AD-A955 268

DTIC ACCESSION NUMBER

PHOTOGRAPH THIS SHEET

LEVEL

INVENTORY

Rept No 27-771-92 App. B
MAY 76

DOCUMENT IDENTIFICATION

DISTRIBUTION STATEMENT

ACCESSION FOR	
NTIS GRA&I	X
DTIC TAB	
UNANNOUNCED	
JUSTIFICATION	
BY	
DISTRIBUTION /	
AVAILABILITY CODES	
DIST	AVAIL AND/OR SPECIAL
A-1	25

DISTRIBUTION STAMP

UNANNOUNCED

DTIC ELECTE JUL 27 1987 S D

DATE ACCESSIONED

QUALITY INSPECTED

DATE RETURNED

87 6 30 242

DATE RECEIVED IN DTIC

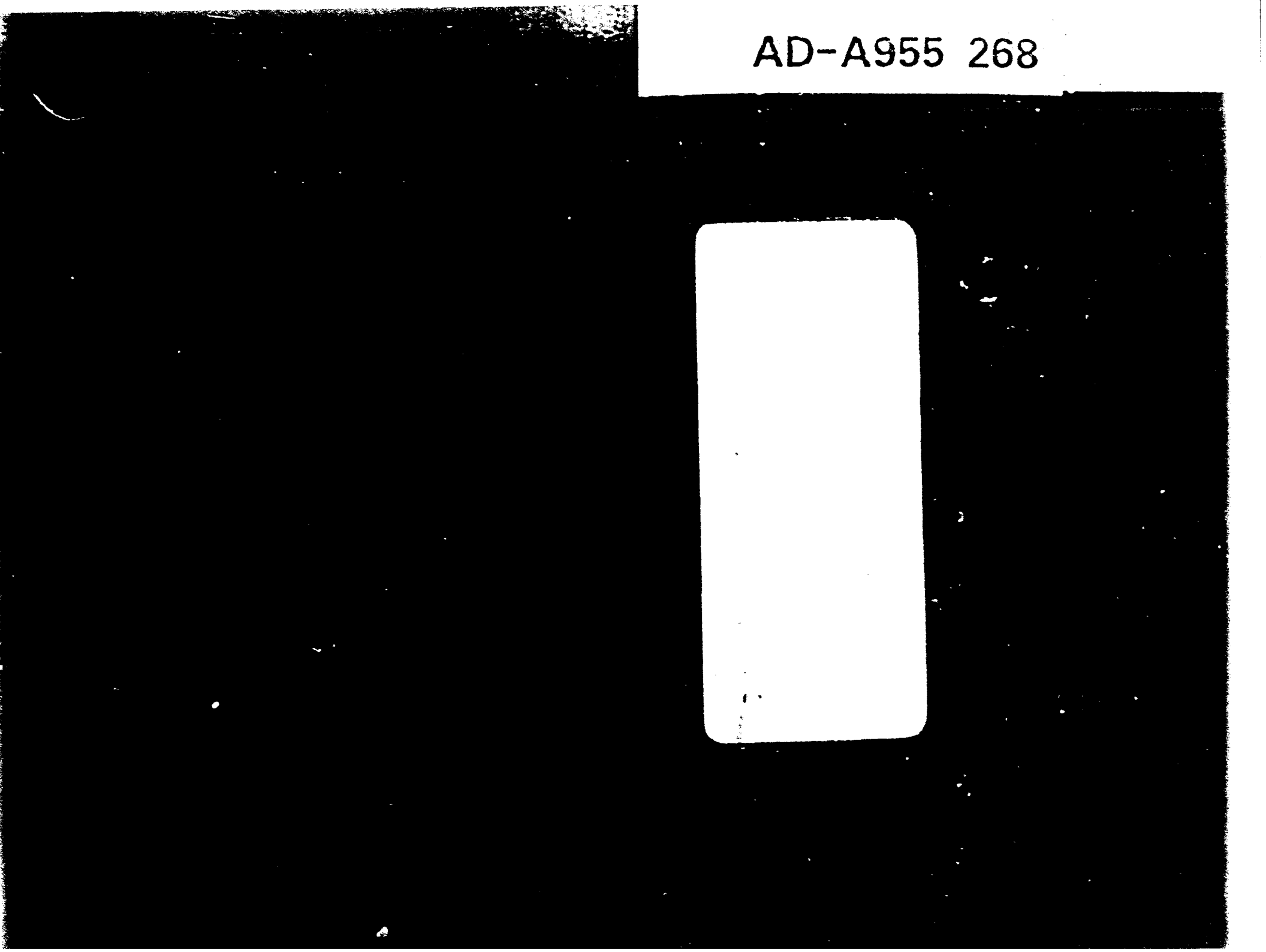
REGISTERED OR CERTIFIED NO.

PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-FDAC

DTIC FORM 70A MAR 86

DOCUMENT PROCESSING SHEET

PREVIOUS EDITION MAY BE USED UNTIL STOCK IS EXHAUSTED.



Unclassified
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION
Unclassified

1b. RESTRICTIVE MARKINGS

2a. SECURITY CLASSIFICATION AUTHORITY

3. DISTRIBUTION AVAILABILITY OF REP
Distribution unlimited.

2b. DECLASSIFICATION/DOWNGRADING SCHEDULE

4. PERFORMING ORGANIZATION REPORT #
27-771-92

5. MONITORING ORGANIZATION REPORT #
FPO 7601, Appendix B

6a. NAME OF PERFORM. ORG. 6b. OFFICE SYM
Crest Engineering, Inc.

7a. NAME OF MONITORING ORGANIZATIO
Ocean Engineering &
Construction Project Office
CHESNAVFACENGCOM

6c. ADDRESS (City, State & Zip)
Tulsa, OK

7b. ADDRESS (City, State, & Zip)
Bldg. 212, Washington Navy Yard
Washington, DC 20374-2121

8a. NAME OF FUNDING ORG. 8b. OFFICE SYM 9. PROCUREMENT INSTRUMENT INDENT #
N62477-76-C-0179

8c. ADDRESS (City, State &Zip)

10. SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT #	PROJECT #	TASK #	WORK UNIT ACCESS #

11. TITLE (Including Security Classification)
Structural concept analysis report for the East Coast Air Combat Maneuvering Range Offshore Kitty Hawk, North Carolina Ap. B four pile concept calculation

12. PERSONAL AUTHOR(S)

13a. TYPE OF REPORT 13b. TIME COVERED FROM TO 14. DATE OF REP (yymmdd) 76-05 15. PAGES 254

16. SUPPLEMENTARY NOTATION

17. COSATI CODES

FIELD	GROUP	SUB-GROUP

18. SUBJECT TERMS (Continue on Reverse if nec)
Construction, East Coast Air Combat Maneuvering Range, North Carolina, Kitty Hawk, NC; Structura analysis

19. ABSTRACT (Continue on reverse if necessary & identify by block number)
This report is a study of four-pile templet type offshore structure. It constitutes a portion of the total project report on the structural concept analysis of an ocean structure for the U.S. Navy Air Combat Maneuvering Range (ACMR) offshore North Carolina, U.S.A. (con't)

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT
same as report

ABSTRACT SECURITY CLASSIFICATION

22a. NAME OF RESPONSIBLE INDIVIDUAL
Jacqueline B. Riley

22b. TELEPHONE
202-433-3881

22c. OFFICE SYMBOL

DD FORM 1473, 84MAR

SECURITY CLASSIFICATION OF THIS PAGE

BLOCK 19 (con't)

The objective of this report is to establish the most efficient four-pile ocean structure under the environmental loading conditions given. The conditions are the same as those used in the previous design of skirt-pile structures.

The four-pile structure is similar to standard templet type structures used by the oil industry. It has four similar faces with equally spaced jacket legs battered at a true slope of 1 to 7. The structure is to be designed for a water depth of 84 feet (MLW). The anchoring of the structure is to be achieved by driving piles through the jacket legs into the seabed. Securing of the jacket is then accomplished by welding of shim plates along the annulus between the jacket leg and piling at the top of the jacket legs. A superstructure consisting of an equipment deck and a top deck will be installed to the piling above the jacket. A boatlanding is to be furnished with the jacket. A set of stairways attached to the superstructure shall be furnished to provide connections among the boatlanding, equipment deck and the top deck.

FPO 7601 APP B

STRUCTURAL CONCEPT ANALYSIS REPORT

FOR THE Lines

EAST COAST AIR COMBAT MANEUVERING RANGE

OFFSHORE KITTY HAWK, NORTH CAROLINA

CONTRACT NO. N62477-76-C-0179

REPORT NO. 27-771-92

APPENDIX B. FOUR-PILE CONCEPT CALCULATIONS

Prepared for

NAVAL FACILITIES ENGINEERING COMMAND
DEPARTMENT OF THE NAVY
CHESAPEAK DIVISION

By

CREST ENGINEERING, INC.
TULSA, OKLAHOMA

May 1976

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

SECTION 1

INTRODUCTION

1.1 INTRODUCTION

This report is a study of a four-pile templet type offshore structure. It constitutes a portion of the total project report on the structural concept analysis of an ocean structure for the U.S. Navy Air Combat Maneuvering Range (ACMR) offshore North Carolina, U.S.A.

The objective of this report is to establish the most efficient four-pile ocean structure under the environmental loading conditions given. The conditions are the same as those used in the previous design of skirt-pile structures.

The four-pile structure is similar to standard templet type structures used by the oil industry. It has four similar faces with equally spaced jacket legs battered at a true slope of 1 to 7. The structure is to be designed for a water depth of 84 feet (MLW). The anchoring of the structure is to be achieved by driving piles through the jacket legs into the seabed. Securing of the jacket is then accomplished by welding of shim plates along the annulus between the jacket leg and piling at the top of the jacket legs. A superstructure consisting of an equipment deck and a top deck will be installed to the piling above the jacket. A boatlanding is to be furrished with the jacket. A set of stairways attached to the superstructure shall be furnished to provide connections among the boatlanding, equipment deck and the top deck.

1.2 DESIGN CRITERIA

Design criteria presented herein serve as guide lines in the conceptual development of the proposed four-pile structure. These criteria are listed as follows:

A. Environmental Criteria

MLW Depth	84 ft
Storm Wave Height	62 ft
Storm Wave Period	12 sec
Maximum Storm Tide	10 ft
Maximum Astronomical Tide	4 ft
Maximun Current (for full depth)	5.4 ft/sec
Wind Velocity	150 Knots @ (+)30 ft

The approach of the storm wind and waves can be from any direction.

B. Foundation Criteria

(1) The basis for the foundation design is a McClelland report to Cubic Corporation entitled "Foundation Investigation East Coast ACMR Ocean Structures, Volume I". The soil information to be used in this analysis is one boring at Site No. 1 in the aforementioned report.

(2) Due to the nature of the sea bottom, and sea bottom currents, scouring of 5 feet below mudline will be used in the preliminary piling design to develop the

theoretical soil resistance to laterally applied loads.

C. Live Loads

The live loads shall be as follows:

Equipment Deck	150 psf
Top Deck	100 psf

The loads shall be distributed uniformly over the entire deck areas.

D. Materials

All structural shapes or fabricated tubular goods are assumed to be ASTM A-36 or equal.

E. Corrosion Protection

(1) All portions of the platform above elevation (-)4' - 0" shall be painted.

(2) All main structural members located within the splash zone shall have an extra 1/2 inch of sacrificial steel added to their wall thickness. This can be in the form of extra wall thickness or a 1/2 inch steel plate wrap.

(3) The portion of the platform below elevation (-)4' - 0" will be protected by cathodic protection. This will be provided by sacrificial anodes having a theoretically expected life of ten years.

The criteria employed for determination of structural acceptability are specified by the documents:

(a) Specification API RP 2A, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms, 7th Edition, American Petroleum Institute, Dallas, Texas, 1976.

(b) Manual of Steel Construction, 7th Edition, American Institute of Steel Construction, New York, N.Y., 1969.

1.3 DESIGN ASSUMPTIONS

Some assumptions to be used in this analysis are listed as follows:

True batter of piling and jacket leg	1:7
Equipment deck area	500 sq ft
Top deck area	1,200 sq ft
Spacing between decks	15 ft

1.4 PROCEDURES OF ANALYSIS

The grid wave data from the skirt-pile structures design is coded to SEALOAD in Section 2 for loading of the structure. This is again used in Sections 6 and 7 of this report.

In order to find the most economical structural member sizes relating selected jacket base spacings to required piling capacities are shown in Section 3. The graphs and formulas derived are used to produce tables relating jacket base spacing to steel weight in Section 4.

A jacket base spacing of 50 ft was then chosen together with preliminary member sizes in Section 5 and sketches were proposed. Section 6 shows the idealized structure with designated joint and member numbers and also the results of the SEALOAD loadings on the structure. Analyzing the results of the loading together with the penetration required for the piles, it was decided that another SEALOAD run should be made to determine the loading to the pile using a 60 ft jacket base spacing (Section 7). A SEALOAD run was also made on the boatlanding (Section 8) and stairway (Section 9) to provide the additional wind and wave forces to the structure.

The pile sizes and lengths are proposed in Section 10 of this report. The piles are then analyzed to ensure sufficient lateral load carrying capacities. The loading conditions on the structure are detailed in Section 11 and the final STRAN run was made to check the integrity of the entire structure.

The results of the STRAN run are shown in Section 12. Section 13 is the final area and weight take-offs for pricing.

1.5 DESIGN SUMMARY

Some of the more significant results from the analysis are summarized as follows:

Environmental Forces:

Total wind and wave forces (Including boatlanding and stairway)	1,350 kips
Total overturning moment (including boatlanding and stairway)	109,627 ft-kips

Pile Axial Loads:

Maximum compressive load	1,712 kips
Maximum tensile load	1,453 kips

Structural Dimensions:

Piling

Outside diameter	36 in.
Penetration below mudline	180 ft

Jacket

Spacing at mudline	50.1 ft
Spacing at work-point level	30.0 ft
Height	101 ft-9 in.

Superstructure

Equipment deck	15 ft x 30 ft
Top deck	35 ft x 35 ft

Structural Steel Weight

Piling	681,620 lbs

Superstructure		172,000 lbs
Jacket		315,160 lbs
	Total weight (excluding boat-landing, stairway and miscellaneous items)	1,168,780 lbs

1.6 PERSONNEL RESUMES

The personnel whose resumes follow were actively engaged in this project.

CREST OFFSHORE, INC.

James M. Atkinson

Design Engineer

University	Degree	Year
University of Notre Dame	2 yrs. Aeronautical Engineering	1963
Oklahoma State University	Bachelor of Architectural Engineering	1967

Licenses: Registered Professional Engineer - Oklahoma

Experience:

1975 to Present — Crest Offshore, Inc.

Design Engineer

Designed office buildings and luxury camp for TOTAL Indonesie in Borneo, Indonesia.

1974 to 1975 — Atkinson Engineering Co.

Owner

Independent design work with other consulting engineers on Yale Avenue Methodist Church, new Central High School and new Sear's Building.

1972 to 1974 — Bloom Van Fossen, Brase Architects & Engineering

Associate Engineer

Responsible for the structural design of Copper Oaks Office Park, Sand Springs Shopping Center, East Vue Shopping Center, United Bank, Falls Office Tower and Shopping Center Denver; The Park, The Port and Falls Phase IV.

CREST OFFSHORE, INC.

James M. Atkinson

Design Engineer

Experience Continued:

1970 to 1972	Sullivan Engineering Co., Tulsa Oklahoma
Senior Engineer	Responsible for design of Heilder Tower, Hornet Stadium, Sheraton Inn, Oral Robert's University Dormitories, O.R.U. Geodestic Dome, Hathaway Mfg. Co. Plant, U.S. Jaycees Expansion, Union High School, Ponca City Savings & Loan, 32 story bank building in Tampa, Florida; Clinton Jr. High School, Thoreau Jr. High School and Grissom Elementary School.
1969 to 1970	Craig & Keithline Consulting Engineers, Tulsa, Oklahoma
Junior Engineer	Assisting in the design of bridges, numerous electrical relay stations and river crossing towers. Later became Senior Engineer in charge of designing sewage treatment and water treatment plant structures, schools and commercial buildings.
1967 to 1969	Engineering Pacific, Inc., Portland, Oregan
Junior Engineer	Responsible for the structural design of concrete tilt-up warehouses, rigid frame steel buildings feed and seed mills, residences, office and commercial buildings.

February 26, 1976

SECTION 2

GRID WAVE DATA

2.1 INTRODUCTION

This structure is designed to the same criteria as those used to design the skirt-pile structure. A Crest Engineering program using Stoke's 5th Order Gravity Wave Theory was used to develop the wave pressure profile for the given wave. This section codes to Synercom Format the pressure profile of that wave. A 24 in. diameter pipe pile extending from the mudline to 145 ft above mudline was used to test the final wave grid. A hand analysis was then computed to test the results from the SEALOAD report. The results were compatible thus indicating that the grid wave data had been coded properly and was ready for use in the loading of the three-pile and four-pile structures.

2.2 TABLE 4P2-1

HORIZONTAL WAVE PRESSURES for a 24" ϕ PIPE

Pt. No.	X SPACING FROM CREST															
	0	(1)		6661	(43)		3	(2)		653	(42)	
	PRESSURE		ELEV.	PRESSURE			PRESSURE		ELEV.		PRESSURE	
1	721	721	142	Same as 0			920	895	141	140	844	867
2	845	845	138				845	845	138	136	797	797
3	777	798	135				778	812	134	133	719	733
4	716	746	131				718	763	130	130	676	676
5	661	694	128				663	718	127	125	602	625
6	611	624	124				614	639	123			579
7	566	566	120				570	570	120	115	537	537
8	526	508	117				530	518	116		488	499
9	489		113				494	469	113	110	442	465
10	456	456	110				461		109			434
11	426	417	106				431	424	106	105	399	405
12	399	380	103				404	387	102	100	365	380
13	374		99				379		99			357
14	352		96				357		95			335
15	331	318	92				336	327	92	90	307	316
16	312		89				317		88			298
17	295	274	85				300	279	85	80	262	282
18	266		78				270		78			254
19	241	238	71				246	243	71	70	229	231
20	220	210	64				225	218	65	60	204	211
21	203		57				208		56			195
22	178	175	43				182	180	42	40	169	171
23	161	156	28				165	160	28	20	151	156
24	152		14				156		14			147
25	150		7				154		7			145
26	149	149	0				153	153	0		144	144

By JWA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 3-31-76 Job No. 27-70-72 Calculation GRID WAVE DATA

PILE 4P2-2

HORIZONTAL WAVE PRESSURES for a 24" ϕ PIPE

NO.	X SPACING FROM CREST											
	17	(3)		644	(41)		25	(4)		630	(40)	
	PRESSURE		ELEV.	PRESSURE			PRESSURE		ELEV.	PRESSURE		
1	807	844	138	139	138	749	769	778	130	646	646	
2	799	799	133	130	709	709	722	722	133	599	599	
3	739	754	130	132	133	669	655	671	130	557	557	
4	684	702		129	130	622	606	625	126	506	518	
5	635	635	125	125	562		562	583	611	123	483	
6	590	570	120	122	120	504	522	544	554	119	459	451
7	549			118			486	509	498	116	412	421
8	512	512	115	115	453		453	477	456	113	376	395
9	479	469	110	111	110	414	423	448		109		370
10	448	427	105	108	105	377	396	421	415	106	343	348
11	420			104			371	397	382	102	315	328
12	395	389	100	101	100	344	349	374		99		309
13	371			97			328	354		96		292
14	350			94			309	335	323	92	267	276
15	331	327	90	91	90	288	292	317		89		262
16	313			87			276	301		85		249
17	297	281	80	84	80	248	262	287	280	82	231	237
18	269			77			237	261	245	75	203	216
19	245	245	70	70	216		216	239		68		195
20	225	218	60	63	60	193	199	221	219	61	181	183
21	208			56			184	206		55		170
22	184	182	40	42	40	160	162	183	182	41	151	152
23	167	162	20	28	20	144	148	168	163	27	136	139
24	158			14			140	159		14		132
25	156			7			133	157		7		131
26	155	155		0	138		138	156	156	0	130	130

TABLE 4P2-3

HORIZONTAL WAVE PRESSURES for a 24" ϕ PIPE

NO.	X SPACING FROM CREST															
	33		(8)		628	(39)		58		(8)		603	(36)			
	PRESSURE		ELEV.		PRESSURE			PRESSURE		ELEV.			PRESSURE			
1	674	674	133	130	519	519		397		119				222		
2	630	641	129	130	494	485		380	374	116	115	115	209	212		
3	590	578	126	125	444	454		363		113				204		
4	553	528	123	120	406	425		348	348	110	110			196		
5	519		119			399		333	324	107	105	105	183	188		
6	488	478	116	115	307	375		320		104				181		
7	459	440	113	110	337	352		307	303	101	100	100	172	174		
8	433		109			332		295		98				168		
9	408	401	106	105	307	313		283		95				162		
10	386	370	103	100	284	290		273	266	92	90	90	153	156		
11	365		99			280		263		89				151		
12	346		96			266		253		86				146		
13	329		93			252		244		84				142		
14	313	313	90	240		240		230	233	81	80	80	135	137		
15	298		86			229		223		78				133		
16	284		83			218		221		75				130		
17	272	272	80	209		209		214	210	72	70	70	124	126		
18	249	241	73	70	180	192		202		68				120		
19	230		66			177		191	191	60	60		114	114		
20	214	214	60	165		165		182		54				109		
21	200		53			155		174	165	48	40	40	101	105		
22	180	180	40	139		139		161		36				99		
23	166	162	27	20	126	129		152	150	24	20	20	93	94		
24	158		13			123		147		12				92		
25	150		7			122		146		6				91		
26	150	150	0	122		122		146	146	0	0		91	91		

CREST OFFSHORE, INC.

Sheet 205 of 4 PILE

By WA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 3-31-76 Job No. 27-701-92 Calculation GRID WAVE DATA

TABLE 4P2-4

HORIZONTAL WAVE PRESSURES for a 24" ϕ PIPE

Ht.	X SPACING FROM CREST															
	91 (12)			570 (32)			330.5 (22)									
	PRESSURE		ELEV.		PRESSURE		PRESSURE		ELEV.		PRESSURE					
1	195	145		105		33	33	-17	-17	80	80					
2	191			103			34	-16			78					
3	187	187		100		35	35	-16			76					
4	183			97			36	-15			74					
5	179			95			37	-14			72					
6	175			92			38	-13	-13	70	70					
7	171	171		90		39	39	-13			68					
8	168			87			39	-12			66					
9	165			84			40	-12			64					
10	161	159	80	82	80	41	41	-11			62					
11	158			79			41	-11	-11	60	60					
12	155			76			42	-10			58					
13	153			74			42	-10			56					
14	150	149	70	71	70	42	42	-9			54					
15	147			68			43	-9			52					
16	145			66			43	-9			50					
17	142	140	60	63	60	44	43	-8			48					
18	138			58			44	-8			44					
19	134			53			44	-7	-7	40	40					
20	131			47			44	-7			36					
21	128	127	40	42	40	44	44	-6			32					
22	123			32			44	-6	-6	20	24					
23	119	119	20	21	20	45	45	-5			16					
24	117			11			45	-5			8					
25	117			5			45	-5			4					
26	116	116		0		45	45	-5	-5	0	0					

2.3 SEALOAD RESULTS

```
*****************************************************
*                                                   *
*                  SEALOAD=2                        *
*                                                   *
*        DEVELOPED BY SYNERCON TECHNOLOGY, INC.     *
*                  HOUSTON, TEXAS                   *
*                RELEASE 2 MOD 10                   *
*                    JAN 1976                       *
*                                                   *
*****************************************************
```



```
LINE NO. 1...5....0....5....1....5....2....5....3....5....4....5....5....6....5....7....5....8
    1  COEF   24.0  1.0   0.0   1.0
    2  END
    3  U.S.NAVY TEMPLET DESIGN = 64 FT MWL                    JOB NO. 27-771-00
    4    100 YEAR STORM WAVE + PRESSURE PROFILES(PSF)         1 PILE  THETA = 0
    5    PRELIMINARY DESIGN  -  ATKINSON                      APRIL 1976
    6  STRAN 2 1  00 16  8 8011                  CD 1    00                  2010
    7  END
    8  GRID  -  14   20  ----  ----  FULL
    9  XSPC     0    8   17    25    33    58    91   570   603   628   636   644   653   661
   10  YSPC   142  140  138   136   133   130   125   120   115   110   105   100    90    80    70
   11          60   40   20     0
   12  YSRF   142  141  139   136   133   119   105   105   119   133   136   139   141   142
   13  SURF   921  920  867   778   674   397   195    33   222   519   646   769   867   921
   14  142    921
   15  140    883  895                                                                  921
   16  138    845  845  844                                                            844   883
   17  136    798  812  799   778                                                      749   797   845
   18  133    746  763  754   722   674                                          646   709   765   798
   19  130    698  718  702   671   681                                    519   589   669   719   746
   20  125    624  639  635   611   578                                    494   557   622   676   694
   21  120    566  570  570   554   528                                    448   506   562   602   624
   22  115    508  518  512   498   478   374                              406   459   504   537   566
   23  110    456  469  469   455   440   348                        209   367   412   453   488   508
   24  105    417  424  427   415   401   324   195    33   183   196   337   376   414   442   456
   25  100    380  387  389   382   370   303   187    35   172   307   343   377   399   417
   26   90    318  327  327   323   313   266   171    39   153   284   315   344   365   380
   27   80    274  279  281   280   272   235   159    41   135   200   267   288   307   318
   28   70    238  243  245   245   241   210   149    42   124   209   231   248   262   274
   29   60    210  218  218   219   214   191   140    44   114   186   203   216   229   238
   30   40    175  180  182   182   180   165   127    44   101   165   181   193   204   210
   31   20    156  160  162   163   162   150   119    45    93   139   151   160   169   175
   32    0    149  153  155   156   156   146   116    45    91   122   136   144   151   156
   33  SURF
   34  142
   35  140
   36  138
   37  136
   38  133
   39  130
   40  125
   41  120
   42  115
```

CREST OFFSHORE, INC.

By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-1-76 Job No. 27-771-92 Calculation GRID WAVE DATA

```
                                     SEALOAD=2                                              PAGE   2
LINE NO. 1...5....1.0....1.5....2.0....2.5....3.0....3.5....4.0....4.5....5.0....5.5....6.0....6.5....7.0....7.5....8.0

     43  110
     44  105
     45  100
     46   90
     47   80
     48   70
     49   60
     50   40
     51   20
     52    0
     53  SECT
     54  SECT COL,LEG    TUB                               24   1
     55  GRUP
     56  GRUP 24C COL,LEG   28    1
     57  MEMBER
     58  MEMBER    1    2 24C         11   1                                       24   1
     59  JOINT
     60  JOINT     1     0      0      0                       111111 FIXED
     61  JOINT     2     0      0    145                          111  FREE END
     62  END
```

**** COEFFICIENT TABLE REPORT ****

DIAMETER IN	NORMAL DRAG COEF	TANG DRAG COEF	MASS COEF
24.000	1.0000	0.0030	1.0000

U.S.NAVY TEMPLET DESIGN = 84 FT MWL JOB NO. 27-771-00

100 YEAR STORM WAVE + PRESSURE PROFILES(PSF) 1 PILE THETA = 0

PRELIMINARY DESIGN ATKINSON APRIL 1976

INPUT UNITS
...ENGLISH

OUTPUT UNITS
...ENGLISH

**** WAVE POSITION SUMMARY REPORT ****

LOAD CONDITION 1

WAVE ANGLE = 0.00

TRIAL NO.	DIST. TO CREST FT	PHASE ANG. WAVE TO STRUC. (DEG)	SHEAR KIPS X	SHEAR KIPS Y	SHEAR KIPS RSLNT	MUDLINE MOMENT FT-KIPS X	MUDLINE MOMENT FT-KIPS Y	MUDLINE MOMENT FT-KIPS RSLNT	VERTICAL FORCE KIPS Z
1	8.0	-4.36	88.9	0.0	88.9	0.	8226.	8226.	0.0
2	14.0	-8.71	70.3	0.0	70.3	0.	5917.	5917.	0.0

WAVE NUMBER = 1

**** L O A D S U M M A R Y R E P O R T ****

WAVE DIRECTION = 0.000

X SHEAR FORCE =	88.8868 KIPS
Y SHEAR FORCE =	0.0000 KIPS
RESULTANT SHEAR FORCE =	88.8868 KIPS
X-MUDLINE MOMENT =	0.0000 FT-KIPS
Y MUDLINE MOMENT =	8228.0501 FT-KIPS
RESULTANT MUDLINE MOMENT =	8228.0501 FT-KIPS
Z VERTICAL FORCE =	0.0000 KIPS

By WAS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-2-76 Job No. 27-771-92 Calculation GRID WAVE DATA

APPROX. WAVE PROFILE AT A POINT 8 FT. BEHIND THE WAVE CREST FOR CHECKING WITH SEALOAD RESULTS.

2.4 WAVE CHECK

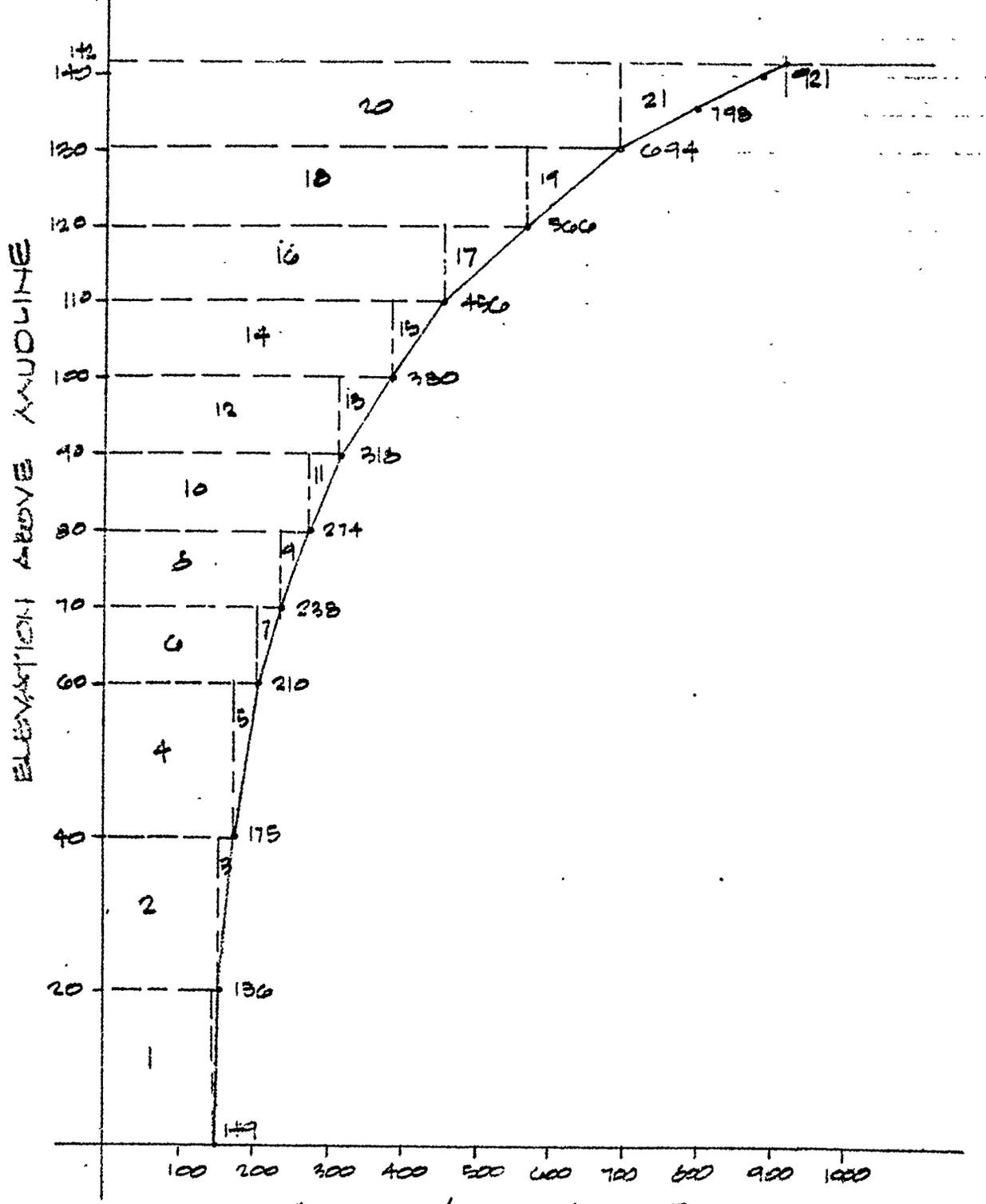


FIGURE 4P2-1

WAVE PROFILE AT -8' FROM CREST OF WAVE

TABLE 4P2-5

AREA	FORCE (LBS/SF.) × S.F		V LBS	MOM ARM FT.		MOM FT. KIPS
1	149 × 20	=	2980	10	=	29.8
2	156 × 20	=	3120	30	=	93.6
3	19 × 20 × .5	=	190	33.3	=	6.33
4	175 × 20	=	3500	60	=	210.0
5	35 × 20 × .5	=	350	53.3	=	18.7
6	210 × 10	=	2100	70	=	147.0
7	28 × 10 × .5	=	140	66.7	=	9.3
8	238 × 10	=	2380	75	=	178.5
9	36 × 10 × .5	=	180	76.7	=	13.8
10	214 × 10	=	2140	85	=	232.9
11	44 × 10 × .5	=	220	86.7	=	19.1
12	318 × 10	=	3180	95	=	302.1
13	62 × 10 × .5	=	310	96.7	=	30.0
14	380 × 10	=	3800	105	=	399
15	76 × 10 × .5	=	380	106.7	=	40.5
16	456 × 10	=	4560	115	=	524.4
17	110 × 10 × .5	=	550	116.7	=	64.2
18	560 × 10	=	5600	125	=	707.5
19	128 × 10 × .5	=	640	126.7	=	81.1
20	699 × 12	=	6940	136	=	943.8
21	227 × 12 × .5	=	1362	138	=	188.0
			45282			4239.0
			× 2			× 2
			90,564	88,880		8479.2 FT-K

CHECK SHEAR

90,564# ≈ 88,880# FROM SEALOAD ∴ O.K.

CHECK MOMENT

8,479.2 FT.K. ≈ 8,218 FT.K. FROM SEALOAD ∴ O.K.

ASSUME WAVE GRID IS CODED PROPERLY

SECTION 3

BASE SPACING vs. PILING CAPACITY

3.1 INTRODUCTION

This section uses the forces from the skirt-pile structure to derive two formulas for the length 'L' of the base of the four-pile jacket as a function of the axial load on the piling, either tension or compression. This information is compiled into a graph plotting the base spacing to the required pile compression and tension capacity. The graph is used in Section 4 to determine the weight of the total structure as a function of base spacing. The forces from the skirt-pile structure are:

Shear V = 1,254.6 kips

Base Moment M = 107,302 ft kips

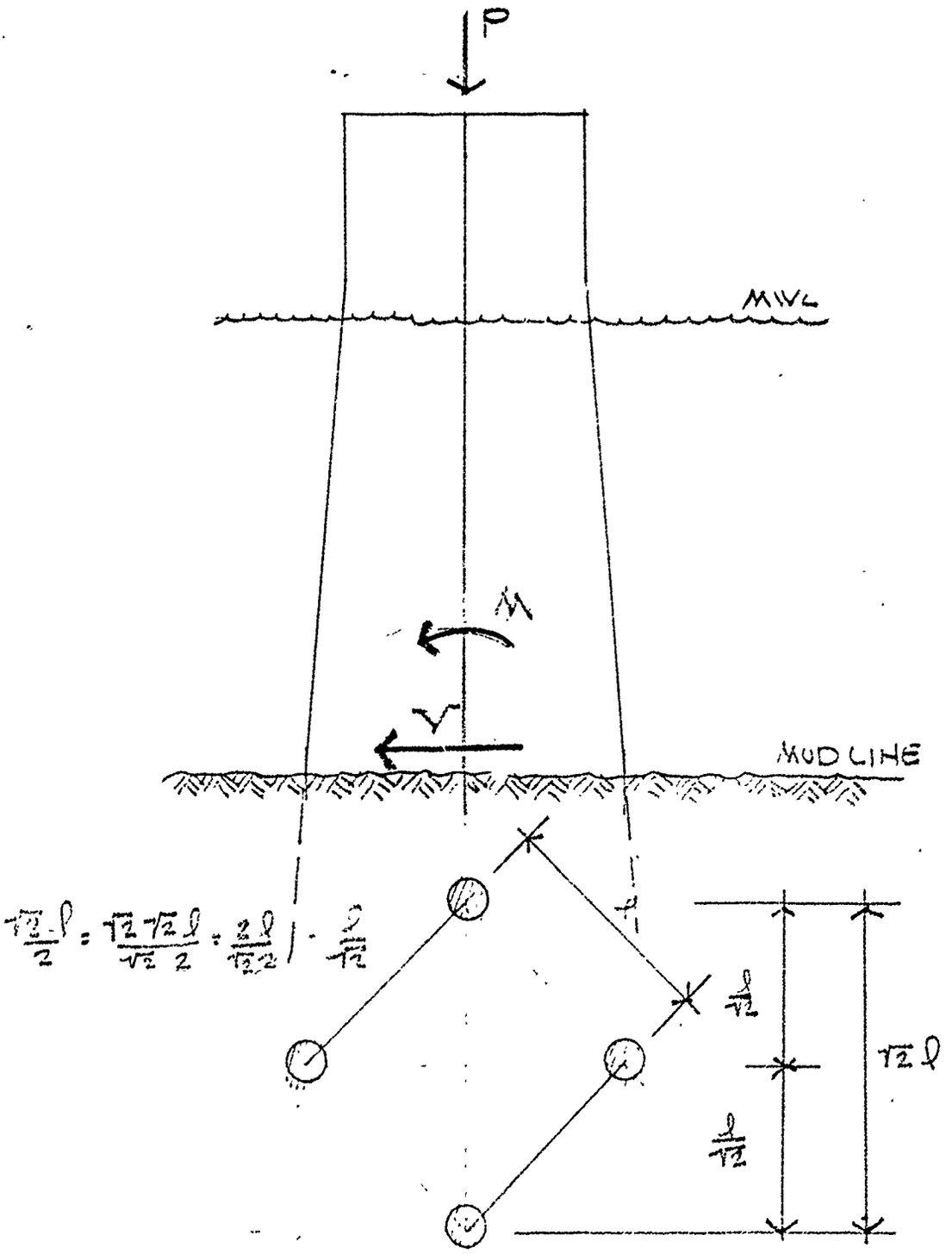
Total Gravity Load = 450 kips

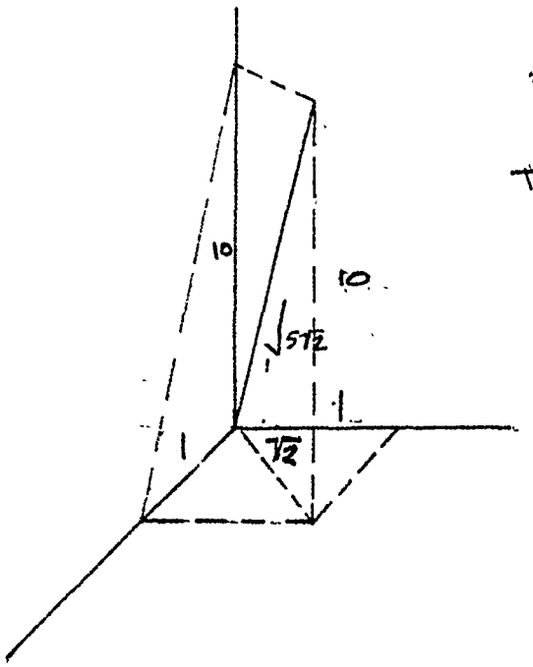
3.2 - LOADING ON STRUCTURE

TOTAL GRAVITY LOAD $P = 450$ KIPS

BASE SHEAR $V = 1,254.6$ KIPS

MOMENT $M = 107,302$ FT-KIPS





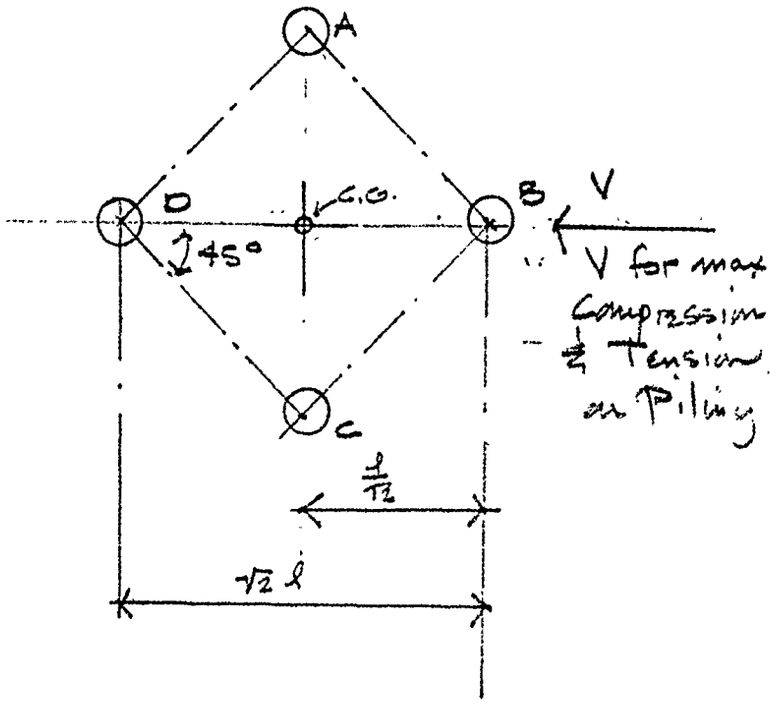
PROJECTED BATTER 1:10

TRUE BATTER

$\sqrt{2} : 10$

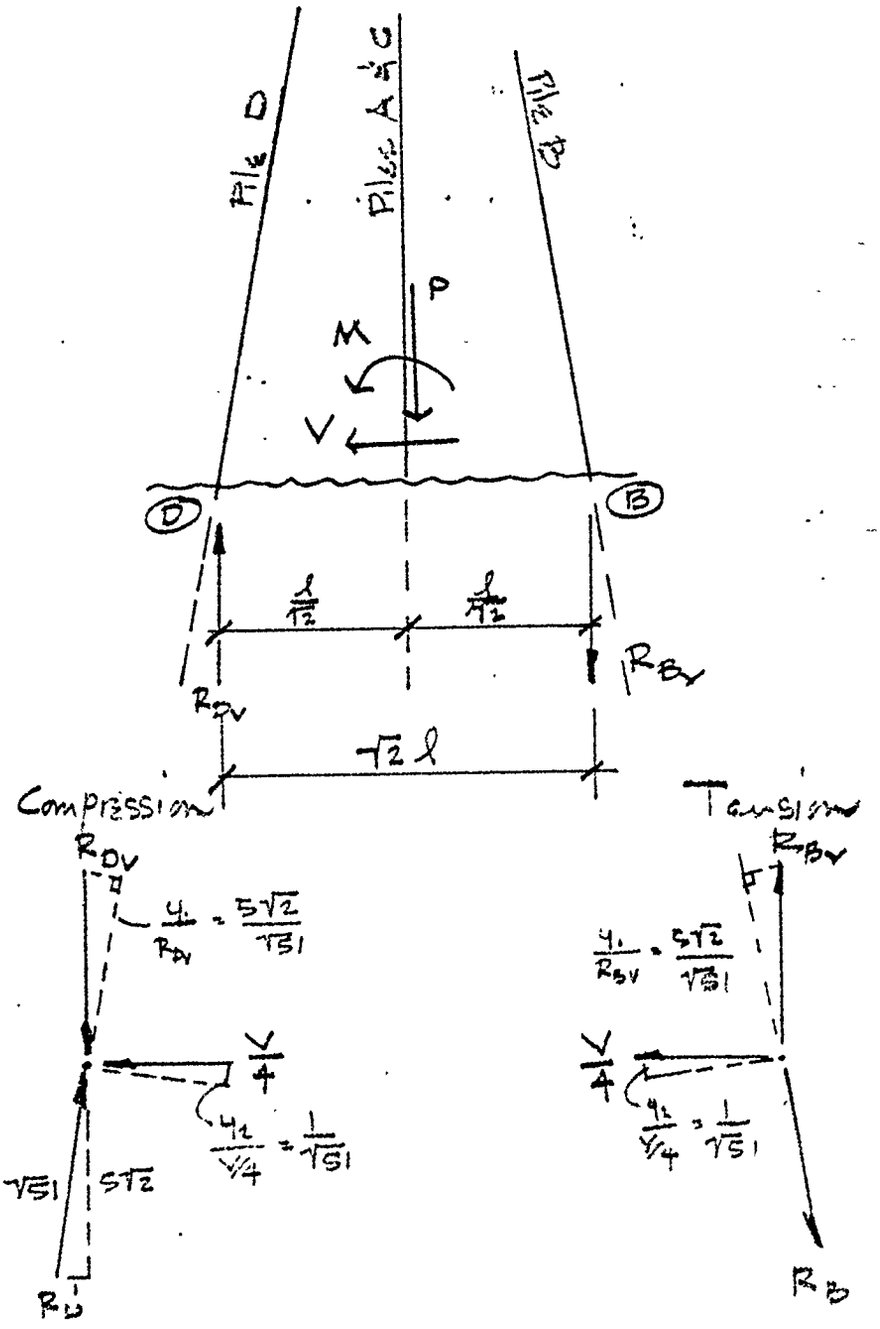
$1 : \frac{10}{\sqrt{2}} = 1 : 7.071$

$= \frac{10}{2}\sqrt{2} : 5\sqrt{2}$



∴ V for max Compression & Tension on Piling

Maximum Compressive & Tensile Forces in Piles



$$R_D = \frac{5\sqrt{2}}{\sqrt{51}} R_{DV} + \frac{1}{\sqrt{51}} \frac{V}{4} \quad (1a) \qquad R_B = \frac{5\sqrt{2}}{\sqrt{51}} R_{BV} + \frac{1}{\sqrt{51}} \frac{V}{4} \quad (1b)$$

$$R_{DV} = \frac{\sqrt{51}}{5\sqrt{2}} R_D - \frac{V}{20\sqrt{2}} \quad (2a) \qquad R_{BV} = \frac{\sqrt{51}}{5\sqrt{2}} R_B - \frac{V}{20\sqrt{2}} \quad (2b)$$

By WMA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 4.26.76 Job No. 27-76L-92 Calculation PILE SPACING VS. PILING CAPACITY

Summation of moments about B axis for Compression

about D axis for Tension

$$R_{DV}\sqrt{2}\,l_c = M + \frac{P l_c}{\sqrt{2}} - \frac{P}{2\sqrt{2}}\,l_c \quad (3a)$$

$$= M + \frac{Pl}{2\sqrt{2}}$$

$$R_{BV}\sqrt{2}\,l_T = M - \frac{P l_T}{\sqrt{2}} + \frac{P l_T}{2\sqrt{2}} \quad (3b)$$

$$= M - \frac{Pl}{2\sqrt{2}}$$

$$M = \left(R_{DV}\sqrt{2} - \frac{P}{2\sqrt{2}}\right) l_c$$

$$\left(R_{BV}\sqrt{2} + \frac{P}{2\sqrt{2}}\right) l = M$$

$$l_c = \frac{M}{R_{DV}\sqrt{2} - P/2\sqrt{2}} \quad (4a)$$

$$l_T = \frac{M}{R_{BV}\sqrt{2} + P/2\sqrt{2}} \quad (4b)$$

Substituting Eq. (2a) into Eq. (4a)

Substituting Eq (2b) into (4b)

$$l_c = \frac{M}{\frac{\sqrt{51}}{5} R_D - \frac{V}{20} - \frac{P}{2\sqrt{2}}} \quad (5a)$$

$$l_T = \frac{M}{\frac{\sqrt{51}}{5} R_B - \frac{V}{20} + \frac{P}{2\sqrt{2}}} \quad (5b)$$

$M = 107,302$ FT. KIPS
$P = 450$ KIPS
$V = 1254.0$ KIPS

$\frac{\sqrt{51}}{5} = 1.428$

$\frac{V}{20} = -62.73$ $\quad -62.73$

$\frac{P}{2\sqrt{2}} = -159.10$ $\quad +159.10$

-221.83 $\quad +96.37$

$$l_c = \frac{107,302}{1.428 R_D - 221.83} \quad (6a)$$

$$l_T = \frac{107,302}{1.428 R_B + 96.37} \quad (6b)$$

when $l_c = \infty$ R_D = min

when $R_B = 0$ l_T = max

$$R_D = \left[\frac{107,302}{l_c} + 221.83\right]\frac{1}{1.428}$$

$$= \frac{221.83}{1.428} = 155.3^{k}$$

$$l_T = \frac{101,302}{96.37} = 1113.4'$$

TABLE 4P3-1.

PILE	COMPRESSION		TENSION	
	R_D (KIPS)	$\ell = \frac{107,302}{1.428R_D - 221.33}$ (FT)	R_B (KIPS)	$\ell = \frac{107,302}{1.428R_B + 96.37}$ (FT.)
1	155.3	∞	0	1113.4
	250	793.8	183	300.0
2	405.8	300.0	250	236.7
3	500	218.0	500	132.4
4	750	126.4	750	91.92
5	1000	88.96	1000	70.39
6	1250	68.6	1250	57.03
7	1500	55.9	1500	47.94
8	1750	47.12	1750	41.34
9	2000	40.73	2000	36.34
10	2250	35.87	2250	32.42
11	2500	32.05	2500	29.27
12	2750	28.96	2750	26.67
13	3000	26.41	3000	24.50
	∞	0	∞	0

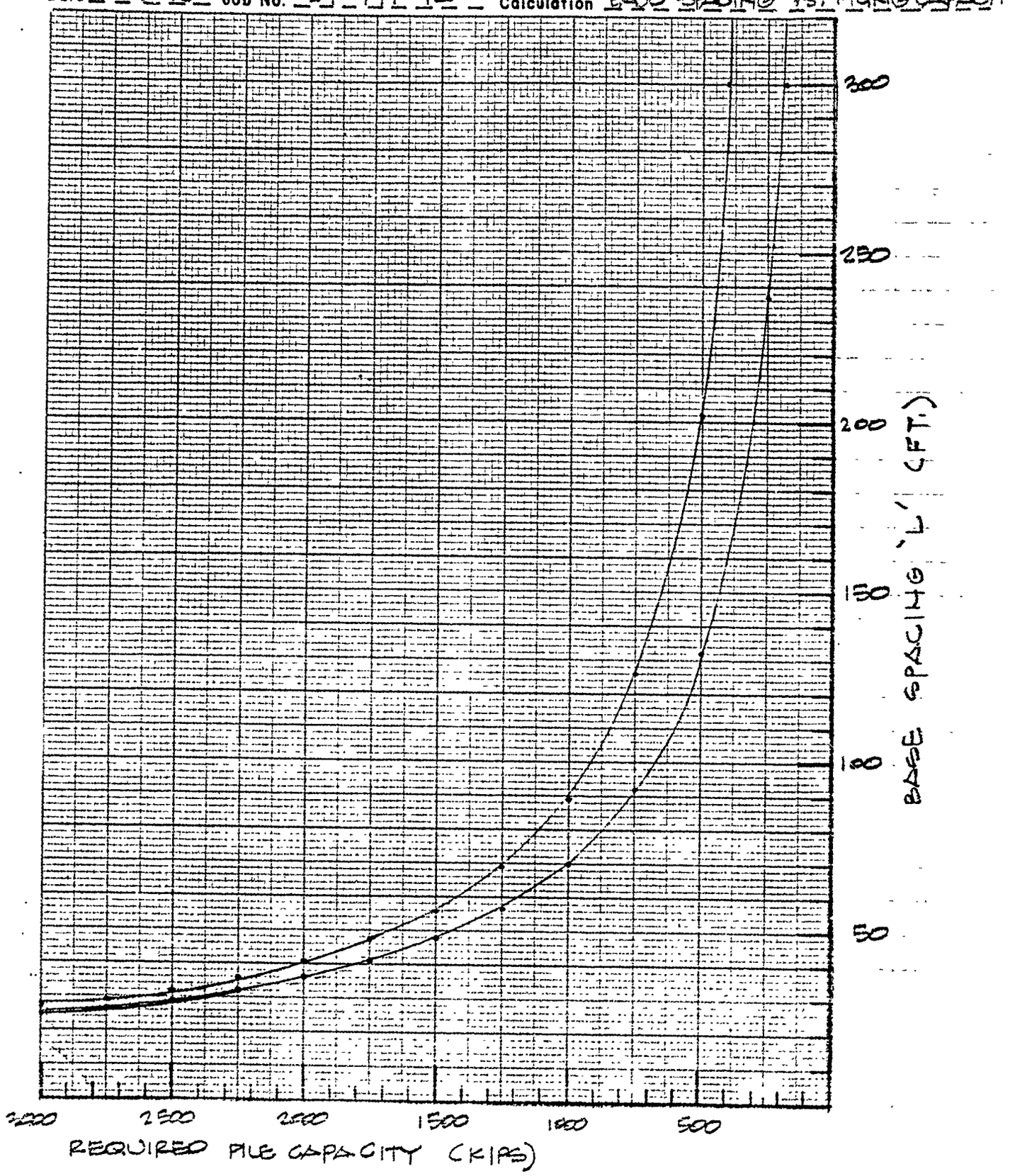

300
250
200
150
100
50
BASE SPACING 'L' (FT.)
3000
2500
2000
1500
1000
500
REQUIRED PILE CAPACITY (KIPS)

FIGURE 4P3-1

SECTION 4

STRUCTURAL STEEL WEIGHT VARIATION

4.1 INTRODUCTION

This section derives formulas and then develops tables to determine the least total weight of a four-pile structure for different jacket base widths at mudline from the given soil conditions and the environmental forces.

The template type structure has to resist the overturning moment due to the wind and wave loadings on the structure. The farther apart the jacket legs are spread the lesser the axial load on the piling will be. However the horizontal and diagonal bracing lengths will be increased thus requiring longer and possibly larger members as the slenderness ratio is increased. As the jacket legs get closer together the axial loads on the pilings increase thus requiring longer piles.

Section 4.2 determines the total length of horizontal and diagonal members as a function of the jacket leg spacing 'L' at the mudline. These are shown in Table 4P4-1. These lengths are multiplied by an assumed unit brace member weight to provide Table 4P4-2 which gives total weight of bracing for the different leg spacings chosen.

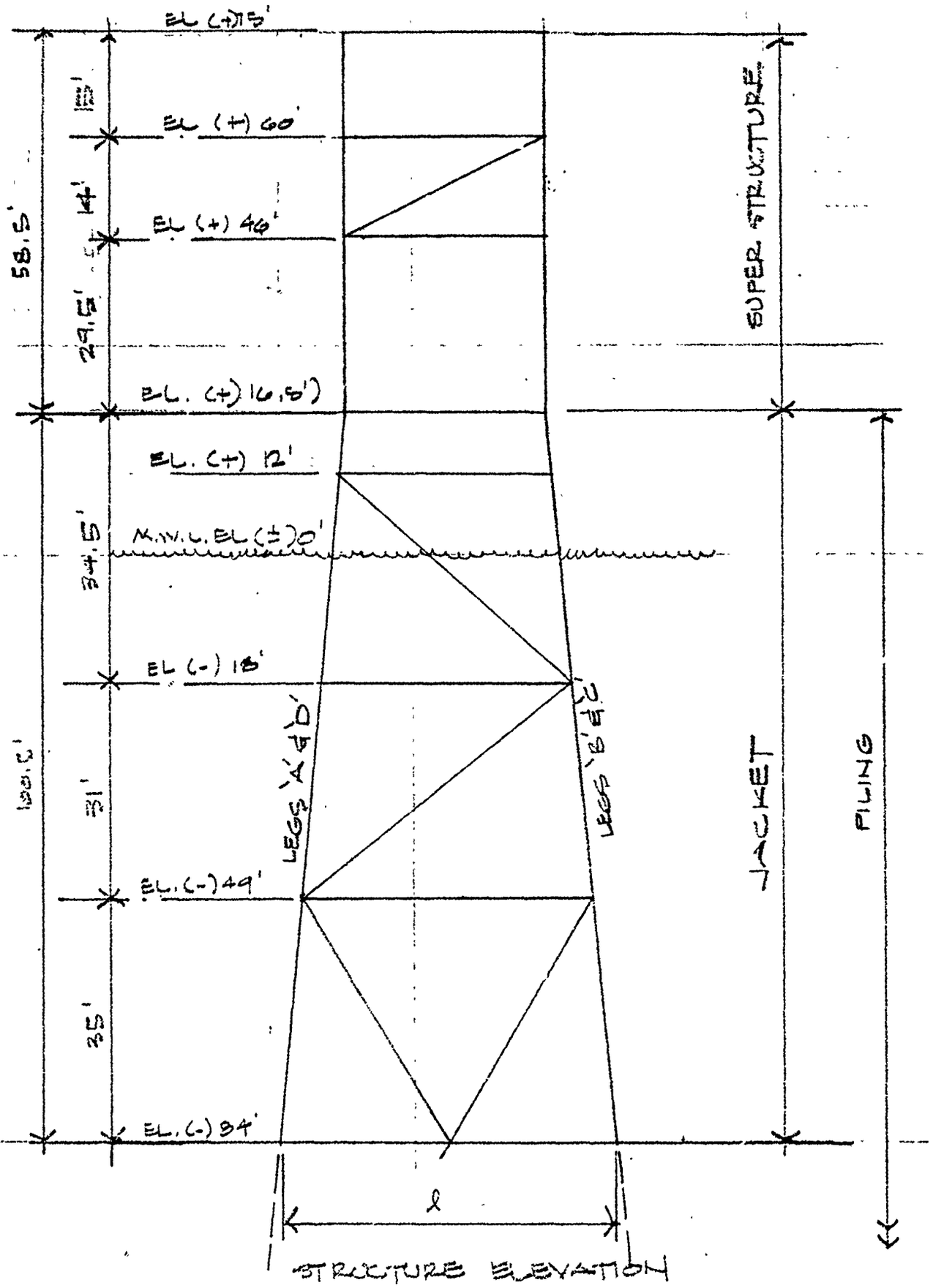
Section 4.3 computes the total weight of the four jacket legs. This is assumed to be constant for all leg spacings and is shown in Table 4P4-3.

From inspection it was determined the pilings will have to be driven a minimum of 150 ft below mudline. Section 4.4 Table 4P4-4 shows assumed piling sizes from the top of the jacket to 150 ft below mudline. The

additional pile length beyond 150 ft is a function of the required pile axial load capacity. For a given jacket leg spacing 'L' the required pile axial load capacity is found from Figure 4P3-1, Section 3, Page 3.07 and placed in Table 4P4-5. The required pile penetration for the corresponding pile capacity is found from the graph, Figure 4P4-1 (See the report on Three-Pile Structure, Section 2, Page 2.39 for the development of this graph). After determining the required pile length below 150' penetration (H) the total weight of the piles as a function of 'L' is computed in Table 4P4-5.

Table 4P4-6 of Section 4.5 adds the weights of the jacket and piling to get the total weight for each 'L' chosen. The sum of the weights of the superstructure, boat landings, stairways, etc., was assumed to remain constant. From this table a jacket leg base spacing of 50 ft is chosen for the actual structural configuration analysis.

4.2 BASE SPACING VS. JACKET MEMBER LENGTHS



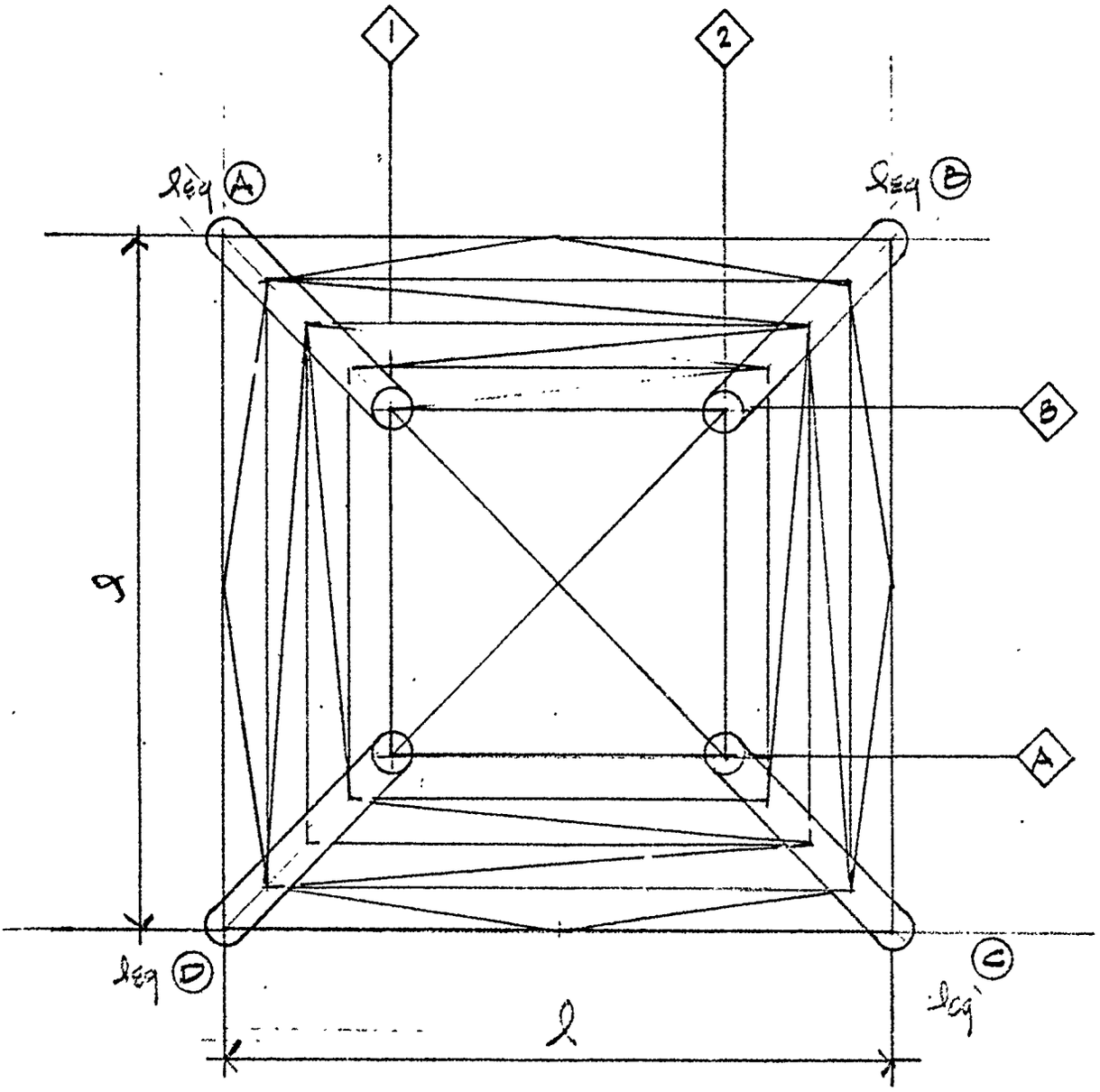
TOP VIEW ON JACKET

Member Sizes:

(i) Bracing: See Pg.

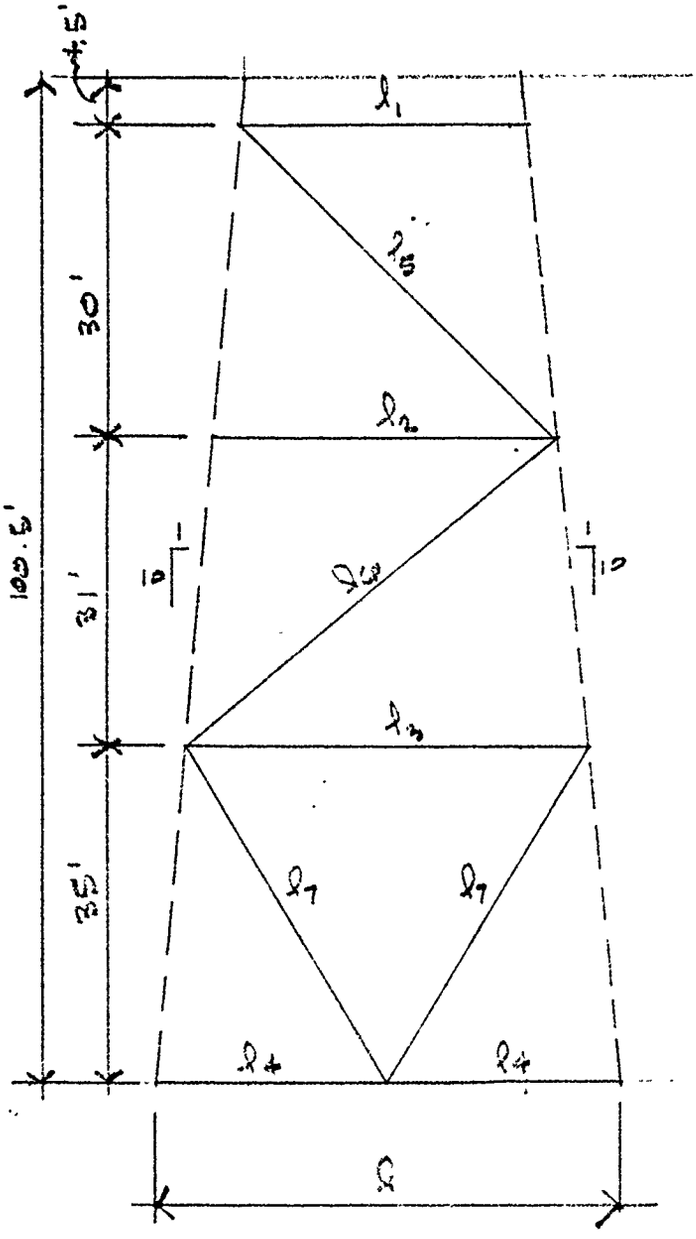
(ii) Leg : (D+4)" ϕ x 0.50" wt.

(iii) Leg Joint Can : (D+5)" ϕ x 1.0 wt.
*D: O.D. of Pipe Piles



By JWA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 4-6-76 Job No. 27-771-92 Calculation STRUCTURAL STL WT VARIATION

BRACING (4 REQ'D)



$l_1 = l - .9(6) \times 2 = l - 19.2$ (ft.)

$l_2 = l - 6.6 \times 2 = l - 13.2$ (ft.)

$l_3 = l - 3.5 \times 2 = l - 7$ (ft.)

$l_4 = l/2 = 0.5\,l$ ft.)

$l_5 = \sqrt{(30)^2 + [l_1 + 3]^2}$

$= \sqrt{(30)^2 + [l - 19.2 + 3]^2}$

$= \sqrt{(30)^2 + (l - 16.2)^2}$

$l_6 = \sqrt{(31)^2 + (l_2 + 3.1)^2}$

$= \sqrt{(31)^2 + (l - 13.2 + 3.1)^2}$

$= \sqrt{(31)^2 + (l - 10.1)^2}$

$l_7 = \sqrt{(35)^2 + (l_4 - 3.5)^2}$

$= \sqrt{(35)^2 + (0.5\,l - 3.5)^2}$

TOTAL LENGTH $L = l_1 + l_2 + l_3 + 2l_4 + l_5 + l_6 + 2l_7$

CREST OFFSHORE, INC.

By WA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4.6.76 Job No. 21.771-92 Calculation STRUCTURAL STEEL WT. VARIATION

Sheet 4 of 4 Sheets

TABLE 4P4-1

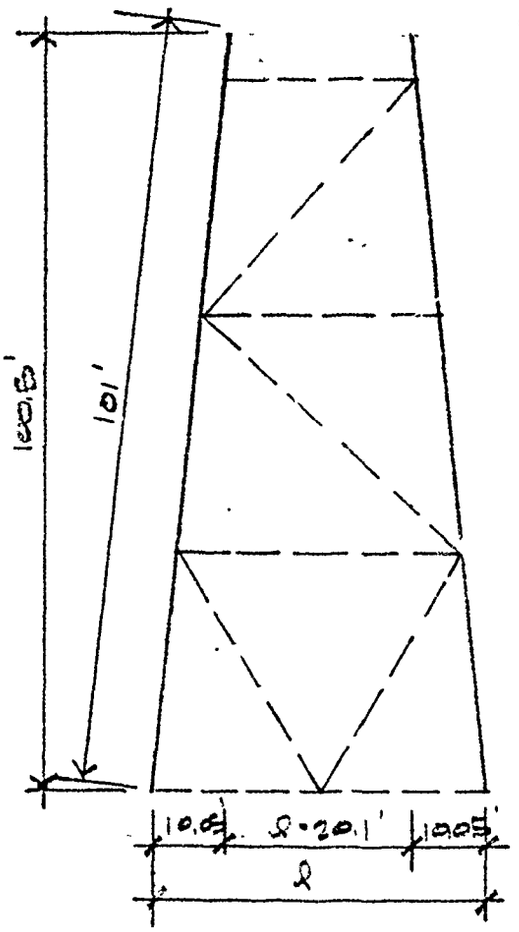
ℓ	ℓ_1	ℓ_2	ℓ_3	ℓ_4^2	ℓ_5	ℓ_6	ℓ_7^2	$\sum(\ell_i)$
	$\ell - 19.2$	$\ell - 13.2$	$\ell - 7$	0.5ℓ	$\sqrt{(30)^2 + (\ell - 16.2)^2}$	$\sqrt{(21)^2 + (\ell - 10.1)^2}$	$\sqrt{(35)^2 + (1.5\ell - 3.5)^2}$	$\ell_1 + \ell_2 + \ell_3 + 2\ell_4 + \ell_5 + \ell_6 + 2\ell_7$
25	15.8	21.8	28	17.5	25.4	39.8	37.7	291.2'
40	20.8	26.8	33	20	38.3	43.1	38.7	279.4'
45	25.8	31.8	38	22.5	41.0	46.7	39.8	308.5
50	30.8	36.8	43	25	45.2	50.6	41.1	338.5
55	35.8	41.8	48	27.5	49.0	54.0	42.4	368.4
60	40.8	46.8	53	30	53.1	58.7	43.9	400.2

ALL UNITS IN FT.
FOR 1 SIDE

TABLE 4P4-2 JACKET BRACING WT./SIDE

BASE SPACING (FT.)	BRACE MEMBER SIZE	TOTAL BRACE MEMBER LENGTH (FT.) (SEE TABLE 4P3-1)	UNIT WT. (LBS/FT.)	TOTAL WT. (LBS.)
35	18"φ x 0.50	251.2	93.45	23,475
40	" "	279.4	"	26,110
45	" "	303.5	"	28,329
50	" "	338.5	"	31,633
55	" "	368.4	"	34,427
60	" "	400.2	"	37,399

4.3 JACKET LEG (4-REQ'D) WEIGHT



JOINT CAN : 8'-0" LONG
1.0" TK.
4 JOINTS
TOTAL LENGTH = 4 x 8 = 32'

JACKET LEG : 0.50" TK.

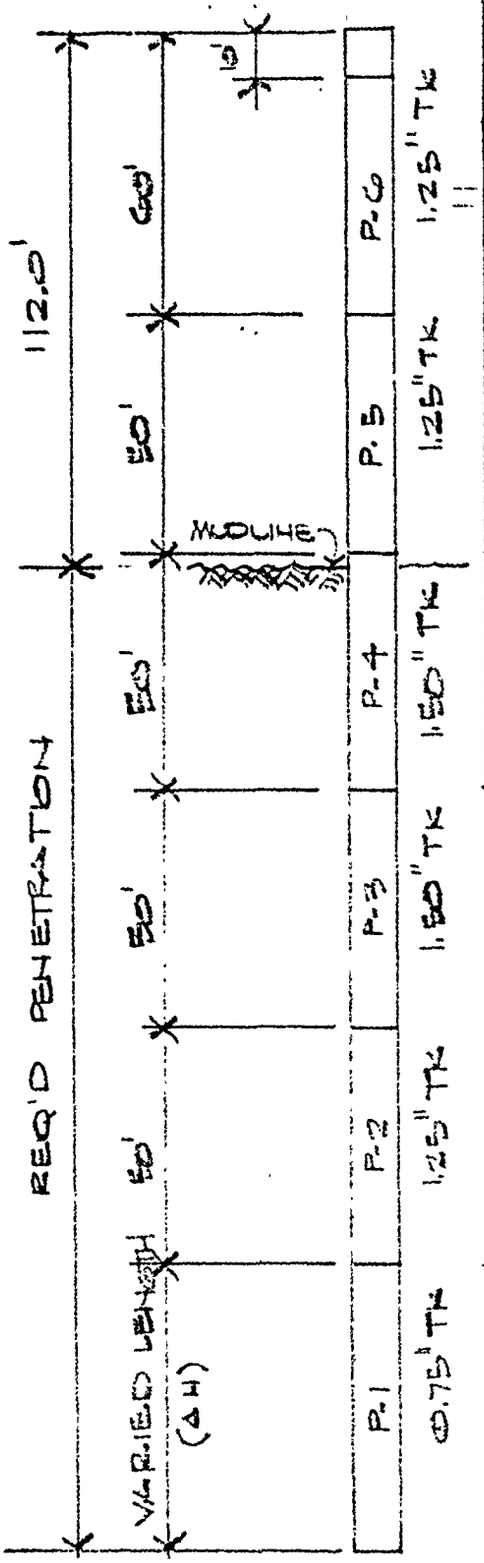
TOTAL LENGTH = 101.0' - 32.0' = 69.0'

TABLE 4P4-3

PILE O.D. (IN.)	SIZE X LENGTH	UNIT WT. (LBS./FT.)	TOTAL WT. (LBS.)
JACKET LEG			
36	40"ϕ x .5 x 69'	210.93	14,554
JACKET CAN			
36	41" ϕ x 1.0 x 32'	427.21	13,671
TOTAL WT.			28,225

By WA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 4.6.76 Job No. 27-171-92 Calculation STRUCTURAL STEEL WT VARIATION

4.4 PILING (4-REQ'D)



ΔH = [Req'd Penetration + 112] · 260
+ Req'd Penetration − 148

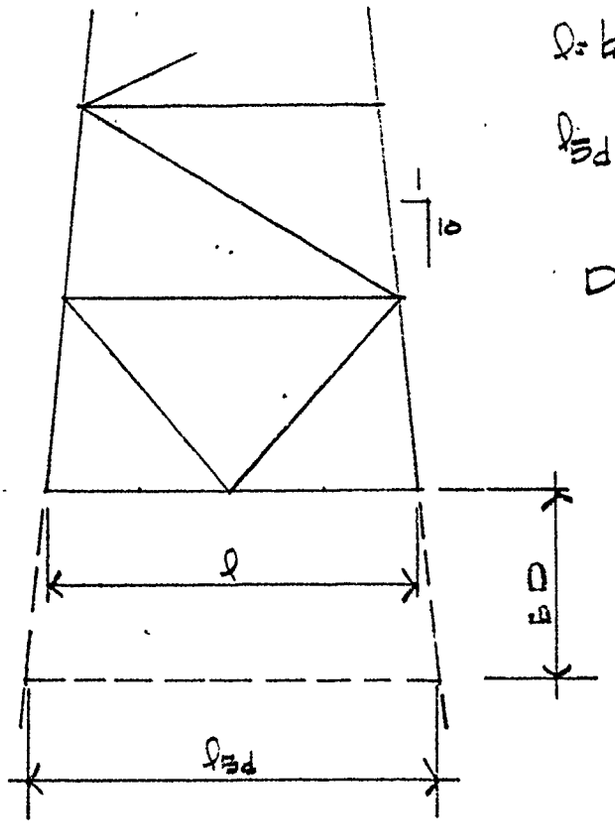
TABLE 4.P4-4

PIPE PILE	WT. (LBS/FT)	LENGTH (FT.)	TOTAL WT. (LBS)
P-6 30"ϕ x 1.25"	463.92	60	27,835
P-5 30"ϕ x 1.25	463.92	50	23,196
P-4 30"ϕ x 1.50	552.7	50	27635
P-3 30"ϕ x 1.50	552.7	50	27635
P-2 30"ϕ x 1.25	463.92	50	23,196
P-1 30"ϕ x 0.75	282.30	ΔH	282.30 ΔH
TOTAL WT = 129,497#			+ 282.30 ΔH

By WMS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4.6.76 Job No. 21-771-92 Calculation STRUCTURAL SYS. OPT. VARIATION

RELATION SHIP BTWEEN ℓ AND ℓ_{5d}



ℓ = base spacing @ mudline

ℓ_{5d} = base spacing @ 5D below mudline

D = pile outside diameter = 36"

$\therefore 5D = 5 \times 3' = 15$

$\ell_{5d} = \ell + \frac{15}{10} \times 2$

$= \ell + 3'$

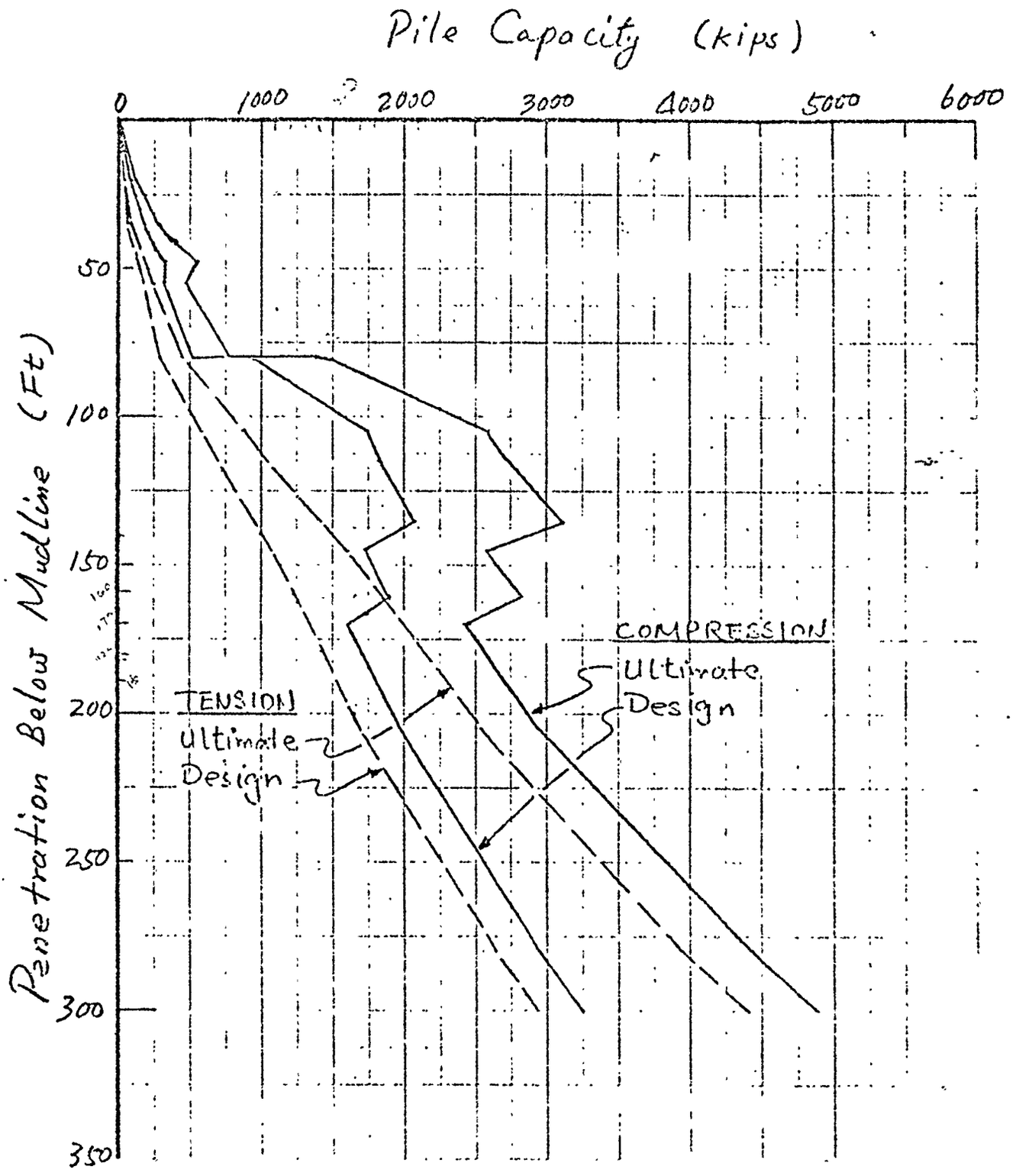


FIGURE 4P4-1

36-in. Diameter Pipe Piles

TABLE 4P4 - 5 P=60 - 14.0 DIAMETER PIPE PILES - WT /LEG

PILE SPACING		REQ'D PILE CAPACITY (KIPS, PER PILE, 4PILES)		REQ'D PILE (PER PILE, 4 PILES)	PILE WEIGHT PER FT		TOTAL WT = 129,447 # + 282,260 ΔH (1 PILE)
P	P_{BD}	COMPRESSION	TENSION		ΔH	282,260 ΔH	
FT.	FT.	KIPS	KIPS	FT.	FT.	LBS	LBS
35	28	2125	1875	2100 *	77	21,742	181,239
40	33	1815	1650	2000 *	52	14,683	144,180
45	38	1720	1500	1850 *	37	10,447	139,447
50	43	1580	1350	1720 *	24	6,777	136,274
55	48	1450	1225	1600 *	12	3385	132,885
60	53	1350	1125	1550 *	2	565	130,012

NOTES: P = base spacing C round line

P_{BD} = base spacing @ 5D below mudline

= P + 2D

ΔH = Pile penetration length = Penetration Req'd - 148

* denotes this value governs.

