MOORING		X		
98		HYBRID/OTHER COMBINATION .... SPECIFY			X	
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			X	
100	M	CHAIN (STEEL)			X	
101	O MATERIA	WIRE ROPE (STEEL)			X	

					Program Name	Yes	No	Comments
102	ORING	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	Fves		x	
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			x	
104				IS IT BASED ON CATENARY EQUATION			x	
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE			x	
106				OTHERS (SPECIFY)			x	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			x	
108		****	VERTICAL MOOR	IS THE MASS OF THE MOORING CONSIDERED			x	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		x		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			x	
111	SYSTEM			IS GEOMETRIC NON LINEARITY CONSIDERED			x	
112				IS MATERIAL NON LINEARITY CONSIDERED			x	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED			x	
114				IS THE STRUCTURAL DAMPING CONSIDERED			x	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM			x	
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE			x	

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD	FVRS		X	
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			X	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D			X	
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D			X	
123	C	M,	D		IS THE MOORING MODEL TWO DIMENSIONAL			X	
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL			X	
125	P	O	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			X	
126	A	R			IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
127	B	I			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES			X	
128	I	N			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
129	L	G		DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X	
130	I	*	*	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			X	
131	E	**	****		MEAN LOAD OF THE MOORING LINE			X	
	S								

				Program Name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	FURS		X	
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE			X	
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3			X	
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY			X	
136	* ***	*	WITH MODEL TESTS - INDICATE SCALE			X	
137	* * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			X	
138	* * *	*** *	WITH OTHER PUBLISHED MATERIAL .... SPECIFY			X	
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			X	
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL			X	
141		STRUCTURAL	IS THE RISER MODEL THREE DIMENSIONAL			X	
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD			X	
143	R I		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			X	
144	S	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY			X	
145	E R	* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			X	
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	FVRS		X	
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
149			IS THE RISER HYDRODYNAMIC MODEL 2D			X	
150			IS THE RISER HYDRODYNAMIC MODEL 3D			X	
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			X	
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			X	
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			X	
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			X	
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			X	
156			WITH MODEL TESTS - INDICATE SCALE			X	
157	* ** * * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			X	
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			X	
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING			X	
160			INTACT WITH VERTICAL TAUT TENDONS			X	
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			X	

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	Fues		X	
163	* * *		HYDRODYNAMIC LOADING CONSIDERED		X		
164	*	LOADING	IS INERTIA LOADING CONSIDERED		X		
165	S T		IS DYNAMIC LOADING CONSIDERED		X		
166	R U		TWO DIMENSIONAL SPACE FRAME ANALYSIS			X	
167	C T	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS			X	
168	U R A L	* ***	BEAM ELEMENT			X	
169			SHELL ELEMENT			X	
170		FINITE ELEMENT ANALYSIS	PLATE ELEMENT			X	
171	A N		STIFFENED PLATE ELEMENT			X	
172	A L	*** *	OTHERS .... SPECIFY			X	
173	Y S		NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM			X	
174	I S		SPECTRAL ANALYSIS			X	
175		OTHER ANALYTICAL	MODAL ANALYSIS			X	
176	* * *	CAPABILITY	FATIGUE LIFE ANALYSIS			X	

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	FVRS		X	
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		X		
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)			X	
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			X	
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (77) SPECIFY THE VERSION		X		
182		.... BASIC			X	
183		.... PASCAL			X	
184		.... OTHERS; SPECIFY			X	
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				NA to FD.
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X		
187		IS THEORETICAL MANUAL AVAILABLE		X		
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED			X	
189		IS ANY TRAINING OFFERED			X	
190	** ****	IBM			X	
191		CDC		X		

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	FURS		X		
193		VAX			X		
194		MICRO .. SPECIFY			X		
195	**** **	OTHERS .... SPECIFY			X		
196	** ****	LEASE (PRICE $ .00)					
197	ACCESSIBILITY	PURCHASE (PRICE $ .00)					
198	ARRANGEMENT	CONSULTANCY BASIS					
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES						
201							
202							

R.T. HUDSPETH

FREQUENCY DOMAIN USING DIFFRACTION THEORY

TABLE II

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

FVRS
RT HUDSPETH
AXISYMMETRIC
DIFFRACTION
PLUS
MORISON EQ
FOR SMALL MEMBERS

ROW #		**** ****	** ** ** ** ** ** ** ** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	FVRS	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM			X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES			X		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM			X		
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		X			
8	E	. : :	VERTICAL MEMBER		X			
9	N	. M E	HORIZ. MEMBER		X			
10	V	. M B	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION			X		
11	I	E R : X-SECT	DOES IT USE EQUIVALENT CIRCULAR X-SECTION			X		
	R							

					Program Name	Yes	No		Comment
12	ONMENTAL FORCES	WAVE FORCES	: :	ION	IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	FURS		X		
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER			X		
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY		X			POTENTIAL THEORY
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN			X		
16					COLUMN AND PONTOON			X		
17					PONTOON AND PONTOON			X		
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE		X			AXISYMMETRIC GREENS FUNCTION
19					IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON		X			
20					DIFFRACTION & FLUID FINITE ELEMENT			X		
21					OR ANY OTHER COMBINATION, PLEASE SPECIFY			X		
22			SECOND	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION			X		
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY		X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY		X			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY		X			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			X		

No.	Group	Category	Question	Program Name	Yes	No	Comments
27	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	Eves		X	
28			DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY			X	
29			IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X	
30			IS ITERATION OF RESPONSE USED FOR CONVERGENCE			X	
31			DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION			X	
32			IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM			X	
33			DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			X	
34	EQUATION OF MOT… / FREQUENCY D…	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X	
35			CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS		X		
36		DAMPING COEFFICIEN…	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			X	
37			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			X	
38			IS THE CURRENT DRAG DAMPING CONSIDERED			X	
39			IS THE CURRENT FRICTION DAMPING CONSIDERED			X	
40			IS THE RADIATION DAMPING CONSIDERED		X		
41			IS THE STRUCTURAL DAMPING CONSIDERED			X	

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	FURS		X	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM		X		MOORING GEOMETRY
44				IS THE STIFFNESS MATRIX COMPUTED		X		HYDROSTATIC
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			+	
46	*	WIN	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			+	
47	*			DAVENPORT			T	
48	ENVIRONMENTAL			SIMIU			T	
49		**		OTHERS (SPECIFY)			T	
50			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			X	
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			X	
52		**	STATISTICS	SIGNIFICANT WAVE HEIGHT			X	
53		**		MEAN SPECTRAL PERIOD			X	
54		**		WAVE SCATTER DIAGRAM			X	
55		*	...	LINEAR WAVE		X	X	
56				STRETCH LINEAR			X	

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	Fves	X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN		X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND		X	
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH		X	
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY		X	
62		V		EXTENDED VELOCITY POTENTIAL		X	
63		E		CHOIDAL WAVE THEORY		X	
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		X	
65	DESCRIPTION			ISSC		X	
66				JONSWAP		X	
67				BRETSCHNEIDER		X	
68				SCOTT		X	
69		*		OCHI (SIX PARAMETER)		X	
70		*		INPUT SPECTRA		X	
71		*		OTHERS		X	

				Program Name	Yes	No	Comments
72	* *	* *	DIRECTIONAL SPECTRA	FUES		X	
73	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA			+	
74	* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			+	
75	SOLUTION TECHNIQUE	STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		6		
76	SOLUTION TECHNIQUE	STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		2		
77	SOLUTION TECHNIQUE	STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			+	
78	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		6		
79	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		2		
80	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY		X		
81	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS .. GAUSSIAN ELIMINATION		X		
82	SOLUTION TECHNIQUE	DYNAMICS FREQUENCY DOMAIN	OTHERS .... SPECIFY		GAUSS JORDAN		
83			MEAN OFFSET OF THE PLATFORM		X		
84			MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'			+	
85	* *** ***** *******	PLATFORM RESPONSE OUTPUT	PLATFORM MOTION RESPONSE SPECTRA			+	
86		PLATFORM RESPONSE OUTPUT	RESPONSE STATISTICS .. MEAN VALUE			+	

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	FURS		X	
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3			X	
89		RESPONSE STATISTICS .. OTHERS; SPECIFY			X	
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)			X	
91	** ****	MODEL TEST - INDICATE SCALE			X	
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS			X	
93		OTHER PUBLISHED MATERIAL - SPECIFY		BLACK DOT		
94	**** **	OTHERS (SPECIFY)			†	
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)			X	
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			X	
97		VERTICAL (TAUT) MOORING		X		
98		HYBRID/OTHER COMBINATION .... SPECIFY			X	
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			X	
100	M	CHAIN (STEEL)			X	
101	O MATERIA	WIRE ROPE (STEEL)			X	

					Program Name	Yes	No	Comments
102	ORING	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	FVES		X	
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			X	
104				IS IT BASED ON CATENARY EQUATION			X	
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE			X	
106				OTHERS (SPECIFY)			X	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X	
108		*****		IS THE MASS OF THE MOORING CONSIDERED			X	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		X		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			X	
111	SYSTEM	VERTICAL		IS GEOMETRIC NON LINEARITY CONSIDERED			X	
112				IS MATERIAL NON LINEARITY CONSIDERED			X	
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED			X	
114			MOOR	IS THE STRUCTURAL DAMPING CONSIDERED			X	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM			X	
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE			X	

						Program Names	Yes	No	Comments
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD	FURS		X	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM		X		SMALL MEMBERS ONLY
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER		X		
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			X	
121			M O D E L		IS THE MOORING HYDRODYNAMIC MODEL 2D			X	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D			X	
123	C	M O O R I N G			IS THE MOORING MODEL TWO DIMENSIONAL			X	
124	A P A B I L I T I E S				IS THE MOORING MODEL THREE DIMENSIONAL			X	
125					IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			X	
126					IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			X	
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES			X	
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
129			DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X	
130		* ** *	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			X	
131		** ****			MEAN LOAD OF THE MOORING LINE			X	

				Program Name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	FURS		X	
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE			X	
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3			X	
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY			X	
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE			X	
137	*	PROGRAM VERIFICATN ***	WITH OTHER SOFTWARE - LIST PROGRAMS			X	
138	*	*	WITH OTHER PUBLISHED MATERIAL .... SPECIFY			X	
139	*		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			X	
140	*	*	IS THE RISER MODEL TWO DIMENSIONAL			X	
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL			X	
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD			X	
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			X	
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY			X	
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			X	
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM			X	

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	FURS		†	
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			†	
149			IS THE RISER HYDRODYNAMIC MODEL 2D			†	
150			IS THE RISER HYDRODYNAMIC MODEL 3D			†	
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			†	
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			†	
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			†	
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			†	
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			†	
156			WITH MODEL TESTS - INDICATE SCALE			†	
157	* * * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			†	
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			†	
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING			†	
160			INTACT WITH VERTICAL TAUT TENDONS			†	
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			†	

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	FURS		X	
163	* * *		HYDRODYNAMIC LOADING CONSIDERED		X		
164	*	LOADING	IS INERTIA LOADING CONSIDERED		X		
165	S T		IS DYNAMIC LOADING CONSIDERED		X		
166	R U	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS			X	
167	C T		THREE DIMENSIONAL SPACE FRAME ANALYSIS			X	
168	U R A L	* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT			X	
169			SHELL ELEMENT			X	
170			PLATE ELEMENT			X	
171	A N		STIFFENED PLATE ELEMENT			X	
172	A L	*** *	OTHERS .... SPECIFY			X	
173	Y S		NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM			X	
174	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS			X	
175			MODAL ANALYSIS			X	
176	* * * *		FATIGUE LIFE ANALYSIS			X	

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	Fvrs		+		
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)		+			
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)			+		
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			+		
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (77) SPECIFY THE VERSION		X			
182		.... BASIC			X		
183		.... PASCAL			X		
184		.... OTHERS; SPECIFY			X		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU			X		F.D, 3 2
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X			
187		IS THEORETICAL MANUAL AVAILABLE		X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED			X		
189		IS ANY TRAINING OFFERED			X		
190	** ****	IBM			X		
191		CDC		X			

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	FURS		X		
193		VAX			X		
194		MICRO .. SPECIFY			X		
195	**** **	OTHERS .... SPECIFY			X		
196	** ****	LEASE (PRICE $ .00)			X		
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)			X		
198		CONSULTANCY BASIS			X		
199	**** **	OTHERS .... SPECIFY			X		
200	REMARKS AND NOTES						
201							
202							

McDONNELL DOUGAL AUTOMATION

FREQUENCY DOMAIN USING MORISON'S EQUATION

Blank

(1)

McDONNELL DOUGLAS

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	SELOS	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	〃	?			
3	*		IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM	〃		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	〃	X			
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	〃		X		
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	〃		X		
7		: ORIENTATION :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	〃	X			
8	E	: MEMBER :	VERTICAL MEMBER	〃	X			
9	N	: MEMBER :	HORIZ. MEMBER	〃	X			
10	V	: X-SECT :	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	〃	?			
11	I R	: X-SECT :	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	〃	?			

						Program Name	Yes	No		Comments
12	ONMENTAL FORCES *	WAVE FORCES : :	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	SELOS	?			
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY	"	?			
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		
16					COLUMN AND PONTOON	"		X		
17					PONTOON AND PONTOON	"		X		
18			FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		X		
19					IS THE PROGRAM BASED ON MORISON'S EQN FORMULATI-ON W/ REL VELOCITY	"		X		
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	X			
21					IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X		
22			SECO	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		X		
24					DOES IT ACCOUNT FOR ADD-ITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"		X		
25					DOES IT ACCOUNT FOR ADD-ITIONAL PRESSURE DUE TO ROTATION OF BODY	"		X		
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FRE-QUENCY 2ND ORDER WAVES	"		X		

						Program Name	Yes	No		Comments
27	* * * * *	: : : : : : : : : : :	N D O R D E R	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	SELOS	X			
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"	X			
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X		
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	?			
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	"	?			
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	"	?			
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"	?			
34	* * * *	F R E Q U E N C Y		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		
35					CIRCLE / COMPUTING METHOD : 2D/3D(ARBITRARY SHAPE); OTHERS	"	2D			
36	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X		
38					IS THE CURRENT DRAG DAMPING CONSIDERED	"	?			
39	OF			COEFFICIEN	IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X		
40					IS THE RADIATION DAMPING CONSIDERED	"		X		
41	MOT	DO			IS THE STRUCTURAL DAMPING CONSIDERED	"		X		

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	SELOS		X	
43	ION	MAIN	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
44	ION	MAIN	STIFFNS	IS THE STIFFNESS MATRIX COMPUTED	"	X		
45	ENVIRONMENTAL	WIND	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	"	X		
46	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	"			NO REFERENCE TO WIND DYNAMICS
47	ENVIRONMENTAL	WIND	DYNAMIC WIND	DAVENPORT	"			
48	ENVIRONMENTAL	WIND	DYNAMIC WIND	SIMIU	"			
49	ENVIRONMENTAL	WIND	DYNAMIC WIND	OTHERS (SPECIFY)	"			
50	ENVIRONMENTAL	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"		X	
51	ENVIRONMENTAL	CURRENT		IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X		
52	ENVIRONMENTAL		STATISTICS	SIGNIFICANT WAVE HEIGHT	"	X		
53	ENVIRONMENTAL		STATISTICS	MEAN SPECTRAL PERIOD	"	X		
54	ENVIRONMENTAL		STATISTICS	WAVE SCATTER DIAGRAM	DANOS	X		FOR FATIGUE LIFE ANALYSIS
55			.....	LINEAR WAVE	SELOS	X		
56				STRETCH LINEAR	"		X	

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR (5TH) ORDER .... PLEASE CIRCLE ...	SELOS	X	
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN	〃	X	
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHMIND	〃		X
60				STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH	〃		X
61				STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY	〃		X
62				EXTENDED VELOCITY POTENTIAL	〃	X	
63				CNOIDAL WAVE THEORY	〃	X		SOLITARY WAVE THEORY
64			SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	SELOS DANOS *	X		* P-M SPECTRA CAN BE USED IN DANOS FOR FATIGUE LIFE ANALYSIS USING POWER SPECTRUM METHOD
65				ISSC	SELOS		X	
66				JONSWAP	〃		X	
67				BRETSCHNEIDER	〃	X		
68				SCOTT	〃		X	
69				OCHI (SIX PARAMETER)	〃		X	
70				INPUT SPECTRA	〃	?		
71				OTHERS	〃	?		

WAVES

DESCRIPTION

x
x
x
x
x

					Program Name	Yes	No	Comments
72		* *	A	DIRECTIONAL SPECTRA	SELOS	X		
73		* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA	DYNAL	?		
74		* *	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?			
75	SOLUTION TECHNIQUE		STATICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	DANOS (STRUDL)	SIX		
76	SOLUTION TECHNIQUE		STATICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?		
77	SOLUTION TECHNIQUE		STATICS	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"	?		
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	SIX		
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?		
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY	"	?		
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"	?		
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY	"		?	
83				MEAN OFFSET OF THE PLATFORM	"	X		
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	SELOS	X		
85	* *** ***** *******			PLATFORM MOTION RESPONSE SPECTRA	"	?		
86	PLATFORM RESPONSE OUTPUT			RESPONSE STATISTICS .. MEAN VALUE	"	?		

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	SELOS	?		
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"	X		
89		RESPONSE STATISTICS .. OTHERS; SPECIFY	"	?		
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	"	?		
91	** ****	MODEL TEST - INDICATE SCALE	"	?		
92	PROGRAM	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	?		
93	VERIFICATION	OTHER PUBLISHED MATERIAL - SPECIFY	"	?		
94	**** **	OTHERS (SPECIFY)	"	?		
95	* * * * * * * *	SPREAD MOORING (CATENARY)	"	X		
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"		X	
97		VERTICAL (TAUT) MOORING	"	X		
98	DESCRIPTION	HYBRID/OTHER COMBINATION .... SPECIFY	"		X	
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"		X	
100	M	CHAIN (STEEL)	"	X		
101	O	WIRE ROPE (STEEL)	"	X		

MATERIA

					Program Name	Yes	No	Comments
102				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	SELOS		X	
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	DYNIOS		X	
104				IS IT BASED ON CATENARY EQUATION	"	?		
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STIFFNSS, CIRCLE	"	?		
106				OTHERS (SPECIFY)	"	?		
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		?	
108				IS THE MASS OF THE MOORING CONSIDERED	"		X	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	?		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	?		
111				IS GEOMETRIC NON LINEARITY CONSIDERED	"	?		
112				IS MATERIAL NON LINEARITY CONSIDERED	"	?		
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X	
114				IS THE STRUCTURAL DAMPING CONSIDERED	"		X	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"		X	
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STIFFNSS, CIRCLE	"	?		

ORIGINAL SYSTEM

VERTICAL MOORING

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD	SELOS DANOS		?	
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	//	?		
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	//	?		
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	//		X	
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D	//	X		
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D	//		?	
123	C	M	D		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCAL)	//	X		
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCAL)	//	X		
125	P	O	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	//	?		
126	A	R	.		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	//	?		
127	B	I	.		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	//		X	
128	I	N	.		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	//	X		
129	L	G	.	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	//	?		
130	I	*	*	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	//		X	
131	E	**	****		MEAN LOAD OF THE MOORING LINE	//	X		
	S								

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	SELOS DANOS	X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	〃	?			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	〃	X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	〃	?			
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE	〃	?			
137	* * * * *	PROGRAM VERIFICATN ***	WITH OTHER SOFTWARE - LIST PROGRAMS	〃	?			
138	* *	*	WITH OTHER PUBLISHED MATERIAL .... SPECIFY	〃	?			
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	〃	?			NO REFERENCE TO RISER ANALYSIS.
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL					
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL					
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD					
143	R I S E R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD					
144			DOES THE PROGRAM USE SMALL DEFLECTION THEORY					
145		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY					
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM					

				Program Name	Yes	NO		Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER					
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING					
149			IS THE RISER HYDRODYNAMIC MODEL 2D					
150			IS THE RISER HYDRODYNAMIC MODEL 3D					
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM					
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS					
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS					
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END					
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE					
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE					
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS					
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY					
159	* *** STABILITY ANALYSIS	I N T A C T	INTACT FREE FLOATING	SELOS	?			CAN CALC BUOYANCY FORCE [illegible]
160			INTACT WITH VERTICAL TAUT TENDONS	"	?			[illegible]
161		D A M	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	?			

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	SELOS	?		
163	* ** ** *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	SELOS DANOS	X		
164			IS INERTIA LOADING CONSIDERED	"	X		
165	S T R U C T U R A L A N A L Y S I S		IS DYNAMIC LOADING CONSIDERED	"	X		
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	DANOS (STRUDL)	X		
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
168		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT	"	X		
169			SHELL ELEMENT	"	X		
170			PLATE ELEMENT	"	X		
171			STIFFENED PLATE ELEMENT	"	?		
172		*** *	OTHERS .... SPECIFY	"	?		
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"	?		
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	"	X		
175	*		MODAL ANALYSIS		X		
176	** ** *		FATIGUE LIFE ANALYSIS	"	X		

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)					
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)					
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	SELOS DANOS	X			
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	DANOS	X			APT CODE CHECK
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (IV) SPECIFY THE VERSION	SELOS DANOS	X			
182		.... BASIC	〃		X		
183		.... PASCAL	〃		X		
184		.... OTHERS; SPECIFY	〃		X		
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	〃	?			
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	〃	X			
187		IS THEORETICAL MANUAL AVAILABLE	〃	X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	〃	X			
189		IS ANY TRAINING OFFERED	〃	?			
190	** ****	IBM MAIN FRAME IBM 4341 MINI	SELOS DANOS	X			STRUDL [illegible] DANOS ALSO IBM TSO
191		CDC	〃		X		

			Program Name	Yes	No		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	SELOS DANOS		X		
193		VAX	〃	X			
194		MICRO .. SPECIFY	〃		X		
195	**** **	OTHERS .... SPECIFY	〃		X		
196	** ****	LEASE (PRICE $ .00)	〃	X			
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	〃	X			
198		CONSULTANCY BASIS	〃	X			
199	**** **	OTHERS .... SPECIFY	〃	?			
200	REMARKS AND NOTES						
201							
202							

McDONNELL DOUGAL AUTOMATION

TIME DOMAIN USING MORISON'S EQUATION

Blank

Mc Auto

(McDonnell Douglas)

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	SEIOS	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"	?			
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM	"		X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"	X			
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES	"		X		
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"		X		
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
8	E	. : : MEMBER	VERTICAL MEMBER	"	X			
9	V	. : : MEMBER	HORIZ. MEMBER	"	X			
10	I	. : : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"	?			
11	R	. : : X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"	?			