4.5 TOTAL WEIGHT OF STRUCTURE

$$W_T = W_P + W_J + W_S + W_M \qquad (1)$$

where W_T = TOTAL WEIGHT of STRUCTURE

W_P = WEIGHT of PILING

W_J = WEIGHT of JACKET

W_S = WEIGHT of SUPERSTRUCTURE

W_M = WEIGHT of MISCELLANEOUS ITEMS such as boat landing, walkway, etc...

Assume: superstructure & miscellaneous remain constant

$$W_S + W_M = \text{CONSTANT} = K$$

Therefore

$$W = W_P + W_J + K \qquad (2)$$

neglecting K

$$W = W_P + W_J \qquad (3)$$

$W =$ 4 W_P + 4 (wt. jacket legs + wt jacket bracing)

$$W_T = 4(W_P + W_J) \qquad (4)$$

By JMA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4.6.76 Job No. 27-701-92 Calculation STRUCTURAL STL WT VARIATION

TABLE 4P4-C TOTAL WT's for 4 FILE w/ 30" ϕ PILES

BASE SPACING AT MUDLINE	WEIGHT				
	JACKET		PILING	TOTAL for 1-SIDE	TOTAL for STRUCTURE Tx4/2000
	LEG TABLE 4P3-3	BRACES TABLE 4P3-2	TABLE 4P3-5		
FT.	LBS	LBS	LBS	LBS	TONS
35	28,225	23,475	151,239	202,939	405.9 T
40	"	26,110	144,180	196,515	397.0 T
45	"	28,329	139,444	196,998	394.0 T
50	"	31,035	136,274	196,132	392.3 T
55	"	34,427	132,885	195,537	391.1 T
60	"	37,399	130,062	195,686	391.4 T

SECTION 5

STRUCTURAL CONFIGURATION

5.1 INTRODUCTION

With a jacket leg base spacing of 50' choosen from Section 4, the structure is drawn showing dimensions and assumed member sizes.

Section 5.2 shows the four (4) faces of the jacket and the jacket bracing plan at various elevations. The lengths of members are computed and their KL/r ratios established in Table 4P5-1.

Section 5.3 shows a typical elevation of the superstructure.

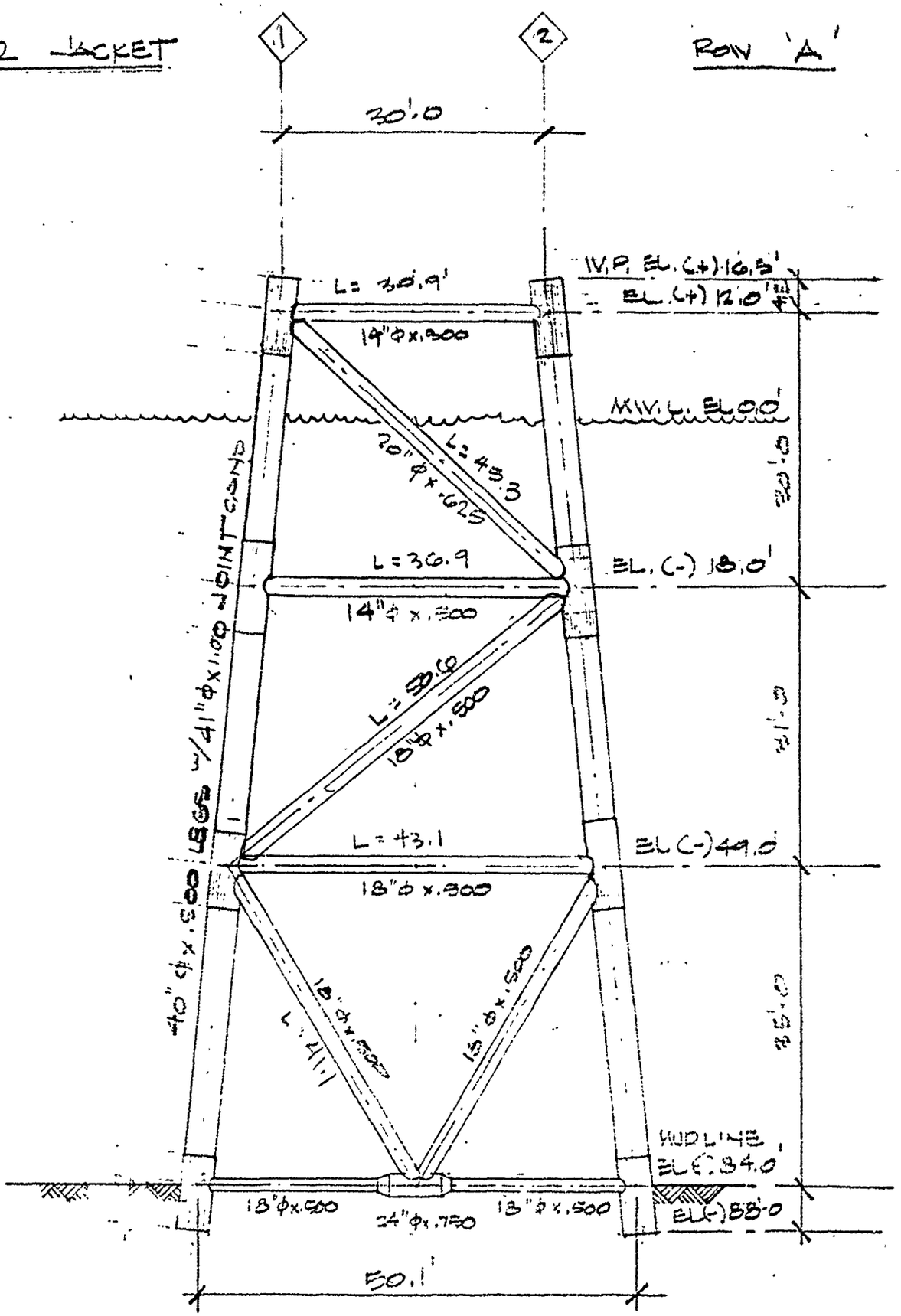
Section 5.4 computes the preliminary deck beam sizes for both upper and lower decks.

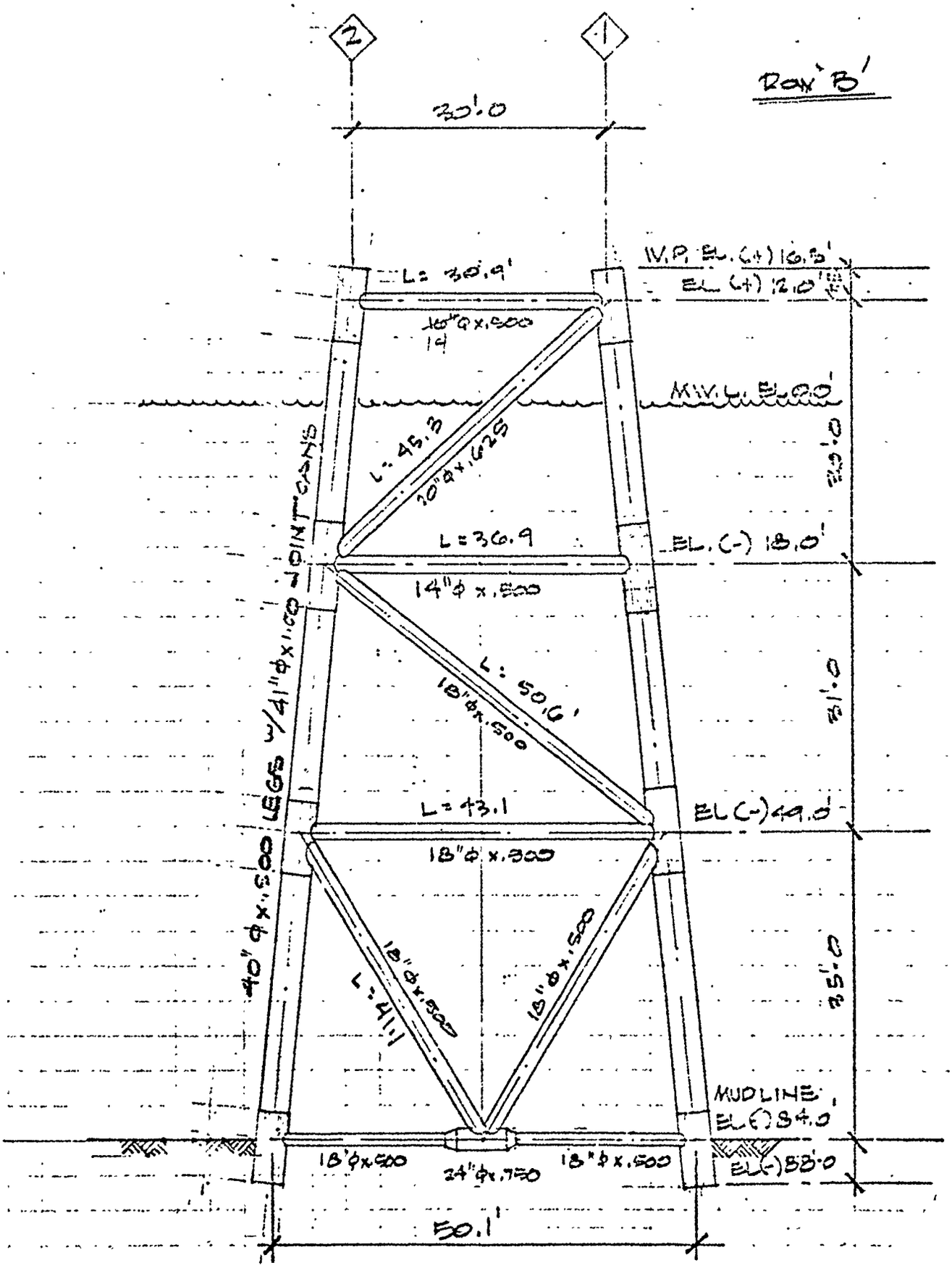
By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

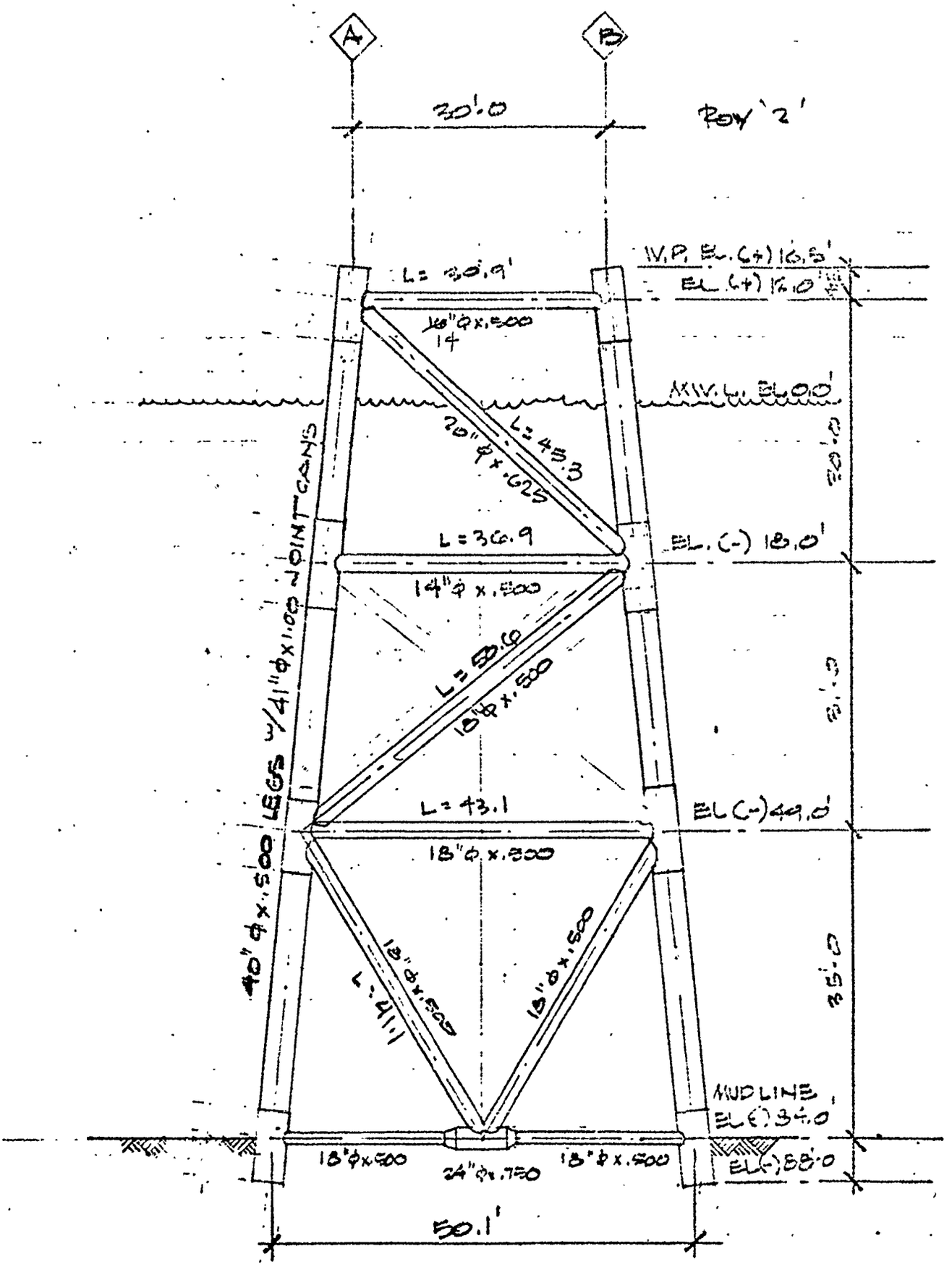
Date 4.6.70 Job No 21-771-72 Calculation STRUCTURAL CONFIGURATION

5.2 JACKET

ROW 'A'




2
1
ROW 'B'
30'.0
L= 30.9'
M.P. EL. (+) 16.5'
EL (+) 12.0'
16"ϕ x.500
14
M.W.L. EL.0.0'
L= 45.3
20"ϕ x.625
20'.0
L=36.9
EL. (-) 18.0'
14"ϕ x.500
L= 50.6'
18"ϕ x.500
31'.0
4 JOINT CANS
3/4" ϕ x 1.00 LEGS
40" ϕ x .500
L=43.1
EL (-) 49.0'
18"ϕ x.500
L=41.1'
18"ϕ x.500
18"ϕ x.500
35'.0
MUDLINE EL (-) 84.0'
18"ϕ x.500
24"ϕ x.750
18"ϕ x.500
EL (-) 88'.0
50.1'

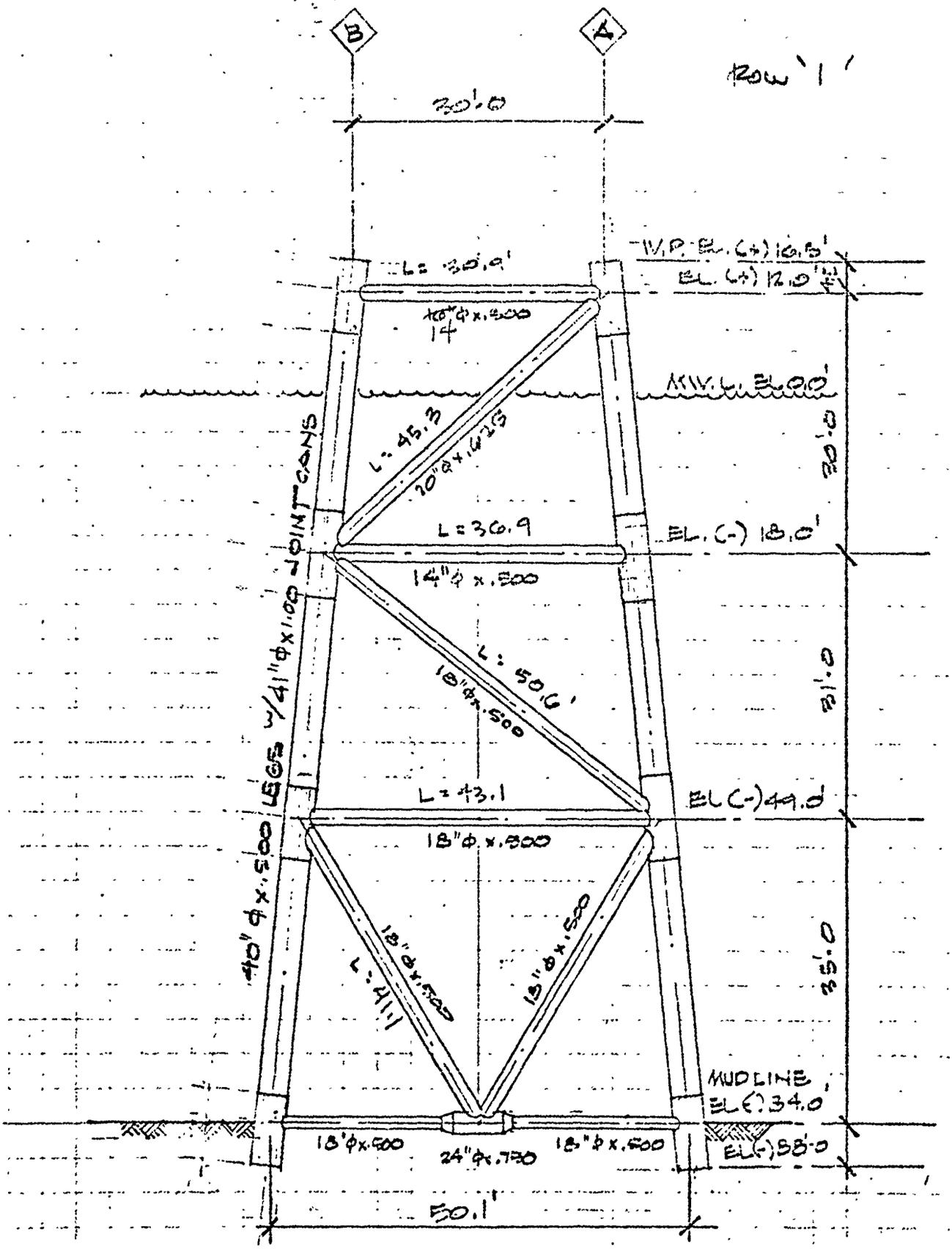

A
B
30'.0
Row '2'
L = 30.9'
W.P. EL. (+) 16.5'
EL. (+) 12.0'
16"ϕx.500
14
MW. EL. 0.0'
20"ϕx.625
L = 45.3
20'.0
L = 36.9
EL. (-) 18.0'
14"ϕ x .500
L = 50.6
18ϕx.500
21'.0
4 LEGS 3/4" ϕx1.00 JOINT CANS
L = 43.1
EL (-) 49.0'
18"ϕ x.500
40" ϕx.500
18"ϕx.500
L = 41.1
18"ϕx.500
35'.0
MUD LINE
EL (-) 34.0'
18"ϕx.500
24"ϕx.750
18"ϕx.500
EL (-) 88.0
50.1'

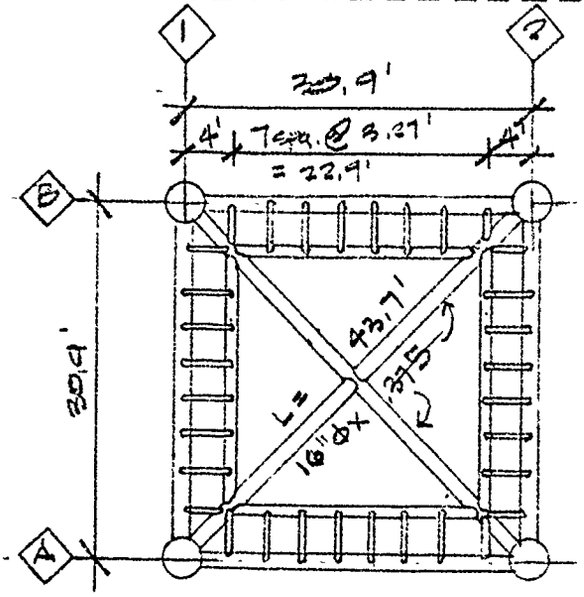
CREST OFFSHORE, INC.

Sheet 3.05 - 4 PILE

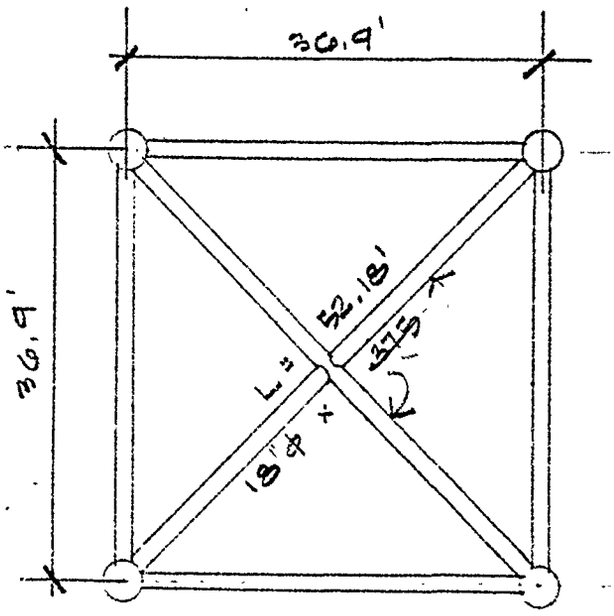
By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4.6.76 Job No. 421-71-121 Calculation STRUCTURAL CONFIGURATION

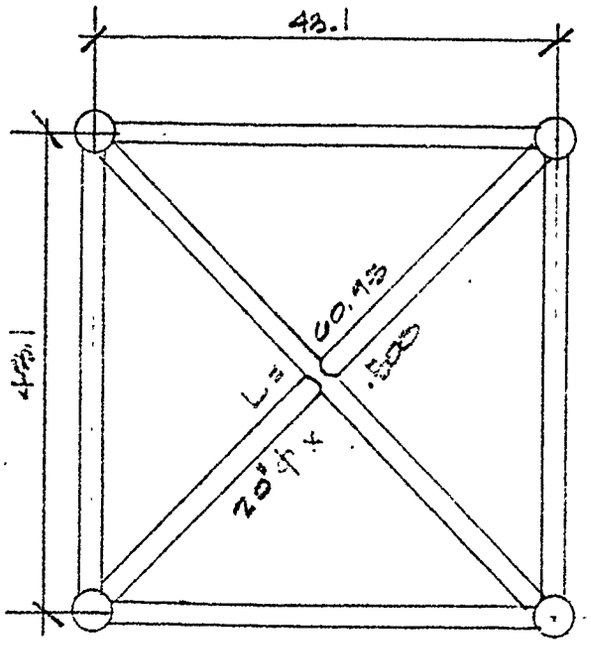




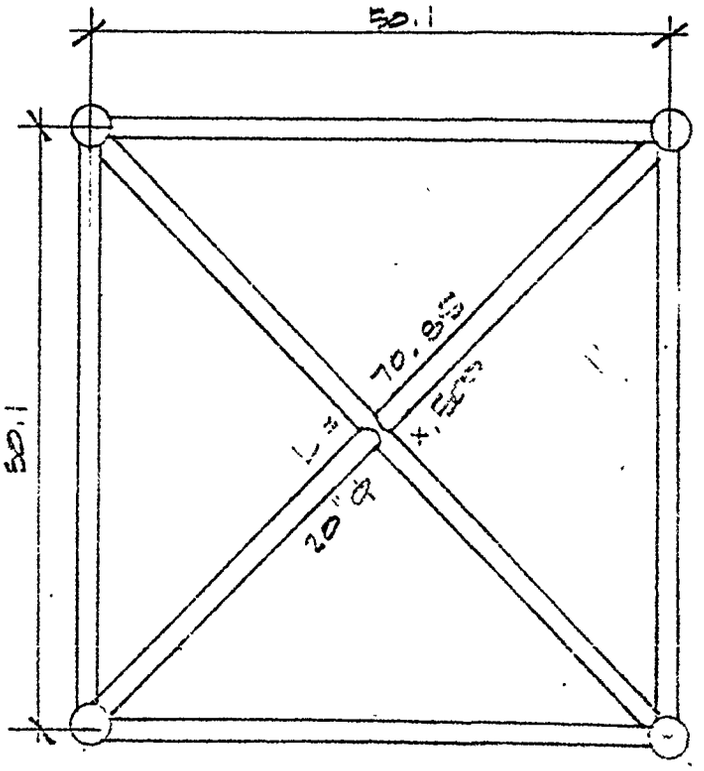
PLAN @ ELEV. (+) 12'



PLAN @ ELEV (-) 18'



PLAN @ EL. (-) 49'



PLAN @ EL (-) 84'

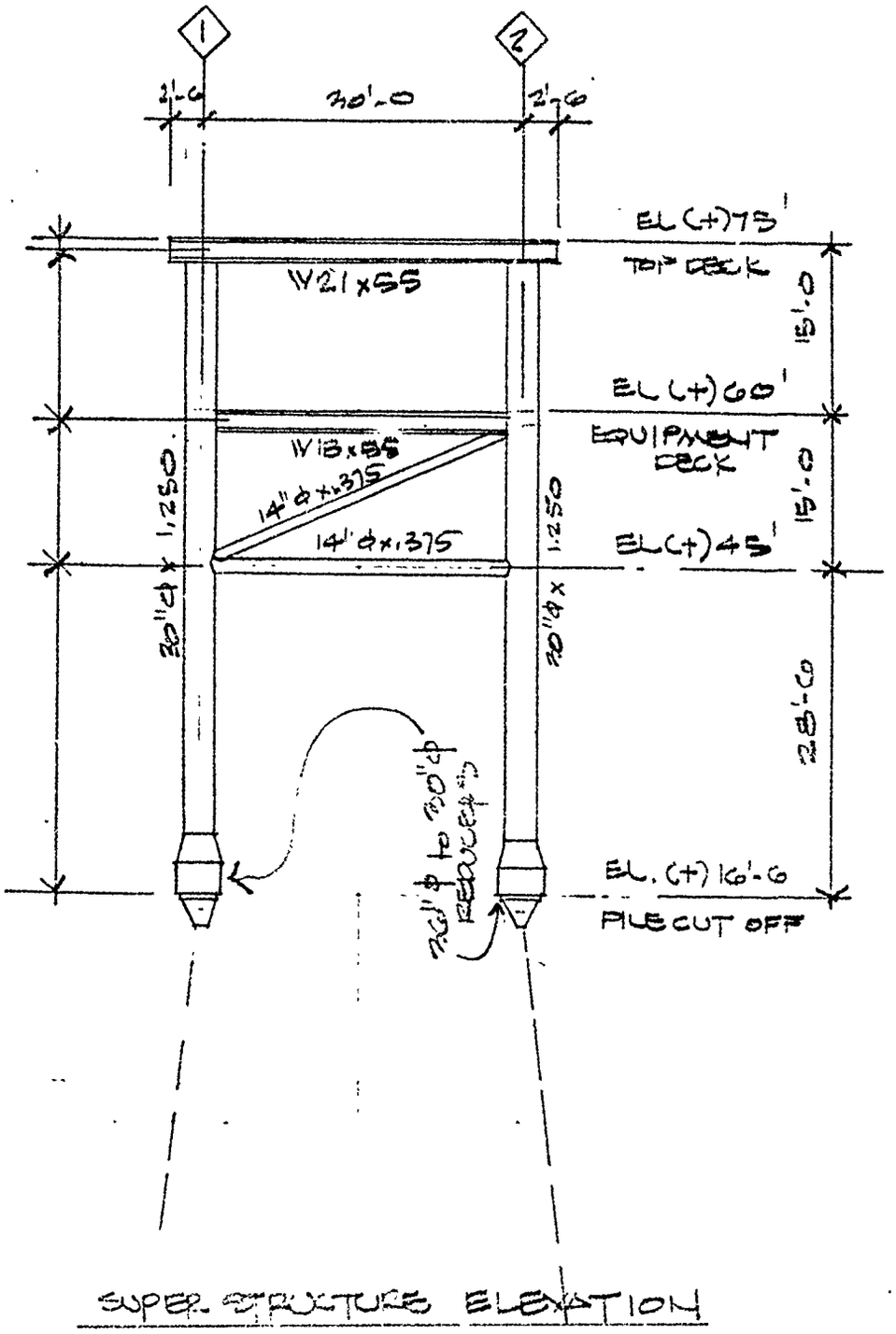
By WA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-7-72 Job No. 21-771-92 Calculation STRUCTURAL CONFIGURATION

TABLE 4P5-1 $\frac{KL}{r}$ RATIO'S for BRACING MEMBERS

LOCATION	MEMBER SIZE	K	L	r	$\frac{KL}{r}$
	14"ϕ x .500	0.7	30.9	4.82	54 ✓
HOR. BRACING	16"ϕx .500	0.7	30.9'	5.484	47
	12¾"ϕx .500	"	30.9'	4.335	72 ✓
	18"ϕx .500	"	43.1'	6.191	58 ✓
	18"ϕx .500	"	25'	6.191	34 ✓
DIAG. BRACING	20"ϕx .625	0.8	45.3	6.855	63 ✓
	18"ϕx .500	"	50.6	6.191	78 ✓
	18"ϕx .500	"	41.1	6.191	64
INT. X-BRACING	14"ϕx .375	0.8	43.7'	4.820	87
	14"ϕx .375	"	52.18'	4.820	104
	18"ϕx .500	"	60.95'	6.191	95
	18"ϕx .500	"	70.85'	6.191	110
elev. +12	16"ϕx .500	"	43.7	5.484	76 ✓
	16"ϕx .500	"	52.18	5.484	91
elev -49	20"ϕx .500	"	60.95	6.897	85 ✓
	20"ϕx .500	"	70.35	6.897	99
elev -18	18"ϕx .500	"	52.18	6.19	81 ✓
elev. -84	20"ϕx .500	"	350	6.897	50 ✓

5.2



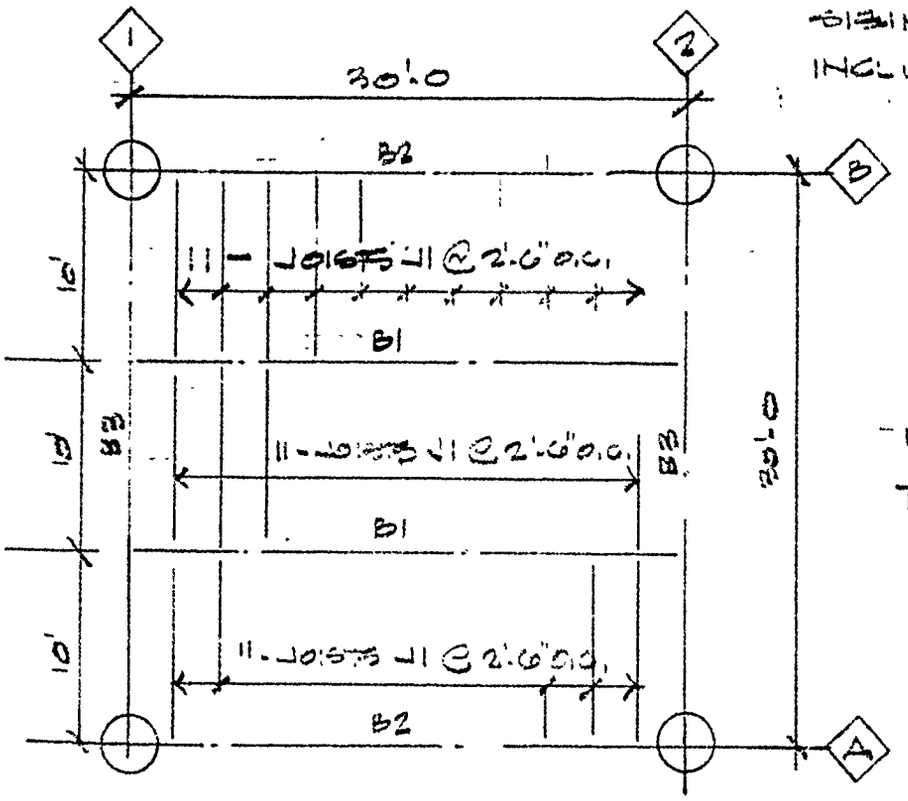
SUPER STRUCTURE ELEVATION

5.4 DECK LAYOUTS

LOADINGS
UPPER DECK 100 PSF
LOWER DECK 150 PSF

USE 30'x30' BAY SPACING
30"ϕ COLUMNS

PRELIMINARY BEAM SIZING - DOES NOT INCLUDE WIND LOADING

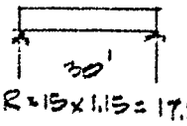


UPPER DECK FRAMING PLAN

DEAD LOAD
4" GRID ϕ = 10.2 PSF
JOISTS = 1.8 "
MISC. = 3.0 "
15 "
LIVE LOAD = 100 PSF
TOTAL LOAD = 115 PSF

BEAM B1

$w = 10' \times 0.115 + 0.04 = 1.19$



$M = 1.19(30)^2/8 = 133.9^{IK}$

$S_R = 133.9 \times 12/24 = 66.9 in^3$

Allowable $= L/240 = \frac{30 \times 12}{240} = 1.5"$

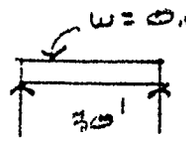
$I_R = \frac{5(1.19)(30)^4 1.728}{384 \times 29 \times 1.5} = 498.6 in^4$

try W18x40 w/ $S_x = 68.4 in^3$ $L_c = 6.4$
$I_x = 612 in^4$

By WMA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 7-26-72 Job No. 31-111-72 Calculation STRUCTURAL CONFIGURATION

BEAM B2 $w = 115\ PSF \times 5' + 40 = 615\ \#/'$



$R = 15 \times .615 = 9.23^k$

$M = 0.615(30)^2/8 = 69.2\ ^{IK}$

$S_R = 69.2 \times 12/24 = 34.60\ in^3$

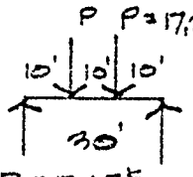
$I_R = \frac{5(.615)(30)^4 1.728}{384 \times 29 \times 1.5} = 257.7\ in^4$

Try W16x26 w/ $S_x = 38.3$ $L_c = 5.6'$

$I_x = 428$

BEAM B3

$w = 1.25' \times 115\ PSF + 40 = 183.75\ \#/'$



$R = 17.25^k$

$M = 17.25^k \times 10' + 0.184(30)^2/8 = 172.5^{IK} + 20.7 = 193.2\ ^{IK}$

$S_R = 193.2 \times 12/24 = 96.60\ in^3$

$FEM = -\frac{2P_3}{9} = -\frac{2(17.25)(30)}{9} = 115^{IK}$

$+wL^2/12 = 0.184(30)^2/12 = 13.8$

128.8^{IK}

$+M = 193.2$

-128.8

$+64.4^{IK}$

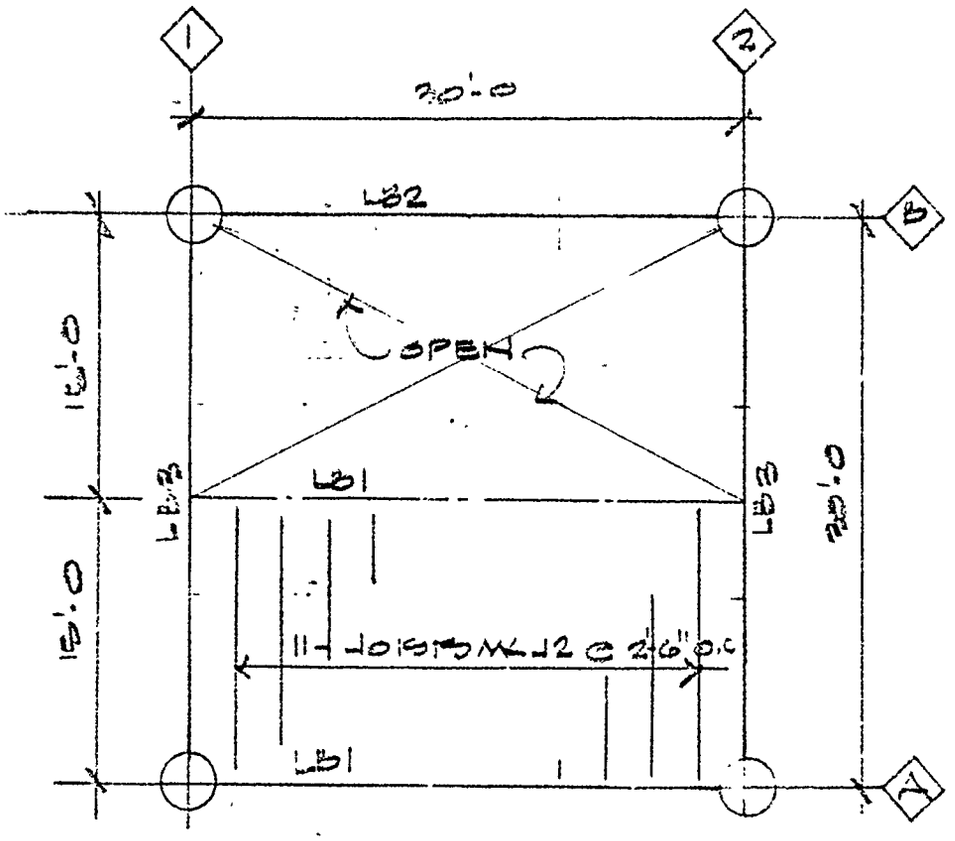
USE W21x55 w/ $S_x = 95.4\ in^3$

$L_c = 8.7$

$L_u = 9.5$

CREST OFFSHORE, INC.

By JWA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 4-6-76 Job No. 27-771-92 Calculation STRUCTURAL CONFIGURATION

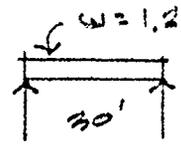


LOWER DECK FRAMING PLAN

DEAD LOAD
4" CK'D PL: 10.2 PSF
JOISTS = 1.8 "
MISC = 3.0 "
15.0 PSF
LIVE LOAD = 150 PSF
TOTAL LOAD = 165 PSF

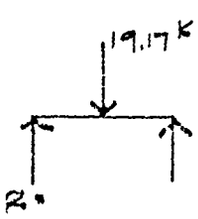
BEAM LB1

$w = 165^{\#}/_{SF} \times 7.5' + 40 = 1,277.5^{\#}/_{'}$



$M = 1.278(30)^2/8 = 143.8^{'K}$ (simple)
$S_R = 143.8 \times 12/24 = 71.9\ in^3$
$FEM = 1.278(30)^2/12 = 95.85$
$S_R = 47.93\ in^3$
$+M = 143.8 - 95.9 = 47.9^{'K}$

BEAM LB3 $w = 1.25 \times 165 + 40 = 246$



$M = 19.17(30)/4 + 0.246(30)^2/8 = 171.4^{'K}$ (simple)
$S_R = 85.7\ in^3$
$FEM = -PL/8 - wL^2/12 = -19.17(30)/8 - .246(30)^2/12 = -90.3$
$+M = 171.4 - 90.3 = 81.1$
$S_R = 90.3 \times 12/24 = 45.15$

USE W 18 x 50 w/ $S_x = 98.4$ $L_c = 8.0$
FOR LB1, LB2, LB3 $L_u = 12.1$

SECTION 6

50 FT JACKET BASE SPACING

6.1 INTRODUCTION

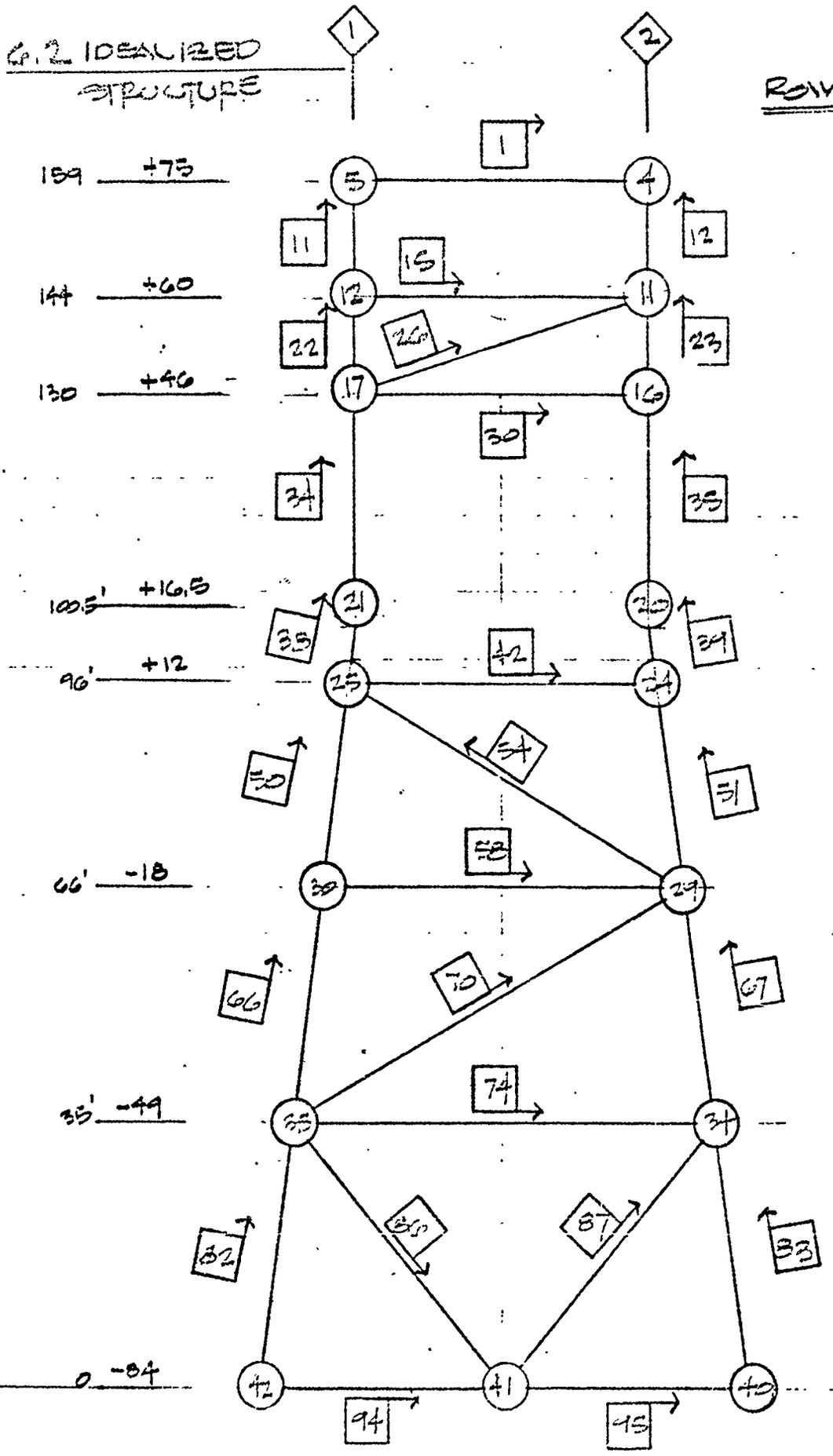
The idealized structural model is shown in Section 6.2 with the joint numbers, member numbers and directions. In order to simulate the behavior of the platform structure, fictitious wishbone members are introduced to connect the jacket leg joints and the piles. These members are coded not to take any wave forces. They will be ignored by SEALOAD but are necessary for STRAN. The dead load report from SEALOAD will, however, include weights for the wishbones which will have to be subtracted out for the computations of the laterally loaded pile.

Section 6.3 gives the direction of wave and wind loading data.

All information was coded on keypunch forms, cards were punched and assembled with the cards from Section 2 'Grid Wave Data' to form a complete SEALOAD deck. A computer run was made and the results saved on a tape. Section 6.4 shows the input information and the load summary reports of that run.

6.2 IDEALIZED STRUCTURE

ROW A

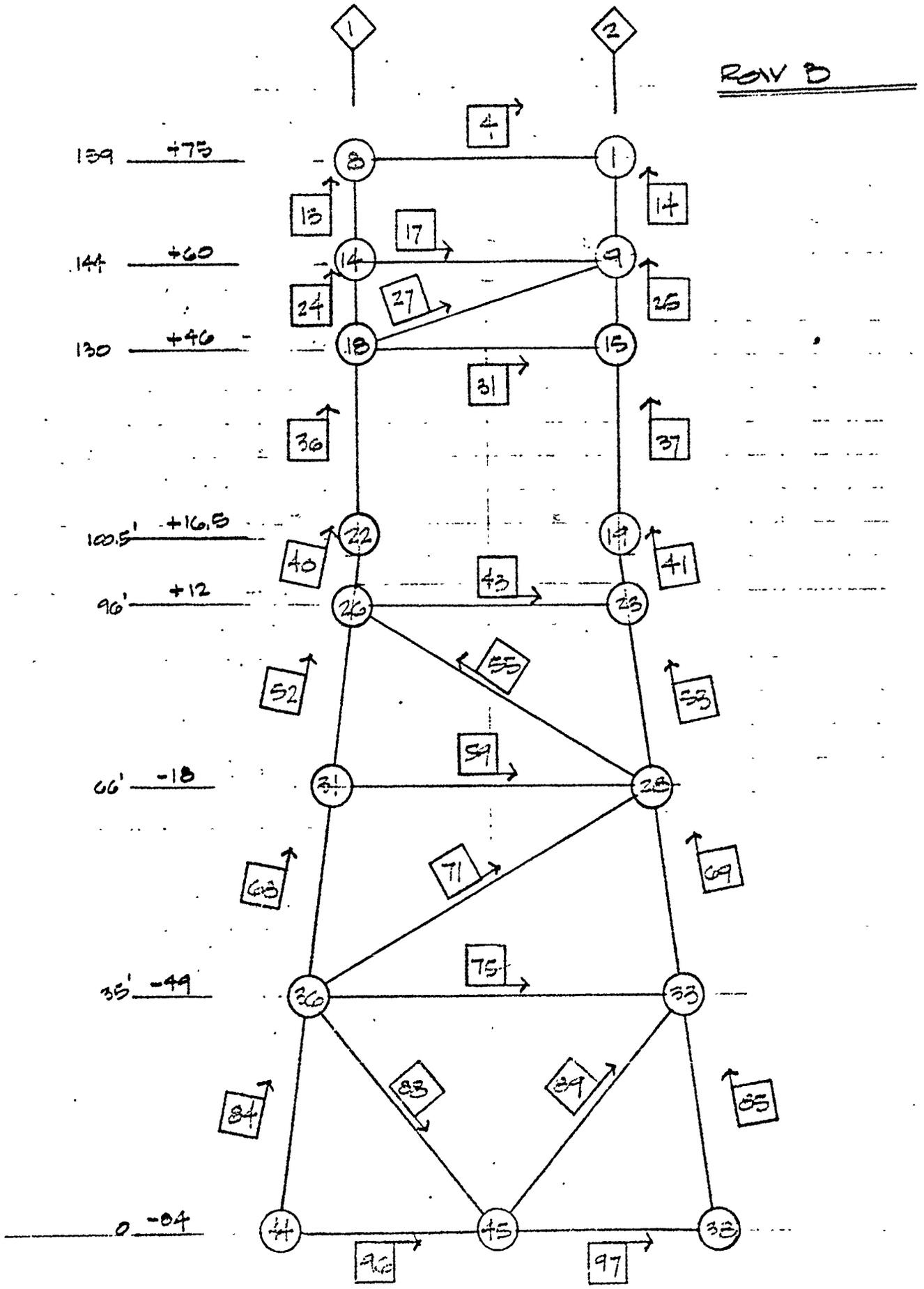


CREST OFFSHORE, INC.

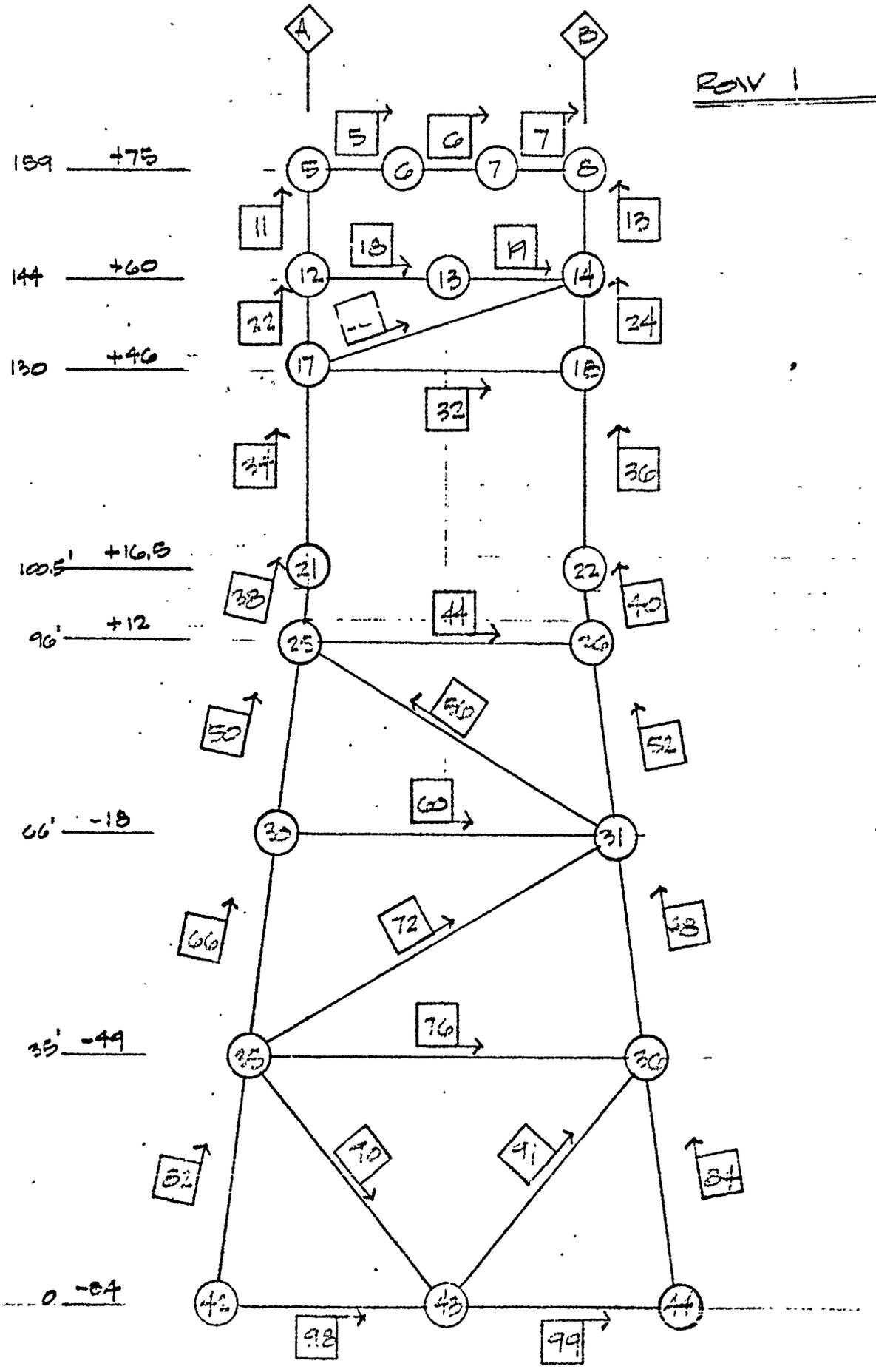
Sheet 6.03 of 7 PILE

By WSA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-6-92 Job No. 27-771-92 Calculation STRUCTURE W/L = 50 FT



ROW 1

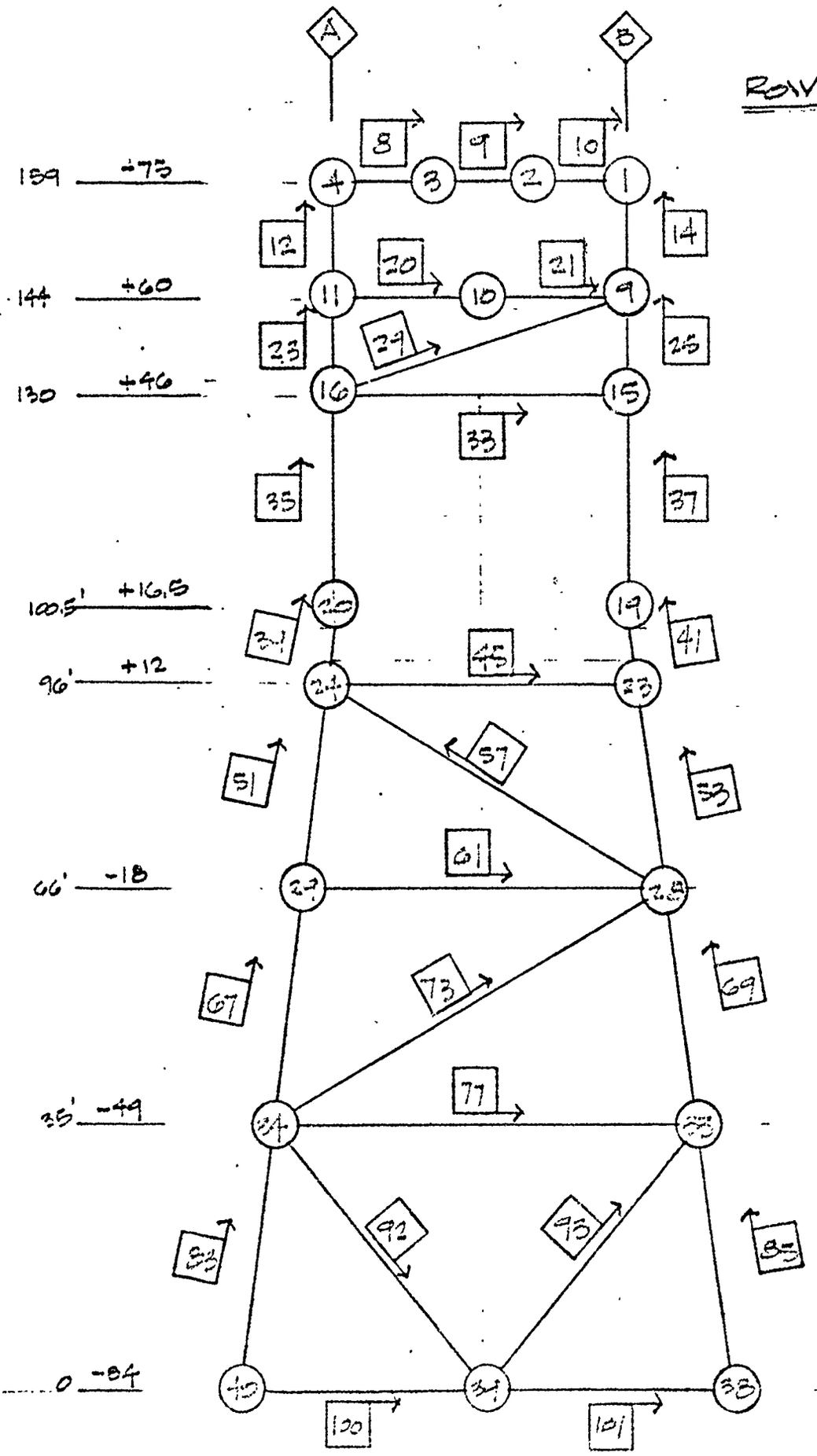

A
B
159 +75
144 +60
130 +46
100.5' +16.5
96' +12
66' -18
35' -49
0 -84
5
6
7
8
11
12
13
14
17
18
21
22
25
26
30
31
35
36
42
43
44
98
99

CREST OFFSHORE, INC.

Sheet 25 of 42 PLE

By WA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-9-76 Job No. 27-771-92 Calculation STRUCTURE 1"/L=50'

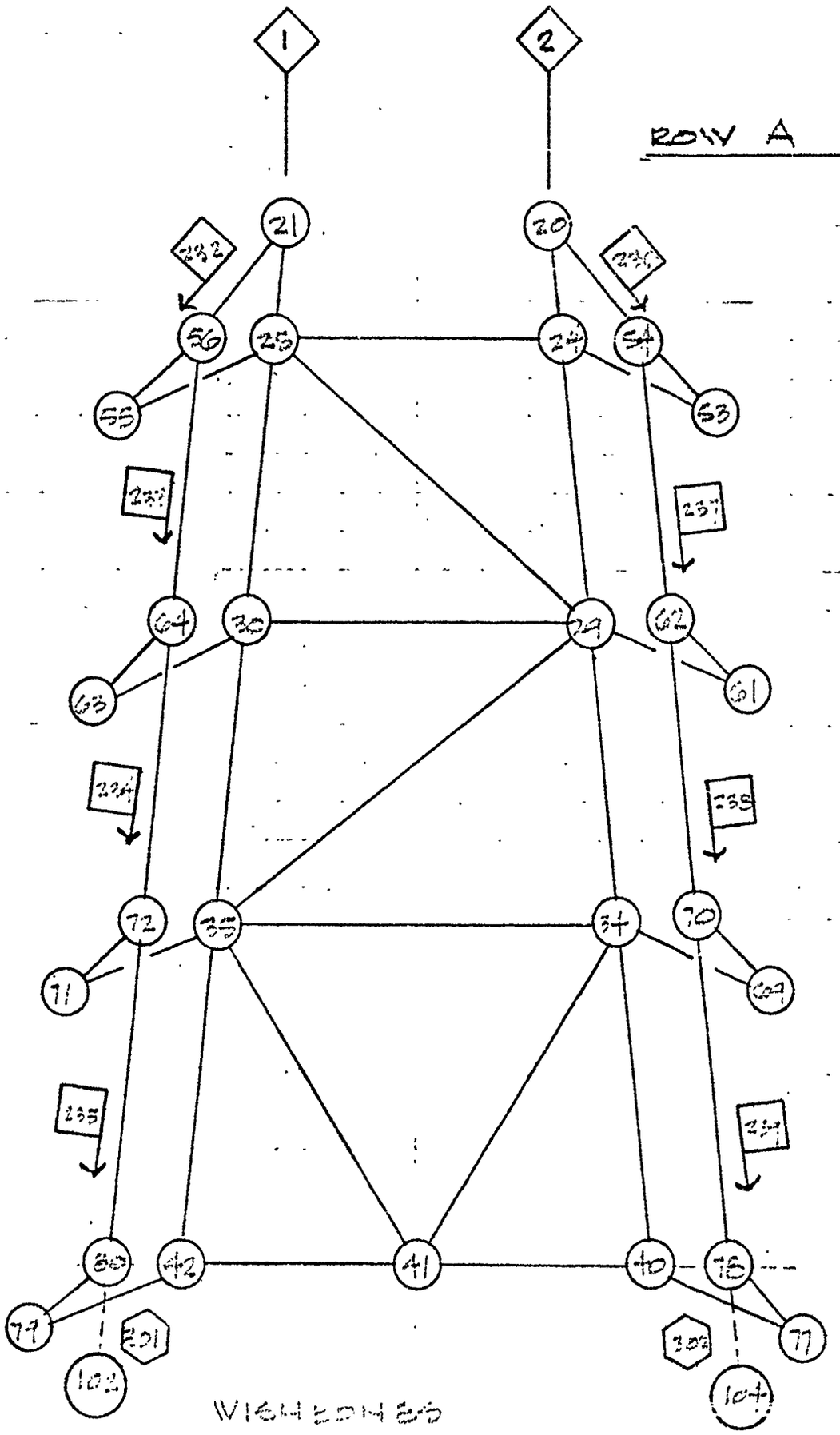


CREST OFFSHORE, INC.

Sheet 6.26 of 4 PILES

By WWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-6-76 Job No. 21-771-92 Calculation STRUCTURE W/ L = 50'

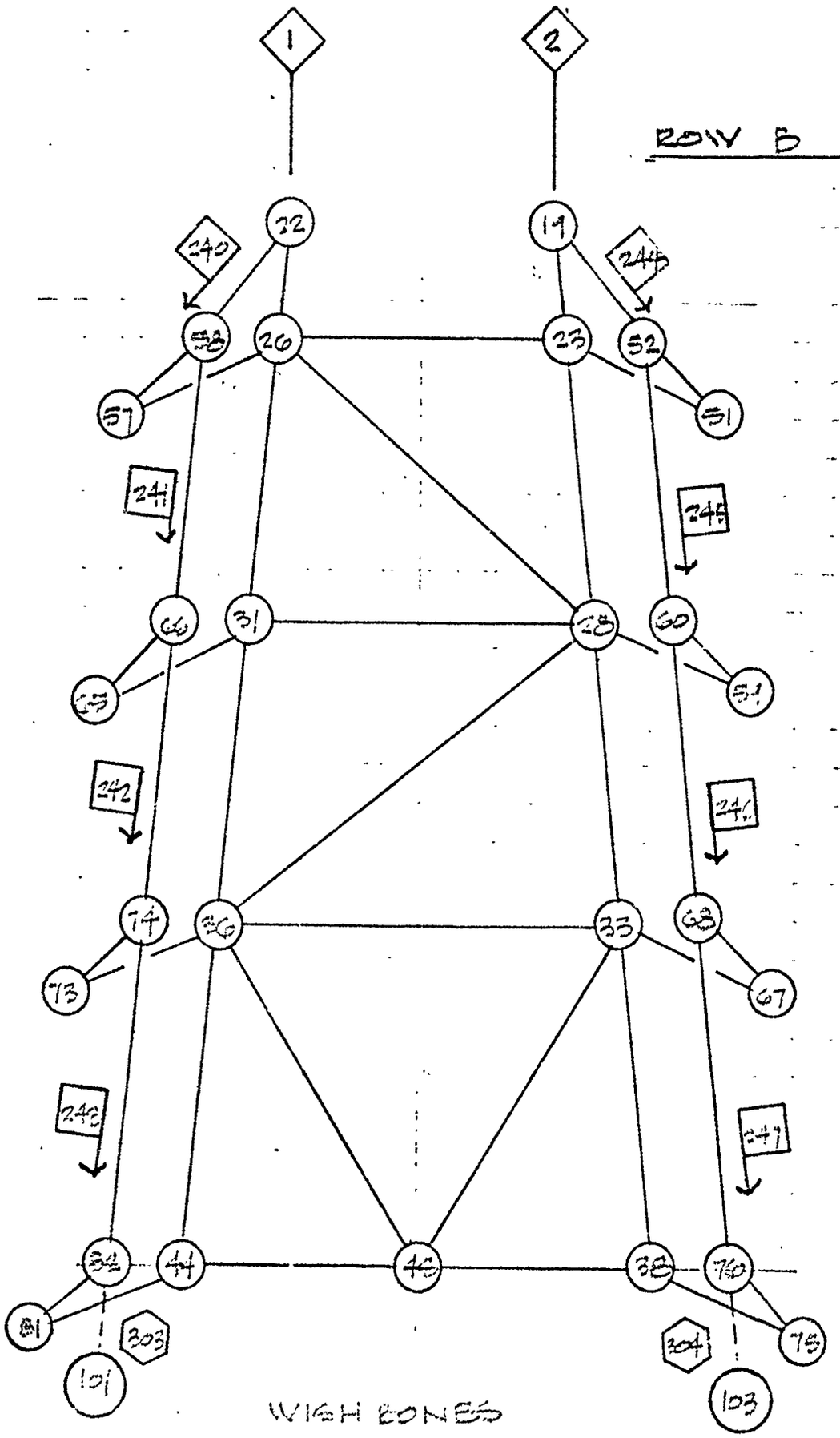


CREST OFFSHORE, INC.

Sheet 607 of 4 PILES

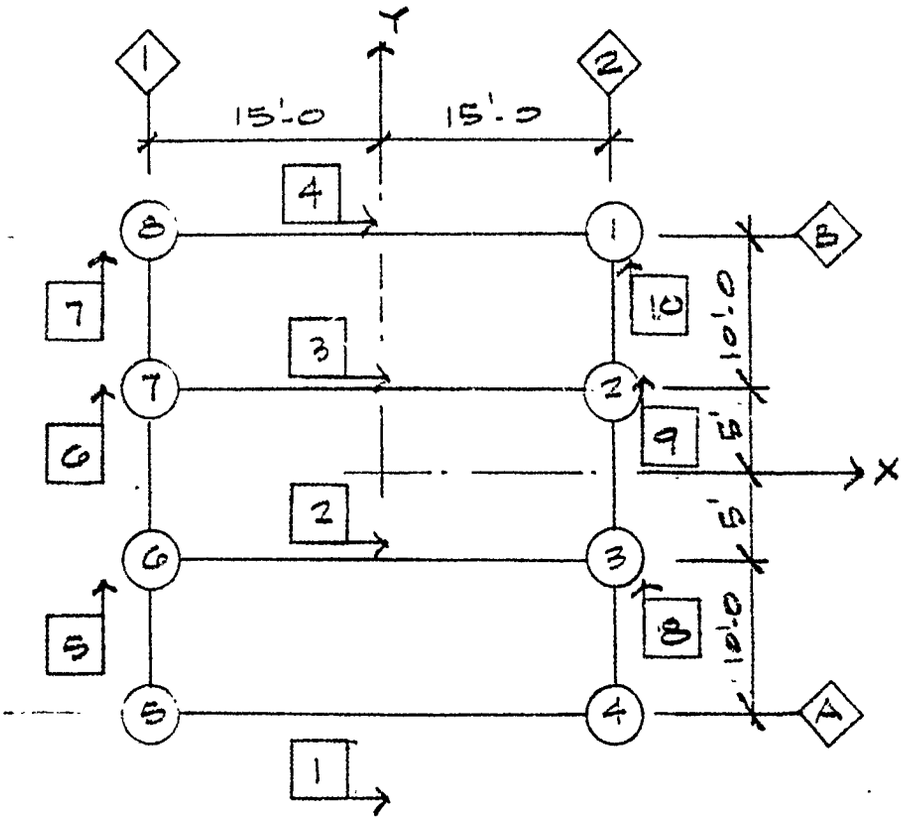
By WWA Client U.S. NAVY Subject STRUCTURAL CONCRET ANALYSIS

Date 4-4-16 Job No. 21-171-92 Calculation STRUCTURE W/ L = 50'

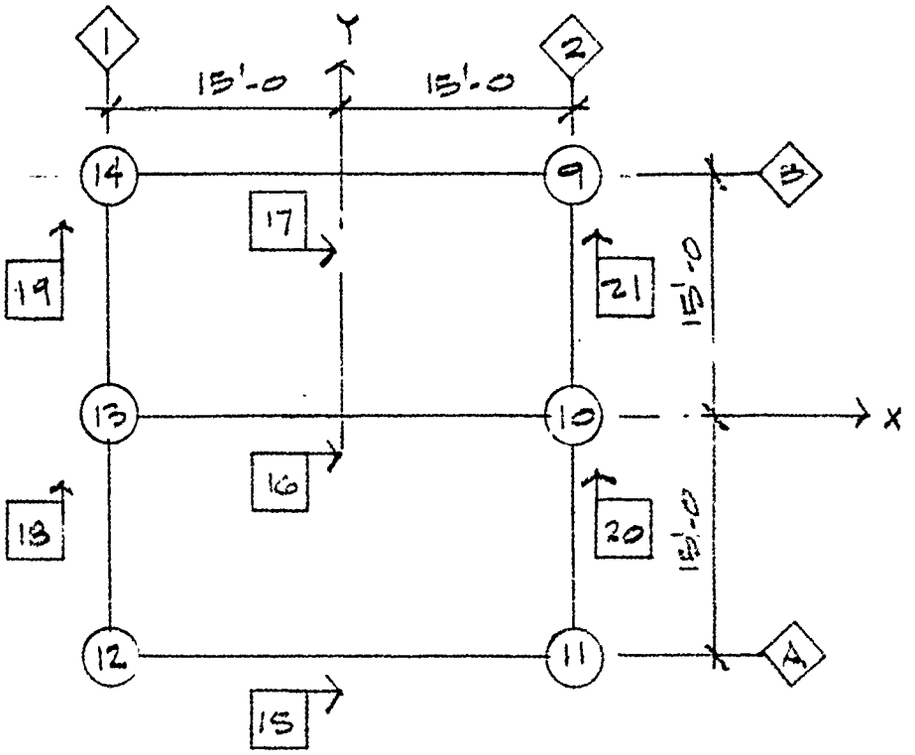


By WA Client USL HAYT Subject STRUCTURAL CONCEPT ANALYSIS

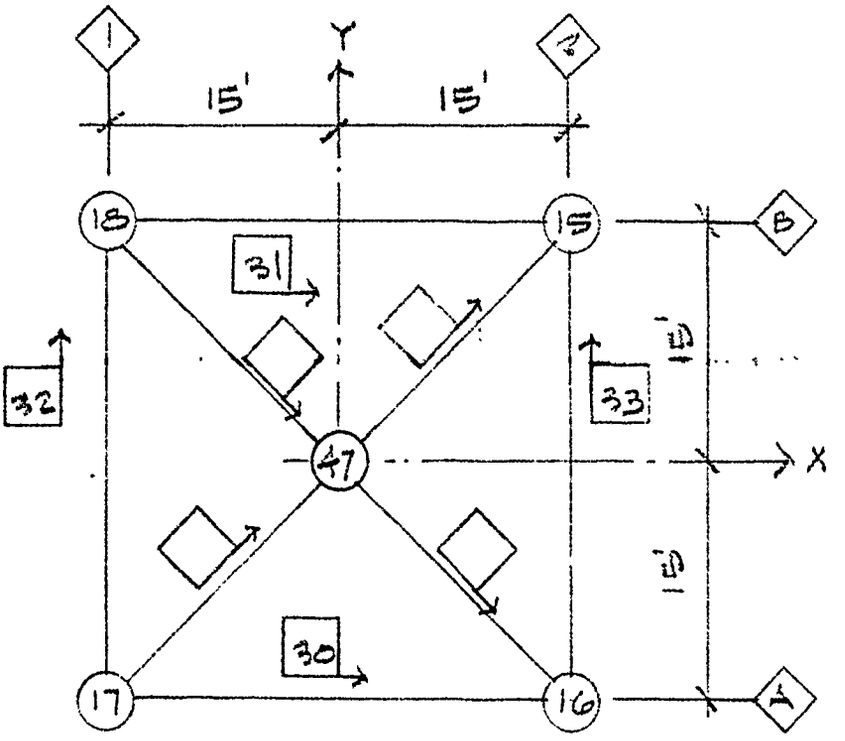
Date 4-7-82 Job No. 81-171-92 Calculation STRUCTURES W/ L = 50'



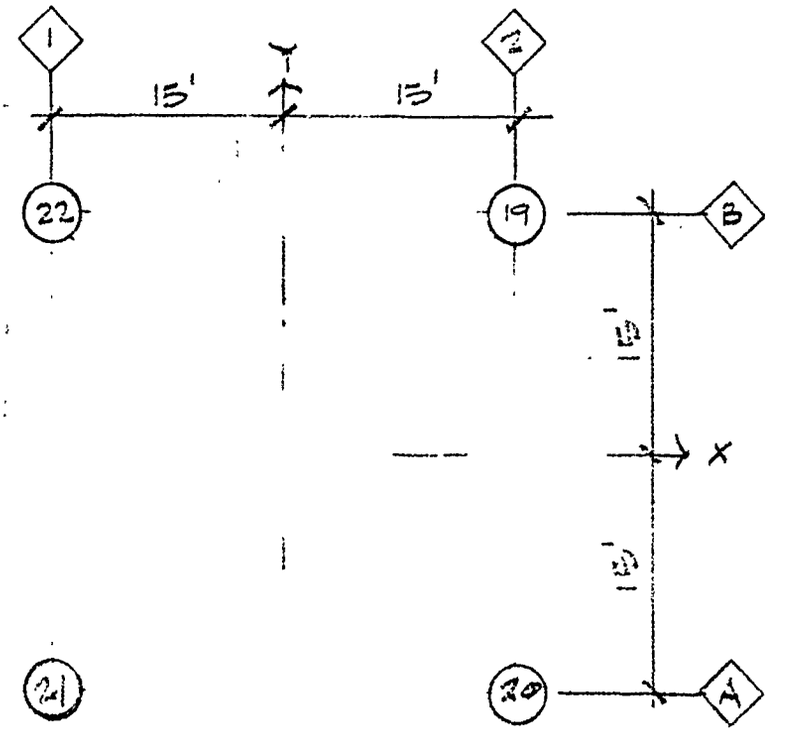
ELEV. (+) 75'-0 (+159)



ELEV. (+) 60 (144)



ELEV. (+) 40' (130)



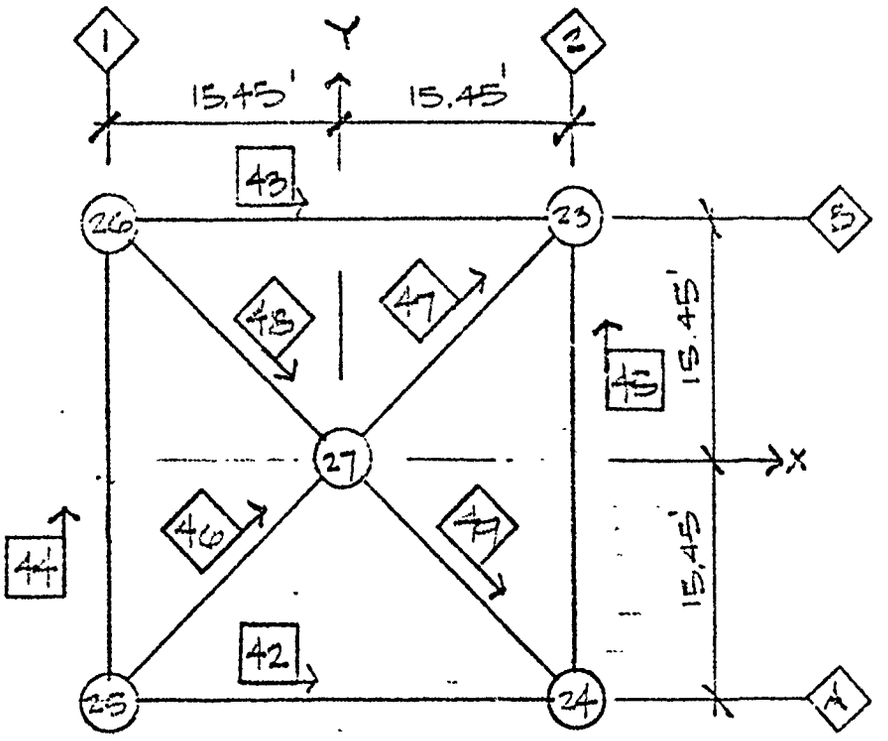
ELEV. (+) 6.5 (100.5)

CREST OFFSHORE, INC.