					Program Name	Yes	No		Comments
12	ON MENTAL FORCES	WAVE FORCES	... IOH	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	SELOS	?			
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	?			
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X		
16				COLUMN AND PONTOON	"		X		
17				PONTOON AND PONTOON	"		X		
18			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		X		
19				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	"		X		
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"	X			
21				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X		
22			... DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		X		
24			SECON	DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"		X		
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"		X		
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X		

						Program Name	Yes	No	Comments
27	x	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	SELOS	X		
28	x				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"	X		
29	x				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X	
30	x				IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	?		
31	x				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	"	?		
32	x				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"	?		
33	x	',			DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"	?		
34	xxxxxx	xxxxxxxxx	xxx	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
35					CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	"	2D		
36			REGULAR	DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X	
38	EQUAT	T I M			IS THE CURRENT DRAG DAMPING CONSIDERED	"	?		
39					IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X	
40					IS THE RADIATION DAMPING CONSIDERED	"		X	
41			WA		IS THE STRUCTURAL DAMPING CONSIDERED	"		X	

						Program Name	Yes	No	Comments
42	I	E	VES	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	SELOS		X	
43	O			STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
44	N		XXX		IS THE STIFFNESS MATRIX COMPUTED	"	X		
45		D	XXX	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
46	O	O	I		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	"	2D		
47	F	M	R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
48	M	,	REGULAR		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		X	
49	O	A			IS THE CURRENT DRAG DAMPING CONSIDERED	"	?		
50	T	I		COEFFICIENTS	IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X	
51	I	N			IS THE RADIATION DAMPING CONSIDERED	"		X	
52	O		WAVES		IS THE SIRUCTURAL DAMPING CONSIDERED	"		X	
53	N				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	"		X	
54	XXXXXX	XXXX		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
55			XXX		IS THE STIFFNESS MATRIX COMPUTED	"	X		
56	X	XX	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT		X		

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	SELOS	?		NO REFERENCE TO WIND DYNAMICS
58				DAVENPORT	"	?		
59				SIMIU	"	?		
60				OTHERS (SPECIFY)	"	?		
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"		X	
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X		
63			WAVE	SIGNIFICANT WAVE HEIGHT	"	X		
64				MEAN SPECTRAL PERIOD	"	X		
65				WAVE SCATTER DIAGRAM	DANOS	X		FOR FATIGUE LIFE ANALYSIS
66				LINEAR WAVE	SELOS	X		
67				STRETCH LINEAR	"		X	
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	"	X		
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN	"	X		
70		WAVE	THEORIE	STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHMIND	"		X	
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH	"		X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	SELOS		?	
73		E	.	EXTENDED VELOCITY POTENTIAL	〃	X		
74		S	.	CNOIDAL WAVE THEORY	〃	X		SOLITARY WAVE THEORY
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	SELOS DANOS *	X		P-M SPECTRA CAN BE USED IN DANOS FOR FATIGUE LIFE ANALYSIS USING POWER SPECTRUM METHOD
76	D		E	ISSC	SELOS		X	
77	E		A	JONSWAP	〃		X	
78	S		S	BRETSCHNEIDER	〃	X		
79	C	x	P	SCOTT	〃		X	
80	R	x	E	OCHI (SIX PARAMETER)	〃		X	
81	I	x	T	INPUT SPECTRA	〃	?		
82	P	x	R	OTHERS	〃	?		
83	T	x	A	DIRECTIONAL SPECTRA	〃	X		
84	I	x	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA	DYNAL	?		
85	O	x		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?			
86	N	x	STA	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	DANOS (STRUDL)	SIX		

			Program Name	Yes	No	Comments
87	* SOLUTION TECHNIQUE *****	DYNAMICS ..... TIME DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	DYNAL	?	
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	〃	?	
89			NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	〃	SIX	
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	〃	?	
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	〃	?	
92			METHOD OF INTEGRATION USED .... HOUBOLT	〃		X
93			.... WILSON - θ	〃		X
94			.... NEWMARK - β	〃	X	
95			OTHERS .... PLEASE SPECIFY	〃	X		RUNGA KUTTA
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	〃	X		LINEAR OR (1-cos θ)
97			.... VARIABLE INTEGR-ATION TIME	〃		?	
98			OTHERS .... PLEASE SPECIFY	〃		?	
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	〃	?		
100			OTHERS .... PLEASE SPECIFY	〃	?		
101			PLATFORM MOTION TIME HISTORY	〃	X		

			Program Name	Yes	No	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	SEL05, DANOS DYNAL	?		
103		... R.M.S. VALUE	〃	?		
104		... (SIGNIFICANT)1/3	〃	?		
105		... EXPECTED MAXIMUM	〃	?		
106		... OTHERS, SPECIFY	〃	?		
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	〃		X	
108	PROGRAM VERIFICATION ** ****	MODEL TEST - INDICATE SCALE	〃	?		
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	〃	?		
110		OTHER PUBLISHED MATERIAL - SPECIFY	〃	?		
111		OTHERS (SPECIFY)	〃	?		
112	DESCRIPTION ** ****	SPREAD MOORING (CATENARY)	DANOS	X		
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	〃		X	
114		VERTICAL (TAUT) MOORING	〃	X		
115	M	HYBRID/OTHER COMBINATION .... SPECIFY	〃		X	
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	〃		X	

					Program Name	Yes	No	Comments
117	D	MATERIAL		CHAIN (STEEL)	DANOS	X		
118	R			WIRE ROPE (STEEL)	〃	X		
119	I			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	〃		X	
120	N	CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	〃	?		
121	G			IS IT BASED ON CATENARY EQUATION	〃	?		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	〃	?		
123				OTHERS (SPECIFY)	〃	?		
124			DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	〃		?	
125	S	×××××××××	×××××	IS THE MASS OF THE MOORING CONSIDERED	〃		X	
126	Y			IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	〃	?		
127	S			IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	〃	?		
128	T			IS GEOMETRIC NON LINEARITY CONSIDERED	〃	?		
129	E		MOORI	IS MATERIAL NON LINEARITY CONSIDERED	〃	?		
130	M			IS THE HYDRODYNAMIC DAMPING CONSIDERED	〃		X	
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED	〃		X	

					Program Name	Yes	No	Comments
132		RTICAL	HG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	DANOS		X	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	〃	?		
134					IS IT BASED ON FINITE DIFFERENCE METHOD	〃		?	
135	C		MODEL	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	〃	?		
136	A				IS IT CAPABLE OF CALCU-LATING HYDRODYHAMIC FOR-CE FOR VARIABLE DIAMETER	〃	?		
137	P				IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING	〃		X	
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL	〃	X		
139	B				IS THE MOORING MODELLED AS THREE DIMENSIONAL	〃		?	
140	I		**		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)	〃	X		
141	L		**		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)	〃	X		
142	I	MOORING			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	〃	?		
143	T				IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING	〃	?		
144	I				IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES	〃		X	
145	E				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	〃	X		
146	S	**	DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	〃	?		

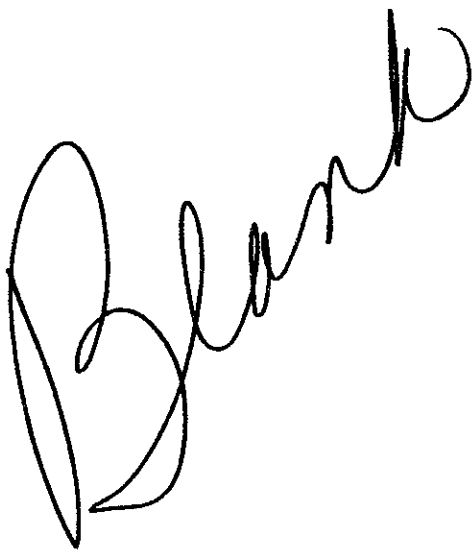
				Program Name	Yes	No	Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	DANOS		X	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	DANOS DYNAL	X		
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	〃	X		
150			... R.M.S. VALUE	〃	?		
151			... (SIGNIFICANT)1/3	〃	X		
152			... EXPECTED MAXIMUM	〃	?		
153			... OTHERS, SPECIFY	〃	?		
154		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	〃	?		
155	* * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	〃	?		
156			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	〃	?		
157			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	〃	?		NO REFERENCE TO RISER ANALYSIS
158		* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL				
159	R		IS THE RISER MODEL THREE DIMENSIONAL				
160	I S E		DOES THE PROGRAM USE FINITE ELEMENT METHOD				
161			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167	Y		IS THE RISER MODELLED AS TWO DIMENSIONAL				
168	S		IS THE RISER MODELLED AS THREE DIMENSIONAL				
169	T	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	E M M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING	SELOS	?		CALCULATES BUOYANCY FORCE, BUT NOT CLEAR WHETHER IT CAN HANDLE NAVAL ARCHITECTURAL CALCULATIONS
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS	"	?		
179		DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	?		
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	"	?		
181	* * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED	SELOS DAMOS	X		
182	S	LOADING	IS INERTIA LOADING CONSIDERED	"	X		
183	T R	LOADING	IS DYNAMIC LOADING CONSIDERED	"	X		
184	U C	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	DAMOS (STRUDL)	X		
185	T U	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
186	R A	* ***	BEAM ELEMENT	"	X		
187	L	FINITE ELEMENT ANALYSIS	SHELL ELEMENT	"	X		
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT	"	X		
189	A H	FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT	"	?		
190	A L	*** *	OTHERS .... SPECIFY	"	?		
191	Y S	*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM	"	?		

	I			Program Name	Yes	No		Comments
192	S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	DANOS DYNAL	X			
193			MODAL ANALYSIS	"	X			
194			FATIGUE LIFE ANALYSIS	"	X			
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)	4				
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	4				
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	4	X			
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)	4	X			API Code Check
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN (IV) SPECIFY THE VERSION	"	X			
200			.... BASIC	/		X		
201			.... PASCAL	4		X		
202			.... OTHERS SPECIFY	4		X		
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU	"	?			
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE	"	X			
205			IS THEORETICAL MANUAL AVAILABLE	"	X			
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X			

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	SELOS DANOS	?		
208	** ****	IBM MAIN FRAME IBM 4341 MINI	1	X X		STRUDL (STAT & DYNA) OF DANOS ALSO IN IBM/ISO
209		CDC	1		X	
210	HARDWARE SYSTEM	PRIME COMPUTER	1		X	
211		VAX	11	X		
212	**** **	MICRO .... SPECIFY	11		X	
213		OTHERS .... SPECIFY	11		X	
214	** ****	LEASE (PRICE $ .00)	11	X		
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)	1	X		
216		CONSULTANCY BASIS	1	X		
217	** ****	OTHERS .... SPECIFY	1	?		
218	REMARKS AND NOTES					
219						
220						



C.J. GARRISON & ASSOCIATES

FREQUENCY DOMAIN USING DIFFRACTION THEORY

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C. J. GARRISON & ASSOC

TABLE II QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES					INFORMATIONS FOR THE PARTICULAR CALCULATIONS ARE LACKING.
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					"
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM					"
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					"
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					"
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					"
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	HYDRAL	X			
8	E	. : :	VERTICAL MEMBER	"	X			
9	N	. : MEMBER :	HORIZ. MEMBER	"	X			
10	V	. : : X-SECT	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION	"		X		'REDA' USES MORISON'S EQN FOR SMALL DIAMETER
11	I R		DOES IT USE EQUIVALENT CIRCULAR X-SECTION	"		X		

					Program Name	Yes	No		Comments
12	OCEAN WAVE FORCES			IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY	HYDRAL	X			
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			pressure on the surface first generated before calculating the force in the axial axes
15			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		?		
16				COLUMN AND PONTOON	"		?	2D STRIP THEORY TO BE PROVIDED IN THE UPDATE TO BE RELEASED ON (???)	3D DIFFRACTION w/ quadrilateral source panel + w/ triangular source sheet of linearly varying strength
17				PONTOON AND PONTOON	"		?		
18			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X			
19				IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON	"		X		
20				DIFFRACTION & FLUID FINITE ELEMENT	"		X		
21				OR ANY OTHER COMBINATION, PLEASE SPECIFY	"		X		
22	FORCES	FORCES	SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	X			

					Program Name	Yes	No	Comments
27	****	:	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	HYDRAL	X		
28		:		DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"		?	
29		:		IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		?	
30		:		IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	X		
31		:		DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION	"	?		
32		:		IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM	"	?		
33		:		DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"		?	
34	****	FREQUENCY	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
35				CIRCLE / COMPUTING METHOD ; (2D, 3D ARBITRARY SHAPE); OTHERS	"	X		
36			DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
37				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		?	
38				IS THE CURRENT DRAG DAMPING CONSIDERED	"		?	
39	EQUATION OF MOT			IS THE CURRENT FRICTION DAMPING CONSIDERED	"		?	
40				IS THE RADIATION DAMPING CONSIDERED	"	X		
41		DO		IS THE STRUCTURAL DAMPING CONSIDERED	"	X		

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	HYDRAL		X	
43	****		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
44				IS THE STIFFNESS MATRIX COMPUTED	"	X		
45	*	**	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	?	?		NO INFORMATION RELATED TO WIND FORCE CALCULATION WAS REC'D
46	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	?	?		"
47	*			DAVENPORT	?	?		"
48	ENV	**		SIMIU	?	?		"
49				OTHERS (SPECIFY)	?	?		"
50	IRON		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	?	?		NO INFORMATION RELATED TO CURRENT FORCE CALCULATION WAS REC'D
51	MENTAL			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	?	?		"
52		*	STATISTICS	SIGNIFICANT WAVE HEIGHT	FREDA	X		
53		*		MEAN SPECTRAL PERIOD	"	X		
54		*		WAVE SCATTER DIAGRAM	"	?		
55		*		LINEAR WAVE	"		?	
56				STRETCH LINEAR	"		?	

				Program Name	Yes	No	Comments
57			STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...	FREDA		?	
58			STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN	"		?	
59			STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND	"		?	
60		W	STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH	"		?	
61		A	STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY	"		?	
62		V	EXTENDED VELOCITY POTENTIAL	"	X		
63		E	CNOIDAL WAVE THEORY	"		?	
64		S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	?		
65			ISSC	"	?		
66			JONSWAP	"	?		
67			BRETSCHNEIDER	"	?		
68			SCOTT	"		?	
69		x	OCHI (SIX PARAMETER)	"		?	
70		x	INPUT SPECTRA	"	?		
71	x	x	OTHERS	"	?		

WAVE THEORIES ..... SEA SPECTR

DESCRIPTION

					Program Name	Yes	No	Comments
72	* *	* *		A	DIRECTIONAL SPECTRA	FREDA	?		
73	* *	OTHERS			DOES IT CONSIDER EARTH QUAKE SPECTRA	?		?	INFORMATION PERTAINING TO THIS CAPABILITY IS LACKING
74	* *				DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?		?	〃
75	SOLUTION TECHNIQUE	STATICS			NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	?	SIX		
76					WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	〃	?		
77					IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	〃		?	
78		DYNAMICS	FREQUENCY DOMAIN		HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	FREDA	SIX		
79					WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	〃	?		
80					WHAT METHOD OF LINEARIZATION USED .... SPECIFY	〃	?		
81					MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS .. GAUSSIAN ELIMINATION	〃	?		
82					OTHERS .... SPECIFY	〃	?		
83					MEAN OFFSET OF THE PLATFORM	〃	X		
84					MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	〃	P		
85	* *** ***** *******				PLATFORM MOTION RESPONSE SPECTRA	〃	X		
86	PLATFORM RESPONSE OUTPUT				RESPONSE STATISTICS .. MEAN VALUE		X		

			Program Name	Yes	No		Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE	F-R'EDA	?			
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3	"	X			
89		RESPONSE STATISTICS .. OTHERS; SPECIFY	"	?			
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)	"	?			
91	** ****	MODEL TEST - INDICATE SCALE	"	X			No comparison results were rec'd for finding structures
92	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"		?		
93		OTHER PUBLISHED MATERIAL - SPECIFY	"		?		
94	**** **	OTHERS (SPECIFY)	"		?		
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)	MORA (?)	X			
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"		?		
97		VERTICAL (TAUT) MOORING	"	X			
98		HYBRID/OTHER COMBINATION .... SPECIFY	"		?		
99		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"		?		
100	M	CHAIN (STEEL)	"	?			
101	O MATERIA	WIRE ROPE (STEEL)	"	?			

					Program Name	Yes	No	Comments
102	ORING SYSTEM	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	MOOA (?)	X		
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		
104				IS IT BASED ON CATENARY EQUATION	"	X		
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE	"		?	
106				OTHERS (SPECIFY)	"		?	
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		?	
108		***** VERTICAL	MOORS	IS THE MASS OF THE MOORING CONSIDERED	"		?	
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X		
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	?		
111				IS GEOMETRIC NON LINEARITY CONSIDERED	"	?		
112				IS MATERIAL NON LINEARITY CONSIDERED	"	?		
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"	?		
114				IS THE STRUCTURAL DAMPING CONSIDERED	"		?	
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"		?	
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE	"		?	

						Program Name	Yes	No	Comments
117			I N G	HYDRODYNAMIC MODEL	IS IT BASED ON FINITE DIFFERENCE METHOD	MOPA (?)		?	
118					IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		?	
119					IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"		?	
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		?	
121			M O D E L		IS THE MOORING HYDRODYNAMIC MODEL 2D	"		X	
122					IS THE MOORING HYDRODYNAMIC MODEL 3D	"	X		
123	C	M O O R I N G			IS THE MOORING MODEL (STRUCT) TWO DIMENSIONAL	"		X	
124	A P A B I L I T I E S				IS THE MOORING MODEL (STRUCT) THREE DIMENSIONAL	"	X		
125					IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"	?		
126					IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"	?		
127					IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"		?	
128					IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		?	
129			DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		?	
130		* ** *	INSTALLATION ANALYS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	"		?	
131		** ****			MEAN LOAD OF THE MOORING LINE	"	X		

				Program Name	Yes	No		Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	MOKA (?)	X			
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE	"	?			
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3	"	X			
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY	"		?		
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE	"	?			
137	*	PROGRAM VERIFICATN ***	WITH OTHER SOFTWARE - LIST PROGRAMS	"	?			
138	*	*	WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	?			
139	*		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	"		?		INFORMATION PERTAINING TO RISER ANALYSIS IS LACKING
140	*	* *	IS THE RISER MODEL TWO DIMENSIONAL	"				
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL					
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD					
143	R I		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD					
144	S		DOES THE PROGRAM USE SMALL DEFLECTION THEORY					
145	E	* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY					
146	R	* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM					

				Program Names	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
149			IS THE RISER HYDRODYNAMIC MODEL 2D				
150			IS THE RISER HYDRODYNAMIC MODEL 3D				
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS				
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
156			WITH MODEL TESTS - INDICATE SCALE				
157	* * * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
159	* *** STABILITY ANALYSIS	INTACT	INTACT FREE FLOATING				NO INFORMATION RELATED TO STABILITY ANALYSIS SOFTWARE WAS RE<'D.
160			INTACT WITH VERTICAL TAUT TENDONS				
161		DAM	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				

				Program Name	Ver	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
163	* **		HYDRODYNAMIC LOADING CONSIDERED				INFORMATION RELATED TO STRUCT ANALYSIS SOFTWARE CAPABILITY ARE LACKING
164	*	LOADING	IS INERTIA LOADING CONSIDERED				
165	S		IS DYNAMIC LOADING CONSIDERED				
166	T U	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
167	C T		THREE DIMENSIONAL SPACE FRAME ANALYSIS				
168	U R A L	* ***	BEAM ELEMENT				
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
170			PLATE ELEMENT				
171	A N A L Y S I S	*** *	STIFFENED PLATE ELEMENT				
172			OTHERS .... SPECIFY				
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
175			MODAL ANALYSIS				
176	* ** *		FATIGUE LIFE ANALYSIS				

			Program Name	Yes	No		Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)					
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	FREDA	?			
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	FREDA	X			
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)					
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE - .. FORTRAN (IV) SPECIFY THE VERSION	HYDCAL FREDA	X			
182		.... BASIC					
183		.... PASCAL					
184		.... OTHERS; SPECIFY					
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE	HYDCAL FREDA	X			
187		IS THEORETICAL MANUAL AVAILABLE	"	X			
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X			
189		IS ANY TRAINING OFFERED	"	X			
190	** ****	IBM	"	?			
191		CDC	"				

			Program Name	Yes	NO		Comments
192	HARDWARE SYSTEM	PRIME COMPUTER	11		?		
193		VAX	11		?		
194		MICRO .. SPECIFY	11		?		
195	**** **	OTHERS .... SPECIFY (THRU' BOEING COMPUTER SERVICES AT A LATER DATE (?))	11				
196	** ****	LEASE (PRICE $ .00)					
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $40000.00)	MORA Package	X			
198		CONSULTANCY BASIS	11	X			
199	**** **	OTHERS .... SPECIFY					
200	REMARKS AND NOTES						
201							
202							

C.J. GARRISON & ASSOCIATES

TIME DOMAIN USING DIFFRACTION THEORY

(B)

C. J. GARRISON & ASSOC

TABLE IV QUESTIONAIRE FOR SOFTWARE CAPABILITIES (TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA FOR FIXED AND MOORED OCEAN STRUCTURES

"MODA"

INFORMATIONS RELATED TO GAITISH'S CAPABILITY BASED ON MORISON'S EQUATION WERE NOT REC'D. SO, THE TABLES I & III ARE NOT FILLED UP.

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES					INFORMATIONS RELATED TO THE PARTICULAR CALCULATIONS ARE LACKING
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					"
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM					"
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					"
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					"
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					"
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	HYDRAL	X			
8	E	. : M	VERTICAL MEMBER	"	X			
9	V	. E M	HORIZ. MEMBER	"	X			
10	I	. B E	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		X		[illegible]
11	R	R : X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"		X		

						Program Name	Yes	No		Comments
12	ON	WAVE FORCES	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	HYDRAL	X			3D diffraction theory using either i) quadrilateral source panel or ii) triangular source element of linearly varying strength
13	MEMBER				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	"	X			
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY	"	X			pressure on the surface first generated before calculating the force in the longitudinal axis
15			MEMBER INTER-ACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		?		
16					COLUMN AND PONTOON	"		?		
17					PONTOON AND PONTOON	"		?		
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE	"	X		* 2D strip theory to be provided in the update to be released on (??)	3D-diffraction 2D-diffraction (strip theory) to be provided in the up-date
19					IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON	"		X		
20					DIFFRACTION AND FLUID FINITE ELEMENT	"		X		
21					OR ANY OTHER COMBINATION	"		X		
22			SECOND	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X			
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"	X			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	X			
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	X			
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"	X			

						Program Name	Yes	No		Comments
27	*	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	HYDRAL	X			
28	*				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"		?		
29	*				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		?		
30	*				IS ITERATION OF RESPONSE USED FOR CONVERGENCE	"	X			
31	*				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION	"	?			
32	*				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM	"	?			
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE	"		?		
34	*	*	*	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		
35	*	*	*		CIRCLE / COMPUTING METHOD : (2D), (3D/ARBITRARY SHAPE), OTHERS	"	X			
36	*	*	REGULAR	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
37	*	*			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		?		
38	E	T			IS THE CURRENT DRAG DAMPING CONSIDERED	"		?		
39	Q				IS THE CURRENT FRICTION DAMPING CONSIDERED	"		?		
40	U	I		COEFFICIEN	IS THE RADIATION DAMPING CONSIDERED	"	X			
41	A T	M	WA		IS THE STRUCTURAL DAMPING CONSIDERED	"		X		

						Program Name	Yes	No		Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	HYDRAL		X		
43				S T I F F N S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X		
44			* * *		IS THE STIFFNESS MATRIX COMPUTED	"	X			
45	O F	D	* * *	A D D M A S S	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		
46		O	I		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS	"	X			
47		M	R R	D A M P I N G	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
48	M	A	E G		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		?		
49	O		U L		IS THE CURRENT DRAG DAMPING CONSIDERED	"		?		
50	T I	I	A R	C O E F F I C I E N T S	IS THE CURRENT FRICTION DAMPING CONSIDERED	"		?		
51	O	N			IS THE RADIATION DAMPING CONSIDERED	"	X			
52	N		W A		IS THE STRUCTURAL DAMPING CONSIDERED	"		X		
53	* * * * * *		V E		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	"		X		
54		* * *	S	S T I F F N S	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X		
55			* * *		IS THE STIFFNESS MATRIX COMPUTED		X			
56	*	* *	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	?		?		NOTHING MENTIONED ABOUT WIND FORCE CALCULATION [illegible] BY PROGRAM

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	?		?	INFORMATIONS RELATING TO THIS PARTICULAR CALCULATIONS ARE LACKING
58				DAVENPORT	?		?	"
59				SIMIU	?		?	"
60				OTHERS (SPECIFY)	?		?	"
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	?		?	"
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	?		?	"
63				SIGNIFICANT WAVE HEIGHT	FREDA NONTID	X		
64				MEAN SPECTRAL PERIOD	"	X		
65				WAVE SCATTER DIAGRAM	?		?	
66			WAVE THEORIE	LINEAR WAVE				
67				STRETCH LINEAR				
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...				
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN				
70		WA		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND				
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH				

					Program Name	Yes	No		Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY					
73		E	.	EXTENDED VELOCITY POTENTIAL	HYDRAL	?			
74		S	.	CNOIDAL WAVE THEORY					
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	NONTID	?			
76	D		E	ISSC	"	?			
77	E		A	JONSWAP	"	?			
78	S		S	BRETSCHNEIDER	"	?			
79	C	*	P	SCOTT	"	?			
80	R	*	E	OCHI (SIX PARAMETER)	"	?			
81	I	*	C	INPUT SPECTRA	"	?			
82	P	*	T	OTHERS	"	?			
83	T	*	R	DIRECTIONAL SPECTRA	"	?			
84	I	*	A	DOES IT CONSIDER EARTH QUAKE SPECTRA	?	?			NO MENTION ABOUT EQ SPECTRA
85	O	*		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?	?			?
86	N	*		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	NONTID	SIX			
			OTHERS						
			STA						

				Program Name	Yes	No	Comments
87	* SOLUTION TECHNIQUE ****	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	NONTID	?		
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	?			
89		DYNAMICS	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY	NONTID DRIFT	SIX THREE-* (?)		* SURGE, SWAY AND YAW (?)
90			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?		
91			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM	"			
92		TIME DOMAIN	METHOD OF INTEGRATION USED .... HOUBOLT	"	?		
93			.... WILSON - θ	"	?		
94			.... NEWMARK - β	"	?		
95			OTHERS .... PLEASE SPECIFY	"	?		
96			HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION	"	?		
97			.... VARIABLE INTEGR-ATION TIME	"	?		
98			OTHERS .... PLEASE SPECIFY	"	?		
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION	"	?		
100			OTHERS .... PLEASE SPECIFY	"	?		
101			PLATFORM MOTION TIME HISTORY	"	X		

			Program Name	Yes	No		Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE	NONLIN DIFF	?			
103		... R.M.S. VALUE	"	?			
104		... (SIGNIFICANT)1/3	"	?			
105		... EXPECTED MAXIMUM	"	?			
106		... OTHERS, SPECIFY	"	?			
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS	"		X		
108	** **** PROGRAM VERIFICATION	MODEL TEST - INDICATE SCALE	"	X			No comparison results were received for floating structures.
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"				
110		OTHER PUBLISHED MATERIAL - SPECIFY	"				
111	** ****	OTHERS (SPECIFY)	"				
112	* * * * M O D E S C R I P T I O N	SPREAD MOORING (CATENARY)	MORA	X			
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	?			
114		VERTICAL (TAUT) MOORING	"	X			
115		HYBRID/OTHER COMBINATION .... SPECIFY	"		?		
116		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"				

					Program Name	Yes	No	Comments
117	ORIGSYSTEM	MATERIAL		CHAIN (STEEL)	MORA	X		
118				WIRE ROPE (STEEL)	"	X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"	?		
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	X		
121				IS IT BASED ON CATENARY EQUATION	"	?		
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		?	
123				OTHERS (SPECIFY)	"			
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		?	
125		VE	MOORI	IS THE MASS OF THE MOORING CONSIDERED	"		?	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	?		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	?		
128				IS GEOMETRIC NON LINEARITY CONSIDERED	"	?		
129				IS MATERIAL NON LINEARITY CONSIDERED	"	?		
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"	?		
131				IS THE STRUCTURAL DAMPING CONSIDERED	"	?		