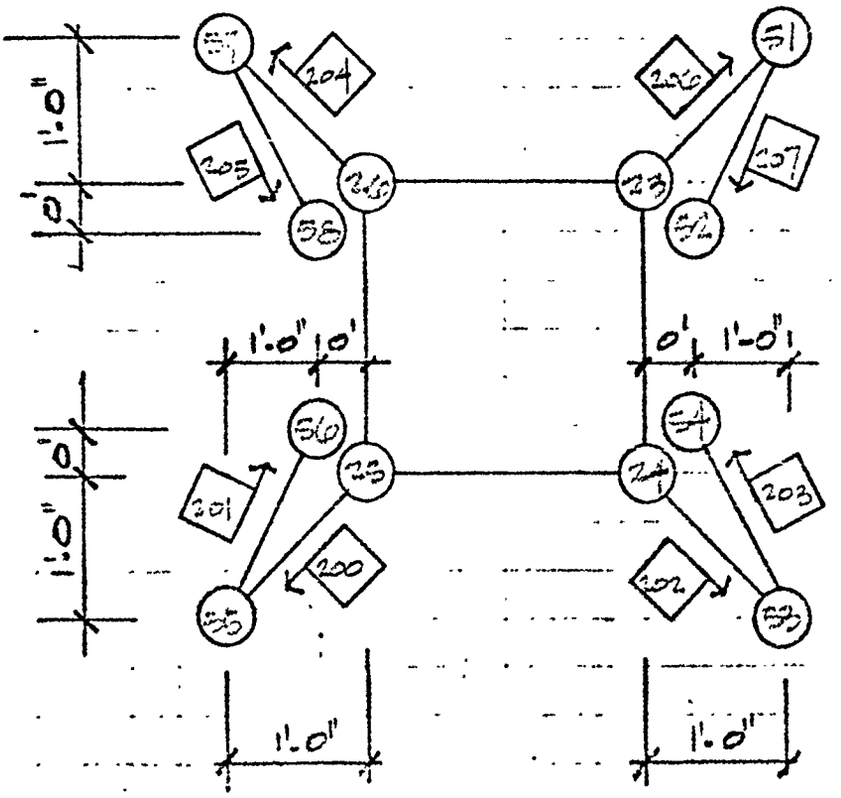
Sheet 6 of 10 of 4 Pl. 2

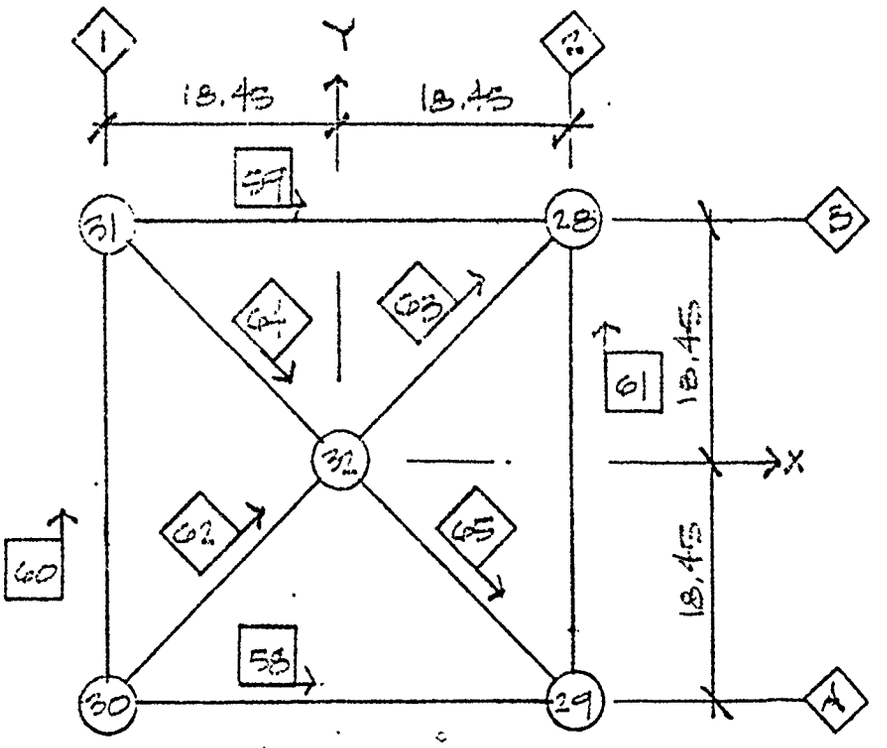
By WS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-7-76 Job No. 21-11-92 Calculation STRUCTURE Y-L = 50'

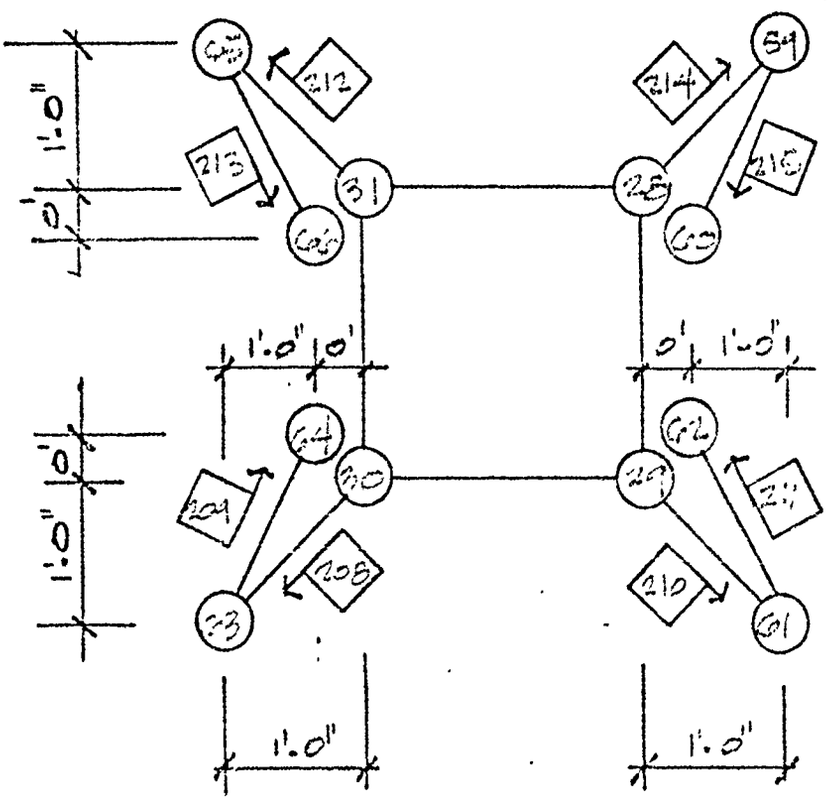


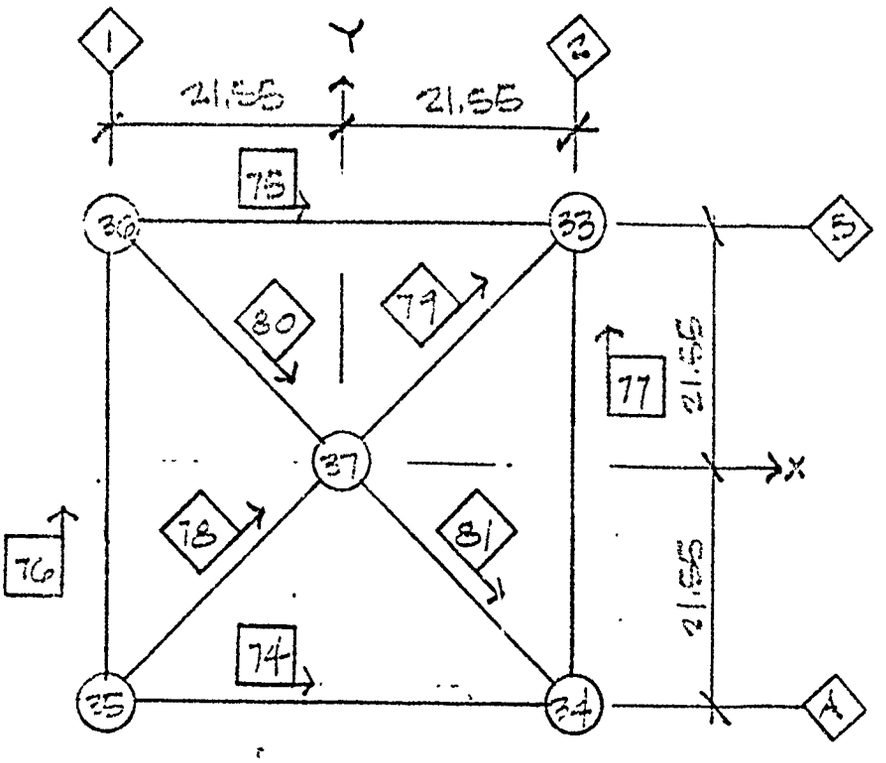
ELEV. (+) 12 (96)



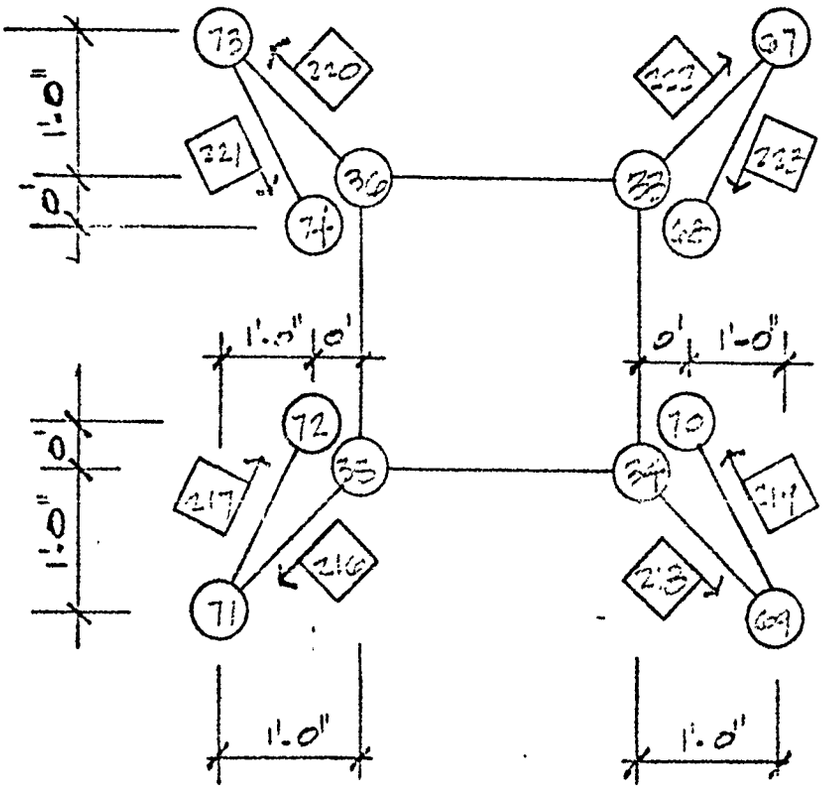

1
2
Y
18.45
18.45
59
28
5
64
63
61
18.45
32
X
62
65
60
18.45
58
30
29
4

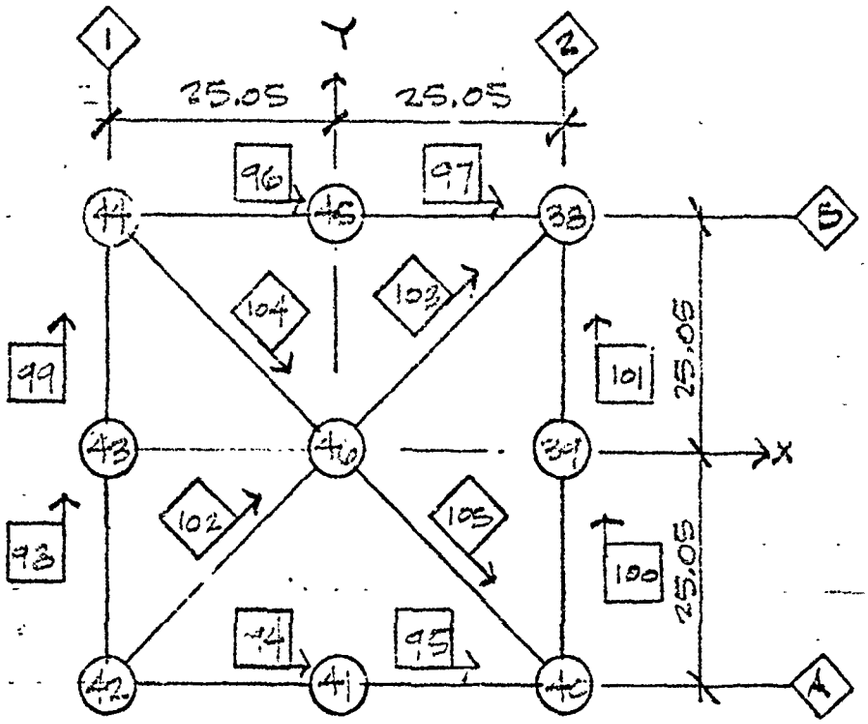
ELEV. (-) 18 (CG)


1'-0"
1'-0"
212
213
31
1'-0"
1'-0"
214
216
28
1'-0"
1'-0"
1'-0"
1'-0"
204
208
30
29
202
210
23
21
1'-0"
1'-0"

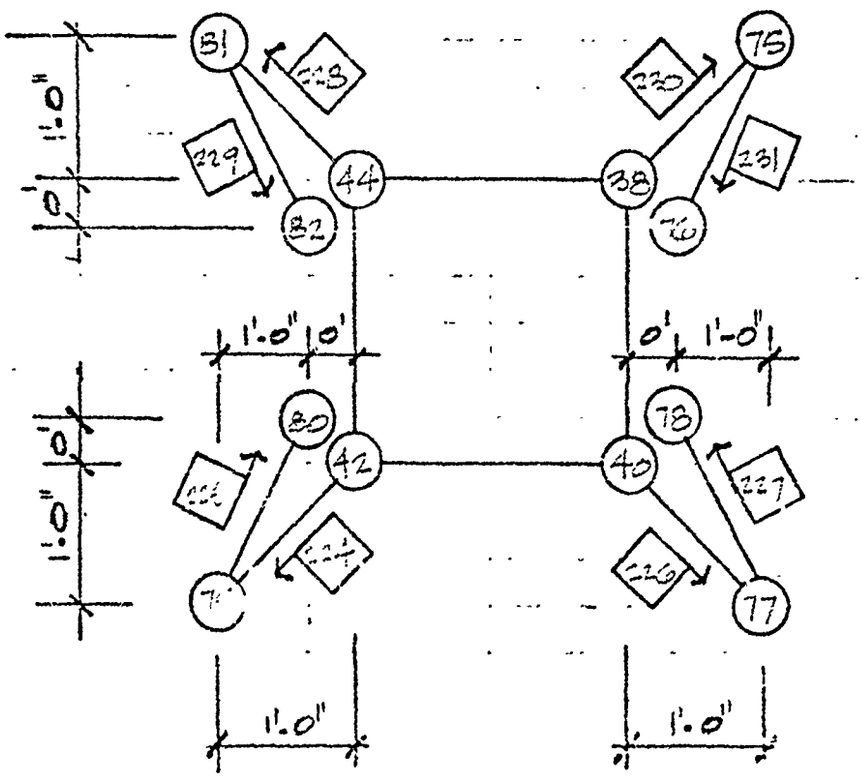

1
2
Y
21.55
21.55
75
36
33
5
80
79
77
21.55
37
X
78
81
76
21.55
74
35
34
4

ELEV. (-) 49 (35)


73
220
321
36
74
1'-0"
1'-0"
1'-0"
1'-0"
72
35
217
216
71
1'-0"
222
37
223
33
32
10
34
219
213
64
1'-0"

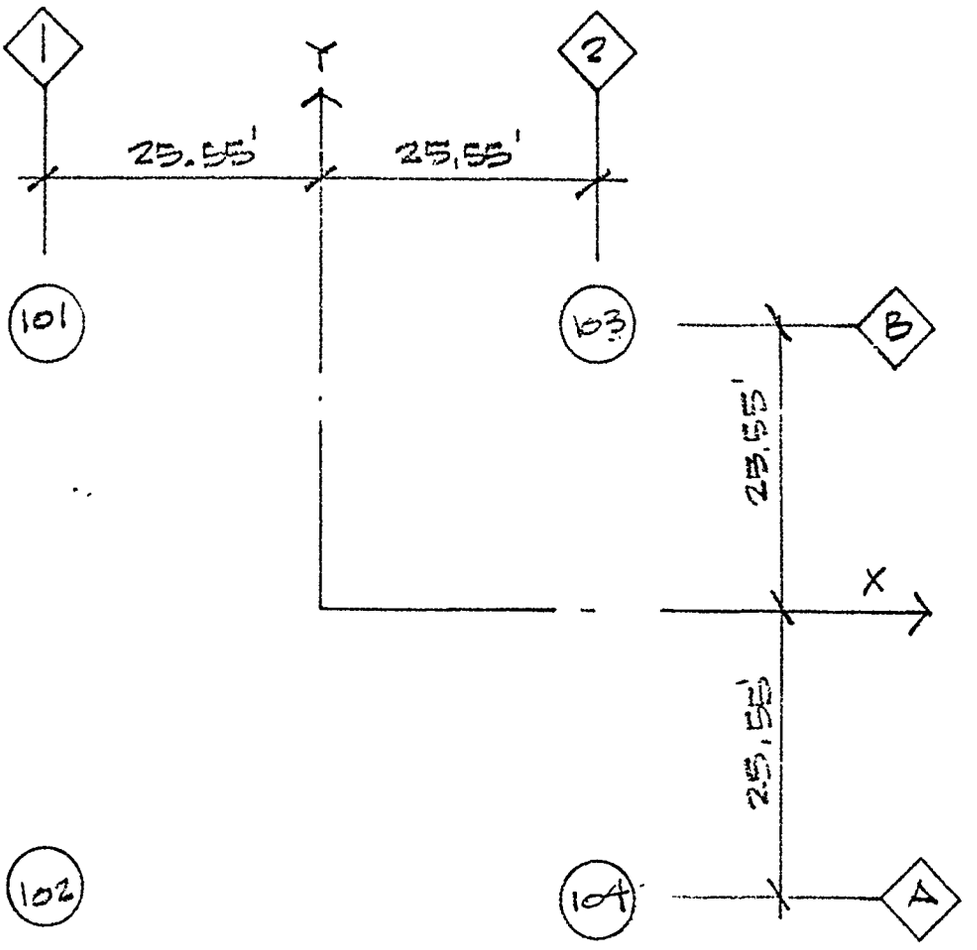

1
2
Y
25.05
25.05
96
97
44
45
38
B
104
103
99
101
25.05
43
40
39
X
102
105
98
100
25.05
94
95
42
41
40
A

ELEV. (-) 84 (0)


81
228
229
44
82
1'-0"
1'-0"
75
230
231
38
76
1'-0"
1'-0"
80
42
78
40
227
226
77
1'-0"
1'-0"

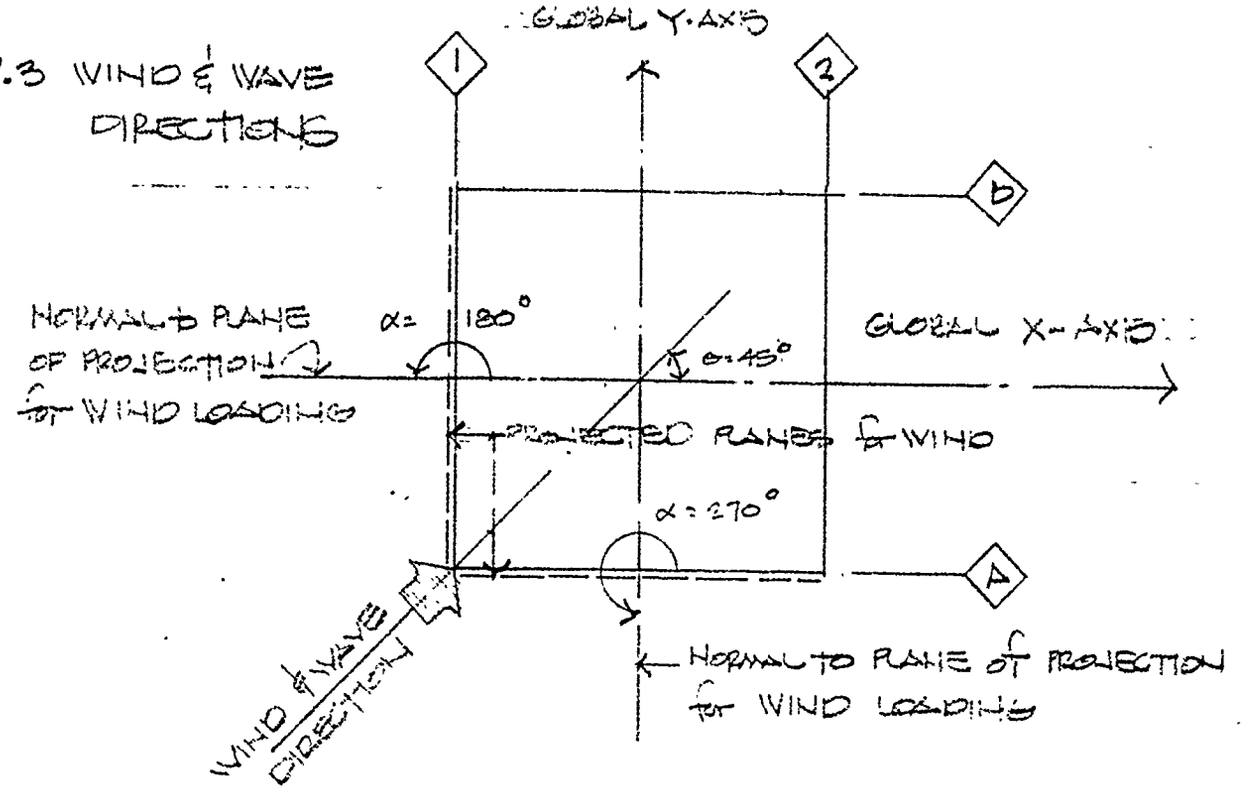
By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-7-76 Job No. 21-771-92 Calculation STRUCTURE W/ L=150'



ELEV. (-) 89 (-5)

2.3 WIND & WAVE DIRECTIONS



WIND LOADING

AREAS TO CONSIDER

FENCE or SAFETY NET = 2' x 40' = 80 S.FT.

AREA BETWEEN DECKS = 15' x 40' x 0.50 = 300 S.FT.

WIND VELOCITY = 173 MPH

SCALOAD=2

DEVELOPED BY SYNERCOM TECHNOLOGY, INC.
HOUSTON, TEXAS
RELEASE 2 MOD 11
MARCH 1976

CREST OFFSHORE, INC.

By LWS Client USNAVY Subject STRUCTURAL COMPUTER ANALYSIS

Date 4-15-76 Job No. 27-771-02 Calculation L-50 Sheet 6 of 14 Pages

6.4 SEALOAD COMPUTER RUN

```
LINE NO. 1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
    1  COEF    14.0   1.0    0.0   1.0
    2          40.0   1.0    0.0   1.0
    3  END
    4  U.S.NAVY TEMPLET DESIGN = 88 FT MWL                    JOB NO. 27-771-00
    5    100 YEAR STORM WAVE = PRESSURE PROFILES(PSF)   4 PILE  THETA = 45DEG
    6    PRELIMINARY DESIGN          ATKINSON                  APRIL 1976
    7    STRUCTURE                          JOB NO. 27-771-00
    8  STRAN   1 45   16 24 4 11                    CD 11    0  1                    10 3
    9  END
   10  GRID     14    20                FULL
   11  XSPC      0     6    17    25    33    58    91   570   603   628   636   644   653   661
   12  YSPC    142   140   138   136   133   130   125   120   115   110   105   100    90    80    70
   13            60    40    20     0
   14  YSRF    142   141   139   136   133   119   105   105   119   133   136   139   141   142
   15  SURF    921   920   867   776   674   397   195    33   222   519   646   769   867   921
   16  142     921                                                                          921
   17  140     883   865                                                              844   883
   18  138     845   845   584                                                  749   797   845
   19  136     798   812   789   778                                      646   709   765   798
   20  135     786   763   754   722   674                          519   599   669   719   746
   21  130     694   718   702   671   641                          494   557   622   676   694
   22  125     624   679   635   611   573                          444   506   562   602   624
   23  120     566   570   570   554   526                          406   459   504   537   566
   24  115     508   518   512   498   478   374                209   367   412   453   488   508
   25  110     456   469   469   456   440   348                196   337   376   414   442   456
   26  105     417   424   427   415   401   324   195    33   183   307   345   377   399   417
   27  100     380   387   389   382   370   303   187    35   172   284   315   344   365   380
   28   90     318   327   327   323   313   266   171    39   153   240   267   288   307   318
   29   80     274   279   281   280   272   233   159    41   135   209   231   248   262   274
   30   70     238   243   245   245   241   210   149    42   124   186   203   216   229   238
   31   60     210   218   218   219   214   191   140    44   114   165   181   193   204   210
   32   40     175   180   182   182   180   165   127    44   101   139   151   160   169   175
   33   20     156   160   162   163   162   150   119    45    93   126   136   144   151   156
   34    0     149   153   155   156   156   145   116    45    91   122   130   138   144   149
   35  SURF
   36  142
   37  140
   38  138
   39  136
   40  133
   41  130
   42  125
```

CREST OFFSHORE, INC.

Sheet 6.17 of 4 PILE

By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-15-76 Job No. 37-771-00 Calculation L=50'


```
LINE NO. 1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
         120
         115
         110
         105
         100
          90
          80
          70
          60
          40
          20
           0
         WIND  1    80 270  177  1005 173 15   ALL
               2   300 270  168  1005 173 15   ALL
               3    80 180  177  1005 173 15   ALL
               4   300 180  168  1005 173 15   ALL
         END
         SECT
         SECT W21X55    WF  16.2       1.24  1140       48.3  8.215 .522 20.8  .375 .563
         SECT W18X55    WF  16.2       1.66   891       45    7.532 .630 18.12 .390 .438
         SECT W18X40    WF  11.8       0.81   612       19.1  6.018 .524 17.9  .316 .438
         SECT HBRACE1   TUB 21.21   968       484       484      14  .500
         SECT XBRACE1   TUB 24.35  1464       732       732      16  .500
         SECT HBRACE2   TUB 27.49  2106      1053      1053      18  .500
         SECT DBRACE1   TUB 36.04  3574      1787      1787      20  .625
         SECT SS COLS   TUB102.05 21310     10655     10655      30 1.250
         SECT PILING1   TUB136.46 41260     20630     20630      36 1.250
         SECT JKT LEG   TUB 62.05 24212     12106     12106      40  .500
         SECT MISHRON   PRI 50.0  30000     30000     30000      10           5
         SECT PILING2   TUB162.58 48480     24240     24240      36 1.500
         SECT DBRACE2   TUB 27.49  2106      1053      1053      18  .500
         SECT XBRACE2   TUB 27.49  2106      1053      1053      18  .500
         SECT XBRACE3   TUB 30.63  2914      1457      1457      20  .500
         SECT DBRACE3   TUB 16.05   746       373       373      14  .375
         SECT HBRACE3   TUB 16.05   746       373       373      14  .375
         GRUP
         GRUP W21 W21X55                    29   11.6 36   1             2.5
         GRUP W18 W18X55                                   1 3.0         2.5
         GRUP W17 W18X40                                   1             2.5
         GRUP HB1 HBRACE1   14    .500                     2 3.0
         GRUP HB2 HBRACE2   18    .500                     2 3.0
         GRUP DB1 DBRACE1   20    .625                     2 3.0 0.8 0.8
         GRUP DB2 DBRACE2   18    .500                     2 3.0 0.8 0.8
         GRUP XB1 XBRACE1   16    .500                     2 2.0 0.7 0.7
         GRUP XB2 XBRACE2   18    .500                     2 2.3 0.7 0.7
         GRUP XB3 XBRACE3   20    .500                     2 2.5 0.7 0.7
         GRUP SSC SS COLS   30   1.250                     1
         GRUP JL1 JKT LEG   40    .500                     1
         GRUP P1  PILING1   36   1.250                     1
         GRUP P2  PILING2   36   1.500                     1
```

LINE NO. 1....5....10....15....20....25....30....35....40....45....50....55....60....65....70....75....80

```
   93 GRUP HBN HISHRON                                                  2
   94 GRUP DB3 DBRACE3   14     .375                                    2 2.5 0.8 0.8
   95 GRUP HB3 HBRACE3   14     .375                                    2 2.5
   96 MEMBER
   97 MEMBER     5    4 W21
   98 MEMBER     6    3 W17
   99 MEMBER     7    2 W17
  100 MEMBER     8    1 W21
  101 MEMBER     5    6 W21
  102 MEMBER     6    7 W21
  103 MEMBER     7    8 W21
  104 MEMBER     4    5 W21
  105 MEMBER     3    2 W21
  106 MEMBER     2    1 W21
  107 MEMBER    12    5 SSC                                                30
  108 MEMBER    11    4 SSC                                                30
  109 MEMBER    14    8 SSC                                                30
  110 MEMBER     9    1 SSC                                                30
  111 MEMBER    12   11 W18
  112 MEMBER    13   10 W18
  113 MEMBER    14    9 W18
  114 MEMBER    12   13 W18
  115 MEMBER    13   14 W18
  116 MEMBER    11   10 W18
  117 MEMBER    10    9 W18
  118 MEMBER    17   12 SSC                                                30
  119 MEMBER    16   11 SSC                                                30
  120 MEMBER    15   10 SSC                                                30
  121 MEMBER    15    9 SSC                                                30
  122 MEMBER    17   11 DB3                                                14
  123 MEMBER    18    9 DB3                                                14
  124 MEMBER    17   14 DB3                                                14
  125 MEMBER    16    9 DB3                                                14
  126 MEMBER    12   16 HB3                                                14
  127 MEMBER    18   15 HB3                                                14
  128 MEMBER    17   18 HB3                                                14
  129 MEMBER    16   15 HB3                                                14
  130 MEMBER    21   17 SSC                                                30
  131 MEMBER    20   16 SSC                                                30
  132 MEMBER    22   18 SSC                                                30
  133 MEMBER    19   15 SSC                                                30
  134 MEMBER    25   21 JL1                                             F  40
  135 MEMBER    24   20 JL1                                             F  40
  136 MEMBER    26   22 JL1                                             F  40
  137 MEMBER    23   19 JL1                                             F  40
  138 MEMBER    25   24 HB1                                                14
  139 MEMBER    26   23 HB1                                                14
  140 MEMBER    25   26 HB1                                                14
  141 MEMBER    24   23 HB1                                                14
  142 MEMBER    25   27 XB1                                                16
```

CREST OFFSHORE, INC.

By [illegible] Client USL HEVY Subject SEISMIC ANALYSIS OF DEEP WATER JACKET

Date 4-15-76 Job No. 247-771-1126 Calculation [illegible]

Sheet 6 of 4 PILES

CREST OFFSHORE, INC.

By — Client — Subject — Sheet of

Date — Job No. — Calculation —

MEMBER NO.		1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
		1...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	...5...0	
143	MEMBER	27	23	XB1											16	
144	MEMBER	26	27	XB1											16	
145	MEMBER	27	24	XB1											16	
146	MEMBER	30	25	JL1										F	40	
147	MEMBER	29	24	JL1										F	40	
148	MEMBER	31	26	JL1										F	40	
149	MEMBER	28	23	JL1										F	40	
150	MEMBER	29	25	DB1											20	
151	MEMBER	28	26	DB1											20	
152	MEMBER	31	25	DB1											20	
153	MEMBER	29	28	DB1											20	
154	MEMBER	30	29	HB1											14	
155	MEMBER	31	28	HB1											14	
156	MEMBER	30	31	HB1											14	
157	MEMBER	29	28	HB1											14	
158	MEMBER	32	32	XB2											18	
159	MEMBER	32	28	XB2											18	
160	MEMBER	31	32	XB2											18	
161	MEMBER	32	29	XB2											18	
162	MEMBER	35	30	JL1										F	40	
163	MEMBER	34	29	JL1										F	40	
164	MEMBER	36	31	JL1										F	40	
165	MEMBER	33	28	JL1										F	40	
166	MEMBER	33	29	DB2											18	
167	MEMBER	36	28	DB2											18	
168	MEMBER	35	31	DB2											18	
169	MEMBER	34	28	DB2											18	
170	MEMBER	35	34	HB2											18	
171	MEMBER	36	33	HB2											18	
172	MEMBER	35	36	HB2											18	
173	MEMBER	34	33	HB2											18	
174	MEMBER	38	37	XB3											20	
175	MEMBER	37	33	XB3											20	
176	MEMBER	36	37	XB3											20	
177	MEMBER	37	34	XB3											20	
178	MEMBER	42	35	JL1										F	40	
179	MEMBER	40	34	JL1										F	40	
180	MEMBER	44	36	JL1										F	40	
181	MEMBER	38	33	JL1										F	40	
182	MEMBER	35	41	DB2											18	
183	MEMBER	41	34	DB2											18	
184	MEMBER	36	45	DB2											16	
185	MEMBER	45	33	DB2											18	
186	MEMBER	35	43	DB2											18	
187	MEMBER	43	36	DB2											18	
188	MEMBER	38	39	DB2											18	
189	MEMBER	39	33	DB2											18	
190	MEMBER	42	41	HB2											18	
191	MEMBER	41	40	HB2											18	
192	MEMBER	44	45	HB2											18	

CREST OFFSHORE, INC.

Sheet 620 of 4 PILE

By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-15-76 Job No. 27-771-72 Calculation L=50'

```
                                                SEALOAD=2                                                5
LINE NO. 1...5....1....1....2....2....3....3....4....4....5....5....6....6....7....7....8
                  0    5    0    5    0    5    0    5    0    5    0    5    0    5    0

   193  MEMBER  45  38 HB2                                                   18
   194  MEMBER  42  43 HB2                                                   18
   195  MEMBER  43  44 HB2                                                   18
   196  MEMBER  40  39 HB2                                                   18
   197  MEMBER  39  38 HB2                                                   18
   198  MEMBER  42  46 XB3                                                   20
   199  MEMBER  46  38 XB3                                                   20
   200  MEMBER  44  46 XB3                                                   20
   201  MEMBER  46  40 XB3                                                   20
   202  MEMBER  25  55 WBN
   203  MEMBER  55  56 WBN           1111
   204  MEMBER  24  53 WBN
   205  MEMBER  53  54 WBN           1111
   206  MEMBER  26  57 WBN
   207  MEMBER  57  58 WBN           1111
   208  MEMBER  23  51 WBN
   209  MEMBER  51  52 WBN           1111
   210  MEMBER  30  63 WBN
   211  MEMBER  63  64 WBN           1111
   212  MEMBER  29  61 WBN
   213  MEMBER  61  62 WBN           1111
   214  MEMBER  31  65 WBN
   215  MEMBER  65  66 WBN           1111
   216  MEMBER  28  59 WBN
   217  MEMBER  59  60 WBN           1111
   218  MEMBER  35  71 WBN
   219  MEMBER  71  72 WBN           1111
   220  MEMBER  34  69 WBN
   221  MEMBER  69  70 WBN           1111
   222  MEMBER  36  73 WBN
   223  MEMBER  73  74 WBN           1111
   224  MEMBER  33  67 WBN
   225  MEMBER  67  68 WBN           1111
   226  MEMBER  42  79 WBN
   227  MEMBER  79  80 WBN           1111
   228  MEMBER  40  77 WBN
   229  MEMBER  77  78 WBN           1111
   230  MEMBER  44  81 WBN
   231  MEMBER  81  82 WBN           1111
   232  MEMBER  38  75 WBN
   233  MEMBER  75  76 WBN           1111
   234  MEMBER  21  56 P1                                               F  36   2
   235  MEMBER  56  64 P1                                               F  36   2
   236  MEMBER  64  72 P1                                               F  36   2
   237  MEMBER  72  80 P2                                               F  36   2
   238  MEMBER  20  54 P1                                               F  36   4
   239  MEMBER  54  62 P1                                               F  36   4
   240  MEMBER  62  70 P1                                               F  36   4
   241  MEMBER  70  78 P2                                               F  36   4
   242  MEMBER  22  58 P1                                               F  36   1
```

CREST OFFSHORE, INC.

By — Client — Subject — Sheet of

Date — Job No. — Calculation —

```
LINE NO. 1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
     243 MEMBER   58  66 P1                                                          F  36   1
     244 MEMBER   66  74 P1                                                          F  36   1
     245 MEMBER   74  82 P2                                                          F  36   1
     246 MEMBER   19  52 P1                                                          F  36   3
     247 MEMBER   52  60 P1                                                          F  36   3
     248 MEMBER   60  68 P1                                                          F  36   3
     249 MEMBER   68  76 P2                                                          F  36   3
     250 MEMBER   80 102 P2                                                          F  36   2
     251 MEMBER   78 104 P2                                                          F  36   4
     252 MEMBER   82 101 P2                                                          F  36   1
     253 MEMBER   76 103 P2                                                          F  36   3
     254 JOINT
     255 JOINT    1    15     15    159                    UPERDECK
     256 JOINT    2    15      5    159                    UPERDECK
     257 JOINT    3    15     -5    159                    UPERDECK
     258 JOINT    4    15    -15    159                    UPERDECK
     259 JOINT    5   -15    -15    159                    UPERDECK
     260 JOINT    6   -15     -5    159                    UPERDECK
     261 JOINT    7   -15      5    159                    UPERDECK
     262 JOINT    8   -15     15    159                    UPERDECK
     263 JOINT    9    15     15    144                    LOERDECK
     264 JOINT   10    15      0    144                    LOERDECK
     265 JOINT   11    15    -15    144                    LOERDECK
     266 JOINT   12   -15    -15    144                    LOERDECK
     267 JOINT   13   -15      0    144                    LOERDECK
     268 JOINT   14   -15     15    144                    LOERDECK
     269 JOINT   15    15     15    130                    SUPERSTR
     270 JOINT   16    15    -15    130                    SUPERSTR
     271 JOINT   17   -15    -15    130                    SUPERSTR
     272 JOINT   18   -15     15    130                    SUPERSTR
     273 JOINT   19    15     15   1005                    SUPERSTR
     274 JOINT   20    15    -15   1005                    SUPERSTR
     275 JOINT   21   -15    -15   1005                    SUPERSTR
     276 JOINT   22   -15     15   1005                    SUPERSTR
     277 JOINT   23    15,45  15,45   96                   ELEV.+12
     278 JOINT   24    15,45 -15,45   96                   ELEV.+12
     279 JOINT   25   -15,45 -15,45   96                   ELEV.+12
     280 JOINT   26   -15,45  15,45   96                   ELEV.+12
     281 JOINT   27     0      0      96                   ELEV.+12
     282 JOINT   28    18,45  18,45   66                   ELEV.-18
     283 JOINT   29    18,45 -18,45   66                   ELEV.-18
     284 JOINT   30   -18,45 -18,45   66                   ELEV.-18
     285 JOINT   31   -18,45  18,45   66                   ELEV.-18
     286 JOINT   32     0      0      66                   ELEV.-18
     287 JOINT   33    21,55  21,55   35                   ELEV.-49
     288 JOINT   34    21,55 -21,55   35                   ELEV.-49
     289 JOINT   35   -21,55 -21,55   35                   ELEV.-49
     290 JOINT   36   -21,55  21,55   35                   ELEV.-49
     291 JOINT   37     0      0      35                   ELEV.-49
     292 JOINT   38    25,05  25,05    0                   ELEV.-84
```

CREST OFFSHORE, INC.

By VVS Client USS HAYES Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-15-76 Job No. 27-11-82 Calculation L=52' Sheet 6.22 of 4 PLS

```
LINE NO. 1...5....1....5....2....5....3....5....4....5....5....6....5....7....5....8
  293 JOINT   39   25.05     0       0                                ELEV.=84
  294 JOINT   40   25.05   -25.05    0                                ELEV.=84
  295 JOINT   41     0     -25.05    0                                ELEV.=84
  296 JOINT   42  -25.05   -25.05    0                                ELEV.=84
  297 JOINT   43  -25.05     0       0                                ELEV.=84
  298 JOINT   44  -25.05    25.05    0                                ELEV.=84
  299 JOINT   45     0      25.05    0                                ELEV.=84
  300 JOINT   46     0       0       0                                ELEV.=84
  301 JOINT   51   17.45    17.45    96                               WISHB+12
  302 JOINT   52   15.45    15.45    96.01                            WISHB+12
  303 JOINT   53   17.45   -17.45    96                               WISHB+12
  304 JOINT   54   15.45   -15.45    96.01                            WISHB+12
  305 JOINT   55  -17.45   -17.45    96                               WISHB+12
  306 JOINT   56  -15.45   -15.45    96.01                            WISHB+12
  307 JOINT   57  -17.45    17.45    96                               WISHB+12
  308 JOINT   58  -15.45    15.45    96.01                            WISHB+12
  309 JOINT   59   20.45    20.45    66                               WISHB=18
  310 JOINT   60   18.45    18.45    66.01                            WISHB=18
  311 JOINT   61   20.45   -20.45    66                               WISHB=18
  312 JOINT   62   18.45   -18.45    66.01                            WISHB=18
  313 JOINT   63  -20.45   -20.45    66                               WISHB=18
  314 JOINT   64  -18.45   -18.45    66.01                            WISHB=18
  315 JOINT   65  -20.45    20.45    66                               WISHB=18
  316 JOINT   66  -18.45    18.45    66.01                            WISHB=18
  317 JOINT   67   23.55    23.55    35                               WISHB=49
  318 JOINT   68   21.55    21.55    35.01                            WISHB=49
  319 JOINT   69   23.55   -23.55    35                               WISHB=49
  320 JOINT   70   21.55   -21.55    35.01                            WISHB=49
  321 JOINT   71  -23.55   -23.55    35                               WISHB=49
  322 JOINT   72  -21.55   -21.55    35.01                            WISHB=49
  323 JOINT   73  -23.55    23.55    35                               WISHB=49
  324 JOINT   74  -21.55    21.55    35.01                            WISHB=49
  325 JOINT   75   27.05    27.05    0                                WISHB=84
  326 JOINT   76   25.05    25.05    0.01                             WISHB=84
  327 JOINT   77   27.05   -27.05    0                                WISHB=84
  328 JOINT   78   25.05   -25.05    0.01                             WISHB=84
  329 JOINT   79  -27.05   -27.05    0                                WISHB=84
  330 JOINT   80  -25.05   -25.05    0.01                             WISHB=84
  331 JOINT   81  -27.05    27.05    0                                WISHB=84
  332 JOINT   82  -25.05    25.05    0.01                             WISHB=84
  333 JOINT  103   26.55    26.55   -15          111                 SUPPORT3
  334 JOINT  104   26.55   -26.55   -15          111                 SUPPORT4
  335 JOINT  102  -26.55   -26.55   -15          111                 SUPPORT2
  336 JOINT  101  -26.55    26.55   -15          111                 SUPPORT1
  337 END
```

CREST OFFSHORE, INC.

Sheet 4.13 of TABLE

By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-15-76 Job No. 21-701-92 Calculation L=5D

U.S.NAVY TEMPLET DESIGN - 84 FT PWL JOB NO. 27-771-00

100 YEAR STORM WAVE - PRESSURE PROFILES(PSF) - 4 PILE THETA = 45DEG

PRELIMINARY DESIGN ATKINSON APRIL 1976

STRUCTURE JOB NO. 27-771-00

INPUT UNITS
....ENGLISH

OUTPUT UNITS
....ENGLISH

**** COEFFICIENT TABLE REPORT ****

DIAMETER IN	NORMAL DRAG COEF	TANG DRAG COFF	MASS COEF
14.000	1.0000	0.0000	1.0000
40.000	1.0000	0.0000	1.0000

**** DEAD LOAD REPORT ****

MEAN WATER DEPTH = 123.500 FT

LOAD CONDITION 1

STRUCTURE DEAD LOAD = *535.0975 KIPS
- 132.1992 (Conductors)
522.5 K
522, Soldier

CREST OFFSHORE, INC.

By _____ Client _____ Subject _____ Sheet 6 of 7 PLES

Date 4-18-12 Job No. 21-711-12 Calculation _____ L=50'

**** WAVE POSITION SUMMARY REPORT ****

LOAD CONDITION 1 WAVE ANGLE = 45.00

TRIAL NO.	DIST. TO CREST FT	PHASE ANG. WAVE TO STRUC. (DEG)	SHEAR KIPS X	SHEAR KIPS Y	SHEAR KIPS RSLNT	MUDLINE MOMENT FT-KIPS X	MUDLINE MOMENT FT-KIPS Y	MUDLINE MOMENT FT-KIPS RSLNT	VERTICAL FORCE KIPS Z
1	-24.0	13.07	845.6	845.6	1195.9	-63649.	63649.	90013.	-5.3
2	-20.0	10.89	863.2	863.2	1220.7	-65948.	65948.	93264.	-0.7
3	-16.0	8.71	871.1	871.1	1231.9	-67112.	67112.	94911.	-7.9
4	-12.0	6.54	883.8	883.8	1249.9	-68964.	68964.	97529.	-8.7
5	-8.0	4.36	885.2	885.2	1251.9	-69404.	69404.	98151.	-8.9
6	-4.0	2.18	882.5	882.5	1248.0	-69594.	69594.	98421.	-9.6
7	0.0	-0.00	874.0	874.6	1236.8	-69181.	69181.	97837.	-9.7
8	4.0	-2.18	858.1	858.1	1213.5	-67789.	67789.	95869.	-7.5
9	8.0	-4.36	838.7	838.7	1186.2	-66091.	66091.	93467.	-5.9
10	12.0	-6.54	814.8	814.8	1152.4	-63943.	63943.	90429.	-2.9
11	16.0	-8.71	780.7	780.7	1104.0	-60536.	60535.	85610.	1.3

CREST OFFSHORE, INC.

By — Client — Subject — Sheet of

Date — Job No. — Calculation —

****** LOAD SUMMARY REPORT ******

WAVE NUMBER = 1 WAVE DIRECTION = 45.000

X SHEAR FORCE =	832.4620 KIPS
Y SHEAR FORCE =	882.4620 KIPS
RESULTANT SHEAR FORCE =	1247.9897 KIPS
X MUDLINE MOMENT =	69594.1543 FT-KIPS
Y MUDLINE MOMENT =	69594.1543 FT-KIPS
RESULTANT MUDLINE MOMENT =	98470.9969 FT-KIPS
Z VERTICAL FORCE =	7.5592 KIPS

SECTION 7

60 FT JACKET BASE SPACING

7.1 INTRODUCTION

The moments and horizontal forces from Section 6 (50 FT JACKET BASE) indicated that the piling would be too long for the pile driving hammer we originally chose. A SEALOAD run was made by quickly changing the joint coordinates to model a structure with a jacket base spring of 60 ft. With the results of that run it was determined the 60 ft jacket base would not appreciably reduce the piling lengths and the decision was made to keep the 50 ft jacket base structure and increase the pile driving hammer size. See report of the three-pile structure (Appendix C of 27-771-92 Report) for calculations and discussion of the pile driving hammer.

Section 7.2 shows the plan view only of the computer model as the elevations will remain the same as the Section 6, 50 ft Jacket Base model.

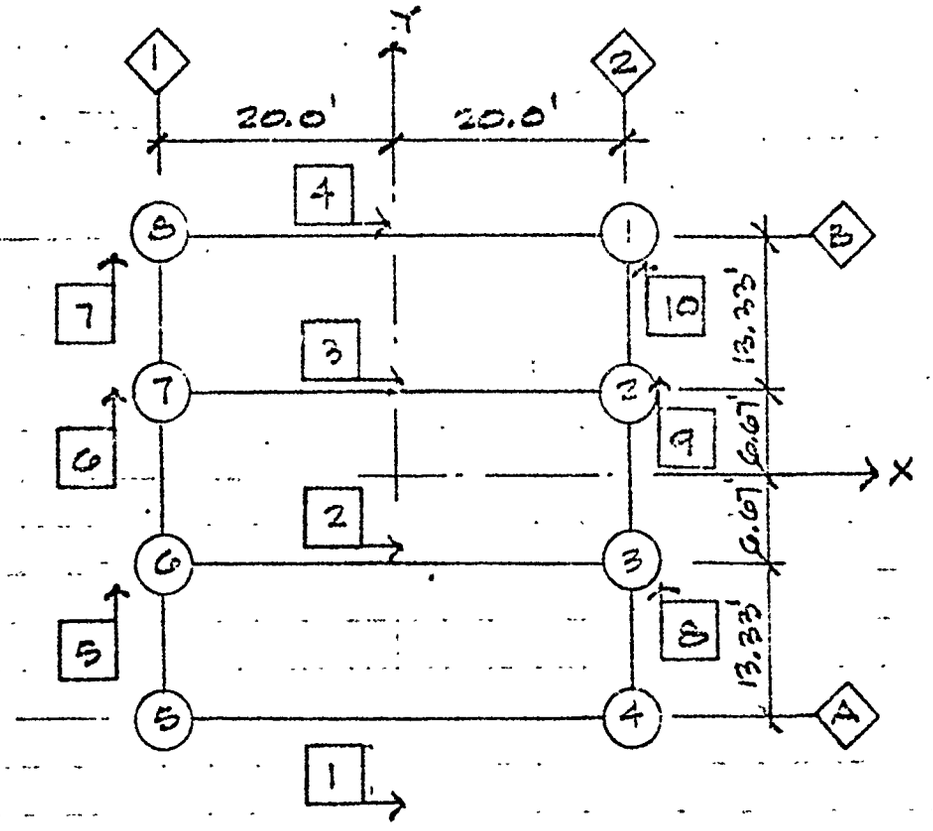
Section 7.3 shows wave direction and wind loading.

Section 7.4 shows the results of the SEALOAD run for this structure.

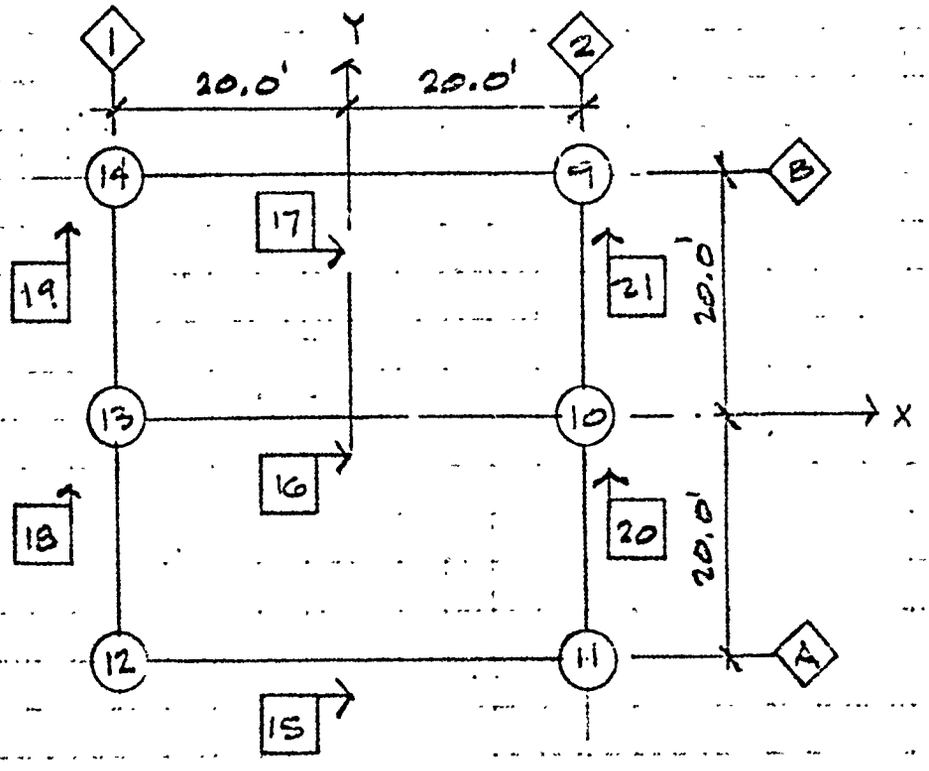
By WAS Client GULF INT Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-20-12 Job No. 21-1-92 Calculation 60' JACKET BASE

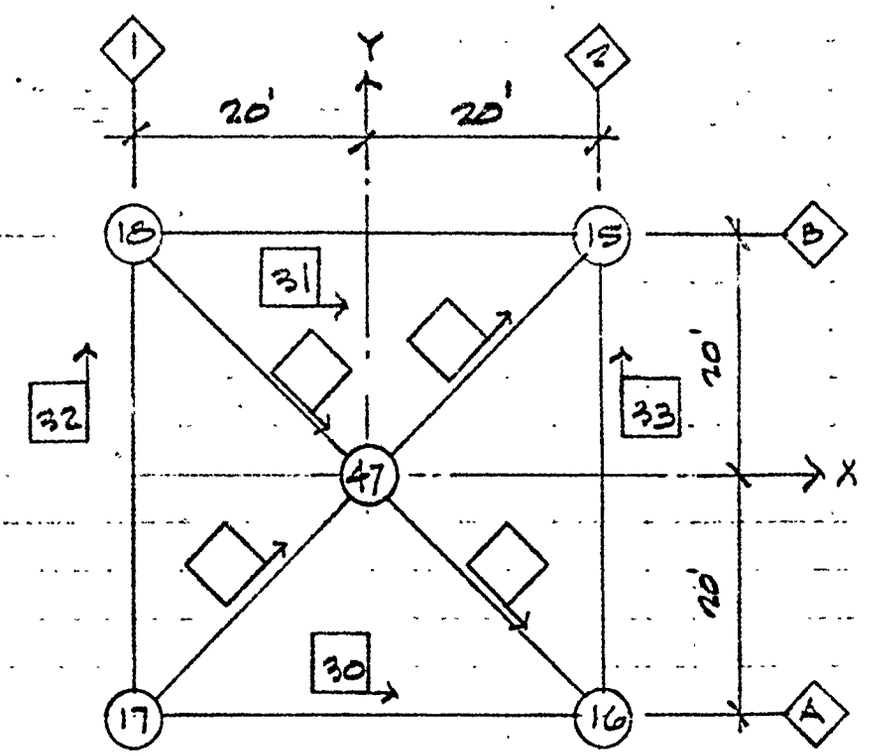
7.2



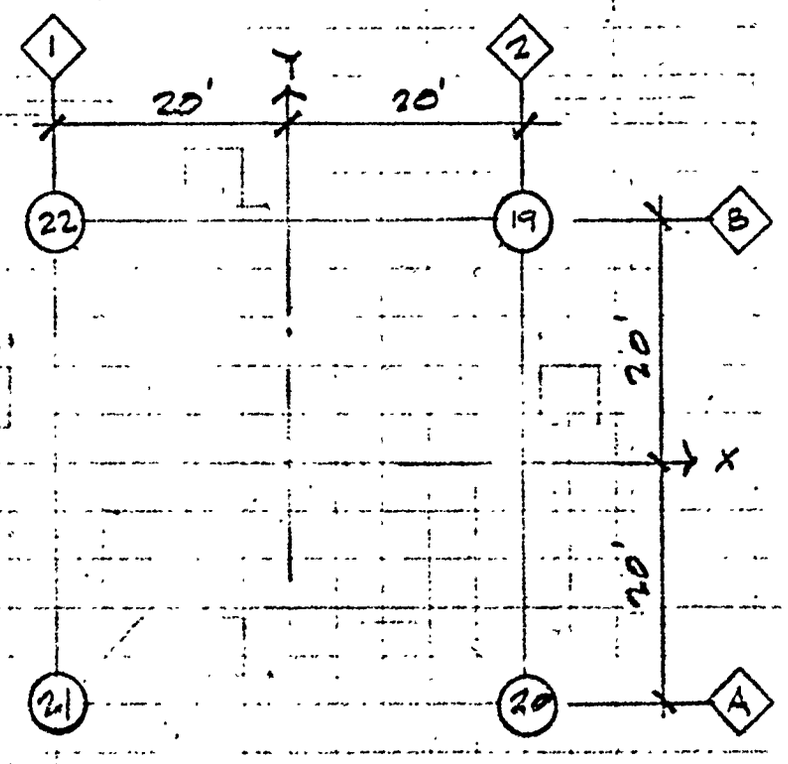
ELEV. (+) 75'.0 (+159)



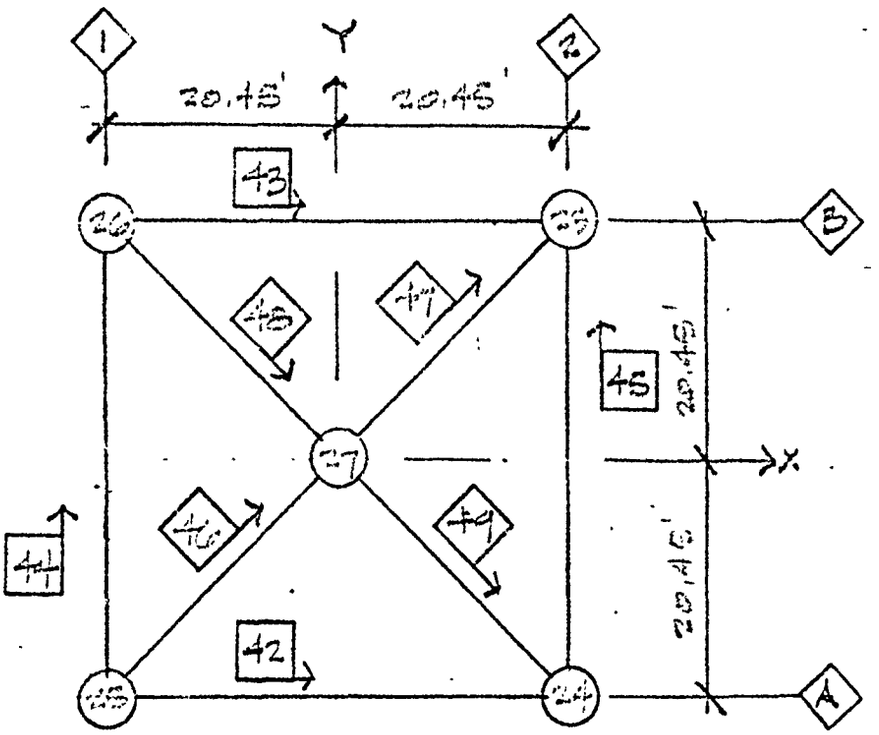
ELEV. (+) 60 (144)



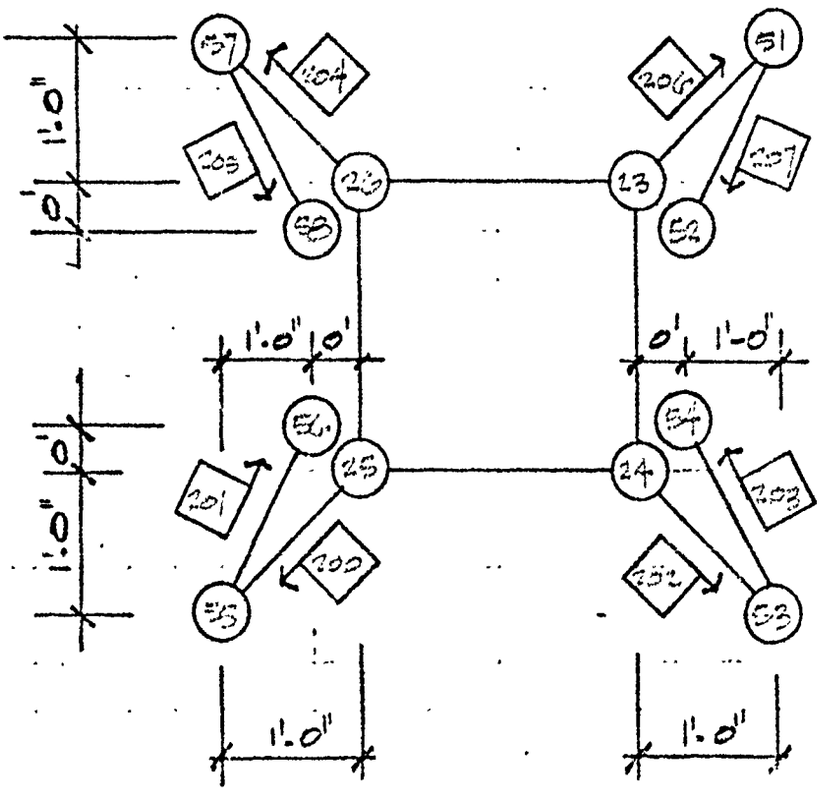
ELEV. (+) 46' (130)

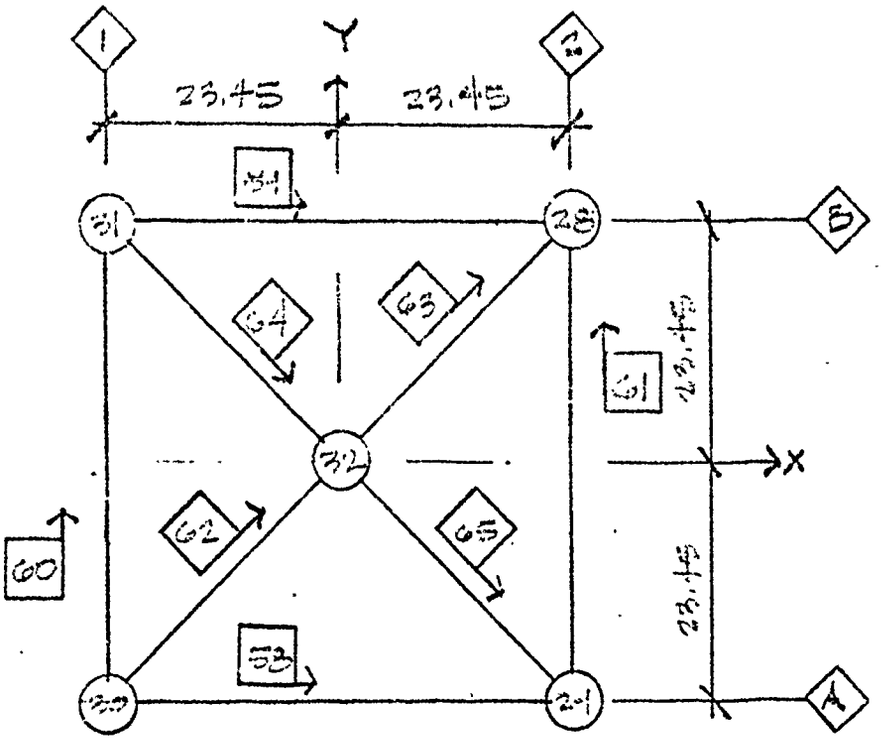


ELEV. (+) 6.5 (100.5)

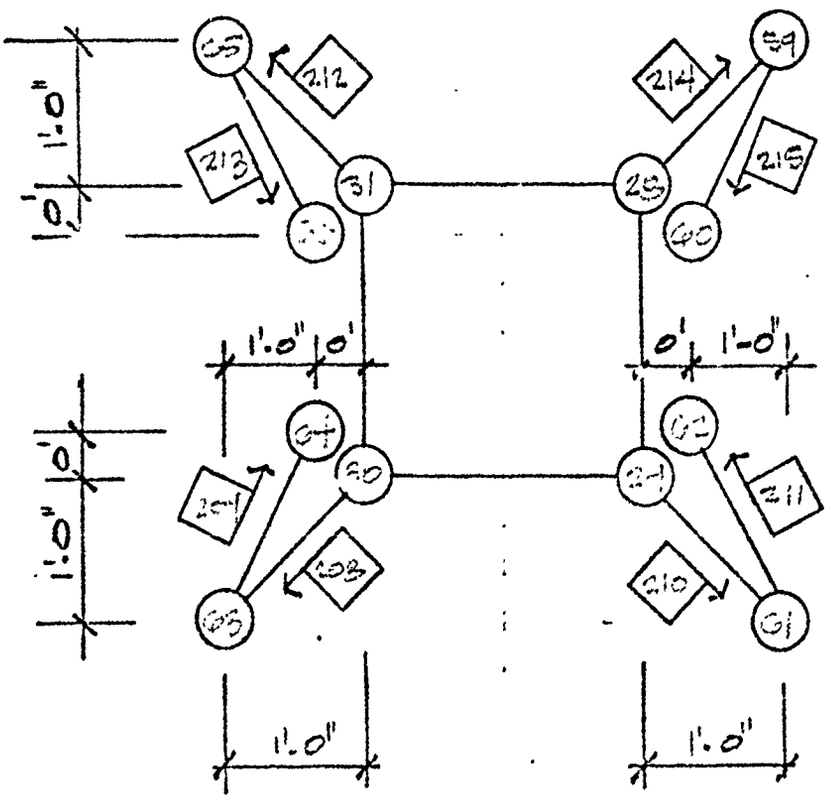

1
2
Y
20.45'
20.45'
43
26
23
B
45
47
45
20.45'
27
X
46
49
41
42
25
24
A
20.45'

ELEV. (+) 12 (90)


57
204
1'-0"
1'-0"
205
26
58
206
51
207
13
52
1'-0"
1'-0"
0'
1'-0"
54
201
25
24
54
203
1'-0"
200
202
53
53
1'-0"
1'-0"


1
2
Y
23.45
23.45
34
31
28
B
64
63
61
23.45
32
X
62
65
60
53
23.45
30
29
A

ELEV. (-) 18 (60)

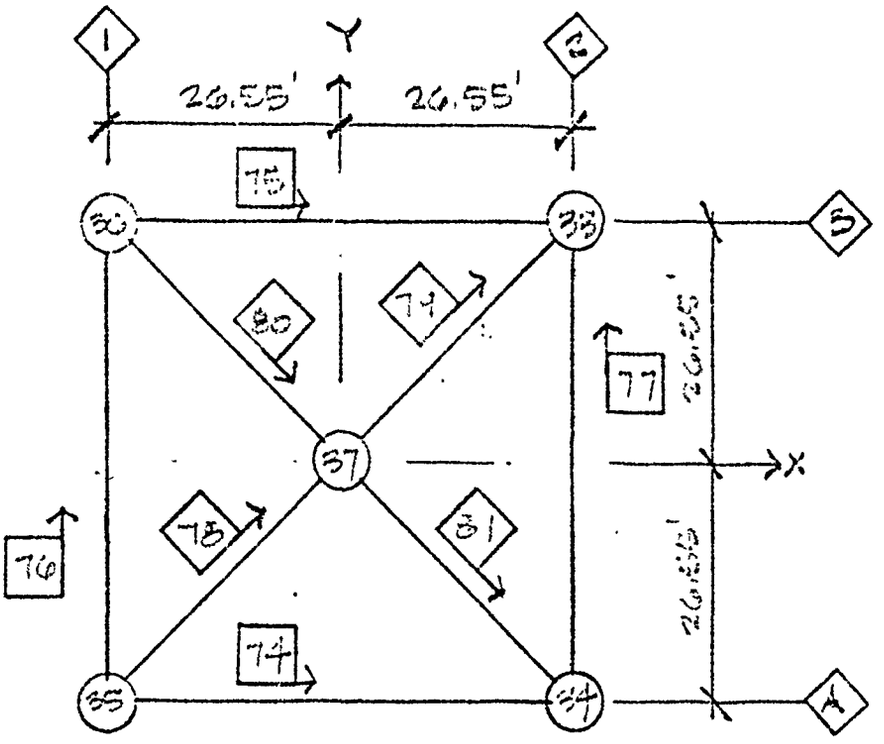

35
212
214
59
1'-0"
213
215
31
29
0'
60
1'-0"
0'
1'-0"
0'
64
62
1'-0"
30
211
204
208
210
63
61
1'-0"
1'-0"

CREST OFFSHORE, INC.

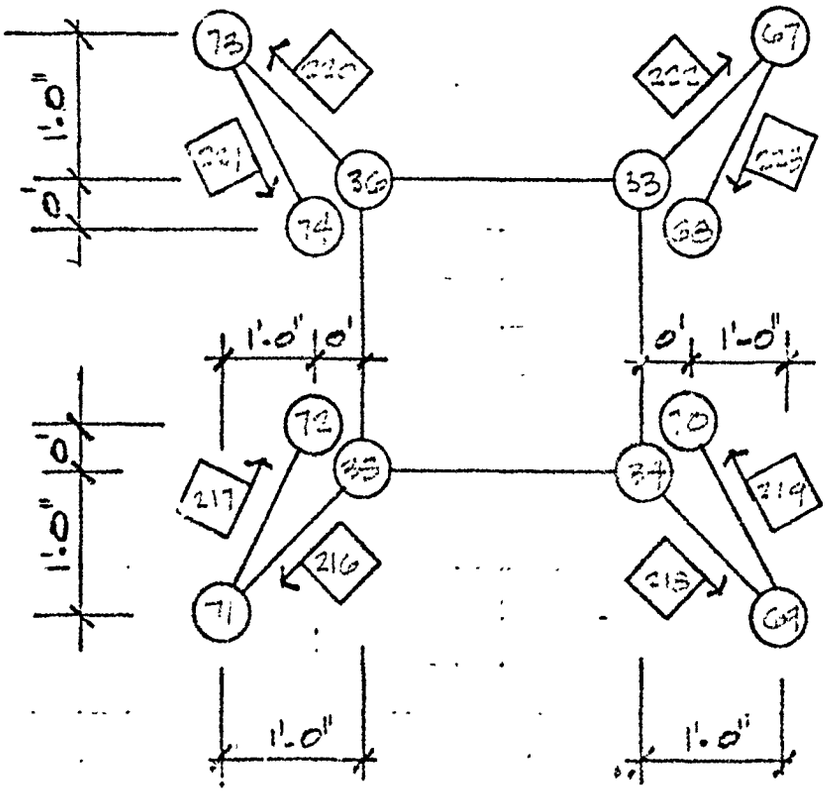
Sheet 1 of 4 Pages

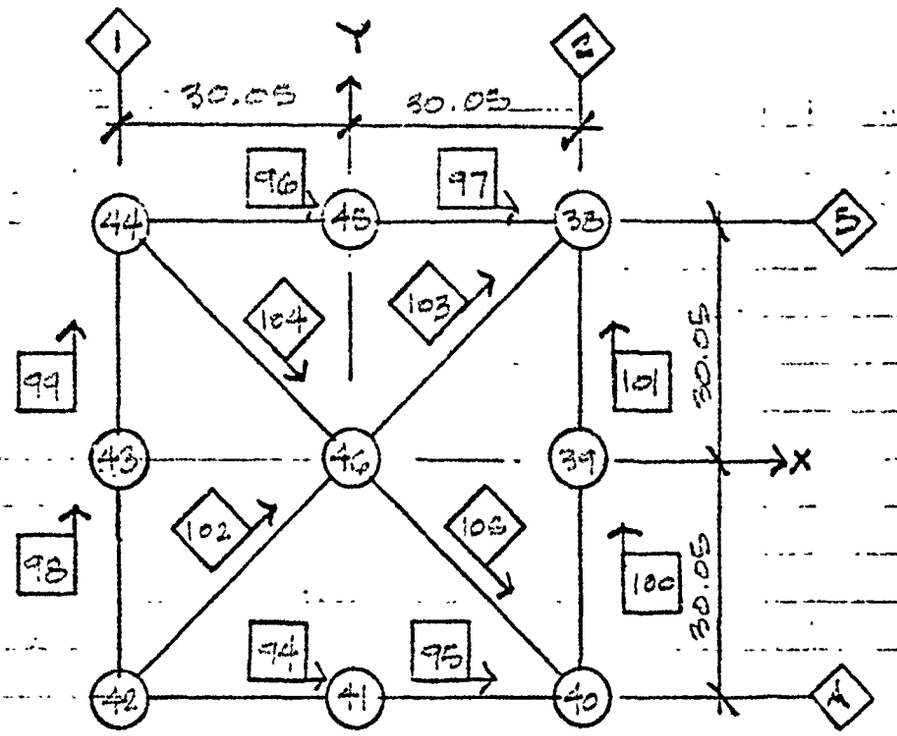
By WS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-20-92 Job No. 21-771-92 Calculation STRUCTURE 5' LEGS

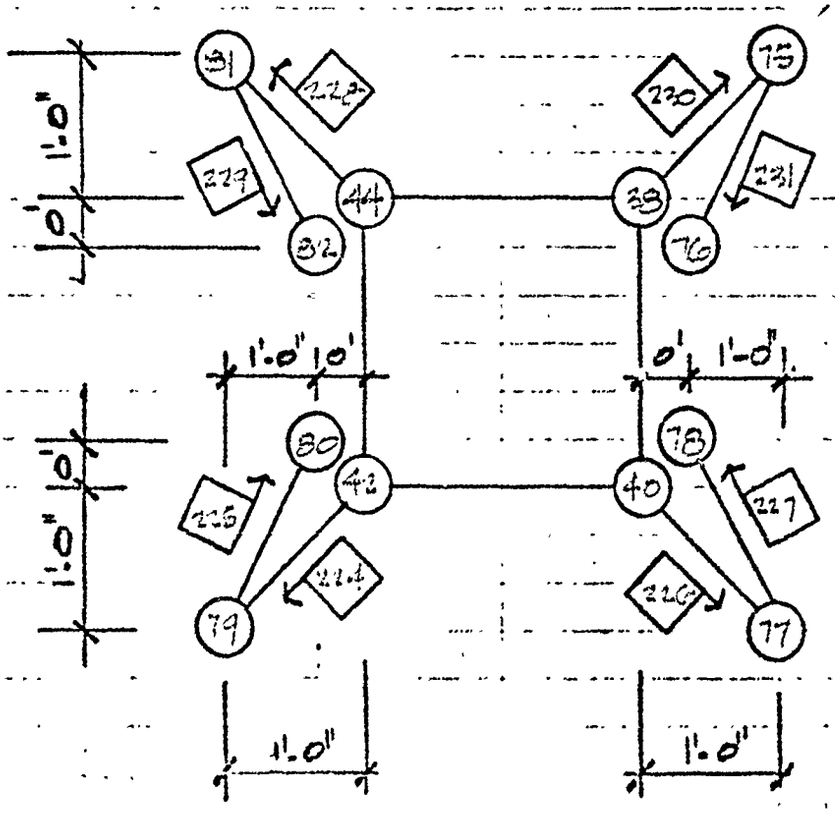


ELEV. (-) 49 (35)




1
2
Y
30.05
30.05
96
97
44
45
38
5
104
103
99
101
30.05
43
46
39
X
102
105
98
100
30.05
94
95
42
41
40
4

ELEV. (-) 84 (0)

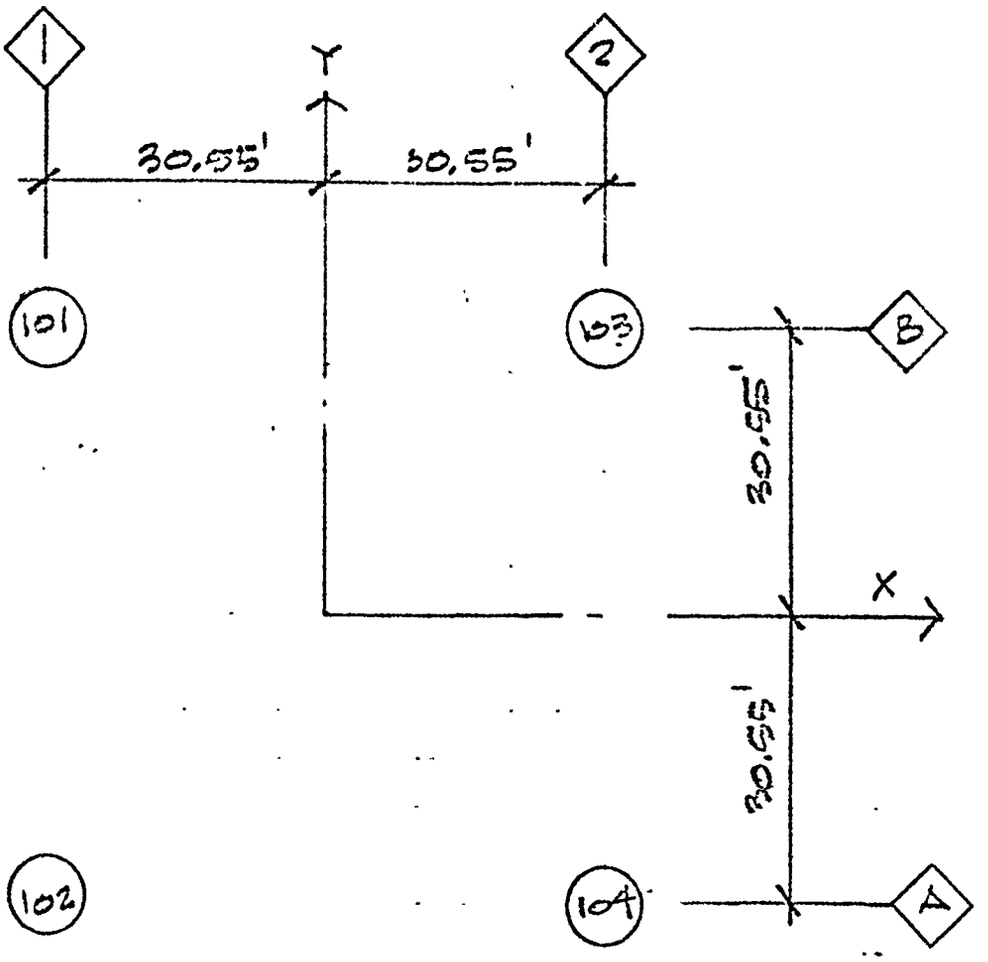

31
228
1'-0"
229
44
1'-0"
32
75
230
231
38
76
1'-0"
1'-0"
1'-0"
1'-0"
80
78
225
42
40
227
224
226
79
77
1'-0"
1'-0"

CREST OFFSHORE, INC.