						Program Name	Yes	No	Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	MORA		?	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE	"		?	
134					IS IT BASED ON FINITE DIFFERENCE METHOD	"		?	
135	C		MODEL	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM	"		X	
136	A				IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"		X	
137	P				IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X	
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL	"		X	
139	B		*		IS THE MOORING MODELLED AS THREE DIMENSIONAL	"	X		
140	I		*		IS THE MOORING MODEL (STEVENS) TWO DIMENSIONAL	"		X	
141	L		*		IS THE MOORING MODEL (STEVENS) THREE DIMENSIONAL	"	X		
142	I	M			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING	"	?		
143	T	O			IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"	?		
144	I	R			IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES	"		?	
145	E	I			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"		?	
146	S	NG	DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X	

				Program Name	Ver	No	Comments
147		* * *	INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	MORA		X	
148			MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	〃	X		
149				MOORING LINE LOAD STATISTICS ... ... MEAN VALUE	〃	X		
150				... R.M.S. VALUE	〃	?		
151				... (SIGNIFICANT)1/3	〃	X		
152				... EXPECTED MAXIMUM	〃	?		
153				... OTHERS, SPECIFY	〃	?		
154			PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	〃	?		
155		* * * *		WITH OTHER SOFTWARE - LIST PROGRAMS	〃	?		
156				WITH OTHER PUBLISHED MATERIAL .... SPECIFY	〃	?		
157		* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	〃		?	INFORMATION RELATED TO RISER SYSTEM CAPABILITIES ARE LACKING
158			* * STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL				
159	R			IS THE RISER MODEL THREE DIMENSIONAL				
160	I			DOES THE PROGRAM USE FINITE ELEMENT METHOD				
161	S			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				
	E							

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE				
175	*		WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING				NO INFORMATION RELATED TO STABILITY ANALYSIS SOFTWARE WAS PROVIDED
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179		DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				NO INFORMATION RELATED TO STRUCTURAL ANALYSIS PROVIDED
182		LOADING	IS INERTIA LOADING CONSIDERED				
183	S T R U C T U R A L A N A L Y S	LOADING	IS DYNAMIC LOADING CONSIDERED				
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		* ***	BEAM ELEMENT				
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT				
189		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT				
190		*** *	OTHERS .... SPECIFY				
191		*** *	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

				Program Name	Yes	No		Comments
192	I S * * * * *	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS					
193			MODAL ANALYSIS					
194			FATIGUE LIFE ANALYSIS					
195	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES		VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)					
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)	NONTID	X			
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)	PLOT	X			PLOTS THE OUTPUT OF MYDRAL, NONTID, DRIFT
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)					
199	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON		PROGRAMMING LANGUAGE .. FORTRAN (IV) SPECIFY THE VERSION	NONTID DRIFT MYDRAL } MORA	X			
200			.... BASIC					
201			.... PASCAL					
202			.... OTHERS SPECIFY					
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU					
204	DOCUMENTATION		IS USERS' GUIDE AVAILABLE	MORA	X			
205			IS THEORETICAL MANUAL AVAILABLE	"	X			
206	SUPPORT		ARE THE PROGRAMS SUPPORTED AND MAINTAINED	"	X			

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED	MORA	X		
208	** ****	IBM				
209		CDC				
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	**** **	MICRO .... SPECIFY				
213		OTHERS .... SPECIFY (THRU BOEING COMPUTER SERVICES)	MORA	X		
214	** ****	LEASE (PRICE $ .00)				
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $40000.00)	11	X		
216		CONSULTANCY BASIS				
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					
219						
220						

TEXAS A&M UNIVERSITY, DR. JAMES MORGAN

TIME DOMAIN USING MORISON'S EQUATION

TEXAS A&M
DR. J. MORGAN

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

TLP PROGRAM

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	?		X		
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION			X		
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM			X		
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED			X		
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES			?		
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM			?		
7		. : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER		X			
8	E	. : : MEMBER	VERTICAL MEMBER		X			
9	H V	. : : MEMBER	HORIZ. MEMBER		X			
10	I	. : : BER	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION		?	?		
11	R	. : : R	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION		?	?		

					Program Name	Yes	No		Comments
12	OMMENTAL FORCES	WAVE FORCES	... ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	?		X		
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER		X			
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY			?		
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN			X		
16				COLUMN AND PONTOON			X		
17				PONTOON AND PONTOON			X		
18			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION			X		
19				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY		X			
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT			X		
21				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION			X		
22			... SECON DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION		X			
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY			X		
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			X		
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY			X		
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES		X			

						Program Name	Yes	No	Comments
27	x	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG	?		X	
28	x				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL			X	
29	x				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			X	
30	x				IS ITERATION OF RESPONSE USED FOR CONVERGENCE		X		
31	x				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION		X		
32	x				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM		X		
33	x				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE			?	
34	xxxxxx	xxxxxxxxx	xxx	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			?	
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS		2D		
36			REGULAR WAVE	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			?	
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			?	
38	EQUAT	TIM			IS THE CURRENT DRAG DAMPING CONSIDERED			?	
39					IS THE CURRENT FRICTION DAMPING CONSIDERED			?	
40					IS THE RADIATION DAMPING CONSIDERED			?	
41				COEFFICIEN	IS THE STRUCTURAL DAMPING CONSIDERED		X		

						Program Name	Yes	No	Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	?		?	
43			x x x	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
44					IS THE STIFFNESS MATRIX COMPUTED		X		
45	O F	D	x x x	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			?	
46		O	I R R E G U L A R		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS		2D		
47		M		DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			?	
48	M O T I O N	, A I N			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			?	
49					IS THE CURRENT DRAG DAMPING CONSIDERED			?	
50					IS THE CURRENT FRICTION DAMPING CONSIDERED			?	
51				COEFFICIENTS	IS THE RADIATION DAMPING CONSIDERED			?	
52			W A V E S		IS THE STRUCTURAL DAMPING CONSIDERED		X		
53	x x x x x x				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			?	
54		x x x x		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
55			x x x		IS THE STIFFNESS MATRIX COMPUTED		X		
56	x	x x	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				DOES NOT HAVE CAPABILITY OF WIND FORCE CALCULATION

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	?			
58				DAVENPORT				
59				SIMIU				
60				OTHERS (SPECIFY)				
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				DOES NOT PERFORM CURRENT FORCE CALCULATION
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
63		WAVE	THEORIES	SIGNIFICANT WAVE HEIGHT		X		
64				MEAN SPECTRAL PERIOD		X		
65				WAVE SCATTER DIAGRAM			X	
66				LINEAR WAVE		X		
67				STRETCH LINEAR			X	
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...			X	
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN			X	
70				STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND			X	
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH			X	

					Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY	?		X	
73		E	.	EXTENDED VELOCITY POTENTIAL			X	
74		S	.	CNOIDAL WAVE THEORY			X	
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ		X		
76	D		E	ISSC			X	
77	E		A	JONSWAP		X		
78	S		S	BRETSCHNEIDER			X	
79	C	X	P	SCOTT			X	
80	R	X	E	OCHI (SIX PARAMETER)			X	
81	I	X	C	INPUT SPECTRA			X	
82	P	X	T	OTHERS			X	
83	T	X	R	DIRECTIONAL SPECTRA			X	
84	I	X	A	DOES IT CONSIDER EARTH QUAKE SPECTRA		X		
85	O	X	OTHERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			X	
86	N	X	STA	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		SIX		

				Program Name	Yes	No	Comments
87	*		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	?	ALL SIX (?)		
88			IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
89	S		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY		SIX		
90	O		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		ALL SIX (?)		
91	L		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
92	U		METHOD OF INTEGRATION USED .... HOUBOLT			X	
93	T		.... WILSON - θ			X	
94	I		.... NEWMARK - β		X		
95	O		OTHERS .... PLEASE SPECIFY			X	
96	N		HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION			?	
97			.... VARIABLE INTEGR-ATION TIME			?	
98	TECHNIQUE		OTHERS .... PLEASE SPECIFY			X	
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION		?		
100	*****		OTHERS .... PLEASE SPECIFY			X	
101			PLATFORM MOTION TIME HISTORY		X		

DYNAMICS — TIME DOMAIN

			Program Name	Yes	No	Comments
102		PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE			X	
103	PLATFORM RESPONSE OUTPUT	... R.M.S. VALUE			X	
104		... (SIGNIFICANT)1/3			X	
105		... EXPECTED MAXIMUM			X	
106		... OTHERS, SPECIFY			X	
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS			X	
108	** ****	MODEL TEST - INDICATE SCALE			X	
109	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS			X	
110		OTHER PUBLISHED MATERIAL - SPECIFY			X	
111	** ****	OTHERS (SPECIFY)			X	
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)			X	DOES NOT PERFORM MOORING ANALYSIS
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			X	
114		VERTICAL (TAUT) MOORING		X		
115	M	HYBRID/OTHER COMBINATION .... SPECIFY			X	
116	0	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			X	

					Program Name	Yes	No	Comments
117	ORIGINAL SYSTEM	MATERIAL		CHAIN (STEEL)	?	X		
118				WIRE ROPE (STEEL)		X		
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY			X	
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			X	
121				IS IT BASED ON CATENARY EQUATION			X	
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE			X	
123				OTHERS (SPECIFY)			X	
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X	
125		XXXXXXXXX	XXX MODEL	IS THE MASS OF THE MOORING CONSIDERED			X	
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING		X		
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			X	
128				IS GEOMETRIC NON LINEARITY CONSIDERED			X	
129				IS MATERIAL NON LINEARITY CONSIDERED			X	
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED			X	
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED			X	

						Program Name	Yes	No	Comments
132		RTICAL	HG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM	?		X	
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STIFFNSS, CIRCLE			X	
134					IS IT BASED ON FINITE DIFFERENCE METHOD			X	
135	C		MODEL	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
136	A				IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER				
137	P				IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING				
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL				
139	B				IS THE MOORING MODELLED AS THREE DIMENSIONAL				
140	I				IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)		X		
141	L				IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)			X	
142	I	MOORING			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING				
143	T				IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING				
144	I				IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES			X	
145	E				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			X	
146	S		DYNA-MICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X	

				Program Name	Yes	No	Comments
147		* * * INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			X	
148		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY			?	
149			MOORING LINE LOAD STATISTICS ... ... MEAN VALUE			?	
150			... R.M.S. VALUE			?	
151			... (SIGHIFICANT)1/3			?	
152			... EXPECTED MAXIMUM			?	
153			... OTHERS, SPECIFY			?	
154		PROGRAM VERIFICATH	WITH MODEL TESTS - INDICATE SCALE			X	
155	*		WITH OTHER SOFTWARE - LIST PROGRAMS			X	
156	* * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY			X	
157	* * * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			X	
158		* * S T R U C T U R A L	IS THE RISER MODEL TWO DIMENSIONAL				
159	R		IS THE RISER MODEL THREE DIMENSIONAL				
160	I S		DOES THE PROGRAM USE FINITE ELEMENT METHOD				
161	E		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		**	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING				DOES NOT HAVE THE CAPABILITY
178	STABILITY	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179	ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* ** *		HYDRODYNAMIC LOADING CONSIDERED				NO MENTION ABOUT STRUCTURAL ANALYSIS CAPABILITIES
182	LOADING		IS INERTIA LOADING CONSIDERED				
183	S T R U C T U R A L A N A L Y S		IS DYNAMIC LOADING CONSIDERED				
184	SPACE FRAME ANALYSIS		TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185	SPACE FRAME ANALYSIS		THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186	* ***		BEAM ELEMENT				
187	FINITE ELEMENT ANALYSIS		SHELL ELEMENT				
188	FINITE ELEMENT ANALYSIS		PLATE ELEMENT				
189	FINITE ELEMENT ANALYSIS		STIFFENED PLATE ELEMENT				
190	*** *		OTHERS .... SPECIFY				
191	*** *		NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

			Program Name	Yes	No	Comments
192	I S	SPECTRAL ANALYSIS				
193	OTHER ANALYTICAL	MODAL ANALYSIS				
194	* * * * * CAPABILITY	FATIGUE LIFE ANALYSIS				
195	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)				
196		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)				
197		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)				
198		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)				
199	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION		X(?)		
200		.... BASIC				
201		.... PASCAL				
202		.... OTHERS SPECIFY				
203		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				
204	DOCUMENTATION	IS USERS' GUIDE AVAILABLE			X	
205		IS THEORETICAL MANUAL AVAILABLE		X		IN A PH.D THESIS FORM
206	SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED			X	

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED			X	
208	XX XXXX	IBM		X(?)		
209		CDC		?		
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	XXXX XX	MICRO .... SPECIFY				
213		OTHERS .... SPECIFY				
214	XX XXXX	LEASE (PRICE $ .00)			?	
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)			?	
216		CONSULTANCY BASIS			?	
217	XX XXXX	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					THE NAME SUPPLIED WAS NOT ADEQUATE TO FILL UP THE SPACE LIKE
219						
220						

Blank

FLUOR SUBSEA SERVICES, INC.

FREQUENCY DOMAIN USING MORISON'S EQUATION

Blank

FLUOR SUBSEA SERVICES, INC.
COMPLETED BY BROWN & ROOT
FROM LIMITED MATERIAL
NOT CONFIRMED BY FLUOR

TABLE QUESTIONAIRE FOR SOFTWARE COMPARISONS
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

RON #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES	?	?			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	?	?	X		
3	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	?				
4	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES	?				
5	E		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	?				
6	V	. : : MEMBER : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	HYDSYN	X			
7	I	.	VERTICAL MEMBER	4	X			
8	R	.	HORIZ. MEMBER	4	X			
9	O	.	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	4		?		
10	N		DOES IT USE MODIFIED C AND C VALUES FOR NON CIRCULAR X-SECTION	4		?		
11	M E N		OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	1		?		

					Program Name	Yes	No	Comments
12	T	W A		IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	HYDSYN	X		
13	A	V		IS THERE ANY METHOD TO CALCULATE PRESSURE DISTRIBUTION AT THE SURFACE; IF YES, PLEASE SPECIFY	〃		?	
14	L	E		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	〃		X	
15			MEMBER INTER-ACTION	COLUMN AND PONTOON	〃		X	
16		F		PONTOON AND PONTOON	〃		X	
17	F	O	F I R S T O R D E R	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	〃			
18	O	R		IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	〃	X		
19	R	C		IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	〃		X	
20	C	E		IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	〃		X	
21	E	S	S E C O N D O D R I F T F O R C E S	DOES IT CONSIDER THE WAVE ELEVATION	〃	X		
22	S	.		DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	〃		X	
23		.		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	〃	?		
24		.		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	〃	?		
25				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	〃		X	

						Program Name	Yes	No		Comments
26	* * * * * *	S	R D E R	VISC FORCES	DOES THE PROGRAM CONSIDER LINEAR WAVE AND NON-LINEAR DRAG	HYDSYN	?			IS THIS LINEARIZED NONLINEAR DRAG
27					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	"		X		
28					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X		
29	* * * * * *	* * * * * * * *	* * *	ADD MASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		
30					CIRCLE / SPECIFY THE COMPUTING METHOD 2D, 3D OR OTHER	"	2D			
31			R E G U L A R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X			
32					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		?		
33	E Q U A T I O N	T I M E			IS THE CURRENT DRAG DAMPING CONSIDERED	"	X			
34				COEFFICIENTS	IS THE CURRENT FRICTION DAMPING CONSIDERED	"		?		
35					IS THE RADIATION DAMPING CONSIDERED	"		X		
36			W A V E S		IS THE STRUCTURAL DAMPING CONSIDERED	"		X		
37					IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	"		X		
38				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X		
39			* * *		IS THE STIFFNESS MATRIX COMPUTED	"	X			
40	O	D	* * *	ADD	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X		

						Program Name	Yes	No
41	F	O	I	MASS	CIRCLE / SPECIFY THE COMPUTING METHOD 2D, 3D OR OTHER	HYDSYN	2D	
42		M	R R E G U L A R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	〃	X	
43	M	A			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	〃		?
44	O T I O N	I			IS THE CURRENT DRAG DAMPING CONSIDERED	〃	X	
45					IS THE CURRENT FRICTION DAMPING CONSIDERED	〃		?
46		N		COEFFICIENTS	IS THE RADIATION DAMPING CONSIDERED	〃		X
47	N		W A V E S		IS THE STRUCTURAL DAMPING CONSIDERED	〃		X
48	*				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	〃		X
49	* * * *	* *		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	〃		X
50		*	* * *		IS THE STIFFNESS MATRIX COMPUTED	〃	X	
51	* *	* *	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	?	?	?
52	*	W	DYNAMIC WIND		IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	?		X
53	*	I N			DAVENPORT	?		X
54	E N	D			SIMIU	?		X
55	V	* *			OTHERS (SPECIFY)	?		X

Comments

					Program Name	Yes	No
56	IRONMENTAL DESCRIPTION		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	?	?	
57				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	?	?	
58		*		SIGNIFICANT WAVE HEIGHT	HYDSYN	X	
59		*		MEAN SPECTRAL PERIOD	"	X	
60		*		WAVE SCATTER DIAGRAM	"	?	
61			SEA SPECTRA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	?	
62		WAVE		ISSC	"	?	
63				JONSWAP	"	?	
64				BRETSCHNEIDER	"	?	
65				SCOTT	"	?	
66				OCHI (SIX PARAMETER)	"	?	
67		*		INPUT SPECTRA	"	?	
68		*		OTHERS	"	?	
69		*		DIRECTIONAL SPECTRA	"	?	
70		*	OTH	DOES IT CONSIDER EARTH QUAKE SPECTRA	?	?	X

Comments

				Program Name	Yes	No
71	* *		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?		X
72	SOLUTION TECHNIQUE	STATICS	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	?	SIX	
73			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	?	?	
74		DYNAMICS TIME DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	HYDSYN, SPECTER	SIX	
75			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	〃	?	
76			WHAT METHOD OF INTEGRATION USED .... SPECIFY	〃	FFT	
77	PLATFORM RESPONSE OUTPUT		PLATFORM MOTION TIME HISTORY	〃	X	
78	** ****		MODEL TEST - INDICATE SCALE	〃	X	
79	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	〃	?	
80			OTHER PUBLISHED MATERIAL - SPECIFY	〃	?	
81	** ****		OTHERS (SPECIFY)	〃	?	
82	* * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	〃	X	
83			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	〃		X
84			VERTICAL (TAUT) MOORING	〃	X	
85	M		HYBRID/OTHER COMBINATION .... SPECIFY	〃	SLANT TAUT	

Comments

PROPRIETORY

					Program Name	Yes	No
86	MOORING SYSTEM	MATERIAL		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	HYDSYN, SPECTER		X
87				CHAIN (STEEL)	"	X	
88				WIRE ROPE (STEEL)	"	X	
89				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"		X
90		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE	?		X
91				IS IT BASED ON CATENARY EQUATION	"	X	
92				IS IT BASED ON FINITE ELEMENT METHOD	"		X
93				OTHERS (SPECIFY)	"		X
94			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	HYDSYN, SPECTER	X	
95		VERTICAL MOORING MODE	**	IS THE MASS OF THE MOORING CONSIDERED	"	X	
96				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"	X	
97				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	?	
98				IS GEOMETRIC NON LINEARITY CONSIDERED	"	X	
99				IS MATERIAL NON LINEARITY CONSIDERED	"		X
100				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		X

Comments

					Program Name	Yes	No
101	C	A	L	IS THE STRUCTURAL DAMPING CONSIDERED	HYDSYN, SPECTER		X
102	A	L	*	IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"		X
103	P	M		IS THE MOORING MODEL TWO DIMENSIONAL	"	X	
104	A	O		IS THE MOORING MODEL THREE DIMENSIONAL	"	X	
105	B	O		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"	X	
106	I	R		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"	?	
107	L	I		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	FATIGUE	X	
108	I	N	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	HYDSYN, SPECTER		X
109	T	G	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	"		X
110	I	*	MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY	"	X	
111	E	*	PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	"	X	
112	S	*		WITH OTHER SOFTWARE - LIST PROGRAMS	"	?	
113		*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	?	
114	*	*		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	MRDAP	X	
115	*	*	*	IS THE RISER MODEL TWO DIMENSIONAL	"	X	

Comments

PROPRIETORY

				Program Name	Yes	No
116	R	STRUCTURAL MODEL **	IS THE RISER MODEL THREE DIMENSIONAL	MRDAP	X	
117	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD	"	?	
118	S		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	"		?
119	E		DOES THE PROGRAM USE SMALL DEFLECTION THEORY	"		?
120	R		IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	"	?	
121		HYDRODYNAMIC MODEL ****	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		X
122			IS IT BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY OF STRUCT	"	X	
123			IS IT BASED ON MORISON'S EQUATION W/ REL VELOCITY OF STRUCTURE & CURRENT	"		X
124			IS IT BASED LINEARIZED FORM OF MORISON'S EQUATION	"		X
125			OTHERS (SPECIFY)	"		X
126			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"	X	
127	S		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X
128	Y		IS THE RISER MODELLED AS TWO DIMENSIONAL	"	X	
129	S		IS THE RISER MODELLED AS THREE DIMENSIONAL	"		X
130	T E M	** SOLUTION	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	"		X

Comments

By SEGMENTS

				Program Name	Yes	No
131	M	MODE **	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS	MRDAP	X	
132		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	"		X
133		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	"		X
134		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	"		X
135			WITH MODEL TESTS - INDICATE SCALE	"	?	
136		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	"	?	
137	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"	?	
138	* ***	I N T A C T	INTACT FREE FLOATING	?		
139	STABILITY		INTACT WITH VERTICAL TAUT TENDONS	?		
140	ANALYSIS	D A M A G E D	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	?		
141	*** *		DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	?		
142	* * * *		HYDRODYNAMIC LOADING CONSIDERED	CHRYBDS	X	
143			IS INERTIA LOADING CONSIDERED	"	?	
144	S T R U		IS DYNAMIC LOADING CONSIDERED	"	?	
145		SPACE	TWO DIMENSIONAL SPACE FRAME ANALYSIS	SCYLLA	X	

Comments

				Program Name	Yes	NO
146	C T U R A L A N A L Y S I S	FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	SCYLLA	X	
147		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT	SAP	X	
148			SHELL ELEMENT	"	X	
149			PLATE ELEMENT	"	X	
150			STIFFENED PLATE ELEMENT	"	-	?
151		*** *	OTHERS .... SPECIFY	"		?
152		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	SCYLLA, HYSTRESS (?)	X	
153			MODAL ANALYSIS	"		?
154		* * * *	FATIGUE LIFE ANALYSIS	FATIGUE	X	
155	DOCUMENTATION		IS USERS' GUIDE AVAILABLE		X	
156			IS THEORETICAL MANUAL AVAILABLE		X	
157	HARDWARE SYSTEM	** ****	IBM			
158			CDC			
159			PRIME COMPUTER			
160			VAX			

Comments

PROPRIETORY

INFORMATIONS NOT SUPPLIED

			Program Name	Yes	No
161	**** **	OTHERS .... SPECIFY			
162	** ****	LEASE (PRICE $? .00)		X	
163	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $? .00)		X	
164		CONSULTANCY BASIS		X	
165	** ****	OTHERS .... SPECIFY		?	
166	REMARKS AND NOTES				
167					
168					

Comments

FLUOR SUBSEA SERVICES, INC.