Sheet 164 of 4 Pages

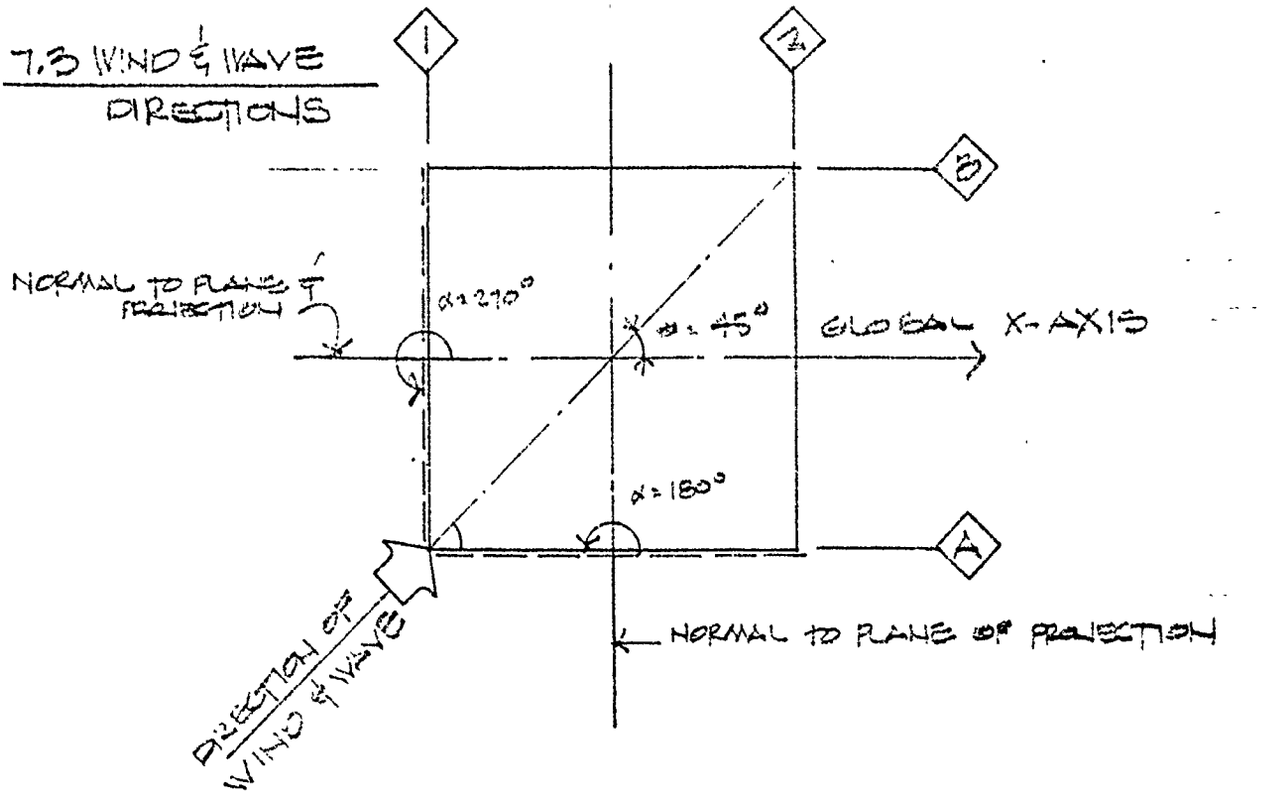
By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-20-96 Job No. 21-771-92 Calculation STRUCTURE/LOAD



ELEV. (-) 89 (-5)

7.3 WIND & WAVE DIRECTIONS



WIND AREAS

FENCE = 50' x 2' = 100 S.F.

AREA BETWEEN DECKS = 50' x 15' x 0.5 = 375 S.F.

CREST OFFSHORE, INC.

By WWA Client U.S. NAVY Subject PRELIMINARY CONCEPT ANALYSIS

Date 4-21-76 Job No. 27-771-92 Calculation L=60

U.S.NAVY TEMPLET DESIGN - 84 FT MWL JOB NO. 27-771-00

100 YEAR STORM WAVE - PRESSURE PROFILES(PSF) 4 PILE THETA = 45DEG

PRELIMINARY DESIGN ATKINSON APRIL 1976

STRUCTURE JOB NO. 27-771-00

INPUT UNITS ....ENGLISH

OUTPUT UNITS ....ENGLISH

**** COEFFICIENT TABLE REPORT ****

DIAMETER IN	NORMAL DRAG COEF	TANG DRAG COEF	MASS COEF
14.000	1.0000	0.0000	1.0000
40.000	1.0000	0.0000	1.0000

CREST OFFSHORE, INC.

Sheet 7.12 of 4-PILE

By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-21-76 Job No. 21-701-92 Calculation L=60'

**** DEAD LOAD REPORT ****

LOAD CONDITION 1 MEAN WATER DEPTH = 123,500 FT

STRUCTURE DEAD LOAD = 573,8088 KIPS

+ 13,4029

560,4059

less with buoyancy loads - 7.12 x 7.625' x 142 #/ft³

****** WAVE POSITION SUMMARY REPORT ******

LOAD CONDITION 1 — WAVE ANGLE = 45.00

TRIAL NO.	DIST. TO CREST FT	PHASE ANG. WAVE-TO-STRUC. (DEG)	SHEAR KIPS X	SHEAR KIPS Y	SHEAR KIPS RSLNT	MUDLINE MOMENT FT-KIPS X	MUDLINE MOMENT FT-KIPS Y	MUDLINE MOMENT FT-KIPS RSLNT	VERTICAL FORCE KIPS Z
1	-24.0	13.07	891.0	891.0	1260.1	-68227.	68227.	96488.	-3.8
2	-20.0	10.89	899.7	899.7	1272.4	-69402.	69402.	98149.	-4.6
3	-16.0	8.71	911.5	911.5	1289.1	-71037.	71037.	100462.	-5.3
4	-12.0	6.54	921.4	921.4	1303.1	-72556.	72556.	102609.	-5.6
5	-8.0	4.36	926.7	926.7	1310.5	-73556.	73556.	104025.	-6.1
6	-4.0	2.18	921.4	921.4	1303.0	-73418.	73418.	103829.	-5.7
7	0.0	-0.00	914.0	914.0	1292.6	-73093.	73093.	103369.	-5.2
8	4.0	-2.18	894.8	894.8	1265.4	-71325.	71325.	100869.	-2.2
9	8.0	-4.36	871.9	871.9	1233.0	-69126.	69126.	97759.	2.2
10	12.0	-6.54	844.2	844.2	1193.8	-66536.	66536.	94097.	5.3
11	16.0	-8.71	818.3	818.3	1157.3	-64243.	64243.	90854.	5.3

**** LOAD SUMMARY REPORT ****

WAVE NUMBER = 1 WAVE DIRECTION = 45.000

X SHEAR FORCE = 926.6732 KIPS

Y SHEAR FORCE = 926.6732 KIPS

RESULTANT SHEAR FORCE = 1310.5139 KIPS

X MUDLINE MOMENT = -73556.4324 FT-KIPS

Y MUDLINE MOMENT = 73556.4324 FT-KIPS

RESULTANT MUDLINE MOMENT = 104024.5043 FT-KIPS

Z VERTICAL FORCE = -6.0790 KIPS

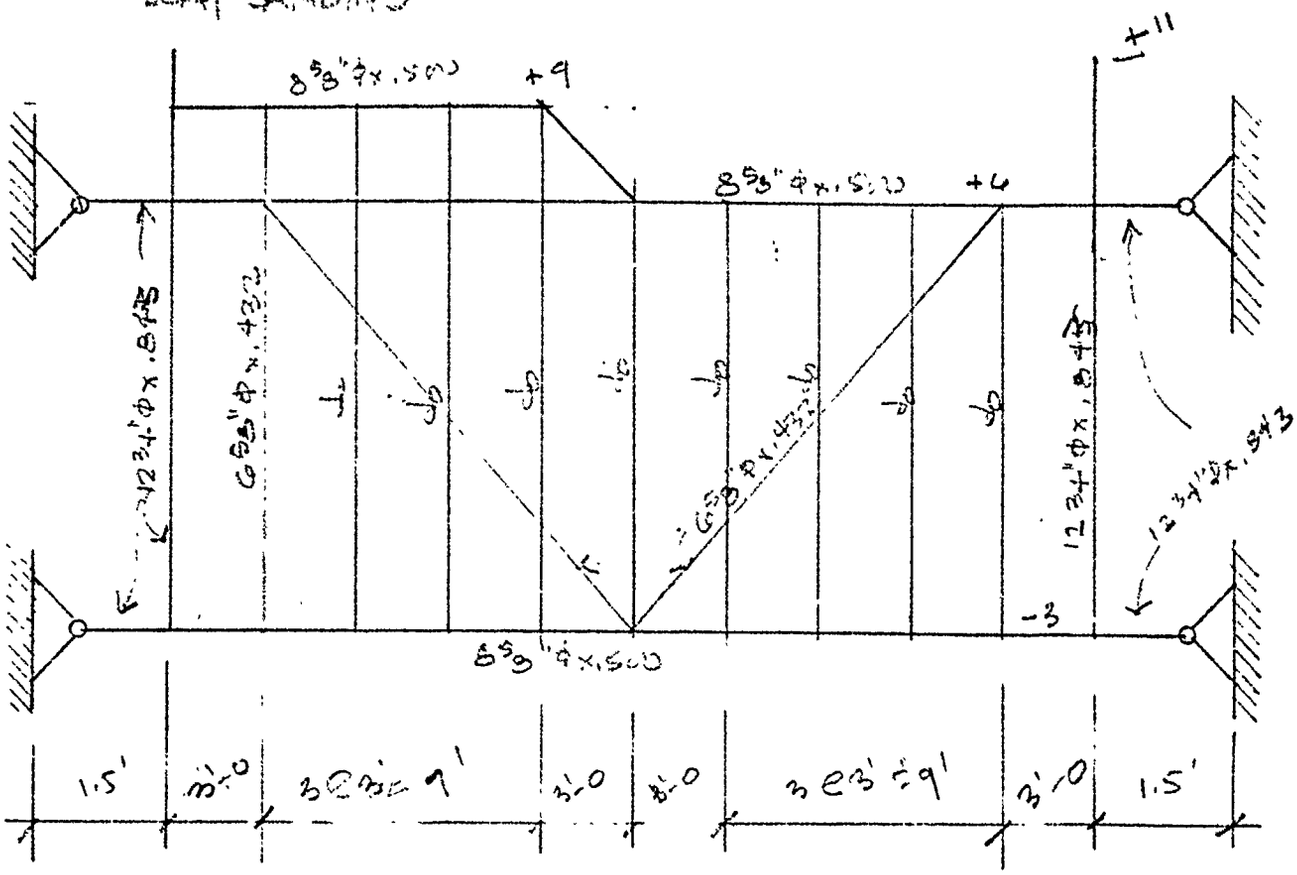
SECTION 8

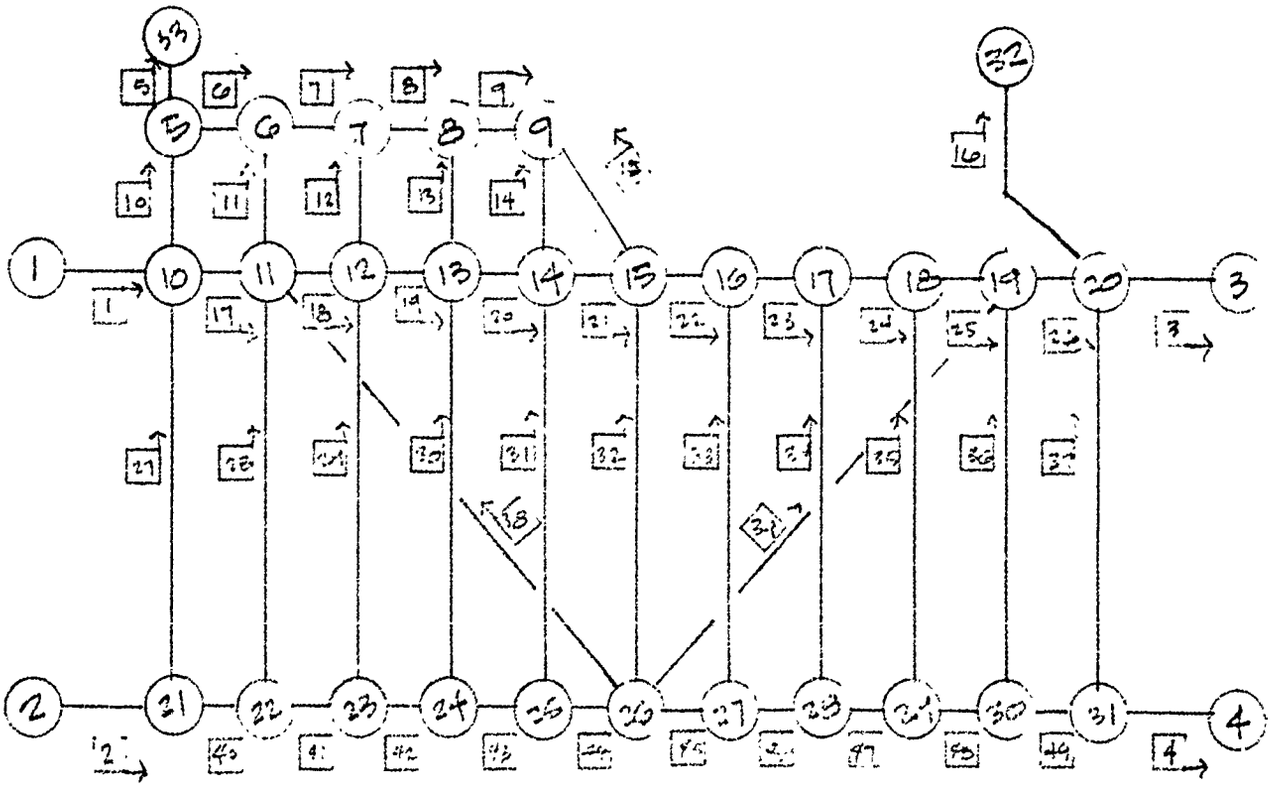
BOATLANDING

8.1 INTRODUCTION

The boat landing was modeled as a separate structure and a SEALOAD run was made using the same wave and wind characteristics as those specified previously. The boat landing was attached to the templet between Rows '1' and '2' at elevations +11 ft and -3 ft from MLW. This section shows the idealized model for the boat landing structure and the results of the SEALOAD program run. For simplicity loading conditions for the three-pile structure (see Report 27-771-92 Appendix C) were also made with this run. Loading #1 is for wind and wave at a 45° angle to the boat landing to be used with the four-pile structure. Loading #2 is for wind and wave normal to the boatlanding and #3 in 180° from #2, both to be used with the three-pile structure.

BOAT LANDING





U.S. NAVY TEMPLET DESIGN = 64 FT MWL JOB NO. 27-771-00

100 YEAR STORM WAVE + PRESSURE PROFILES(PSF) + PILE THETA = 45DEG

PRELIMINARY DESIGN ATKINSON APRIL 1976

BOAT LANDING

INPUT UNITS ENGLISH

OUTPUT UNITS ENGLISH

CREST OFFSHORE, INC.

By — Client — Subject — Sheet 204 of 4 Sheets

Date — Job No. — Calculation —

**** WAVE POSITION SUMMARY REPORT ****

LOAD CONDITION 1 — WAVE ANGLE = 45.00

TRIAL NO.	DIST. TO CREST FT	PHASE ANG. WAVE-TO-STRUC. (DEG)	SHEAR KIPS X	SHEAR KIPS Y	SHEAR KIPS RSLNT	MUDLINE MOMENT FT-KIPS X	MUDLINE MOMENT FT-KIPS Y	MUDLINE MOMENT FT-KIPS RSLNT	VERTICAL FORCE KIPS Z
1	-24.0	13.07	19.1	34.4	39.3	-2988.	1657.	3416.	.3
2	-16.0	8.71	18.8	33.9	38.8	-2950.	1637.	3373.	.3
3	-8.0	4.36	18.3	33.0	37.8	-2869.	1594.	3282.	.2
4	0.0	-0.00	17.5	31.6	36.1	-2744.	1525.	3139.	.2
5	8.0	-4.36	16.5	29.7	34.0	-2580.	1435.	2952.	.2
6	16.0	-8.71	15.2	27.4	31.3	-2377.	1323.	2720.	.1

**** LOAD SUMMARY REPORT ****

WAVE NUMBER = 1 WAVE DIRECTION = 45.000

X SHEAR FORCE =	10.0504 KIPS
Y SHEAR FORCE =	34.3760 KIPS
RESULTANT SHEAR FORCE =	39.2965 KIPS
X MUDLINE MOMENT =	-2987.5665 FT-KIPS
Y MUDLINE MOMENT =	1656.9426 FT-KIPS
RESULTANT MUDLINE MOMENT =	3416.2862 FT-KIPS
Z VERTICAL FORCE =	.2779 KIPS

CREST OFFSHORE, INC.

By _____ Client _____ Subject _____

Date 4-15-76 Job No. 21-77-12 Calculation _____

Sheet 2 of 4 Pile

**** WAVE POSITION SUMMARY REPORT ****

LOAD CONDITION 2 WAVE ANGLE = 90.00

TRIAL NO.	DIST, TO CREST FT	PHASE ANG, WAVE TO STRUC. (DEG)	SHEAR KIPS X	SHEAR KIPS Y	SHEAR KIPS RSLNT	MUDLINE MOMENT FT-KIPS X	MUDLINE MOMENT FT-KIPS Y	MUDLINE MOMENT FT-KIPS RSLNT	VERTICAL FORCE KIPS Z
1	-20.0	10.89	0.0	48.4	48.4	-4206.	0.	4206.	0.0
2	-15.0	8.17	0.0	47.6	47.6	-4141.	0.	4141.	0.0
3	-10.0	5.45	0.0	46.5	46.5	-4042.	0.	4042.	0.0
4	-5.0	2.72	0.0	45.2	45.2	-3932.	0.	3932.	0.0
5	0.0	-0.00	0.0	43.7	43.7	-3800.	0.	3800.	0.0
6	5.0	-2.72	0.0	41.9	41.9	-3646.	0.	3646.	0.0
7	10.0	-5.45	0.0	40.0	40.0	-3476.	0.	3476.	0.0

**** LOAD SUMMARY REPORT ****

WAVE NUMBER = 2 WAVE DIRECTION = 90.000

X SHEAR FORCE =	0.0000 KIPS
Y SHEAR FORCE =	46.3774 KIPS
RESULTANT SHEAR FORCE =	46.3770 KIPS
X MUDLINE MOMENT =	-4205.5219 FT-KIPS
Y MUDLINE MOMENT =	0.0000 FT-KIPS
RESULTANT MUDLINE MOMENT =	4205.5219 FT-KIPS
Z VERTICAL FORCE =	0.0000 KIPS

CREST OFFSHORE, INC.

By _____ Client _____ Sheet _____ of _____

Date 4-15-92 Job No. 27-771-92 Subject _____

Calculation _____

**** WAVE POSITION SUMMARY REPORT ****

WAVE ANGLE = 270.00

LOAD CONDITION 3

TRIAL NO.	DIST. TO CREST FT	PHASE ANG. WAVE-TO-STRUC. (DEG)	SHEAR KIPS X	SHEAR KIPS Y	SHEAR KIPS RSLNT	MUDLINE MOMENT FT-KIPS X	MUDLINE MOMENT FT-KIPS Y	MUDLINE MOMENT FT-KIPS RSLNT	VERTICAL FORCE KIPS Z
1	-20.0	10.89	0.0	-46.4	46.4	4033.	0.	4033.	0.0
2	-15.0	8.17	0.0	-47.5	47.5	4132.	0.	4132.	0.0
3	-10.0	5.45	0.0	-48.4	48.4	4208.	0.	4208.	0.0
4	-5.0	2.72	0.0	-48.7	48.7	4236.	0.	4236.	0.0
5	0.0	-0.00	0.0	-48.9	48.9	4249.	0.	4249.	0.0
6	5.0	-2.72	0.0	-48.8	48.8	4245.	0.	4245.	0.0
7	10.0	-5.45	0.0	-48.4	48.4	4206.	0.	4206.	0.0

**** LOAD SUMMARY REPORT ****

WAVE NUMBER = 3 WAVE DIRECTION =270.000

X SHEAR FORCE = 0.0000 KIPS

Y SHEAR FORCE = -46.8782 KIPS

RESULTANT SHEAR FORCE = 46.8782 KIPS

X MUDLINE MOMENT = 4248.9737 FT-KIPS

Y MUDLINE MOMENT = 0.0000 FT-KIPS

RESULTANT MUDLINE MOMENT = 4248.9737 FT-KIPS

Z VERTICAL FORCE = 0.0000 KIPS

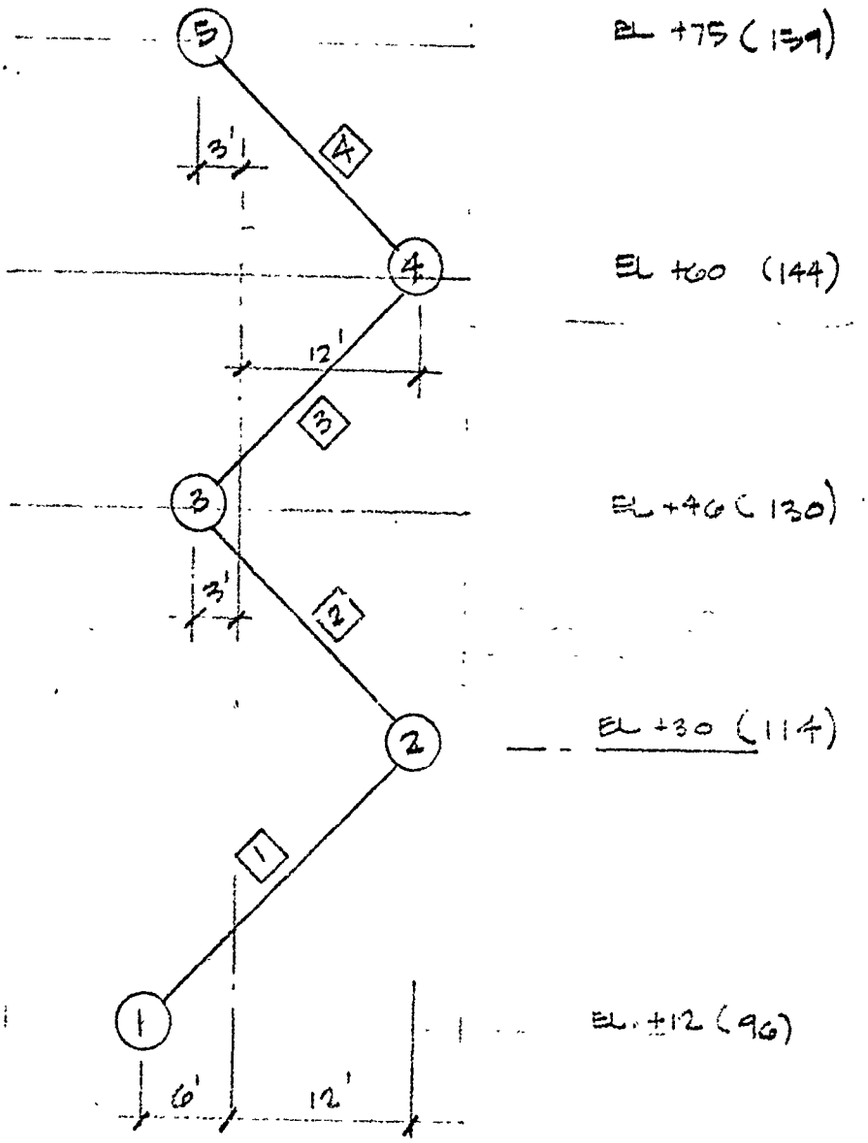
SECTION 9

STAIRWAY

9.1 INTRODUCTION

The stairway was modeled as a separate structure also. The stairway was attached to the superstructure legs between Rows '1' and '2' at elevations +11 ft and +75 ft from MLW.

This section shows the idealized model for the stairway structure and the results of the SEALOAD run. Loading #1 is for the four-pile structures while loadings #2 and#3 are to be used with the three-pile structure.


5
4
3
2
1
3'
12'
3'
6'
12'
EL +75 (159)
EL +60 (144)
EL +46 (130)
EL +30 (114)
EL +12 (96)

U.S.NAVY TEMPLET DESIGN - 84 FT MWL JOB NO. 27-771-00

100 YEAR STORM WAVE + PRESSURE PROFILES(PSF) 4 PILE THETA = 45DEG

PRELIMINARY DESIGN ATKINSON APRIL 1976

STAIRWAY

INPUT UNITS
....ENGLISH

OUTPUT UNITS
....ENGLISH

CREST OFFSHORE, INC.

By — Client — Subject — Sheet 1.03 of 4 pages
Date Job No. Calculation

**** WAVE POSITION SUMMARY REPORT ****

LOAD CONDITION 1

WAVE ANGLE = 45.00

TRIAL NO.	DIST. TO CREST FT	PHASE ANG.WAVE-TO-STRUC. (DEG)	SHEAR KIPS X	SHEAR KIPS Y	SHEAR RSLNT	MUDLINE MOMENT Ft-KIPS X	MUDLINE MOMENT Ft-KIPS Y	MUDLINE MOMENT RSLNT	VERTICAL FORCE KIPS X
1	-24.0	13.07	26.2	92.3	96.5	-6427.	3217.	7187.	-4.1
2	-16.0	8.71	27.6	55.2	61.7	-6833.	3406.	7634.	-5.6
3	-8.0	4.36	28.0	56.1	62.7	-6976.	3467.	7790.	-6.3
4	0.0	0.00	27.0	54.2	60.5	-6744.	3351.	7531.	-6.0
5	8.0	-4.36	23.9	47.8	53.4	-5895.	2946.	6590.	-3.9
6	16.0	-8.71	20.3	40.4	45.2	-4941.	2485.	5530.	-1.7

**** L O A D S U M M A R Y R E P O R T ****

WAVE NUMBER = 1 WAVE DIRECTION = 45.000

X SHEAR FORCE = 27.9532 KIPS

Y SHEAR FORCE = 56.0895 KIPS

RESULTANT SHEAR FORCE = 62.6689 KIPS

X MUDLINE MOMENT = -6975.5942 FT-KIPS

Y MUDLINE MOMENT = 3467.1854 FT-KIPS

RESULTANT MUDLINE MOMENT = 7789.7554 FT-KIPS

Z VERTICAL FORCE = -6.2904 KIPS

***** WAVE POSITION SUMMARY REPORT *****

LOAD CONDITION 8 WAVE ANGLE = 90.00

TRIAL NO.	DIST. TO CREST FT	PHASE ANG. WAVE TO-STRUC. (DEG)	BASE SHEAR KIPS X	BASE SHEAR KIPS Y	BASE SHEAR KIPS RSLNT	MUDLINE MOMENT FT-KIPS X	MUDLINE MOMENT FT-KIPS Y	MUDLINE MOMENT FT-KIPS RSLNT	VERTICAL FORCE KIPS Z
1	=20.0	10.89	0.0	80.7	80.7	=10025.	0.	10028.	0.0
2	=15.0	8.17	0.0	81.2	81.2	=10128.	0.	10128.	0.0
3	=10.0	5.45	0.0	77.9	77.9	=9694.	0.	9694.	0.0
4	=5.0	2.72	0.0	74.0	74.0	=9182.	0.	9182.	0.0
5	0.0	=0.00	0.0	68.1	68.1	=8403.	0.	8403.	0.0
6	5.0	=2.72	0.0	62.4	62.4	=7661.	0.	7661.	0.0
7	10.0	=5.45	0.0	56.8	56.8	=6952.	0.	6952.	0.0

**** LOAD SUMMARY REPORT ****

WAVE NUMBER = 2 WAVE DIRECTION = 90.000

X SHEAR FORCE =	0.0000 KIPS	
Y SHEAR FORCE =	81.2343 KIPS	
RESULTANT SHEAR FORCE =	81.2343 KIPS	
X MUDLINE MOMENT =	10126.1059 FT-KIPS	
Y MUDLINE MOMENT =	0.0000 FT-KIPS	
RESULTANT MUDLINE MOMENT =	10126.1059 FT-KIPS	
Z VERTICAL FORCE =	0.0000 KIPS	

****** WAVE POSITION SUMMARY REPORT ******

LOAD CONDITION 3 — WAVE ANGLE = 270.00

TRIAL NO.	DIST. TO CREST FT	PHASE ANG. WAVE TO STRUC. (DEG)	SHEAR KIPS X	SHEAR KIPS Y	SHEAR KIPS RSLNT	MUDLINE MOMENT FT-KIPS X	MUDLINE MOMENT FT-KIPS Y	MUDLINE MOMENT FT-KIPS RSLNT	VERTICAL FORCE KIPS Z
1	-20.0	10.89	0.0	-48.2	48.2	5772.	0.	5772.	0.0
2	-15.0	8.17	0.0	-61.9	61.9	7502.	0.	7502.	0.0
3	-10.0	5.45	0.0	-67.0	67.0	8162.	0.	8162.	0.0
4	-5.0	2.72	0.0	-71.1	71.1	8703.	0.	8703.	0.0
5	0.0	-0.00	0.0	-75.1	75.1	9249.	0.	9249.	0.0
6	5.0	-2.72	0.0	-79.2	79.2	9810.	0.	9810.	0.0
7	10.0	-5.45	0.0	-80.7	80.7	10028.	0.	10028.	0.0

CREST OFFSHORE, INC.

By — Client — Subject — Sheet of

Date Job No. Calculation

**** LOAD SUMMARY REPORT ****

WAVE NUMBER = 3 WAVE DIRECTION =270.000

X SHEAR FORCE =	0.0000 KIPS
Y SHEAR FORCE =	-80.6503 KIPS
RESULTANT SHEAR FORCE =	80.6503 KIPS
X MUDLINE MOMENT =	10027.6899 FT-KIPS
Y MUDLINE MOMENT =	0.0000 FT-KIPS
RESULTANT MUDLINE MOMENT =	10027.6899 FT-KIPS
Z VERTICAL FORCE =	0.0000 KIPS

SECTION 10

LATERALLY LOADED PILE CAPACITY

10.1 INTRODUCTION

Some additional data input into the STRAN Program is "Equivalent Pile" length, area, and moment of inertia of the piling sections below mudline to simulate the supports in a more realistic manner. This is done with the results of the "LATERALLY LOADED PILE" Program* which also checks the stress in the piles.

Section 10.2 computes the pile top restraint and the shear and axial loadings to the pile top from the SEALOAD results. Both the 50 ft and 60 ft jacket base spacings were checked for required pile penetration and it was decided to use the 50 ft jacket base spacing for the final analysis.

Section 10.3 shows soil data, minimum wall thickness required for pile driving hammer in accordance with API Recommendations, pile driving resistance curve, and final thicknesses and lengths of piles chosen.

All information was coded and a LATERALLY LOADED PILE Program run was made. The whole run is shown in Exhibit A with only the results of that run being shown in Section 10.4.

Section 10.5 computes the "Equivalent Pile Properties" to be used in the STRAN run.

* This program is available at Crest Engineering, Inc., Tulsa.

10.2 DATA PREPARATION

1. PILE TOP RESTRAINT

$$k = \frac{3.5EI}{L} \qquad \left(= \frac{M}{\theta}\right)$$

WHERE $E = 29{,}000$ ksi

$I = 24{,}240.424$ in^4
(for a 36"ϕ x 1.5" WT PILE)

$L = 35' = 420$ in

$$\therefore k = \frac{3.5\,(29{,}000)(24{,}240.424)}{420} \qquad \left(\frac{\frac{k}{in^2} \times in^4}{in} = in\text{-}kip\right)$$

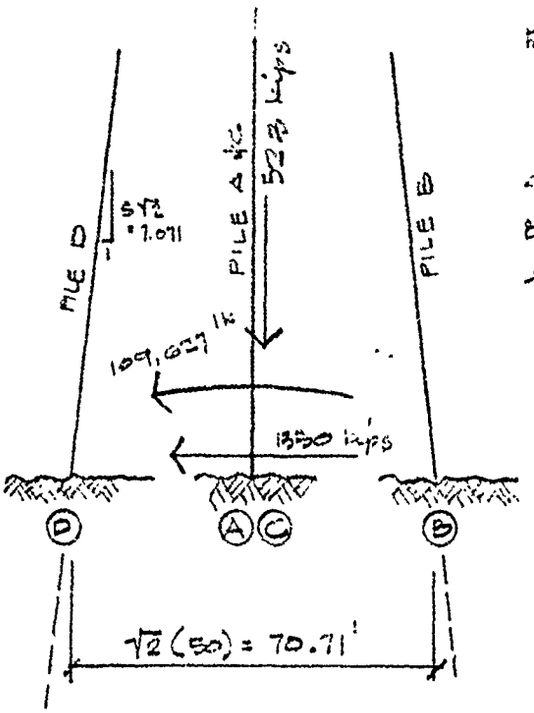
$= 5{,}858{,}102.467 \approx 5{,}858{,}102$ in-kips/rad.

By JWA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-30-76 Job No. 27-171-92 Calculation INTERNAL LOADED PILE

LOADINGS AT PILE TOP

$\ell = 50'$



FORCES FROM COMPUTER PROGRAMS

DEAD LOAD = 522.5 K

	V	M
STRUCTURE	1248 K	98421 IK
BOAT LANDING	39.3 K	3416.3 IK
STAIRS	63.7 K	7789.8 IK
TOTALS	1350 K	109,627.1 IK

CHECK COMPRESSION:

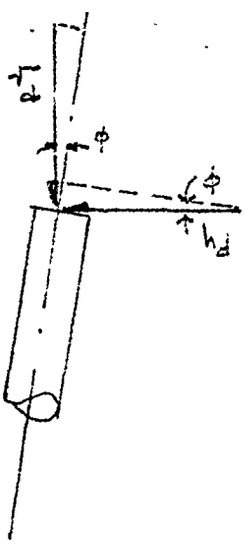
Moment about B axis

$\Sigma M = 0 = M_{OVERTURN} + M_D - M_{AC} - M_D$

$= 109,627 + \frac{522 \times 70.71}{2} - \frac{522}{2} \times \frac{70.71}{2} - 70.71(V_d)$

$V_d = \left[109,627 + \frac{522}{2} \times \frac{70.71}{2}\right] \frac{1}{70.71} = 1681.1$ K

$h_d = 1350^k/4 = 337.5^k$



Axial Compression

$A_d = V_d \cos\phi + h_d \sin\phi$

$= 1681.1 \times \frac{50}{\sqrt{5051}} + 337.5 \times \frac{1}{\sqrt{5051}} = 1664.5 + 47.3$

$= 1711.8^K$ compression

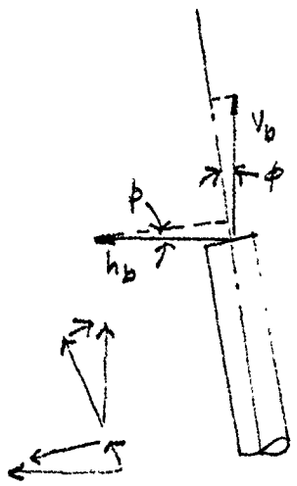
Shear

$S_d = h_d \cos\phi - V_d \sin\phi$

$= 337.5 \times \frac{50}{\sqrt{5051}} - 1681.1 \times \frac{1}{\sqrt{5051}} = 334.17 - 235.7$

$= 98.5^K$

CHECK TENSION $\ell = 50'$



Moment about D axis

$$M=0 = M_{WIND} - M_P + M_{AC} - M_B$$

$$= 109,627 - 523 \times \frac{70.71}{2} + \frac{523}{2} \times \frac{70.71}{2} - 70.71 V_b$$

$$\therefore V_b = \left[109,627 - \frac{523}{2} \times \frac{70.71}{2}\right] \frac{1}{70.71} = 1419.6^{k}$$

$$h_b = 1350/4 = 337.5^{k}$$

Axial Tension

$$A_b = V_b \cos\phi + h_b \sin\phi$$

$$= 1419.6 \times \frac{5\sqrt{2}}{\sqrt{51}} + 337.5 \times \frac{1}{\sqrt{51}} = 1405.0 + 47.3$$

$$= 1452.9^{k} \text{ tension}$$

Shear

$$S_b = h_b \cos\phi - V_b \sin\phi$$

$$= 337.5 \frac{5\sqrt{2}}{\sqrt{51}} - 1419.0 \frac{1}{\sqrt{51}} = 334.2 - 198.8$$

$$= 135.4^{k}$$

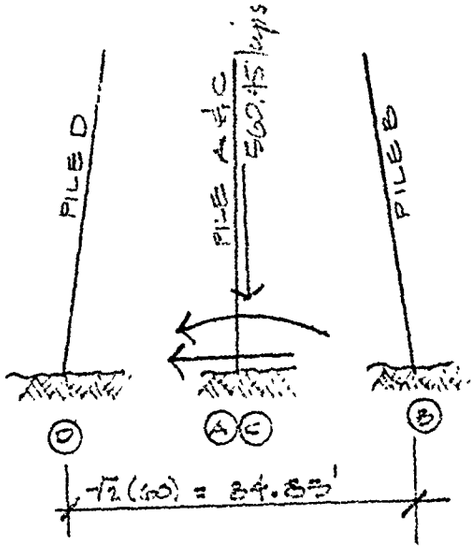
with 1711.8^{k} compression
1452.9^{k} tension

Required Penetration = 180'

By _____ Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 4.21.76 Job No. 21-111-92 Calculation LATERALLY LOADED PILE

LOADINGS AT PILE TOP

$l = 60'$



FORCES FROM COMPUTER PROGRAMS

DEAD LOAD = 560.45^k

	V	M
STRUCTURE	1310.5^k	104,024.5^{1k}
BOAT LANDING	39.3^k	3416.3^{1k}
STAIRS	62.7^k	7789.5^{1k}
TOTALS	1412.5^k	115,230.0^{1}

COMPRESSION

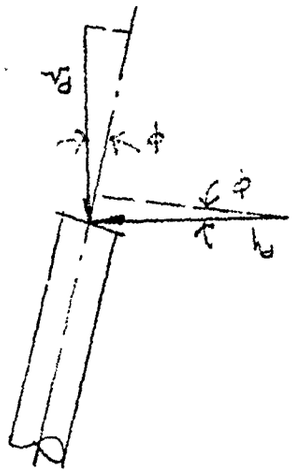
Moment about B axis

$M = 0 = M_{OVERTURN} + M_P - M_{AC} - M_D$

$= 115,230.0 + \frac{560.45 \times 34.85}{2} - \frac{560.45 \times 34.85}{2 \times 2} - 34.85(V_d)$

$\therefore V_d = \left[115,230.0 + \frac{560.45 \times 34.85}{2 \times 2}\right] \frac{1}{34.85} = 1498.2^k$

$h_d = 1412.5^k/4 = 353.125^k$



Axial Compression

$A_d = V_d \cos\phi + h_d \sin\phi$

$= 1498.2 \times \frac{5\sqrt{2}}{\sqrt{51}} + 353.125 \times \frac{1}{\sqrt{51}}$

$= 1532.1^k$ COMPRESSION

Shear

$S_d = h_d \cos\phi - V_d \sin\phi$

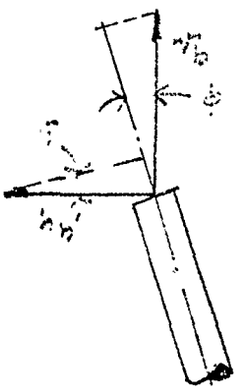
$= 353.125 \times 5\sqrt{2}/\sqrt{51} - 1498.2 \times 1/\sqrt{51}$

$= 139.9^k$

CHECK TENSION

$\ell = 60'$

Moment about D axis



$M_D = M_{overturning} - M_p + M_{AC} - M_B$

$= 115,230.6 - \frac{500.4 \times 84.85}{2} + \frac{500.4 \times 84.85}{2 \times 2} - 35.95(\ell$

$\therefore V_b = \left[115,230.6 - \frac{500.4 \times 84.85}{2 \times 2}\right] \frac{1}{84.85} = 1217.94^k$

$h_b = 1412.5 \cdot \ell = 353.125^k$

Axial Tension

$A_b = V_b \cos\phi + h_b \sin\phi$

$= 1217.94 \times 5\sqrt{2}/51 + 353.125 \times 1/51$

$= 1255.4^k$ tension

Shear

$S_b = h_b \cos\phi - V_b \sin\phi$

$= 353.125 \times 5\sqrt{2}/51 - 1217.94 \times 1/51$

$= 179.1^k$

Required Pile Penetration

with $C = 1532.9^k$

$T = 1255.4^k$

Required Pile Penetration = 162.5'

CREST OFFSHORE, INC.

By _____ Client _____ Subject _____ Sheet _____ of _____

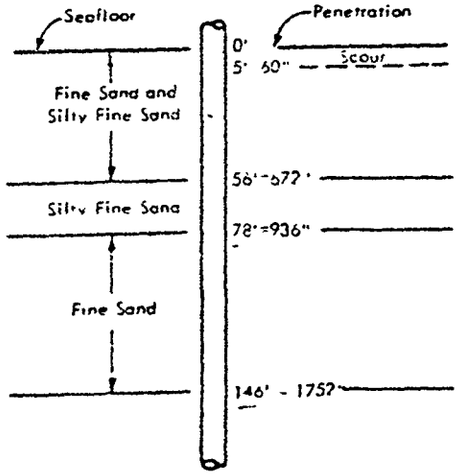
Date _____ Job No. _____ Calculation _____

SECTION 10.3
PILE DESIGN

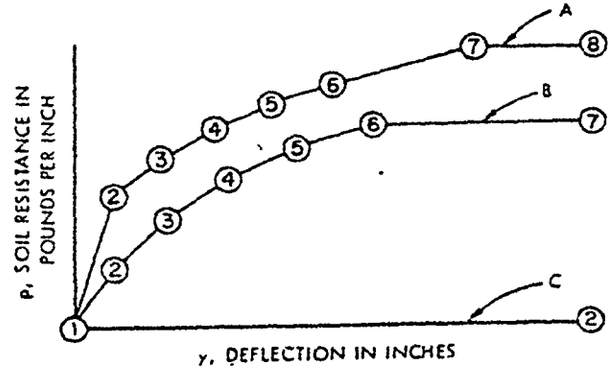
36-IN. DIAMETER PIPE PILES

Coordinates of Curve Points

Penetration inches	Typical Curve	y_1	P_1	y_2	P_2	y_3	P_3	y_4	P_4	y_5	P_5	y_6	P_6	y_7	P_7	y_8	P_8
ca.d60	C	0	0	20.	0												
96	A	0	0	0.016	85	0.070	120	0.18	145	0.30	168	0.50	190	1.13	244	20.0	244
169	A	0	0	0.009	222	0.063	574	0.17	926	0.29	1194	0.50	1544	1.13	2471	20.0	2471
252	A	0	0	0.017	637	0.071	1267	0.18	1975	0.30	2521	0.50	3244	1.13	5190	20.0	5190
264	A	0	0	0.011	320	0.063	857	0.17	1390	0.29	1792	0.50	2320	1.13	3710	20.0	3710
336	A	0	0	0.012	606	0.066	1374	0.17	2189	0.29	2809	0.50	3626	1.13	5803	20.0	5803
420	A	0	0	0.012	756	0.066	1716	0.17	2734	0.29	3509	0.50	4529	1.13	7247	20.0	7247
432	A	0	0	0.038	2492	0.090	3743	0.19	5396	0.30	6733	0.50	8537	1.13	13660	20.0	13660
672	A	0	0	0.038	3877	0.090	5824	0.19	8395	0.30	10475	0.50	13280	1.13	21248	20.0	21248
673	B	0	0	0.054	664	0.13	900	0.34	1222	0.84	1658	2.10	2250	20.0	2250		
936	E	0	0	0.054	664	0.13	900	0.34	1222	0.84	1658	2.10	2250	20.0	2250		
937	A	0	0	0.038	5395	0.090	8107	0.19	11692	0.30	14588	0.50	18497	1.13	29596	20.0	29596
1752	A	0	0	0.038	10109	0.090	15181	0.19	21887	0.30	27307	0.50	34624	1.13	55398	20.0	55398



STRATIGRAPHY ASSUMED FOR P-Y DATA

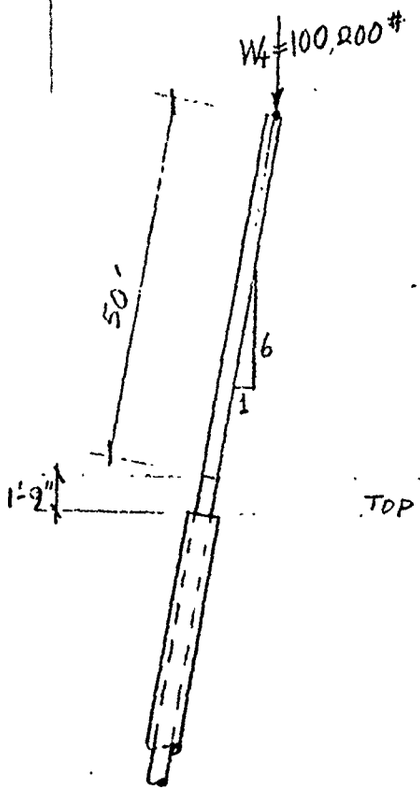


TYPICAL CURVES

P-Y DATA

Boring 1

MINIMUM WALL THICKNESS REQUIREMENTS



Use Vulcan 060 Hammer

Wt. of Hammer = 60,000 LBS

Wt. of Pile Cap = 40,200 LBS

Total Wt. = 100,200 LBS

Bending moment at the top of jacket leg is

$$M = 100,200 \times \left[\frac{1}{6}(51.75)\right]$$

$$= 864,225 \text{ ft-Lbs}$$

Axial Compression at the top of jacket leg (Piling)

$$P = 100,200 \times \frac{6}{\sqrt{37}} = 98,837 \text{ LBS}$$

36" O.D. x 1.25" WT $I = 20,630 \text{ in}^4$

$A = 136.5 \text{ in}^2$

Combined Stress $\sigma_c = \frac{M\frac{d}{2}}{I} + \frac{P}{A}$

$$\sigma_c = \frac{(864,225 \times 12) \times 18}{20,630} + \frac{98,837}{136.5}$$

$$\sigma_c = 9,773 \text{ psi}$$

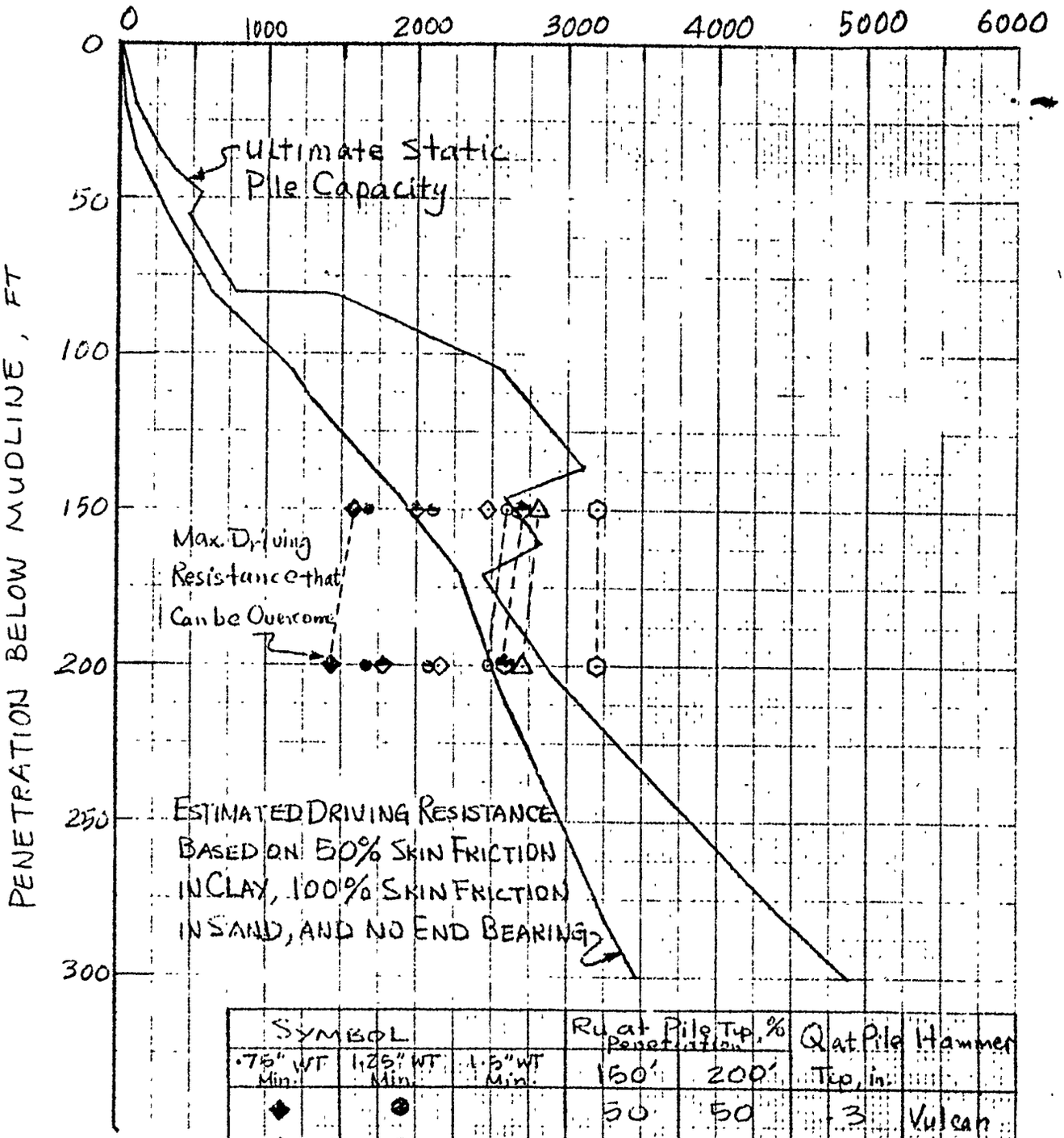
$$= 9.8 \text{ ksi}$$

Use Impact factor of 2 for the dynamic effect on piles during driving:

$$\sigma_{cd} = 2 \times \sigma_c = 19.6 \text{ ksi} < 22 \text{ ksi}$$

Say O.K.

ULTIMATE STATIC PILE CAPACITY, KIPS
ESTIMATED DRIVING RESISTANCE, KIPS



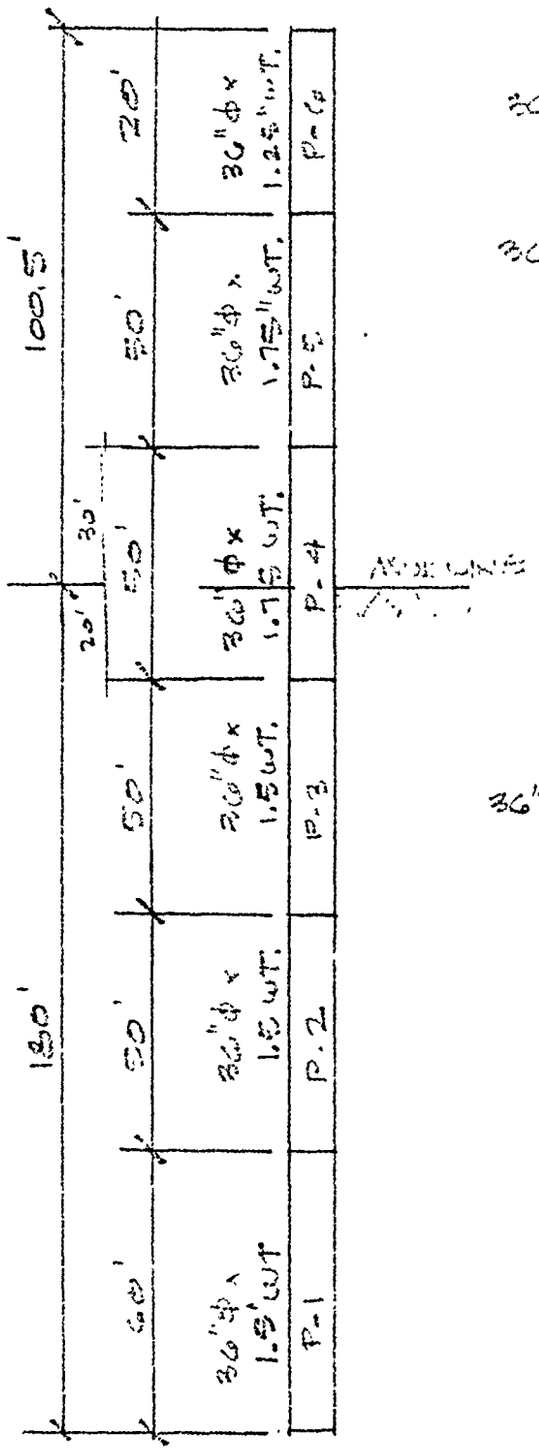
SYMBOL			Ru at Pile Tip, % Penetration		Q at Pile Tip, in.	Hammer
.75" WT Min.	1.25" WT Min.	1.5" WT Min.	150'	200'		
◆	●		50	50	.3	Vulcan
◈	◒		35	35	.1	940
◇	○	△	14	14	.025	
		◒	35	35	.1	Vulcan
		○	14	14	.025	060

36-IN. DIAMETER PIPE PILES

By WVS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4.21.76 Job No. 27-771-12 Calculation LATERALLY LOADED PILE

ESTIMATED PENETRATION - 180 FT. BELOW MUDLINE



36"ϕ x 1.25" WT. $I = 20,025.14\ in^4$
$A = 130.46\ in^2$

36"ϕ x 1.75" WT. $I = 27,690.04\ in^4$
$A = 188.30\ in^2$

36"ϕ x 1.5" WT. $I = 24,234.25\ in^4$
$A = 162.58\ in^2$

RESULTS

STA.	DIST. ALONG PILE	DEFL.	SLOPE	MOMENT	BEAM COLUMN SHEAR	APPLIED NON LINEAR LATERAL LOADING	COMBINED STRESS(MAX.)
0	0.0	0.534	-0.16710-02	-0.9790 04		0.0	-15,860
1	36.000	0.466	-0.20160-02	-0.6120 04	102.198	0.0	-12,988
2	72.000	0.389	-0.22010-02	-0.2440 04	102.460	0.0	-10,828
3	108.000	0.308	-0.22270-02	0.1260 04	99.409	-6.083	-9,536
4	144.000	0.229	-0.20970-02	0.4720 04	85.209	-21.506	-11,068
5	180.000	0.157	-0.18350-02	0.7390 04	57.949	-31.771	-13,272
6	216.000	0.097	-0.14220-02	0.8530 04	22.816	-38.104	-14,125
7	252.000	0.050	-0.10410-02	0.8000 04	-15.701	-36.822	-15,051
8	288.000	0.019	-0.60780-03	0.6760 04	-48.958	-24.422	-15,111
9	324.000	0.001	-0.30880-03	0.5160 04	-68.675	-1.985	-13,374
10	360.000	-0.006	-0.12510-03	0.3400 04	-55.564	12.881	-11,573
11	396.000	-0.008	-0.72510-06	0.1620 04	-40.677	17.261	-10,111
12	432.000	-0.006	0.51080-04	0.4670 03	-24.453	15.337	-9,106
13	468.000	-0.004	0.59230-04	-0.1340 03	-11.390	10.803	-8,[illegible]7
14	504.000	-0.002	0.47060-04	-0.3530 03	-2.916	6.105	-8,[illegible]33
15	540.000	-0.001	0.29680-04	-0.3480 03	1.809	2.694	-8,581
16	576.000	-0.000	0.14820-04	-0.2520 03	2.824	0.296	-8,768
17	612.000	0.000	0.49920-05	-0.1440 03	2.633	-0.704	-8,108
18	648.000	0.000	-0.13230-06	-0.6220 02	1.827	-0.921	-7,930
19	684.000	0.000	-0.10950-05	-0.1200 02	0.954	-0.749	-7,760
20	720.000	0.000	-0.20430-05	0.9380 01	0.385	-0.466	-7,564
21	756.000	0.000	-0.19820-05	0.1480 02	0.040	-0.221	-7,434
22	792.000	0.000	-0.81090-06	0.1250 02	-0.101	-0.060	-7,279
23	828.000	-0.000	-0.32020-06	0.7530 01	-0.122	0.019	-7,122
24	864.000	-0.000	-0.47710-07	0.3460 01	-0.092	0.043	-6,966
25	900.000	-0.000	0.61080-07	0.9260 00	-0.052	0.038	-6,811
26	936.000	-0.000	0.77770-07	-0.2530 00	-0.021	0.024	-6,657
27	972.000	-0.000	0.57370-07	-0.5700 00	-0.003	0.011	-6,505
28	1008.000	-0.000	0.31200-07	-0.4850 00	0.004	0.003	-6,350
29	1044.000	0.000	0.11930-07	-0.2920 00	0.005	-0.001	-6,197
30	1080.000	0.000	0.15960-08	-0.1270 00	0.004	-0.002	-6,043
31	1116.000	0.000	-0.23310-08	-0.2920-01	0.002	-0.002	-5,890
32	1152.000	0.000	-0.27370-08	0.1280-01	0.001	-0.001	-5,736
33	1188.000	0.000	-0.18830-08	0.2160-01	0.000	-0.000	-5,583
34	1224.000	0.000	-0.93440-09	0.1660-01	-0.000	-0.000	-5,[illegible]
35	1260.000	-0.000	-0.29870-09	0.9000-02	-0.000	0.000	-4,969
36	1296.000	-0.000	0.66030-11	0.3310-02	-0.000	0.000	-4,[illegible]
37	1332.000	-0.000	0.96950-10	0.3300-03	-0.000	0.000	-4,[illegible]
38	1368.000	-0.000	0.87670-10	-0.7040-03	-0.000	0.000	-4,[illegible]
39	1404.000	-0.000	0.51590-10	-0.7510-03	0.000	0.000	-3,702
40	1440.000	0.000	0.21120-10	-0.4780-03	0.000	-0.000	-3,[illegible]
41	1476.000	0.000	0.39970-11	-0.2150-03	0.000	-0.000	-3,121
42	1512.000	0.000	-0.25570-11	-0.5170-04	0.000	-0.000	-2,822
43	1548.000	0.000	-0.38510-11	0.1560-04	0.000	-0.000	-2,[illegible]
44	1584.000	0.000	-0.25440-11	0.2980-04	0.000	-0.000	-2,200
45	1620.000	0.000	-0.10960-11	0.2130-04	-0.000	-0.000	-1,922
46	1656.000	-0.000	-0.30430-12	0.1060-04	-0.000	0.000	-1,575
47	1692.000	-0.000	0.48290-13	0.3050-05	-0.000	0.000	-1,208

SECTION 10.5

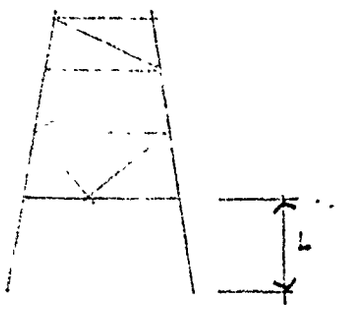
EQUIVALENT PILE PROPERTIES

$l = 50'$ from GD worksheet run

L = equivalent pile length

$$= \frac{\text{Mudline Moment}}{\text{Mudline Shear}} = \frac{M_M}{P_M}$$

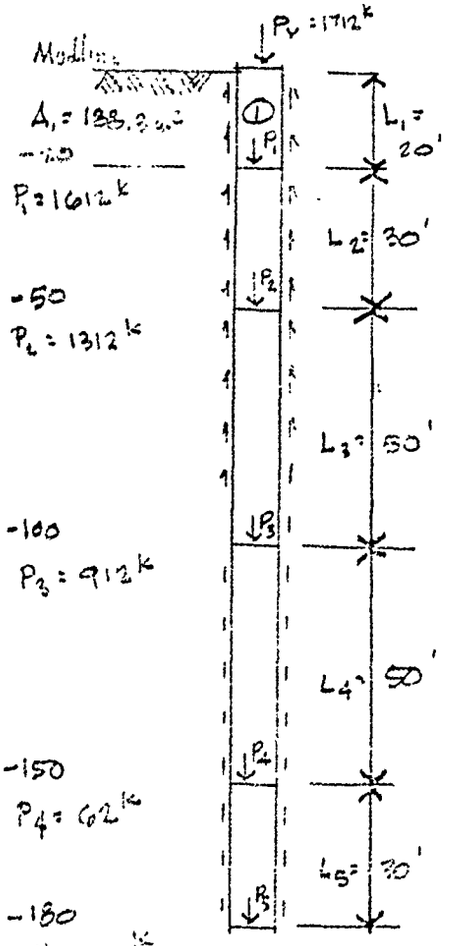
$$L = \frac{9790^{11K}}{93.8^{K} \times 12''} = \frac{99.1''}{12''/1} = 8.26'$$



A = cross sectional area of "equivalent pile"

$$= \frac{PL}{\Delta E}$$

where $P = 1712^{KIP}$ comp.
$L = 8.26'$ (see above)
$E = 29 \times 10^3$ ksi
$\Delta = \Sigma \frac{P_v L_v}{A_v E}$



$$\Delta = \Sigma \frac{PL}{AE} = \frac{1}{E}\left[\frac{P_v L_1}{A_1} + \frac{P_1 L_2}{A_2} + \frac{P_2 L_3}{A_3} + \frac{P_3 L_4}{A_4} + \frac{P_4 L_5}{A_5}\right]$$

$$= \frac{1}{E}\left[\frac{1712(20)}{188.3} + \frac{1612(30)}{162.6} + \frac{1312(50)}{162.6} + \frac{912(50)}{162.6} + \frac{62(30)}{162.6}\right]$$

$$= \frac{1174.6}{E}$$

$$\therefore A = \frac{PL}{\Delta E} = \frac{1712^{K} \times 8.26'}{\frac{1174.6}{E} \times E} \qquad \left(\frac{K \cdot FT}{K \cdot FT/in^2} = in^2\right)$$

Area $A = 12.04\ m^2$

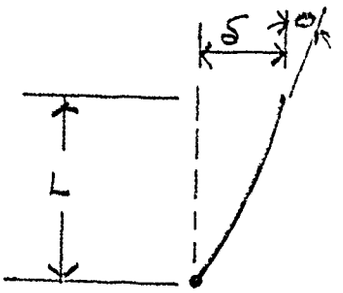
CREST OFFSHORE, INC.

Sheet 10-14 of 4 FILE

By WA Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 4-22-16 Job No. 21-171-92 Calculation LATERALLY LOADED PILE

$\ell = 50'$



I: equivalent pile moment of inertia

$$= \frac{VL^3}{3E(\delta - \theta L)}$$

where $V = 18.8^k$ $\quad E = 29 \times 10^3 \text{ ksi}$

$L = 8.26'$

$\delta = 0.534 \text{ in}$

$\theta = 0.00167 |$

$$\therefore I = \frac{18.8^k \times (8.26^{FT})^3 \times 1728^{in^3/ft^3}}{3(29 \times 10^3 \text{ ksi})(0.534 - 0.00167 | \times 8.26 \times 12)}$$

$(0.534 - 0.00167 | \times 8.26 \times 12) = 0.368$

$$= 3002.18 \text{ in}^4$$

$\frac{k \times ft^3 \times in^3}{k \times k - ft^3} = in^4$

USE $L = 8.26'$

$A = 12.04 \text{ in}^2$

$I = 3002 \text{ in}^4$

SECTION 11

LOADINGS

11.1 INTRODUCTION

At this point the SEALOAD data update file was used to input the loadings from the stairway, boatlanding, and decks on the same tape with the structure loading from Section 5. The combined loading conditions were also input to this tape.

When the final tape had been checked and edited the STRAN space frame analysis was run. The results of that run can be found in Exhibit 'B' of this report.

DATA PREPARATION

1. SEALOAD Program will calculate wind and wave, dead weight of structure adjusted by the buoyancy effect.
2. Additional wind and wave forces due to boat landing and stairways --- input as joint loads
3. Additional dry weight of the superstructure:
   a. Secondary deck beams (joists)
   b. Floor plates
   c. Handrails, kickplates, safety nets, etc., -- input as joint loads

11.3 LOADINGS

#1
- 1a. - WIND & WAVE on JACKET & SUPERSTRUCTURE BOTH APPROACH AT 45° ANGLE
- 1b - DEAD LOAD on JACKET & SUPERSTRUCTURE DRY WT. + BUOYANCY

#2
- 2a - WIND & WAVE on BOAT LANDING & STAIRWAY BOTH APPROACH AT 45° ANGLE
- 2b - ADDITIONAL DEAD LOAD on SUPERSTRUCTURE EQUIP. DECK & TOP DECK

#3 - LIVE LOADS on SUPER STRUCTURES EQUIP DECK & TOP DECK

#4 - COMBINED LOADS #1 + #2

#5 - COMBINED LOADS #1 + #2 + #3

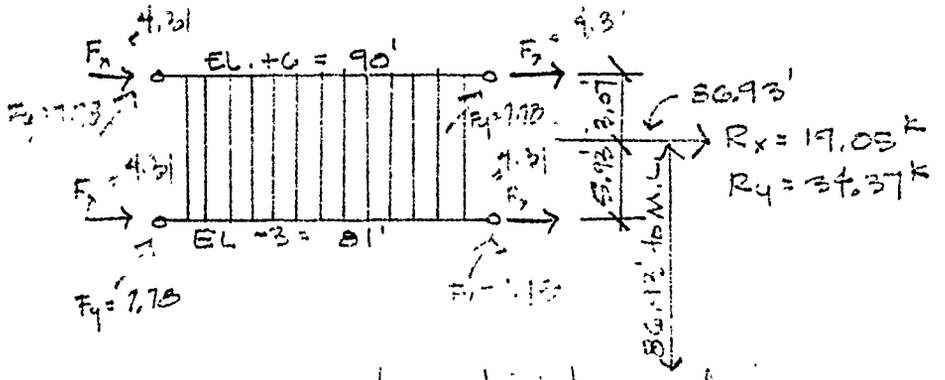
STRAN INPUT DATA LOAD # 2a

Boat Landing Forces

$$h = \frac{\Delta}{\nabla} = \frac{3416.28^{1k}}{39.30^{k}} = 86.93'$$

$$h_x = \frac{M_y}{V_x} = \frac{1656.9426^{1k}}{19.0504^{k}} = 86.9768'$$

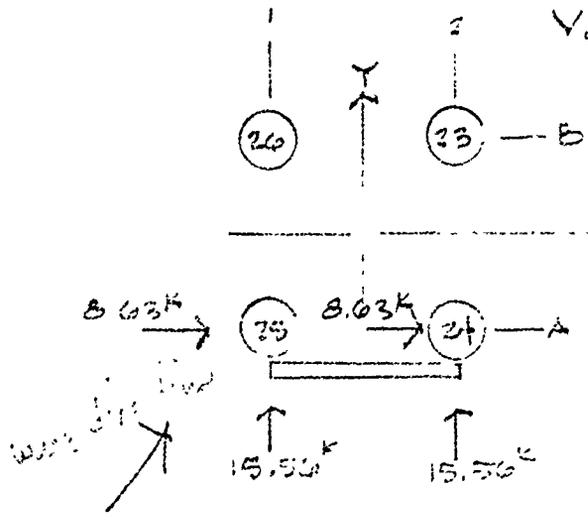
$$h_y = \frac{M_x}{V_y} = \frac{-2987.5663^{1k}}{34.3709^{k}} = 86.9237'$$



Need to put moments at elev +12 (96' above mudline)
and at elev = 0 (90' above mudline)
∴ put moments into joints @ elev. +12

equivalent $V_x = \frac{1656.94^{1k}}{96} = 17.26^{k}$

$V_y = \frac{2987.57}{96} = 31.12^{k}$

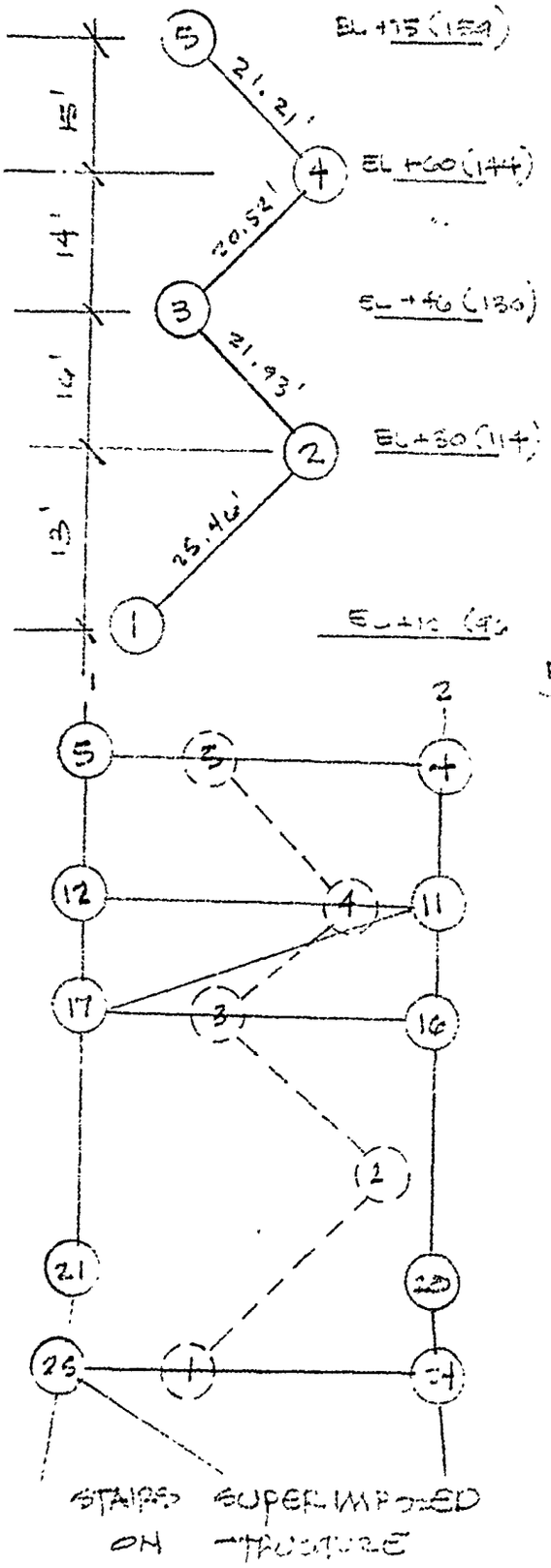


$R_x = \frac{V_x}{2} = \frac{17.26}{2} = 8.63^{k}$

$R_y = \frac{V_y}{2} = \frac{31.12}{2} = 15.56^{k}$

STRAN INPUT DATA LOAD #2a

Structure



$h = \frac{M_x}{V} = \frac{7789.7554^{1k}}{62.6689^{k}} = 124.300'$

$h_x = \frac{M_y}{V_x} = \frac{3467.1854}{27.9532} = 124.035'$

$h_y = \frac{M_x}{V_y} = \frac{6975.5942}{56.0893} = 124.366'$

Neglect joints at 144 & 130

Neglect joints 1 & 5 as they take only a small amount of the load. Assume joints 2, 3, & 4 take equal amounts of load.

Forces in X-direction

$V_{2x} = V_{3x} = V_{4x} = V_x$

V_{1x} is distributed btwn joints 1 & 3

$\therefore V_{3x} = V_x + \frac{1}{2}V_x = 1.5V_x$

$V_{1x} = \frac{1}{2}V_{2x} = 0.5V_x$

$M_y: 3467.2 = 144 \times V_x + 130 \times 1.5V_x + 96 \times 0.5V_x$

$V_x = \frac{3467.2}{387} = 8.96^{k}$

$V_{4x} = 8.96^{k}$

$V_{3x} = 1.5 \times 8.96^{k} = 13.44^{k}$

$V_{1x} = 0.5 \times 8.16 = 4.48^{k}$

CREST OFFSHORE, INC. Sheet 11 of 46 PILES

By WWS Client U.S. NAVY Subject SEMISUBMERSIBLE CONCEPT ANALYSIS
Date 4-26-72 Job No. 27-271-92 Calculation LOADING

TRY LOADING FROM WAVE PROFILE

MBR	LOAD ON MBRS from	to	wave face/ avg d.	face ⊥ X	length ∥ Y	moment in dist. X	moment in dist. Y
1-2	96	to 102	359	99 x.140	x 8.49 x 2'	= 202	
				" x -.240	x 8.49 x 2	= —	
	102	- 108	399	105 x.133	x 8.49 x 2	= 237	
				" x -.266	x 8.49 x 2	= —	
	108	-114	451	111 x.150	x 8.49 x 2	= 283	
				" x -.300	x 8.49 x 2	= —	
2-3	114	-119.3	505	116.7 x.103	x 7.31 x 2	= 287	
				" x -.337	x 7.31 x 2	= —	
	119.3	-124.7	563	122 x.188	x 7.31 x 2	= 335	
				" x -.375	x 7.31 ^2	= —	
	124.7	-130	638	127.4 x.213	x 7.31 x 2	= 397	
				" x -.425	x 7.31 x 2	= —	
3-4	130	-134	705	132 x.235	x 5.86 x 2	= 304	
				" x -.470	x 5.86 x 2	= —	
	134	- 138	765	136 x.255	x 5.86 x 2	= 400	
				" x -.510	x 5.86 x 2	= —	
	138	- 142	844	140 x.281	x 5.86 x 2	= 461	
				" x -.563	x 5.86 x 2	= —	
	142	- 144	180	143 x.060	x 2.93 x 2	= 50	
				" x -.130	x 2.93 x 2	= —	
4-5	144	-159	183	151.5 x.091	x 21.21 x 2	= 392	
				" x -.122	x 21.21 x 2	= —	
						=413.6	6827.5
						≈ 3467	6975
						Y midship	K

FORCE TO DIRECTION
POINT

1 X $\left(0.12^{15} \times 8.49' + .133 \times \frac{8.49}{2}\right) \times 2$ = 3.107^k
↓ x 2
Y = 6,215^k } 7.081 moment.