TABLE QUESTIONAIRE FOR SOFTWARE COMPARISONS
(TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

FSS DOES NOT HAVE THE CAPABILITY OF CALCULATING HYD COEFFICIENTS BY POTENTIAL (DIFFRACTION) THEORY

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES					
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
4	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
5	E N		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
6	V	. : : M E M B E R : : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER					
7	I		VERTICAL MEMBER					
8	R O		HORIZ. MEMBER					
9	H	X-SECTION	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION					
10	M E		DOES IT USE MODIFIED C AND C VALUES FOR NON CIRCULAR X-SECTION					
11	N		OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					

					Program Name	Yes	No	Comments
12	T	W A V E		IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER				
13	A L			IS THERE ANY METHOD TO CALCULATE PRESSURE DISTRIBUTION AT THE SURFACE; IF YES, PLEASE SPECIFY				
14				IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN				
15			MEMBER INTERACTION	COLUMN AND PONTOON				
16				PONTOON AND PONTOON				
17	F	F O R C E S	FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY				
18	O R C E			IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON				
19				DIFFRACTION AND FLUID FINITE ELEMENT				
20				OR ANY OTHER COMBINATION				
21	S		SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION				
22				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY				
23				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY				
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY				
25				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES				

						Program Name	Yes	No		Comments
26	*	S	R	VISC FORCES	DOES THE PROGRAM CONSID-NON-LINEAR DRAG					
27	*		D		IF DRAG FORCE CALCULATI-ON CONSIDER MEAN CURRE-NT & WAVE PARTICLE VEL					
28	*		E		IS CURRENT AND WAVE FRI-CTION CONSIDERED IN RES-ULTANT FRICTIONAL DRIFT					
29	*	*	R	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM					
30	*	*	*		CIRCLE / SPECIFY THE COMPUTING METHOD 2D, 3D OR OTHER					
31		*	R	DAMPING COEFFICIENTS	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING					
32			E		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED					
33	E	T	G		IS THE CURRENT DRAG DAMPING CONSIDERED					
34	Q		U		IS THE CURRENT FRICTION DAMPING CONSIDERED					
35	U	I	L		IS THE RADIATION DAMPING CONSIDERED					
36	A	M	A		IS THE STRUCTURAL DAMPING CONSIDERED					
37	T	E	R		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM					
38	I		W	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM					
39	O		A		IS THE STIFFNESS MATRIX COMPUTED					
40	N	D	V	ADD	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM					
	0		E							
			S							

						Program Name	Yes	NO
41	F	O	I	MASS	CIRCLE / SPECIFY THE COMPUTING METHOD 2D, 3D OR OTHER			
42		M	R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			
43	M		E		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			
44	O	A	G		IS THE CURRENT DRAG DAMPING CONSIDERED			
45	T I	I	U L A R	COEFFICIENTS	IS THE CURRENT FRICTION DAMPING CONSIDERED			
46	O	N			IS THE RADIATION DAMPING CONSIDERED			
47	N		N A		IS THE STRUCTURAL DAMPING CONSIDERED			
48			V E		IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			
49	x x x x x	x x x	S	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			
50		x	x x x		IS THE STIFFNESS MATRIX COMPUTED			
51	x x	x x	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			
52	x	W	DYNAMIC WIND		IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			
53	x	I N			DAVENPORT			
54	E N	D			SIMIU			
55	V	x x			OTHERS (SPECIFY)			

Comments

				Program Name	Yes	No
56	ENVIRONMENTAL DESCRIPTION	CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			
57			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			
58		WAVE	SIGNIFICANT WAVE HEIGHT			
59			MEAN SPECTRAL PERIOD			
60			WAVE SCATTER DIAGRAM			
61			IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			
62			ISSC			
63			JONSWAP			
64			BRETSCHNEIDER			
65			SCOTT			
66			OCHI (SIX PARAMETER)			
67			INPUT SPECTRA			
68	*		OTHERS			
69	*		DIRECTIONAL SPECTRA			
70	*	OTH	DOES IT CONSIDER EARTH QUAKE SPECTRA			

Comments

				Program Name	Yes	No
71	* *	ERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			
72	SOLUTION TECHNIQUE	STATICS	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY			
73			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
74		DYNAMICS TIME DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY			
75			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
76			WHAT METHOD OF INTEGRATION USED .... SPECIFY			
77	PLATFORM RESPONSE OUTPUT		PLATFORM MOTION TIME HISTORY			
78	** ****		MODEL TEST - INDICATE SCALE			
79	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS			
80			OTHER PUBLISHED MATERIAL - SPECIFY			
81	** ****		OTHERS (SPECIFY)			
82	* * * *	DESCRIPTION	SPREAD MOORING (CATENARY)			
83			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			
84			VERTICAL (TAUT) MOORING			
85	M		HYBRID/OTHER COMBINATION .... SPECIFY			

Comments

					Program Name	Yes	No
86	MOORING SYSTEM	MATERIAL		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			
87				CHAIN (STEEL)			
88				WIRE ROPE (STEEL)			
89				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY			
90		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			
91				IS IT BASED ON CATENARY EQUATION			
92				IS IT BASED ON FINITE ELEMENT METHOD			
93				OTHERS (SPECIFY)			
94			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			
95		***** VERTIC	** MOORING MODE	IS THE MASS OF THE MOORING CONSIDERED			
96				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING			
97				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			
98				IS GEOMETRIC NON LINEARITY CONSIDERED			
99				IS MATERIAL NON LINEARITY CONSIDERED			
100				IS THE HYDRODYNAMIC DAMPING CONSIDERED			

Comments

					Program Name	Yes	No
101	CAPABILITIES	ALL	L	IS THE STRUCTURAL DAMPING CONSIDERED			
102			* * * *	IS THE MOORING SYSTEM COUPLED WITH PLATFORM			
103		MOORING		IS THE MOORING MODEL TWO DIMENSIONAL			
104				IS THE MOORING MODEL THREE DIMENSIONAL			
105				IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING			
106				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			
107				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			
108			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			
109			* * * INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			
110			MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY			
111			PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			
112	* * * *			WITH OTHER SOFTWARE - LIST PROGRAMS			
113				WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
114	* * * *			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			
115			* *	IS THE RISER MODEL TWO DIMENSIONAL			

Comments

				Program Name	Yes	NO
116	R	STRUCTURAL MODEL **	IS THE RISER MODEL THREE DIMENSIONAL			
117	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD			
118	S		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			
119	E		DOES THE PROGRAM USE SMALL DEFLECTION THEORY			
120	R		IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			
121		HYDRODYNAMIC MODEL *****	IS THE PROGRAM BASED ON DIFFRACTION THEORY			
122			IS IT BASED ON HYDRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON			
123			DIFFRACTION AND FLUID FINITE ELEMENT			
124			OR ANY OTHER COMBINATION, PLEASE SPECIFY EQUATION			
125			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			
126	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			
127			IS THE RISER MODELLED AS TWO DIMENSIONAL			
128			IS THE RISER MODELLED AS THREE DIMENSIONAL			
129		SOLUTION MODE **	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			
130			IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS			

Comments

				Program Name	Yes	No
131		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			
132		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			
133		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			
134			WITH MODEL TESTS - INDICATE SCALE			
135		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			
136	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
137		* *** I N T A C T	INTACT FREE FLOATING			
138	STABILITY		INTACT WITH VERTICAL TAUT TENDONS			
139	ANALYSIS	D A M A G E D	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			
140		*** *	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING			
141	* * * *		HYDRODYNAMIC LOADING CONSIDERED			
142			IS INERTIA LOADING CONSIDERED			
143	S T R U C T		IS DYNAMIC LOADING CONSIDERED			
144		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS			
145			THREE DIMENSIONAL SPACE FRAME ANALYSIS			

Comments

				Program Name	Yes	NO
146	U R A L A N A L Y S I S * ***	* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT			
147			SHELL ELEMENT			
148			PLATE ELEMENT			
149			STIFFENED PLATE ELEMENT			
150		*** *	OTHERS .... SPECIFY			
151		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS			
152			MODAL ANALYSIS			
153			FATIGUE LIFE ANALYSIS			
154	DOCUMENTATION		IS USERS' GUIDE AVAILABLE			
155			IS THEORETICAL MANUAL AVAILABLE			
156	HARDWARE SYSTEM	** ****	IBM			
157			CDC			
158			PRIME COMPUTER			
159			VAX			
160		**** **	OTHERS .... SPECIFY			

comments

			Program Name	Yes	No
161	** ****	LEASE (PRICE $ .00)			
162	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)			
163		CONSULTANCY BASIS			
164	** ****	OTHERS .... SPECIFY			
165	REMARKS AND NOTES				
166					
167					

Comments

FLUOR SUBSEA SERVICES, INC.

TIME DOMAIN USING MORISON'S EQUATION

FLUOR SUBSEA SERVICES, INC.

COMPLETED BY BROWN & ROOT
FROM LIMITED MATERIAL
NOT CONFIRMED BY FLUOR

TABLE QUESTIONAIRE FOR SOFTWARE COMPARISONS
(FREQUENCY DOMAIN W/ MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

RON #		**** ** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	?	?	X		
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	?	?	X		
3	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	?	?	X		
4	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	?	?	X		
5			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	?	X			
6		: MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	HYDSYN	X			
7	E	: MEMBER : ORIENTATION	VERTICAL MEMBER	"	X			
8	N	: MEMBER : ORIENTATION	HORIZ. MEMBER	"	X			
9	V	: MEMBER : X-SECTION	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		?		
10	I	: MEMBER : X-SECTION	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"		?		
11	R	: MEMBER : X-SECTION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	"		?		
	O							
	N							

					Program Name	Yes	No	Comments
12				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	HYDSYN	X		
13				IS THERE ANY METHOD TO CALCULATE PRESSURE DISTRIBUTION AT THE SURFACE; IF YES, PLEASE SPECIFY	"		?	
14				IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X	
15			MEMBER INTERACTION	COLUMN AND PONTOON	"		X	
16				PONTOON AND PONTOON	"		X	
17			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"		X	
18				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	"	X		
19				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"		X	
20				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X	
21			SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	"	X		
22				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		X	
23				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"	?		
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"	?		
25				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X	

						Program Name	Yes	No	Comments
26	* *	: :	ORDER	VISC FORCES	DOES THE PROGRAM CONSIDER LINEAR WAVE AND NON-LINEAR DRAG	HYDSYN	?		IS THIS LINEARIZED NON-LINEAR DRAG ??
27	* *	: :			DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY	"		X	
28	*	:			IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	"		X	
29	* * * *	FREQUENCY		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	"		X	
30					CIRCLE / SPECIFY THE COMPUTING METHOD 2D 3D OR OTHER	"	2D		
31	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X		
32					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		?	
33					IS THE CURRENT DRAG DAMPING CONSIDERED	"	X	?	
34	OF			COEFFICIENTS	IS THE CURRENT FRICTION DAMPING CONSIDERED	"		X	
35					IS THE RADIATION DAMPING CONSIDERED	"		X	
36	MOTION	DOMAIN			IS THE STRUCTURAL DAMPING CONSIDERED	"		X	
37					IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	"		X	
38	* * * *			STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X	
39					IS THE STIFFNESS MATRIX COMPUTED	"	X		
40	*	* *	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	"	?		

					Program Name	Yes	No
41	ENVIRONMENTAL DESCRIPTIC	WIND DYNAMIC		IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	HYDSYN		X
42				DAVENPORT	〃		X
43				SIMIU	〃		X
44				OTHERS (SPECIFY)	〃		X
45		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	?	?	
46				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	?	?	
47		WAVE		SIGNIFICANT WAVE HEIGHT	〃	X	
48				MEAN SPECTRAL PERIOD	〃	X	
49				WAVE SCATTER DIAGRAM	〃	?	
50			SEA SPEC	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	〃	?	
51				ISSC	〃	?	
52				JONSWAP	〃	?	
53				BRETSCHNEIDER	〃	?	
54				SCOTT	〃	?	
55				OCHI (SIX PARAMETER)	〃	?	

NO MENTION ABOUT SEA SPECTRA TYPE

				Program Name	Yes	No
56	N	* * * *	INPUT SPECTRA	HYDSYN	?	
57	*	* * *	OTHERS	"	?	
58	* *		DIRECTIONAL SPECTRA	"	?	
59	* *	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA	?		X
60	* *		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	?		X
61	SOLUTION TECHNIQUE	STATICS	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	" ?	SIX	
62			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?	
63		DYNAMICS	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	HYDSYN	SIX	
64		FREQ DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?	
65			WHAT METHOD OF LINEARIZATION USED .... SPECIFY	"	?	
66	** **** ****** ********		MEAN OFFSET OF THE PLATFORM	?	?	
67	PLATFORM		MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	HYDSYN	X	
68	RESPONSE		PLATFORM MOTION RESPONSE SPECTRA	"	X	
69	OUTPUT		RESPONSE STATISTICS (SIGNIFICANT VALUES)	"	X	
70	******** ****** **** **		EIGEN VALUES (SYSTEM NATURAL PERIODS)	"	X	

EQUIV LINEAR DRAG (?)

				Program Name	Yes	No
71	** ****		MODEL TEST - INDICATE SCALE	HYDSYN	X	
72	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	〃	?	
73			OTHER PUBLISHED MATERIAL - SPECIFY	〃	?	
74	** ****		OTHERS (SPECIFY)	〃	?	
75	* * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	〃	X	
76			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	〃		X
77	M		VERTICAL (TAUT) MOORING	〃	X	
78	O		HYBRID/OTHER COMBINATION .... SPECIFY	〃	SLANT TAUT	
79	O R I N G	MATERIAL	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	〃		X
80			CHAIN (STEEL)	〃	X	
81			WIRE ROPE (STEEL)	〃	X	
82			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	〃		X
83		ANALYSTATI	USER SPECIFIED LOAD DISPLACEMENT TABLE	?		X
84			IS IT BASED ON CATENARY EQUATION	〃	X	
85			IS IT BASED ON FINITE ELEMENT METHOD	〃		X

COMPARISON MATERIAL NOT SUPPLIED

					Program Name	Yes	No
86		SES	CS	OTHERS (SPECIFY)	?		X
87		SES	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	HYDSYN		X
88	SYSTEM	******	** MOORING MODEL	IS THE MASS OF THE MOORING CONSIDERED	〃		X
89	SYSTEM	******	MOORING MODEL	IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	〃	X	
90	SYSTEM	******	MOORING MODEL	IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	〃	?	
91	SYSTEM	VERTICAL	MOORING MODEL	IS GEOMETRIC NON LINEARITY CONSIDERED	〃	?	
92		VERTICAL	MOORING MODEL	IS MATERIAL NON LINEARITY CONSIDERED	〃		X
93		VERTICAL	MOORING MODEL	IS THE HYDRODYNAMIC DAMPING CONSIDERED	〃		X
94		VERTICAL	MOORING MODEL	IS THE STRUCTURAL DAMPING CONSIDERED	〃		X
95		VERTICAL	**** MOORING MODEL	IS THE MOORING SYSTEM COUPLED WITH PLATFORM	〃		X
96				IS THE MOORING MODEL TWO DIMENSIONAL	〃	X	
97	CAPAD			IS THE MOORING MODEL THREE DIMENSIONAL	〃	X	
98	CAPAD	MOORI		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	〃	X	
99	CAPAD	MOORI		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	〃	?	
100	CAPAD	MOORI		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	FATIGUE	?	

				Program Name	Yes	No
101	I	N G	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	HYDSYN		X
102	L I	* * *	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	?		X
103	T	** **	OUTPUT FOR THE MOORING SYSTEM	MEAN LOAD OF THE MOORING LINE	?	?	
104	I			MOORING LINE LOAD RAO(S)	HYDSYN	X	
105	E S	** **		MOORING LINE LOAD STATISTICS	〃	X	
106			PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE	〃	X	
107	*			WITH OTHER SOFTWARE - LIST PROGRAMS	〃		X
108	* * *			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	〃		X
109	* * *			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	MRDAP (X)	X	
110	*	* *	STRUCTURAL MODEL	IS THE RISER MODEL TWO DIMENSIONAL			
111	R			IS THE RISER MODEL THREE DIMENSIONAL			
112	I			DOES THE PROGRAM USE FINITE ELEMENT METHOD			
113	S E			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			
114	R			DOES THE PROGRAM USE SMALL DEFLECTION THEORY			
115		* *		IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			

COMPARISON MATERIAL NOT SUPPLIED

(X) TIME DOMAIN ANALYSIS — SEE THE TABLE PREPARED FOR TD ANALYSIS FOR ITEMS 110 THRU 132

				Program Name	Yes	NO
116		* * * *	IS THE PROGRAM BASED ON DIFFRACTION THEORY			
117		HYDRODYNAMIC	IS IT BASED ON HYBRID ELEMENT W/ COMBINATN OF DIFFRACTION & MORISON			
118			DIFFRACTION & FINITE FLUID ELEMENT			
119			OR ANY OTHER COMBINATION, PLEASE SPECIFY			
120			OTHERS (SPECIFY)			
121		MODEL	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			
122	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			
123			IS THE RISER MODELLED AS TWO DIMENSIONAL			
124		* * * *	IS THE RISER MODELLED AS THREE DIMENSIONAL			
125		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			
126		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			
127		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			
128		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			
129		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			
130			WITH MODEL TESTS - INDICATE SCALE			

				Program Name	Yes	No
131	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			
132	*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
133	* ***	I N T A C T	INTACT FREE FLOATING	?		
134	STABILITY		INTACT WITH VERTICAL TAUT TENDONS	?		
135	ANALYSIS	D A M A G E D	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	?		
136	*** *		DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	?		
137	* * * *		HYDRODYNAMIC LOADING CONSIDERED	CHRYBDS	X	
138			IS INERTIA LOADING CONSIDERED	"	?	
139	S T R U C T U R A L A N A L Y S I S		IS DYNAMIC LOADING CONSIDERED	"	?	
140		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS	SCYLLA	X	
141			THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X	
142		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT	SAP	X	
143			SHELL ELEMENT	"	X	
144			PLATE ELEMENT	"	X	
145			STIFFENED PLATE ELEMENT	"		?

NO MATERIAL RELATED TO STABILITY ANALYSIS WAS REC'D

				Program Name	Yes	No
146	ALYSIS	*** *	OTHERS .... SPECIFY	?		?
147		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS	SCYLLA, HYSTRESS	X	
148			MODAL ANALYSIS	"		?
149			FATIGUE LIFE ANALYSIS	FATIGUE	X	
150		DOCUMENTATION	IS USERS' GUIDE AVAILABLE	—	X	
151			IS THEORETICAL MANUAL AVAILABLE	—	X	
152		** **** HARDWARE SYSTEM **** **	IBM			
153			CDC			
154			PRIME COMPUTER			
155			VAX			
156			OTHERS .... SPECIFY			
157		** **** ACCESSIBILITY ARRANGEMENT ** ****	LEASE (PRICE $? .00)		X	
158			PURCHASE (PRICE $? .00)		X	
159			CONSULTANCY BASIS		X	
160			OTHERS .... SPECIFY		?	

PROPRIETORY

INFORMATION NOT SUPPLIED

			Program Name	Yes	No
161	*				
	***				
162	*****				
	*******				
	*********				
163					
164	REMARKS AND NOTES				
165					
166	*********				
	*******				
	*****				
	***				
167	*				

FLUOR SUBSEA SERVICE, INC.