2 X $\left(.133 \times \frac{8.49}{2} + .15 \times 3.49 + .168 \times 7.31 + .183 \times \frac{7.31}{2}\right) 2$ = 1.507
↓ x 7
Y = 15.013 } 16.785 moment.

3 X $\left(.188 \times \frac{7.31}{2} + .213 \times 7.31 + .235 \times 5.86 + .255 \times \frac{5.86}{2}\right) 2$ = 8.74^k
↓ x L
Y = 17.474 } 19.54 moment.

4 X $\left(.255 \times \frac{5.86}{2} + .281 \times 5.86 + .06 \times 2.93 + .091 \times \frac{21.21}{2}\right) 2$ = 6.433
Y = 12.866 } 14.38 moment

5 X $\left(.091 \times \frac{21.21}{2}\right) 2$ = 1.294
Y = 2.588 } 2.89 moment.

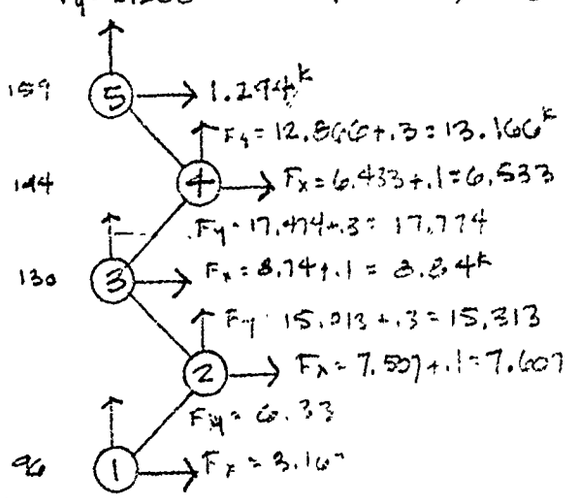
By WWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 4.26.76 Job No. 21-111-76 Calculation LOADING

CHECK OVERTURNING MOMENT

JOINT	ELEV.	Reaction	X	Mom. about y	Mom. about x
1	96	7.081		679.8	
			3.167		304.0
2	114	16.795		1913.5	
			7.507		855.3
3	130	19.54		2540.2	
			8.74		1136.2
4	144	14.38		2070.7	
			6.433		926.4
5	159	2.189		459.5	
			1.214		205.7
				7663.7	3428.1
				≈ 7789.3	≈ 3467.2
					6856
					6975.0
				DIFFERENCE =	39.1 119.3

IF DIFF. IS APPLIED EQUALLY TO JOINTS 2,3,4
THEN $V_x = \frac{39.1}{114+130+144} = 0.1^k$ ADDED TO EA JOINT

$F_y = 2.583^k$ $V_y = 119.3/388 = 0.3^k$ ADDED TO EA JOINT



JOINT LOADS FROM STAIRWAY

IN ORDER TO APPLY LOADS TO STRUCTURE JOINT 2 LOADS WILL HAVE TO BE SPLIT BTWN JOINT 1 & JOINT 3

∴ JOINT 1: $F_x = 3.167 + \frac{7.607}{34}\times\frac{16}{34} = 6.747$

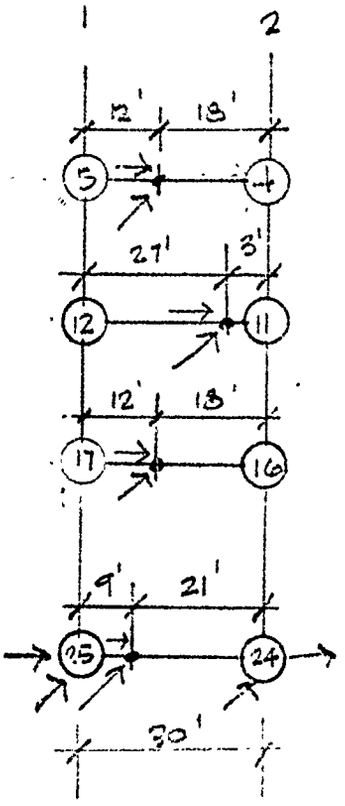
$F_y = 6.33 + 15.313\times\frac{16}{34} = 13.530$

JOINT 3 $F_x = 8.84 + 7.607\times\frac{18}{34} = 12.867$

$F_y = 17.774 + 15.313\times\frac{18}{34} = 25.880$

∴ $M_x = 3466.928 = 3467$ from computation

$M_y = 6971.378 \approx 6975$ " "



LOADS FROM STAIRWAY JOINT 5 ON MBR (5)-(4)

$F_x = 1.294^K$

$F_y = 2.588^K$

LOADS FROM STAIRWAY JOINT 4 ON MBR (12)-(11)

$F_x = 6.583^K$

$F_y = 13.166^K$

LOADS FROM STAIRWAY JOINT 3 & 2 ON MBR (17)-(16)

$F_x = 12.867^K$

$F_y = 25.880^K$

LOADS FROM STAIRWAY JOINT 1 & 2 ON MBR (15)-(24)

$F_x = 6.741^K$

$F_y = 13.556^K$

LOADS FROM EAST LANDING ON MBR (25)-(24)

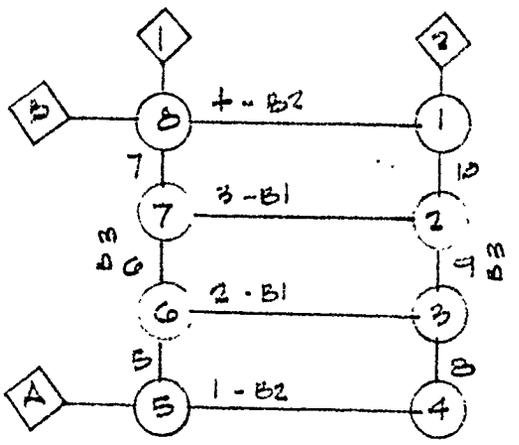
$F_x = 8.03^K$ EA. END

$F_y = 15.50^K$ EA. END

STRSN INPUT DATA - LOAD #2b

DEAD LOADS FOR DECKS

UPPER DECK



DEAD LOAD:

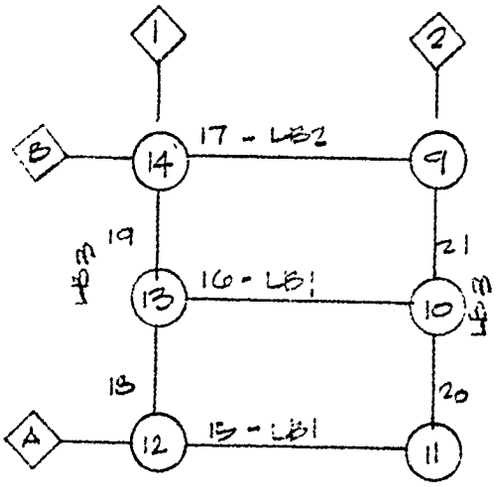
PIPE'S & EQ	=	10.2 PSF
BEAMS	=	1.8
MISC (CHANNELS, HGR'S)	=	3.0
		15.0 PSF

$W_{B1} = (0.015 \times 10) = 0.150$ K/I

$W_{B2} = (0.015 \times 5) = 0.075$ K/I

$W_{B3} = 0$

EQUIPMENT DECK



DEAD LOAD = same as above = 15.0 PSF

$W_{LB1} = (0.015 \times 7.5') = 0.113$ K/I

(13-10 & 12-11)

$W_{LB2} = 0$

(14-9)

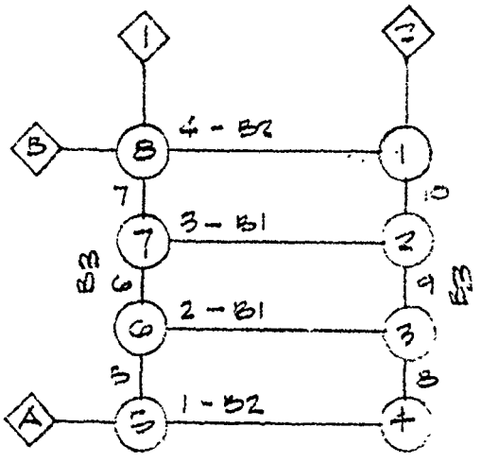
$W_{LB3} = 0$

(12-13)
(13-14)
(11-12)
(10-9)

STRAN INPUT DATA - LOAD #3

LIVE LOADS from DECKS

UPPER DECK



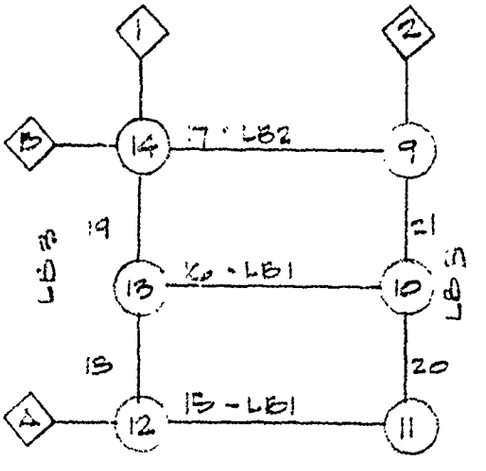
LIVE LOAD = 100 PSF

$w_{B1} = 0.1 \times 15 = 1.5^{K}/_{1}$
on 6-3 & 7-2

$w_{B2} = 0.1 \times 7.5 = 0.75^{K}/_{1}$
on 5-4 & 8-1

$w_{B3} = 0$

EQUIPMENT DECK



LIVE LOAD = 150 PSF

$w_{LB1} = 0.150 \times 7.5' = 1.125^{K}/_{1}$
on 13-10
12-11

$w_{LB2} = 0$

$w_{LB3} = 0$

SECTION 12

SPACE FRAME ANALYSIS

12.1 INTRODUCTION

The results of the STRAN space frame analysis, found in Exhibit 'B' of this report show the four-pile structure with a jacket base spacing of 50 ft to work, with a few exceptions, for member and pile sizes chosen.

Section 12.2 discusses the differences between the deflection at mudline of the STRAN run and that of the LATERALLY LOADED PILE run.

Section 12.3 shows all members that have a unity check greater than 1.0. Since the storm forces which produce these stresses are temporary, all unity checks less than 1.33 are assumed acceptable. Members with unity checks greater than 1.33 are discussed in 12.4.

Section 12.5 shows a typical elevation of the structure with final selected member sizes.

12.3 DEFLECTIONS

Deflection at mudline
$\Delta = \sqrt{(0.520)^2 + (0.54)^2} = 0.75''$

This amounts to the 0.534" from the pile

Horizontal forces at supports
Loading condition 4

Joint	F_x	F_y	Resultant	F_z	
101	-99.93 k	-147.40 k	-178.15 k	200.31 k	
102	-243.82 k	-248.21 k	-348.44	-1284.44 k	tension
103	-203.25 k	-275.30 k	-281.37	1515.58 k	compression
104	-185.75 k	-110.52 k	-183.73	105.75 k	
Total	-745.85 k	-781.44 k	1081.44 k	543.23 k	

compression $1515.58^k \approx 1711.5^k$ used for h_2 of laterally loaded pile
tension $1284.44 \approx 1452.9^k$ " " " " " "
shear $331.37 \approx 387.5^k$ used for h_3 of laterally loaded pile.

CONCLUSION - THE RESULTS OF THE STRAN COMPUTER OUT-PUT COMPARES FAVORABLY WITH THE LOADS INPUT TO THE LATERALLY LOADED PILE PROGRAM. THIS DOES ASSUME THE PILINGS ARE GOOD AS DESIGNED IN THE LATERALLY LOADED PILING SECTION.

12.3 SUMMARY OF MEMBERS W/ UNITY CHECK > 1.0

MEMBER GROUP I.D.	MEMBER I-J	MAX. U.C.	LD.	AXIAL Fx kips	MOMENT My in-kips	MOM MY IN-KIPS	MOM Mz
W1S	12-11	173.21	5	-66.45	0	569.22	347.99
W1S	14-9	1.38	1	-24.44	0	4.35	-23.47
DB3	17-14	1.07	5	} < 1.33 ∴ ACCEPTABLE			
HB3	17-16	1.75	4	-25.44	-5.44	-442.61	1847.28
JL1	25-21	2.06	5	-1230.93	626.87	14933.29	-62.12
JL1	25-19	1.92	5	1241.33	312.99	-12,416.47	-592.93
JL1	28-23	1.71	5	1301.3	144.2	-9,667.21	-529.57
JL1	24-30	1.05	5	} LESS THAN 1.33 ∴ ACCEPTABLE			
JL1	26-22	1.04	4				
JL1	29-24	1.04	5				
JL1	30-25	1.21	5				
JL1	31-26	1.01	5				
P1	19-22	1.15	5	} LESS THAN 1.33 ∴ ACCEPTABLE			
P1	32-30	1.15	5				
P1	56-54	1.10	4				
P1	21.56	1.10	4				
HB1	25-24	1.07	4				
DB1	31-27	1.31	5				
DB1	29-25	1.20	5				
DB1	28-24	1.05	5				
P2	68-76	1.01	5	APPROX = 1.0 ∴ ACCEPTABLE			
P3	76-103	6.61	5	} THESE ARE EQUIVALENT MEMBERS THEREFORE NEGLECT			
P3	80-102	5.04	4				
P3	82-101	1.49	5				
P3	78-104	1.15	1				

12.4 OVERSTRESSED MEMBERS

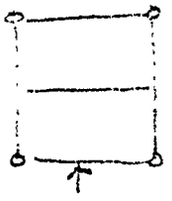
GROUP W18

MEMBERS 12-11 AND 14-9 ARE SPANDREL BEAMS AT THE EQUIPMENT DECK LEVEL. THESE BEAMS WERE SIZED FOR THE LIVE AND DEAD LOADS ONLY FROM THE EQUIPMENT DECK. WHEN THE STAAD RUN WAS MADE THE REACTION FROM THE WAVE FORCE ON THE STAIRWAY WAS INPUT AT ABOUT THE CENTER LINE OF THE BEAM 12-11. NO PROVISION WAS MADE FOR THE $F_y r$ OF THIS BEAM IN THE HORIZONTAL DIRECTION.

THE WAVE AND WIND FORCES PRODUCE TWISTING MOMENTS ABOUT THE STRUCTURE WHICH HAVE PRODUCED AXIAL LOADS IN THESE BEAMS ALSO.

THESE BEAMS WERE SIZED TO TAKE MOMENT IN THE GLOBAL Z DIRECTION ONLY. THEY MUST BE INCREASED IN SIZE TO TAKE MOMENT IN BOTH DIRECTIONS PLUS AXIAL LOAD.

with P: 63.45^k M_Y = 560.22^{ik} M_x = 347.99^{ik}



try W 18x105

$A = 30.9\ in^2$ $S_x = 202\ in^3$ $S_y = 42.3\ in^3$ $r = 2.84$

$\frac{KL}{r}$ in the member y axis: $1.0 \times 30' \times 12'' / 2.84 = 126$

$\therefore F_a = 9.41$

$$\text{UNITY CK} = \frac{\frac{P}{A}}{F_a} + \frac{\frac{M_Y}{S_y}}{F_b} + \frac{\frac{M_x}{S_x}}{F_b} = \frac{\frac{63.45}{30.9}}{9.41} + \frac{\frac{560.22}{42.3}}{22} + \frac{\frac{347.99}{202}}{22}$$

$$= 0.218 + 0.60 + 0.08 = 0.8985 < 1.0$$

$\therefore$ ok.

USE W 18x105 for all SPANDREL BEAMS AT THE EQUIPMENT DECK.

NOTE: WE CAN RELOCATE STAIRWAYS TO THE SUPERSTRUCTURE LEGS TO AVOID HEAVY BEAMS.

By WD Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 5-2-76 Job No. 21-11-12 Calculation ANALYSIS OF STAAD RUN

GROUP H33.
MEMBER 17-16

LOADS; $P = 25.44^k$ $M_T = 442.61^k$ $M_L = 1847.28^k$
UNITY CHECK = 1.75
SIZE = 14" ϕ x 0.375
TRY 14" ϕ x 0.500 $A_x = 21.200$ $S = 69.126$ $r = 4.78$
LENGTH = 27.5'
$\frac{kl}{r} = \frac{1.0 \times 27.5 \times 12}{4.78} = 69.0 \therefore F_a = 16.53\ ksi$

$$\text{UNITY CHECK} = \frac{\frac{25.44^k}{21.200\ in^2}}{16.53\ ksi} + \frac{\frac{442.61}{69.126}}{22} + \frac{\frac{1847.28}{69.126}}{22}$$

$= 0.073 + 0.29 + 1.2 = 1.58 > 1.33$

TRY 16" ϕ x 0.500 $A = 24.347$ $S = 91.516$ $r = 5.5$
$\frac{kl}{r} = \frac{1.0 \times 27.5 \times 12}{5.5} = 60 \therefore F_a = 17.43$

$$\text{UNITY CHECK} = \frac{\frac{25.44^k}{24.347\ in^2}}{17.43\ ksi} + \frac{\frac{442.61}{91.516}}{22} + \frac{\frac{1847.28}{91.516}}{22}$$

$= 0.06 + 0.22 + 0.92 = 1.20 < 1.33 \therefore$ O.K.

USE 16" ϕ x 0.500' for all Horiz. Bracing AT ELEV. +45.

GROUP JL1

THE JACKET LEGS HAVE 41"ϕ x 1.00" JOINT CANS WHICH WERE NOT CONSIDERED IN THE STRAH RUN FOR SAKE OF SIMPLICITY.

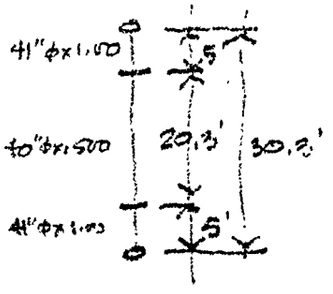
MEMBERS 25-21 & 23-19 ARE 41"ϕ x 1.00" for their entire length
w/A = 125.000 S = 1220.754 r = 14.15

Max forces in mbr 23-19
F_x = 12.97 M_Y = 12,412, M_Z = 592.98
LENGTH = 4.54'
∴ KL/r = 1.0 x 4.54 x 12/14.15 = 4
& F_a = 21.44

$$\text{UNITY CHECK} = \frac{\frac{12.97^{k}}{125.000\ in^2}}{21.44} + \frac{\frac{12416}{1220.754}}{22} + \frac{\frac{592.98}{1220.754}}{22}$$

O.C. = 0.48 + 0.46 + 0.22 = 1.16 < 1.33 ∴ o.k.

MEMBER 26-23



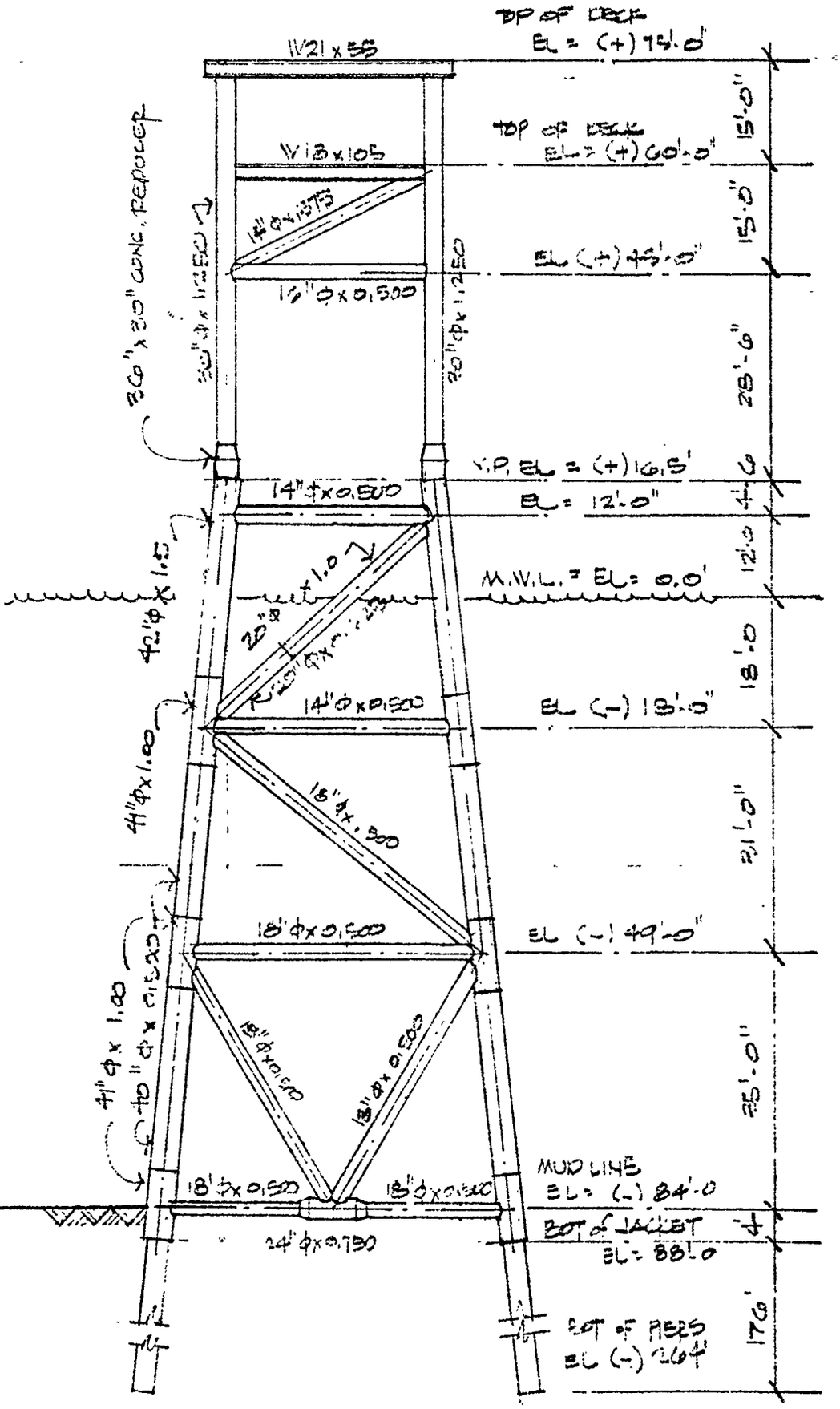
F_x = 1301.3^k M_Y = 9007.32$^{in\text{-}k}$ M_Z = 509.57$^{in\text{-}k}$
shear at ends = F_y = 1.67^k F_z = 43.91^k
∴ Mom 5' from top: M_Y = 9007.2 − 5' x 43.91^{k} x 12 = 7032.6
M_Z = 509.57$^{in\text{-}k}$ − 5 x 1.67^{k} x 12 = 409.37

41"ϕx1.00 in joint cans are used at each end of the member, from above it can be seen that will be ok., ∴ check stress in portion of member that is 40"ϕ x 0.50
w/A = 62.040 S = 605.3 r = 13.908
KL/r = 20.3' x 12/13.908 = 17.4 F_a = 20.78

$$\text{Unity check} = \frac{\frac{1301.3}{62.040}}{20.78} + \frac{\frac{7032.6}{605.3}}{22} + \frac{\frac{409}{605.3}}{22} = 1.57 > 1.33$$

USE 41"ϕ x 1.00" FOR ENTIRE LENGTH OF MBR.

12.5 FINAL STRUCTURE CONFIGURATION



SECTION 13

CORROSION PROTECTION AND STRUCTURAL STEEL WEIGHT

13.1 INTRODUCTION

In order to determine prices for the four-pile structure, area and weight take-offs are made. Section 13.2 shows areas to consider for painting and corrosion protection.

Section 13.3 is a copy of the SEALOAD report which shows member lengths. These lengths are used in the tables of Section 13.4. Each table gives the weight and area of different sections of the structure. Section 13.5 gives the totals of all the areas and weights.

By JWS Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 5-1-16 Job No. 71-11-12 Calculation AREA & WEIGHT TAKE-OFFS

13.2 AREAS TO BE CONSIDERED

A. FOR PAINTING

FROM NAVY SPECIFICATIONS, PAINTING IS REQUIRED FROM -4 BELOW MEAN WATER LEVEL TO THE TOP OF THE PILES

B. FOR CORROSION PROTECTION

1. FROM API RP2A CATHODIC PROTECTION IS REQ'D BELOW THE SPLASH ZONE WHICH IS 4 FT. BELOW LOW WATER TIDE.

MEAN WATER LEVEL = 84'-0"
LOW WATER TIDE = 0'-0"
-4' = -4'-0"
EL. TOP OF CATHODIC PROTECTION = 80'-0"

2. CURRENT REQUIREMENTS for CATHODIC PROTECTION

CURRENT DENSITY = CO mA/ft² of SURFACE AREA IN WATER
1 mA/ft² of SURFACE AREA IN MUD ZONE

5. DESIGN LIFE

N = 10 YEARS

CREST OFFSHORE, INC.

By _____ Client U.S. NAVY Subject STRUCTURAL CONCEPT ANALYSIS

Date 5-4-92 Job No. 27-271-92 Calculation LCN JOINT REACTIONS Sheet 13 of 13

13.3 JOINT REACTIONS

257	JOINT	77	27.05	-27.05	0						WISHB-84			
258	JOINT	78	25.05	-25.05	0.01						WISHB-84			
259	JOINT	79	-27.05	-27.05	0						WISHB-84			
260	JOINT	80	-25.05	-25.05	0.01						WISHB-84			
261	JOINT	81	-27.05	27.05	0						WISHB-84			
262	JOINT	82	-25.05	25.05	0.01						WISHB-84			
263	JOINT	103	25.88	25.88	-8.26					111	SUPPORT3			
264	JOINT	104	25.88	-25.88	-8.26					111	SUPPORT4			
265	JOINT	102	-25.88	-25.88	-8.26					111	SUPPORT2			
266	JOINT	101	-25.88	25.88	-8.26					111	SUPPORT1			
267	LOAD		MEMBER			MEMBER								
268	LOADCN		1 JOINT NO			LENGTHS								
269	LOAD Z	5	4	0.00	-.055	30.00	-.055				GLOB UNIF	DL	0	1
270	LOAD Z	6	3	0.00	-.040	30.00	-.040				GLOB UNIF	DL	0	1
271	LOAD Z	7	2	0.00	-.040	30.00	-.040				GLOB UNIF	DL	0	1
272	LOAD Z	8	1	0.00	-.055	30.00	-.055				GLOB UNIF	DL	0	1
273	LOAD Z	5	6	0.00	-.055	10.00	-.055				GLOB UNIF	DL	0	1
274	LOAD Z	6	7	0.00	-.055	10.00	-.055				GLOB UNIF	DL	0	1
275	LOAD Z	7	8	0.00	-.055	10.00	-.055				GLOB UNIF	DL	0	1
276	LOAD Z	4	3	0.00	-.055	10.00	-.055				GLOB UNIF	DL	0	1
277	LOAD Z	3	2	0.00	-.055	10.00	-.055				GLOB UNIF	DL	0	1
278	LOAD Z	2	1	0.00	-.055	10.00	-.055				GLOB UNIF	DL	0	1
279	LOAD Z	12	5	0.00	-.347	15.00	-.347				GLOB UNIF	DL	0	1
280	LOAD Z	11	4	0.00	-.347	15.00	-.347				GLOB UNIF	DL	0	1
281	LOAD Z	14	8	0.00	-.347	15.00	-.347				GLOB UNIF	DL	0	1
282	LOAD Z	9	1	0.00	-.347	15.00	-.347				GLOB UNIF	DL	0	1
283	LOAD Z	12	11	1.50	-.055	27.00	-.055				GLOB UNIF	DL	0	1
284	LOAD Z	13	10	1.50	-.055	27.00	-.055				GLOB UNIF	DL	0	1
285	LOAD Z	14	9	1.50	-.055	27.00	-.055				GLOB UNIF	DL	0	1
286	LOAD Z	12	13	1.50	-.055	12.00	-.055				GLOB UNIF	DL	0	1
287	LOAD Z	13	14	1.50	-.055	12.00	-.055				GLOB UNIF	DL	0	1
288	LOAD Z	11	10	1.50	-.055	12.00	-.055				GLOB UNIF	DL	0	1
289	LOAD Z	10	9	1.50	-.055	12.00	-.055				GLOB UNIF	DL	0	1
290	LOAD Z	17	12	0.00	-.347	14.00	-.347				GLOB UNIF	DL	0	1
291	LOAD Z	16	11	0.00	-.347	14.00	-.347				GLOB UNIF	DL	0	1
292	LOAD Z	18	14	0.00	-.347	14.00	-.347				GLOB UNIF	DL	0	1
293	LOAD Z	15	9	0.00	-.347	14.00	-.347				GLOB UNIF	DL	0	1
294	LOAD Z	17	11	26	1.25	-.055	30.61	-.055			GLOB UNIF	DL	0	1
295	LOAD Z	18	9	27	1.25	-.055	30.61	-.055			GLOB UNIF	DL	0	1
296	LOAD Z	17	14	29	1.25	-.055	30.61	-.055			GLOB UNIF	DL	0	1
297	LOAD Z	16	9	31	1.25	-.055	30.61	-.055			GLOB UNIF	DL	0	1
298	LOAD Z	17	16	30	1.25	-.055	27.50	-.055			GLOB UNIF	DL	0	1
299	LOAD Z	18	15	51	1.25	-.055	27.50	-.055			GLOB UNIF	DL	0	1
300	LOAD Z	17	18	32	1.25	-.055	27.50	-.055			GLOB UNIF	DL	0	1
301	LOAD Z	16	15	33	1.25	-.055	27.50	-.055			GLOB UNIF	DL	0	1
302	LOAD Z	21	17		0.00	-.302	23.00	-.302			GLOB UNIF	DL	0	1
303	LOAD Z	21	17		23.00	-.347	6.50	-.347			GLOB UNIF	DL	0	1
304	LOAD Z	20	16		0.00	-.302	23.00	-.302			GLOB UNIF	DL	0	1
305	LOAD Z	20	16		23.00	-.347	6.50	-.347			GLOB UNIF	DL	0	1
306	LOAD Z	22	18		0.00	-.302	23.00	-.302			GLOB UNIF	DL	0	1
307	LOAD Z	22	18		23.00	-.347	6.50	-.347			GLOB UNIF	DL	0	1
308	LOAD Z	19	15		0.00	-.302	23.00	-.302			GLOB UNIF	DL	0	1
309	LOAD Z	19	15		23.00	-.347	6.50	-.347			GLOB UNIF	DL	0	1
310	LOAD Z	25	21		0.00	-.183	4.54	-.183			GLOB UNIF	DL	0	1
311	LOAD Z	24	20		0.00	-.183	4.54	-.183			GLOB UNIF	DL	0	1
312	LOAD Z	26	22		0.00	-.183	4.54	-.183			GLOB UNIF	DL	0	1

CREST OFFSHORE, INC.

By _____ Client _____ Subject _____ Sheet _____ of _____

Date _____ Job No. _____ Calculation _____

MEMBER LENGTHS

313	LOAD Z	23	19	0.00	-.183	4.54	-.183		GLOB	UNIF	DL	0	1	
314	LOAD Z	25	24 42	1.50	-.063	27.90	-.063	HOR.	GLOB	UNIF	DL	0	1	
315	LOAD Z	26	23 43	1.50	-.063	27.90	-.063		GLOB	UNIF	DL	0	1	
316	LOAD Z	25	26 44	1.50	-.063	27.90	-.063	ELEV. +12.	GLOB	UNIF	DL	0	1	
317	LOAD Z	24	23 45	1.50	-.063	27.90	-.063	HB1 - 14"Φx.5	GLOB	UNIF	DL	0	1	
318	LOAD Z	25	27 46	1.00	-.072	19.85	-.072		GLOB	UNIF	DL	0	1	
319	LOAD Z	27	25 47	1.00	-.072	19.85	-.072	XB1	GLOB	UNIF	DL	0	1	
320	LOAD Z	26	27 48	1.00	-.072	19.85	-.072	(-) +12,	GLOB	UNIF	DL	0	1	
321	LOAD Z	27	24 49	1.00	-.072	19.85	-.072	OR -20.13'	GLOB	UNIF	DL	0	1	
322	LOAD Z	30	25	0.00	-.183	30.30	-.183	XB1 - 16"Φx.5	GLOB	UNIF	DL	0	1	
323	LOAD Z	29	24	0.00	-.183	30.30	-.183		GLOB	UNIF	DL	0	1	
324	LOAD Z	31	26	0.00	-.183	30.30	-.183		GLOB	UNIF	DL	0	1	
325	LOAD Z	28	23	0.00	-.183	30.30	-.183		GLOB	UNIF	DL	0	1	
326	LOAD Z	29	25 54	1.50	-.112	42.37	-.112		GLOB	UNIF	DL	0	1	
327	LOAD Z	28	26 55	1.50	-.112	42.37	-.112	MAG. blw.	GLOB	UNIF	DL	0	1	
328	LOAD Z	31	25 56	1.50	-.112	42.37	-.112	+12 to -18	GLOB	UNIF	DL	0	1	
329	LOAD Z	28	24 57	1.50	-.112	42.37	-.112		GLOB	UNIF	DL	0	1	
330	LOAD Z	30	29 58	1.50	-.063	33.90	-.063	XB1 -20"Φx.5	GLOB	UNIF	DL	0	1	
331	LOAD Z	31	28 59	1.50	-.063	33.90	-.063	HB1 -14"Φx.5	GLOB	UNIF	DL	0	1	
332	LOAD Z	30	31 60	1.50	-.063	33.90	-.063	HB1 -14"Φx.5	GLOB	UNIF	DL	0	1	
333	LOAD Z	29	26 61	1.50	-.063	33.90	-.063		GLOB	UNIF	DL	0	1	
334	LOAD Z	35	32 62	1.15	-.081	23.79	-.081	X-BRACE	GLOB	UNIF	DL	0	1	
335	LOAD Z	32	28 63	1.15	-.081	23.79	-.081	-18	GLOB	UNIF	DL	0	1	
336	LOAD Z	31	32 64	1.15	-.081	23.79	-.081	XB2 -18"Φx.5	GLOB	UNIF	DL	0	1	
337	LOAD Z	32	29 65	1.15	-.081	23.79	-.081		GLOB	UNIF	DL	0	1	
338	LOAD Z	35	30	0.00	-.183	31.31	-.183		GLOB	UNIF	DL	0	1	
339	LOAD Z	34	29	0.00	-.183	31.31	-.183		GLOB	UNIF	DL	0	1	
340	LOAD Z	36	31	0.00	-.183	31.31	-.183		GLOB	UNIF	DL	0	1	
341	LOAD Z	33	28	0.00	-.183	31.31	-.183		GLOB	UNIF	DL	0	1	
342	LOAD Z	35	29 70	1.50	-.081	47.70	-.081	DB2 -18"Φx.5	GLOB	UNIF	DL	0	1	
343	LOAD Z	36	28 71	1.50	-.081	47.70	-.081	DIA.	GLOB	UNIF	DL	0	1	
344	LOAD Z	35	31 72	1.50	-.081	47.70	-.081	-18 to -49	GLOB	UNIF	DL	0	1	
345	LOAD Z	34	28 73	1.50	-.081	47.70	-.081		GLOB	UNIF	DL	0	1	
346	LOAD Z	35	34 74	1.50	-.081	40.10	-.081	HOR. -49	GLOB	UNIF	DL	0	1	
347	LOAD Z	36	33 75	1.50	-.081	40.10	-.081	HB2 -18"Φx.5	GLOB	UNIF	DL	0	1	
348	LOAD Z	35	36 76	1.50	-.081	40.10	-.081		GLOB	UNIF	DL	0	1	
349	LOAD Z	34	33 77	1.50	-.081	40.10	-.081		GLOB	UNIF	DL	0	1	
350	LOAD Z	35	37 78	1.25	-.091	27.98	-.091	X BRACE	GLOB	UNIF	DL	0	1	
351	LOAD Z	37	33 79	1.25	-.091	27.98	-.091	-49	GLOB	UNIF	DL	0	1	
352	LOAD Z	36	37 80	1.25	-.091	27.98	-.091	XB2	GLOB	UNIF	DL	0	1	
353	LOAD Z	37	34 81	1.25	-.091	27.98	-.091	20"Φx.5	GLOB	UNIF	DL	0	1	
354	LOAD Z	42	35	0.00	-.183	35.35	-.183		GLOB	UNIF	DL	0	1	
355	LOAD Z	41	34	0.00	-.183	35.35	-.183		GLOB	UNIF	DL	0	1	
356	LOAD Z	44	36	0.00	-.183	35.35	-.183		GLOB	UNIF	DL	0	1	
357	LOAD Z	38	33	0.00	-.183	35.35	-.183		GLOB	UNIF	DL	0	1	
358	LOAD Z	35	41 86	1.50	-.081	38.25	-.081	DIA.	GLOB	UNIF	DL	0	1	
359	LOAD Z	41	34 87	1.50	-.081	38.25	-.081	-49 to -84	GLOB	UNIF	DL	0	1	
360	LOAD Z	36	45 88	1.50	-.081	38.25	-.081		GLOB	UNIF	DL	0	1	
361	LOAD Z	45	35 89	1.50	-.081	38.25	-.081	DB2	GLOB	UNIF	DL	0	1	
362	LOAD Z	35	43 90	1.50	-.081	38.25	-.081	18"Φx.5	GLOB	UNIF	DL	0	1	
363	LOAD Z	43	36 91	1.50	-.081	38.25	-.081		GLOB	UNIF	DL	0	1	
364	LOAD Z	36	39 92	1.50	-.081	38.25	-.081		GLOB	UNIF	DL	0	1	
365	LOAD Z	39	33 93	1.50	-.081	38.25	-.081		GLOB	UNIF	DL	0	1	
366	LOAD Z	42	41 94	1.50	-.081	22.05	-.081	HOR. -84	GLOB	UNIF	DL	0	1	
367	LOAD Z	41	40 95	1.50	-.081	22.05	-.081	HB2	GLOB	UNIF	DL	0	1	
368	LOAD Z	44	45 96	1.50	-.081	22.05	-.081	18"Φx.5	GLOB	UNIF	DL	0	1	

CREST OFFSHORE, INC.

By _____ Client _____ Subject _____

Date _____ Job No. _____ Calculation _____

Sheet 13/25 of 1 Date _____

MBR. MEMBER LENGTHS

369	LOAD	Z	45	38	99	1.50	-.081	22.05	-.081		GLOB	UNIF	DL	0	1
370	LOAD	Z	42	43	98	1.50	-.081	22.05	-.081		GLOB	UNIF	DL	0	1
371	LOAD	Z	43	44	99	1.50	-.081	22.05	-.081		GLOB	UNIF	DL	0	1
372	LOAD	Z	40	39	100	1.50	-.081	22.05	-.081		GLOB	UNIF	DL	0	1
373	LOAD	Z	39	34	101	1.50	-.081	22.05	-.081		GLOB	UNIF	DL	0	1
374	LOAD	Z	42	46	102	1.25	-.091	32.93	-.091		GLOB	UNIF	DL	0	1
375	LOAD	Z	46	38	103	1.25	-.091	32.93	-.091		GLOB	UNIF	DL	0	1
376	LOAD	Z	44	46	104	1.25	-.091	32.93	-.091		GLOB	UNIF	DL	0	1
377	LOAD	Z	46	40	105	1.25	-.091	32.93	-.091		GLOB	UNIF	DL	0	1
378	LOAD	Z	25	55		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
379	LOAD	Z	55	56		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
380	LOAD	Z	24	53		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
381	LOAD	Z	53	54		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
382	LOAD	Z	26	57		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
383	LOAD	Z	57	58		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
384	LOAD	Z	23	51		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
385	LOAD	Z	51	52		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
386	LOAD	Z	30	63		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
387	LOAD	Z	63	64		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
388	LOAD	Z	29	61		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
389	LOAD	Z	61	62		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
390	LOAD	Z	31	65		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
391	LOAD	Z	65	66		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
392	LOAD	Z	28	59		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
393	LOAD	Z	59	60		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
394	LOAD	Z	35	71		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
395	LOAD	Z	71	72		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
396	LOAD	Z	34	69		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
397	LOAD	Z	69	70		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
398	LOAD	Z	36	73		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
399	LOAD	Z	73	74		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
400	LOAD	Z	33	67		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
401	LOAD	Z	67	68		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
402	LOAD	Z	42	74		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
403	LOAD	Z	79	80		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
404	LOAD	Z	40	77		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
405	LOAD	Z	77	78		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
406	LOAD	Z	44	81		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
407	LOAD	Z	81	82		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
408	LOAD	Z	38	75		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
409	LOAD	Z	75	76		0.00	-.148	2.83	-.148		GLOB	UNIF	DL	0	1
410	LOAD	Z	21	56		0.00	-.403	4.53	-.403		GLOB	UNIF	DL	0	1
411	LOAD	Z	56	64		0.00	-.403	50.30	-.403		GLOB	UNIF	DL	0	1
412	LOAD	Z	64	72		0.00	-.403	31.31	-.403		GLOB	UNIF	DL	0	1
413	LOAD	Z	72	60		0.00	-.481	55.55	-.481		GLOB	UNIF	DL	0	1
414	LOAD	Z	20	54		0.00	-.403	4.53	-.403		GLOB	UNIF	DL	0	1
415	LOAD	Z	54	62		0.00	-.403	30.30	-.403		GLOB	UNIF	DL	0	1
416	LOAD	Z	62	70		0.00	-.403	31.31	-.403		GLOB	UNIF	DL	0	1
417	LOAD	Z	70	78		0.00	-.481	35.35	-.481		GLOB	UNIF	DL	0	1
418	LOAD	Z	22	58		0.00	-.403	4.53	-.403		GLOB	UNIF	DL	0	1
419	LOAD	Z	58	66		0.00	-.403	50.30	-.403		GLOB	UNIF	DL	0	1
420	LOAD	Z	66	74		0.00	-.403	31.31	-.403		GLOB	UNIF	DL	0	1
421	LOAD	Z	74	82		0.00	-.481	35.35	-.481		GLOB	UNIF	DL	0	1
422	LOAD	Z	19	52		0.00	-.403	4.53	-.403		GLOB	UNIF	DL	0	1
423	LOAD	Z	52	60		0.00	-.403	30.30	-.403		GLOB	UNIF	DL	0	1
424	LOAD	Z	60	68		0.00	-.403	31.31	-.403		GLOB	UNIF	DL	0	1

CREST OFFSHORE, INC.

By _____ Client _____ Subject _____ Sheet _____ of _____

Date _____ Job No. _____ Calculation _____

425	LOAD Z	68	76	0.00	-.481	35.35	-.481			GLOB	UNIF	DL	0	1
426	LOAD Z	80	102	0.00	-.481	15.16	-.481			GLOB	UNIF	DL	0	1
427	LOAD Z	78	104	0.00	-.481	15.16	-.481			GLOB	UNIF	DL	0	1
428	LOAD Z	82	101	0.00	-.481	15.16	-.481			GLOB	UNIF	DL	0	1
429	LOAD Z	76	103	0.00	-.481	15.16	-.481			GLOB	UNIF	DL	0	1
430	LOADCN	1												
431	LOAD X	21	56	0.00	115					GLOB	CONC	WN	1	1
432	LOAD Y	21	56					0.00	105503	GLOB	MOMT	WN	1	1
433	LOAD Y	21	56	0.00	115					GLOB	CONC	WN	1	1
434	LOAD X	21	56					0.00	-105503	GLOB	MOMT	WN	1	1
435	LOAD X	20	54	0.00	115					GLOB	CONC	WN	1	1
436	LOAD Y	20	54					0.00	105503	GLOB	MOMT	WN	1	1
437	LOAD Y	20	54	0.00	115					GLOB	CONC	WN	1	1
438	LOAD X	20	54					0.00	-105503	GLOB	MOMT	WN	1	1
439	LOAD X	22	58	0.00	115					GLOB	CONC	WN	1	1
440	LOAD Y	22	58					0.00	105503	GLOB	MOMT	WN	1	1
441	LOAD Y	22	58	0.00	115					GLOB	CONC	WN	1	1
442	LOAD X	22	58					0.00	-105503	GLOB	MOMT	WN	1	1
443	LOAD X	19	52	0.00	115					GLOB	CONC	WN	1	1
444	LOAD Y	19	52					0.00	105503	GLOB	MOMT	WN	1	1
445	LOAD Y	19	52	0.00	115					GLOB	CONC	WN	1	1
446	LOAD X	19	52					0.00	-105503	GLOB	MOMT	WN	1	1
447	LOAD X	21	56	0.00	431					GLOB	CONC	WN	2	1
448	LOAD Y	21	56					0.00	349092	GLOB	MOMT	WN	2	1
449	LOAD Y	21	56	0.00	431					GLOB	CONC	WN	2	1
450	LOAD Y	21	56					0.00	-349092	GLOB	MOMT	WN	2	1
451	LOAD X	20	54	0.00	431					GLOB	CONC	WN	2	1
452	LOAD Y	20	54					0.00	349092	GLOB	MOMT	WN	2	1
453	LOAD Y	20	54	0.00	431					GLOB	CONC	WN	2	1
454	LOAD X	20	54					0.00	-349092	GLOB	MOMT	WN	2	1
455	LOAD X	22	58	0.00	431					GLOB	CONC	WN	2	1
456	LOAD Y	22	58					0.00	349092	GLOB	MOMT	WN	2	1
457	LOAD Y	22	58	0.00	431					GLOB	CONC	WN	2	1
458	LOAD X	22	58					0.00	-349092	GLOB	MOMT	WN	2	1
459	LOAD X	19	52	0.00	431					GLOB	CONC	WN	2	1
460	LOAD Y	19	52					0.00	349092	GLOB	MOMT	WN	2	1
461	LOAD Y	19	52	0.00	431					GLOB	CONC	WN	2	1
462	LOAD X	19	52					0.00	-349092	GLOB	MOMT	WN	2	1
463	LOAD X	21	56	0.00	115					GLOB	CONC	WN	3	1
464	LOAD Y	21	56					0.00	105503	GLOB	MOMT	WN	3	1
465	LOAD Y	21	56	0.00	115					GLOB	CONC	WN	3	1
466	LOAD X	21	56					0.00	-105503	GLOB	MOMT	WN	3	1
467	LOAD X	20	54	0.00	115					GLOB	CONC	WN	3	1
468	LOAD Y	20	54					0.00	105503	GLOB	MOMT	WN	3	1
469	LOAD Y	20	54	0.00	115					GLOB	CONC	WN	3	1
470	LOAD X	20	54					0.00	-105503	GLOB	MOMT	WN	3	1
471	LOAD X	22	58	0.00	115					GLOB	CONC	WN	3	1
472	LOAD Y	22	58					0.00	105503	GLOB	MOMT	WN	3	1
473	LOAD Y	22	58	0.00	115					GLOB	CONC	WN	3	1
474	LOAD X	22	58					0.00	-105503	GLOB	MOMT	WN	3	1
475	LOAD X	19	52	0.00	115					GLOB	CONC	WN	3	1
476	LOAD Y	19	52					0.00	105503	GLOB	MOMT	WN	3	1
477	LOAD Y	19	52	0.00	115					GLOB	CONC	WN	3	1
478	LOAD X	19	52					0.00	-105503	GLOB	MOMT	WN	3	1
479	LOAD Y	21	56	0.00	431					GLOB	CONC	WN	4	1
480	LOAD Y	21	56					0.00	349092	GLOB	MOMT	WN	4	1

CREST OFFSHORE, INC.

Sheet 3.07 of SPLE

By ___ Client USCG/OCS Subject SPECIAL CONCEPT ANALYSIS
Date 5.22.70 Job No. 27-771-72 Calculation WEIGHT TAKE-OFFS

13.4 AREA AND WEIGHT TAKE-OFFS

SEE SHT 5-4P10 PILINGS

for cathodic protection

REF	SIZE	UNIT WT. K/1	UNIT LENGTH FT.	NO. REQ'D.	TOTAL WT. K	UNIT AREA ft²/1	TOTAL SURFACE AREA ft²
P-6	30"ϕx1.25	0.464	70'	1x4	37.12 K		
P-5 P-4	30"ϕx1.75	0.640	50'	2x4	256.0	2/10 x 9.425	754 ft²
P-3 P-2	30"ϕx1.50	0.553	50'	2x4	221.2 K	9.425	3770 ft²
P-1	30"ϕx1.50	0.553	60'	1x4	132.72 K	9.425	2262 ft²
SPLICE POINT	33"ϕx0.625	0.210	3'	5x4	31.50 K		
PILING TOTALS					651.60 K 340.8 T		6786 ft²

CREST OFFSHORE, INC.

By JAL Client U.S.NAVY Subject STRUCTURAL CONCEPT ANALYSIS
Date 5-2-79 Job No. 32-11-92 Calculation WEIGHT TAKE-OFFS

PILING
EXCESS TO BE CUT OFF IN FIELD

NO.	SIZE	UNIT WT. K/ft	UNIT LENGTH ft	NO. REQ'D.	TOTAL WT. K	UNIT AREA ft²/ft	TOTAL SURFACE ft²
P-6	30"φ x 1.25	0.404	10'	1x4	16.50K		
P-5 P-4	30"φ x 1.75	0.240	2'	2x4	10.24K		
P-3 P-2 P-1	30"φ x 1.50	0.553	2'	3x4	13.27K		
PILING EXCESS TOTALS					42.07K 21.0T		

CREST OFFSHORE, INC.

Sheet 13.09 of 1 FILE

By JJL Client UNOCAL Subject STRUCTURAL CONCEPT ANALYSIS

Date 5-27-76 Job No. 27-111-94 Calculation WEIGHT TAKE-OFFS

JACKET

for cathodic protection

MBR	SIZE	UNIT WT. K/	UNIT LENGTH FT	NO. REQ.	TOTAL WT. K	UNIT AREA ft²/	TOTAL SURFACE AREA ft²
HB1 @ +12	1'φ x 0.500	0.072	27.90'	4	8.04 K		
XB1 +12	16"φ x 0.5	0.083	40.4	2	6.71 K		
LL1 +10.5 -23	41"φ x 1.00	0.4272	43.45	4	74.25 K	23/39.5 x 10.73	1080 ft²
BHT CANS	41"φ x 1.00	0.4272	10.0	2x4	34.18 K	10.73	429 ft²
LL1	40"φ x 0.500	0.211	51.5	4	43.47	10.472	2157 ft²
DB1 -12 -18	20"φ x 0.625	0.1293	42.37	4	21.91 K	5.230	887.4 ft²
HB1 -18	14"φ x 0.500	0.072	33.70	4	9.72 K	3.665	497.0 ft²
XB2 -18	18"φ x 0.500	0.0935	48.9	2	9.14 K	4.712	460.8 ft²
DB2 -18 -49	18"φ x 0.500	0.0935	47.7	4	17.84 K	4.712	874.0 ft²
HB2 -49	18"φ x 0.500	0.0935	40.1	4	15.0 K	4.712	755.8 ft²
XB3 -49	20"φ x 0.500	0.104	57.6	2	11.98 K	5.230	603.2 ft²
DB2 -49 -24	18"φ x 0.500	0.0935	33.25	8	28.61	4.712	1441.9 ft²
HB2 -54	18"φ x 0.500	0.0935	22.05	8	16.49 K	4.712	831.2 ft²
XB3 -54	20"φ x 0.500	0.104	67.6	2	14.00 K	5.230	707.9 ft²
BHT CAN	24"φ x 0.750	0.1863	5.0	4	2.12 K	6.233	125.7 ft²
JACKET TOTALS					315.16 K 158 T	Unit;	10832 ft²

CREST OFFSHORE, INC.

By _____ Client _____ Subject STRUCTURAL CONCEPT ANALYSIS
Date 5-3-72 Job No. 57-111-92 Calculation WEIGHT TAKE-OFFS

JACKET WALKWAY

Areas for Painting

ITEM	SIZE	UNIT WT. K/	UNIT LENGTH Ft	NO. REQ'D.	TOTAL WT. K	UNIT AREA S/	TOTAL AREA S
	8 5/8"ϕ x 0.438	0.0365	22'	4	3.5 K	2.258	208 S
	12 3/4"ϕ x 0.438	0.008	4'	8 x 4	1.0 K	0.753	96 S
	1/4" RED'D ϕ	0.0102	4 x 30' + 4 x 22'	2	4.2 K	A x 2	832 S
	JACKET WALKWAY TOTALS				8.8 K / 4.4 T		
	JACKET RUN =	4 ϕ + 10	- AREAS for PAINTING				
HBI C 12	14" ϕ x 0.50		27.90	4		4.189	407 S
XBI 7-12	12" ϕ x 0.375		40.4'	2		3.605	296
	41" ϕ x 1.10		43.45	4		6.5 / 39.5 x 10.75	779 S
JACKET WALKWAY TOTALS					9.3 K 4.4 T	for painting	2073 S

CREST OFFSHORE, INC.

Sheet 13 of 4 PILES

By _____ Client _____ Subject _____

Date 5-2-79 Job No. 22-171-92 Calculation WEIGHT TAKE-OFFS

BOAT LANDING

MBR	SIZE	UNIT WT. K/	UNIT LENGTH FT.	NO. MBRS.	TOTAL WT. K	UNIT AREA ft²/	SURFACE AREA ft²
HOR.	5 5/8"φ x 0.500	0.0744	15'	1	0.65 K	2.258	34 ft²
HOR.	5 5/8"φ x 0.500	0.0744	30'	4	5.21 K	2.258	271
HOR.	12 3/4"φ x 0.375	0.1073	3'	4	0.80 K	3.34	27
VERT.	12 3/4"φ x 0.375	0.1073	16'	2	3.43 K	3.34	107
VERT.	6 5/8"φ x 0.432	0.0230	13'	4	1.40 K	1.734	90
VERT.	6 5/8"φ x 0.432	0.0230	10'	5	1.43 K	1.734	87
DIAG.	6 5/8"φ x 0.432	0.0230	15'	2	0.80 K	1.734	52
STUBS	6 5/8"φ x 0.432	0.0230	4'	14	1.60 K	1.734	97
DIAG. STUBS	6 5/8"φ x 0.432	0.0230	5.7'	12	1.96 K	1.734	119
	14" CHN'D ⊥	0.0102	4'x24'	1	0.98 K	2	192
BOAT LANDING TOTALS					18.47 K +1.84 T	total area painting	1276 ft² 490 ft² 610 ft²

CREST OFFSHORE, INC.

Sheet B12 of 4 PILE

By JLA Client U.S. ARMY Subject STRUCTURAL CONCEPT ANALYSIS

Date 5.2.79 Job No. 22-111-92 Calculation WEIGHT TAKE-OFFS

SUPER STRUCTURE

MFC	SIZE	UNIT WT. K/L	UNIT LENGTH FT.	NO. MEMB.	TOTAL WT. K	UNIT AREA #/L	TOTAL SURFACE AREA ±
W21	W21x55	0.055	30'	2	3.3 K	0.52	31.2 #
W17	W18x40	0.040	30'	2	2.4 K	0.42	25.2 #
W21	W21x55	0.055	30'	2	3.3 K	0.52	31.2 #
W18	W18x55	0.055	30'	1	1.65	0.46	13.8 #
W18	W 8x105	0.105	30'	4	12.60 K	0.53	69.0 #
DB3 +23 +45	14"φx0.375	0.055	30.61	4	6.73 K	3.605	449.0 #
HB3 +45	10"φx0.500	0.085	27.50	4	9.13	4.19	460.9 #
XB1 +45	10"φx0.500	0.085	40.0	2	6.64 K	4.19	335.2
SSC	30"φx1.250	0.384	58.5'	4	89.80 K	7.854	1837.5 #
BRACE	12"φx 0.625	0.170	5'	4	5.03 K	7.07	226.2
DECK	¼" CKD PL	0.015 #/#	35x35	1	18.4	A x 2	2450
DECK	¼ CKD PL	0.015	15x30	1	6.75	A x 2	900
[illegible]	W10X11.5	0.0115	10'	33	3.8 K	10x2.14x4 3.0	990
[illegible]	W10x11.5	0.0115	15	11	1.9 K	3.0	495
SUPER STRUCTURE TOTALS					172.1 86 T	Impossible	8315 #

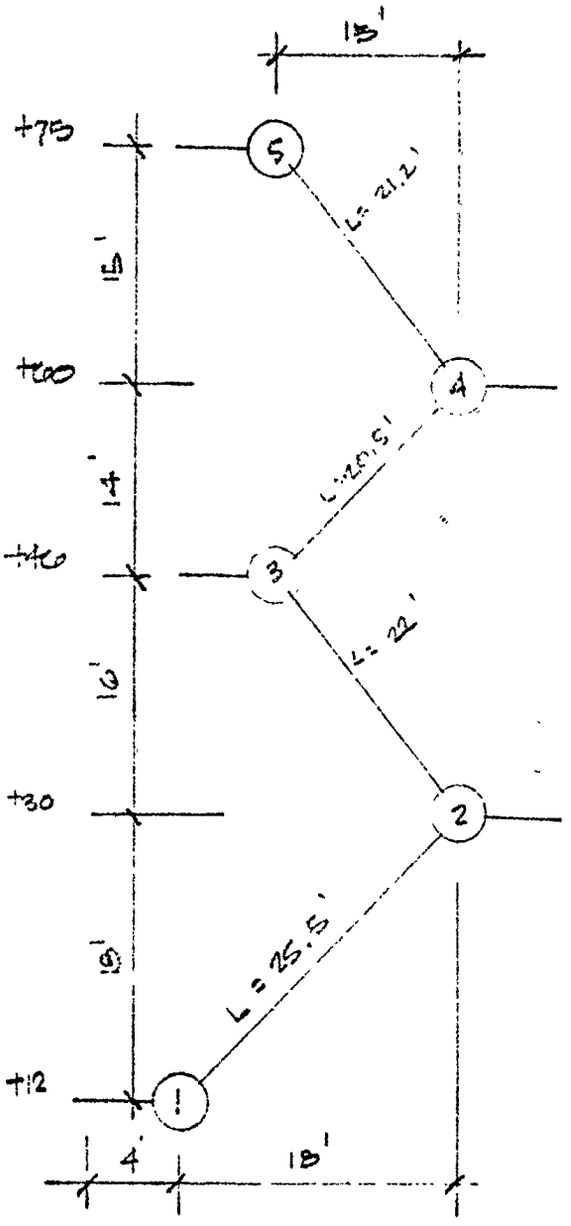
CREST OFFSHORE, INC.

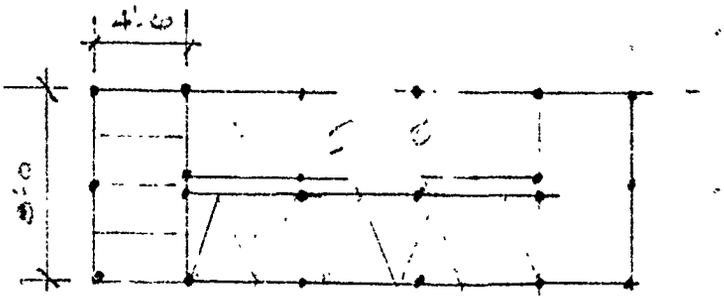
Sheet 13 of 13 of STAIRWAY

By WA Client UNOCAL Subject STRUCTURAL CONCEPT ANALYSIS
Date 5-12-76 Job No. 32-111-92 Calculation WEIGHT TAKE-OFFS

STAIRWAY

ITEM	SIZE	UNIT WT. #/	UNIT LENGTH FT	NO. REQ'D.	TOTAL WT. #	UNIT AREA #/	TOTAL SURFACE AREA #
STRINGER	L 12x20.7	0.0207	89.2'	2	3.7#	3	535#
HOR. HAND-RAIL	1.9"ϕx0.145	0.00272	89.2'	4	1.0#	0.5	178.4#
VERT HAND-RAIL	1.9"ϕx0.145	0.00272	3.5'	47	0.4#	0.5	82.3#
TREADS	1"x3/16"x10'8" GRATING	0.00730	2.5'	10	1.3#	2.0	350#
HOR. ℄	4"x4"℄	0.001	89.2	2	0.2#	0.71	126.7#
LANDING	W6x15.5	0.0155	25'	5	1.94#	3	375#
LANDING	1"x3/16" GRATING	0.00729	5'x4.5'	5	1.32#	2	300#
LANDING BRACE	3½"ϕx0.25	0.013	6.4	5	0.01#	1.73	61.8#
LANDING BRACE	4½"ϕx0.237	0.0108	25'	5	1.35#	1.18	147.5#
STAIR BRACE	2x2x¼"∠	0.0232	3.3'	10x5	0.53#	0.7	115.5#
LANDING JOIST	3½"ϕx0.30	0.0102	4.5'	5x5	0.7#	0.92	62.1#
LANDING HAND-RAIL	1.9"ϕx0.145	0.00272	18	2x5	0.49#	0.5	90#
					13.54#		
	+15% MISCELLANEOUS			=	2.06		
STAIRWAY TOTALS					15.6# 7.8T	(1 furnished)	2434#





VERT HANDRAILS 5/SIDE x 4 STAIRS = 32

5/LAND x 5 = 15

47

TREADS @ 8" RISE

5-4	22	@ 8"	= 21 TREADS
4-3	21	@ 8"	= 20 "
3-2	24	@ 8"	= 23 "
2-1	27	@ 8"	= 26

70

B.5 PAINTING AND ANODES
AREA TAKE-OFF DTLS

A. AREAS ABOVE SPLASH ZONE TO BE PAINTED

JACKET WALKWAY		2073 ft²
SUPER-STRUCTURE	=	8315 ft²
BOATLANDING		610 ft²
"DRIVEST	=	2,484 ft²
TOTAL AREA	=	14 087 ft²

B. AREAS BELOW SPLASH ZONE REQUIRING ANODES

PILING	=	5756 ft² BELOW MUD LINE
JACKET	=	13,382 ft²
BOAT LANDING	=	460 ft²
TOTAL AREA	=	11,348 ft² ABOVE MUDLINE

C. TOTAL CURRENT REQUIREMENTS

$I = 6\ \text{mamps/ft}^2 \times 11{,}348\ \text{ft}^2 + 2\ \text{mamp/ft}^2 \times 6780\ \text{ft}^2$

$= 81{,}660\ \text{mamps} = 81.66\ \text{amps}$

D. CAPACITY OF ALLOY

ALUMINUM - ZINC - INDIUM (1) : $i = 1250\ \frac{\text{amp-hrs}}{\text{lb}}$

E. TOTAL WT. OF ANODES REQ'D

$W_a = \frac{81.66\ \text{amps} \times 8760\ \text{hrs/yr} \times 2\ \text{yrs/dsn}}{1250\ \text{amp-hrs/lb}}$

$= 5722.7\ \text{lbs}$

F. NO. OF ANODES REQ'D

$N = \frac{5722.7\ \text{lbs}}{\text{wt. of anode}} = 17.61$ use 18 ANODES

13.6 WEIGHT TAKE-OFF DATA

PILING	=	340.8 T
PILING EXCESS	=	21.0 T
JACKET	=	156.0 T
JACKET WALKWAY	=	4.4 T
BOAT LANDING	=	1.2 T
SUPER STRUCTURE	=	86.0 T
STAIRWAY	=	7.8 T
TOTAL WEIGHT	=	627.2 T

EXHIBIT A

Laterally Loaded Pile Capacity

```
J.ATKINSON 00442705 7345          LEC9011          SYSMSG
```

FILE PROGRAM.

GOOD RUN

60 SPACES @ 36" EA.

$\ell = 50'$

```
LL              EEEEEEEEEEEE    CCCCCCCCCC      9999999999      0000000        11          11
LL              EEEEEEEEEEEEE   CCCCCCCCCCCC    99999999999     00000000       111         111
LL              EE              CC      CC      99      99     00    00       1111        1111
LL              EE              CC      CC      99      99     00    00       11          11
LL              EE              CC              99      99     00    00       11          11
LL              EEEEEEEE        CC              999999999999    00    00       11          11
LL              EEEEEEEE        CC               99999999999    00    00       11          11
LL              EE              CC                      99     00    00       11          11
LL              EE              CC      CC      99      99     00    00       11          11
LLLLLLLLLLLL    EEEEEEEEEEEE    CCCCCCCCCCCC    999999999999    00000000     111111      111111
LLLLLLLLLLLL    EEEEEEEEEEEE    CCCCCCCCCC      999999999999    0000000      111111      111111

          JJ    OOOOOOOOOO      RRRRRRRRRRR                     7777777777777   33333333333       44      5555555 55555
          JJ    OOOOOOOOOOOO    RRRRRRRRRRRRR                   777777777777    3333333333333     444     5555555555555
          JJ    OO      OO      RR      RR                      77      77      33      33        4444    55
          JJ    OO      OO      RR      RR                              77              33      44 44   55
          JJ    OO      OO      RR      RR                              77              33      44  44  55
          JJ    OO      OO      RRRRRRRRRRR                     77              333     44   44 555555555555
          JJ    OO      OO      RRRRRRRRRRRR                    77              333     44    44 5555555555555
          JJ    OO      OO      RR      RR                      77              33      4444444444444           55
    JJ    JJ    OO      OO      RR      RR                      77              33      4444444444444           55
    JJ    JJ    OO      OO      RR      RR                      77      33      33              44      55      55
    JJJJJJJJJJJJ    OOOOOOOOOOOO    RRRRRRRRRRRR              77      3333333333333           44      5555555555555
     JJJJJJJJJJ     OOOOOOOOOO      RRRRRRRRRRR               77      3333333333              44       55555555555

  SSSSSSSSSSS   YY          YY    SSSSSSSSSSS     MM          MM    SSSSSSSSSS      GGGGGGGGGGG
 SSSSSSSSSSSSS   YY        YY    SSSSSSSSSSSSS    MMM        MMM   SSSSSSSSSSSS    GGGGGGGGGGGGG
SS             SS   YY    YY     SS              SS  MMMM    MMMM  SS              SS  GG          GG
SS                   YY  YY      SS              SS  MM MM  MM MM  SS              SS  GG          GG
 SSSSSSSSSSS          YYYY       SS              SS  MM  MMMM  MM  SS              SS  GG
  SSSSSSSSSSSSS       YY         SSSSSSSSSSSSS   SS  MM   MM   MM   SSSSSSSSSSSS   GG
           SSSSSSS    YY                  SSSSSSS  SS  MM        MM          SSSSSSS  GG    GGGG
                SS    YY                       SS  SS  MM        MM               SS  GG    GGGG
                SS    YY                       SS  SS  MM        MM               SS  GG      GG
SS             SS    YY              SS       SS  SS  MM        MM  SS           SS  GG      GG
 SSSSSSSSSSSSS       YY              SSSSSSSSSSSS   SS  MM        MM   SSSSSSSSSSSS   GGGGGGGGGGGG
  SSSSSSSSSSS        YY               SSSSSSSSSS    SS  MM        MM    SSSSSSSSSS     GGGGGGGGGG
```


```
J.ATKINSON 00442705 7345          LEC9011          SYSMSG
```

```
TSV40 JOB ORIGIN FROM GROUP=RM027    , DSP=CR , DEVICE=RM027RD1, 0A3
//LEC9011 JOB (00442705002777100TLEC27011),'J.ATKINSON',PRTY=4,CLASS=A,C
// TIME=(005),REGION=256K
//*MAIN LINES=(005,*),CARDS=(00,C)
//JOBLIB  DD DSN=DCPROD.LIB03,DISP=SHR
//          EXEC PGM=TNKC997
//FT06F001 DD SYSOUT=A
//FT05F001 DD *
/*

 LEC9011  IEF403I LEC9011  STARTED     TIME=13.52.52
 LEC9011  IEF234E D 6AC,ASP6AC
*LEC9011 *37 IECASPO 6AC IS LEC9011  A                    FT06F001
*LEC9011 *38 IECASPO 6AE IS LEC9011                       ASPI0001
 LEC9011  IEC202E K 6AE,017345,NL,LEC9011,
 LEC9011  TI=LEC9011 CC=00442705 P=2777100 T J=LEC27011 N=J.ATKINSON A=7345
 LEC9011  IEF404I LEC9011  ENDED       TIME=13.53.12
//LEC9011 JOB (00442705002777100TLEC27011),'J.ATKINSON',PRTY=4,CLASS=A,*
// TIME=(005),REGION=256K
//JOBLIB  DD DSN=DCPROD.LIB03,DISP=SHR
//          EXEC PGM=TNKC997
//FT06F001 DD SYSOUT=A
//FT05F001 DD UNIT=(CTC,,DEFER),DSNAME=&&ASPI0001,                    *
// DISP=(OLD,DELETE),VOL=SER=017345,DCB=(LRECL=80,BLKSIZE=80,RECFM=F)
//
IEF236I ALLOC. FOR LEC9011
IEF237I 147    ALLOCATED TO JOBLIB
IEF237I 6AC    ALLOCATED TO FT06F001
IEF237I 6AE    ALLOCATED TO FT05F001
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I    DCPROD.LIB03                                   PASSED
IEF285I    VOL SER NOS= DC5002,
IEF285I    SYS76113.T134909.RV001.LEC9011.ASPDA001        DELETED
IEF285I    VOL SER NOS= ASP6AC,
IEF285I    SYS76113.T134939.RV001.LEC9011.ASPI0001        DELETED
IEF285I    VOL SER NOS= 017345,
IEF373I STEP /          / START 76113.1352
IEF374I STEP /          / STOP  76113.1353 CPU    0MIN 01.39SEC STOR VIRT 100K
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$                                                                                                                                  $
$                                           PACER DATA ACQUISITION SYSTEM                                                          $
$                                                                                                                                  $
* STEP NAME                      START TIME 13.52.52.00    MAIN CORE REQD    256 K    LCS CORE REQD     0 K    STEP CPU      00.00.01.39 *
* PGM NAME        TNKC997        STOP  TIME 13.53.11.52    MAIN CORE USED    100 K    LCS CORE USED     0 K    JOB  CPU      00.00.01.39 *
* DISPATCH PRTY  1               ELAP. TIME 00.00.19.52    MAIN CORE BORRWD    0 K    LCS CORE BORRWD   0 K    CONDITION CODE       0000 *
*                                                                                                                                  *
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$                                                  EXCP STATISTICS                                                                 $
$                                                                                                                                  $
$ UNIT    EXCP COUNT     UNIT    EXCP COUNT     UNIT    EXCP COUNT     UNIT    EXCP COUNT     UNIT    EXCP COUNT     UNIT    EXCP COUNT  $
$                                                                                                                                  $
$ 147             0      6AC          453       6AE           43                                                                    $
$                                              EXCP TOTAL        476                                                               $
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
IEF376I STEP/          / TOTAL EXCP 000476
IEF285I    DCPROD.LIB03                                   KEPT
IEF285I    VOL SER NOS= DC5002,
IEF375I  JOB /LEC9011 / START 76113.1352
IEF376I  JOB /LEC9011 / STOP  76113.1353 CPU    0MIN 01.39SEC
```

FE37?I JOB /LEC9011 / START 76113,1552
FE37?I JOB /LEC9011 / STOP 76113,1353 CPU 0MIN 01.39SEC

PACES DATA ACQUISITION SYSTEM

JOB LOG NUMBER = LEC9011 76113 13,49,09,35

PROGRAMMER J.ATKINSON	DATE	04/22/76	76,113	INITIATION TIME	13,52,52.00
ACCTG DATA 0044270500277100?LEC27011	CPU TIME	00.00.01.39		TERMINATION TIME	13.53.11.89
JOBNAME LEC9011	PRIORITY	02		ELAPSED TIME	00.00.19.89
SWITCH TO 58 = 50	CLASS	A		COMPLETION STATUS	C0000

J.ATKINSON 00042705 7345 A LFC9011 FT06F001

```
LL              EEEEEEEEEEEEE     CCCCCCCCCCC      99999999999       0000000        11          11
LL              EEEEEEEEEEEEE     CCCCCCCCCCCC     99999999999       0000000        111         111
LL              EE                CC       CC      99      99       00    00       1111        1111
LL              EE                CC               99      99       00    00       11          11
LL              EE                CC               99      99       00    00       11          11
LL              EEEEEEEEE         CC               99999999999      00    00       11          11
LL              EEEEEEEEE         CC               99999999999      00    00       11          11
LL              EE                CC               99      99       00    00       11          11
LL              EE                CC       CC      99      99       00    00       11          11
LLLLLLLLLLLLL   EEEEEEEEEEEEE     CCCCCCCCCCCC     99999999999      000000000      111111      111111
LLLLLLLLLLLLL   EEEEEEEEEEEEE     CCCCCCCCCCC      99999999999      00000000       111111      111111

          JJ    000000000000      HHHHHHHHHHHH     7777777777777    33333333         44        555555555555
          JJ    000000000000000   HHHHHHHHHHHHHH   7777777777777    333333333        444       555555555555
          JJ    00        00      HH        HH     77      77       33    33         4444      55
          JJ    00        00      HH        HH           77         33    33       44  44      55
          JJ    00        00      HH        HH           77         33    33      44   44      55
          JJ    00        00      HHHHHHHHHHHH           77         333   33     44    44      555555555555
          JJ    00        00      HHHHHHHHHHHH           77         333   33    44     44      555555555555
          JJ    00        00      HH        HH           77         33    33   4444444444444          55
    JJ    JJ    00        00      HH        HH           77         33    33   4444444444444          55
    JJ    JJ    00        00      HH        HH           77         33    33         44      55        55
    JJJJJJJJJJJJ    000000000000  HHHHHHHHHHHH           77         333333333333       44      555555555555
     JJJJJJJJJJ     000000000000  HHHHHHHHHHHH           77         3333333333         44      555555555555

FFFFFFFFFFFFF   TTTTTTTTTTTT      0000000      666666666666   FFFFFFFFFFFFF     0000000      0000000       11
FFFFFFFFFFFFF   TTTTTTTTTTTT      0000000000   666666666666   FFFFFFFFFFFFF     0000000000   0000000000    111
FF                  TT            00    00   66             FF                00    00     00    00      1111
FF                  TT            00    00   66             FF                00    00     00    00        11
FF                  TT            00    00   66             FF                00    00     00    00        11
FFFFFFFFF           TT            00    00   666666666666   FFFFFFFFF         00    00     00    00        11
FFFFFFFFF           TT            00    00   666666666666   FFFFFFFFF         00    00     00    00        11
FF                  TT            00    00   66    66       FF                00    00     00    00        11
FF                  TT            00    00   66    66       FF                00    00     00    00        11
FF                  TT            00    00   66    66       FF                00    00     00    00        11
FF                  TT            0000000000 66666666666   FF                0000000000   0000000000    111111
FF                  TT            0000000    66666666666   FF                0000000      0000000       111111
```

J.ATKINSON 00042705 7345 A LFC9011 FT06F001

LATERALLY LOADED PILE PROGRAM

BEAM COLUMN ANALYSIS USING RIGID LINK FINITE ELEMENT TECHNIQUES .

NUMBER OF PROBLEMS IN SET = 1

GENERAL PROBLEM TITLE = 4=PILE ACMR STRUCTURE == U.S. NAVY (36=IN. DIAMETER PILING) J.ATKINS()

PROBLEM DESCRIPTION = MUDLINE CONDITIONS V=98,8KIP R=5858102 P= 1712 KIP COMP.

TABLE 1 = PROGRAM CONTROLS DATA FOR PROB NO. 1

PRIOR DATA OPTIONS (HOLD = 1) DEFLS.

	TABLE NUMBER				
2	3	4A	4B	5	
0	0	0	0	0	0

NUMBER OF CARDS INPUT THIS PROBLEM

TABLE NUMBER				
3	4A	4B	5	
1	0	3	5	30

LIST OF MONITOR STATIONS = 5 10 15 20 30

TABLE 2 CONSTANTS AND ITERATION CONTROL DATA

NUMBER OF INCREMENTS = 60
CALCULATE STRESSES (YES =1) (NO = 0) 1
INCREMENT LENGTH = 0,3600 02
MAXIMUM ALLOWABLE DEFLECTION = 0,1000 03
DEFLECTION CONTROL TOLERANCE = 0,1000-02
MODULUS OF ELASTICITY = 0,3000 05
PILE RADIUS = 0,1800 02
STA. AT WHICH FORCES AND DEFLECTIONS SPECIFIED FOR RETENTION = 1

DEFLECTION CLOSURE TOLERANCE LESS THAN 0,001 SUGGESTED

TABLE 3 - SPECIFIED DEFLECTIONS AND SLOPES

STATION	CASE	DEFLECTION	SLOPE
NONE SPECIFIED			

TABLE 4A - PILE PROPERTIES

PROGRAM AUTOMATICALLY AVERAGES MOMENT OF INERTIA AND AREA VALUES AT CHANGES IN A AND I THUS, I VALUES FOR TOP AND BOTTOM ELEMENTS ARE HALVED.

FROM STA.	TO STA.	I	A
0	7	0,277C 05	0,188D 03
7	40	0,242D 05	0,163D 03
40	60	0,242D 05	0,163D 03

TABLE 4B - PILE LOADINGS

FROM	TO	CONT.	Q	S	T	R	P
0	0	0	0.9880 02	0.0	0.0	0.5860 07	0.0
0		1	0.0	0.0	0.0	0.0	-0.1710 04
	17	1	0.0	0.0	0.0	0.0	-0.1310 04
	33	1	0.0	0.0	0.0	0.0	-0.9100 03
	50	0	0.0	0.0	0.0	0.0	-0.6000 02

PROGRAM ASSUMES LOADING OF TABLES 4B AND 5 IS APPLIED AS
CONCENTRATED LOADING AT INCREMENT POINTS. THEORETICAL SPRINGS
CONNECTING RIGID FINITE ELEMENTS ARE LOCATED AT INCREMENT POINTS.

TABLE 5 - NONLINEAR LOAD AND SUPPORT CURVES

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
0	1		-0.3000-01	0.1000-02	2	1

ACTUAL Q-W CURVE POINTS

Q	0.3000 04	0.0	0.0	0.3000 04
W	-0.9900 02	-0.9800 02	0.9800 02	0.9900 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
2	1		-0.3000-01	0.1000-02	2	1

ACTUAL Q-W CURVE POINTS

Q	0.3000 04	0.0	0.0	-0.3000 04
W	-0.9900 02	-0.9800 02	0.9800 02	0.9900 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
3	1		-0.3000-01	0.1000-02	8	1

ACTUAL Q-W CURVE POINTS

Q	0.8790 01	0.8790 01	0.8790 01	0.6660 01	0.6060 01	0.5220 01	0.4320 01	0.3060 01
W	-0.9990 02	-0.2000 02	-0.1130 01	-0.5000 00	-0.3000 00	-0.1800 00	-0.7000-01	-0.1600-01
Q	-0.3060 01	-0.4320 01	-0.5220 01	-0.6060 01	-0.6660 01	-0.8790 01	-0.8790 01	-0.8790 01
W	0.1600-01	0.7000-01	0.1800 00	0.3000 00	0.5000 00	0.1130 01	0.2000 02	0.9990 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
5	1		-0.3000-01	0.1000-02	8	1

ACTUAL Q-W CURVE POINTS

Q	0,8900 02	0,8900 02	0,8900 02	0,5560 02	0,4300 02	0,3330 02	0,2070 02	0,7980 01
W	-0,9990 02	-0,2000 02	-0,1130 01	-0,5000 00	-0,2900 00	-0,1700 00	-0,6300-01	-0,9000-02
Q	-0,7980 01	-0,2070 02	-0,3330 02	-0,4300 02	-0,5560 02	-0,8900 02	-0,8900 02	-0,8900 02
W	0,9000-02	0,6300-01	0,1700 00	0,2900 00	0,5000 00	0,1130 01	0,2000 02	0,9990 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
7	1		-0,3000-01	0,1000-02	8	1

ACTUAL Q-W CURVE POINTS

Q	0,1870 03	0,1870 03	0,1870 03	0,1170 03	0,9080 02	0,7110 02	0,4560 02	0,2290 02
W	-0,9990 02	-0,2000 02	-0,1130 01	-0,5000 00	-0,3000 00	-0,1800 00	-0,7100-01	-0,1700-01
Q	-0,2290 02	-0,4560 02	-0,7110 02	-0,9080 02	-0,1170 03	-0,1870 03	-0,1870 03	-0,1870 03
W	0,1700-01	0,7100-01	0,1800 00	0,3000 00	0,5000 00	0,1130 01	0,2000 02	0,9990 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
9	1		-0,3000-01	0,1000-02	8	1

ACTUAL Q-W CURVE POINTS

Q	0,2090 03	0,2090 03	0,2090 03	0,1310 03	0,1010 03	0,7880 02	0,4950 02	0,2180 02
W	-0,9990 02	-0,2000 02	-0,1130 01	-0,5000 00	-0,2900 00	-0,1700 00	-0,6600-01	-0,1200-01
Q	-0,2180 02	-0,4950 02	-0,7880 02	-0,1010 03	-0,1310 03	-0,2090 03	-0,2090 03	-0,2090 03
W	0,1200-01	0,6600-01	0,1700 00	0,2900 00	0,5000 00	0,1130 01	0,2000 02	0,9990 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
12	1		-0,3000-01	0,1000-02	8	1

ACTUAL Q-W CURVE POINTS

Q	0,4920 03	0,4920 03	0,4920 03	0,3070 03	0,2420 03	0,1940 03	0,1500 03	0,8970 02
W	-0,9990 02	-0,2000 02	-0,1130 01	-0,5000 00	-0,3000 00	-0,1900 00	-0,9000-01	-0,3800-01

W	0.3800=01	0.9000=01	0.1900 00	0.3000 00	0.5000 00	0.1130 01	0.2000 02	0.9990 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
19	1		=0.3000=01	0.1000=02	8	1

ACTUAL Q=W CURVE POINTS

Q	0.7650 03	0.7650 03	0.7650 03	0.4780 03	0.3770 03	0.3020 03	0.2100 03	0.1400 03
W	=0.9990 02	=0.2000 02	=0.1130 01	=0.5000 00	=0.3000 00	=0.1900 00	=0.9000=01	=0.3800=01
Q	=0.1400 03	=0.2100 03	=0.3020 03	=0.3770 03	=0.4780 03	=0.7650 03	=0.7650 03	=0.7650 03
W	0.3800=01	0.9000=01	0.1900 00	0.3000 00	0.5000 00	0.1130 01	0.2000 02	0.9990 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
26	1		=0.3000=01	0.1000=02	8	1

ACTUAL Q=W CURVE POINTS

Q	0.1070 04	0.1070 04	0.1070 04	0.6660 03	0.5250 03	0.4210 03	0.2920 03	0.1940 0.
W	=0.9990 02	=0.2000 02	=0.1130 01	=0.5000 00	=0.3000 00	=0.1900 00	=0.9000=01	=0.3800=01
Q	=0.1940 03	=0.2920 03	=0.4210 03	=0.5250 03	=0.6660 03	=0.1070 04	=0.1070 04	=0.1070 04
W	0.3800=01	0.9000=01	0.1900 00	0.3000 00	0.5000 00	0.1130 01	0.2000 02	0.9990 02

FROM	TO	CONT.	QMULTIPLIER	WMULTIPLIER	TOTAL NO. OF POINTS	SYMMETRY
49	1		=0.3000=01	0.1000=02	8	1

ACTUAL Q=W CURVE POINTS

Q	0.1990 04	0.1990 04	0.1990 04	0.1250 04	0.9830 03	0.7880 03	0.5470 03	0.3640 03
W	=0.9990 02	=0.2000 02	=0.1130 01	=0.5000 00	=0.3000 00	=0.1900 00	=0.9000=01	=0.3800=01
Q	=0.3640 03	=0.5470 03	=0.7880 03	=0.9830 03	=0.1250 04	=0.1990 04	=0.1990 04	=0.1990 04
W	0.3800=01	0.9000=01	0.1900 00	0.3000 00	0.5000 00	0.1130 01	0.2000 02	0.9990 02

PROBLEM NUMBER = 1

PROBLEM DESCRIPTION = NODLINE CONDITIONS V=98.8KIP R=5858102 P= 1712 KIP COMP.

ITERATION MONITOR DATA

ITER. NUM.	OFF CURVES	NO. STAS. NOT CLOSED	DEFLS.AT MONITOR STAS. 5	10	15	20	30
1	NO	14	0.496D-01	-0.638D-02	0.809D-04	0.312D-04	0.198D-06
2	NO	14	0.133D 00	-0.819D-02	-0.523D-03	0.999D-04	0.331D-06
3	NO	9	0.155D 00	-0.687D-02	-0.815D-03	0.120D-03	0.324D-06
4	NO	9	0.157D 00	-0.645D-02	-0.853D-03	0.121D-03	0.314D-06
5	NO	0	0.157D 00	-0.645D-02	-0.853D-03	0.121D-03	0.314D-06

RESULTS

STA.	DIST. ALONG PILE	DEFL.	SLOPE	MOMENT	BEAM COLUMN SHEAR	APPLIED NON LINEAR LATERAL LOADING	COMBINED STRESS(MAX.)
0	0.0	0.534	=0.16710=02	=0.9790 04		0.0	=15.460
1	36.000	0.466	=0.20160=02	=0.6120 04	102.198	0.0	=12.948
2	72.000	0.389	=0.22010=02	=0.2440 04	102.460	0.0	=10.428
3	108.000	0.308	=0.2227D=02	0.1260 04	99.409	=6.083	=9.536
4	144.000	0.229	=0.2097D=02	0.4720 04	85.204	=21.806	=11.664
5	180.000	0.157	=0.18350=02	0.7390 04	57.949	=31.771	=13.272
6	216.000	0.097	=0.14820=02	0.8890 04	22.416	=38.104	=14.125
7	252.000	0.050	=0.10410=02	0.9000 04	=15.701	=36.822	=15.051
8	288.000	0.019	=0.5807D=03	0.7760 04	=46.958	=24.422	=15.111
9	324.000	0.001	=0.34880=03	0.5620 04	=60.675	=1.983	=13.374
10	360.000	=0.006	=0.12510=03	0.3400 04	=55.564	12.881	=11.573
11	396.000	=0.008	=0.72510=06	0.1620 04	=40.677	17.261	=10.110
12	432.000	=0.006	0.51080=04	0.4670 03	=24.453	15.337	=9.106
13	468.000	=0.004	0.5924D=04	=0.1380 03	=11.390	10.808	=8.717
14	504.000	=0.002	0.4706D=04	=0.3530 03	=2.916	6.106	=8.735
15	540.000	=0.001	0.29680=04	=0.3480 03	1.409	2.494	=8.584
16	576.000	=0.000	0.14820=04	=0.2520 03	2.824	0.296	=8.368
17	612.000	0.000	0.49920=05	=0.1480 03	2.633	=0.704	=8.148
18	648.000	0.000	=0.13230=06	=0.6220 02	1.827	=0.921	=7.930
19	684.000	0.000	=0.1995D=05	=0.1290 02	0.994	=0.749	=7.740
20	720.000	0.000	=0.20830=05	0.9380 01	0.385	=0.468	=7.584
21	756.000	0.000	=0.14820=05	0.1480 02	0.040	=0.221	=7.434
22	792.000	0.000	=0.8109D=06	0.1230 02	=0.101	=0.060	=7.279
23	828.000	=0.000	=0.3202D=06	0.7530 01	=0.122	0.019	=7.122
24	864.000	=0.000	=0.4771D=07	0.3460 01	=0.092	0.043	=6.966
25	900.000	=0.000	0.61080=07	0.9260 00	=0.052	0.038	=6.811
26	936.000	=0.000	0.7777D=07	=0.2530 00	=0.021	0.024	=6.657
27	972.000	=0.000	0.5737D=07	=0.5700 00	=0.003	0.011	=6.503
28	1008.000	=0.000	0.31200=07	=0.4850 00	0.004	0.005	=6.350
29	1044.000	0.000	0.1193D=07	=0.2920 00	0.005	=0.001	=6.197
30	1080.000	0.000	0.1546D=08	=0.1270 00	0.004	=0.002	=6.043
31	1116.000	0.000	=0.2331D=08	=0.2920=01	0.002	=0.002	=5.890
32	1152.000	0.000	=0.2737D=08	0.1280=01	0.001	=0.001	=5.736
33	1188.000	0.000	=0.1883D=08	0.2160=01	0.000	=0.000	=5.583
34	1224.000	0.000	=0.9344D=09	0.1660=01	=0.000	=0.000	=5.276
35	1260.000	=0.000	=0.2987D=09	0.9000=02	=0.000	0.000	=4.969
36	1296.000	=0.000	0.6603D=11	0.3310=02	=0.000	0.000	=4.663
37	1332.000	=0.000	0.9695D=10	0.3300=03	=0.000	0.000	=4.356
38	1368.000	=0.000	0.8767D=10	=0.7040=03	=0.000	0.000	=4.049
39	1404.000	=0.000	0.5149D=10	=0.7510=03	0.000	0.000	=3.742
40	1440.000	0.000	0.2112D=10	=0.4760=03	0.000	=0.000	=3.436
41	1476.000	0.000	0.3997D=11	=0.2130=03	0.000	=0.000	=3.129
42	1512.000	0.000	=0.2557D=11	=0.5170=04	0.000	=0.000	=2.822
43	1548.000	0.000	=0.3451D=11	0.1560=04	0.000	=0.000	=2.515
44	1584.000	0.000	=0.2544D=11	0.2900=04	0.000	=0.000	=2.209
45	1620.000	0.000	=0.1096D=11	0.2130=04	=0.000	=0.000	=1.902
46	1656.000	=0.000	=0.3043D=12	0.1060=04	=0.000	0.000	=1.595
47	1692.000	=0.000	0.4439D=13	0.3450=05	=0.000	0.000	=1.288

51	1836.000	0.000	0.15020-12	-0.1320-18	-0.000	0.0	-0.184
52	[illegible]2.000	0.000	0.15020-12	-0.1010-18	0.000	0.0	-0.000
53	[illegible]4.000	0.000	0.15020-12	-0.7600-19	.000	0.0	-0.000
54	1980.000	0.000	0.15020-12	-0.5250-19	.000	0.0	-0.000
55	1980.000	0.000	0.15020-12	-0.3440-19	0.000	0.0	-0.000
56	2016.000	0.000	0.15020-12	-0.1990-19	0.000	0.0	-0.000
57	2052.000	0.000	0.15020-12	-0.7240-20	0.000	0.0	-0.000
58	2088.000	0.000	0.15020-12	-0.3620-20	0.000	0.0	-0.000
59	2124.000	0.000	0.15020-12	-0.1810-20	0.000	0.0	-0.000
60	2160.000	0.000	0.15020-12	-0.3620-20	0.0	0.0	-0.000

USER SHOULD NOTE THAT SLOPE LISTED ABOVE IS RELATIVE TO SLOPE AT BOTTOM OF PILE
AND IS NOT TRUE SLOPE RELATIVE TO ORIGINAL PILE DIRECTION

USER SHOULD NOTE THAT REACTION SHEAR LISTED IS THAT DUE TO BOTH LATERAL AND AXIAL EFFECTS
ALSO THAT APPLIED LATERAL LOADING IS TOTAL FOR ONE INCREMENT LENGTH

MOVEMENTS AND REACTIONS STORED FOR STIFFNESS COEFFICIENT DEVELOPMENT USE

DEFLECTIONS	ROTATIONS	MOMENTS	LATERAL SHEAR	AT STATION
0.866320 00	-0.201590-02	-0.612140 [illegible]	0.987750 02	1

USER SHOULD NOTE LATERAL SHEAR ABOVE IS TRUE SHEAR AT STATION
SHEAR GIVEN IS PERPENDICULAR TO ORIGINAL UNDEFLECTED MEMBER AXIS.

ASP JOB NO. = 7345 DATE = 76.113

//LEC9011 JOB (0044270500277100TLEC27011),'J.ATKINSON',PRTY=4,CLASS=A,C7345

ELAPSED TIME OK MAIN = 8 = 000.39, START TIME = 13.52.53

DDNAME = SYSMSG PRINTED ON RM027PR1, LINES = 000077
DDNAME = FT06F001 PRINTED ON RM027PR1, LINES = 000453
LINES OUTPUT FOR THIS JOB = 000510

CARDS FROM MAIN FOR THIS JOB = NONE

EXHIBIT B

STRAN - Space Fram Analysis

6000 REMOTE BATCH

4 PILE ACMR STRUCTURE
FINAL RUN B.

UNITED COMPUTING 67, APEX/SL, 8.0.25

13.30.59. 04/30/76.

```
JJJJJJJJJJJJ  YY      YY  JJJJJJJJJJJJ   333333333333   QQQQQQQQQQ   UU      UU   GGGGGGGGGG
JJJJJJJJJJJJ  YY      YY  JJJJJJJJJJJJ   333333333333   QQQQQQQQQQQQ  UU      UU   GGGGGGGGGGGG
      JJ      YY      YY        JJ              3333   QQ      QQ  UU      UU   GG          G
      JJ      YY      YY        JJ                33   QQ      QQ  UU      UU   GG
      JJ      YY      YY        JJ               333   QQ      QQ  UU      UU   GG
      JJ      YY      YY        JJ              3333   QQ      QQ  UU      UU   GG
      JJ      YYY    YYY        JJ                33   QQ      QQ  UU      UU   GG
      JJ       YYY  YYY         JJ               333   QQ      QQ  UU      UU   GG
      JJ        YYYYYY          JJ               333   QQ      QQ  UU      UU   GG        GGGG
      JJ         YYYY           JJ                33   QQ      QQ  UU      UU   GG        GGGG
      JJ          YY            JJ               333   QQ      QQ  UU      UU   GG          GG
      JJ          YY            JJ              3333   QQ      QQ  UU      UU   GG          GG
      JJ          YY            JJ                33   QQ      QQ  UU      UU   GG          GG
      JJ          YY            JJ               333   QQ      QQ  UU      UU   GG          GG
JJ    JJ          YY      JJ    JJ          3    333   QQ    QQQQ  UU      UU   GG          GG
JJJJJJJ           YY      JJJJJJJ          333333333333  QQQQQQQQQQQQ  UUUUUUUUUUUUUU   GGGGGGGGGGGG
 JJJJJ            YY       JJJJJ           333333333333   QQQQQQQQQQ   UUUUUUUUUU    GGGGGGGGGG
```

SYNERCOM TECHNOLOGY USER BULLETIN

MARCS BULLETIN NO. 4 04/05/76
*** STRAN 6 ***

STRAN RELEASE MOD 12

ALL ERROR MESSAGES WERE NUMBERED FOR EASY REFERENCE. A FEW INSTANCES OF PRINTING THE WRONG ERROR MESSAGE WERE CORRECTED.

THE DAYFILE MESSAGE OF UNIT NO. FOLLOWED BY FOUR INTEGERS WAS REPLACED BY A MORE EXPLANATORY MESSAGE.

NEW FEATURE: USER SELECTION OF METHOD FOR CALCULATING ALLOWABLE MEMBER STRESSES AND UNITY CHECKS:

1. ON THE OPTIONS CARD COLUMNS 25-26 TWO NEW SELECTIONS NA AND AP WERE ADDED TO PREVIOUSLY ALLOWED SELECTIONS BLANKS AND UC.
   BLANKS-- SUPPRESSES CALCULATIONS OF ALLOWABLE MEMBER STRESSES AND UNITY CHECKS.
   UC -- REQUESTS CALCULATION IN ACCORDANCE WITH AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) 1969 CODE. INVESTIGATION OF LOCAL BUCKLING FOLLOWS THE RECOMMENDATION OF THE COLUMN RESEARCH COUNCIL. THE UC OPTION HAS NOT CHANGED FROM PRIOR STRAN RELEASES.
   NA -- SAME AS UC, BUT IN COMPUTING COMBINED UNITY CHECK AISC FORMULA 1.6-2 IS ALWAYS USED, FORMULAS 1.6-1A AND 1.6-1B ARE NEVER USED.
   AP -- REQUESTS CALCULATION IN ACCORDANCE WITH AMERICAN PETROLEUM INSTITUTE (API) REPORT API-RP-2A.

2. THE SELECTION PS ON THE OPTIONS CARD COLUMNS 27-28 WAS DELETED. IF SELECTED, IT WILL BE IGNORED AND A WARNING MESSAGE WILL BE PRINTED.

3. GROUP CARD COLUMN 70: IF THE LETTER N APPEARS, LOCAL BUCKLING EFFECTS WILL NOT BE INVESTIGATED FOR ALL TUBULAR MEMBERS HAVING THIS GROUP CODE.

NOTE - IF YOU DO NOT HAVE ALL OF THE BULLETINS, YOU MAY OBTAIN A COPY BY SUBMITTING A RUN WITH THE FOLLOWING CONTROL CARDS:

```
GET,MARCBUL.
COPYSBF,MARCBUL.
```

```
**********                    **********
*                                      *
*                STRAN                 *
*  A SYNERCOM TECHNOLOGY, INC. DEVELOPMENT *
*              RELEASE 6  MOD 12       *
*                MARCH 1976            *
*                                      *
**************************************
```

DATE 04/30/76

4-PILE ACNR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

PROGRAM OPTIONS

THE FOLLOWING OPTIONS HAVE BEEN REQUESTED FOR THIS ANALYSIS

INPUT
- ....CARD PLUS DATA FILE INPUT

INPUT UNITS
- ....ENGLISH

OUTPUT UNITS
- ....ENGLISH

EXECUTION
- ....UNITY CHECK
  - ..UNITY CHECKS COMPUTED BY AMERICAN INSTITUTE OF STEEL CONSTRUCTION 1969 CODE, SECTIONS 1.5, 1.6, LOCAL BUCKLING STRESS OF TUBULAR MEMBERS INVESTIGATED BY COLUMN RESEARCH COUNCIL METHOD, RESULTS INVALID FOR A514 STEEL.
- ....NO. OF SEGMENTS 1
- ....VARBL MEMB. SEGMENTS/SECT 1

LOAD
- ....NO. BASIC LOAD CONDS. 3
- ....NO. COMBINED LOAD CONDS. 2

REPORT

....INPUT ECHO AND GROUP PROP	PRINT
....JOINT DEFLECTIONS	PRINT
....GROUP AND UN CHK SUMMARY	PRINT
....MEMBER STRESS REPORT NO. 1	PRINT
....MEMBER STRESS REPORT NO. 2	PRINT
....MEMBER STRESS REPORT NO. 3	PRINT
....REACTION FORCES AND MOMTS	PRINT
....EQUILIBRIUM CHECK	PRINT

EQUILIBRIUM CHECK EDIT VALUES
- ....FORCES 100.00 LB
- ....MOMENTS 100.00 IN-LB

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON
TUBULAR MEMBER PROPERTIES

GRP	M/S	JOINT THICK FT.	WT IN.	OD IN.	AX IN2	IX IN4	IY IN4	IZ IN4	FY KSI	KY	KZ	SHEAR AREA IN2	INPUT SEC LEN FT.
*** E = 29000000.0 PSI, G = 11600000.0 PSI ***													
HB1	2	3.00	.500	36.00	21.21	967.51	483.76	483.76	36.0	1.0	1.0	21.21	-0.00
HB2	2	4.00	.500	36.00	27.49	2106.34	1053.17	1053.17	36.0	1.0	1.0	27.49	-0.00
DB1	2	3.00	.625	20.00	38.04	3573.94	1786.97	1786.97	36.0	.8	.8	38.04	-0.00
DB2	2	3.00	.500	18.00	27.49	2106.34	1053.17	1053.17	36.0	.8	.8	27.49	-0.00
XB1	2	2.00	.500	36.00	24.35	1463.88	731.94	731.94	36.0	.7	.7	24.35	-0.00
XB2	2	2.50	.500	18.00	27.49	2106.34	1053.17	1053.17	36.0	.7	.7	27.49	-0.00
XB3	2	2.50	.500	20.00	30.63	2913.75	1456.86	1456.86	36.0	.7	.7	30.63	-0.00
SSC	1	-0.00	1.250	30.00	112.90	23374.03	11687.02	11687.02	36.0	1.0	1.0	112.90	-0.00
JL1	1	-0.00	.500	40.00	62.05	24205.87	12102.94	12102.94	36.0	1.0	1.0	62.05	-0.00
P1	1	-0.00	1.250	36.00	136.46	41250.18	20625.09	20625.09	36.0	1.0	1.0	136.46	-0.00
P2	1	-0.00	1.500	36.00	162.58	48468.39	24234.20	24234.20	36.0	1.0	1.0	162.58	-0.00
DB3	2	2.50	.375	14.00	16.05	745.52	372.76	372.76	36.0	.8	.8	16.05	-0.00
HB3	2	2.50	.375	14.00	16.05	745.52	372.76	372.76	36.0	1.0	1.0	16.05	-0.00

STRAN - GROUP PROPERTIES REPORT

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON
WIDE FLANGE/WIDE FLANGE COMPACT MEMBER PROPERTIES

GRP	M/S	JOINT THICK FT.	FLANGE THICK IN.	FLANGE WIDTH IN.	WEB THICK IN.	FILET RADIUS IN.	DEPTH IN.	AX IN2	IX IN4	IY IN4	IZ IN4	FY KSI	KY	KZ	LB FT.	INPUT SEC LEN FT.
		*** E = 29000000.0 PSI, G = 11600000.0 PSI ***														
-21	1	-0.00	.522	8.21	.375	.563	20.80	16.20	1.24	1140.00	48.30	36.0	1.0	1.0	2.50	-0.00
-18	1	3.00	.630	7.53	.390	.438	18.12	16.20	1.06	891.00	45.00	36.0	1.0	1.0	2.50	-0.00
-17	1	-0.00	.524	6.02	.316	.438	17.90	11.80	.81	612.00	19.10	36.0	1.0	1.0	2.50	-0.00

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON
PRISMATIC SECTION MEMBERS

GRP	M/S	JOINT THICK FT.	Z-DPTH IN.	Y-DPTH IN.	AX IN2	IX IN4	IY IN4	IZ IN4	FY KSI	KY	KZ	INPUT SEC LEN FT.
		*** E = 29000000.0 PSI, G = 11600000.0 PSI ***										
MAIN	2	=0.00	10.00	5.00	50.00	30000.00	30000.00	30000.00	36.0	1.0	1.0	=0.00
P3	1	=0.00	36.00	36.00	12.04	48480.00	24240.00	24240.00	36.0	1.0	1.0	=0.00

STRAN INPUT DATA

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

```
LINE NO.  1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
    1  SECT
    2  SECT W21X55     WF  16.2      1.24   1140       48.3  8.215 .522 20.8  .375 .563
    3  SECT W18X55     WF  16.2      1.66    891       45    7.532 .630 18.12 .390 .438
    4  SECT W18X40     WF  11.8      0.81    612       19.1  6.018 .524 17.9  .316 .438
    5  SECT WISHBON    PRI 50.0  30000    30000    30000      10          5
    6  SECT PILINGS    PRI 12.04 48480    24240    24240      36         36
    7  GRUP
    8  GRUP W21 W21X55                  29   11.6 36   1                 2.5
    9  GRUP W18 W18X55                               1 3.0               2.5
   10  GRUP W17 W18X40                               1                   2.5
   11  GRUP WB1              14    .500                2 3.0
   12  GRUP WB2              18    .500                2 3.0
   13  GRUP DB1              20    .625                2 3.0 0.8 0.8
   14  GRUP DB2              18    .500                2 3.0 0.8 0.8
   15  GRUP XB1              16    .500                2 2.0 0.7 0.7
   16  GRUP XB2              18    .500                2 2.3 0.7 0.7
   17  GRUP XB3              20    .500                2 2.5 0.7 0.7
   18  GRUP SSC              30   1.250                1
   19  GRUP JL1              40    .500                1
   20  GRUP P1               36   1.250                1
   21  GRUP P2               36   1.500                1
   22  GRUP WBN WISHBON                                2
   23  GRUP DB3              14    .375                2 2.5 0.8 0.8
   24  GRUP WB3              14    .375                2 2.5
   25  GRUP P3  PILINGS                                1
   26  MEMBER
   27  MEMBER    5   4 W21                                                30
   28  MEMBER    6   5 W17                                                30
   29  MEMBER    7   2 W17                                                30
   30  MEMBER    8   1 W21                                                30
   31  MEMBER    5   6 W21
   32  MEMBER    6   7 W21
   33  MEMBER    7   8 W21
   34  MEMBER    4   3 W21
   35  MEMBER    3   2 W21
   36  MEMBER    2   1 W21
   37  MEMBER   12   5 SSC                                                30
   38  MEMBER   11   4 SSC                                                30
   39  MEMBER   14   8 SSC                                                30
   40  MEMBER    9   1 SSC                                                30
   41  MEMBER   12  11 W18
   42  MEMBER   13  10 W18
   43  MEMBER   14   9 W18
   44  MEMBER   12  13 W18
   45  MEMBER   13  14 W18
   46  MEMBER   11  10 W18
   47  MEMBER   10   9 W18
   48  MEMBER   17  12 SSC                                                30
   49  MEMBER   16  11 SSC                                                30
```

STRAN [illegible] PUT DATA

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- ',ATKINSON

LINE NO.					
50	MEMBER	18	14	SSC	30
51	MEMBER	15	9	SSC	30
52	MEMBER	17	11	DA3	14
53	MEMBER	18	9	DA3	14
54	MEMBER	17	14	DA3	14
55	MEMBER	16	9	DA3	14
56	MEMBER	17	16	HA3	14
57	MEMBER	18	15	HA3	14
58	MEMBER	17	18	HA3	14
59	MEMBER	16	15	HA3	14
60	MEMBER	21	17	SSC	30
61	MEMBER	20	16	SSC	30
62	MEMBER	22	18	SSC	30
63	MEMBER	19	15	SSC	30
64	MEMBER	25	21	JL1	F 40
65	MEMBER	24	20	JL1	F 40
66	MEMBER	26	22	JL1	F 40
67	MEMBER	23	19	JL1	F 40
68	MEMBER	25	24	HA1	14
69	MEMBER	26	23	HA1	14
70	MEMBER	25	26	HA1	14
71	MEMBER	24	23	HA1	14
72	MEMBER	25	27	XA1	16
73	MEMBER	27	23	XA1	16
74	MEMBER	26	27	XA1	16
75	MEMBER	27	24	XA1	16
76	MEMBER	30	25	JL1	F 40
77	MEMBER	29	24	JL1	F 40
78	MEMBER	31	26	JL1	F 40
79	MEMBER	28	23	JL1	F 40
80	MEMBER	29	25	DA1	20
81	MEMBER	28	26	DA1	20
82	MEMBER	31	25	DA1	20
83	MEMBER	28	24	DA1	20
84	MEMBER	30	29	HA1	14
85	MEMBER	31	28	HA1	14
86	MEMBER	30	31	HA1	14
87	MEMBER	29	28	HA1	14
88	MEMBER	33	32	XA2	18
89	MEMBER	32	28	XA2	18
90	MEMBER	31	32	XA2	18
91	MEMBER	32	29	XA2	18
92	MEMBER	35	30	JL1	F 40
93	MEMBER	34	29	JL1	F 40
94	MEMBER	36	31	JL1	F 40
95	MEMBER	33	28	JL1	F 40
96	MEMBER	35	29	DA2	18
97	MEMBER	36	28	DA2	18
98	MEMBER	35	31	DA2	18

S T R A N   I N P U T   D A T A

4-PILE ACRT STRUCTURE BY U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

```
                1    1    2    2    3    3    4    4    5    5    6    6    7    7    8
LINE NO. 1....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

    99  MEMBER   34   28 DB2                                                     18
   100  MEMBER   35   34 HB2                                                     18
   101  MEMBER   36   33 HB2                                                     18
   102  MEMBER   35   36 HB2                                                     18
   103  MEMBER   34   33 HB2                                                     18
   104  MEMBER   35   37 XB3                                                     20
   105  MEMBER   37   33 XB3                                                     20
   106  MEMBER   36   37 XB3                                                     20
   107  MEMBER   37   34 XB3                                                     20
   108  MEMBER   42   35 JL1                                                 F   40
   109  MEMBER   40   34 JL1                                                 F   40
   110  MEMBER   44   36 JL1                                                 F   40
   111  MEMBER   38   33 JL1                                                 F   40
   112  MEMBER   35   41 DB2                                                     18
   113  MEMBER   41   34 DB2                                                     18
   114  MEMBER   36   45 DB2                                                     18
   115  MEMBER   45   33 DB2                                                     18
   116  MEMBER   35   43 DB2                                                     18
   117  MEMBER   43   36 DB2                                                     18
   118  MEMBER   34   39 DB2                                                     18
   119  MEMBER   39   33 DB2                                                     18
   120  MEMBER   42   41 HB2                                                     18
   121  MEMBER   41   40 HB2                                                     18
   122  MEMBER   44   45 HB2                                                     18
   123  MEMBER   45   38 HB2                                                     18
   124  MEMBER   42   43 HB2                                                     18
   125  MEMBER   43   44 HB2                                                     18
   126  MEMBER   40   39 HB2                                                     18
   127  MEMBER   39   38 HB2                                                     18
   128  MEMBER   42   46 XB3                                                     20
   129  MEMBER   46   38 XB3                                                     20
   130  MEMBER   44   46 XB3                                                     20
   131  MEMBER   46   40 XB3                                                     20
   132  MEMBER   25   55 WBN
   133  MEMBER   55   56 WBN           1111
   134  MEMBER   24   53 WBN
   135  MEMBER   53   54 WBN           1111
   136  MEMBER   26   57 WBN
   137  MEMBER   57   58 WBN           1111
   138  MEMBER   23   51 WBN
   139  MEMBER   51   52 WBN           1111
   140  MEMBER   30   63 WBN
   141  MEMBER   63   64 WBN           1111
   142  MEMBER   29   61 WBN
   143  MEMBER   61   62 WBN           1111
   144  MEMBER   31   65 WBN
   145  MEMBER   65   66 WBN           1111
   146  MEMBER   28   59 WBN
   147  MEMBER   59   60 WBN           1111
```

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1	2	3	4	5	6	7	8
148	MEMBER	35	71	WBN				
149	MEMBER	71	72	WBN	1111			
150	MEMBER	34	69	WBN				
151	MEMBER	69	70	WBN	1111			
152	MEMBER	36	73	WBN				
153	MEMBER	73	74	WBN	1111			
154	MEMBER	33	67	WBN				
155	MEMBER	67	68	WBN	1111			
156	MEMBER	42	79	WBN				
157	MEMBER	79	80	WBN	1111			
158	MEMBER	40	77	WBN				
159	MEMBER	77	78	WBN	1111			
160	MEMBER	44	81	WBN				
161	MEMBER	81	82	WBN	1111			
162	MEMBER	38	75	WBN				
163	MEMBER	75	76	WBN	1111			
164	MEMBER	21	56	P1			F 36 2	
165	MEMBER	56	64	P1			F 36 2	
166	MEMBER	64	72	P1			F 36 2	
167	MEMBER	72	80	P2			F 36 2	
168	MEMBER	20	54	P1			F 36 4	
169	MEMBER	54	62	P1			F 36 4	
170	MEMBER	62	70	P1			F 36 4	
171	MEMBER	70	78	P2			F 36 4	
172	MEMBER	22	58	P1			F 36 1	
173	MEMBER	58	66	P1			F 36 1	
174	MEMBER	66	74	P1			F 36 1	
175	MEMBER	74	82	P2			F 36 1	
176	MEMBER	19	52	P1			F 36 3	
177	MEMBER	52	60	P1			F 36 3	
178	MEMBER	60	68	P1			F 36 3	
179	MEMBER	68	76	P2			F 36 3	
180	MEMBER	80	102	P3			F 36 2	
181	MEMBER	78	104	P3			F 36 4	
182	MEMBER	82	101	P3			F 36 1	
183	MEMBER	76	103	P3			F 36 3	
184	MEMBER	17	47	XB1				
185	MEMBER	47	15	XB1				
186	MEMBER	18	47	XB1				
187	MEMBER	47	16	XB1				
188	JOINT							
189	JOINT	1	15	15	159	UPERDECK		
190	JOINT	2	15	5	159	UPERDECK		
191	JOINT	3	15	-5	159	UPERDECK		
192	JOINT	4	15	-15	159	UPERDECK		
193	JOINT	5	-15	-15	159	UPERDECK		
194	JOINT	6	-15	-5	159	UPERDECK		
195	JOINT	7	-15	5	159	UPERDECK		
196	JOINT	8	-15	15	159	UPERDECK		

4=PILE ACKR STRUCTURE == U.S. NAVY (36=IN. DIAMETER PILING) == J.ATKINSON

LINE NO.						
197	JOINT	9	15	15	144	LOERDECK
198	JOINT	10	15	0	144	LOERDECK
199	JOINT	11	15	-15	144	LOERDECK
200	JOINT	12	-15	-15	144	LOERDECK
201	JOINT	13	-15	0	144	LOERDECK
202	JOINT	14	-15	15	144	LOERDECK
203	JOINT	15	15	15	130	SUPERSTR
204	JOINT	16	15	-15	130	SUPERSTR
205	JOINT	17	-15	-15	130	SUPERSTR
206	JOINT	18	-15	15	130	SUPERSTR
207	JOINT	19	15	15	1005	SUPERSTR
208	JOINT	20	15	-15	1005	SUPERSTR
209	JOINT	21	-15	-15	1005	SUPERSTR
210	JOINT	22	-15	15	1005	SUPERSTR
211	JOINT	23	15.45	15.45	96	ELEV.+12
212	JOINT	24	15.45	-15.45	96	ELEV.+12
213	JOINT	25	-15.45	-15.45	96	ELEV.+12
214	JOINT	26	-15.45	15.45	96	ELEV.+12
215	JOINT	27	0	0	96	ELEV.+12
216	JOINT	28	18.45	18.45	66	ELEV.-18
217	JOINT	29	18.45	-18.45	66	ELEV.-18
218	JOINT	30	-18.45	-18.45	66	ELEV.-18
219	JOINT	31	-18.45	18.45	66	ELEV.-18
220	JOINT	32	0	0	66	ELEV.-18
221	JOINT	33	21.55	21.55	35	ELEV.-49
222	JOINT	34	21.55	-21.55	35	ELEV.-49
223	JOINT	35	-21.55	-21.55	35	ELEV.-49
224	JOINT	36	-21.55	21.55	35	ELEV.-49
225	JOINT	37	0	0	35	ELEV.-49
226	JOINT	38	25.05	25.05	0	ELEV.-84
227	JOINT	39	25.05	0	0	ELEV.-84
228	JOINT	40	25.05	-25.05	0	ELEV.-84
229	JOINT	41	0	-25.05	0	ELEV.-84
230	JOINT	42	-25.05	-25.05	0	ELEV.-84
231	JOINT	43	-25.05	0	0	ELEV.-84
232	JOINT	44	-25.05	25.05	0	ELEV.-84
233	JOINT	45	0	25.05	0	ELEV.-84
234	JOINT	46	0	0	0	ELEV.-84
235	JOINT	47	0	0	130	
236	JOINT	51	17.45	17.45	96	WISHR+12
237	JOINT	52	15.45	15.45	96.01	WISHR+12
238	JOINT	53	17.45	-17.45	96	WISHR+12
239	JOINT	54	15.45	-15.45	96.01	WISHR+12
240	JOINT	55	-17.45	-17.45	96	WISHR+12
241	JOINT	56	-15.45	-15.45	96.01	WISHR+12
242	JOINT	57	-17.45	17.45	96	WISHR+12
243	JOINT	58	-15.45	15.45	96.01	WISHR+12
244	JOINT	59	20.45	20.45	66	WISHR-18
245	JOINT	60	18.45	18.45	66.01	WISHR-18

8-PILE ACSR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

```
                    1   1   2   2   3   3   4   4   5   5   6   6   7   7   8
LINE NO. 1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

  246 JOINT   61   20.45 -20.45   66                          WISHB-18
  247 JOINT   62   18.45 -18.45   66.01                       WISHB-18
  248 JOINT   63  -20.45 -20.45   66                          WISHB-18
  249 JOINT   64  -18.45 -18.45   66.01                       WISHB-18
  250 JOINT   65  -20.45  20.45   66                          WISHB-18
  251 JOINT   66  -18.45  18.45   66.01                       WISHB-18
  252 JOINT   67   23.55  23.55   35                          WISHB-49
  253 JOINT   68   21.55  21.55   35.01                       WISHB-49
  254 JOINT   69   23.55 -23.55   35                          WISHB-49
  255 JOINT   70   21.55 -21.55   35.01                       WISHB-49
  256 JOINT   71  -23.55 -23.55   35                          WISHB-49
  257 JOINT   72  -21.55 -21.55   35.01                       WISHB-49
  258 JOINT   73  -23.55  23.55   35                          WISHB-49
  259 JOINT   74  -21.55  21.55   35.01                       WISHB-49
  260 JOINT   75   27.05  27.05   0                           WISHB-84
  261 JOINT   76   25.05  25.05   0.01                        WISHB-84
  262 JOINT   77   27.05 -27.05   0                           WISHB-84
  263 JOINT   78   25.05 -25.05   0.01                        WISHB-84
  264 JOINT   79  -27.05 -27.05   0                           WISHB-84
  265 JOINT   80  -25.05 -25.05   0.01                        WISHB-84
  266 JOINT   81  -27.05  27.05   0                           WISHB-84
  267 JOINT   82  -25.05  25.05   0.01                        WISHB-84
  268 JOINT  103   25.88  25.88  -8.26          111  SUPPORT3
  269 JOINT  104   25.88 -25.88  -8.26          111  SUPPORT4
  270 JOINT  102  -25.88 -25.88  -8.26          111  SUPPORT2
  271 JOINT  101  -25.88  25.88  -8.26          111  SUPPORT1
  272 LOAD
  273 LOADCN  1
  274 LOAD Z    5   4    0.00  -.055  30.00  -.055          GLOB UNIF    DL 0 1
  275 LOAD Z    6   3    0.00  -.040  30.00  -.040          GLOB UNIF    DL 0 1
  276 LOAD Z    7   2    0.00  -.040  30.00  -.040          GLOB UNIF    DL 0 1
  277 LOAD Z    8   1    0.00  -.055  30.00  -.055          GLOB UNIF    DL 0 1
  278 LOAD Z    5   6    0.00  -.055  10.00  -.055          GLOB UNIF    DL 0 1
  279 LOAD Z    6   7    0.00  -.055  10.00  -.055          GLOB UNIF    DL 0 1
  280 LOAD Z    7   8    0.00  -.055  10.00  -.055          GLOB UNIF    DL 0 1
  281 LOAD Z    4   3    0.00  -.055  10.00  -.055          GLOB UNIF    DL 0 1
  282 LOAD Z    3   2    0.00  -.055  10.00  -.055          GLOB UNIF    DL 0 1
  283 LOAD Z    2   1    0.00  -.055  10.00  -.055          GLOB UNIF    DL 0 1
  284 LOAD Z   12   5    0.00  -.347  15.00  -.347          GLOB UNIF    DL 0 1
  285 LOAD Z   11   4    0.00  -.347  15.00  -.347          GLOB UNIF    DL 0 1
  286 LOAD Z   14   8    0.00  -.347  15.00  -.347          GLOB UNIF    DL 0 1
  287 LOAD Z    9   1    0.00  -.347  15.00  -.347          GLOB UNIF    DL 0 1
  288 LOAD Z   12  11    1.50  -.055  27.00  -.055          GLOB UNIF    DL 0 1
  289 LOAD Z   13  10    1.50  -.055  27.00  -.055          GLOB UNIF    DL 0 1
  290 LOAD Z   14   9    1.50  -.055  27.00  -.055          GLOB UNIF    DL 0 1
  291 LOAD Z   12  15    1.50  -.055  12.00  -.055          GLOB UNIF    DL 0 1
  292 LOAD Z   13  14    1.50  -.055  12.00  -.055          GLOB UNIF    DL 0 1
  293 LOAD Z   11  10    1.50  -.055  12.00  -.055          GLOB UNIF    DL 0 1
  294 LOAD Z   10   9    1.50  -.055  12.00  -.055          GLOB UNIF    DL 0 1
```

4-PILE ACHA STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.												
295	LOAD Z	17	12	0.00	-.347	14.00	-.347	GLOB UNIF	DL	0	1	
296	LOAD Z	16	11	0.00	-.347	14.00	-.347	GLOB UNIF	DL	0	1	
297	LOAD Z	18	14	0.00	-.347	14.00	-.347	GLOB UNIF	DL	0	1	
298	LOAD Z	15	9	0.00	-.347	14.00	-.347	GLOB UNIF	DL	0	1	
299	LOAD Z	17	11	1.25	-.055	30.61	-.055	GLOB UNIF	DL	0	1	
300	LOAD Z	18	9	1.25	-.055	30.61	-.055	GLOB UNIF	DL	0	1	
301	LOAD Z	17	14	1.25	-.055	30.61	-.055	GLOB UNIF	DL	0	1	
302	LOAD Z	16	9	1.25	-.055	30.61	-.055	GLOB UNIF	DL	0	1	
303	LOAD Z	17	16	1.25	-.055	27.50	-.055	GLOB UNIF	DL	0	1	
304	LOAD Z	18	15	1.25	-.055	27.50	-.055	GLOB UNIF	DL	0	1	
305	LOAD Z	17	18	1.25	-.055	27.50	-.055	GLOB UNIF	DL	0	1	
306	LOAD Z	16	15	1.25	-.055	27.50	-.055	GLOB UNIF	DL	0	1	
307	LOAD Z	21	17	0.00	-.302	23.00	-.302	GLOB UNIF	DL	0	1	
308	LOAD Z	21	17	23.00	-.347	6.50	-.347	GLOB UNIF	DL	0	1	
309	LOAD Z	20	16	0.00	-.302	23.00	-.302	GLOB UNIF	DL	0	1	
310	LOAD Z	20	16	23.00	-.347	6.50	-.347	GLOB UNIF	DL	0	1	
311	LOAD Z	22	18	0.00	-.302	23.00	-.302	GLOB UNIF	DL	0	1	
312	LOAD Z	22	18	23.00	-.347	6.50	-.347	GLOB UNIF	DL	0	1	
313	LOAD Z	19	15	0.00	-.302	23.00	-.302	GLOB UNIF	DL	0	1	
314	LOAD Z	19	15	23.00	-.347	6.50	-.347	GLOB UNIF	DL	0	1	
315	LOAD Z	25	21	0.00	-.183	4.54	-.183	GLOB UNIF	DL	0	1	
316	LOAD Z	24	20	0.00	-.183	4.54	-.183	GLOB UNIF	DL	0	1	
317	LOAD Z	26	22	0.00	-.183	4.54	-.183	GLOB UNIF	DL	0	1	
318	LOAD Z	23	19	0.00	-.183	4.54	-.183	GLOB UNIF	DL	0	1	
319	LOAD Z	25	24	1.50	-.063	27.90	-.063	GLOB UNIF	DL	0	1	
320	LOAD Z	26	23	1.50	-.063	27.90	-.063	GLOB UNIF	DL	0	1	
321	LOAD Z	25	26	1.50	-.063	27.90	-.063	GLOB UNIF	DL	0	1	
322	LOAD Z	24	23	1.50	-.063	27.90	-.063	GLOB UNIF	DL	0	1	
323	LOAD Z	25	27	1.00	-.072	19.85	-.072	GLOB UNIF	DL	0	1	
324	LOAD Z	27	23	1.00	-.072	19.85	-.072	GLOB UNIF	DL	0	1	
325	LOAD Z	26	27	1.00	-.072	19.85	-.072	GLOB UNIF	DL	0	1	
326	LOAD Z	27	24	1.00	-.072	19.85	-.072	GLOB UNIF	DL	0	1	
327	LOAD Z	30	25	0.00	-.183	30.30	-.183	GLOB UNIF	DL	0	1	
328	LOAD Z	29	24	0.00	-.183	30.30	-.183	GLOB UNIF	DL	0	1	
329	LOAD Z	31	26	0.00	-.183	30.30	-.183	GLOB UNIF	DL	0	1	
330	LOAD Z	28	23	0.00	-.183	30.30	-.183	GLOB UNIF	DL	0	1	
331	LOAD Z	29	25	1.50	-.112	42.37	-.112	GLOB UNIF	DL	0	1	
332	LOAD Z	28	26	1.50	-.112	42.37	-.112	GLOB UNIF	DL	0	1	
333	LOAD Z	31	25	1.50	-.112	42.37	-.112	GLOB UNIF	DL	0	1	
334	LOAD Z	28	24	1.50	-.112	42.37	-.112	GLOB UNIF	DL	0	1	
335	LOAD Z	30	29	1.50	-.063	33.90	-.063	GLOB UNIF	DL	0	1	
336	LOAD Z	31	28	1.50	-.063	33.90	-.063	GLOB UNIF	DL	0	1	
337	LOAD Z	30	31	1.50	-.063	33.90	-.063	GLOB UNIF	DL	0	1	
338	LOAD Z	29	28	1.50	-.063	33.90	-.063	GLOB UNIF	DL	0	1	
339	LOAD Z	30	32	1.15	-.081	23.79	-.081	GLOB UNIF	DL	0	1	
340	LOAD Z	32	28	1.15	-.081	23.79	-.081	GLOB UNIF	DL	0	1	
341	LOAD Z	31	32	1.15	-.081	23.79	-.081	GLOB UNIF	DL	0	1	
342	LOAD Z	32	29	1.15	-.081	23.79	-.081	GLOB UNIF	DL	0	1	
343	LOAD Z	35	30	0.00	-.183	31.31	-.183	GLOB UNIF	DL	0	1	

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.													
344	LOAD Z	34	29	0.00	-.183	31.31	-.183			GLOB	UNIF	DL	0 1
345	LOAD Z	36	31	0.00	-.183	31.31	-.183			GLOB	UNIF	DL	0 1
346	LOAD Z	33	28	0.00	-.183	31.31	-.183			GLOB	UNIF	DL	0 1
347	LOAD Z	35	29	1.50	-.081	47.70	-.081			GLOB	UNIF	DL	0 1
348	LOAD Z	36	28	1.50	-.081	47.70	-.081			GLOB	UNIF	DL	0 1
349	LOAD Z	35	31	1.50	-.081	47.70	-.081			GLOB	UNIF	DL	0 1
350	LOAD Z	34	28	1.50	-.081	47.70	-.081			GLOB	UNIF	DL	0 1
351	LOAD Z	35	34	1.50	-.081	40.10	-.081			GLOB	UNIF	DL	0 1
352	LOAD Z	36	33	1.50	-.081	40.10	-.081			GLOB	UNIF	DL	0 1
353	LOAD Z	35	36	1.50	-.081	40.10	-.081			GLOB	UNIF	DL	0 1
354	LOAD Z	34	33	1.50	-.081	40.10	-.081			GLOB	UNIF	DL	0 1
355	LOAD Z	35	37	1.25	-.091	27.98	-.091			GLOB	UNIF	DL	0 1
356	LOAD Z	37	33	1.25	-.091	27.98	-.091			GLOB	UNIF	DL	0 1
357	LOAD Z	36	37	1.25	-.091	27.98	-.091			GLOB	UNIF	DL	0 1
358	LOAD Z	37	34	1.25	-.091	27.98	-.091			GLOB	UNIF	DL	0 1
359	LOAD Z	42	35	0.00	-.183	35.35	-.183			GLOB	UNIF	DL	0 1
360	LOAD Z	40	34	0.00	-.183	35.35	-.183			GLOB	UNIF	DL	0 1
361	LOAD Z	44	36	0.00	-.183	35.35	-.183			GLOB	UNIF	DL	0 1
362	LOAD Z	38	33	0.00	-.183	35.35	-.183			GLOB	UNIF	DL	0 1
363	LOAD Z	35	41	1.50	-.081	38.25	-.081			GLOB	UNIF	DL	0 1
364	LOAD Z	41	34	1.50	-.081	38.25	-.081			GLOB	UNIF	DL	0 1
365	LOAD Z	36	45	1.50	-.081	38.25	-.081			GLOB	UNIF	DL	0 1
366	LOAD Z	45	33	1.50	-.081	38.25	-.081			GLOB	UNIF	DL	0 1
367	LOAD Z	35	43	1.50	-.081	38.25	-.081			GLOB	UNIF	DL	0 1
368	LOAD Z	43	36	1.50	-.081	38.25	-.081			GLOB	UNIF	DL	0 1
369	LOAD Z	34	39	1.50	-.081	38.25	-.081			GLOB	UNIF	DL	0 1
370	LOAD Z	39	33	1.50	-.081	38.25	-.081			GLOB	UNIF	DL	0 1
371	LOAD Z	42	41	1.50	-.081	22.05	-.081			GLOB	UNIF	DL	0 1
372	LOAD Z	41	40	1.50	-.081	22.05	-.081			GLOB	UNIF	DL	0 1
373	LOAD Z	44	45	1.50	-.081	22.05	-.081			GLOB	UNIF	DL	0 1
374	LOAD Z	45	38	1.50	-.081	22.05	-.081			GLOB	UNIF	DL	0 1
375	LOAD Z	42	43	1.50	-.081	22.05	-.081			GLOB	UNIF	DL	0 1
376	LOAD Z	43	44	1.50	-.081	22.05	-.081			GLOB	UNIF	DL	0 1
377	LOAD Z	40	39	1.50	-.081	22.05	-.081			GLOB	UNIF	DL	0 1
378	LOAD Z	39	38	1.50	-.081	22.05	-.081			GLOB	UNIF	DL	0 1
379	LOAD Z	42	46	1.25	-.091	32.93	-.091			GLOB	UNIF	DL	0 1
380	LOAD Z	46	58	1.25	-.091	32.93	-.091			GLOB	UNIF	DL	0 1
381	LOAD Z	48	46	1.25	-.091	32.93	-.091			GLOB	UNIF	DL	0 1
382	LOAD Z	46	48	1.25	-.091	32.93	-.091			GLOB	UNIF	DL	0 1
383	LOAD Z	25	55	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
384	LOAD Z	55	56	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
385	LOAD Z	24	53	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
386	LOAD Z	53	54	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
387	LOAD Z	26	57	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
388	LOAD Z	57	58	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
389	LOAD Z	23	51	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
390	LOAD Z	51	52	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
391	LOAD Z	30	63	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1
392	LOAD Z	63	64	0.00	-.148	2.83	-.148			GLOB	UNIF	DL	0 1

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
	1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0														
393	LOAD Z	29	61	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
394	LOAD Z	61	62	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
395	LOAD Z	31	65	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
396	LOAD Z	65	66	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
397	LOAD Z	28	59	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
398	LOAD Z	59	60	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
399	LOAD Z	35	71	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
400	LOAD Z	71	72	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
401	LOAD Z	34	69	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
402	LOAD Z	69	70	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
403	LOAD Z	36	73	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
404	LOAD Z	73	74	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
405	LOAD Z	33	67	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
406	LOAD Z	67	68	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
407	LOAD Z	42	79	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
408	LOAD Z	79	80	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
409	LOAD Z	40	77	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
410	LOAD Z	77	78	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
411	LOAD Z	44	81	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
412	LOAD Z	81	82	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
413	LOAD Z	38	75	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
414	LOAD Z	75	76	0.00	-.148	2.83	-.148				GLOB UNIF		DL 0 1		
415	LOAD Z	21	56	0.00	-.403	4.53	-.403				GLOB UNIF		DL 0 1		
416	LOAD Z	56	64	0.00	-.403	30.30	-.403				GLOB UNIF		DL 0 1		
417	LOAD Z	64	72	0.00	-.403	31.31	-.403				GLOB UNIF		DL 0 1		
418	LOAD Z	72	80	0.00	-.481	35.35	-.481				GLOB UNIF		DL 0 1		
419	LOAD Z	20	54	0.00	-.403	4.53	-.403				GLOB UNIF		DL 0 1		
420	LOAD Z	54	62	0.00	-.403	30.30	-.403				GLOB UNIF		DL 0 1		
421	LOAD Z	62	70	0.00	-.403	31.31	-.403				GLOB UNIF		DL 0 1		
422	LOAD Z	70	78	0.00	-.481	35.35	-.481				GLOB UNIF		DL 0 1		
423	LOAD Z	22	58	0.00	-.403	4.53	-.403				GLOB UNIF		DL 0 1		
424	LOAD Z	58	66	0.00	-.403	30.30	-.403				GLOB UNIF		DL 0 1		
425	LOAD Z	66	74	0.00	-.403	31.31	-.403				GLOB UNIF		DL 0 1		
426	LOAD Z	74	82	0.00	-.481	35.35	-.481				GLOB UNIF		DL 0 1		
427	LOAD Z	19	52	0.00	-.403	4.53	-.403				GLOB UNIF		DL 0 1		
428	LOAD Z	52	60	0.00	-.403	30.30	-.403				GLOB UNIF		DL 0 1		
429	LOAD Z	60	68	0.00	-.403	31.31	-.403				GLOB UNIF		DL 0 1		
430	LOAD Z	68	76	0.00	-.481	35.35	-.481				GLOB UNIF		DL 0 1		
431	LOAD Z	80	102	0.00	-.481	15.16	-.481				GLOB UNIF		DL 0 1		
432	LOAD Z	78	104	0.00	-.481	15.16	-.481				GLOB UNIF		DL 0 1		
433	LOAD Z	82	101	0.00	-.481	15.16	-.481				GLOB UNIF		DL 0 1		
434	LOAD Z	76	103	0.00	-.481	15.16	-.481				GLOB UNIF		DL 0 1		
435	LOAD X	21	56	0.00	115						GLOB CONC		WN 1 1		
436	LOAD Y	21	56					0.00	105503		GLOB MOMT		WN 1 1		
437	LOAD Y	21	56	0.00	115						GLOB CONC		WN 1 1		
438	LOAD X	21	56					0.00	-105503		GLOB MOMT		WN 1 1		
439	LOAD X	20	54	0.00	115						GLOB CONC		WN 1 1		
440	LOAD Y	20	54					0.00	105503		GLOB MOMT		WN 1 1		
441	LOAD Y	20	54	0.00	115						GLOB CONC		WN 1 1		

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1	2	3	4	5	6	7	8
	1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0							
442	LOAD X 20 54			0.00-105503	GLOB MOMT	WN 1 1		
443	LOAD X 22 58	0.00	115		GLOB CONC	WN 1 1		
444	LOAD Y 22 58			0.00 105503	GLOB MOMT	WN 1 1		
445	LOAD Y 22 58	0.00	115		GLOB CONC	WN 1 1		
446	LOAD X 22 58			0.00-105503	GLOB MOMT	WN 1 1		
447	LOAD X 19 52	0.00	115		GLOB CONC	WN 1 1		
448	LOAD Y 19 52			0.00 105503	GLOB MOMT	WN 1 1		
449	LOAD Y 19 52	0.00	115		GLOB CONC	WN 1 1		
450	LOAD X 19 52			0.00-105503	GLOB MOMT	WN 1 1		
451	LOAD X 21 56	0.00	431		GLOB CONC	WN 2 1		
452	LOAD Y 21 56			0.00 349092	GLOB MOMT	WN 2 1		
453	LOAD Y 21 56	0.00	431		GLOB CONC	WN 2 1		
454	LOAD X 21 56			0.00-349092	GLOB MOMT	WN 2 1		
455	LOAD X 20 54	0.00	431		GLOB CONC	WN 2 1		
456	LOAD Y 20 54			0.00 349092	GLOB MOMT	WN 2 1		
457	LOAD Y 20 54	0.00	431		GLOB CONC	WN 2 1		
458	LOAD X 20 54			0.00-349092	GLOB MOMT	WN 2 1		
459	LOAD X 22 58	0.00	431		GLOB CONC	WN 2 1		
460	LOAD Y 22 58			0.00 349092	GLOB MOMT	WN 2 1		
461	LOAD Y 22 58	0.00	431		GLOB CONC	WN 2 1		
462	LOAD X 22 58			0.00-349092	GLOB MOMT	WN 2 1		
463	LOAD X 19 52	0.00	431		GLOB CONC	WN 2 1		
464	LOAD Y 19 52			0.00 349092	GLOB MOMT	WN 2 1		
465	LOAD Y 19 52	0.00	431		GLOB CONC	WN 2 1		
466	LOAD X 19 52			0.00-349092	GLOB MOMT	WN 2 1		
467	LOAD X 21 56	0.00	115		GLOB CONC	WN 3 1		
468	LOAD Y 21 56			0.00 105503	GLOB MOMT	WN 3 1		
469	LOAD Y 21 56	0.00	115		GLOB CONC	WN 3 1		
470	LOAD X 21 56			0.00-105503	GLOB MOMT	WN 3 1		
471	LOAD X 20 54	0.00	115		GLOB CONC	WN 3 1		
472	LOAD Y 20 54			0.00 105503	GLOB MOMT	WN 3 1		
473	LOAD Y 20 54	0.00	115		GLOB CONC	WN 3 1		
474	LOAD X 20 54			0.00-105503	GLOB MOMT	WN 3 1		
475	LOAD X 22 58	0.00	115		GLOB CONC	WN 3 1		
476	LOAD Y 22 58			0.00 105503	GLOB MOMT	WN 3 1		
477	LOAD Y 22 58	0.00	115		GLOB CONC	WN 3 1		
478	LOAD X 22 58			0.00-105503	GLOB MOMT	WN 3 1		
479	LOAD X 19 52	0.00	115		GLOB CONC	WN 3 1		
480	LOAD Y 19 52			0.00 105503	GLOB MOMT	WN 3 1		
481	LOAD Y 19 52	0.00	115		GLOB CONC	WN 3 1		
482	LOAD X 19 52			0.00-105503	GLOB MOMT	WN 3 1		
483	LOAD X 21 56	0.00	431		GLOB CONC	WN 4 1		
484	LOAD Y 21 56			0.00 349092	GLOB MOMT	WN 4 1		
485	LOAD Y 21 56	0.00	431		GLOB CONC	WN 4 1		
486	LOAD X 21 56			0.00-349092	GLOB MOMT	WN 4 1		
487	LOAD X 20 54	0.00	431		GLOB CONC	WN 4 1		
488	LOAD Y 20 54			0.00 349092	GLOB MOMT	WN 4 1		
489	LOAD Y 20 54	0.00	431		GLOB CONC	WN 4 1		
490	LOAD X 20 54			0.00-349092	GLOB MOMT	WN 4 1		

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
	1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0														
491	LOAD X	22	58	0.00	431						GLOB CONC		KN	4	1
492	LOAD Y	22	58						0.00	349092	GLOB MOMT		KN	4	1
493	LOAD Y	22	58	0.00	431						GLOB CONC		KN	4	1
494	LOAD X	22	58						0.00	-349092	GLOB MOMT		KN	4	1
495	LOAD X	19	52	0.00	431						GLOB CONC		KN	4	1
496	LOAD Y	19	52						0.00	349092	GLOB MOMT		KN	4	1
497	LOAD Y	19	52	0.00	431						GLOB CONC		KN	4	1
498	LOAD X	19	52						0.00	-349092	GLOB MOMT		KN	4	1
499	LOAD X	17	12	0.00	110	2.97	118				GLOB UNIF		MV	0	1
500	LOAD Y	17	12	0.00	110	2.97	118				GLOB UNIF		MV	0	1
501	LOAD X	17	12	2.97	118	2.97	125				GLOB UNIF		MV	0	1
502	LOAD Y	17	12	2.97	118	2.97	125				GLOB UNIF		MV	0	1
503	LOAD X	17	12	5.95	125	2.97	133				GLOB UNIF		MV	0	1
504	LOAD Y	17	12	5.95	125	2.97	133				GLOB UNIF		MV	0	1
505	LOAD X	16	11	0.00	125	3.83	136				GLOB UNIF		MV	0	1
506	LOAD Y	16	11	0.00	125	3.83	136				GLOB UNIF		MV	0	1
507	LOAD X	16	11	3.83	136	3.83	148				GLOB UNIF		MV	0	1
508	LOAD Y	16	11	3.83	136	3.83	148				GLOB UNIF		MV	0	1
509	LOAD X	16	11	7.67	148	3.83	163				GLOB UNIF		MV	0	1
510	LOAD Y	16	11	7.67	148	3.83	163				GLOB UNIF		MV	0	1
511	LOAD X	18	14	0.00	125	3.83	136				GLOB UNIF		MV	0	1
512	LOAD Y	18	14	0.00	125	3.83	136				GLOB UNIF		MV	0	1
513	LOAD X	18	14	3.83	136	3.83	148				GLOB UNIF		MV	0	1
514	LOAD Y	18	14	3.83	136	3.83	148				GLOB UNIF		MV	0	1
515	LOAD X	18	14	7.67	148	3.83	163				GLOB UNIF		MV	0	1
516	LOAD Y	18	14	7.67	148	3.83	163				GLOB UNIF		MV	0	1
517	LOAD X	15	9	0.00	118	1.97	124				GLOB UNIF		MV	0	1
518	LOAD Y	15	9	0.00	118	1.97	124				GLOB UNIF		MV	0	1
519	LOAD X	15	9	1.97	124	1.97	130				GLOB UNIF		MV	0	1
520	LOAD Y	15	9	1.97	124	1.97	130				GLOB UNIF		MV	0	1
521	LOAD X	15	9	3.95	130	1.97	137				GLOB UNIF		MV	0	1
522	LOAD Y	15	9	3.95	130	1.97	137				GLOB UNIF		MV	0	1
523	LOAD X	17	11	0.00	09	6.46	10				GLOB UNIF		MV	0	1
524	LOAD Y	17	11	0.00	51	6.46	57				GLOB UNIF		MV	0	1
525	LOAD Z	17	11	0.00-	20	6.46-	22				GLOB UNIF		MV	0	1
526	LOAD X	17	11	6.46	10	6.46	11				GLOB UNIF		MV	0	1
527	LOAD Y	17	11	6.46	57	6.46	62				GLOB UNIF		MV	0	1
528	LOAD Z	17	11	6.46-	22	6.46-	24				GLOB UNIF		MV	0	1
529	LOAD X	17	11	12.93	11	6.46	12				GLOB UNIF		MV	0	1
530	LOAD Y	17	11	12.93	62	6.46	68				GLOB UNIF		MV	0	1
531	LOAD Z	17	11	12.93-	24	6.46-	26				GLOB UNIF		MV	0	1
532	LOAD X	17	11	19.39	12	6.46	13				GLOB UNIF		MV	0	1
533	LOAD Y	17	11	19.39	68	6.46	74				GLOB UNIF		MV	0	1
534	LOAD Z	17	11	19.39-	26	6.46-	28				GLOB UNIF		MV	0	1
535	LOAD X	18	9	0.00	10	6.48	11				GLOB UNIF		MV	0	1
536	LOAD Y	18	9	0.00	58	6.48	63				GLOB UNIF		MV	0	1
537	LOAD Z	18	9	0.00-	22	6.48-	24				GLOB UNIF		MV	0	1
538	LOAD X	18	9	6.48	11	6.48	12				GLOB UNIF		MV	0	1
539	LOAD Y	18	9	6.48	63	6.48	66				GLOB UNIF		MV	0	1

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.														
540	LOAD Z	18	9	6.48-	24	6.48-	25			GLOB UNIF	WV	0	1	
541	LOAD X	18	9	12.96	12	6.48	13			GLOB UNIF	WV	0	1	
542	LOAD Y	18	9	12.96	66	6.48	70			GLOB UNIF	WV	0	1	
543	LOAD Z	18	9	12.96-	25	6.48-	27			GLOB UNIF	WV	0	1	
544	LOAD X	17	14	0.00	51	6.46	57			GLOB UNIF	WV	0	1	
545	LOAD Y	17	14	0.00	09	6.46	10			GLOB UNIF	WV	0	1	
546	LOAD Z	17	14	0.00-	20	6.46-	22			GLOB UNIF	WV	0	1	
547	LOAD X	17	14	6.46	57	6.46	62			GLOB UNIF	WV	0	1	
548	LOAD Y	17	14	6.46	10	6.46	11			GLOB UNIF	WV	0	1	
549	LOAD Z	17	14	6.46-	22	6.46-	24			GLOB UNIF	WV	0	1	
550	LOAD X	17	14	12.93	62	6.46	68			GLOB UNIF	WV	0	1	
551	LOAD Y	17	14	12.93	11	6.46	12			GLOB UNIF	WV	0	1	
552	LOAD Z	17	14	12.93-	24	6.46-	26			GLOB UNIF	WV	0	1	
553	LOAD X	17	14	19.39	68	6.46	74			GLOB UNIF	WV	0	1	
554	LOAD Y	17	14	19.39	12	6.46	13			GLOB UNIF	WV	0	1	
555	LOAD Z	17	14	19.39-	26	6.46-	28			GLOB UNIF	WV	0	1	
556	LOAD X	16	9	0.00	58	6.48	63			GLOB UNIF	WV	0	1	
557	LOAD Y	16	9	0.00	10	6.48	11			GLOB UNIF	WV	0	1	
558	LOAD Z	16	9	0.00-	23	6.48-	24			GLOB UNIF	WV	0	1	
559	LOAD X	16	9	6.48	63	6.48	64			GLOB UNIF	WV	0	1	
560	LOAD Y	16	9	6.48	11	6.48	12			GLOB UNIF	WV	0	1	
561	LOAD Z	16	9	6.48-	24	6.48-	25			GLOB UNIF	WV	0	1	
562	LOAD X	16	9	12.96	66	6.48	70			GLOB UNIF	WV	0	1	
563	LOAD Y	16	9	12.96	12	6.48	13			GLOB UNIF	WV	0	1	
564	LOAD Z	16	9	12.96-	25	6.48-	27			GLOB UNIF	WV	0	1	
565	LOAD Y	17	16	0.00	51	10.00	55			GLOB UNIF	WV	0	1	
566	LOAD Y	17	16	10.00	55	10.00	57			GLOB UNIF	WV	0	1	
567	LOAD Y	17	16	20.00	57	10.00	58			GLOB UNIF	WV	0	1	
568	LOAD Y	18	15	0.00	58	10.00	59			GLOB UNIF	WV	0	1	
569	LOAD Y	18	15	10.00	59	10.00	57			GLOB UNIF	WV	0	1	
570	LOAD Y	18	15	20.00	57	10.00	55			GLOB UNIF	WV	0	1	
571	LOAD X	17	18	0.00	51	10.00	55			GLOB UNIF	WV	0	1	
572	LOAD X	17	18	10.00	55	10.00	57			GLOB UNIF	WV	0	1	
573	LOAD X	17	18	20.00	57	10.00	58			GLOB UNIF	WV	0	1	
574	LOAD X	16	15	0.00	58	10.00	59			GLOB UNIF	WV	0	1	
575	LOAD X	16	15	10.00	59	10.00	57			GLOB UNIF	WV	0	1	
576	LOAD X	16	15	20.00	57	10.00	55			GLOB UNIF	WV	0	1	
577	LOAD X	21	17	0.00	61	5.90	68			GLOB UNIF	WV	0	1	
578	LOAD Y	21	17	0.00	61	5.90	68			GLOB UNIF	WV	0	1	
579	LOAD X	21	17	5.90	68	5.90	76			GLOB UNIF	WV	0	1	
580	LOAD Y	21	17	5.90	68	5.90	76			GLOB UNIF	WV	0	1	
581	LOAD X	21	17	11.80	76	5.90	86			GLOB UNIF	WV	0	1	
582	LOAD Y	21	17	11.80	76	5.90	86			GLOB UNIF	WV	0	1	
583	LOAD X	21	17	17.70	86	5.90	97			GLOB UNIF	WV	0	1	
584	LOAD Y	21	17	17.70	86	5.90	97			GLOB UNIF	WV	0	1	
585	LOAD X	21	17	23.60	97	5.90	110			GLOB UNIF	WV	0	1	
586	LOAD Y	21	17	23.60	7	5.90	110			GLOB UNIF	WV	0	1	
587	LOAD X	20	16	0.00	65	5.90	76			GLOB UNIF	WV	0	1	
588	LOAD Y	20	16	0.00	66	5.90	76			GLOB UNIF	WV	0	1	

4-PILE ACRR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.													
589	LOAD X	20	16	5.90	76	5.90	86	GLOB UNIF	WV	0	1		
590	LOAD Y	20	16	5.90	76	5.90	86	GLOB UNIF	WV	0	1		
591	LOAD X	20	16	11.80	86	5.90	97	GLOB UNIF	WV	0	1		
592	LOAD Y	20	16	11.80	86	5.90	97	GLOB UNIF	WV	0	1		
593	LOAD X	20	16	17.70	97	5.90	110	GLOB UNIF	WV	0	1		
594	LOAD Y	20	16	17.70	97	5.90	110	GLOB UNIF	WV	0	1		
595	LOAD X	20	16	23.60	110	5.90	125	GLOB UNIF	WV	0	1		
596	LOAD Y	20	16	23.60	110	5.90	125	GLOB UNIF	WV	0	1		
597	LOAD X	22	18	0.00	68	5.90	76	GLOB UNIF	WV	0	1		
598	LOAD Y	22	18	0.00	68	5.90	76	GLOB UNIF	WV	0	1		
599	LOAD X	22	18	5.90	76	5.90	86	GLOB UNIF	WV	0	1		
600	LOAD Y	22	18	5.90	76	5.90	86	GLOB UNIF	WV	0	1		
601	LOAD X	22	18	11.80	86	5.90	97	GLOB UNIF	WV	0	1		
602	LOAD Y	22	18	11.80	86	5.90	97	GLOB UNIF	WV	0	1		
603	LOAD X	22	18	17.70	97	5.90	110	GLOB UNIF	WV	0	1		
604	LOAD Y	22	18	17.70	97	5.90	110	GLOB UNIF	WV	0	1		
605	LOAD X	22	18	23.60	110	5.90	125	GLOB UNIF	WV	0	1		
606	LOAD Y	22	18	23.60	110	5.90	125	GLOB UNIF	WV	0	1		
607	LOAD X	19	15	0.00	68	5.90	75	GLOB UNIF	WV	0	1		
608	LOAD Y	19	15	0.00	68	5.90	75	GLOB UNIF	WV	0	1		
609	LOAD X	19	15	5.90	75	5.90	84	GLOB UNIF	WV	0	1		
610	LOAD Y	19	15	5.90	75	5.90	84	GLOB UNIF	WV	0	1		
611	LOAD X	19	15	11.80	84	5.90	94	GLOB UNIF	WV	0	1		
612	LOAD Y	19	15	11.80	84	5.90	94	GLOB UNIF	WV	0	1		
613	LOAD X	19	15	17.70	94	5.90	106	GLOB UNIF	WV	0	1		
614	LOAD Y	19	15	17.70	94	5.90	106	GLOB UNIF	WV	0	1		
615	LOAD X	19	15	23.60	106	5.90	118	GLOB UNIF	WV	0	1		
616	LOAD Y	19	15	23.60	106	5.90	118	GLOB UNIF	WV	0	1		
617	LOAD X	25	21	0.00	74	1.51	76	GLOB UNIF	WV	0	1		
618	LOAD Y	25	21	0.00	74	1.51	76	GLOB UNIF	WV	0	1		
619	LOAD Z	25	21	0.00-	15	1.51-	15	GLOB UNIF	WV	0	1		
620	LOAD X	25	21	1.51	76	1.51	78	GLOB UNIF	WV	0	1		
621	LOAD Y	25	21	1.51	76	1.51	78	GLOB UNIF	WV	0	1		
622	LOAD Z	25	21	1.51-	15	1.51-	16	GLOB UNIF	WV	0	1		
623	LOAD X	25	21	3.03	78	1.51	80	GLOB UNIF	WV	0	1		
624	LOAD Y	25	21	3.03	78	1.51	80	GLOB UNIF	WV	0	1		
625	LOAD Z	25	21	3.03-	16	1.51-	16	GLOB UNIF	WV	0	1		
626	LOAD X	24	20	0.00	85	1.51	87	GLOB UNIF	WV	0	1		
627	LOAD Y	24	20	0.00	85	1.51	87	GLOB UNIF	WV	0	1		
628	LOAD X	24	20	1.51	87	1.51	89	GLOB UNIF	WV	0	1		
629	LOAD Y	24	20	1.51	87	1.51	89	GLOB UNIF	WV	0	1		
630	LOAD X	24	20	3.03	89	1.51	91	GLOB UNIF	WV	0	1		
631	LOAD Y	24	20	3.03	89	1.51	91	GLOB UNIF	WV	0	1		
632	LOAD X	26	22	0.00	85	1.51	87	GLOB UNIF	WV	0	1		
633	LOAD Y	26	22	0.00	85	1.51	87	GLOB UNIF	WV	0	1		
634	LOAD X	26	22	1.51	87	1.51	89	GLOB UNIF	WV	0	1		
635	LOAD Y	26	22	1.51	87	1.51	89	GLOB UNIF	WV	0	1		
636	LOAD X	26	22	3.03	89	1.51	91	GLOB UNIF	WV	0	1		
637	LOAD Y	26	22	3.03	89	1.51	91	GLOB UNIF	WV	0	1		