TABLE QUESTIONAIRE FOR SOFTWARE COMPARISONS
(FREQUENCY DOMAIN W/ POTENTIAL THEORY)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

FSS DOES NOT HAVE THE CAPABILITY OF CALCULATING HYDRODYNAMIC COEFFICIENTS BY POTENTIAL (DIFFRACTION) THEORY

ROW #		**** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES					
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
4	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
5	E N V I R O N M E N T		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
6		. . . . MEMBER :: ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER					
7			VERTICAL MEMBER					
8			HORIZ. MEMBER					
9		. MEMBER :: X-SECTION	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION					
10			DOES IT USE EQUIVALENT CIRCULAR X-SECTION					
11			IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY					

					Program Name	Yes	No	Comments
12	T	W A		IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER				
13	A	V		IS THERE ANY METHOD TO CALCULATE PRESSURE DISTRIBUTION AT THE SURFACE; IF YES, PLEASE SPECIFY				
14	L	E	MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN				
15				COLUMN AND PONTOON				
16		F		PONTOON AND PONTOON				
17	F	O	FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY				
18	O	R C		IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON				
19	R C	E		DIFFRACTION & FLUID FINITE ELEMENT				
20	E	S		OR ANY OTHER COMBINATION, PLEASE SPECIFY				
21	S	.	SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION				
22		.		DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY				
23		.		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY				
24		.		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY				
25				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES				

						Program Name	Yes	No		Comments
26	* * * *	S	R D E R	VISC FORCES	DOES THE PROGRAM CONSIDER LINEAR WAVE AND NON-LINEAR DRAG					
27					IF DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY					
28					IS CURRENT & WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT					
29	* * * *			ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM					
30					CIRCLE / SPECIFY THE COMPUTING METHOD 2D, 3D OR OTHER					
31	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING					
32					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED					
33					IS THE CURRENT DRAG DAMPING CONSIDERED					
34	OF				IS THE CURRENT FRICTION DAMPING CONSIDERED					
35					IS THE RADIATION DAMPING CONSIDERED					
36	MOTION				IS THE STRUCTURAL DAMPING CONSIDERED					
36					IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM					
37	* * * *			STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM					
38					IS THE STIFFNESS MATRIX COMPUTED					

FREQUENCY DOMAIN

					Program Name	Yes	No
39	*	* *	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			
40	*	W	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			
41	*	I N		DAVENPORT			
42	E	D		SIMIU			
43	N V	* *		OTHERS (SPECIFY)			
44	I R		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			
45	O N			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			
46	M E	* *		SIGNIFICANT WAVE HEIGHT			
47	N T	* *		MEAN SPECTRAL PERIOD			
48	A L			WAVE SCATTER DIAGRAM			
49			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			
50	D E	W	E	ISSC			
51	S C	A	A	JONSWAP			
52	R I	V	S	BRETSCHNEIDER			

				Program Name	Yes	No
53	PTION	E	PECTRA	SCOTT		
54		*		OCHI (SIX PARAMETER)		
55		*		INPUT SPECTRA		
56		*		OTHERS		
57	*	*		DIRECTIONAL SPECTRA		
58	*	*	OTHERS	DOES IT CONSIDER EARTH QUAKE SPECTRA		
59	*	*		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE		
60	SOLUTION TECHNIQUE	STATICS		HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		
61				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		
62		DYNAMICS	FREQ DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY		
63				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY		
64				WHAT METHOD OF LINEARI-ZATION USED .... SPECIFY		
65	** **** ****** ********			MEAN OFFSET OF THE PLATFORM		
66				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPA-BILITY ENTER 'P'		

			Program Name	Yes	No
	PLATFORM				
67	RESPONSE	PLATFORM MOTION RESPONSE SPECTRA			
	OUTPUT				
68		RESPONSE STATISTICS (SIGNIFICANT VALUES)			
	********				
69	****** **** **	EIGEN VALUES (SYSTEM NATURAL PERIODS)			
70	** ****	MODEL TEST - INDICATE SCALE			
71	PROGRAM	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS			
72	VERIFICATION	OTHER PUBLISHED MATERIAL - SPECIFY			
73	** ****	OTHERS (SPECIFY)			
74	* * * *	SPREAD MOORING (CATENARY)			
75	*	SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT			
76	M	VERTICAL (TAUT) MOORING			
77	O	HYBRID/OTHER COMBINATION .... SPECIFY			
78	O R	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			
79	I	CHAIN (STEEL)			
80	N	WIRE ROPE (STEEL)			

DESCRIPTION

MATERIA

					Program Name	Yes	No
81	G	L			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY			
82		ANALYSES	STATICS		USER SPECIFIED LOAD DISPLACEMENT TABLE			
83					IS IT BASED ON CATENARY EQUATION			
84					IS IT BASED ON FINITE ELEMENT METHOD			
85					OTHERS (SPECIFY)			
86			DYNAMICS		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			
87	S	*****	**		IS THE MASS OF THE MOORING CONSIDERED			
88	Y		MOORING		IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING			
89	S				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			
90	T	VERTICAL			IS GEOMETRIC NON LINEARITY CONSIDERED			
91	E				IS MATERIAL NON LINEARITY CONSIDERED			
92	M		MODEL		IS THE HYDRODYNAMIC DAMPING CONSIDERED			
93					IS THE STRUCTURAL DAMPING CONSIDERED			
94			*****		IS THE MOORING SYSTEM COUPLED WITH PLATFORM			

					Program Name	Yes	NO
95	C	M		IS THE MOORING MODEL TWO DIMENSIONAL			
96	A	O O R I N G		IS THE MOORING MODEL THREE DIMENSIONAL			
97	P A			IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			
98	B			IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			
99	I			IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			
100	L I	G	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			
101	T	* * *	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			
102	I	** **		MEAN LOAD OF THE MOORING LINE			
103	E S	OUTPUT FOR THE MOORING SYSTEM		MOORING LINE LOAD RAO(S)			
104		** **		MOORING LINE LOAD STATISTICS			
105				WITH MODEL TESTS - INDICATE SCALE			
106	*	PROGRAM VERIFICATN		WITH OTHER SOFTWARE - LIST PROGRAMS			
107	* * *			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
108	* *			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			

				Program Name	Yes	No
	*					
109	*	* * STRUCTURAL MODEL * *	IS THE RISER MODEL TWO DIMENSIONAL			
110	R		IS THE RISER MODEL THREE DIMENSIONAL			
111	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD			
112	S		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			
113	E		DOES THE PROGRAM USE SMALL DEFLECTION THEORY			
114	R		IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			
115		* * * * HYDRODYNAMIC MODEL	IS THE PROGRAM BASED ON DIFFRACTION THEORY			
113			IS IT BASED ON HYBRID ELEMENT W/ COMBINATN OF DIFFRACTION & MORISON			
116			DIFFRACTION & FINITE FLUID ELEMENT			
117			OR ANY OTHER COMBINATION, PLEASE SPECIFY			
118			OTHERS (SPECIFY)			
119			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			
120	S Y S		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			
121			IS THE RISER MODELLED AS TWO DIMENSIONAL			

				Program Name	Yes	No
		*				
122	T	* * *	IS THE RISER MODELLED AS THREE DIMENSIONAL			
	E					
123	M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			
124	M	**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			
125		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			
126		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			
127		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			
128			WITH MODEL TESTS - INDICATE SCALE			
129		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			
130	* * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
131	* ***	I N T A C T	INTACT FREE FLOATING			
132	STABILITY		INTACT WITH VERTICAL TAUT TENDONS			
133	ANALYSIS	D A M A G E D	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			
134	*** *		DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING			
135	* *		HYDRODYNAMIC LOADING CONSIDERED			

				Program Name	Yes	No
136	* * STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS * *** FINITE ELEMENT ANALYSIS *** * OTHER ANALYTICAL CAPABILITY * * * *	IS INERTIA LOADING CONSIDERED			
137			IS DYNAMIC LOADING CONSIDERED			
138			TWO DIMENSIONAL SPACE FRAME ANALYSIS			
139			THREE DIMENSIONAL SPACE FRAME ANALYSIS			
140			BEAM ELEMENT			
141			SHELL ELEMENT			
142			PLATE ELEMENT			
143			STIFFENED PLATE ELEMENT			
144			OTHERS .... SPECIFY			
145			SPECTRAL ANALYSIS			
146			MODAL ANALYSIS			
147			FATIGUE LIFE ANALYSIS			
148	DOCUMENTATION		IS USERS' GUIDE AVAILABLE			
149			IS THEORETICAL MANUAL AVAILABLE			

			Program Name	Yes	No
150	** ****	IBM			
151		CDC			
152	HARDWARE SYSTEM	PRIME COMPUTER			
153		VAX			
154	**** **	OTHERS .... SPECIFY			
155	** ****	LEASE (PRICE $ .00)			
156	ACCESSIBILITY	PURCHASE (PRICE $ .00)			
157	ARRANGEMENT	CONSULTANCY BASIS			
158	** ****	OTHERS .... SPECIFY			
159					
160	REMARKS AND NOTES				
161					

EARL AND WRIGHT

FREQUENCY DOMAIN USING MORISON'S EQUATION

EARL & WRIGHT

TABLE I QUESTIONAIRE FOR SOFTWARE COMPARISONS
(FREQUENCY DOMAIN W/ MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

NOTES: 1. PROGRAM "ICES COSMOS"
BASICALLY BASED ON MORISON EQN
2. COMPLETED WITH MATERIAL FROM ADVERTISING BROCHURE ONLY
3. COMPLETED BY BROWN & ROOT

ROW #		**** ** ****	** ** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	ICES COSMOS	X			
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"		?		
3	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"		?		
4	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	"	X			
5			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"	CAN BE			
6		: MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
7	E	: MEMBER : ORIENTATION	VERTICAL MEMBER	"	X			
8	N	: MEMBER : ORIENTATION	HORIZ. MEMBER	"	X			
9	V	: MEMBER : X-SECTION	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		X		
10	I	: MEMBER : X-SECTION	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"		X		
11	R	: MEMBER : X-SECTION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	"	X			DIFFRACTION THEORY
	O							
	N							

					Program Name	Yes	No		Comments
12	N	W		IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	ICES COSMOS	X			
13	E	A		IS THERE ANY METHOD TO CALCULATE PRESSURE DISTRIBUTION AT THE SURFACE; IF YES, PLEASE SPECIFY	»		?		
14	N	V		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	»		X		
15	T	E	MEMBER INTER-ACTION	COLUMN AND PONTOON	»		X		
16	A			PONTOON AND PONTOON	»		X		
17	L		FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	»	X			
18		F		IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	»		X		
19		O		IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	»		X		
20		R		IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	»		X		
21	F	C	SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION	»	X			
22	O	E		DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	»		X		
23	R	S		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			X		
24	C	:		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY			X		
25	E	:		DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			X		
	S	:							

					Program Name	Yes	No	Comments
26	*	:	ORDER	VISC FORCES	DOES THE PROGRAM CONSIDER LINEAR WAVE AND NON-LINEAR DRAG	ICES COSMOS		?	
27	*	:			DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY		X		
28	*	:			IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT			?	
29	*		FREQUENCY	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM			X	
30	*				CIRCLE / SPECIFY THE COMPUTING METHOD (2D) 3D OR OTHER		2D		
31	*			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING		X		
32	EQUATION				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			?	
33					IS THE CURRENT DRAG DAMPING CONSIDERED		X		
34	OF			COEFFICIENTS	IS THE CURRENT FRICTION DAMPING CONSIDERED			?	
35					IS THE RADIATION DAMPING CONSIDERED			X	
36	MOTION		DOMAIN		IS THE STRUCTURAL DAMPING CONSIDERED			X	
37					IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			X	
38	*			STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			X	
39	*				IS THE STIFFNESS MATRIX COMPUTED		X		
40	*	*	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT		?		

					Program Name	Yes	No
	*						
41	*	W		IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	ICES COSMOS		?
	*	I	D				
42			Y	DAVENPORT	"		?
		N	N				
43	E	D	A	SIMIU	"		?
	N		M				
44	V	*	I	OTHERS (SPECIFY)	"		?
	I	*	C				
	R						
45	O		C	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	"	X	
	N		U				
46	M		R	IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X	
	E		E				
47	N	*	N	SIGNIFICANT WAVE HEIGHT	"	X	
	T	*	T				
48	A	*		MEAN SPECTRAL PERIOD	"	X	
	L	*					
49				WAVE SCATTER DIAGRAM	"		?
50			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	X	
		W					
51	D		E	ISSC	"	X	
	E	A					
52	S		A	JONSWAP	"	X	
	C	V					
53	R		S	BRETSCHNEIDER	"	X	
	I	E					
54	P		P	SCOTT	"		X
	T						
55	I		E	OCHI (SIX PARAMETER)	"		X
	C		C				

Comments

No mention about wind spectra

					Program Name	Yes	No
56	N	*	T	INPUT SPECTRA	ICES COSMOS		?
57	*	*	R	OTHERS	"		X
58	*	*	A	DIRECTIONAL SPECTRA	"		?
59	*	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA	"	X	
60	*			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	"	X	
61	SOLUTION TECHNIQUE	STATICS		HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	6(?)	
62				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	? *	
63		DYNAMICS	FREQ DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	6(?)	
64				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	? *	
65				WHAT METHOD OF LINEARIZATION USED .... SPECIFY	"	?	
66	** **** ****** ********	PLATFORM RESPONSE OUTPUT		MEAN OFFSET OF THE PLATFORM	"	X	
67				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'	"	P	
68				PLATFORM MOTION RESPONSE SPECTRA	"	X	
69				RESPONSE STATISTICS (SIGNIFICANT VALUES)	"	X	
70	******** ****** **** **			EIGEN VALUES (SYSTEM NATURAL PERIODS)	"	X	

Comments

* INFORMATION NOT SUPPLIED

* INFORMATION NOT SUPPLIED

				Program Name	Yes	No	
71	** ****		MODEL TEST - INDICATE SCALE	ICES COSMOS	X		*
72	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"	X		
73			OTHER PUBLISHED MATERIAL - SPECIFY	"	?		
74	** ****		OTHERS (SPECIFY)	"	?		
75	* * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	"	X		
76			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X		
77	M		VERTICAL (TAUT) MOORING	"	X		
78	O		HYBRID/OTHER COMBINATION .... SPECIFY	"		?	
79	O R	MATERIAL	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR	"		?	
80	I		CHAIN (STEEL)	"	X		
81	N		WIRE ROPE (STEEL)	"	X		
82	G		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY	"		?	
83		ANALYSY STATI	USER SPECIFIED LOAD DISPLACEMENT TABLE	"	?		
84			IS IT BASED ON CATENARY EQUATION	"	X		
85			IS IT BASED ON FINITE ELEMENT METHOD	"		?	

Comments

* BENNETT'S LETTER INDICATED THAT ALL PROGRAMS ARE "THOROUGHLY VALIDATED AGAINST ANALYTICAL CHECKS, AGAINST OTHER PROGRAMS IF AVAILABLE, AND COMPARED TO EXPERIMENTAL DATA AVAILABLE" - NO COMPARISON AS SUCH ARE PROVIDED IN THE MATERIAL

					Program Name	Yes	NO
86		SES	CSS	OTHERS (SPECIFY)	ICES COSMOS		?
87			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X
88	SYSTEM		**	IS THE MASS OF THE MOORING CONSIDERED	"		X
89		****	MOORING MODEL	IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING	"		X
90				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING	"	X	
91		VERTICAL		IS GEOMETRIC NON LINEARITY CONSIDERED	"		?
92				IS MATERIAL NON LINEARITY CONSIDERED	"		X
93				IS THE HYDRODYNAMIC DAMPING CONSIDERED	"		?
94				IS THE STRUCTURAL DAMPING CONSIDERED	"		?
95			****	IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"	X	
96	CAPAB	MOORI		IS THE MOORING MODEL TWO DIMENSIONAL	"	X	
97				IS THE MOORING MODEL THREE DIMENSIONAL	"	X	
98				IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"	?	
99				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"	?	
100				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"	?	

Comments

					Program Name	Yes	No	Comment
101	I	N G	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	ICES COSMOS		X	
102	L I	* * *	INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	〃		?	
103	T	** **		MEAN LOAD OF THE MOORING LINE	〃	X		
104	I		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)	〃	X		
105	E S	** **		MOORING LINE LOAD STATISTICS	〃	X		
106				WITH MODEL TESTS - INDICATE SCALE	〃			*
107	*		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	〃			*
108	* * *			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	〃			*
109	* * *			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	〃	X		
110	*	* *		IS THE RISER MODEL TWO DIMENSIONAL	〃	X		
111	R	S T R U C T U R A L M O D E L		IS THE RISER MODEL THREE DIMENSIONAL	〃		?	
112	I			DOES THE PROGRAM USE FINITE ELEMENT METHOD	〃	?		
113	S E			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	〃		?	
114	R			DOES THE PROGRAM USE SMALL DEFLECTION THEORY	〃		?	
115		* *		IS THE PROGRAM CAPABLE OF USING LARGE DEFLECT-ION THEORY	〃	?		

* SAME AS THE COMMENTS FOR ITEM 71 THRU 74

				Program Name	Yes	No
116		***	IS THE PROGRAM BASED ON DIFFRACTION THEORY	ICES COSMOS		X
117			IS IT BASED ON HYBRID ELEMENT W/ COMBINATN OF DIFFRACTION & MORISON	"		X
118		HYDRODYNAMIC	DIFFRACTION & FINITE FLUID ELEMENT	"		X
119			OR ANY OTHER COMBINATION, PLEASE SPECIFY	"		X
120			OTHERS (SPECIFY)	"	MORISON	
121			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	"	?	
122	S	MODEL	IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	"		X
123	Y		IS THE RISER MODELLED AS TWO DIMENSIONAL	"	X	
124	S	***	IS THE RISER MODELLED AS THREE DIMENSIONAL	"		?
125	T	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	"		X
126	E	**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS	"	X	
127	M	* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS	"		X
128		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END	"		?
129		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE	"		?
130			WITH MODEL TESTS - INDICATE SCALE	"		X

Comments

				Program Name	Yes	No	
131	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS	ICES COSMOS			*
132	*		WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"			
133	*	INTACT	INTACT FREE FLOATING	"	X		
134		INTACT	INTACT WITH VERTICAL TAUT TENDONS	"		?	
135	STABILITY ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED	"	X		
136	***	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING	"		?	
137	*		HYDRODYNAMIC LOADING CONSIDERED	"	X		
138	*		IS INERTIA LOADING CONSIDERED	"	X		
139	S		IS DYNAMIC LOADING CONSIDERED	"	X		
140	R		TWO DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
141	C	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS	"	X		
142	U		BEAM ELEMENT	"	X		
143	R	*	SHELL ELEMENT	"	X		
144	A	***	PLATE ELEMENT	"	X		
145	L	FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT	"		X	
	A						
	N						

Comments

SAME AS THE COMMENTS FOR ITEM 71 THRU 74

				Program Name	Yes	No
146	A L Y S I S ***	*** *	OTHERS .... SPECIFY			?
147		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS		X	
148			MODAL ANALYSIS		X	
149			FATIGUE LIFE ANALYSIS		X	
150		DOCUMENTATION	IS USERS' GUIDE AVAILABLE		X(*)	
151			IS THEORETICAL MANUAL AVAILABLE		X(*)	
152		** **** HARDWARE SYSTEM **** **	IBM			
153			CDC			
154			PRIME COMPUTER			
155			VAX			
156			OTHERS .... SPECIFY			
157		** **** ACCESSIBILITY ARRANGEMENT ** ****	LEASE (PRICE $ .00)			
158			PURCHASE (PRICE $ .00)			
159			CONSULTANCY BASIS			
160			OTHERS .... SPECIFY			

Comments

(*) AVAILABLE BUT PROPRIETORY

INFORMATION NOT SUPPLIED

AVAILABLE THROUGH STANDARD AGREEMENT (?)

		Program Name	Yes	No
161	*			
162	*** ***** ******* *********			
163				
164	REMARKS AND NOTES			
165				
166	********* ******* ***** *** *			
167				

Comments

EARL AND WRIGHT

FREQUENCY DOMAIN USING DIFFRACTION THEORY

TABLE II QUESTIONAIRE FOR SOFTWARE COMPARISONS
(FREQUENCY DOMAIN W/ DIFFRACTION THEORY)*

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

E & W IS DEVELOPING CAPABILITY OF USING DIFFRACTION THEORY. IN THE BROCHURE, NO TARGET DATE OF COMPLETION IS SPECIFIED

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	* * * * * * E N V I R O N M E N T	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES					
2			CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3		CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
4			CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
5			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
6		. . . .	ORIENTATION :: MEMBER :: IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER					
7			VERTICAL MEMBER					
8			HORIZ. MEMBER					
9		.	X-SECTION IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION					
10			DOES IT USE EQUIVALENT CIRCULAR X-SECTION					
11			IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY					

					Program Name	Yes	No	Comments
12	TABLE	WAVE FORCES		IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER				
13				IS THERE ANY METHOD TO CALCULATE PRESSURE DISTRIBUTION AT THE SURFACE; IF YES, PLEASE SPECIFY				
14			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN				
15				COLUMN AND PONTOON				
16				PONTOON AND PONTOON				
17			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY				
18				IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON				
19				DIFFRACTION & FLUID FINITE ELEMENT				
20				OR ANY OTHER COMBINATION, PLEASE SPECIFY				
21			SECOND	DOES IT CONSIDER THE WAVE ELEVATION				
22				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY				
23				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY				
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY				
25				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES				

DRIFT FORCES

						Program Name	Yes	NO		Comments
26	* * * *	S	R D E R	VISC FORCES	DOES THE PROGRAM CONSIDER LINEAR WAVE AND NON-LINEAR DRAG					
27	* * * *				IF DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY					
28	*				IS CURRENT & WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT					
29	* * * *		F R E Q U E N C Y	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM					
30					CIRCLE / SPECIFY THE COMPUTING METHOD 2D, 3D OR OTHER					
31	EQUATION			DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING					
32					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED					
33					IS THE CURRENT DRAG DAMPING CONSIDERED					
34	OF			COEFFICIENTS	IS THE CURRENT FRICTION DAMPING CONSIDERED					
35					IS THE RADIATION DAMPING CONSIDERED					
36	MOTION		D O M A I N		IS THE STRUCTURAL DAMPING CONSIDERED					
36					IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM					
37	* * * *			STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM					
38					IS THE STIFFNESS MATRIX COMPUTED					

					Program Name	Yes	No	Comments
39	*	*	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				
40	*	W	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
41	*	I N		DAVENPORT				
42	E	D		SIMIU				
43	N V	* *		OTHERS (SPECIFY)				
44	I R		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
45	O N			IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
46	M E	* *		SIGNIFICANT WAVE HEIGHT				
47	N T	* *		MEAN SPECTRAL PERIOD				
48	A L			WAVE SCATTER DIAGRAM				
49			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ				
50	D E	W	E	ISSC				
51	S C	A	A	JONSWAP				
52	R I	V	S	BRETSCHNEIDER				

					Program Name	Yes	No
53	PTION	E	P	SCOTT			
54			E	OCHI (SIX PARAMETER)			
55		*	C	INPUT SPECTRA			
56		*	T	OTHERS			
57	*	*	R	DIRECTIONAL SPECTRA			
58	*	OTHERS	A	DOES IT CONSIDER EARTH QUAKE SPECTRA			
59	*			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			
60	SOLUTION	STATICS		HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY			
61				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
62	TECHNIQUE	DYNAMICS	FREQ DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY			
63				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
64				WHAT METHOD OF LINEARIZATION USED .... SPECIFY			
65	** **** ****** ********			MEAN OFFSET OF THE PLATFORM			
66				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'			

Comments

			Program Name	Yes	NO	Comments
	PLATFORM					
67	RESPONSE	PLATFORM MOTION RESPONSE SPECTRA				
	OUTPUT					
68		RESPONSE STATISTICS (SIGNIFICANT VALUES)				
	********					
69	****** **** **	EIGEN VALUES (SYSTEM NATURAL PERIODS)				
70	** ****	MODEL TEST - INDICATE SCALE				
		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
71	PROGRAM					
	VERIFICATION	OTHER PUBLISHED MATERIAL - SPECIFY				
72						
	**					
73	****	OTHERS (SPECIFY)				
74	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)				
		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
75						
76	M	VERTICAL (TAUT) MOORING				
77	O	HYBRID/OTHER COMBINATION .... SPECIFY				
	O					
78	R	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				
79	I MATERIA	CHAIN (STEEL)				
	N					
80		WIRE ROPE (STEEL)				

					Program Name	Yes	NO	Comments
81	G	L		COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
82		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE				
83				IS IT BASED ON CATENARY EQUATION				
84				IS IT BASED ON FINITE ELEMENT METHOD				
85				OTHERS (SPECIFY)				
86			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
87	SYSTEM	***** VERTICAL	** MOORING MODEL	IS THE MASS OF THE MOORING CONSIDERED				
88				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING				
89				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING				
90				IS GEOMETRIC NON LINEARITY CONSIDERED				
91				IS MATERIAL NON LINEARITY CONSIDERED				
92				IS THE HYDRODYNAMIC DAMPING CONSIDERED				
93				IS THE STRUCTURAL DAMPING CONSIDERED				
94			*****	IS THE MOORING SYSTEM COUPLED WITH PLATFORM				

					Program Name	Yes	No
95	C	M		IS THE MOORING MODEL TWO DIMENSIONAL			
96	A	O		IS THE MOORING MODEL THREE DIMENSIONAL			
97	P	R		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING			
98	A	I		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			
99	B	N		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			
100	I	G	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			
101	L	*	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			
102	I	**		MEAN LOAD OF THE MOORING LINE			
103	E	OUTPUT FOR THE MOORING SYSTEM		MOORING LINE LOAD RAO(S)			
104	S	**		MOORING LINE LOAD STATISTICS			
105		PROGRAM VERIFICATN		WITH MODEL TESTS - INDICATE SCALE			
106	*			WITH OTHER SOFTWARE - LIST PROGRAMS			
107	*			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
108	*			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			

Comments

				Program Name	Yes	No
109	* *	* * STRUCTURAL MODEL * *	IS THE RISER MODEL TWO DIMENSIONAL			
110	R		IS THE RISER MODEL THREE DIMENSIONAL			
111	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD			
112	S		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			
113	E R		DOES THE PROGRAM USE SMALL DEFLECTION THEORY			
114			IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			
115		* * * * HYDRODYNAMIC MODEL	IS THE PROGRAM BASED ON DIFFRACTION THEORY			
113			IS IT BASED ON HYBRID ELEMENT W/ COMBINATN OF DIFFRACTION & MORISON			
116			DIFFRACTION & FINITE FLUID ELEMENT			
117			OR ANY OTHER COMBINATION, PLEASE SPECIFY			
118			OTHERS (SPECIFY)			
119			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			
120	S Y S		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			
121			IS THE RISER MODELLED AS TWO DIMENSIONAL			

Comments

				Program Name	Yes	NO
		*				
122	T	* * *	IS THE RISER MODELLED AS THREE DIMENSIONAL			
123	E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			
124	M	**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			
125		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			
126		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			
127		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			
128			WITH MODEL TESTS - INDICATE SCALE			
129		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			
130	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
131	* *** STABILITY ANALYSIS	I N T A C T	INTACT FREE FLOATING			
132			INTACT WITH VERTICAL TAUT TENDONS			
133		D A M A G E D	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			
134	*** *		DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING			
135	* *		HYDRODYNAMIC LOADING CONSIDERED			

Comments

				Program Name	Yes	No
	*					
136	*		IS INERTIA LOADING CONSIDERED			
	S					
137	T		IS DYNAMIC LOADING CONSIDERED			
	R					
138	U	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS			
	C					
139	T		THREE DIMENSIONAL SPACE FRAME ANALYSIS			
	U					
140	R	*	BEAM ELEMENT			
	A	***				
141	L		SHELL ELEMENT			
		FINITE ELEMENT ANALYSIS				
142			PLATE ELEMENT			
	A					
143	N		STIFFENED PLATE ELEMENT			
	A	***				
144	L	*	OTHERS .... SPECIFY			
	Y					
145	S		SPECTRAL ANALYSIS			
	I	OTHER				
146	S	ANALYTICAL	MODAL ANALYSIS			
	*	CAPABILITY				
147	*		FATIGUE LIFE ANALYSIS			
	*					
	*					
148			IS USERS' GUIDE AVAILABLE			
	DOCUMENTATION					
149			IS THEORETICAL MANUAL AVAILABLE			

Comments

			Program Name	Yes	No
150	** ****	IBM			
151		CDC			
152	HARDWARE SYSTEM	PRIME COMPUTER			
153		VAX			
154	**** **	OTHERS .... SPECIFY			
155	** ****	LEASE (PRICE $ .00)			
156	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)			
157		CONSULTANCY BASIS			
158	** ****	OTHERS .... SPECIFY			
159					
160	REMARKS AND NOTES				
161					

Comments

EARL AND WRIGHT

TIME DOMAIN USING MORISON'S EQUATION

TABLE III QUESTIONAIRE FOR SOFTWARE COMPARISONS
(TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

EARL & WRIGHT

NOTES: 1. PROGRAM "ICES COSMOS" BASICALLY BASED ON MORISON EQN.
2. COMPLETED WITH MATERIAL FROM ADVERTIZING BROCHURE ONLY
3. COMPLETED BY BROWN & ROOT

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	* * *	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES	ICES COSMOS	X			
2	* * *		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION	"		?		
3	* * *	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED	"		?		
4	E		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES	"	X			
5	N		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM	"	CAN BE			
6	V	. : : MEMBER : : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER	"	X			
7	I	.	VERTICAL MEMBER	"	X			
8	R	.	HORIZ. MEMBER	"	X			
9	O	.	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION	"		X		
10	N M E N	X-SECTION	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION	"		X		
11			OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION	"	X			DIFFRACTION THEORY

					Program Name	Yes	No	Comments
12	TAVLE FORCES	WAVE FORCES		IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER	ICES COSHOS	X		
13				IS THERE ANY METHOD TO CALCULATE PRESSURE DISTRIBUTION AT THE SURFACE; IF YES, PLEASE SPECIFY	"		?	
14			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN	"		X	
15				COLUMN AND PONTOON	"		X	
16				PONTOON AND PONTOON	"		X	
17			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	"	X		
18				IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY	"		X	
19				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT	"		X	
20				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION	"		X	
21			SECOND ORDER	DOES IT CONSIDER THE WAVE ELEVATION	"	X		
22				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY	"		X	
23				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY	"		X	
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY	"		X	
25			DRIFT FORCES	DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES	"		X	

						Program Name	Yes	No	Comments
26				VISC FORCES	DOES THE PROGRAM CONSIDER LINEAR WAVE AND NON-LINEAR DRAG	ICES COSMOS		?	
27					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL	»	X		
28					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT	»		?	
29				ADD MASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	»		X	
30					CIRCLE / SPECIFY THE COMPUTING METHOD (2D), 3D OR OTHER	»	2D		
31				DAMPING COEFFICIENTS	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	»	X		
32					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	»		?	
33					IS THE CURRENT DRAG DAMPING CONSIDERED	»	X		
34					IS THE CURRENT FRICTION DAMPING CONSIDERED	»		?	
35					IS THE RADIATION DAMPING CONSIDERED	»		X	
36					IS THE STRUCTURAL DAMPING CONSIDERED	»		X	
37					IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	»		X	
38				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	»		X	
39					IS THE STIFFNESS MATRIX COMPUTED	»	X		
40				ADD	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM	»		X	

REGULAR WAVES

EQUATION

TIME

						Program Name	Yes	No
41	F	O	I	MASS	CIRCLE / SPECIFY THE COMPUTING METHOD (2D, 3D OR OTHER	ICES COSMOS	2D	
42		M	R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING	"	X	
43	M		E		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED	"		?
44	O	A	G		IS THE CURRENT DRAG DAMPING CONSIDERED	"	X	
45	T I	I	U L A R		IS THE CURRENT FRICTION DAMPING CONSIDERED	"		?
46	O	N		COEFFICIENTS	IS THE RADIATION DAMPING CONSIDERED	"		X
47	N		W A V E		IS THE STRUCTURAL DAMPING CONSIDERED	"		X
48	*				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM	"		X
49	* * * *	* * *	S	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM	"		X
50		*	* * *		IS THE STIFFNESS MATRIX COMPUTED	"	X	
51	*	* *	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT	"	X	
52	*	W	DYNAMIC WIND		IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS	"		X
53	*	I N			DAVENPORT	"		X
54	E N	D			SIMIU	"		X
55	V	* *			OTHERS (SPECIFY)	"		X

Comments

NO MENTION ABOUT WIND SPECTRA

					Program Name	Yes	No
56	ENVIRONMENTAL DESCRIPTION	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE	ICES COSMOS	X	
57				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE	"	X	
58		WAVE	SEA SPECTRA	SIGNIFICANT WAVE HEIGHT	"	X	
59				MEAN SPECTRAL PERIOD	"	X	
60				WAVE SCATTER DIAGRAM	"		?
61				IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ	"	X	
62				ISSC	"	X	
63				JONSWAP	"	X	
64				BRETSCHNEIDER	"	X	
65				SCOTT	"		X
66				OCHI (SIX PARAMETER)	"		X
67				INPUT SPECTRA	"		?
68				OTHERS	"		?
69				DIRECTIONAL SPECTRA	"		?
70		OTH		DOES IT CONSIDER EARTH QUAKE SPECTRA	"	X	

Comments

			Program Name	Yes	No
71	* *	ERS	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE	ICES COSMOS	X	
72	SOLUTION TECHNIQUE	STATICS	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	6 (?)	
73			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?	
74		DYNAMICS — TIME DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY	"	6 (?)	
75			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY	"	?	
76			WHAT METHOD OF INTEGRATION USED .... SPECIFY	"	DIRECT TIME INTEGRATION	
77	PLATFORM RESPONSE OUTPUT		PLATFORM MOTION TIME HISTORY	"	X	
78	** ****	PROGRAM VERIFICATION	MODEL TEST - INDICATE SCALE	"		
79			OTHER AVAILABLE SOFTWARE - LIST PROGRAMS	"		
80			OTHER PUBLISHED MATERIAL - SPECIFY	"		
81	** ****		OTHERS (SPECIFY)	"		
82	* * * *	DESCRIPTION	SPREAD MOORING (CATENARY)	"	X	
83			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT	"	X	
84			VERTICAL (TAUT) MOORING	"	X	
85	M		HYBRID/OTHER COMBINATION .... SPECIFY	"		?

Comments

NOT MENTIONED

ACCORDING TO BENNETT'S LETTER "EARL & WRIGHT PROGRAMS ARE THOROUGHLY VALIDATED AGAINST ANALYTICAL CHECKS, AGAINST OTHER PROGRAMS IF AVAILABLE, AND COMPARED TO EXPERIMENTAL DATA IF AVAILABLE".

					Program Name	Yes	No
86	MOORING SYSTEM	MATERIAL		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			?
87				CHAIN (STEEL)		X	
88				WIRE ROPE (STEEL)		X	
89				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY			?
90		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			?
91				IS IT BASED ON CATENARY EQUATION		X	
92				IS IT BASED ON FINITE ELEMENT METHOD			?
93				OTHERS (SPECIFY)			?
94			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			X
95		***** VERTICAL MODE	** MOORING	IS THE MASS OF THE MOORING CONSIDERED			X
96				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING			X
97				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING		X	
98				IS GEOMETRIC NON LINEARITY CONSIDERED			?
99				IS MATERIAL NON LINEARITY CONSIDERED			X
100				IS THE HYDRODYNAMIC DAMPING CONSIDERED			?

Comments

					Program Name	Yes	No
101	C A L *	A L	L *	IS THE STRUCTURAL DAMPING CONSIDERED	ICES COSMOS		?
102	A P A	M O O R I N G	* * * *	IS THE MOORING SYSTEM COUPLED WITH PLATFORM	"		X
103				IS THE MOORING MODEL TWO DIMENSIONAL	"	X	
104	B I L I T I E S			IS THE MOORING MODEL THREE DIMENSIONAL	"	X	
105				IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING	"	?	
106				IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING	"	?	
107				IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS	"	?	
108			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS	"		X
109		* *	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING	"		?
110		MOORING SYSTEM OUTPUT		MOORING LINE LOAD TIME HISTORY	"	X	
111		PROGRAM VERIFICATN		WITH MODEL TESTS - INDICATE SCALE	"		
112	*			WITH OTHER SOFTWARE - LIST PROGRAMS	"		
113	* * *			WITH OTHER PUBLISHED MATERIAL .... SPECIFY	"		
114	* * *			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES	"	X	
115	*	* *		IS THE RISER MODEL TWO DIMENSIONAL	"	X	

Comments

SAME AS COMMENTS FOR ITEM 78 THRU 81

				Program Name	Yes	No
116	RISER SYSTEM	STRUCTURAL MODEL **	IS THE RISER MODEL THREE DIMENSIONAL	ICES COSMOS		X
117			DOES THE PROGRAM USE FINITE ELEMENT METHOD	〃	?	
118			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD	〃	?	
119			DOES THE PROGRAM USE SMALL DEFLECTION THEORY	〃	?	
120			IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY	〃	?	
121		HYDRODYNAMIC MODEL *****	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION	〃	X	
122			IS IT BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY OF STRUCT	〃		X
123			IS IT BASED ON MORISON'S EQUATION W/ REL VELOCITY OF STRUCTURE & CURRENT	〃		X
124			IS IT BASED LINEARIZED FORM OF MORISON'S EQUATION	〃		X
125			OTHERS (SPECIFY)	〃		X
126			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER	〃	?	
127			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING	〃		?
128			IS THE RISER MODELLED AS TWO DIMENSIONAL	〃	X	
129			IS THE RISER MODELLED AS THREE DIMENSIONAL	〃		X
130		** SOLUTION	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM	〃		X

Comments

				Program Name	Yes	NO
131	M	MODE **	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS	KES COSMOS	X	
132		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			?
133		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			?
134		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			?
135			WITH MODEL TESTS - INDICATE SCALE			
136	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			
137	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
138	* ***	I N T A C T	INTACT FREE FLOATING		X	
139	STABILITY		INTACT WITH VERTICAL TAUT TENDONS			?
140	ANALYSIS	D A M A G E D	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED		X	
141	*** *		DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING			?
142	* * * *		HYDRODYNAMIC LOADING CONSIDERED		X	
143			IS INERTIA LOADING CONSIDERED		X	
144	S T R U		IS DYNAMIC LOADING CONSIDERED		X	
145		SPACE	TWO DIMENSIONAL SPACE FRAME ANALYSIS		X	

Comments

SAME AS COMMENTS FOR ITEMS 78 THRU 81

				Program Name	Yes	NO
146	C T U R A L A N A L Y S I S * * * *	FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS		X	
147		* ***	BEAM ELEMENT		X	
148		FINITE ELEMENT ANALYSIS	SHELL ELEMENT		X	
149			PLATE ELEMENT		X	
150			STIFFENED PLATE ELEMENT			X
151		*** *	OTHERS .... SPECIFY			X
152		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS		X	
153			MODAL ANALYSIS		X	
154			FATIGUE LIFE ANALYSIS		X	
155	DOCUMENTATION		IS USERS' GUIDE AVAILABLE		X(*)	
156			IS THEORETICAL MANUAL AVAILABLE		X(*)	
157	HARDWARE SYSTEM	** ****	IBM			
158			CDC			
159			PRIME COMPUTER			
160			VAX			

Comments

(*) AVAILABLE BUT PROPRIETORY

INFORMATION NOT SUPPLIED

			Program Name	Yes	No
161	**** **	OTHERS .... SPECIFY			
162	** ****	LEASE (PRICE $ .00)			
163	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)			
164		CONSULTANCY BASIS			
165	** ****	OTHERS .... SPECIFY			
166	REMARKS AND NOTES				
167					
168					

Comments

AVAILABLE THROUGH STANDARD (?) AGREEMENT

EARL AND WRIGHT

TIME DOMAIN USING DIFFRACTION THEORY

TABLE IV QUESTIONAIRE FOR SOFTWARE COMPARISONS (TIME DOMAIN USING DIFFRACTION THEORY) X

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA FOR FIXED AND MOORED OCEAN STRUCTURES

E & W IS DEVELOPING CAPABILITY OF POTENTIAL THEORY. IN THE BROCHURE, NO TARGET DATE OF COMPLETION SPECIFIED

ROW #		**** ****	** ** ** ** ** ** ** ** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES					
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
4	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
5	E N		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
6	V	. : : MEMBER : :	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER					
7	I	. : :	VERTICAL MEMBER					
8	R	. E	HORIZ. MEMBER					
9	O	. M B	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION					
10	N M	E R	DOES IT USE MODIFIED C AND C VALUES FOR NON CIRCULAR X-SECTION					
11	E N	: :	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					

ORIENTATION

X-SECTION

					Program Name	yes	no	Comments
12	TABLE WAVE FORCES			IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER				
13				IS THERE ANY METHOD TO CALCULATE PRESSURE DISTRIBUTION AT THE SURFACE; IF YES, PLEASE SPECIFY				
14			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN				
15				COLUMN AND PONTOON				
16				PONTOON AND PONTOON				
17			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY				
18				IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON				
19				DIFFRACTION AND FLUID FINITE ELEMENT				
20				OR ANY OTHER COMBINATION				
21			SECOND	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION			
22					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY			
23					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY			
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY			
25					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES			

						Program Name	Yes	No	Comments
26				VISC FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR DRAG				
27					IF DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL				
28					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT				
29				ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				
30					CIRCLE / SPECIFY THE COMPUTING METHOD 2D, 3D OR OTHER				
31				DAMPING COEFFICIENTS	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
32					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
33					IS THE CURRENT DRAG DAMPING CONSIDERED				
34					IS THE CURRENT FRICTION DAMPING CONSIDERED				
35					IS THE RADIATION DAMPING CONSIDERED				
36					IS THE STRUCTURAL DAMPING CONSIDERED				
37					IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
38				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
39					IS THE STIFFNESS MATRIX COMPUTED				
40				ADD	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				

						Program Name	Yes	No
41	F	O	I	MASS	CIRCLE / SPECIFY THE COMPUTING METHOD 2D, 3D OR OTHER			
42		M	IRREGULAR	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING			
43	M				IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED			
44	O	A			IS THE CURRENT DRAG DAMPING CONSIDERED			
45	T I	I			IS THE CURRENT FRICTION DAMPING CONSIDERED			
46	O	N		COEFFICIENTS	IS THE RADIATION DAMPING CONSIDERED			
47	N		WAVES		IS THE STRUCTURAL DAMPING CONSIDERED			
48	*				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM			
49	* * * *	* *	S	STIFF	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM			
50		*	* * *	NS	IS THE STIFFNESS MATRIX COMPUTED			
51	*	*	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT			
52	*	W	DYNAMIC WIND		IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS			
53	*	I H			DAVENPORT			
54	E N	D			SIMIU			
55	V	* *			OTHERS (SPECIFY)			

Comments

					Program Name	Yes	No
56	IRONMENTAL DESCRIPTION	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE			
57				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE			
58		* * * *		SIGNIFICANT WAVE HEIGHT			
59				MEAN SPECTRAL PERIOD			
60				WAVE SCATTER DIAGRAM			
61		WAVE	SEA SPECTRA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			
62				ISSC			
63				JONSWAP			
64				BRETSCHNEIDER			
65				SCOTT			
66				OCHI (SIX PARAMETER)			
67		* * * *		INPUT SPECTRA			
68				OTHERS			
69	* * * *			DIRECTIONAL SPECTRA			
70	* *	OTH		DOES IT CONSIDER EARTH QUAKE SPECTRA			

Comments

				Program Name	Yes	NO	Comments
71	* *		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE				
72	SOLUTION TECHNIQUE	STATICS	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY				
73			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				
74		DYNAMICS	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY				
75			WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				
76			WHAT METHOD OF INTEGRATION USED .... SPECIFY				
77	PLATFORM RESPONSE OUTPUT		PLATFORM MOTION TIME HISTORY				
78	** ****		MODEL TEST - INDICATE SCALE				
79	PROGRAM VERIFICATION		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
80			OTHER PUBLISHED MATERIAL - SPECIFY				
81	** ****		OTHERS (SPECIFY)				
82	* * * *	DESCRIPTION	SPREAD MOORING (CATENARY)				
83			SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
84			VERTICAL (TAUT) MOORING				
85	M		HYBRID/OTHER COMBINATION .... SPECIFY				

					Program Name	Yes	No
86	OCEAN SYSTEM	MATERIAL		SYNTHETIC ROPE - SUCH AS NYLON KEVLAR			
87				CHAIN (STEEL)			
88				WIRE ROPE (STEEL)			
89				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY			
90		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE			
91				IS IT BASED ON CATENARY EQUATION			
92				IS IT BASED ON FINITE ELEMENT METHOD			
93				OTHERS (SPECIFY)			
94			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			
95		***** VERTICAL	** MOORING MODE	IS THE MASS OF THE MOORING CONSIDERED			
96				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING			
97				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING			
98				IS GEOMETRIC NON LINEARITY CONSIDERED			
99				IS MATERIAL NON LINEARITY CONSIDERED			
100				IS THE HYDRODYNAMIC DAMPING CONSIDERED			

Comments

					Program Name	Yes	NO
			L				
101		A		IS THE STRUCTURAL DAMPING CONSIDERED			
		L					
			*				
102	C		*	IS THE MOORING SYSTEN COUPLED WITH PLATFORM			
			*				
			*				
	A						
103		M		IS THE MOORING MODEL TWO DIMENSIONAL			
	P						
		O					
104	A	O		IS THE MOORING MODEL THREE DIMENSIONAL			
		R					
105	B			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING			
	I	R					
106		O		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING			
	L	R					
107	I	I		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS			
		N					
	T		DYNA-				
108		G	MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS			
	I	*					
		*	INSTAL-				
109		*	LATION	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			
	E		ANALYS				
110	S		MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY			
111				WITH MODEL TESTS - INDICATE SCALE			
112			PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS			
	*						
	*						
	*			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
113	*						
114	*			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			
	*						
	*		*				
115			*	IS THE RISER MODEL TWO DIMENSIONAL			

Comments

				Program Name	Yes	No
116	R	STRUCTURAL MODEL **	IS THE RISER MODEL THREE DIMENSIONAL			
117	I		DOES THE PROGRAM USE FINITE ELEMENT METHOD			
118	S		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			
119	E		DOES THE PROGRAM USE SMALL DEFLECTION THEORY			
120	R		IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY			
121		***** HYDRODYNAMIC MODEL *****	IS THE PROGRAM BASED ON DIFFRACTION THEORY			
122			IS IT BASED ON HYDRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON			
123			DIFFRACTION AND FLUID FINITE ELEMENT			
124			OR ANY OTHER COMBINATION, PLEASE SPECIFY EQUATION			
125			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			
126	S		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			
127	Y		IS THE RISER MODELLED AS TWO DIMENSIONAL			
128	S		IS THE RISER MODELLED AS THREE DIMENSIONAL			
129	T	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			
130	E M M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS			

Comments

				Program Name	Yes	No	Comments
131		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
132		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
133		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
134			WITH MODEL TESTS - INDICATE SCALE				
135		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
136	* * * *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
137		* *** I N T A C T	INTACT FREE FLOATING				
138	STABILITY		INTACT WITH VERTICAL TAUT TENDONS				
139	ANALYSIS	D A M A G E D	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
140		*** *	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
141	* * * *		HYDRODYNAMIC LOADING CONSIDERED				
142			IS INERTIA LOADING CONSIDERED				
143	S T R U C T		IS DYNAMIC LOADING CONSIDERED				
144		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
145			THREE DIMENSIONAL SPACE FRAME ANALYSIS				

				Program Name	Yes	No
146	U R A L A N A L Y S I S * ***	FINITE ELEMENT ANALYSIS * ***	BEAM ELEMENT			
147			SHELL ELEMENT			
148			PLATE ELEMENT			
149			STIFFENED PLATE ELEMENT			
150		*** *	OTHERS .... SPECIFY			
151		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS			
152			MODAL ANALYSIS			
153			FATIGUE LIFE ANALYSIS			
154		DOCUMENTATION	IS USERS' GUIDE AVAILABLE			
155			IS THEORETICAL MANUAL AVAILABLE			
156		** **** HARDWARE SYSTEM **** **	IBM			
157			CDC			
158			PRIME COMPUTER			
159			VAX			
160			OTHERS .... SPECIFY			

Comments

			Program Name	Yes	No
161	** ****	LEASE (PRICE $ .00)			
162	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)			
163		CONSULTANCY BASIS			
164	** ****	OTHERS .... SPECIFY			
165	REMARKS AND NOTES				
166					
167					

Comments

BLANK FORMS

FREQUENCY DOMAIN USING MORISON'S EQUATION

TABLE I QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING MORISON'S EQUATION)

NAVAL CIVIL ENGINEERING LABORATORY

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #					PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	COMMENTS
1	E N V I R	WIND FORCE CALCULATIONS		CALCULATES STATIC WIND FORCES					
2				CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3				IS THE ~~CURRENT~~ WIND FORCE AN INPUT TO THE PROGRAM					
4		CURRENT FORCE CALCULATION		IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
5				CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6				IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		: MEMBER :	ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER					
8				VERTICAL MEMBER					
9				HORIZ. MEMBER					
10			X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION					
11				DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION					