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.											
638	LOAD X	23	19	0.00	82	1.51	85	GLOB UNIF	WV	0	1
639	LOAD Y	23	19	0.00	82	1.51	85	GLOB UNIF	WV	0	1
640	LOAD Z	23	19	0.00	16	1.51	17	GLOB UNIF	WV	0	1
641	LOAD X	23	19	1.51	85	1.51	87	GLOB UNIF	WV	0	1
642	LOAD Y	23	19	1.51	85	1.51	87	GLOB UNIF	WV	0	1
643	LOAD Z	23	19	1.51	17	1.51	17	GLOB UNIF	WV	0	1
644	LOAD X	23	19	3.03	87	1.51	89	GLOB UNIF	WV	0	1
645	LOAD Y	23	19	3.03	87	1.51	89	GLOB UNIF	WV	0	1
646	LOAD Z	23	19	3.03	17	1.51	18	GLOB UNIF	WV	0	1
647	LOAD Y	25	24	0.00	26	10.30	28	GLOB UNIF	WV	0	1
648	LOAD Y	25	24	10.30	28	10.30	29	GLOB UNIF	WV	0	1
649	LOAD Y	25	24	20.60	29	10.30	30	GLOB UNIF	WV	0	1
650	LOAD Y	26	23	0.00	30	10.30	30	GLOB UNIF	WV	0	1
651	LOAD Y	26	23	10.30	30	10.30	30	GLOB UNIF	WV	0	1
652	LOAD Y	26	23	20.60	30	10.30	29	GLOB UNIF	WV	0	1
653	LOAD X	25	26	0.00	26	10.30	28	GLOB UNIF	WV	0	1
654	LOAD X	25	26	10.30	28	10.30	29	GLOB UNIF	WV	0	1
655	LOAD X	25	26	20.60	29	10.30	30	GLOB UNIF	WV	0	1
656	LOAD X	24	23	0.00	30	10.30	30	GLOB UNIF	WV	0	1
657	LOAD X	24	23	10.30	30	10.30	30	GLOB UNIF	WV	0	1
658	LOAD X	24	23	20.60	30	10.30	29	GLOB UNIF	WV	0	1
659	LOAD X	26	27	0.00	34	7.28	34	GLOB UNIF	WV	0	1
660	LOAD Y	26	27	0.00	34	7.28	34	GLOB UNIF	WV	0	1
661	LOAD X	26	27	7.28	34	7.28	34	GLOB UNIF	WV	0	1
662	LOAD Y	26	27	7.28	34	7.28	34	GLOB UNIF	WV	0	1
663	LOAD X	26	27	14.57	34	7.28	34	GLOB UNIF	WV	0	1
664	LOAD Y	26	27	14.57	34	7.28	34	GLOB UNIF	WV	0	1
665	LOAD X	27	24	0.00	34	7.28	34	GLOB UNIF	WV	0	1
666	LOAD Y	27	24	0.00	34	7.28	34	GLOB UNIF	WV	0	1
667	LOAD X	27	24	7.28	34	7.28	34	GLOB UNIF	WV	0	1
668	LOAD Y	27	24	7.28	34	7.28	34	GLOB UNIF	WV	0	1
669	LOAD X	27	24	14.57	34	7.28	34	GLOB UNIF	WV	0	1
670	LOAD Y	27	24	14.57	34	7.28	34	GLOB UNIF	WV	0	1
671	LOAD X	30	25	0.00	46	7.57	51	GLOB UNIF	WV	0	1
672	LOAD Y	30	25	0.00	46	7.57	51	GLOB UNIF	WV	0	1
673	LOAD Z	30	25	0.00-	09	7.57-	10	GLOB UNIF	WV	0	1
674	LOAD X	30	25	7.57	51	7.57	57	GLOB UNIF	WV	0	1
675	LOAD Y	30	25	7.57	51	7.57	57	GLOB UNIF	WV	0	1
676	LOAD Z	30	25	7.57-	10	7.57-	11	GLOB UNIF	WV	0	1
677	LOAD X	30	25	15.15	57	7.57	64	GLOB UNIF	WV	0	1
678	LOAD Y	30	25	15.15	57	7.57	64	GLOB UNIF	WV	0	1
679	LOAD Z	30	25	15.15-	11	7.57-	13	GLOB UNIF	WV	0	1
680	LOAD X	30	25	22.72	64	7.57	74	GLOB UNIF	WV	0	1
681	LOAD Y	30	25	22.72	64	7.57	74	GLOB UNIF	WV	0	1
682	LOAD Z	30	25	22.72-	13	7.57-	15	GLOB UNIF	WV	0	1
683	LOAD X	29	24	0.00	54	7.57	60	GLOB UNIF	WV	0	1
684	LOAD Y	29	24	0.00	54	7.57	60	GLOB UNIF	WV	0	1
685	LOAD X	29	24	7.57	60	7.57	66	GLOB UNIF	WV	0	1
686	LOAD Y	29	24	7.57	60	7.57	66	GLOB UNIF	WV	0	1

4-PILE ACHR STRUCYURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.										
687	LOAD X	29	24	15,15	56	7,57	74	GLOB UNIF	WV	0 1
688	LOAD Y	29	24	15,15	66	7,57	74	GLOB UNIF	WV	0 1
689	LOAD X	29	24	22,72	74	7,57	85	GLOB UNIF	WV	0 1
690	LOAD Y	29	24	22,72	74	7,57	85	GLOB UNIF	WV	0 1
691	LOAD X	31	26	0,00	54	7,57	60	GLOB UNIF	WV	0 1
692	LOAD Y	31	26	0,00	54	7,57	60	GLOB UNIF	WV	0 1
693	LOAD X	31	26	7,57	60	7,57	66	GLOB UNIF	WV	0 1
694	LOAD Y	31	26	7,57	60	7,57	66	GLOB UNIF	WV	0 1
695	LOAD X	31	26	15,15	66	7,57	78	GLOB UNIF	WV	0 1
696	LOAD Y	31	26	15,15	66	7,57	74	GLOB UNIF	WV	0 1
697	LOAD X	31	26	22,72	74	7,57	85	GLOB UNIF	WV	0 1
698	LOAD Y	31	26	22,72	74	7,57	85	GLOB UNIF	WV	0 1
699	LOAD X	28	23	0,00	54	7,57	59	GLOB UNIF	WV	0 1
700	LOAD Y	28	23	0,00	54	7,57	59	GLOB UNIF	WV	0 1
701	LOAD Z	28	23	0,00	11	7,57	12	GLOB UNIF	WV	0 1
702	LOAD X	28	23	7,57	59	7,57	65	GLOB UNIF	WV	0 1
703	LOAD Y	28	23	7,57	59	7,57	65	GLOB UNIF	WV	0 1
704	LOAD Z	28	23	7,57	12	7,57	13	GLOB UNIF	WV	0 1
705	LOAD X	28	23	15,15	65	7,57	73	GLOB UNIF	WV	0 1
706	LOAD Y	28	23	15,15	65	7,57	73	GLOB UNIF	WV	0 1
707	LOAD Z	28	23	15,15	13	7,57	14	GLOB UNIF	WV	0 1
708	LOAD X	28	23	22,72	73	7,57	82	GLOB UNIF	WV	0 1
709	LOAD Y	28	23	22,72	73	7,57	82	GLOB UNIF	WV	0 1
710	LOAD Z	28	23	22,72	14	7,57	16	GLOB UNIF	WV	0 1
711	LOAD X	29	25	0,00	13	15,12	15	GLOB UNIF	WV	0 1
712	LOAD Y	29	25	0,00	28	15,12	31	GLOB UNIF	WV	0 1
713	LOAD Z	29	25	0,00	12	15,12	13	GLOB UNIF	WV	0 1
714	LOAD X	29	25	15,12	15	15,12	16	GLOB UNIF	WV	0 1
715	LOAD Y	29	25	15,12	31	15,12	35	GLOB UNIF	WV	0 1
716	LOAD Z	29	25	15,12	13	15,12	15	GLOB UNIF	WV	0 1
717	LOAD X	29	25	30,24	16	15,12	18	GLOB UNIF	WV	0 1
718	LOAD Y	29	25	30,24	35	15,12	39	GLOB UNIF	WV	0 1
719	LOAD Z	29	25	30,24	15	15,12	17	GLOB UNIF	WV	0 1
720	LOAD X	28	26	0,00	11	11,34	12	GLOB UNIF	WV	0 1
721	LOAD Y	28	26	0,00	26	11,34	29	GLOB UNIF	WV	0 1
722	LOAD Z	28	26	0,00	15	11,34	16	GLOB UNIF	WV	0 1
723	LOAD X	28	26	11,34	12	11,34	13	GLOB UNIF	WV	0 1
724	LOAD Y	28	26	11,34	29	11,34	32	GLOB UNIF	WV	0 1
725	LOAD Z	28	26	11,34	16	11,34	18	GLOB UNIF	WV	0 1
726	LOAD X	28	26	22,68	13	11,34	15	GLOB UNIF	WV	0 1
727	LOAD Y	28	26	22,68	32	11,34	36	GLOB UNIF	WV	0 1
728	LOAD Z	28	26	22,68	18	11,34	20	GLOB UNIF	WV	0 1
729	LOAD X	28	26	34,03	15	11,34	17	GLOB UNIF	WV	0 1
730	LOAD Y	28	26	34,03	36	11,34	40	GLOB UNIF	WV	0 1
731	LOAD Z	28	26	34,03	20	11,34	23	GLOB UNIF	WV	0 1
732	LOAD X	31	25	0,00	28	15,12	31	GLOB UNIF	WV	0 1
733	LOAD Y	31	25	0,00	13	15,12	15	GLOB UNIF	WV	0 1
734	LOAD Z	31	25	0,00	12	15,12	13	GLOB UNIF	WV	0 1
735	LOAD X	31	25	15,12	31	15,12	35	GLOB UNIF	WV	0 1

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1...5....0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
736	LOAD Y	31	25	15.12	15	15.12	16					GLOB	UNIF	WV	0	1
737	LOAD Z	31	25	15.12	13	15.12	15					GLOB	UNIF	WV	0	1
738	LOAD X	31	25	30.24	35	15.12	39					GLOB	UNIF	WV	0	1
739	LOAD Y	31	25	30.24	16	15.12	18					GLOB	UNIF	WV	0	1
740	LOAD Z	31	25	30.24	15	15.12	17					GLOB	UNIF	WV	0	1
741	LOAD X	28	24	0.00	26	11.34	29					GLOB	UNIF	WV	0	1
742	LOAD Y	28	24	0.00	11	11.34	12					GLOB	UNIF	WV	0	1
743	LOAD Z	28	24	0.00	15	11.34	16					GLOB	UNIF	WV	0	1
744	LOAD X	28	24	11.34	29	11.34	32					GLOB	UNIF	WV	0	1
745	LOAD Y	28	24	11.34	12	11.34	13					GLOB	UNIF	WV	0	1
746	LOAD Z	28	24	11.34	16	11.34	18					GLOB	UNIF	WV	0	1
747	LOAD X	28	24	22.68	32	11.34	36					GLOB	UNIF	WV	0	1
748	LOAD Y	28	24	22.68	13	11.34	15					GLOB	UNIF	WV	0	1
749	LOAD Z	28	24	22.68	18	11.34	20					GLOB	UNIF	WV	0	1
750	LOAD X	28	24	34.03	36	11.34	40					GLOB	UNIF	WV	0	1
751	LOAD Y	28	24	34.03	15	11.34	17					GLOB	UNIF	WV	0	1
752	LOAD Z	28	24	34.03	20	11.34	23					GLOB	UNIF	WV	0	1
753	LOAD Y	30	29	0.00	16	12.30	17					GLOB	UNIF	WV	0	1
754	LOAD Y	30	29	12.30	17	12.30	18					GLOB	UNIF	WV	0	1
755	LOAD Y	30	29	24.60	18	12.30	19					GLOB	UNIF	WV	0	1
756	LOAD Y	31	28	0.00	19	12.30	19					GLOB	UNIF	WV	0	1
757	LOAD Y	31	28	12.30	19	12.30	19					GLOB	UNIF	WV	0	1
758	LOAD Y	31	28	24.60	19	12.30	19					GLOB	UNIF	WV	0	1
759	LOAD X	30	31	0.00	16	12.30	17					GLOB	UNIF	WV	0	1
760	LOAD X	30	31	12.30	17	12.30	18					GLOB	UNIF	WV	0	1
761	LOAD X	30	31	24.60	18	12.30	19					GLOB	UNIF	WV	0	1
762	LOAD X	29	28	0.00	19	12.30	19					GLOB	UNIF	WV	0	1
763	LOAD X	29	28	12.30	19	12.30	19					GLOB	UNIF	WV	0	1
764	LOAD X	29	28	24.60	19	12.30	19					GLOB	UNIF	WV	0	1
765	LOAD X	31	32	0.00	24	8.70	24					GLOB	UNIF	WV	0	1
766	LOAD Y	31	32	0.00	24	8.70	24					GLOB	UNIF	WV	0	1
767	LOAD X	31	32	8.70	24	8.70	24					GLOB	UNIF	WV	0	1
768	LOAD Y	31	32	8.70	24	8.70	24					GLOB	UNIF	WV	0	1
769	LOAD X	31	32	17.39	24	8.70	24					GLOB	UNIF	WV	0	1
770	LOAD Y	31	32	17.39	24	8.70	24					GLOB	UNIF	WV	0	1
771	LOAD X	32	29	0.00	24	8.70	24					GLOB	UNIF	WV	0	1
772	LOAD Y	32	29	0.00	24	8.70	24					GLOB	UNIF	WV	0	1
773	LOAD X	32	29	8.70	24	8.70	24					GLOB	UNIF	WV	0	1
774	LOAD Y	32	29	8.70	24	8.70	24					GLOB	UNIF	WV	0	1
775	LOAD X	32	29	17.39	24	8.70	24					GLOB	UNIF	WV	0	1
776	LOAD Y	32	29	17.39	24	8.70	24					GLOB	UNIF	WV	0	1
777	LOAD X	35	30	0.00	33	10.44	37					GLOB	UNIF	WV	0	1
778	LOAD Y	35	30	0.00	33	10.44	37					GLOB	UNIF	WV	0	1
779	LOAD Z	35	30	0.00-	07	10.44-	07					GLOB	UNIF	WV	0	1
780	LOAD X	35	30	10.44	37	10.44	41					GLOB	UNIF	WV	0	1
781	LOAD Y	35	30	10.44	37	10.44	41					GLOB	UNIF	WV	0	1
782	LOAD Z	35	30	10.44-	07	10.44-	08					GLOB	UNIF	WV	0	1
783	LOAD X	35	30	20.87	41	10.44	46					GLOB	UNIF	WV	0	1
784	LOAD Y	35	30	20.87	41	10.44	46					GLOB	UNIF	WV	0	1

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1	2	3	4	5	6	7	8
785	LOAD Z 35 30	20.87-	08	10.88-	05	GLOB UNIF	WV 0 1	
786	LOAD X 34 29	0.00	41	10.88	44	GLOB UNIF	WV 0 1	
787	LOAD Y 34 29	0.00	41	10.88	44	GLOB UNIF	WV 0 1	
788	LOAD X 34 29	10.44	42	10.88	42	GLOB UNIF	WV 0 1	
789	LOAD Y 34 29	10.44	40	10.88	40	GLOB UNIF	WV 0 1	
790	LOAD X 34 29	20.87	39	10.88	38	GLOB UNIF	WV 0 1	
791	LOAD Y 34 29	20.87	37	10.88	34	GLOB UNIF	WV 0 1	
792	LOAD X 36 31	0.00	41	10.88	44	GLOB UNIF	WV 0 1	
793	LOAD Y 36 31	0.00	41	10.88	44	GLOB UNIF	WV 0 1	
794	LOAD X 36 31	10.44	44	10.88	40	GLOB UNIF	WV 0 1	
795	LOAD Y 36 31	10.44	44	10.88	40	GLOB UNIF	WV 0 1	
796	LOAD X 36 31	20.87	49	10.88	50	GLOB UNIF	WV 0 1	
797	LOAD Y 36 31	20.87	46	10.88	54	GLOB UNIF	WV 0 1	
798	LOAD X 33 28	0.00	45	10.88	49	GLOB UNIF	WV 0 1	
799	LOAD Y 33 28	0.00	48	10.88	48	GLOB UNIF	WV 0 1	
800	LOAD Z 33 28	0.00	08	10.44	09	GLOB UNIF	WV 0 1	
801	LOAD X 33 28	10.44	48	10.88	48	GLOB UNIF	WV 0 1	
802	LOAD Y 33 28	10.44	44	10.88	46	GLOB UNIF	WV 0 1	
803	LOAD Z 33 28	10.44	09	10.88	10	GLOB UNIF	WV 0 1	
804	LOAD X 33 28	20.87	48	10.88	54	GLOB UNIF	WV 0 1	
805	LOAD Y 33 28	20.87	48	10.88	54	GLOB UNIF	WV 0 1	
806	LOAD Z 33 28	20.87	10	10.88	11	GLOB UNIF	WV 0 1	
807	LOAD X 35 29	0.00	05	12.68	06	GLOB UNIF	WV 0 1	
808	LOAD Y 35 29	0.00	15	12.68	16	GLOB UNIF	WV 0 1	
809	LOAD Z 35 29	0.00-	08	12.68-	09	GLOB UNIF	WV 0 1	
810	LOAD X 35 29	12.68	06	12.68	06	GLOB UNIF	WV 0 1	
811	LOAD Y 35 29	12.68	16	12.68	18	GLOB UNIF	WV 0 1	
812	LOAD Z 35 29	12.68-	09	12.68-	10	GLOB UNIF	WV 0 1	
813	LOAD X 35 29	25.35	06	12.68	07	GLOB UNIF	WV 0 1	
814	LOAD Y 35 29	25.35	18	12.68	20	GLOB UNIF	WV 0 1	
815	LOAD Z 35 29	25.35-	10	12.68-	11	GLOB UNIF	WV 0 1	
816	LOAD X 35 29	38.03	07	12.68	08	GLOB UNIF	WV 0 1	
817	LOAD Y 35 29	38.03	20	12.68	23	GLOB UNIF	WV 0 1	
818	LOAD Z 35 29	38.03-	11	12.68-	13	GLOB UNIF	WV 0 1	
819	LOAD X 36 28	0.00	08	16.90	09	GLOB UNIF	WV 0 1	
820	LOAD Y 36 28	0.00	19	16.90	21	GLOB UNIF	WV 0 1	
821	LOAD Z 36 28	0.00-	08	16.90-	09	GLOB UNIF	WV 0 1	
822	LOAD X 36 28	16.90	09	16.90	09	GLOB UNIF	WV 0 1	
823	LOAD Y 36 28	16.90	21	16.90	23	GLOB UNIF	WV 0 1	
824	LOAD Z 36 28	16.90-	09	16.90-	10	GLOB UNIF	WV 0 1	
825	LOAD X 36 28	33.80	09	16.90	10	GLOB UNIF	WV 0 1	
826	LOAD Y 36 28	33.80	23	16.90	26	GLOB UNIF	WV 0 1	
827	LOAD Z 36 28	33.80-	10	16.90-	11	GLOB UNIF	WV 0 1	
828	LOAD X 35 31	0.00	15	12.68	16	GLOB UNIF	WV 0 1	
829	LOAD Y 35 31	0.00	05	12.68	06	GLOB UNIF	WV 0 1	
830	LOAD Z 35 31	0.00-	08	12.68-	09	GLOB UNIF	WV 0 1	
831	LOAD X 35 31	12.68	16	12.68	18	GLOB UNIF	WV 0 1	
832	LOAD Y 35 31	12.68	06	12.68	06	GLOB UNIF	WV 0 1	
833	LOAD Z 35 31	12.68-	09	12.68-	10	GLOB UNIF	WV 0 1	

4-PILE ACNR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.																			
1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0																			
834	LOAD	X	35	31	25,35	18	12,68	20					GLOB	UNIF	WV	0	1		
835	LOAD	Y	35	31	25,35	06	12,68	07					GLOB	UNIF	WV	0	1		
836	LOAD	Z	35	31	25,35-	10	12,68-	11					GLOB	UNIF	WV	0	1		
837	LOAD	X	35	31	38,03	20	12,68	23					GLOB	UNIF	WV	0	1		
838	LOAD	Y	35	31	38,03	07	12,68	08					GLOB	UNIF	WV	0	1		
839	LOAD	Z	35	31	38,03-	11	12,68-	13					GLOB	UNIF	WV	0	1		
840	LOAD	X	34	28	0,00	19	16,90	21					GLOB	UNIF	WV	0	1		
841	LOAD	Y	34	28	0,00	08	16,90	09					GLOB	UNIF	WV	0	1		
842	LOAD	Z	34	28	0,00-	08	16,90-	09					GLOB	UNIF	WV	0	1		
843	LOAD	X	34	28	16,90	21	16,90	23					GLOB	UNIF	WV	0	1		
844	LOAD	Y	34	28	16,90	09	16,90	09					GLOB	UNIF	WV	0	1		
845	LOAD	Z	34	28	16,90-	09	16,90-	10					GLOB	UNIF	WV	0	1		
846	LOAD	X	34	28	33,80	23	16,90	26					GLOB	UNIF	WV	0	1		
847	LOAD	Y	34	28	33,80	09	16,90	10					GLOB	UNIF	WV	0	1		
848	LOAD	Z	34	28	33,80-	10	16,90-	11					GLOB	UNIF	WV	0	1		
849	LOAD	Y	35	34	0,00	15	14,37	17					GLOB	UNIF	WV	0	1		
850	LOAD	Y	35	34	14,37	17	14,37	18					GLOB	UNIF	WV	0	1		
851	LOAD	Y	35	34	28,73	18	14,37	18					GLOB	UNIF	WV	0	1		
852	LOAD	Y	36	33	0,00	18	14,37	19					GLOB	UNIF	WV	0	1		
853	LOAD	Y	36	33	14,37	19	14,37	19					GLOB	UNIF	WV	0	1		
854	LOAD	Y	36	33	28,73	19	14,37	18					GLOB	UNIF	WV	0	1		
855	LOAD	X	35	36	0,00	15	14,37	17					GLOB	UNIF	WV	0	1		
856	LOAD	X	35	36	14,37	17	14,37	18					GLOB	UNIF	WV	0	1		
857	LOAD	X	35	36	28,73	18	14,37	18					GLOB	UNIF	WV	0	1		
858	LOAD	X	34	33	0,00	18	14,37	19					GLOB	UNIF	WV	0	1		
859	LOAD	X	34	33	14,37	19	14,37	19					GLOB	UNIF	WV	0	1		
860	LOAD	X	34	33	28,73	19	14,37	18					GLOB	UNIF	WV	0	1		
861	LOAD	X	36	37	0,00	20	10,16	20					GLOB	UNIF	WV	0	1		
862	LOAD	Y	36	37	0,00	20	10,16	20					GLOB	UNIF	WV	0	1		
863	LOAD	X	36	37	10,16	20	10,16	20					GLOB	UNIF	WV	0	1		
864	LOAD	Y	36	37	10,16	20	10,16	20					GLOB	UNIF	WV	0	1		
865	LOAD	X	36	37	20,32	20	10,16	20					GLOB	UNIF	WV	0	1		
866	LOAD	Y	36	37	20,32	20	10,16	20					GLOB	UNIF	WV	0	1		
867	LOAD	X	37	34	0,00	20	10,16	20					GLOB	UNIF	WV	0	1		
868	LOAD	Y	37	34	0,00	20	10,16	20					GLOB	UNIF	WV	0	1		
869	LOAD	X	37	34	10,16	20	10,16	20					GLOB	UNIF	WV	0	1		
870	LOAD	Y	37	34	10,16	20	10,16	20					GLOB	UNIF	WV	0	1		
871	LOAD	X	37	34	20,32	20	10,16	20					GLOB	UNIF	WV	0	1		
872	LOAD	Y	37	34	20,32	20	10,16	20					GLOB	UNIF	WV	0	1		
873	LOAD	X	42	35	0,00	29	11,78	30					GLOB	UNIF	WV	0	1		
874	LOAD	Y	42	35	0,00	29	11,78	30					GLOB	UNIF	WV	0	1		
875	LOAD	Z	42	35	0,00-	06	11,78-	06					GLOB	UNIF	WV	0	1		
876	LOAD	X	42	35	11,78	30	11,78	31					GLOB	UNIF	WV	0	1		
877	LOAD	Y	42	35	11,78	30	11,78	31					GLOB	UNIF	WV	0	1		
878	LOAD	Z	42	35	11,78-	06	11,78-	06					GLOB	UNIF	WV	0	1		
879	LOAD	X	42	35	23,57	31	11,78	33					GLOB	UNIF	WV	0	1		
880	LOAD	Y	42	35	23,57	31	11,78	33					GLOB	UNIF	WV	0	1		
881	LOAD	Z	42	35	23,57-	06	11,78-	07					GLOB	UNIF	WV	0	1		
882	LOAD	X	40	34	0,00	36	11,78	37					GLOB	UNIF	WV	0	1		

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1...5	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
		0....5	0....5	0....5	0....5	0....5	0....5	0....5	0....5	0....5	0....5	0....5	0....5	0....5	0....5	0
883	LOAD Y	40	34	0,00	[illegible]	11,78		37				GLOB UNIF		WV 0 1		
884	LOAD X	40	34	11,78	[illegible]	11,78		38				GLOB UNIF		WV 0 1		
885	LOAD Y	40	34	11,78	37	11,78		38				GLOB UNIF		WV 0 1		
886	LOAD X	40	34	23,57	[illegible]	11,78		41				GLOB UNIF		WV 0 1		
887	LOAD Y	40	34	23,57	38	11,78		41				GLOB UNIF		WV 0 1		
888	LOAD X	44	36	0,00	36	11,78		37				GLOB UNIF		WV 0 1		
889	LOAD Y	44	36	0,00	35	11,78		37				GLOB UNIF		WV 0 1		
890	LOAD X	44	36	11,78	37	11,78		38				GLOB UNIF		WV 0 1		
891	LOAD Y	44	36	11,78	37	11,78		38				GLOB UNIF		WV 0 1		
892	LOAD X	44	36	23,57	38	11,78		41				GLOB UNIF		WV 0 1		
893	LOAD Y	44	36	23,57	38	11,78		41				GLOB UNIF		WV 0 1		
894	LOAD X	38	33	0,00	35	11,78		36				GLOB UNIF		WV 0 1		
895	LOAD Y	38	33	0,00	35	11,78		36				GLOB UNIF		WV 0 1		
896	LOAD Z	38	33	0,00	07	11,78		07				GLOB UNIF		WV 0 1		
897	LOAD X	38	33	11,78	36	11,78		38				GLOB UNIF		WV 0 1		
898	LOAD Y	38	33	11,78	36	11,78		38				GLOB UNIF		WV 0 1		
899	LOAD Z	38	33	11,78	07	11,78		08				GLOB UNIF		WV 0 1		
900	LOAD X	38	33	23,57	38	11,78		40				GLOB UNIF		WV 0 1		
901	LOAD Y	38	33	23,57	38	11,78		40				GLOB UNIF		WV 0 1		
902	LOAD Z	38	33	23,57	08	11,78		08				GLOB UNIF		WV 0 1		
903	LOAD X	35	41	0,00	12	13,75		12				GLOB UNIF		WV 0 1		
904	LOAD Y	35	41	0,00	16	13,75		15				GLOB UNIF		WV 0 1		
905	LOAD Z	35	41	0,00	06	13,75		06				GLOB UNIF		WV 0 1		
906	LOAD X	35	41	13,75	12	13,75		11				GLOB UNIF		WV 0 1		
907	LOAD Y	35	41	13,75	15	13,75		15				GLOB UNIF		WV 0 1		
908	LOAD Z	35	41	13,75	06	13,75		05				GLOB UNIF		WV 0 1		
909	LOAD X	35	41	27,50	11	13,75		11				GLOB UNIF		WV 0 1		
910	LOAD Y	35	41	27,50	15	13,75		15				GLOB UNIF		WV 0 1		
911	LOAD Z	35	41	27,50	05	13,75		05				GLOB UNIF		WV 0 1		
912	LOAD X	41	34	0,00	10	13,75		11				GLOB UNIF		WV 0 1		
913	LOAD Y	41	34	0,00	14	13,75		15				GLOB UNIF		WV 0 1		
914	LOAD Z	41	34	0,00-	08	13,75-		08				GLOB UNIF		WV 0 1		
915	LOAD X	41	34	13,75	11	13,75		11				GLOB UNIF		WV 0 1		
916	LOAD Y	41	34	13,75	15	13,75		16				GLOB UNIF		WV 0 1		
917	LOAD Z	41	34	13,75-	08	13,75-		09				GLOB UNIF		WV 0 1		
918	LOAD X	41	34	27,50	11	13,75		13				GLOB UNIF		WV 0 1		
919	LOAD Y	41	34	27,50	16	13,75		17				GLOB UNIF		WV 0 1		
920	LOAD Z	41	34	27,50-	09	13,75-		09				GLOB UNIF		WV 0 1		
921	LOAD X	36	45	0,00	13	13,75		12				GLOB UNIF		WV 0 1		
922	LOAD Y	36	45	0,00	17	13,75		16				GLOB UNIF		WV 0 1		
923	LOAD Z	36	45	0,00	09	13,75		09				GLOB UNIF		WV 0 1		
924	LOAD X	36	45	13,75	12	13,75		11				GLOB UNIF		WV 0 1		
925	LOAD Y	36	45	13,75	16	13,75		16				GLOB UNIF		WV 0 1		
926	LOAD Z	36	45	13,75	09	13,75		09				GLOB UNIF		WV 0 1		
927	LOAD X	36	45	27,50	11	13,75		11				GLOB UNIF		WV 0 1		
928	LOAD Y	36	45	27,50	16	13,75		16				GLOB UNIF		WV 0 1		
929	LOAD Z	36	45	27,50	09	13,75		08				GLOB UNIF		WV 0 1		
930	LOAD X	45	33	0,00	13	13,75		13				GLOB UNIF		WV 0 1		
931	LOAD Y	45	33	0,00	17	13,75		18				GLOB UNIF		WV 0 1		

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1...5	1...0	1...5	2...0	2...5	3...0	3...5	4...0	4...5	5...0	5...5	6...0	6...5	7...0	7...5	8...0
932	LOAD Z	45	33	0.00-	06	13.75-	06					GLOB UNIF		WV 0 1		
933	LOAD X	45	33	13.75	13	13.75	13					GLOB UNIF		WV 0 1		
934	LOAD Y	45	33	13.75	18	13.75	18					GLOB UNIF		WV 0 1		
935	LOAD Z	45	33	13.75-	06	13.75-	06					GLOB UNIF		WV 0 1		
936	LOAD X	45	33	27.50	13	13.75	14					GLOB UNIF		WV 0 1		
937	LOAD Y	45	33	27.50	18	13.75	19					GLOB UNIF		WV 0 1		
938	LOAD Z	45	33	27.50-	06	13.75-	07					GLOB UNIF		WV 0 1		
939	LOAD X	35	43	0.00	16	13.75	15					GLOB UNIF		WV 0 1		
940	LOAD Y	35	43	0.00	12	13.75	12					GLOB UNIF		WV 0 1		
941	LOAD Z	35	43	0.00	06	13.75	06					GLOB UNIF		WV 0 1		
942	LOAD X	35	43	13.75	15	13.75	15					GLOB UNIF		WV 0 1		
943	LOAD Y	35	43	13.75	12	13.75	11					GLOB UNIF		WV 0 1		
944	LOAD Z	35	43	13.75	06	13.75	05					GLOB UNIF		WV 0 1		
945	LOAD X	35	43	27.50	15	13.75	15					GLOB UNIF		WV 0 1		
946	LOAD Y	35	43	27.50	11	13.75	11					GLOB UNIF		WV 0 1		
947	LOAD Z	35	43	27.50	05	13.75	05					GLOB UNIF		WV 0 1		
948	LOAD X	43	36	0.00	14	13.75	15					GLOB UNIF		WV 0 1		
949	LOAD Y	43	36	0.00	10	13.75	11					GLOB UNIF		WV 0 1		
950	LOAD Z	43	36	0.00-	08	13.75-	08					GLOB UNIF		WV 0 1		
951	LOAD X	43	36	13.75	15	13.75	16					GLOB UNIF		WV 0 1		
952	LOAD Y	43	36	13.75	11	13.75	11					GLOB UNIF		WV 0 1		
953	LOAD Z	43	36	13.75-	08	13.75-	09					GLOB UNIF		WV 0 1		
954	LOAD X	43	36	27.50	16	13.75	17					GLOB UNIF		WV 0 1		
955	LOAD Y	43	36	27.50	11	13.75	13					GLOB UNIF		WV 0 1		
956	LOAD Z	43	36	27.50-	09	13.75-	09					GLOB UNIF		WV 0 1		
957	LOAD X	34	39	0.00	17	13.75	16					GLOB UNIF		WV 0 1		
958	LOAD Y	34	39	0.00	13	13.75	12					GLOB UNIF		WV 0 1		
959	LOAD Z	34	39	0.00	09	13.75	09					GLOB UNIF		WV 0 1		
960	LOAD X	34	39	13.75	16	13.75	16					GLOB UNIF		WV 0 1		
961	LOAD Y	34	39	13.75	12	13.75	11					GLOB UNIF		WV 0 1		
962	LOAD Z	34	39	13.75	09	13.75	09					GLOB UNIF		WV 0 1		
963	LOAD X	34	39	27.50	16	13.75	16					GLOB UNIF		WV 0 1		
964	LOAD Y	34	39	27.50	11	13.75	11					GLOB UNIF		WV 0 1		
965	LOAD Z	34	39	27.50	09	13.75	08					GLOB UNIF		WV 0 1		
966	LOAD X	39	33	0.00	17	13.75	18					GLOB UNIF		WV 0 1		
967	LOAD Y	39	33	0.00	13	13.75	13					GLOB UNIF		WV 0 1		
968	LOAD Z	39	33	0.00-	06	13.75-	06					GLOB UNIF		WV 0 1		
969	LOAD X	39	33	13.75	18	13.75	18					GLOB UNIF		WV 0 1		
970	LOAD Y	39	33	13.75	13	13.75	13					GLOB UNIF		WV 0 1		
971	LOAD Z	39	33	13.75-	06	13.75-	06					GLOB UNIF		WV 0 1		
972	LOAD X	39	33	27.50	18	13.75	19					GLOB UNIF		WV 0 1		
973	LOAD Y	39	33	27.50	13	13.75	14					GLOB UNIF		WV 0 1		
974	LOAD Z	39	33	27.50-	06	13.75-	07					GLOB UNIF		WV 0 1		
975	LOAD Y	42	41	0.00	13	8.35	14					GLOB UNIF		WV 0 1		
976	LOAD Y	42	41	8.35	14	8.35	14					GLOB UNIF		WV 0 1		
977	LOAD Y	42	41	16.70	14	8.35	15					GLOB UNIF		WV 0 1		
978	LOAD Y	41	40	0.00	15	8.35	15					GLOB UNIF		WV 0 1		
979	LOAD Y	41	40	8.35	15	8.35	16					GLOB UNIF		WV 0 1		
980	LOAD Y	41	40	16.70	16	8.35	16					GLOB UNIF		WV 0 1		

4=PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

LINE NO.	1	2	3	4	5	6	7	8
981	LOAD Y 44 45 0.00 16 8.35 16						GLOB UNIF WV 0 1	
982	LOAD Y 44 45 8.35 16 8.35 16						GLOB UNIF WV 0 1	
983	LOAD Y 44 45 16.70 16 8.35 16						GLOB UNIF WV 0 1	
984	LOAD Y 45 [illegible] 0.00 16 8.35 16						GLOB UNIF WV 0 1	
985	LOAD Y 45 [illegible] 8.35 16 8.35 16						GLOB UNIF WV 0 1	
986	LOAD Y 45 [illegible] 16.70 16 8.35 16						GLOB UNIF WV 0 1	
987	LOAD X 42 43 0.00 13 8.35 14						GLOB UNIF WV 0 1	
988	LOAD X 42 [illegible] 8.35 14 8.35 14						GLOB UNIF WV 0 1	
989	LOAD X 42 43 16.70 14 8.35 15						GLOB UNIF WV 0 1	
990	LOAD X 43 44 0.00 15 8.35 15						GLOB UNIF WV 0 1	
991	LOAD X 43 44 8.35 15 8.35 16						GLOB UNIF WV 0 1	
992	LOAD X 43 44 16.70 16 8.35 16						GLOB UNIF WV 0 1	
993	LOAD X 40 39 0.00 16 8.35 16						GLOB UNIF WV 0 1	
994	LOAD X 40 39 8.35 16 8.35 16						GLOB UNIF WV 0 1	
995	LOAD X 40 39 16.70 16 8.35 16						GLOB UNIF WV 0 1	
996	LOAD X 39 38 0.00 16 8.35 16						GLOB UNIF WV 0 1	
997	LOAD X 39 38 8.35 16 8.35 16						GLOB UNIF WV 0 1	
998	LOAD X 39 38 16.70 16 8.35 16						GLOB UNIF WV 0 1	
999	LOAD X 46 46 0.00 18 11.81 18						GLOB UNIF WV 0 1	
1000	LOAD Y 44 46 0.00 18 11.81 18						GLOB UNIF WV 0 1	
1001	LOAD X 44 46 11.81 18 11.81 18						GLOB UNIF WV 0 1	
1002	LOAD Y 44 46 11.81 18 11.81 18						GLOB UNIF WV 0 1	
1003	LOAD X 44 46 23.62 18 11.81 18						GLOB UNIF WV 0 1	
1004	LOAD Y 44 46 23.62 18 11.81 18						GLOB UNIF WV 0 1	
1005	LOAD X 46 40 0.00 18 11.81 18						GLOB UNIF WV 0 1	
1006	LOAD Y 46 40 0.00 18 11.81 18						GLOB UNIF WV 0 1	
1007	LOAD X 46 40 11.81 18 11.81 18						GLOB UNIF WV 0 1	
1008	LOAD Y 46 40 11.81 18 11.81 18						GLOB UNIF WV 0 1	
1009	LOAD X 46 40 23.62 18 11.81 18						GLOB UNIF WV 0 1	
1010	LOAD Y 46 40 23.62 18 11.81 18						GLOB UNIF WV 0 1	
1011	LOADCN 2							
1012	LOAD X 5 4 12 1,294						GLOB CONC STAIRWAY	
1013	LOAD Y 5 4 12 2,588						GLOB CONC STAIRWAY	
1014	LOAD X 12 11 27 6,533						GLOB CONC STAIRWAY	
1015	LOAD Y 12 11 27 13,066						GLOB CONC STAIRWAY	
1016	LOAD X 17 16 12 12,867						GLOB CONC STAIRWAY	
1017	LOAD Y 17 16 12 25,880						GLOB CONC STAIRWAY	
1018	LOAD X 25 24 9 6,747						GLOB CONC STAIRWAY	
1019	LOAD Y 25 24 9 13,536						GLOB CONC STAIRWAY	
1020	LOAD X 25 24 0 8,63						GLOB CONC BOATLAND	
1021	LOAD Y 25 24 0 15,56						GLOB CONC BOATLAND	
1022	LOAD X 25 24 30 8,63						GLOB CONC BOATLAND	
1023	LOAD Y 25 24 30 15,56						GLOB CONC BOATLAND	
1024	LOAD Z 6 3 -0,150						GLOB UNIF ADD DEAD	
1025	LOAD Z 7 2 -0,150						GLOB UNIF ADD DEAD	
1026	LOAD Z 5 4 -0,075						GLOB UNIF ADD DEAD	
1027	LOAD Z 8 1 -0,075						GLOB UNIF ADD DEAD	
1028	LOAD Z 12 11 -0,113						GLOB UNIF ADD DEAD	
1029	LOAD Z 15 10 -0,113						GLOB UNIF ADD DEAD	

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

```
                                1   1   2   2   3   3   4   4   5   5   6   6   7   7   8
LINE NO. 1...5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

    1030 LOADCN  3
    1031 LOAD Z   6   3          -1.500                          GLOB UNIF   LIVELOAD
    1032 LOAD Z   7   2          -1.500                          GLOB UNIF   LIVELOAD
    1033 LOAD Z   5   4          -0.075                          GLOB UNIF   LIVELOAD
    1034 LOAD Z   8   1          -0.075                          GLOB UNIF   LIVELOAD
    1035 LOAD Z  13  10          -1.125                          GLOB UNIF   LIVELOAD
    1036 LOAD Z  12  11          -1.125                          GLOB UNIF   LIVELOAD
    1037 LDCOMB
    1038 LDCOMB  4 100.    1 100.    2                                       MAX TENS
    1039 LDCOMB  5 100.    1 100.    2 100.    3                             MAX COMP
    1040 END
```

STRAN - JOINT DEFLECTIONS AND ROTATIONS

DATE 04/30/76

LOAD CONDITION NO. 1

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES			ROTATION IN RADIANS			REMARKS
	X	Y	Z	X	Y	Z	
1	5.09280	5.09222	-.04598	-.00057	.00058	.00065	
2	5.15960	5.09312	-.16484	-.00624	.00065	.00045	
3	5.17419	5.09402	-.12726	-.00036	.00008	.00003	
4	5.12311	5.09492	-.08344	-.00030	.00066	-.00150	
5	5.12598	5.12586	.09083	-.00040	.00040	-.00002	
6	5.17386	5.12487	.05138	-.00051	.00041	-.00024	
7	5.16014	5.12387	-.02439	-.00045	.00075	.00015	
8	5.09504	5.12289	-.08344	-.00065	.00050	.00149	
9	4.99205	4.99193	-.20470	-.00049	.00049	.00002	
10	5.09067	5.01270	-.15741	-.00038	.00007	.00038	
11	5.01027	5.03346	-.08318	-.00048	.00054	-.00154	
12	5.04720	5.04697	.09109	-.00053	.00053	-.00001	
13	5.09070	5.02860	-.00875	-.00046	.00075	-.00031	
14	5.03376	5.01025	-.08518	-.00058	.00044	.00155	
15	4.79457	4.79453	-.20344	-.00252	.00252	.00001	
16	4.79751	4.81620	-.07979	-.00277	.00265	-.00135	
17	4.81650	4.81644	.09166	-.00288	.00289	-.00000	
18	4.81632	4.79746	-.07980	-.00265	.00278	.00135	
19	3.04876	3.04471	-.18031	-.00467	.00447	.00061	
20	3.04812	3.01530	-.07694	-.00470	.00452	-.00018	
21	2.97849	2.97848	.08270	-.00454	.00454	-.00000	
22	3.01529	3.04809	-.07694	-.00462	.00470	.00018	
23	2.81811	2.81810	-.26924	-.00375	.00374	.00001	
24	2.82284	2.78633	-.07582	-.00361	.00359	-.00040	
25	2.76092	2.76092	.15953	-.00349	.00349	-.00000	
26	2.78634	2.82283	-.07882	-.00359	.00361	.00040	
27	2.79117	2.79115	-.10673	.00018	-.00018	-.00000	
28	2.13659	2.13659	-.64302	-.00135	.00135	.00000	
29	2.17001	2.13662	-.15695	-.00120	.00120	-.00095	
30	2.13515	2.13516	.39729	-.00132	.00132	-.00000	
31	2.13663	2.17501	-.13695	-.00120	.00120	.00095	
32	2.13767	2.13767	-.20917	-.00111	.00111	-.00000	
33	1.44537	1.44537	-.87745	-.00197	.00197	.00000	
34	1.44815	1.47693	-.12159	-.00194	.00194	-.00155	
35	1.46609	1.46609	.64935	-.00215	.00215	-.00000	
36	1.47693	1.44815	-.12159	-.00194	.00195	.00155	
37	1.45786	1.45786	-.25255	-.00131	.00131	-.0 .00	
38	.50774	.50774	-1.06746	-.00223	.00223	.00000	
39	.96758	.55436	-.55949	-.00187	.00229	.00031	
40	.49816	.50193	-.12086	-.00233	.00206	-.00199	
41	.50963	.96335	.30729	-.00238	.00186	.00057	
42	.50576	.50577	.83981	-.00241	.00241	-.00000	
43	.96334	.54963	.30730	-.00186	.00238	-.00037	
44	.50193	.49816	-.12086	-.00206	.00233	.00198	
45	.55436	.96750	-.55950	-.00229	.00187	-.00031	
46	.50919	.50919	-.37768	-.00138	.00138	-.00000	
47	4.80624	4.80614	-.08988	.00016	-.00016	-.00000	
51	2.81823	2.81848	-.44899	-.00375	.00374	.00001	

STRAN - JOINT DEFLECTIONS AND ROTATIONS

DATE 04/30/76

LOAD CONDITION NO. 1

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES			ROTATION IN RADIANS			REMARKS
	X	Y	Z	X	Y	Z	
52	2.81919	2.81918	-.21518	-.00366	.00366	.00001	
53	2.81287	2.77856	-.07816	-.00361	.00359	-.00044	
54	2.82458	2.78800	-.07511	-.00372	.00366	.00001	
55	2.76081	2.76089	.32689	-.00349	.00349	-.00000	
56	2.76129	2.76129	.10987	-.00349	.00349	-.00000	
57	2.77644	2.81293	-.07816	-.00359	.00361	.00044	
58	2.78901	2.82455	-.07511	-.00366	.00372	-.00001	
59	2.13531	2.13559	-.70769	-.00135	.00135	.00000	
60	2.13531	2.13551	-.22497	-.00143	.00143	.00001	
61	2.14764	2.11442	-.13690	-.00120	.00120	-.00089	
62	2.16851	2.13509	-.06501	-.00139	.00151	.00045	
63	2.13395	2.13398	.46060	-.00132	.00132	-.00000	
64	2.13360	2.13361	.12664	-.00131	.00131	-.00000	
65	2.11845	2.14767	-.13689	-.00120	.00120	.00089	
66	2.13510	2.16851	-.06501	-.00151	.00139	-.00045	
67	1.46640	1.44813	-.97213	-.00197	.00197	.00000	
68	1.44930	1.44930	-.23688	-.00162	.00162	.00001	
69	1.41054	1.43927	-.12119	-.00195	.00194	-.00160	
70	1.45089	1.47847	-.05919	-.00165	.00173	.00040	
71	1.46717	1.46718	.75252	-.00215	.00215	-.00000	
72	1.46977	1.46977	.18721	-.00164	.00164	-.00000	
73	1.43929	1.41056	-.12119	-.00194	.00195	.00160	
74	1.47847	1.45609	-.05919	-.00173	.00165	-.00040	
75	.50440	.50441	-1.17467	-.00223	.00223	.00000	
76	.50324	.50324	-.50305	-.00415	.00415	.00001	
77	.45159	.45548	-.11457	-.00252	.00206	-.00184	
78	.49393	.49760	-.04403	-.00438	.00435	-.00016	
79	.50257	.50257	.95570	-.00241	.00241	-.00000	
80	.50116	.50116	.23478	-.00421	.00421	-.00000	
81	.45549	.45160	-.11457	-.00206	.00232	.00184	
82	.49760	.49393	-.04403	-.00435	.00448	.00015	
101	0.00000	0.00000	0.00000	-.00519	.00531	.00032	
102	0.00000	0.00000	0.00000	-.00497	.00497	-.00000	
103	0.00000	0.00000	0.00000	-.00493	.00495	.00001	
104	0.00000	0.00000	0.00000	-.00531	.00519	-.00032	

STRAN - JOINT DEFLECTIONS AND ROTATIONS

LOAD CONDITION NO. 2

DATE 04/30/76

PILED ACMG STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES X	Y	Z	ROTATION IN RADIANS X	Y	Z	REMARKS
1	.30658	1.02228	-.02499	-.00026	.00004	.00072	
2	.39519	1.02280	-.01379	-.00021	-.00063	.00073	
3	.50436	1.02332	-.01010	-.00008	-.00062	.00126	
4	.5[illegible]619	1.02384	.00603	-.00016	.00015	-.00085	
5	.5[illegible]726	.74946	.02550	-.00018	.00012	.00205	
6	.50356	.74894	-.00574	-.00018	.00075	.00050	
7	.39531	.74843	-.01176	.00003	.00074	.00100	
8	.30708	.74792	-.01277	-.00018	.00003	.00056	
9	.30040	.97437	-.02490	-.00024	.00002	.00072	
10	.43446	.98309	-.01365	-.00002	-.00030	.00108	
11	.56815	.99180	.00608	-.00021	.00014	-.00085	
12	.57486	.72029	.02360	-.00015	.00013	.00200	
13	.43411	.71726	-.00451	-.00007	.00042	.00055	
14	.30142	.71424	-.01263	-.00017	.00004	.00035	
15	.29204	.90868	-.02575	-.00072	.00012	.00068	
16	.52905	.92051	.00673	-.00079	.00043	-.00070	
17	.53570	.67861	.02376	-.00045	.00045	.00196	
18	.28859	.67229	-.01203	-.00044	.00014	.00033	
19	.20652	.50099	-.02114	-.00050	.00015	.00049	
20	.28858	.49446	.00611	-.[illegible]078	.00045	-.00050	
21	.27493	.42547	.02184	-.00047	.00052	.00112	
22	.20783	.42503	-.01099	-.00051	.00020	.00011	
23	.19517	.46368	-.03001	-.00067	.00016	.00044	
24	.26470	.45492	.00887	-.00062	.00036	-.00028	
25	.25548	.39552	.03087	-.00039	.00042	.00100	
26	.19676	.39887	-.01399	-.00044	.00018	.00009	
27	.22956	.42604	-.00057	-.00000	-.00001	.00010	
28	.10118	.34016	-.07457	-.00028	.00012	.00023	
29	.19422	.33627	.01098	-.00024	.00013	-.00005	
30	.19041	.29051	.06049	-.00019	.00019	.00046	
31	.14377	.29599	-.02974	-.00024	.00012	.00005	
32	.16696	.31423	-.00731	-.00018	.00016	.00008	
33	.08857	.21503	-.10042	-.00037	.00014	.00011	
34	.12110	.22214	.02527	-.00034	.00021	-.00000	
35	.12338	.18534	.09053	-.00029	.00021	.00019	
36	.08894	.18351	-.03619	-.00032	.00015	.00004	
37	.10413	.20196	-.00481	-.00022	.00011	.00006	
38	.02378	.07040	-.12138	-.00033	.00014	.00007	
39	.03762	.07760	-.04746	-.00024	.00017	.00002	
40	.04018	.07045	.03036	-.00035	.00018	-.00000	
41	.04497	.07111	.06947	-.00035	.00013	.00002	
42	.04125	.05248	.11206	-.00030	.00020	.00011	
43	.02512	.05598	.03471	-.00025	.00017	.00002	
44	.02276	.05192	-.04274	-.00030	.00015	.00003	
45	.02479	.05768	-.08264	-.00032	.00013	.00005	
46	.03212	.06185	-.00734	-.00024	.00013	.00002	
47	.40992	.79809	-.00380	.00004	-.00001	.00072	
51	.18461	.47429	-.04994	-.00067	.00016	.00044	

STRAN - JOINT DEFLECTIONS AND ROTATIONS

DATE 04/30/76

LOAD CONDITION NO. 2

4-PILE 4CNR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES X	Y	Z	ROTATION IN RADIANS X	Y	Z	REMARKS
52	.19513	.46396	-.02382	-.00066	.00014	.00050	
53	.25784	.44803	.01498	-.00062	.00036	-.00029	
54	.26501	.45520	.00705	-.00062	.00036	-.00027	
55	.27483	.37247	.05034	-.00039	.00042	.00100	
56	.25544	.39665	.02451	-.00037	.00043	.00112	
57	.19450	.39663	-.02001	-.00044	.00018	.00010	
58	.19696	.39906	-.01172	-.00041	.00018	.00010	
59	.13558	.34558	-.08405	-.00026	.00012	.00025	
60	.18120	.33909	-.02711	-.00033	.00008	.00053	
61	.19510	.33510	.01455	-.00024	.00013	-.00004	
62	.19407	.33604	.00766	-.00022	.00014	-.00021	
63	.20140	.27931	.06960	-.00019	.00019	.00046	
64	.19032	.29059	.02714	-.00013	.00026	.00111	
65	.14518	.29562	-.03272	-.00024	.00012	.00002	
66	.14372	.29589	-.01156	-.00025	.00015	.00007	
67	.06589	.21769	-.11251	-.00057	.00014	.00010	
68	.08465	.21555	-.02974	-.00034	.00008	.00051	
69	.12098	.22295	.02653	-.00034	.00021	-.00001	
70	.12123	.22252	.00756	-.00025	.00014	-.00021	
71	.12812	.18076	.10257	-.00021	.00021	.00019	
72	.12372	.18569	.02920	-.00016	.00027	.00112	
73	.08793	.18257	-.04007	-.00032	.00015	.00004	
74	.08892	.16376	-.01192	-.00027	.00013	.00008	
75	.02184	.07184	-.13273	-.00053	.00014	.00008	
76	.02375	.06990	-.03658	-.00064	.00013	.00050	
77	.04055	.07049	.03455	-.00035	.00018	.00001	
78	.03980	.06994	.01055	-.00060	.00044	-.00027	
79	.04365	.04962	.12397	-.00030	.00020	.00011	
80	.04098	.05225	.03660	-.00033	.00044	.00112	
81	.02226	.05126	-.04628	-.00050	.00015	.00002	
82	.02267	.05163	-.01344	-.00045	.00022	.00010	
101	0.00000	0.00000	0.00000	-.00051	.00024	.00011	
102	0.00000	0.00000	0.00000	-.00039	.00050	.00112	
103	0.00000	0.00000	0.00000	-.00074	.00015	.00049	
104	0.00000	0.00000	0.00000	-.00070	.00041	-.00029	

STRAN - JOINT DEFLECTIONS AND ROTATIONS

LOAD CONDITION NO. 3

DATE 04/30/76

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES X	Y	Z	ROTATION IN RADIANS X	Y	Z	REMARKS
1	-.01020	-.01195	-.01129	.00012	-.00002	.00000	
2	-.00905	-.01085	-.08594	.00059	-.00660	.00001	
3	-.00735	-.00975	-.08667	-.00057	-.00660	.00001	
4	-.00588	-.00866	-.01417	-.00009	.00002	.00000	
5	-.00567	-.01110	-.02150	-.00018	-.00001	.00000	
6	-.00734	-.01330	-.16689	-.00115	.00707	.00002	
7	-.00906	-.01550	-.16581	.00117	.00707	.00001	
8	-.01004	-.01770	-.01694	.00023	-.00000	.00000	
9	-.00825	-.00654	-.01086	.00001	-.00001	.00000	
10	-.00772	-.00799	-.06520	.00001	-.00345	.00000	
11	-.00725	-.00944	-.01374	.00001	-.00004	.00000	
12	-.00678	-.01327	-.02064	.00002	.00005	.00000	
13	-.00772	-.01039	-.12418	.00001	.00359	.00001	
14	-.00845	-.00751	-.01608	.00002	-.00001	.00000	
15	-.00671	-.00564	-.01031	.00000	-.00001	.00000	
16	-.00552	-.00575	-.01290	.00002	.00000	.00000	
17	-.00606	-.00604	-.01894	.00004	-.00003	.00000	
18	-.00639	-.00654	-.01497	-.00000	-.00001	.00000	
19	-.00442	-.00316	-.00915	.00001	-.00001	.00000	
20	-.00462	-.00197	-.01113	-.00000	-.00001	.00000	
21	-.00270	-.00146	-.01545	-.00001	.00001	.00000	
22	-.00333	-.00401	-.01265	.00002	.00000	.00000	
23	-.00383	-.00257	-.00914	.00001	-.00001	.00000	
24	-.00386	-.00219	-.01110	-.00000	-.00001	.00000	
25	-.00332	-.00213	-.01514	-.00001	.00001	.00000	
26	-.00355	-.00305	-.01254	.00002	.00000	.00000	
27	-.00350	-.00242	-.01375	.00001	-.00001	.00000	
28	-.00185	-.00130	-.00954	.00000	-.00000	-.00000	
29	-.00163	-.00124	-.01146	.00000	-.00000	.00000	
30	-.00197	-.00128	-.01482	.00001	-.00001	.00000	
31	-.00189	-.00096	-.01264	.00000	-.00001	-.00000	
32	-.00194	-.00127	-.01172	.00000	-.00001	-.00000	
33	-.00068	-.00045	-.00960	.00000	-.00000	.00000	
34	-.00068	-.00035	-.01145	.00000	-.00000	.00000	
35	-.00046	-.00032	-.01452	.00000	-.00000	.00000	
36	-.00049	-.00045	-.01255	.00000	-.00000	.00000	
37	-.00057	-.00038	-.01209	.00000	-.00001	-.00000	
38	.00057	.00056	-.00940	.00000	-.00000	.00000	
39	.00059	.00044	-.01043	.00000	-.00000	-.00000	
40	.00060	.00029	-.01138	.00000	-.00000	-.00000	
41	.00073	.00027	-.01311	.00000	-.00001	.00000	
42	.00048	.00026	-.01467	.00000	-.00000	-.00000	
43	.00058	.00045	-.01367	.00000	-.00000	.00000	
44	.00049	.00040	-.01256	.00000	-.00000	.00000	
45	.00071	.00059	-.01105	.00000	-.00001	.00000	
46	.00052	.00032	-.01210	.00000	-.00001	.00000	
47	-.00622	-.00631	-.01210	.00000	-.00001	.00000	
51	-.00385	-.00257	-.00866	.00001	-.00001	.00000	

LOAD CONDITION NO. 3

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES X	Y	Z	ROTATION IN RADIANS X	Y	Z	REMARKS
52	-.00386	-.00260	-.00884	.00001	-.00001	.00000	
53	-.00385	-.00213	-.01070	-.00000	-.00001	.00000	
54	-.00393	-.00215	-.01078	-.00000	-.00001	.00000	
55	-.00326	-.00210	-.01466	-.00001	.00001	.00000	
56	-.00324	-.00205	-.01494	-.00001	.00001	.00000	
57	-.00352	-.00308	-.01207	.00002	.00000	.00000	
58	-.00349	-.00311	-.01225	.00002	.00000	.00000	
59	-.00189	-.00110	-.00941	.00000	-.00000	-.00000	
60	-.00187	-.00129	-.00717	.00000	-.00000	.00000	
61	-.00160	-.00121	-.01148	.00000	-.00000	.00000	
62	-.00163	-.00125	-.00891	.00000	-.00000	.00000	
63	-.00197	-.00129	-.01515	.00001	-.00001	.00000	
64	-.00199	-.00130	-.01261	.00000	-.00001	.00000	
65	-.00188	-.00094	-.01276	.00000	-.00001	-.00000	
66	-.00191	-.00095	-.01018	.00000	-.00000	.00000	
67	-.00068	-.00044	-.00947	.00000	-.00000	.00000	
68	-.00066	-.00044	-.00559	.00000	-.00000	.00000	
69	-.00068	-.00035	-.01142	.00000	-.00000	-.00000	
70	-.00067	-.00036	-.00712	.00000	-.00000	.00000	
71	-.00046	-.00031	-.01461	.00000	-.00000	-.00000	
72	-.00046	-.00032	-.01026	.00000	-.00000	.00000	
73	-.00049	-.00045	-.01257	.00000	-.00000	.00000	
74	-.00050	-.00044	-.00820	.00000	-.00000	.00000	
75	.00056	.00036	-.00927	.00000	-.00000	-.00000	
76	.00057	.00037	-.00408	.00000	.00000	.00000	
77	.00060	.00029	-.01134	.00000	-.00000	.00000	
78	.00060	.00025	-.00556	-.00001	-.00000	.00000	
79	.00046	.00024	-.01478	.00000	-.00000	.00000	
80	.00043	.00021	-.00792	-.00001	.00001	.00000	
81	.00048	.00040	-.01257	.00000	-.00000	-.00000	
82	.00048	.00042	-.00825	.00000	.00001	.00000	
101	0.00000	0.00000	0.00000	.00000	.00001	.00000	
102	0.00000	0.00000	0.00000	-.00001	.00001	.00000	
103	0.00000	0.00000	0.00000	.00000	.00000	.00000	
104	0.00000	0.00000	0.00000	-.00001	.00000	-.00000	

STRAN - JOINT DEFLECTIONS AND ROTATIONS

DATE 04/30/76

LOAD CONDITION NO. 4

A-PILE 48HH STRUCTURE AS U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES X	Y	Z	ROTATION IN RADIANS X	Y	Z	REMARKS
1	5.39938	6.11450	-.23498	-.00083	.00062	.00076	
2	5.55479	6.11592	-.17867	-.00029	-.00061	.00118	
3	5.67855	6.11734	-.13736	-.00044	-.00058	.00129	
4	5.71931	6.11876	-.07741	-.00046	.00081	-.00236	
5	5.72324	5.87532	.11434	-.00058	.00052	.00204	
6	5.67722	5.87381	.02764	-.00070	.00155	.00026	
7	5.55548	5.87231	-.03625	-.00039	.00149	.00114	
8	5.40212	5.87081	-.09621	-.00082	.00035	.00185	
9	5.29249	5.96630	-.23460	-.00072	.00051	.00074	
10	5.52507	5.99578	-.17105	-.00031	-.00025	.00147	
11	5.57841	6.02526	-.07709	-.00065	.00068	-.00239	
12	5.62206	5.76726	.11469	-.00068	.00066	.00200	
13	5.52485	5.74586	-.01326	-.00055	.00116	.00024	
14	5.33519	5.72447	-.19581	-.00071	.00048	.00168	
15	5.08661	5.70320	-.22719	-.00328	.00260	.00069	
16	5.32656	5.73671	-.07306	-.00456	.00309	-.00206	
17	5.35220	5.49595	.11542	-.00334	.00533	.00195	
18	5.10492	5.46974	-.09183	-.00310	.00292	.00169	
19	3.25128	3.54571	-.20945	-.00547	.00474	.00050	
20	3.33670	3.50976	-.07083	-.00588	.00507	-.00048	
21	3.25341	3.40395	.10454	-.00501	.00506	.00112	
22	3.22313	3.47311	-.08794	-.00513	.00490	.00029	
23	3.01328	3.28178	-.29925	-.00442	.00390	.00045	
24	3.08754	3.24125	-.06995	-.00423	.00395	-.00069	
25	3.01636	3.15744	.19040	-.00588	.00390	.00100	
26	2.98310	3.22170	-.09272	-.00402	.00340	.00049	
27	3.02072	3.21719	-.10730	.00018	-.00019	.00010	
28	2.27778	2.47675	-.71759	-.00163	.00146	.00023	
29	2.36423	2.47290	-.12597	-.00144	.00133	-.00100	
30	2.32557	2.42567	.45778	-.00151	.00151	.00046	
31	2.28040	2.46600	-.16668	-.00144	.00132	.00097	
32	2.30463	2.45190	-.21648	-.00129	.00121	.00008	
33	1.53374	1.66040	-.97787	-.00234	.00211	.00011	
34	1.56925	1.69907	-.09812	-.00229	.00215	-.00156	
35	1.58947	1.65145	.73988	-.00244	.00246	.00019	
36	1.56587	1.63187	-.15758	-.00226	.00210	.00159	
37	1.56199	1.65982	-.25736	-.00153	.00143	.00006	
38	.53152	.57814	-1.18884	-.00256	.00258	.00007	
39	1.00520	.63195	-.60695	-.00211	.00246	.00034	
40	.53834	.57238	-.09850	-.00268	.00224	-.00199	
41	.59460	1.03446	.37676	-.00273	.00199	.00039	
42	.54701	.55825	.95187	-.00271	.00261	.00011	
43	.98846	.60561	.30201	-.00211	.00255	-.00035	
44	.52469	.55008	-.16360	-.00236	.00248	.00201	
45	.57915	1.02519	-.64214	-.00261	.00200	-.00029	
46	.54131	.57104	-.38501	-.00162	.00151	.00002	
47	5.21616	5.60424	-.09369	.00020	-.00017	.00072	
51	3.00284	3.29277	-.49893	-.00442	.00390	.00044	

STRAN - JOINT DEFLECTIONS AND ROTATIONS

LOAD CONDITION NO. 4

DATE 04/30/76

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINS

JOINT NUMBER	DEFLECTION IN INCHES X	Y	Z	ROTATION IN RADIANS X	Y	Z	REMARKS
52	3.01432	3.28313	-.23960	-.00432	.00380	.00051	
53	3.07071	3.22438	-.06325	-.00423	.00395	-.00073	
54	3.04955	3.24321	-.06805	-.00434	.00402	-.00026	
55	3.04037	3.13333	.37724	-.00388	.00390	.00100	
56	3.01673	3.15794	.13458	-.00386	.00392	.00112	
57	2.97094	3.20957	-.09817	-.00402	.00380	.00053	
58	2.98481	3.22359	-.08683	-.00408	.00391	.00009	
59	2.27089	2.48091	-.79174	-.00162	.00146	.00025	
60	2.27651	2.47530	-.25608	-.00176	.00150	.00053	
61	2.38474	2.44951	-.12334	-.00148	.00135	-.00094	
62	2.36258	2.47113	-.05735	-.00161	.00165	.00024	
63	2.33534	2.41329	.55020	-.00151	.00151	.00048	
64	2.32342	2.42000	.15379	-.00144	.00157	.00111	
65	2.25763	2.44299	-.16961	-.00148	.00132	.00092	
66	2.27263	2.46040	-.07657	-.00176	.00152	-.00038	
67	1.53229	1.66412	-1.08454	-.00234	.00211	.00011	
68	1.55794	1.66482	-.26662	-.00196	.00171	.00053	
69	1.53152	1.68132	-.09465	-.00229	.00215	-.00161	
70	1.57132	1.70088	-.05182	-.00191	.00187	.00018	
71	1.59529	1.64795	.85509	-.00204	.00256	.00019	
72	1.59389	1.65546	.17691	-.00180	.00191	.00131	
73	1.52722	1.59312	-.16126	-.00226	.00210	.00164	
74	1.56739	1.63385	-.07111	-.00200	.00178	-.00032	
75	.52624	.57625	-1.30741	-.00256	.00238	.00008	
76	.52708	.57314	-.33963	-.00480	.00429	.00051	
77	.49194	.52598	-.08002	-.00268	.00224	-.00183	
78	.53373	.56754	-.03370	-.00507	.00469	-.00042	
79	.54622	.55218	1.07966	-.00271	.00261	.00011	
80	.54215	.55342	.27339	-.00455	.00465	.00111	
81	.47775	.50286	-.16084	-.00236	.00248	.00186	
82	.52022	.54557	-.05747	-.00480	.00470	.00026	
101	0.00000	0.00000	0.00000	-.00576	.00555	.00043	
102	0.00000	0.00000	0.00000	-.00535	.00547	.00111	
103	0.00000	0.00000	0.00000	-.00567	.00508	.00050	
104	0.00000	0.00000	0.00000	-.00600	.00560	-.00061	

STRAN - JOINT DEFLECTIONS AND ROTATIONS

LOAD CONDITION NO. 5

4-PILE ACNR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES X	Y	Z	ROTATION IN RADIANS X	Y	Z	REMARKS
1	5.38918	6.10258	-.24627	-.00072	.00068	.00076	
2	5.54574	6.10507	-.26481	.00029	-.00721	.00120	
3	5.67120	6.10756	-.22903	-.00102	-.00715	.00130	
4	5.71243	6.11011	-.09158	-.00055	.00083	-.00255	
5	5.71757	5.88427	.09263	-.00071	.00051	.00204	
6	5.66988	5.86051	-.13024	-.00185	.00862	.00029	
7	5.54639	5.85661	-.20206	.00077	.00856	.00116	
8	5.39208	5.85311	-.11116	-.00060	.00045	.00185	
9	5.28423	5.85476	-.28508	-.00071	.00650	.00075	
10	5.51736	5.98779	-.23685	-.00051	-.00348	.00147	
11	5.57116	6.01582	-.04063	-.00068	.00064	-.00239	
12	5.61527	5.75809	.00069	-.00066	.00071	.00200	
13	5.51713	5.73547	-.13788	-.00052	.00475	.00025	
14	5.32674	5.71696	-.11129	-.00069	.00048	.00188	
15	5.07989	5.69736	-.14750	-.00523	.00263	.00069	
16	5.32104	5.73036	-.25032	-.00554	.00509	-.00205	
17	5.34615	5.48541	.00689	-.00330	.00331	.00175	
18	5.09853	5.46341	-.10686	-.00310	.00290	.00169	
19	3.24686	3.58254	-.21860	-.00546	.00453	.00050	
20	3.55208	3.50779	-.08196	-.00548	.00506	-.00048	
21	3.25071	3.46249	.08911	-.00503	.00507	.00112	
22	3.21980	3.46410	-.10059	-.00511	.00491	.00029	
23	3.00945	3.27921	-.30840	-.00491	.00389	.00045	
24	3.08369	3.23906	-.08185	-.00423	.00394	-.00069	
25	3.01304	3.15532	.17526	-.00389	.00391	.00104	
26	2.97955	3.21865	-.10526	-.00401	.00300	.00049	
27	3.01722	3.21477	-.12105	.00019	-.00021	.00010	
28	2.27589	2.47546	-.72713	-.00162	.00146	.00025	
29	2.36259	2.47166	-.15745	-.00143	.00133	-.00099	
30	2.32360	2.42439	.44296	-.00150	.00150	.00046	
31	2.27851	2.46505	-.17933	-.00144	.00131	.00097	
32	2.30269	2.46062	-.22820	-.00129	.00121	.00008	
33	1.55306	1.65976	-.98747	-.00238	.00211	.00011	
34	1.56857	1.69872	-.10957	-.00229	.00214	-.00155	
35	1.58900	1.65111	.72536	-.00244	.00236	.00019	
36	1.56538	1.63122	-.17013	-.00226	.00210	.00159	
37	1.56142	1.65944	-.26906	-.00153	.00102	.00006	
38	.53209	.57850	-1.19824	-.00256	.00257	.00007	
39	1.00579	.63239	-.61738	-.00210	.00246	.00034	
40	.53894	.57267	-.10109	-.00268	.00224	-.00199	
41	.59533	1.03473	.36365	-.00273	.00198	.00039	
42	.54749	.55851	.93720	-.00271	.00261	.00011	
43	.98896	.60606	.32838	-.00211	.00255	-.00035	
44	.52518	.55048	-.17616	-.00236	.00248	.00201	
45	.57986	1.02558	-.65319	-.00261	.00199	-.00029	
46	.54183	.57136	-.39711	-.00161	.00150	.00002	
47	5.20994	5.59793	-.10579	.00020	-.00019	.00072	
51	2.99898	3.29020	-.50759	-.00441	.00389	.00044	

STRAN - JOINT DEFLECTIONS AND ROTATIONS

LOAD CONDITION NO. 5

4-PILE ACRN STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	DEFLECTION IN INCHES			ROTATION IN RADIANS			REMARKS
	X	Y	Z	X	Y	Z	
52	3.01046	3.28053	-.24784	-.00431	.00379	.00051	
53	3.00087	3.22225	-.07393	-.00423	.00394	-.00073	
54	3.08564	3.24106	-.07884	-.00436	.00401	-.00026	
55	3.03703	3.13124	.36258	-.00389	.00391	.00100	
56	3.01349	3.15589	.11943	-.00387	.00393	.00112	
57	2.96742	3.20649	-.11024	-.00401	.00380	.00053	
58	2.98138	3.22048	-.09308	-.00407	.00391	.00009	
59	2.26902	2.47468	-.80115	-.00162	.00146	.00023	
60	2.27464	2.47401	-.26325	-.00176	.00150	.00053	
61	2.33913	2.44830	-.13083	-.00145	.00155	-.00094	
62	2.36095	2.46988	-.06626	-.00161	.00164	.00024	
63	2.33358	2.41200	.51505	-.00150	.00150	.00046	
64	2.32193	2.42270	.24117	-.00145	.00156	.00111	
65	2.25575	2.44205	-.18237	-.00184	.00131	.00092	
66	2.27092	2.46545	-.08576	-.00176	.00152	-.00038	
67	1.53162	1.66567	-1.09410	-.00254	.00211	.00011	
68	1.53728	1.66439	-.27221	-.00196	.00178	.00053	
69	1.53084	1.66097	-.10607	-.00220	.00214	-.00161	
70	1.57065	1.70053	-.05095	-.00191	.00186	.00018	
71	1.59484	1.64762	.88048	-.00244	.00256	.00019	
72	1.53303	1.65514	.24615	-.00161	.00190	.00112	
73	1.52673	1.59267	-.17382	-.00226	.00210	.00164	
74	1.56689	1.65342	-.07932	-.00199	.00178	-.00032	
75	.52680	.57661	-1.31664	-.00258	.00257	.00008	
76	.52757	.57352	-.34371	-.00479	.00429	.00051	
77	.49254	.52526	-.09156	-.00268	.00224	-.00183	
78	.53134	.56780	-.03906	-.00508	.00469	-.00042	
79	.54868	.55243	1.06488	-.00271	.00261	.00011	
80	.54257	.55363	.26546	-.00455	.00466	.00111	
81	.47623	.50326	-.17341	-.00236	.00247	.00186	
82	.52061	.54598	-.06372	-.00481	.00470	.00026	
101	0.00000	0.00000	0.00000	-.00570	.00556	.00043	
102	0.00000	0.00000	0.00000	-.00537	.00548	.00111	
103	0.00000	0.00000	0.00000	-.00567	.00506	.00050	
104	0.00000	0.00000	0.00000	-.00601	.00560	-.00061	

STRAN - REACTION FORCES AND MOMENTS

LOAD CONDITION NO. 1

DATE 04/30/76

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	FORCE IN KIPS F-X	F-Y	F-Z	MOMENT IN IN-KIPS M-X	M-Y	M-Z	REMARKS
101	-101.8250	-133.2227	150.4587	0.0000	0.0000	0.0000	
102	-220.3096	-220.3049	-1129.0104	0.0000	0.0000	0.0000	
103	-245.7955	-245.7954	1360.1873	0.0000	0.0000	0.0000	
104	-133.2224	-101.8250	150.9552	0.0000	0.0000	0.0000	
TOTAL	-701.1529	-701.1529	533.0868	0.0000	0.0000	0.0000	

STRAN • REACTION FORCES AND MOMENTS

LOAD CONDITION NO. 2

DATE 04/30/76

4-PILE ACSR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	FORCE IN KIPS F-X	F-Y	F-Z	MOMENT IN IN-KIPS M-X	M-Y	M-Z	REMARKS
101	1.8647	-14.2385	55.3553	0.0000	0.0000	0.0000	
102	-23.5077	-22.9838	-155.4324	0.0000	0.0000	0.0000	
103	-17.5302	-30.0695	155.3967	0.0000	0.0000	0.0000	
104	-5.5278	-18.9986	-45.1797	0.0000	0.0000	0.0000	
TOTAL	-44.7010	-86.2900	10.1400	0.0000	0.0000	0.0000	

STRAN * REACTIONS AND MOMENTS

DATE 04/30/76

LOAD CONDITION NO. 3

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	FORCE IN KIPS			MOMENT IN IN-KIPS			REMARKS
	F-X	F-Y	F-Z	M-X	M-Y	M-Z	
101	1.5914	-2.1687	21.3793	0.0000	0.0000	0.0000	
102	2.0915	2.2190	26.9852	0.0000	0.0010	0.0000	
103	-1.6417	-1.5020	14.2303	0.0000	0.0000	0.0000	
104	-2.0412	1.4517	18.4051	0.0000	0.0000	0.0000	
TOTAL	.0000	.0000	81.0000	0.0000	0.0000	0.0000	

LOAD CONDITION NO. 4

4-PILE ACM4 STRUCTURE -- U.S. NAVY (36-IN. DIAMEYER PILING) -- J.ATKINSON

JOINT NUMBER	FORCE IN KIPS F-X	F-Y	F-Z	MOMENT IN IN-KIPS M-X	M-Y	M-Z	REMARKS
101	-99.9606	-147.4612	206.3100	0.0000	0.0000	0.0000	
102	-243.8174	-243.2955	-1284.4427	0.0000	0.0000	0.0000	
103	-263.3258	-275.8648	1515.5840	0.0000	0.0000	0.0000	
104	-138.7502	-120.8236	105.7755	0.0000	0.0000	0.0000	
TOTAL	-745.8539	-787.4429	543.2268	0.0000	0.0000	0.0000	

STRAN - REACTION - ORCES AND MOMENTS

LOAD CONDITION NO. 5

DATE 04/30/74

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

JOINT NUMBER	FORCE IN KIPS F-X	F-Y	F-Z	MOMENT IN IN-KIPS M-X	M-Y	M-Z	REMARKS
101	-98.3692	-149.6259	387.6494	0.0000	0.0000	0.0000	
102	-241.7259	-241.6743	-1251.4075	0.0000	0.0000	0.0000	
103	-264.9674	-277.3668	1529.8143	0.0000	0.0000	0.0000	
104	-140.7914	-119.3719	124.2206	0.0000	0.0000	0.0000	
TOTAL	-745.8539	-787.4429	624.2268	0.0000	0.0000	0.0000	