					Program Name	Yes	No		Comments
12	ONMENTAL FORCES	WAVE FORCES	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER					
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE IF YES, PLEASE SPECIFY					
15			MEMBER INTER-ACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN					
16				COLUMN AND PONTOON					
17				PONTOON AND PONTOON					
18			FIRST ORDER	IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION					
19				IS THE PROGRAM BASED ON MORISON'S EQN FORMULATI-ON W/ REL VELOCITY					
20				IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT					
21				IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION					
22			SECO DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION					
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY					
24				DOES IT ACCOUNT FOR ADD-ITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY					
25				DOES IT ACCOUNT FOR ADD-ITIONAL PRESSURE DUE TO ROTATION OF BODY					
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FRE-QUENCY 2ND ORDER WAVES					

						Program Name	Yes	No		Comments
27	*****	: : : : : : : : : :	ND ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG					
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY					
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT					
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE					
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION					
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM					
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE					
34	**** EQUATION OF MOT	FREQUENCY DO		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM					
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS					
36				DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING					
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED					
38					IS THE CURRENT DRAG DAMPING CONSIDERED					
39					IS THE CURRENT FRICTION DAMPING CONSIDERED					
40					IS THE RADIATION DAMPING CONSIDERED					
41					IS THE STRUCTURAL DAMPING CONSIDERED					

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
43	××××		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
44				IS THE STIFFNESS MATRIX COMPUTED				
45	×	××	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				
46	×	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
47	×			DAVENPORT				
48	ENVIRONMENTAL			SIMIU				
49		××		OTHERS (SPECIFY)				
50		CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
51				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
52		×	STATISTICS	SIGNIFICANT WAVE HEIGHT				
53		×		MEAN SPECTRAL PERIOD				
54		×		WAVE SCATTER DIAGRAM				
55		×	...	LINEAR WAVE				
56				STRETCH LINEAR				

				Program Name	Yes	No	Comments
57			WAVE THEORIES	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...			
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN			
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND			
60		W		STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH			
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY			
62		V		EXTENDED VELOCITY POTENTIAL			
63		E		CNOIDAL WAVE THEORY			
64		S	SEA SPECTR	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			
65	DESCRIPTION			ISSC			
66				JONSWAP			
67				BRETSCHNEIDER			
68				SCOTT			
69		X		OCHI (SIX PARAMETER)			
70		X		INPUT SPECTRA			
71	X	X		OTHERS			

				Program Name	Yes	No	Comments
72	* *	* *	A	DIRECTIONAL SPECTRA			
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA			
74	* *			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY			
76				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
77				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			
78		DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY			
79				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
80				WHAT METHOD OF LINEARIZATION USED .... SPECIFY			
81				MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION			
82				OTHERS .... SPECIFY			
83				MEAN OFFSET OF THE PLATFORM			
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'			
85	* *** ***** *******			PLATFORM MOTION RESPONSE SPECTRA			
86	PLATFORM RESPONSE OUTPUT			RESPONSE STATISTICS .. MEAN VALUE			

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE				
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3				
89		RESPONSE STATISTICS .. OTHERS; SPECIFY				
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)				
91	** **** PROGRAM VERIFICATION **** **	MODEL TEST - INDICATE SCALE				
92		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
93		OTHER PUBLISHED MATERIAL - SPECIFY				
94		OTHERS (SPECIFY)				
95	****** DESCRIPTION	SPREAD MOORING (CATENARY)				
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
97		VERTICAL (TAUT) MOORING				
98		HYBRID/OTHER COMBINATION .... SPECIFY				
99	MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				
100	M	CHAIN (STEEL)				
101	O	WIRE ROPE (STEEL)				

					Program Name	Yes	No	Comments
	MOORING SYSTEM			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
103		ANALYSES	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE				
104				IS IT BASED ON CATENARY EQUATION				
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE				
106				OTHERS (SPECIFY)				
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
108		XXXX	.....	IS THE MASS OF THE MOORING CONSIDERED				
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING				
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING				
111		VERTICAL		IS GEOMETRIC NON LINEARITY CONSIDERED				
112				IS MATERIAL NON LINEARITY CONSIDERED				
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED				
114			MOOR	IS THE STRUCTURAL DAMPING CONSIDERED				
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM				
116			R	IS IT BASED ON FINITE EL-EMENT METHOD.W/ OR W/O				

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD				
118			N		IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
119			G	HYDRODYNAMIC MODEL	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D				
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D				
123	C	M,	D		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCTL)				
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCTL)				
125	P	R	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING				
126	A	I	.		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING				
127	B	N	.		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES				
128	I	G	.		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS				
129	L		.		IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
130	I	**	DYNAMICS		IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING				
131	T	***	INSTALLATION ANALYS		MEAN LOAD OF THE MOORING LINE				
	I								
	E								
	S	** ****							

				Program Name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)				
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE				
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3				
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY				
136	*	* ***	WITH MODEL TESTS - INDICATE SCALE				
137	*	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
138	*	*** *	WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
139	*		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES				
140	*	* * STRUCTURAL MODEL * *	IS THE RISER MODEL TWO DIMENSIONAL				
141			IS THE RISER MODEL THREE DIMENSIONAL				
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD				
143	R		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				
144	I S E R		DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
145			IS THE PROGRAM CAPABLE OF USING LARGE DEFLECT-ION THEORY				
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				

				Program Name	Yes	No	Comments
147		* HYDRODYNAMIC	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
148			IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
149			IS THE RISER HYDRODYNAMIC MODEL 2D				
150			IS THE RISER HYDRODYNAMIC MODEL 3D				
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS				
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE				
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS				
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
159	* *** STABILITY ANALYSIS	I N T A C T	INTACT FREE FLOATING				
160			INTACT WITH VERTICAL TAUT TENDONS				
161		D A M	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				

				Program Name	Yes	No	Comments
162	****	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
163	****	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
164			IS INERTIA LOADING CONSIDERED				
165	STRUCTURAL ANALYSIS		IS DYNAMIC LOADING CONSIDERED				
166		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
167			THREE DIMENSIONAL SPACE FRAME ANALYSIS				
168		* *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT				
169			SHELL ELEMENT				
170			PLATE ELEMENT				
171			STIFFENED PLATE ELEMENT				
172		****	OTHERS .... SPECIFY				
173			NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
175			MODAL ANALYSIS				
176	****		FATIGUE LIFE ANALYSIS				

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)				
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)				
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)				
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)				
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE ?? FORTRAN (ASCII) SPECIFY THE VERSION				
182		.... BASIC				
183		.... PASCAL				
184		.... OTHERS; SPECIFY				
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE				
187		IS THEORETICAL MANUAL AVAILABLE				
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED				
189		IS ANY TRAINING OFFERED				
190	** ****	IBM				
191		CDC				

			Program Name	Yes	No	Comments
192	HARDWARE SYSTEM	PRIME COMPUTER				
193		VAX				
194		MICRO .. SPECIFY				
195	**** **	OTHERS .... SPECIFY				
196	** ****	LEASE (PRICE $ .00)				
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
198		CONSULTANCY BASIS				
199	**** **	OTHERS .... SPECIFY				
200	REMARKS AND NOTES					
201						
202						

BLANK FORMS

FREQUENCY DOMAIN USING DIFFRACTION THEORY

TABLE II

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(FREQUENCY DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULATIONS	CALCULATES STATIC WIND FORCES					
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM					
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
5	*		CURRENT FORCES CALCULATED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		. : : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER					
8	E	. : : MEMBER : ORIENTATION	VERTICAL MEMBER					
9	N V I R	. : : MEMBER : ORIENTATION	HORIZ. MEMBER					
10		. : : MEMBER : X-SECT	IS THE PROGRAM CAPABLE OF HANDLING NONCIRCULAR CROSS SECTION					
11			DOES IT USE EQUIVALENT CIRCULAR X-SECTION					

						Program Name	Yes	No		Comments
12	ONMENTAL	WAVE FORCES			IS IT POSSIBLE TO DEFINE ARBITRARY GEOMETRY					
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER					
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY					
15			MEMBER INTERACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN					
16					COLUMN AND PONTOON					
17					PONTOON AND PONTOON					
18			FIRST ORDER		IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE					
19					IS THE PROGRAM BASED ON HYBRID ELEMENT METHOD : DIFFRACTION & MORISON					
20					DIFFRACTION & FLUID FINITE ELEMENT					
21					OR ANY OTHER COMBINATION, PLEASE SPECIFY					
22			SECOND ORDER FORCES	DRIFT	DOES IT CONSIDER THE WAVE ELEVATION					
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY					
24					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY					
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY					
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES					

						Program Name	Yes	No		Comments
27	* * * * *	: : : : : : : : : : : :	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG					
28					DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VELOCITY					
29					IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT					
30					IS ITERATION OF RESPONSE USED FOR CONVERGENCE					
31					DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP SOLUTION					
32					IS THE CONVERGENCE TOLERANCE BUILT IN THE PROGRAM					
33					DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE					
34	* * * * EQUATION OF MOT	FREQUENCY DO		ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM					
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE); OTHERS					
36				DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING					
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED					
38					IS THE CURRENT DRAG DAMPING CONSIDERED					
39					IS THE CURRENT FRICTION DAMPING CONSIDERED					
40					IS THE RADIATION DAMPING CONSIDERED					
41					IS THE STRUCTURAL DAMPING CONSIDERED					

					Program Name	Yes	No	Comments
42	ION	MAIN	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
43	ION	MAIN	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
44	ION	MAIN	STIFFNS	IS THE STIFFNESS MATRIX COMPUTED				
45	ENVIRONMENTAL	WIND	STATIC WIND	IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				
46	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
47	ENVIRONMENTAL	WIND	DYNAMIC WIND	DAVENPORT				
48	ENVIRONMENTAL	WIND	DYNAMIC WIND	SIMIU				
49	ENVIRONMENTAL	WIND	DYNAMIC WIND	OTHERS (SPECIFY)				
50	ENVIRONMENTAL	CURRENT		IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
51	ENVIRONMENTAL	CURRENT		IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
52	ENVIRONMENTAL		STATISTICS	SIGNIFICANT WAVE HEIGHT				
53	ENVIRONMENTAL		STATISTICS	MEAN SPECTRAL PERIOD				
54	ENVIRONMENTAL		STATISTICS	WAVE SCATTER DIAGRAM				
55			.....	LINEAR WAVE				
56			.....	STRETCH LINEAR				

					Program Name	Yes	No		Comments
57			WAVE	STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...					
58				STREAM FUNCTION USING THE FORM GIVEN BY .... DEAN					
59				STREAM FUNCTION : THE FORM GIVEN BY .... VON SCHWIND					
60		W	THEORIES	STREAM FUNCTION : THE FORM GIVEN BY .... HUDSPETH					
61		A		STREAM FUNCTION : OR ANY OTHER FORM .... PLEASE SPECIFY					
62		V		EXTENDED VELOCITY POTENTIAL					
63		E		CNOIDAL WAVE THEORY					
64		S	SEA	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ					
65	DESCRIPTION			ISSC					
66				JONSWAP					
67			SPECTR	BRETSCHNEIDER					
68				SCOTT					
69		*		OCHI (SIX PARAMETER)					
70		*		INPUT SPECTRA					
71	*	*		OTHERS					

				Program Name	Yes	No	Comments
72	* *	* *	A	DIRECTIONAL SPECTRA			
73	* *	OTHERS		DOES IT CONSIDER EARTH QUAKE SPECTRA			
74	* *	OTHERS		DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			
75	SOLUTION TECHNIQUE	STATICS		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY			
76	SOLUTION TECHNIQUE	STATICS		WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
77	SOLUTION TECHNIQUE	STATICS		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			
78	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	HOW MANY DEGREES OF FREEDOM INCLUDED IN THE SOLUTION .... SPECIFY			
79	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
80	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	WHAT METHOD OF LINEARIZATION USED .... SPECIFY			
81	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS, .. GAUSSIAN ELIMINATION			
82	SOLUTION TECHNIQUE	DYNAMICS	FREQUENCY DOMAIN	OTHERS .... SPECIFY			
83				MEAN OFFSET OF THE PLATFORM			
84				MOTION RAO(S) OF THE PLATFORM, FOR PLOT CAPABILITY ENTER 'P'			
85	* *** ***** *******			PLATFORM MOTION RESPONSE SPECTRA			
86	PLATFORM RESPONSE OUTPUT			RESPONSE STATISTICS .. MEAN VALUE			

			Program Name	Yes	No	Comments
87	******* ***** *** *	RESPONSE STATISTICS .. R.M.S. VALUE				
88		RESPONSE STATISTICS .. (SIGNIFICANT)1/3				
89		RESPONSE STATISTICS .. OTHERS; SPECIFY				
90		EIGEN VALUES (SYSTEM NATURAL PERIODS)				
91	** **** PROGRAM VERIFICATION **** **	MODEL TEST - INDICATE SCALE				
92		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
93		OTHER PUBLISHED MATERIAL - SPECIFY				
94		OTHERS (SPECIFY)				
95	* * * * * * * DESCRIPTION	SPREAD MOORING (CATENARY)				
96		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
97		VERTICAL (TAUT) MOORING				
98		HYBRID/OTHER COMBINATION .... SPECIFY				
99	MATERIA	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				
100	M	CHAIN (STEEL)				
101	O	WIRE ROPE (STEEL)				

					Program Name	Yes	No	Comments
102	MOORING SYSTEM	ANALYSES	STATICS	COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
103				USER SPECIFIED LOAD DISPLACEMENT TABLE				
104				IS IT BASED ON CATENARY EQUATION				
105				IS IT BASED ON FINITE EL-EMENT METHOD W/ OR W/O BENDING STFFNSS, CIRCLE				
106				OTHERS (SPECIFY)				
107			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
108		VERTICAL MOORING SYSTEM		IS THE MASS OF THE MOORING CONSIDERED				
109				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING				
110				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING				
111				IS GEOMETRIC NON LINEARITY CONSIDERED				
112				IS MATERIAL NON LINEARITY CONSIDERED				
113				IS THE HYDRODYNAMIC DAMPING CONSIDERED				
114				IS THE STRUCTURAL DAMPING CONSIDERED				
115				IS THE MOORING SYSTEM COUPLED WITH PLATFORM				
116				IS IT BASED ON FINITE EL-EMENT METHOD,W/ OR W/O BENDING STFFNSS, CIRCLE				

						Program Name	Yes	No	Comments
117			I		IS IT BASED ON FINITE DIFFERENCE METHOD				
118			N	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
119			G		IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
120					IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
121			M		IS THE MOORING HYDRODYNAMIC MODEL 2D				
122			O		IS THE MOORING HYDRODYNAMIC MODEL 3D				
123	C	M	D		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)				
124	A	O	E		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)				
125	P	R	L		IS THE MOORING END AT FOUNDATION MODELED BY A LINEAR AXIAL SPRING				
126	A	I	.		IS MOORING END AT FOUNDATION MODELED BY A LINEAR & ROTATIONAL SPRING				
127	B	N	.		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNECTED MOORING LINES				
128	I	G	.		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS				
129	L		.	DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
130	I	* ** *	.	INSTALLATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING				
131	E	** ****	.		MEAN LOAD OF THE MOORING LINE				
	S								

				Program Name	Yes	No	Comments
132		OUTPUT FOR THE MOORING SYSTEM	MOORING LINE LOAD RAO(S)				
133		**** **	MOORING LINE LOAD STATISTICS .. R.M.S. VALUE				
134			MOORING LINE LOAD STATISTICS .. (SIGNIFICANT)1/3				
135			MOORING LINE LOAD STATISTICS .. OTHERS; SPECIFY				
136	* **	* ***	WITH MODEL TESTS - INDICATE SCALE				
137	* * * * *	PROGRAM VERIFICATN ***	WITH OTHER SOFTWARE - LIST PROGRAMS				
138	* * *	*	WITH OTHER PUBLISHED MATERIAL .... SPECIFY				
139	* * *		DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES				
140	* * *	* *	IS THE RISER MODEL TWO DIMENSIONAL				
141		STRUCTURAL MODEL	IS THE RISER MODEL THREE DIMENSIONAL				
142			DOES THE PROGRAM USE FINITE ELEMENT METHOD				
143	R I		DOES THE PROGRAM USE FINITE DIFFERENCE METHOD				
144	S		DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
145	E R	* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
146		* * *	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				

				Program Name	Y/S, N0	Comments
147		*	IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER			
148		HYDRODYNAMIC	IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING			
149			IS THE RISER HYDRODYNAMIC MODEL 2D			
150			IS THE RISER HYDRODYNAMIC MODEL 3D			
151	S Y S T E M	** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM			
152		**	IS THE PROGRAM PERFORM FREQUENCY DOMAIN ANALYSIS			
153		* *** SPECIAL ANALYSIS	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS			
154			IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END			
155		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE			
156		PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			
157	* * * * * *		WITH OTHER SOFTWARE - LIST PROGRAMS			
158			WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
159	* ***	I N T A C T	INTACT FREE FLOATING			
160	STABILITY ANALYSIS		INTACT WITH VERTICAL TAUT TENDONS			
161		D A M	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED			

				Program Name	Yes	No	Comments
162	*** *	AGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
163	* * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
164	*	LOADING	IS INERTIA LOADING CONSIDERED				
165	S T	LOADING	IS DYNAMIC LOADING CONSIDERED				
166	R U C T U R A L A N A L Y S I S	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
167		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS				
168		, * *** FINITE ELEMENT ANALYSIS	BEAM ELEMENT				
169		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
170		FINITE ELEMENT ANALYSIS	PLATE ELEMENT				
171		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT				
172		*** * FINITE ELEMENT ANALYSIS	OTHERS .... SPECIFY				
173		FINITE ELEMENT ANALYSIS	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				
174		OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
175		OTHER ANALYTICAL CAPABILITY	MODAL ANALYSIS				
176	* * * *	OTHER ANALYTICAL CAPABILITY	FATIGUE LIFE ANALYSIS				

			Program Name	Yes	No	Comments
177	PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)				
178		RESTART CAPABILITIES (LIST ALL THE PROGRAMS)				
179		PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)				
180		CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)				
181	PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION				
182		.... BASIC				
183		.... PASCAL				
184		.... OTHERS; SPECIFY				
185		COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				
186	DOCUMENTATION	IS USERS' GUIDE AVAILABLE				
187		IS THEORETICAL MANUAL AVAILABLE				
188	SUPPORT MAINTENANCE AND TRAINING	ARE THE PROGRAMS SUPPORTED AND MAINTAINED				
189		IS ANY TRAINING OFFERED				
190	** ****	IBM				
191		CDC				

			Program Name	Yes	No	Comments
192	HARDWARE SYSTEM	PRIME COMPUTER				
193		VAX				
194		MICRO .. SPECIFY				
195	**** **	OTHERS .... SPECIFY				
196	** ****	LEASE (PRICE $ .00)				
197	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
198		CONSULTANCY BASIS				
199	**** **	OTHERS .... SPECIFY				
200	REMARKS AND NOTES					
201						
202						

BLANK FORMS

TIME DOMAIN USING MORISON'S EQUATION

TABLE III QUESTIONAIRE FOR SOFTWARE CAPABILITIES (TIME DOMAIN USING MORISON'S EQN)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		***** *****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES					
	*							
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
	*							
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM					
	*							
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
	*							
5			CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6			IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		.	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER					
8	E	.	VERTICAL MEMBER					
9	N	.	HORIZ. MEMBER					
10	V	.	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION					
11	I	.	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION					
	R	.						

: : MEMBER : ORIENTATION : X-SECT

						Program Name	Yes	No	Comments
12	OCEAN	NAVAL	: :	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION				
13					IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER				
14					ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY				
15			MEMBER INTERACTION		IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN				
16					COLUMN AND PONTOON				
17					PONTOON AND PONTOON				
18			FIRST ORDER		IS THE PROGRAM BASED ON BASIC MORISON'S EQUATION				
19					IS THE PROGRAM BASED ON MORISON'S EQUATION FORMULATION W/ REL VELOCITY				
20					IS THE PROGRAM BASED ON MORISON'S EQN W/ REL VELOCITY AND CURRENT				
21	FORCES	FORCES			IS THE PROGRAM BASED ON LINEARIZED FORM OF MORISON'S EQUATION				
22			. . .	DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION				
23					DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY				
24			SECOND		DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY				
25					DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY				
26					DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES				

						Program Name	Yes	No	Comments
27	X	S	ORDER	VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG				
28	X				DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL				
29	X				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT				
30	X				IS ITERATION OF RESPONSE USED FOR CONVERGENCE				
31	X				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION				
32	X				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM				
33	X				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE				
34	XXXXXX	XXXXXXXXX	XXX	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				
35					CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS				
36			REGULAR WAVE	DAMPING COEFFICIEN	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
37					IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
38	EQUAT	TIM			IS THE CURRENT DRAG DAMPING CONSIDERED				
39					IS THE CURRENT FRICTION DAMPING CONSIDERED				
40					IS THE RADIATION DAMPING CONSIDERED				
41					IS THE STRUCTURAL DAMPING CONSIDERED				

						Program Name	Yes	No	Comments
42	I	E	VES	TS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
43	O			STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
44	H		XXX		IS THE STIFFNESS MATRIX COMPUTED				
45	O	D	XXX	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				
46	F	O	I		CIRCLE / COMPUTING METHOD : 2D, 3D(ARBITRARY SHAPE), OTHERS				
47		M	R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
48	M	,	E		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
49	O	A	G		IS THE CURRENT DRAG DAMPING CONSIDERED				
50	T	I	U		IS THE CURRENT FRICTION DAMPING CONSIDERED				
51	I	N	L		IS THE RADIATION DAMPING CONSIDERED				
52	O		A		IS THE STRUCTURAL DAMPING CONSIDERED				
53	N		R	COEFFICIENTS	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
54	XXXXXX	XXXX	WAVES	STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
55			XXX		IS THE STIFFNESS MATRIX COMPUTED				
56	X	XX	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				

					Program Name	Yes	No	Comments
57	ENVIRONMENTAL	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
58				DAVENPORT				
59				SIMIU				
60				OTHERS (SPECIFY)				
61			CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
63		WAVE	THEORIES	SIGNIFICANT WAVE HEIGHT				
64				MEAN SPECTRAL PERIOD				
65				WAVE SCATTER DIAGRAM				
66				LINEAR WAVE				
67				STRETCH LINEAR				
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...				
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN				
70				STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND				
71				STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH				

					Program Name	Yes	No	Comments
72			S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY				
73		V	.	EXTENDED VELOCITY POTENTIAL				
74		E	.	CNOIDAL WAVE THEORY				
75		S	.	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ				
76			S	ISSC				
77			E	JONSWAP				
78			A	BRETSCHNEIDER				
79			S	SCOTT				
80			P	OCHI (SIX PARAMETER)				
81			E	INPUT SPECTRA				
82			C	OTHERS				
83			T	DIRECTIONAL SPECTRA				
84			R	DOES IT CONSIDER EARTH QUAKE SPECTRA				
85			A	DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE				
86				NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY				

				Program Name	Yes	No	Comments
87	SOLUTION TECHNIQUE XXXX	DYNAMICS	TIME DOMAIN	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
88				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			
89				NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY			
90				WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY			
91				IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM			
92				METHOD OF INTEGRATION USED .... HOUBOLT			
93				.... WILSON - θ			
94				.... NEWMARK - β			
95				OTHERS .... PLEASE SPECIFY			
96				HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION			
97				.... VARIABLE INTEGR -ATION TIME			
98				OTHERS .... PLEASE SPECIFY			
99				MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION			
100				OTHERS .... PLEASE SPECIFY			
101				PLATFORM MOTION TIME HISTORY			

			Program Name	Yes	No	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE				
103		... R.M.S. VALUE				
104		... (SIGNIFICANT)1/3				
105		... EXPECTED MAXIMUM				
106		... OTHERS, SPECIFY				
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS				
108	XX XXXX	MODEL TEST - INDICATE SCALE				
109	PROGRAM VERIFICATION	OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
110		OTHER PUBLISHED MATERIAL - SPECIFY				
111	XX XXXX	OTHERS (SPECIFY)				
112	XXXX DESCRIPTION	SPREAD MOORING (CATENARY)				
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
114		VERTICAL (TAUT) MOORING				
115	M	HYBRID/OTHER COMBINATION .... SPECIFY				
116	O	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				

					Program Name	Yes	No	Comments
117	DRING SYSTEM	MATERIAL		CHAIN (STEEL)				
118				WIRE ROPE (STEEL)				
119				COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY				
120		CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE				
121				IS IT BASED ON CATENARY EQUATION				
122				IS IT BASED ON FINITE EL-MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE				
123				OTHERS (SPECIFY)				
124			DYNAMICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
125		XXXXXXX	XXX	IS THE MASS OF THE MOORING CONSIDERED				
126				IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING				
127				IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING				
128				IS GEOMETRIC NON LINEARITY CONSIDERED				
129			MOORI	IS MATERIAL NON LINEARITY CONSIDERED				
130				IS THE HYDRODYNAMIC DAMPING CONSIDERED				
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED				

						Program Name	Yes	No	Comments
132		VERTICAL MOORING	NG	HYDRODYNAMIC MODEL	IS THE MOORING SYSTEM COUPLED WITH PLATFORM				
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE				
134					IS IT BASED ON FINITE DIFFERENCE METHOD				
135	C		MODEL		IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORN				
136	A				IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER				
137	P				IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING				
138	A				IS THE MOORING MODELLED AS TWO DIMENSIONAL				
139	B				IS THE MOORING MODELLED AS THREE DIMENSIONAL				
140	I		NNN		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)				
141	L		N		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)				
142	I	MOORING			IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING				
143	T				IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING				
144	I				IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES				
145	E				IS THE PROGRAM CAPABLE OF FATIGUE LIFE AHALYSIS				
146	S		N	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				

				Program Name	Yes	No	Comments
147		XXX	INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			
148			MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY			
149				MOORING LINE LOAD STATISTICS ... ... MEAN VALUE			
150				... R.M.S. VALUE			
151				... (SIGNIFICANT)1/3			
152				... EXPECTED MAXIMUM			
153				... OTHERS, SPECIFY			
154			PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			
155	XXXX			WITH OTHER SOFTWARE - LIST PROGRAMS			
156				WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
157	XXXX			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			
158		XX	STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL			
159	R			IS THE RISER MODEL THREE DIMENSIONAL			
160	I			DOES THE PROGRAM USE FINITE ELEMENT METHOD			
161	S E			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			

				Program Name	Yes	No	Comments
162	R	MODEL **	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163			IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175		PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176	* *** *		WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	X XXX	INTACT	INTACT FREE FLOATING				
178	STABILITY	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179	ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	XXX X	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	X XXX X	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
182		LOADING	IS INERTIA LOADING CONSIDERED				
183	STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED				
184		SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185		SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186		X XXX	BEAM ELEMENT				
187		FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
188		FINITE ELEMENT ANALYSIS	PLATE ELEMENT				
189		FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT				
190		XXX X	OTHERS .... SPECIFY				
191		XXX X	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

				Program Name	Yes	No	Comments
192	I S	OTHER ANALYTICAL CAPABILITY	SPECTRAL ANALYSIS				
193			MODAL ANALYSIS				
194			FATIGUE LIFE ANALYSIS				
195		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)				
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)				
197			PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)				
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)				
199		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	PROGRAMMING LANGUAGE 77 FORTRAN (ASCII) SPECIFY THE VERSION				
200			.... BASIC				
201			.... PASCAL				
202			.... OTHERS SPECIFY				
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU				
204		DOCUMENTATION	IS USERS' GUIDE AVAILABLE				
205			IS THEORETICAL MANUAL AVAILABLE				
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED				

			Program Name	Yes	No	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED				
208	** ****	IBM				
209		CDC				
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	**** **	MICRO .... SPECIFY				
213		OTHERS .... SPECIFY				
214	** ****	LEASE (PRICE $ .00)				
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
216		CONSULTANCY BASIS				
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					
219						
220						

BLANK FORMS

TIME DOMAIN USING DIFFRACTION THEORY

BLANK FORMS

TIME DOMAIN USING DIFFRACTION THEORY

TABLE IV

QUESTIONAIRE FOR SOFTWARE CAPABILITIES
(TIME DOMAIN USING DIFFRACTION THEORY)

NAVAL CIVIL ENGINEERING LABORATORY
U. S. MINERALS MANAGEMENT SERVICES

DEVELOPMENT OF DESIGN CRITERIA
FOR FIXED AND MOORED OCEAN STRUCTURES

ROW #		**** ****	** ** ** ** ****** ** ** ** **	PROGRAM NAME	YES	NO	BEING DEVELOPED, INDICATE STATUS & COMPLETION DATE	**** COMMENTS ****
1	*	WIND FORCE CALCULAT-IONS	CALCULATES STATIC WIND FORCES					
2	*		CALCULATES DYNAMIC WIND FORCE USING SPECTRAL FORMULATION					
3	*		IS THE WIND FORCE AN INPUT TO THE PROGRAM					
4	*	CURRENT FORCE CALCULATION	IS THE INTERACTION BETWEEN WAVE AND CURRENT CONSIDERED					
5	*		CURRENT FORCES CALCULA-TED INDEPENDENTLY AND ADDED TO WAVE FORCES					
6	*		IS THE CURRENT FORCE AN INPUT TO THE PROGRAM					
7		. : MEMBER : ORIENTATION	IS PROGRAM CAPABLE OF CALCULATING WAVE FORCE ON : INCLINED MEMBER					
8	E	. : MEMBER : ORIENTATION	VERTICAL MEMBER					
9	N	. : MEMBER : ORIENTATION	HORIZ. MEMBER					
10	V	. : MEMBER : X-SECT	DOES IT USE EQUIVALENT CIRCULAR CROSS SECTION FOR NONCIRCULAR SECTION					
11	I R	: MEMBER : X-SECT	DOES IT USE MODIFIED C_d AND C_m VALUES FOR NON CIRCULAR X-SECTION					

					Program Name	Yes	No		Comments
12	ONMENTAL FORCES	WAVE FORCES	ION	OTHER METHODS, IF ANY, TO CALCULATE WAVE FORCE ON NON CIRCULAR X-SECTION					
13				IS THE FORCE CALCULATED AT THE LONGL AXIS OF THE MEMBER					
14				ANY METHOD TO CALC PRESS DISTRIBUTION ON SURFACE; IF YES, PLEASE SPECIFY					
15			MEMBER INTERACTION	IS THE INTERACTION BET MEMBERS CONSIDERED : COLUMN AND COLUMN					
16				COLUMN AND PONTOON					
17				PONTOON AND PONTOON					
18			FIRST ORDER	IS THE PROGRAM BASED ON DIFFRACTION THEORY, SPECIFY THE TYPE					
19				IS IT BASED ON HYBRID ELEMENT W/COMBINATION OF DIFFRACTION & MORISON					
20				DIFFRACTION AND FLUID FINITE ELEMENT					
21				OR ANY OTHER COMBINATION					
22			SECOND DRIFT FORCES	DOES IT CONSIDER THE WAVE ELEVATION					
23				DOES THE PROGRAM ACCOUNT REFLECTION OF 1ST ORDER WAVES FROM THE BODY					
24				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO DISPLACEMENT OF BODY					
25				DOES IT ACCOUNT FOR ADDITIONAL PRESSURE DUE TO ROTATION OF BODY					
26				DOES IT ACCOUNT FORCE ON A FIXED BODY BY LOW FREQUENCY 2ND ORDER WAVES					

						Program Name	Yes	No	Comments
27	*	S		VISCOUS FORCES	DOES THE PROGRAM CONSIDER NON-LINEAR WAVE DRAG				
28	*		ORDER		DO DRAG FORCE CALCULATION CONSIDER MEAN CURRENT & WAVE PARTICLE VEL				
29	*				IS CURRENT AND WAVE FRICTION CONSIDERED IN RESULTANT FRICTIONAL DRIFT				
30	*				IS ITERATION OF RESPONSE USED FOR CONVERGENCE				
31	*				DOES IT USE PREVIOUS TIME STEP RESULTS IN PRESENT STEP CALCULATION				
32	*				IS THE CONVERGENCE TOLERANCE BUILT-IN THE PROGRAM				
33	*				DOES THE USER SPECIFY THE CONVERGENCE TOLERANCE				
34	*	*	*	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				
35	*	*	*		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS				
36		*	REGULAR	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
37		*			IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
38	E	T			IS THE CURRENT DRAG DAMPING CONSIDERED				
39	Q				IS THE CURRENT FRICTION DAMPING CONSIDERED				
40	U	I			IS THE RADIATION DAMPING CONSIDERED				
41	A	M	WA	COEFFICIEN	IS THE STRUCTURAL DAMPING CONSIDERED				
	T								

						Program Name	Yes	No	Comments
42	I O N	E	V E S	T S	IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
43				STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
44			x x x		IS THE STIFFNESS MATRIX COMPUTED				
45	O F	D	x x x	ADDMASS	IS THE ADDED MASS MATRIX AN INPUT TO THE PROGRAM				
46		O	I		CIRCLE / COMPUTING METHOD : 2D,3D(ARBITRARY SHAPE), OTHERS				
47		M	R R	DAMPING	IS THE WAVE DRAG DAMPING CONSIDERED IN THE DAMPING				
48	M	,	E G		IS THE DAMPING DUE TO WAVE FRICTION CONSIDERED				
49	O T I O N	A I N	U L A R		IS THE CURRENT DRAG DAMPING CONSIDERED				
50					IS THE CURRENT FRICTION DAMPING CONSIDERED				
51				COEFFICIENTS	IS THE RADIATION DAMPING CONSIDERED				
52			W A V E S		IS THE STRUCTURAL DAMPING CONSIDERED				
53	x x x x x				IS THE DAMPING COEFF MATRIX AN INPUT TO THE PROGRAM				
54		x x x x		STIFFNS	IS THE STIFFNESS MATRIX AN INPUT TO THE PROGRAM				
55			x x x		IS THE STIFFNESS MATRIX COMPUTED				
56	x	x x	STATIC WIND		IS WIND (STATIC) VEL. SPECIFIED AT A REFERENCE HEIGHT				

					Program Name	Yes	No	Comments
57	*	WIND	DYNAMIC WIND	IS THERE PROVISION TO USE FOLLOWING SPECTRA : HARRIS				
58	*			DAVENPORT				
59				SIMIU				
60		**		OTHERS (SPECIFY)				
61	ENVIRONMENTAL		CURRENT	IS IT BASED ON UNIFORM CURRENT VELOCITY PROFILE				
62				IS IT CAPABLE OF USING NON-UNIFORM CURRENT PROFILE				
63		*	WAVE THEORIES	SIGNIFICANT WAVE HEIGHT				
64		*		MEAN SPECTRAL PERIOD				
65		*		WAVE SCATTER DIAGRAM				
66		*		LINEAR WAVE				
67				STRETCH LINEAR				
68				STOKE'S 2ND, 3RD OR 5TH ORDER .... PLEASE CIRCLE ...				
69				STREAM FUNCTION USING THE FORM GIVEN BY ..... DEAN				
70		W		STREAM FUNCTION : THE FORM GIVEN BY ..... VON SCHWIND				
71		A		STREAM FUNCTION : THE FORM GIVEN BY ..... HUDSPETH				

				Program Name	Yes	No	Comments
72		V	S	STREAM FUNCTION : OR ANY OTHER FORM, ... PLEASE SPECIFY			
73		E	.	EXTENDED VELOCITY POTENTIAL			
74		S	.	CNOIDAL WAVE THEORY			
75			S	IS THERE PROVISION TO USE FOLLOWING SPECTRA : PIERSON-MOSKOWITZ			
76	D E		E	ISSC			
77	S C		A	JONSWAP			
78	R I	x	S	BRETSCHNEIDER			
79	P T	x x	P	SCOTT			
80	I O	x x	E C	OCHI (SIX PARAMETER)			
81	N	x x	T	INPUT SPECTRA			
82	x	x x	R	OTHERS			
83	x x		A	DIRECTIONAL SPECTRA			
84	x x	O T H E R S		DOES IT CONSIDER EARTH QUAKE SPECTRA			
85	x x			DOES IT CONSIDER CHANGE IN WATER LEVEL DUE TO TIDE			
86	x x x	S T A		NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY			

				Program Name	Yes	No	Comments
87	*	TICS	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				
88	SOLUTION		IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
89		.	NO OF RIGID BODY DEGREES OF FREEDOM INCLUDED IN THE SOLN .... SPECIFY				
90		.	WHAT ARE THE COUPLED DEGREES OF FREEDOM .... SPECIFY				
91		.	IN CASE OF FINITE ELEMENT METHOD, NO OF DEGREES OF FREEDOM				
92		DYNAMICS	METHOD OF INTEGRATION USED .... HOUBOLT				
93		TIME	.... WILSON - θ				
94			.... NEWMARK - β				
95	TECHNIQUE		OTHERS .... PLEASE SPECIFY				
96		DOMAIN	HOW THE TRANSIENT IS HANDLED .... RAMP FUNCTION				
97			.... VARIABLE INTEGR -ATION TIME				
98			OTHERS .... PLEASE SPECIFY				
99			MATRIX SOLVER USED IN SOLVING THE SYSTEM EQNS. .. GAUSSIAN ELIMINATION				
100	****		OTHERS .... PLEASE SPECIFY				
101			PLATFORM MOTION TIME HISTORY				

			Program Name	Yes	No	Comments
102	PLATFORM RESPONSE OUTPUT	PLATFORM RESPONSE STATISTICS ... ... MEAN VALUE				
103		... R.M.S. VALUE				
104		... (SIGNIFICANT)1/3				
105		... EXPECTED MAXIMUM				
106		... OTHERS, SPECIFY				
107		CAN IT CALC RESPONSES IN ANY HEADING FROM RESPONSES IN ORTHOGNL HEADINGS				
108	** **** PROGRAM VERIFICATION	MODEL TEST - INDICATE SCALE				
109		OTHER AVAILABLE SOFTWARE - LIST PROGRAMS				
110		OTHER PUBLISHED MATERIAL - SPECIFY				
111	** ****	OTHERS (SPECIFY)				
112	* * * * DESCRIPTION	SPREAD MOORING (CATENARY)				
113		SPREAD (CATENARY) MOORING WITH LUMPED WEIGHT				
114		VERTICAL (TAUT) MOORING				
115	M	HYBRID/OTHER COMBINATION .... SPECIFY				
116	0	SYNTHETIC ROPE - SUCH AS NYLON KEVLAR				

					Program Name	Yes	No		Comments
117	O	MATERIAL		CHAIN (STEEL)					
118	R			WIRE ROPE (STEEL)					
119	I			COMBINATIONS SUCH AS CHAIN/WIRE ROPE OTHERS, SPECIFY					
120	N	CATENARY	STATICS	USER SPECIFIED LOAD DISPLACEMENT TABLE					
121	G			IS IT BASED ON CATENARY EQUATION					
122				IS IT BASED ON FINITE EL -MENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE					
123				OTHERS (SPECIFY)					
124			DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS					
125	S	******	****	IS THE MASS OF THE MOORING CONSIDERED					
126	Y			IS THE MOORING SYSTEM MODELLED AS A LINEAR SPRING					
127	S			IS THE MOORING SYSTEM MODELLED AS A NON-LINEAR SPRING					
128	T			IS GEOMETRIC NON LINEA-RITY CONSIDERED					
129	E		MOORI	IS MATERIAL NON LINEA-RITY CONSIDERED					
130	M			IS THE HYDRODYNAMIC DAMPING CONSIDERED					
131		VE		IS THE STRUCTURAL DAMPING CONSIDERED					

						Program Name	Yes	No	Comments
132		RTICAL	NG		IS THE MOORING SYSTEM COUPLED WITH PLATFORM				
133					IS IT BASED ON FINITE EL-EMENT METHOD, W/ OR W/O BENDING STFFNSS, CIRCLE				
134					IS IT BASED ON FINITE DIFFERENCE METHOD				
135	C		M	HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
136	A		O		IS IT CAPABLE OF CALCU-LATING HYDRODYNAMIC FOR-CE FOR VARIABLE DIAMETER				
137	P		D		IS IT CAPABLE OF CONSID-ERING EFFECT OF VORTEX SHEDDING				
138	A		E		IS THE MOORING MODELLED AS TWO DIMENSIONAL				
139	B		L		IS THE MOORING MODELLED AS THREE DIMENSIONAL				
140	I		x		IS THE MOORING MODEL TWO DIMENSIONAL (STRUCT'L)				
141	L		x		IS THE MOORING MODEL THREE DIMENSIONAL (STRUCT'L)				
142	I	M	x		IS THE MOORING END AT FOUNDATION BY LINEAR AXIAL SPRING				
143	T	O	x		IS MOORING END AT FOUND-ATION MODELED BY A LINE-AR & ROTATIONAL SPRING				
144	I	O	x		IS IT POSSIBLE TO MODEL AN ARRAY OF INTERCONNE-CTED MOORING LINES				
145	E	R	x		IS THE PROGRAM CAPABLE OF FATIGUE LIFE ANALYSIS				
146	S	I	x	DYNA-MICS	IS THE MOORING SYSTEM COUPLED WITH THE PLATFORM MOTIONS				
		NG							

				Program Name	Yes	No	Comments
147		* * *	INSTAL-LATION ANALYS	IS THE PROGRAM CAPABLE OF TWO BODY DYNAMICS DURING TENDON LOWERING			
148			MOORING SYSTEM OUTPUT	MOORING LINE LOAD TIME HISTORY			
149				MOORING LINE LOAD STATISTICS ... ... MEAN VALUE			
150				... R.M.S. VALUE			
151				... (SIGNIFICANT)1/3			
152				... EXPECTED MAXIMUM			
153				... OTHERS, SPECIFY			
154			PROGRAM VERIFICATN	WITH MODEL TESTS - INDICATE SCALE			
155	* * * *			WITH OTHER SOFTWARE - LIST PROGRAMS			
156				WITH OTHER PUBLISHED MATERIAL .... SPECIFY			
157	* * * *			DOES THE PROGRAM SUITE HAVE RISER ANALYSIS CAPABILITIES			
158		* *	STRUCTURAL	IS THE RISER MODEL TWO DIMENSIONAL			
159	R			IS THE RISER MODEL THREE DIMENSIONAL			
160	I			DOES THE PROGRAM USE FINITE ELEMENT METHOD			
161	S E			DOES THE PROGRAM USE FINITE DIFFERENCE METHOD			

				Program Name	Yes	No	Comments
162	R	MODEL	DOES THE PROGRAM USE SMALL DEFLECTION THEORY				
163		* *	IS THE PROGRAM CAPABLE OF USING LARGE DEFLECTION THEORY				
164		HYDRODYNAMIC MODEL	IS IT BASED ON MORISON'S EQUATION, SPECIFY THE FORM				
165			IS IT CAPABLE OF CALCULATING HYDRODYNAMIC FORCE FOR VARIABLE DIAMETER				
166	S Y S T E M		IS IT CAPABLE OF CONSIDERING EFFECT OF VORTEX SHEDDING				
167			IS THE RISER MODELLED AS TWO DIMENSIONAL				
168			IS THE RISER MODELLED AS THREE DIMENSIONAL				
169		** SOLUTION MODE	IS THE PROGRAM COUPLED WITH MOTION ANALYSIS PROGRAM				
170	M	**	IS THE PROGRAM PERFORM TIME DOMAIN ANALYSIS				
171		* ***	IS IT CAPABLE OF CLEARANCE ANALYSIS BETWEEN RISERS				
172		SPECIAL ANALYSIS	IS IT CAPABLE OF INSTALLATION ANALYSIS W/ RISER BOTTOM AS FREE END				
173		*** *	IS IT CAPABLE OF INSTALLATION ANALYSIS W/BOTTOM END SUPPORTED BY GUIDE				
174			WITH MODEL TESTS - INDICATE SCALE				
175	* * * *	PROGRAM VERIFICATN	WITH OTHER SOFTWARE - LIST PROGRAMS				
176			WITH OTHER PUBLISHED MATERIAL .... SPECIFY				

				Program Name	Yes	No	Comments
177	* ***	INTACT	INTACT FREE FLOATING				
178	STABILITY ANALYSIS	INTACT	INTACT WITH VERTICAL TAUT TENDONS				
179	STABILITY ANALYSIS	DAMAGED	DAMAGED EQUILIBRIUM WITH COMPARTMENT (S) DAMAGED				
180	*** *	DAMAGED	DAMAGED EQUILIBRIUM WITH TENDON (S) BREAKING				
181	* * * *	LOADING	HYDRODYNAMIC LOADING CONSIDERED				
182	STRUCTURAL ANALYSIS	LOADING	IS INERTIA LOADING CONSIDERED				
183	STRUCTURAL ANALYSIS	LOADING	IS DYNAMIC LOADING CONSIDERED				
184	STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	TWO DIMENSIONAL SPACE FRAME ANALYSIS				
185	STRUCTURAL ANALYSIS	SPACE FRAME ANALYSIS	THREE DIMENSIONAL SPACE FRAME ANALYSIS				
186	STRUCTURAL ANALYSIS	* ***	BEAM ELEMENT				
187	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	SHELL ELEMENT				
188	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	PLATE ELEMENT				
189	STRUCTURAL ANALYSIS	FINITE ELEMENT ANALYSIS	STIFFENED PLATE ELEMENT				
190	STRUCTURAL ANALYSIS	*** * FINITE ELEMENT ANALYSIS	OTHERS .... SPECIFY				
191	STRUCTURAL ANALYSIS	*** * FINITE ELEMENT ANALYSIS	NO OF DEGREES OF FREEDOM PER ELEMENT AND TOTAL DEGREES OF FREEDOM				

			Program Name	Yes	No	Comments
	I					
192	S		SPECTRAL ANALYSIS			
		OTHER				
193		ANALYTICAL	MODAL ANALYSIS			
	x					
	x	CAPABILITY				
194	x		FATIGUE LIFE ANALYSIS			
	x					
	x					
195			VERIFICATION OF INPUT (LIST ALL THE PROGRAMS)			
196			RESTART CAPABILITIES (LIST ALL THE PROGRAMS)			
197		PRE-PROCESSING AND POST-PROCESSING CAPABILITIES	PLOTTING CAPABILITIES (LIST ALL THE PROGRAMS)			
198			CODE CHECK CAPABILITIES (LIST ALL THE PROGRAMS)			
199			PROGRAMMING LANGUAGE .. FORTRAN ( ) SPECIFY THE VERSION			
200			.... BASIC			
201		PROGRAMMING LANGUAGE AND COMPUTER COST COMPARISON	.... PASCAL			
202			.... OTHERS SPECIFY			
203			COMPUTER RUNNING COST - RATIO OF SIMULATED TIME TO CPU			
204			IS USERS' GUIDE AVAILABLE			
205		DOCUMENTATION	IS THEORETICAL MANUAL AVAILABLE			
206		SUPPORT	ARE THE PROGRAMS SUPPORTED AND MAINTAINED			

			Program Name	Yes	NO	Comments
207	MAINTENANCE AND TRAINING	IS ANY TRAINING OFFERED				
208	** ****	IBM				
209		CDC				
210	HARDWARE SYSTEM	PRIME COMPUTER				
211		VAX				
212	**** **	MICRO .... SPECIFY				
213		OTHERS .... SPECIFY				
214	** ****	LEASE (PRICE $ .00)				
215	ACCESSIBILITY ARRANGEMENT	PURCHASE (PRICE $ .00)				
216		CONSULTANCY BASIS				
217	** ****	OTHERS .... SPECIFY				
218	REMARKS AND NOTES					
219						
220						