STRAN GROUP SUMMARY REPORT

DATE 08/30/76

4-PILE ACOR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER GROUP I D	THREE MOST RESTRICTIVE MEMBERS: FIRST MEMBER NO.	FIRST MAX. U. CK	FIRST LD. CN.	SECOND MEMBER NO.	SECOND MAX. U. CK	SECOND LD. CN.	THIRD MEMBER NO.	THIRD MAX. U. CK	THIRD LD. CN.	TOTAL	NUMBER OF MEMBERS IN GROUP WITH UNITY CK GT 1.33	WITH UNITY CK GT 1.00	WITH UNITY CK LT .50
W21	5- 6	.91	5	7- 8	.76	5	4- 3	.72	5	8	0	0	3
SSC	19- 15	.90	5	21- 17	.95	4	20- 16	.90	5	12	0	0	4
W17	7- 2	.06	5	6- 3	.02	5				2	0	0	2
W18	12- 11	175.21	5	14- 9	1.38	1	11- 10	.67	5	7	2	2	1
DB3	17- 14	1.07	5	16- 9	.99	4	17- 11	.97	5	4	0	1	0
HB3	17- 16	1.75	4	16- 15	.90	4	17- 18	.84	4	4	1	1	0
XB1	27- 23	.99	4	25- 27	.85	5	17- 47	.71	4	8	0	0	3
JL1	25- 21	2.06	5	23- 19	1.92	5	28- 23	1.71	5	16	3	8	6
P1	19- 52	1.15	5	52- 60	1.15	5	50- 64	1.10	4	12	0	4	2
HB1	25- 24	1.07	4	24- 23	.79	4	25- 26	.77	4	8	0	1	4
WAN	58- 75	.20	5	75- 76	.20	5	79- 80	.19	5	32	0	0	32
DB1	31- 25	1.31	5	29- 25	1.20	5	28- 24	1.05	5	4	0	3	0
XB2	32- 29	.82	5	31- 32	.29	5	32- 28	.13	5	4	0	0	4
DB2	35- 43	.78	5	35- 41	.78	5	34- 39	.77	5	12	0	0	0
HB2	39- 38	.85	5	45- 38	.82	5	42- 43	.80	5	12	0	0	4
XB3	37- 34	.31	5	36- 37	.30	5	37- 33	.29	5	8	0	0	8
P2	68- 76	1.01	5	72- 80	.92	4	74- 82	.68	5	4	0	1	0
P3	78- 103	6.61	5	80- 102	5.64	4	82- 101	1.49	5	4	3	4	0
										TOTAL MEMBERS	161	9	25	73

STRAN UNITY CHECK SUMMARY REPORT

DATE 04/30/76

4-PILE ACCESS STRUCTURE -- U.S. NAVY (54-IN. DIAMETER PILING) -- J. ATKINSON

THREE HIGHEST UNITY CHECKS G.T. 1.00

MEMBER NUMBER	MEMBER GROUP ID	FIRST HIGHEST UNITY CHECK	FIRST HIGHEST LD. CN.	SECOND HIGHEST UNITY CHECK	SECOND HIGHEST LD. CN.	THIRD HIGHEST UNITY CHECK	THIRD HIGHEST LD. CN.
12= 11	M15	173.21	5	72.11	4	1.84	2
76= 103	P3	6.41	5	6.56	4	5.88	1
60= 102	P3	5.64	4	5.54	5	5.01	1
25= 21	JL1	2.08	5	2.05	4	1.86	1
23= 19	JL1	1.92	5	1.92	4	1.75	1
17= 16	HA3	1.75	4	1.74	5	1.11	2
28= 23	JL1	1.71	5	1.71	4	1.56	1
62= 101	P3	1.49	5	1.41	4	1.15	1
14= 9	A1A	1.38	1	1.38	4	1.32	5
31= 25	DA1	1.31	5	1.30	4	1.11	1
30= 25	JL1	1.21	5	1.20	4	1.10	1
29= 25	DA1	1.20	5	1.19	4	1.11	1
19= 52	P1	1.15	5	1.15	4	1.04	1
52= 60	P1	1.15	5	1.14	4	1.04	1
78= 104	P3	1.15	1	1.11	5	1.03	4
56= 64	P1	1.10	4	1.10	5	.99	1
21= 56	P1	1.10	4	1.10	5	.99	1
7= 14	DB3	1.07	5	1.07	4	.94	1
25= 24	HB1	1.07	4	1.07	5	.72	1
24= 20	JL1	1.05	5	1.05	4	.97	1
28= 24	DA1	1.05	5	1.05	4	.88	1
26= 22	JL1	1.04	4	1.04	5	.97	1
29= 24	JL1	1.04	5	1.04	4	.93	1
31= 26	JL1	1.01	5	1.01	4	.95	1
68= 76	P2	1.01	5	1.00	4	.92	1

STRAN MEMBER STRESS REPORT NO. 1

4-PILE 4CHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.		GROUP ID	MAXIMUM COMBINED UNITY CK	UNITY CHECK COMPONENT VALUES AXIAL	Y-AXIS	Z-AXIS	LOAD COND NO.	DIST FROM END(FT)	CONTROLLING MEMBER ACTIONS FORCE FX KIPS	TORSION MX IN-KIPS	MOMENT MY IN-KIPS	MOMENT MZ IN-KIPS	NEXT TWO HIGH CASES COMBINED UNITY CK	LD CN	COMBINED UNITY CK	LD CN
2-	1	M21-01	.521	.037	.374	.110	5	10.0	-9.89	.94	885.90	-27.94	.261	3	.260	4
8-	1	M21-01	.185	.068	.044	.073	5	0.0	-3.79	-.00	103.88	-18.58	.169	4	.164	1
9-	1	SSC-01	.071	.007	.046	.018	5	0.0	-17.30	17.87	-908.60	568.30	.058	4	.044	1
3-	2	M21-01	.265	.037	.166	.061	5	0.0	-9.86	-.01	-393.43	-15.59	.152	3	.115	4
7-	2	M17-01	.062	.028	.001	.033	5	30.0	-.62	-.01	.94	4.56	.062	4	.052	1
4-	3	M21-01	.324	.037	.278	.409	5	0.0	-9.86	-.96	658.92	103.47	.461	4	.264	3
6-	3	M17-01	.124	.005	.001	.019	5	30.0	1.25	.68	.95	2.58	.023	4	.020	2
5-	4	M21-01	.576	.107	.031	.538	5	0.0	-5.94	.01	28.52	136.68	.635	4	.512	2
11-	4	SSC-01	.186	.007	.042	.036	5	0.0	-16.22	50.71	971.42	900.04	.064	4	.049	1
5-	6	M21-01	.914	.054	.567	.293	5	0.0	-14.51	.97	1541.70	-773.85	.529	3	.389	4
12-	5	SSC-01	.088	.008	.080	.000	5	15.0	-19.52	62.82	-1341.69	75.49	.076	3	.052	4
6-	7	M21-01	.492	.054	.311	.126	5	0.0	-14.50	-.01	-736.07	32.12	.302	3	.191	4
7-	8	M21-01	.768	.054	.618	.092	5	10.0	-14.48	-.99	1482.37	23.45	.522	3	.244	4
14-	8	SSC-01	.096	.009	.087	.000	5	15.0	-20.37	-42.03	1884.36	104.87	.076	3	.061	4
10-	9	M18-01	.553	.309	.166	.057	5	15.0	-73.18	.45	463.96	-13.35	.469	4	.349	1
14-	9	M18-01	1.176	.850	.002	.523	1	0.0	-54.44	.00	4.85	-23.47	1.339	4	1.319	5
15-	9	SSC-01	.840	.067	.451	.321	5	0.0	-157.64	88.15	9939.02	-8383.44	.835	4	.716	1
16-	9	DB3-01	.990	.473	.197	.320	4	33.1	164.88	-225.11	166.97	-867.81	.990	5	.798	1
18-	9	DB3-01	.810	.372	.179	.260	5	33.1	128.82	32.80	322.90	588.35	.810	4	.801	1
11-	10	M18-01	.672	.309	.105	.261	5	0.0	-73.18	-.48	253.27	60.89	.589	4	.320	1
13-	10	M18-01	.032	.001	.000	.030	5	30.0	.28	.01	.91	7.87	.032	4	.018	1
12-	11	M18-01	173.215	.991	.236	171.988	5	30.0	-53.45	.00	998.28	347.99	72.111	4	1.840	2
16-	11	SSC-01	.866	.041	.459	.366	5	0.0	-97.40	-558.90	10354.33	-9251.51	.859	4	.712	1
17-	11	DB3-01	.971	.420	.005	.548	5	0.0	145.72	12.53	46.19	632.22	.967	4	.938	1
12-	13	M18-01	.990	.204	.238	.148	5	0.0	-48.34	.45	589.88	-37.82	.419	4	.264	3
17-	12	SSC-01	.957	.021	.417	.419	5	0.0	-49.91	71.81	9936.95	-9952.59	.839	4	.729	1
15-	14	M18-01	.524	.204	.275	.047	5	15.0	-48.32	-.48	677.41	12.15	.355	4	.343	1
17-	14	DB3-01	1.073	.401	.003	.669	5	0.0	159.03	-56.75	53.48	-771.37	1.071	4	.937	1
18-	14	SSC-01	.793	.043	.402	.348	5	0.0	-101.60	312.19	9236.21	-8588.84	.784	4	.711	1
15-	15	DB3-01	.897	.125	.324	.448	4	30.0	-43.33	-10.79	574.77	-676.53	.896	5	.759	1
18-	15	DB3-01	.761	.106	.240	.416	1	30.0	-28.14	5.54	455.93	600.34	.744	5	.742	4
19-	15	SSC-01	.958	.077	.512	.369	5	29.5	-170.11	149.43	11500.40	-9589.12	.953	4	.818	1
47-	15	XB1-01	.670	.123	.546	.000	4	21.2	-60.00	-29.23	1080.09	32.55	.669	5	.562	1
17-	16	DB3-01	1.747	.096	.090	1.562	4	0.0	-25.44	-5.44	-442.61	1847.28	1.744	5	1.109	2
20-	16	SSC-01	.901	.015	.496	.390	5	29.5	-32.29	-1206.90	11165.54	-9899.28	.893	4	.736	1
47-	16	XB1-01	.508	.089	.083	.456	4	21.2	-43.30	-331.21	-69.20	-904.00	.547	5	.307	1
17-	18	DB3-01	.845	.123	.198	.524	4	0.0	-52.72	-10.02	-434.27	-707.48	.842	5	.688	1
21-	17	SSC-01	.952	.043	.452	.457	4	29.5	105.39	654.20	10794.73	-10845.75	.942	5	.819	1
17-	47	XB1-01	.715	.108	.529	.076	4	0.0	-52.67	1.20	-1119.07	-829.90	.712	5	.572	1
22-	18	SSC-01	.822	.024	.430	.368	5	29.5	-52.78	1071.88	9852.83	-9117.74	.812	4	.735	1
18-	47	XB1-01	.305	.076	.000	.229	1	0.0	-36.81	271.26	-8.68	-453.48	.268	4	.267	5
23-	19	JL1-01	1.919	.968	.949	.002	5	0.0	1297.33	317.09	-12816.47	-592.98	1.918	4	1.745	1
19-	52	P1 -01	1.149	.506	.640	.002	5	4.5	-1492.24	.73	-15873.37	917.34	1.145	4	1.039	1
24-	21	JL1-01	1.050	.027	.005	1.019	5	0.0	36.33	2259.19	917.53	-13345.14	1.049	4	.965	1
20-	54	P1 -01	.730	.027	.001	.702	5	4.5	-79.32	14.64	619.57	17387.57	.724	4	.656	1
25-	21	JL1-01	2.061	.916	1.142	.000	5	0.0	-1230.93	626.87	14955.29	-62.12	2.051	4	1.859	1
21-	56	P1 -01	1.101	.452	.649	.000	4	4.5	1333.74	-.04	16061.11	-178.93	1.096	5	.995	1
26-	22	JL1-01	1.042	.089	.000	.954	4	0.0	118.78	-2167.07	67.81	12463.61	1.042	5	.965	1

STRAN MEMBER STRES REPORT NO. 1

DATE 04/30/76

4=PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	UNITY CHECK COMPONENT VALUES AXIAL	Y-AXIS	Z-AXIS	LOAD COND NO.	DIST FROM END(FT)	CONTROLLING MEMBER ACTIONS FORCE FX KIPS	TORSION MX IN-KIPS	MOMENT MY IN-KIPS	MOMENT MZ IN-KIPS	NEXT TWO HIGH CASES COMBINED UNITY CK	LD CN	COMBINED UNITY CK	LD CN
22= 58	P1 =01	.716	.063	.000	.653	5	4.5	-183.27	-15.85	-294.27	-16165.43	.709	4	.656	1
23= 23	HB1=01	.790	.147	.574	.069	4	30.9	67.22	-1.40	907.31	-514.60	.789	5	.681	1
26= 23	HB1=01	.702	.109	.498	.094	4	30.9	50.06	-11.91	810.88	355.16	.701	5	.681	1
27= 23	XB1=01	.987	.207	.779	.001	4	21.8	108.82	-22.90	1540.84	66.45	.986	5	.906	1
24= 23	JL1=01	1.712	.971	.739	.002	5	30.1	1301.33	194.24	-9667.22	-509.57	1.711	4	1.556	1
55= 51	WBN=01	.016	.015	.000	.001	4	2.8	16.48	-.72	-7.10	-202.87	.015	5	.014	1
25= 24	HB1=01	1.072	.288	.258	.526	4	0.0	131.72	-10.58	-671.02	958.71	1.071	5	.724	1
27= 24	XB1=01	.371	.155	.000	.217	4	0.0	81.63	-391.63	-.44	428.03	.369	5	.299	1
28= 24	DB1=01	1.050	.547	.336	.117	5	45.4	-397.14	-173.79	-1534.69	789.01	1.049	4	.881	1
29= 24	JL1=01	1.037	.225	.005	.810	5	30.3	301.70	450.71	591.40	-10599.20	1.035	4	.934	1
54= 53	WBN=01	.10	.001	.000	.000	4	2.8	.99	-8.44	-7.10	-2386.05	.010	5	.008	1
25= 26	HB1=01	.770	.235	.519	.018	4	30.9	106.57	-3.29	788.38	-144.95	.766	5	.725	1
25= 27	XB1=01	.832	.230	.572	.030	5	0.0	121.17	-1.82	-1159.31	-267.52	.832	4	.759	1
29= 25	DB1=01	1.202	.711	.265	.227	5	45.4	-472.77	253.34	-1156.31	-1069.81	1.195	4	1.106	1
30= 25	JL1=01	1.206	.457	.744	.006	5	30.3	-613.03	413.30	9786.74	132.03	1.200	4	1.096	1
31= 25	DB1=01	1.306	.707	.208	.309	5	45.8	-807.11	-158.96	-1113.09	1572.22	1.300	4	1.106	1
25= 55	WBN=01	.005	.005	.000	.000	4	2.8	6.21	.36	-7.10	102.22	.005	1	.003	5
26= 27	XB1=01	.303	.153	.001	.150	4	21.8	80.24	375.02	-21.73	297.23	.301	5	.299	1
28= 26	DB1=01	.912	.496	.270	.146	5	45.4	-330.16	137.02	-1208.16	-869.74	.909	4	.881	1
31= 26	JL1=01	1.008	.254	.000	.755	5	30.1	449.24	-753.20	35.47	9864.08	1.008	4	.934	1
26= 57	WBN=01	.009	.001	.000	.008	4	2.8	.86	1.72	-7.10	2182.80	.009	5	.008	1
29= 28	HB1=01	.249	.012	.031	.206	4	36.9	5.36	3.43	128.06	-329.86	.249	5	.236	1
31= 28	HB1=01	.256	.012	.026	.219	6	36.9	-1.63	-4.70	118.02	344.85	.256	4	.236	1
32= 28	XB2=01	.133	.007	.129	.002	5	26.1	-3.56	-4.42	316.90	56.22	.132	4	.123	1
33= 28	JL1=01	.538	.372	.165	.001	5	31.3	498.40	84.28	2161.45	166.62	.537	4	.492	1
34= 28	DB2=01	.757	.426	.135	.197	5	50.7	292.76	20.55	533.72	-665.89	.756	4	.684	1
36= 28	DB2=01	.714	.374	.127	.211	5	50.7	221.65	-11.87	525.88	680.91	.712	4	.686	1
28= 59	WBN=01	.076	.076	.000	.001	4	2.8	-81.55	.59	-7.10	166.29	.076	5	.070	1
30= 29	HB1=01	.309	.106	.011	.192	1	0.0	48.41	2.98	71.15	294.82	.296	5	.295	4
32= 29	XB2=01	.319	.118	.005	.196	5	0.0	69.97	-14.70	-77.45	502.21	.318	4	.285	1
34= 29	JL1=01	.267	.111	.017	.138	5	31.3	-139.27	290.66	666.45	1916.25	.266	4	.215	1
35= 29	DB2=01	.547	.291	.104	.152	5	0.0	175.03	.06	412.57	497.69	.545	4	.511	1
29= 61	WBN=01	.015	.005	.000	.010	1	2.8	-4.92	9.39	-7.10	2657.20	.015	4	.015	5
30= 31	HB1=01	.353	.123	.010	.220	5	0.0	56.47	-4.89	70.93	-334.95	.352	4	.309	1
30= 32	XB2=01	.091	.016	.039	.037	5	0.0	9.60	-4.81	136.24	-132.97	.091	4	.076	1
35= 33	JL1=01	.598	.447	.101	.000	5	31.3	-621.30	204.30	-1475.57	-28.28	.595	4	.532	1
30= 63	WBN=01	.073	.073	.000	.000	5	0.0	78.83	-.06	23.67	.00	.073	4	.067	1
31= 32	XB2=01	.293	.117	.005	.171	5	26.1	69.50	14.11	-77.05	457.88	.292	4	.215	1
35= 31	DB2=01	.547	.287	.103	.157	5	0.0	170.67	-11.64	413.18	-509.86	.546	4	.511	1
36= 31	JL1=01	.230	.078	.021	.131	5	31.3	-98.03	-340.04	728.58	-1836.00	.229	4	.215	1
31= 65	WBN=01	.018	.007	.000	.011	4	2.8	-7.49	-9.94	-7.10	-2811.60	.018	5	.015	1
34= 33	HB2=01	.396	.139	.084	.173	5	43.1	-59.74	-1.80	370.44	-532.01	.395	4	.362	1
36= 33	HB2=01	.369	.116	.070	.183	5	43.1	-49.81	-3.88	334.97	543.57	.368	4	.362	1
37= 33	XB3=01	.268	.079	.208	.000	5	30.5	-47.81	-7.96	656.01	24.52	.287	4	.267	1
38= 33	JL1=01	.104	.006	.098	.000	5	0.0	7.40	29.38	-1241.26	-22.32	.103	4	.099	1
39= 35	DB2=01	.738	.485	.033	.219	5	41.3	288.07	-17.82	230.37	-594.92	.737	4	.677	1
45= 35	DB2=01	.694	.438	.029	.227	5	41.3	259.79	23.07	219.84	609.88	.692	4	.677	1
33= 67	WBN=01	.064	.063	.000	.001	5	2.8	68.57	-.52	-7.10	-146.95	.064	4	.059	1

4-PILE ACMR STRUCTURE -- U.S. NAVY (56-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	UNITY CHECK MAXIMUM COMBINED UNITY CK	COMPONENT VALUES AXIAL	Y-AXIS	Z-AXIS	LOAD COND NO.	DIST FROM END(FT)	CONTROLLING MEMBER ACTIONS FORCE FX KIPS	TORSION MX IN-KIPS	MOMENT MY IN-KIPS	MOMENT MZ IN-KIPS	NEXT TWO HIGH CASES COMBINED UNITY CK	LD CN	COMBINED UNITY CK	LD CN
35	34 MB2-01	.269	.075	.006	.189	5	0.0	-31.49	7.02	-88.96	486.49	.268	4	.266	1
37	34 XB3-01	.307	.092	.012	.205	5	0.0	-55.17	-97.09	-159.65	658.43	.307	4	.290	1
38	39 DB2-01	.769	.580	.058	.131	5	0.0	-278.81	-70.55	-235.55	-355.75	.767	4	.684	1
40	34 JL1-01	.063	.004	.013	.046	5	0.0	5.03	250.47	-363.09	-680.05	.063	4	.060	1
41	34 DB2-01	.649	.445	.118	.086	5	41.3	264.24	-69.61	391.62	333.83	.647	4	.610	1
34	69 MBN-01	.011	.001	.000	.010	4	2.8	.55	-9.48	-7.10	-2681.27	.011	5	.011	1
35	36 MB2-01	.285	.071	.005	.209	5	0.0	-30.66	-12.16	-79.56	-533.85	.285	4	.266	1
35	37 XB3-01	.086	.055	.021	.010	5	0.0	-33.07	-2.00	-72.68	-54.56	.085	4	.068	1
35	41 DB2-01	.776	.535	.004	.239	5	0.0	-256.22	-14.31	-72.75	559.57	.774	4	.730	1
42	35 JL1-01	.029	.003	.026	.000	5	0.0	3.37	57.02	341.12	-.25	.028	4	.026	1
35	43 DB2-01	.782	.527	.003	.252	5	0.0	-253.43	26.39	-66.38	-589.01	.780	4	.730	1
35	71 MBN-01	.066	.066	.000	.000	5	2.8	-70.77	-.03	-7.10	-8.85	.065	4	.061	1
36	37 XB3-01	.297	.092	.010	.192	5	30.5	-55.28	92.09	-165.61	623.73	.297	4	.290	1
45	36 DB2-01	.643	.480	.117	.086	5	41.3	261.05	69.15	389.68	-333.80	.642	4	.610	1
44	36 JL1-01	.062	.004	.010	.042	5	0.0	5.12	-243.74	-394.59	849.88	.062	4	.060	1
36	45 DB2-01	.704	.521	.058	.125	5	0.0	-250.50	69.12	-239.45	352.71	.702	4	.684	1
36	73 MBN-01	.013	.003	.000	.010	4	2.8	3.35	9.01	-7.10	2547.29	.013	5	.011	1
39	38 MB2-01	.645	.241	.085	.368	5	25.0	-142.90	-7.04	339.75	-964.59	.645	4	.610	1
45	36 MB2-01	.619	.213	.038	.368	5	25.0	-126.60	5.85	313.84	976.42	.618	4	.610	1
46	36 XB3-01	.266	.017	.259	.000	5	35.4	-5.83	-4.24	814.95	14.14	.265	4	.258	1
36	75 MBN-01	.203	.202	.000	.001	5	2.8	-217.14	1.38	-7.10	391.32	.203	4	.187	1
47	39 MB2-01	.546	.267	.091	.189	5	25.0	158.38	17.91	403.30	580.40	.546	4	.510	1
41	40 MB2-01	.523	.287	.039	.197	5	0.0	-149.56	4.05	-206.94	-597.66	.522	4	.491	1
48	40 XB3-01	.244	.011	.019	.215	4	0.0	-6.56	-101.15	-207.74	765.61	.244	5	.240	1
40	77 MBN-01	.032	.004	.000	.028	1	2.8	-3.87	25.72	-7.10	7274.31	.031	5	.031	4
42	41 MB2-01	.594	.214	.029	.355	5	0.0	126.87	-1.48	-250.36	928.17	.593	4	.579	1
42	43 MB2-01	.605	.212	.024	.366	5	0.0	126.11	-4.80	-245.85	-955.62	.602	4	.579	1
42	46 XB3-01	.060	.015	.044	.000	1	35.4	10.13	-.00	-139.64	-.00	.059	5	.059	4
42	79 MBN-01	.193	.193	.000	.000	5	0.0	208.37	.08	39.21	.00	.192	4	.179	1
43	44 MB2-01	.512	.243	.041	.189	5	0.0	-147.00	-6.00	-264.17	578.11	.511	4	.491	1
44	45 MB2-01	.519	.244	.089	.186	5	25.0	145.01	-20.00	394.55	-571.00	.518	4	.510	1
44	46 XB3-01	.240	.009	.019	.212	1	35.4	-5.56	91.68	-210.01	695.86	.240	4	.240	5
44	81 MBN-01	.038	.008	.000	.030	4	2.8	-8.56	-27.09	-7.10	-7661.42	.037	5	.032	1
51	52 MBN-01	.016	.015	.000	.001	4	0.0	-16.48	-.00	7.10	-202.87	.015	5	.014	1
52	60 P1 -01	1.148	.506	.640	.002	5	0.0	-1490.03	.44	-15873.37	917.34	1.145	4	1.038	1
53	58 MBN-01	.010	.001	.000	.009	4	0.0	-.99	.60	7.10	-2386.07	.010	5	.008	1
54	62 P1 -01	.732	.629	.001	.702	5	0.0	-79.37	9.27	619.57	17387.57	.725	4	.659	1
55	56 MBN-01	.005	.005	.001	.000	4	0.0	-5.21	.00	7.10	102.22	.005	1	.003	5
56	64 P1 -01	1.102	.453	.649	.000	4	0.0	1334.51	.02	16061.11	-178.93	1.096	5	.995	1
57	58 MBN-01	.009	.001	.000	.008	4	0.0	-.86	-.00	7.10	2182.82	.009	5	.008	1
58	66 P1 -01	.721	.067	.000	.653	5	0.0	-183.58	-8.84	-294.27	-16165.43	.713	4	.659	1
59	20 MBN-01	.076	.076	.000	.001	4	0.0	81.55	.00	7.10	168.29	.076	5	.070	1
60	70 P1 -01	.731	.558	.173	.001	5	0.0	-1515.81	.44	4699.20	-296.37	.726	4	.653	1
61	62 MBN-01	.015	.005	.000	.010	1	0.0	4.92	.00	7.10	2657.31	.015	4	.015	5
62	70 P1 -01	.253	.034	.001	.218	5	0.0	-91.90	9.27	353.07	-5417.15	.246	4	.240	1
63	64 MBN-01	.073	.073	.000	.000	5	0.0	-78.83	.00	7.10	-15.77	.073	4	.067	1
64	72 P1 -01	.648	.452	.195	.000	4	0.0	1333.67	.02	-4837.31	14.72	.640	5	.580	1
65	66 MBN-01	.018	.007	.000	.011	4	0.0	7.48	-.00	7.10	-2811.61	.018	5	.015	1

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	UNITY CHECK MAXIMUM COMBINED UNITY CK	COMPONENT VALUES AXIAL	Y-AXIS	Z-AXIS	LOAD COND NO.	DIST FROM END(FT)	CONTROLLING MEMBER ACTIONS FORCE FX KIPS	TORSION MX IN-KIPS	MOMENT MY IN-KIPS	MOMENT MZ IN-KIPS	NEXT TWO HIGH CASES COMBINED UNITY CK	LD CN	COMBINED UNITY CK	LD CN
66- 74	P1 -01	.281	.072	.003	.206	5	0.0	-196.51	-8.84	590.24	5130.08	.273	4	.240	1
67- 68	HBN-01	.064	.064	.000	.001	5	0.0	-68.57	-.00	7.10	-146.95	.064	4	.059	1
68- 76	P2 -01	1.006	.437	.568	.002	5	35.3	-1533.30	.44	16537.37	-878.83	1.001	4	.916	1
69- 70	HBN-01	.011	.001	.000	.010	4	0.0	-.55	.00	7.10	-2681.28	.011	5	.011	1
70- 78	P2 -01	.672	.038	.000	.634	5	35.3	-121.16	9.27	-218.35	-18459.49	.665	4	.619	1
71- 72	HBN-01	.066	.066	.000	.000	5	0.0	70.77	.00	7.10	-8.85	.065	4	.061	1
72- 80	P2 -01	.921	.369	.252	.589	4	35.3	1294.23	.02	-16061.75	-57.14	.916	5	.839	1
73- 74	HBN-01	.013	.003	.000	.010	4	0.0	-3.35	-.00	7.10	2547.31	.013	5	.011	1
74- 82	P2 -01	.675	.071	.000	.604	5	35.3	-225.38	-8.84	418.29	17577.33	.667	4	.619	1
75- 76	HBN-01	.203	.201	.000	.002	5	0.0	217.14	.00	7.10	391.33	.202	4	.187	1
76- 103	P3 -01	6.615	6.016	.569	.050	5	0.0	-1564.55	-.00	16537.37	-878.83	6.559	4	5.879	1
77- 78	HBN-01	.032	.004	.000	.028	1	0.0	5.87	.00	7.10	7274.36	.031	5	.031	4
78- 104	P3 -01	1.148	.571	.004	.573	1	0.0	-148.66	-.00	105.27	-16659.36	1.107	5	1.034	4
79- 80	HBN-01	.194	.193	.000	.000	5	0.0	-208.37	.00	7.10	22.36	.193	4	.180	1
80- 102	P3 -01	5.645	5.041	.552	.001	4	0.0	1324.08	-0.00	-16061.75	-57.14	5.544	5	4.997	1
81- 82	HBN-01	.038	.008	.000	.030	4	0.0	8.56	-.00	7.10	-7661.47	.037	5	.032	1
82- 101	P3 -01	1.490	.871	.014	.604	4	0.0	-224.55	-.00	418.29	17577.33	1.407	4	1.148	1

STRAN MEMBER STRESS REPORT NO. 2

DATE 04/30/76

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	LOAD COND	DIST FROM END(FT)	/-------- CONTROLLING MEMBER ACTIONS --------/ FORCE FX KIPS	TORSION MX IN-KIPS	MOMENT MY IN-KIPS	MOMENT MZ IN-KIPS	Z-AXIS SHEAR UNITY CK	LD CN	Y-AXIS SHEAR UNITY CK	LD CN	KLY/RY	KLZ/RZ	NEXT HIGH UN.CK.	LD CN
2- 1	M21-01	.521	5	10.0	-9.89	.94	885.90	-27.94	.095	5	.004	5	14.3	69.5	.261	3
8- 1	M21-01	.185	5	0.0	-3.79	-.00	103.88	-18.58	.019	5	.001	1	82.9	208.5	.169	4
9- 1	SSC-01	.071	5	0.0	-17.30	17.87	-908.60	568.30	.008	5	.007	5	17.7	17.7	.058	4
3- 2	M21-01	.265	5	0.0	-9.86	-.01	-393.43	-15.59	.008	5	.002	4	14.3	69.5	.152	3
7- 2	M17-01	.062	5	30.0	-.62	-.01	.94	4.56	.210	5	.000	5	50.0	283.0	.062	4
4- 3	M21-01	.724	5	0.0	-9.86	-.96	658.92	103.47	.083	5	.009	5	14.3	69.5	.461	3
6- 3	M17-01	.024	5	30.0	1.25	.02	.95	2.58	.210	5	.000	5	50.0	283.0	.023	4
5- 4	M21-01	.676	5	0.0	-5.94	.01	78.52	136.60	.018	5	.014	5	82.9	208.5	.635	4
11- 4	SSC-01	.086	5	0.0	-16.22	50.71	971.42	900.04	.011	5	.009	5	17.7	17.7	.064	4
5- 6	M21-01	.914	5	0.0	-14.51	.97	1341.70	-75.85	.159	3	.008	5	14.3	69.5	.529	3
12- 5	SSC-01	.088	5	15.0	-19.52	62.82	-1341.69	75.49	.014	5	.011	5	17.7	17.7	.076	3
6- 7	M21-01	.492	5	0.0	-14.50	-.01	-736.07	32.12	.006	4	.005	4	14.3	69.5	.302	3
7- 8	M21-01	.764	5	10.0	-14.48	-.99	1462.37	23.45	.165	5	.003	1	14.3	69.5	.522	3
14- 8	SSC-01	.090	5	15.0	-20.57	-42.03	1462.36	104.87	.013	5	.011	5	17.7	17.7	.076	3
10- 9	M18-01	.553	5	15.0	-73.18	.45	463.96	-14.55	.048	5	.001	5	19.4	86.4	.469	4
14- 9	M18-01	1.376	1	0.0	-54.44	.00	4.85	-23.47	.010	1	.001	1	43.7	194.4	1.339	4
15- 9	SSC-01	.840	5	0.0	-157.64	88.15	9959.02	-8383.44	.057	4	.053	4	16.5	16.5	.835	4
16- 9	DB3-01	.990	4	33.1	164.08	-25.11	366.97	-467.81	.080	1	.061	1	61.0	61.0	.990	5
18- 9	DB3-01	.810	5	33.1	128.82	58.46	322.58	388.35	.091	5	.066	5	61.0	61.0	.810	4
11- 10	M18-01	.672	5	0.0	-73.14	-.46	253.27	60.89	.036	5	.003	5	19.4	86.4	.589	4
13- 10	M18-01	.032	5	30.0	.28	.01	.91	7.87	.129	5	.000	4	43.7	194.4	.032	4
12- 11	M18-01	173.215	5	30.0	-63.45	.00	560.22	347.99	.131	5	.094	2	43.7	194.4	72.111	4
16- 11	SSC-01	.866	5	0.0	-97.40	-534.90	10353.33	-9251.51	.102	4	.078	4	16.5	16.5	.859	4
17- 11	DB3-01	.971	5	0.0	145.72	12.53	46.19	632.22	.091	1	.069	1	61.0	61.0	.967	4
12- 13	M18-01	.590	5	0.0	-48.34	.43	589.88	-37.82	.070	5	.003	5	19.4	86.4	.419	4
17- 12	SSC-01	.857	5	0.0	-49.91	71.81	9936.95	-9942.59	.060	5	.056	5	16.5	16.5	.839	4
13- 14	M18-01	.524	5	15.0	-48.32	-.46	677.41	12.15	.076	5	.001	1	19.4	86.4	.355	4
17- 14	DB3-01	1.073	5	0.0	139.03	-56.75	53.48	-771.37	.122	4	.085	4	61.0	61.0	1.071	4
18- 14	SSC-01	.793	5	0.0	-101.60	312.19	9236.21	-8588.84	.079	4	.065	4	16.5	16.5	.784	4
16- 15	MB3-01	.897	4	30.0	-43.33	-10.79	574.77	-676.53	.060	5	.053	5	68.5	68.5	.896	5
18- 15	MB3-01	.761	1	30.0	-28.14	3.34	455.93	600.30	.046	1	.044	1	68.5	68.5	.744	5
19- 15	SSC-01	.958	5	29.5	-170.11	149.43	11300.40	-9589.12	.069	5	.062	5	34.8	34.8	.953	4
17- 15	XB1-01	.670	4	21.2	-60.00	-29.23	1080.09	32.55	.038	4	.027	4	29.4	29.4	.669	5
17- 16	MB3-01	1.747	4	0.0	-25.44	-5.44	-842.61	1847.28	.119	5	.115	5	68.5	68.5	1.744	5
20- 16	SSC-01	.901	5	29.5	-52.29	-1206.90	11163.54	-9869.28	.165	4	.111	4	34.8	34.8	.893	4
17- 16	XB1-01	.548	4	21.2	-43.30	-331.21	-69.20	-904.00	.266	4	.141	4	29.4	29.4	.547	5
17- 18	MB3-01	.845	4	0.0	-32.72	-10.02	-438.27	-707.48	.094	4	.047	4	68.5	68.5	.842	5
21- 17	SSC-01	.952	4	29.5	105.39	636.20	10794.73	-10388.75	.135	5	.087	4	34.8	34.8	.942	5
17- 47	XB1-01	.715	4	0.0	-52.67	1.20	-1119.07	-424.90	.018	4	.018	4	29.4	29.4	.712	5
22- 18	SSC-01	.822	5	29.5	-52.76	1071.62	9852.63	-9117.74	.147	4	.100	4	34.8	34.8	.812	4
18- 47	XB1-01	.305	1	0.0	-54.81	271.26	-8.68	-249.48	.235	5	.120	5	29.4	29.4	.268	4
23- 19	JC1-01	1.919	5	0.0	1297.33	312.09	-12816.47	-592.98	.176	4	.158	4	3.9	3.9	1.918	4
19- 52	P1 -01	1.149	5	4.5	-1492.24	.73	-15873.57	917.34	.029	5	.028	5	4.4	4.4	1.145	4
24- 20	JL1-01	1.050	5	0.0	36.53	2259.19	917.53	-13345.14	.379	5	.250	5	3.9	3.9	1.049	4
20- 54	P1 -01	.730	5	4.5	-79.52	14.64	619.57	17387.57	.115	1	.060	1	4.4	4.4	.724	4
25- 21	JL1-01	2.061	5	0.0	-1230.93	626.87	14935.29	-62.12	.259	5	.223	5	3.9	3.9	2.051	4
21- 56	P1 -01	1.101	4	4.5	1333.74	-.04	16061.11	-178.93	.040	4	.040	4	4.4	4.4	1.096	5
26- 22	JC1-01	1.642	4	0.0	118.78	-2167.07	67.81	12463.61	.360	4	.236	4	3.9	3.9	1.642	5

STRAN MEMBER STRES REPORT NO. 2

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	LOAD COND	DIST FROM END(FT)	CONTROLLING MEMBER ACTIONS: AXIAL FORCE FX KIPS	TORSION MX IN-KIPS	MOMENT MY IN-KIPS	MOMENT MZ IN-KIPS	Z-AXIS SHEAR UNITY CK	LD CN	Y-AXIS SHEAR UNITY CK	LD CN	KLY/RY	KLZ/RZ	NEXT HIGH UN.CK.	LD CN
22- 56	P1 -01	.716	5	4.6	-144.27	-13.33	-294.27	-16165.83	.115	1	.060	1	4.4	4.4	.709	4
24- 23	HB1-01	.790	4	30.9	67.22	-1.80	903.31	-314.60	.027	1	.025	4	70.1	70.1	.789	5
26- 23	HB1-01	.702	4	30.9	50.06	-11.91	810.88	353.16	.035	5	.029	5	70.1	70.1	.701	5
27- 23	XB1-01	.987	4	21.8	106.82	-22.90	1540.84	66.45	.041	4	.033	4	30.4	30.4	.986	5
28- 23	JL1-01	1.712	5	30.3	1301.33	198.24	-9667.22	-509.57	.072	4	.060	4	26.0	26.0	1.711	4
23- 51	HBN-01	.016	4	2.8	16.43	-.72	-7.10	-207.87	.001	4	.008	2	1.4	1.4	.015	5
25- 24	HB1-01	1.072	4	0.0	141.72	-10.46	-671.02	958.71	.112	4	.106	4	70.1	70.1	1.071	5
27- 24	XB1-01	.371	4	0.0	81.43	-301.63	-.44	428.03	.318	5	.170	5	30.4	30.4	.369	5
28- 24	DB1-01	1.050	5	45.4	-397.14	-173.79	-1338.69	789.01	.087	4	.058	4	59.3	59.3	1.049	4
29- 24	JL1-01	1.037	5	30.3	301.70	650.71	591.40	-10599.20	.140	1	.095	1	26.0	26.0	1.035	4
24- 53	HBN-01	.010	4	2.8	.99	-8.84	-7.10	-2386.05	.001	4	.098	5	1.4	1.4	.010	5
25- 26	HB1-01	.770	4	30.9	106.57	-5.29	788.38	-184.95	.024	1	.022	1	70.1	70.1	.766	5
25- 27	XB1-01	.832	5	0.0	121.17	-1.82	-1159.31	-267.52	.020	5	.019	5	30.4	30.4	.832	4
29- 25	DB1-01	1.202	5	45.4	-472.77	253.34	-1156.31	-1069.81	.114	5	.069	5	59.3	59.3	1.195	4
30- 25	JL1-01	1.206	5	30.3	-613.03	413.30	9788.74	132.05	.098	5	.075	5	26.0	26.0	1.200	4
31- 25	DB1-01	1.306	5	45.4	-470.11	-158.96	-1113.09	1572.22	.094	1	.057	1	59.3	59.3	1.300	4
25- 55	HBN-01	.005	4	2.8	5.21	.36	-7.10	102.22	.001	4	.004	5	1.4	1.4	.005	1
26- 27	XB1-01	.303	4	21.8	80.24	375.02	-21.75	297.23	.362	5	.160	5	30.4	30.4	.361	5
28- 26	DB1-01	.912	5	45.4	-530.16	137.02	-1206.16	-859.74	.073	4	.046	4	59.3	59.3	.909	4
31- 26	JL1-01	1.008	5	30.3	359.94	-755.20	35.97	9864.08	.140	1	.095	1	26.0	26.0	1.008	4
26- 57	HBN-01	.009	4	2.8	.86	7.72	-7.10	2182.80	.001	4	.089	4	1.4	1.4	.009	5
29- 28	HB1-01	.249	4	36.9	5.36	3.43	128.06	-329.86	.017	1	.015	1	85.2	85.2	.249	5
31- 28	HB1-01	.256	5	36.9	-3.63	-4.70	118.02	584.85	.018	5	.016	5	85.2	85.2	.256	4
32- 28	XB2-01	.133	5	26.1	-1.54	-4.42	314.90	36.22	.009	4	.007	4	32.3	32.3	.132	4
33- 28	JL1-01	.538	5	31.3	244.10	88.28	2151.43	186.02	.032	4	.027	4	26.9	26.9	.537	4
34- 28	DB2-01	.757	5	58.7	252.76	29.55	533.72	-645.89	.033	4	.027	4	74.0	74.0	.756	4
36- 28	DB2-01	.714	5	58.7	221.85	-11.67	529.88	680.91	.031	1	.026	1	74.0	74.0	.712	4
28- 59	HBN-01	.076	4	2.8	-81.55	.59	-7.10	168.29	.001	1	.007	2	1.4	1.4	.076	5
30- 29	HB1-01	.309	1	0.0	88.41	2.98	71.15	294.82	.015	1	.014	1	85.2	85.2	.296	5
32- 29	XB2-01	.319	5	0.0	59.07	-14.70	-77.45	502.21	.026	5	.022	5	32.3	32.3	.318	4
34- 29	JL1-01	.267	5	31.3	-146.27	280.66	606.45	1916.25	.058	1	.038	1	26.9	26.9	.266	4
35- 29	DB2-01	.547	5	0.0	173.03	.06	412.57	497.69	.020	1	.018	1	74.0	74.0	.545	4
29- 61	HBN-01	.015	1	2.8	-4.92	9.39	-7.10	2657.29	.001	5	.123	5	1.4	1.4	.015	4
30- 31	HB1-01	.353	5	0.0	56.47	-4.89	70.93	-334.95	.017	4	.015	4	85.2	85.2	.352	4
30- 32	XB2-01	.091	5	0.0	9.60	-4.81	136.24	-132.97	.007	5	.006	5	32.3	32.3	.091	4
35- 30	JL1-01	.598	5	31.3	-621.30	204.30	-1475.57	-24.28	.038	5	.027	5	26.9	26.9	.595	4
30- 63	HBN-01	.075	5	0.0	78.83	-.06	23.67	.00	.002	5	.001	2	1.4	1.4	.073	4
31- 32	XB2-01	.293	5	26.1	69.50	14.11	-77.05	437.88	.024	5	.020	5	32.3	32.3	.292	4
35- 31	DB2-01	.547	5	0.0	170.67	-11.64	413.18	-509.88	.024	5	.020	5	74.0	74.0	.546	4
36- 31	JL1-01	.230	5	31.3	-98.03	-340.04	728.58	-1836.00	.058	5	.039	5	26.9	26.9	.229	4
31- 65	HBN-01	.018	4	2.8	-7.49	-9.94	-7.10	-2811.60	.001	1	.115	5	1.4	1.4	.018	5
34- 33	HB2-01	.396	5	43.1	-59.74	-1.80	370.44	-532.01	.015	5	.015	5	77.7	77.7	.395	4
36- 33	HB2-01	.369	5	43.1	-49.81	-3.88	334.97	543.57	.017	4	.015	4	77.7	77.7	.368	4
37- 33	XB3-01	.288	5	30.5	-47.81	-7.96	656.01	24.32	.012	4	.010	4	34.1	34.1	.287	4
35- 33	JL1-01	.104	5	0.0	7.40	29.38	-1281.26	-22.32	.018	5	.016	5	30.4	30.4	.103	4
39- 33	DB2-01	.738	5	41.3	288.07	-17.82	230.57	-594.92	.028	1	.022	1	59.3	59.3	.737	4
45- 33	DB2-01	.694	5	41.3	259.79	23.07	219.84	609.88	.029	4	.022	4	59.3	59.3	.692	4
33- 67	HBN-01	.064	5	2.8	68.57	-.52	-7.10	-146.95	.001	5	.006	2	1.4	1.4	.060	4

STRAN MEMBER STRESS REPORT NO. 2

DATE 04/30/76

4-PILE ACHN STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	LOAD COND	DIST FROM END(FT)	FORCE FX KIPS	TORSION MX IN-KIPS	MOMENT MY IN-KIPS	MOMENT MZ IN-KIPS	Z-AXIS SHEAR UNITY CK	LD CN	Y-AXIS SHEAR UNITY CK	LD CN	KLY/RY	KLZ/RZ	NEXT HIGH UN.CK.	LD CN
35	34 HB2-01	.269	5	0.0	-31.49	7.02	-88.96	486.49	.018	1	.015	1	77.7	77.7	.268	4
37	34 XB3-01	.307	5	0.0	-55.17	-97.09	-159.65	658.43	.063	5	.040	5	34.1	34.1	.307	4
34	39 DB2-01	.769	5	0.0	-278.81	-70.33	-235.55	-355.75	.053	5	.053	4	59.3	59.3	.767	4
40	34 JL1-01	.063	5	0.0	5.03	250.47	-363.09	-680.05	.041	5	.027	5	30.4	30.4	.063	4
41	34 DB2-01	.649	5	41.3	264.24	-69.61	391.62	333.83	.056	4	.035	4	59.3	59.3	.647	4
34	69 HB2-01	.011	4	2.8	.55	-9.48	-7.10	-2681.27	.001	1	.110	5	1.4	1.4	.011	5
35	36 HB2-01	.285	5	0.0	-30.66	-12.16	-79.36	-553.85	.019	5	.016	4	77.7	77.7	.285	4
35	37 XB3-01	.086	5	0.0	-33.07	-2.00	-79.68	-54.56	.004	5	.004	5	34.1	34.1	.085	4
35	41 DB2-01	.776	5	0.0	-256.22	-14.31	-72.75	559.57	.024	1	.018	1	59.3	59.3	.774	4
42	35 JL1-01	.029	5	0.0	5.37	57.02	341.13	-.25	.016	5	.013	5	30.4	30.4	.028	4
35	43 DB2-01	.782	5	0.0	-253.43	26.39	-66.39	-589.01	.028	4	.020	4	59.3	59.3	.780	4
35	71 HB2-01	.066	5	2.8	-70.77	-.01	-7.10	-8.85	.001	1	.000	5	1.4	1.4	.065	4
36	37 XB3-01	.297	5	30.5	-55.28	92.09	-165.61	623.73	.060	5	.038	5	34.1	34.1	.297	4
36	36 DB2-01	.643	5	41.3	251.45	69.15	380.68	-335.80	.055	4	.035	4	59.3	59.3	.642	4
36	36 JL1-01	.062	5	0.0	5.12	-245.74	-398.55	849.88	.041	1	.026	1	30.4	30.4	.062	4
36	45 DB2-01	.704	5	0.0	-250.50	69.12	-239.45	352.71	.053	4	.032	4	59.3	59.3	.702	4
36	73 HBN-01	.013	4	2.8	3.35	9.01	-7.10	2547.29	.001	4	.104	5	1.4	1.4	.013	5
39	38 HB2-01	.645	5	25.0	-142.90	-7.04	339.75	-964.59	.024	5	.022	5	42.7	42.7	.645	4
45	38 HB2-01	.619	5	25.0	-126.68	3.83	315.84	976.42	.023	1	.021	1	42.7	42.7	.618	4
46	38 XB3-01	.266	5	35.4	-3.83	-4.24	814.95	14.14	.012	4	.011	4	40.1	40.1	.265	4
36	75 HBN-01	.203	5	2.8	-217.14	1.58	-7.10	591.32	.000	5	.016	2	1.4	1.4	.203	4
40	39 HB2-01	.546	5	25.0	158.38	17.91	403.30	580.40	.024	1	.019	5	42.7	42.7	.546	4
41	40 HB2-01	.523	5	0.0	-149.56	4.05	-266.94	-597.66	.017	1	.016	5	42.7	42.7	.522	4
46	40 XB3-01	.244	4	0.0	-6.36	-101.15	-207.78	705.01	.065	5	.041	5	40.1	40.1	.244	5
40	77 HBN-01	.032	1	2.8	-3.87	25.72	-7.10	7274.31	.001	5	.330	5	1.4	1.4	.031	5
42	41 HB2-01	.594	5	0.0	126.07	-1.48	-250.56	928.17	.020	1	.019	1	42.7	42.7	.593	4
42	43 HB2-01	.603	5	0.0	126.11	-4.80	-245.85	-955.62	.021	4	.020	4	42.7	42.7	.602	4
42	46 XB3-01	.060	1	35.4	10.13	-.00	-139.64	-.00	.005	5	.005	1	40.1	40.1	.059	5
42	79 HBN-01	.193	5	0.0	208.37	.08	39.21	.00	.002	5	.001	5	1.4	1.4	.192	4
43	44 HB2-01	.512	5	0.0	-147.40	-6.00	-244.17	574.11	.018	5	.016	5	42.7	42.7	.511	4
44	45 HB2-01	.519	5	25.0	145.01	-20.00	398.59	-571.00	.025	5	.019	5	42.7	42.7	.518	4
44	46 XB3-01	.240	1	35.4	-5.56	91.66	-210.01	695.86	.062	5	.039	5	40.1	40.1	.240	4
44	81 HBN-01	.038	4	2.8	-8.56	-27.09	-7.10	-7661.42	.001	1	.314	5	1.4	1.4	.037	5
51	52 HBN-01	.016	4	0.0	-16.48	-.00	7.10	-202.67	.001	4	.008	2	1.4	1.4	.015	5
52	60 P1 -01	1.148	5	0.0	-1090.03	.44	-15873.37	917.34	.029	4	.029	4	29.6	29.6	1.145	4
53	54 HBN-01	.010	4	0.0	-.49	.00	7.10	-2386.07	.001	5	.098	5	1.4	1.4	.010	5
54	62 P1 -01	.732	5	0.0	-79.57	9.27	613.57	17387.57	.038	5	.032	5	29.6	29.6	.725	4
55	56 HBN-01	.005	4	0.0	-5.21	.00	7.10	102.22	.001	1	.004	5	1.4	1.4	.005	1
56	64 P1 -01	1.102	4	0.0	1334.51	.02	16061.11	-178.93	.030	5	.030	5	29.6	29.6	1.096	5
57	58 HBN-01	.009	4	0.0	-.86	-.00	7.10	2184.98	.001	4	.089	4	1.4	1.4	.009	5
58	66 P1 -01	.721	5	0.0	-183.38	-8.84	-294.37	-15165.43	.030	5	.030	5	29.6	29.6	.713	4
59	60 HBN-01	.076	4	0.0	81.55	.00	7.10	168.29	.001	5	.007	2	1.4	1.4	.076	5
60	68 P1 -01	.751	5	0.0	-1513.61	.44	4699.20	-296.37	.012	5	.012	5	30.6	30.6	.726	4
61	62 HBN-01	.015	1	0.0	4.92	.00	7.10	2657.31	.001	1	.123	5	1.4	1.4	.015	4
62	70 P1 -01	.253	5	0.0	-91.90	9.27	353.07	-5417.15	.014	5	.013	5	30.6	30.6	.246	4
63	64 HBN-01	.073	5	0.0	-78.83	.00	7.10	-15.77	.001	5	.001	2	1.4	1.4	.073	4
64	72 P1 -01	.648	4	0.0	1336.67	.02	-4837.31	14.72	.012	5	.012	5	30.6	30.6	.640	5
65	66 HBN-01	.018	4	0.0	7.48	-.00	7.10	-2811.61	.001	4	.115	5	1.4	1.4	.018	5

STRAN MEMBER STRE[illegible] REPORT NO, 2

DATE 04/30/76

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	LOAD COND	DIST FROM END(FT)	FORCE FX KIPS	TORSION MX IN-KIPS	MOMENT MY IN-KIPS	MOMENT MZ IN-KIPS	Z-AXIS SHEAR UNITY CK	LD CN	Y-AXIS SHEAR UNITY CK	LD CN	KLY/RY	KLZ/RZ	NEXT HIGH UN.CK.	LD CN
66- 74	P1 -01	.281	5	0.0	-198.51	-8.34	590.28	5150.88	.015	5	.013	5	30.6	30.6	.273	4
67- 68	WBN-01	.064	5	0.0	-48.57	-.08	7.10	-146.95	.001	4	.006	2	1.4	1.4	.064	4
68- 76	P2 -01	1.006	5	35.3	-1543.56	.44	16537.57	-878.83	.021	5	.021	5	34.7	34.7	1.001	4
69- 70	WBN-01	.011	4	0.0	[illegible]	.08	7.10	-2681.28	.001	1	.110	5	1.4	1.4	.011	5
70- 78	P2 -01	.672	5	35.3	-121.16	8.27	-218.35	-18439.49	.023	5	.023	5	34.7	34.7	.665	4
71- 72	WBN-01	.066	5	0.0	70.77	.00	7.10	-8.85	.001	1	.000	5	1.4	1.4	.065	4
72- 80	P2 -01	.921	4	35.3	1294.21	.02	-16061.75	-37.14	.020	5	.020	5	34.7	34.7	.916	5
73- 74	WBN-01	.013	4	0.0	-4.55	-.00	7.10	2547.31	.001	5	.104	5	1.4	1.4	.013	5
74- 82	P2 -01	.675	5	35.3	-225.58	-8.88	418.29	17577.33	.022	5	.022	5	34.7	34.7	.667	4
75- 76	WBN-01	.203	5	0.0	217.18	.00	7.10	391.33	.001	1	.016	2	1.4	1.4	.202	4
76- 103	P3 -01	6.615	5	0.0	-1561.55	-.00	16537.57	-878.83	.953	5	.051	2	2.2	2.2	6.559	4
77- 78	WBN-01	.032	1	0.0	3.57	.00	7.10	7274.36	.001	5	.330	5	1.4	1.4	.031	5
78- 104	P3 -01	1.148	1	0.0	[illegible]	-.00	105.27	-16459.36	.018	2	1.061	5	2.2	2.2	1.107	5
79- 80	WBN-01	.194	5	0.0	-20.87	.00	7.10	22.36	.001	1	.001	5	1.4	1.4	.195	4
80- 102	P3 -01	5.645	4	0.0	1324.08	-.00	-16061.75	-37.14	.930	5	.003	5	2.2	2.2	5.544	5
81- 82	WBN-01	.038	4	0.0	8.56	-.00	9.10	-7081.47	.001	4	.314	5	1.4	1.4	.037	5
82- 101	P3 -01	1.490	5	0.0	-226.55	-.00	418.29	17577.33	.028	4	1.011	5	2.2	2.2	1.407	4

/-------- CONTROLLING MEMBER ACTIONS --------/

STRAN MEMBER STRESS REPORT NO. 3

DATE 04/30/76

4=PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	LOAD COND NO.	DIST FROM END(FT)	AXIAL STRESS KSI	BENDING STRESS Y KSI	BENDING STRESS Z KSI	SHEAR FORCE FY KIPS	SHEAR FORCE FZ KIPS	KLY/RY	KLZ/RZ	SECOND-HIGHEST UNITY CHECK	SECOND-HIGHEST LOAD COND	THIRD-HIGHEST UNITY CHECK	THIRD-HIGHEST LOAD COND
2= 1	=21=01	.521	5	10.0	-.51	8.08	-2.38	.38	10.31	14.3	69.5	.261	3	.260	4
8= 1	H21=01	.185	5	0.0	-.23	.95	-1.58	-.08	-2.11	42.9	208.5	.169	4	.164	1
9= 1	SSC=01	.071	5	0.0	-.15	-1.38	0.00	4.17	9.97	17.7	17.7	.058	4	.044	1
3= 2	=21=01	.265	5	0.0	-.61	-3.59	-1.33	-.24	.36	14.3	69.5	.152	3	.115	4
7= 2	=17=01	.062	5	30.0	-.05	.01	.72	-.02	8.85	50.0	283.0	.062	4	.052	1
4= 3	=21=01	.724	5	0.0	-.61	6.01	8.80	1.01	-9.04	14.3	69.5	.461	4	.264	3
6= 3	=17=01	.024	5	30.0	.11	.01	.40	-.01	8.85	50.0	283.0	.023	4	.020	2
5= 4	H21=01	.676	5	0.0	-.37	.68	11.62	1.79	-1.93	42.9	208.5	.635	4	.512	2
11= 4	SSC=01	.086	5	0.0	-.14	-1.70	0.00	0.22	-9.06	17.7	17.7	.064	4	.049	1
5= 6	=21=01	.914	5	0.0	-.90	12.24	-6.28	-.89	-17.59	14.3	69.5	.529	3	.389	4
12= 5	SSC=01	.088	5	15.0	-.17	-1.72	0.00	-5.05	-12.72	17.7	17.7	.076	3	.052	4
6= 7	=21=01	.492	5	0.0	-.90	-6.72	2.73	.36	.06	14.3	69.5	.302	3	.191	4
7= 8	=21=01	.764	5	10.0	-.89	13.34	1.99	-.26	18.26	14.3	69.5	.522	3	.244	4
14= 8	SSC=01	.096	5	15.0	-.18	-1.88	0.00	-4.34	14.40	17.7	17.7	.076	3	.061	4
10= 9	=18=01	.553	5	15.0	-4.52	4.72	-1.12	.09	4.71	19.4	86.4	.469	4	.349	1
14= 9	=18=01	1.376	1	0.0	-3.56	.05	-1.96	-.10	-.48	43.7	194.4	1.339	4	1.319	5
15= 9	SSC=01	.840	5	0.0	-1.40	-16.69	0.00	-45.84	-52.98	16.5	16.5	.835	4	.716	1
16= 9	DB3=01	.990	4	33.1	10.22	11.17	0.00	4.55	3.36	61.0	61.0	.990	5	.798	1
15= 9	DB3=01	.810	5	33.1	8.03	9.48	0.00	-3.71	3.08	61.0	61.0	.810	4	.801	1
11= 10	=18=01	.672	5	0.0	-4.52	2.56	5.10	.37	-5.54	19.4	86.4	.589	4	.326	1
13= 10	=18=01	.032	5	30.0	.02	.01	.66	-.02	6.93	43.7	194.4	.032	4	.018	1
12= 11	H18=01	173.215	5	30.0	-5.92	5.70	29.12	-12.69	6.70	43.7	194.4	72.111	4	1.840	2
16= 11	SSC=01	.866	5	0.0	-.86	-17.82	0.00	-48.12	-47.24	16.5	16.5	.859	4	.712	1
17= 11	DB3=01	.971	5	0.0	9.08	11.90	0.00	4.88	-3.79	61.0	61.0	.967	4	.938	1
12= 13	=18=01	.590	5	0.0	-2.98	6.00	-3.17	1.28	-6.96	19.4	86.4	.419	4	.264	3
17= 12	SSC=01	.857	5	0.0	-.44	-18.05	0.00	-50.82	24.23	16.5	16.5	.839	4	.729	1
13= 14	=18=01	.524	5	15.0	-2.98	6.89	1.02	-1.00	7.00	19.4	86.4	.355	4	.343	1
17= 14	DB3=01	1.073	5	0.0	8.66	14.52	0.00	-10.59	93.92	61.0	61.0	1.071	4	.957	1
18= 14	SSC=01	.793	5	0.0	-.90	-16.19	0.00	-37.38	-45.72	16.5	16.5	.784	4	.711	1
16= 15	HB3=01	.897	4	30.0	-2.70	-16.67	0.00	9.86	3.73	58.5	58.5	.896	5	.759	1
18= 15	HB3=01	.761	1	30.0	-1.75	-14.16	0.00	28.81	3.08	58.5	58.5	.744	5	.742	4
19= 15	SSC=01	.958	5	29.5	-1.51	-19.02	0.00	32.11	41.65	34.8	34.8	.953	4	.818	1
47= 15	XB1=01	.670	4	21.2	-2.46	-11.81	0.00	-.27	5.56	29.4	29.4	.669	5	.562	1
17= 16	HB3=01	1.747	1	0.0	-1.56	-35.67	0.00	28.82	1.93	58.5	58.5	1.744	5	1.109	2
20= 16	SSC=01	.901	5	29.5	-.29	-19.15	0.00	34.75	41.99	34.8	34.8	.893	4	.736	1
47= 16	XB1=01	.548	4	21.2	-1.78	-9.91	0.00	5.28	-.31	29.4	29.4	.547	5	.307	1
17= 18	HB3=01	.845	4	0.0	-2.04	-15.59	0.00	-9.26	1.09	58.5	58.5	.842	5	.688	1
21= 17	SSC=01	.952	4	29.5	.93	19.64	0.00	42.88	52.50	34.8	34.8	.942	5	.819	1
17= 47	XB1=01	.715	4	0.0	-2.16	-13.10	0.00	-2.57	5.55	29.4	29.4	.712	5	.572	1
22= 18	SSC=01	.822	5	29.5	-.47	-17.23	0.00	30.09	38.20	34.8	34.8	.812	4	.735	1
18= 47	XB1=01	.305	1	0.0	-1.51	-4.96	0.00	22.24	1.41	29.4	29.4	.268	4	.267	5
23= 19	JL1=01	1.919	5	0.0	20.91	20.54	0.00	-4.16	124.73	3.9	3.9	1.918	4	1.745	1
19= 52	P1 =01	1.149	5	4.5	-10.94	-13.88	0.00	-2.58	80.80	0.4	4.4	1.145	4	1.034	1
24= 20	JL1=01	1.050	5	0.0	.59	22.10	0.00	2106.54	515.59	3.9	3.9	1.049	4	.965	1
20= 54	P1 =01	.730	5	4.5	-.58	-15.18	0.00	-7.61	1.22	4.4	4.4	.724	4	.656	1
25= 21	JL1=01	2.061	5	0.0	-19.84	-24.68	0.00	-2.50	1106.85	3.9	3.9	2.051	4	1.859	1
21= 56	P1 =01	1.101	4	4.5	9.77	14.02	0.00	2.48	803.90	4.4	4.4	1.096	5	.995	1
26= 22	JL1=01	1.042	4	0.0	1.91	20.60	0.00	99.67	85.38	3.9	3.9	1.042	5	.965	1

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	LOAD COND NO.	DIST FROM END(FT)	AXIAL STRESS KSI	BENDING STRESS Y KSI	BENDING STRESS Z KSI	SHEAR FORCE FY KIPS	SHEAR FORCE FZ KIPS	KLY/RY	KLZ/RZ	SECOND-HIGHEST UNITY CHECK	SECOND-HIGHEST LOAD COND	THIRD-HIGHEST UNITY CHECK	THIRD-HIGHEST LOAD COND
22- 58	P1 -01	.716	5	4.5	-1.34	-10.11	0.00	5.72	2.43	4.4	4.4	.709	4	.656	1
24- 23	HB1-01	.790	4	30.9	4.17	15.98	0.00	4.98	5.41	70.1	70.1	.789	5	.681	1
26- 23	HB1-01	.702	4	30.9	2.15	14.40	0.00	-4.96	4.91	70.1	70.1	.701	5	.681	1
27- 23	XB1-01	.987	4	21.8	4.47	12.85	0.00	-.29	8.41	30.4	30.4	.986	5	.906	1
28- 23	JL1-01	1.712	5	30.3	20.97	16.80	0.00	1.67	-43.91	26.0	26.0	1.711	4	1.556	1
23- 51	WBN-01	.016	4	2.8	.33	-.00	-.02	5.98	-.48	1.4	1.4	.015	5	.014	1
25- 24	HB1-01	1.072	4	0.0	6.21	16.93	0.00	30.70	3.07	70.1	70.1	1.071	5	.724	1
27- 24	XB1-01	.371	4	0.0	3.14	6.68	0.00	7.25	-.57	30.4	30.4	.369	5	.299	1
28- 24	DB1-01	1.050	5	45.4	-10.48	-8.68	0.00	-7.85	-6.89	59.3	59.3	1.049	4	.881	1
29- 24	JL1-01	1.037	5	30.3	4.86	17.54	0.00	49.13	2.91	26.0	26.0	1.035	4	.934	1
24- 53	WBN-01	.010	4	2.8	.02	-.00	-.20	70.30	-.42	1.4	1.4	.010	5	.008	1
25- 26	HB1-01	.770	4	30.9	5.03	11.46	0.00	5.69	4.76	70.1	70.1	.766	5	.725	1
25- 27	XB1-01	.832	5	0.0	4.98	13.00	0.00	-1.48	4.81	30.4	30.4	.832	4	.759	1
29- 25	DB1-01	1.202	5	45.4	-12.43	-8.82	0.00	9.48	-5.37	59.3	59.3	1.195	4	1.106	1
30- 25	JL1-01	1.206	5	30.3	-9.88	-16.17	0.00	-.39	45.43	26.0	26.0	1.200	4	1.096	1
31- 25	DB1-01	1.306	5	45.4	-12.56	-10.78	0.00	-10.76	-5.26	59.3	59.3	1.300	4	1.106	1
25- 55	WBN-01	.005	4	2.8	.10	-.00	.01	-3.01	-.44	1.4	1.4	.005	1	.003	5
26- 27	XB1-01	.303	4	21.8	3.30	3.26	0.00	-6.01	.20	30.4	30.4	.301	5	.299	1
28- 26	DB1-01	.912	5	45.4	-8.68	-8.80	0.00	8.07	-6.52	59.3	59.3	.909	4	.881	1
31- 26	JL1-01	1.008	5	30.3	5.48	16.36	0.00	-46.54	.76	26.0	26.0	1.308	4	.954	1
26- 57	WBN-01	.009	4	2.8	.02	-.00	.18	-60.31	-.42	1.4	1.4	.009	5	.008	1
29- 28	HB1-01	.249	4	36.9	.25	5.12	0.00	4.00	1.24	85.2	85.2	.249	5	.236	1
31- 28	HB1-01	.256	5	36.9	-.17	-5.27	0.00	-4.00	1.20	85.2	85.2	.256	4	.236	1
32- 28	XB2-01	.133	5	26.1	-.13	-2.73	0.00	-.14	2.38	32.3	32.3	.132	4	.123	1
33- 28	JL1-01	.538	5	31.3	8.03	3.59	0.00	-.67	-.43	26.9	26.9	.537	4	.492	1
34- 28	DB2-01	.757	5	50.7	9.19	7.16	0.00	6.58	4.99	74.0	74.0	.756	4	.688	1
36- 28	DB2-01	.714	5	50.7	8.07	7.35	0.00	-6.63	4.96	74.0	74.0	.712	4	.668	1
28- 59	WBN-01	.076	4	2.8	-1.63	-.00	.01	-4.96	-.13	1.4	1.4	.076	5	.070	1
30- 29	HB1-01	.309	1	0.0	2.28	4.39	0.00	3.53	-1.02	85.2	85.2	.296	5	.295	4
32- 29	XB2-01	.319	2	0.0	2.55	4.34	0.00	6.83	-.13	32.3	32.3	.318	4	.285	1
34- 29	JL1-01	.267	5	31.3	-2.24	-3.35	0.00	3.44	3.95	26.9	26.9	.266	4	.215	1
35- 29	DB2-01	.547	5	0.0	6.29	5.52	0.00	4.56	-4.46	74.0	74.0	.545	4	.511	1
29- 61	WBN-01	.015	1	2.8	-.10	-.00	.22	-76.29	-.40	1.4	1.4	.015	4	.015	5
30- 31	HB1-01	.353	5	0.0	2.66	4.95	0.00	-3.65	-1.01	85.2	85.2	.352	4	.309	1
30- 32	XB2-01	.091	5	0.0	.35	1.63	0.00	-.61	-1.71	32.3	32.3	.091	4	.076	1
35- 30	JL1-01	.598	5	31.3	-10.01	-2.44	0.00	.02	5.04	26.9	26.9	.595	4	.532	1
10- 63	WBN-01	.073	5	0.0	1.58	.00	.00	.46	-1.12	1.4	1.4	.073	4	.067	1
11- 32	XB2-01	.293	5	26.1	2.53	3.80	0.00	-6.31	.10	32.3	32.3	.292	4	.285	1
35- 31	DB2-01	.547	5	0.0	6.21	5.61	0.00	-4.55	-4.45	74.0	74.0	.546	4	.511	1
36- 31	JL1-01	.230	5	31.3	-1.58	-3.26	0.00	-3.68	4.05	26.9	26.9	.229	4	.215	1
31- 65	WBN-01	.018	4	2.8	-.15	-.00	-.23	82.84	-.39	1.4	1.4	.018	5	.015	1
34- 33	HB2-01	.396	5	43.1	-2.17	-5.54	0.00	5.11	2.47	77.7	77.7	.395	4	.362	1
16- 33	HB2-01	.369	5	43.1	-1.81	-5.46	0.00	-5.11	2.34	77.7	77.7	.368	4	.362	1
17- 33	XB3-01	.288	5	30.5	-1.56	-4.51	0.00	-.10	3.74	34.1	34.1	.287	4	.267	1
18- 33	JL1-01	.104	5	0.0	.12	2.12	0.00	-.00	13.14	30.4	30.4	.103	4	.099	1
19- 33	DB2-01	.738	5	41.3	10.48	5.45	0.00	5.23	3.05	59.3	59.3	.737	4	.677	1
15- 33	DB2-01	.69?	5	41.3	9.45	5.54	0.00	-5.26	3.04	59.3	59.3	.692	4	.677	1
33- 67	WBN-01	.064	5	2.8	1.37	-.00	-.01	4.33	-.66	1.4	1.4	.064	4	.059	1

STRAN MEMBER STRESS REPORT NO. 3

DATE 04/30/76

4-PILE ACMR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	LOAD COND NO.	DIST FROM END(FT)	AXIAL STRESS KSI	BENDING STRESS Y KSI	BENDING STRESS Z KSI	SHEAR FORCE FY KIPS	SHEAR FORCE FZ KIPS	KLY/RY	KLZ/RZ	SECOND-HIGHEST UNITY CHECK	SECOND-HIGHEST LOAD COND	THIRD-HIGHEST UNITY CHECK	THIRD-HIGHEST LOAD COND
35= 34	HH2=01	.269	5	0.0	-1.15	-4.23	0.00	4.63	-.75	77.7	77.7	.268	4	.266	1
37= 34	XH3=01	.307	5	0.0	-1.80	-4.65	0.00	7.49	.04	34.1	34.1	.307	4	.290	1
34= 39	DH2=01	.769	5	0.0	-10.14	-3.65	0.00	-3.72	2.76	59.3	59.3	.767	4	.684	1
40= 34	JL1=01	.063	5	0.0	.08	1.27	0.00	-10.90	.60	30.4	30.4	.063	4	.060	1
41= 34	DH2=01	.649	5	41.3	9.61	4.40	0.00	-3.65	4.39	59.3	59.3	.647	4	.610	1
34= 69	HBN=01	.011	4	2.8	.01	-.00	-.22	79.00	-.42	1.4	1.4	.011	5	.011	1
35= 36	HH2=01	.285	5	0.0	-1.12	-4.61	0.00	-4.73	-.78	77.7	77.7	.285	4	.266	1
35= 37	XH3=01	.086	5	0.0	-1.08	-.66	0.00	-.21	-1.21	34.1	34.1	.085	4	.068	1
35= 41	DH2=01	.776	5	0.0	-9.32	-4.82	0.00	4.63	1.17	59.3	59.3	.774	4	.730	1
42= 35	JL1=01	.029	5	0.0	.05	.56	0.00	.01	-8.36	30.4	30.4	.028	4	.026	1
35= 45	DH2=01	.782	5	0.0	-9.22	-5.07	0.00	-4.69	1.16	59.3	59.3	.780	4	.730	1
35= 71	HBN=01	.066	5	2.8	-1.42	-.00	-.00	.26	-.17	1.4	1.4	.065	4	.061	1
36= 37	XH3=01	.297	5	30.5	-1.80	-4.43	0.00	-7.25	-.11	34.1	34.1	.297	4	.290	1
43= 36	DH2=01	.643	5	41.3	9.51	4.38	0.00	3.65	4.39	59.3	59.3	.642	4	.610	1
44= 36	JL1=01	.062	5	0.0	.08	1.26	0.00	10.74	.84	30.4	30.4	.062	4	.060	1
36= 45	DH2=01	.704	5	0.0	-9.11	-3.64	0.00	3.71	2.80	59.3	59.3	.702	4	.684	1
35= 73	HBN=01	.013	4	2.8	.07	-.00	.21	-75.05	-.43	1.4	1.4	.013	5	.011	1
39= 38	HH2=01	.645	5	25.0	-5.20	-8.74	0.00	7.57	2.51	42.7	42.7	.645	4	.610	1
45= 38	HH2=01	.619	5	25.0	-4.61	-8.76	0.00	-7.59	2.39	42.7	42.7	.618	4	.610	1
46= 38	XH3=01	.266	5	35.4	-.12	-5.59	0.00	-.04	4.20	40.1	40.1	.266	4	.258	1
35= 75	HBN=01	.203	5	2.8	-4.34	-.00	.03	-11.53	.55	1.4	1.4	.203	4	.187	1
40= 39	HH2=01	.546	5	25.0	5.76	6.04	0.00	-.95	3.64	42.7	42.7	.546	4	.510	1
41= 40	HH2=01	.523	5	0.0	-5.44	-5.59	0.00	-1.10	1.39	42.7	42.7	.522	4	.491	1
46= 40	XH3=01	.244	4	0.0	-.21	-5.04	0.00	7.26	-.10	40.1	40.1	.244	5	.240	1
40= 77	HBN=01	.032	1	2.8	-.08	-.00	.61	-210.32	-.40	1.4	1.4	.031	5	.031	4
42= 41	HH2=01	.594	5	0.0	4.62	8.22	0.00	7.12	.08	42.7	42.7	.593	4	.579	1
42= 43	HH2=01	.603	5	0.0	4.59	8.43	0.00	-7.18	.67	42.7	42.7	.602	4	.579	1
42= 46	XH3=01	.060	1	35.4	.53	.98	0.00	.00	.99	40.1	40.1	.059	5	.059	4
42= 79	HBN=01	.193	5	0.0	4.17	.01	.00	-.00	-1.57	1.4	1.4	.192	4	.179	1
43= 44	HH2=01	.512	5	0.0	-5.36	-5.43	0.00	.59	1.37	42.7	42.7	.511	4	.491	1
48= 45	HH2=01	.519	5	25.0	5.28	5.93	0.00	.91	[illegible]	42.7	42.7	.518	4	.510	1
44= 46	XH3=01	.240	1	35.4	-.18	-4.99	0.00	-7.21	[illegible]	40.1	40.1	.240	4	.240	5
44= 81	HBN=01	.038	4	2.8	-.17	-.00	-.64	225.73	-.39	1.4	1.4	.037	5	.032	1
51= 52	HB1=01	.016	4	0.0	-.33	.00	-.02	-5.98	-.42	1.4	1.4	.015	5	.014	1
52= 60	P1 =01	1.148	5	0.0	-10.92	-13.88	0.00	3.35	95.73	29.6	29.6	1.145	4	1.038	1
53= 54	WBA=01	.010	4	0.0	-.02	.00	-.20	-75.30	-.48	1.4	1.4	.010	5	.008	1
54= 62	P1 =01	.732	5	0.0	-.58	-15.16	0.00	62.72	-1.56	29.6	29.6	.725	4	.659	1
55= 56	HBA=01	.005	4	0.0	-.10	.00	.01	3.01	-.02	1.4	1.4	.005	1	.003	5
56= 64	P1 =01	1.102	4	0.0	9.74	14.02	0.00	-.53	-56.55	29.6	29.6	1.096	5	.995	1
57= 58	HBA=01	.009	4	0.0	-.02	.00	.18	64.31	-.02	1.4	1.4	.009	5	.008	1
58= 66	P1 =01	.721	5	0.0	-1.34	-14.11	0.00	-58.57	1.38	29.6	29.6	.713	4	.659	1
59= 60	HBN=01	.076	4	0.0	1.63	.00	.01	4.96	-.42	1.4	1.4	.076	5	.070	1
60= 68	P1 =01	.731	5	0.0	-11.09	-4.11	0.00	-1.57	-23.17	30.6	30.6	.726	4	.653	1
61= 62	HBA=01	.015	1	0.0	.10	.00	.22	75.29	-.42	1.4	1.4	.015	4	.015	5
62= 70	P1 =01	.253	5	0.0	-.67	-4.74	0.00	-25.71	-2.45	30.6	30.6	.246	4	.240	1
63= 64	HBA=01	.073	5	0.0	-1.58	.00	-.00	-.85	-.42	1.4	1.4	.073	4	.067	1
64= 72	P1 =01	.648	4	0.0	9.77	4.22	0.00	-.06	20.98	30.6	30.6	.640	5	.580	1
65= 66	HBN=01	.018	4	0.0	.15	.00	-.23	-82.84	-.42	1.4	1.4	.018	5	.015	1

STRAN MEMBER STRE REPORT NO. 5

4-PILE ACHR STRUCTURE -- U.S. NAVY (36-IN. DIAMETER PILING) -- J.ATKINSON

MEMBER NO.	GROUP ID	MAXIMUM COMBINED UNITY CK	LOAD COND NO.	DIST FROM END(FT)	AXIAL STRESS KSI	BENDING STRESS Y KSI	BENDING STRESS Z KSI	SHEAR FORCE FY KIPS	SHEAR FORCE FZ KIPS	KLY/RY	KLZ/RZ	SECOND-HIGHEST UNITY CHECK	SECOND-HIGHEST LOAD COND	THIRD-HIGHEST UNITY CHECK	THIRD-HIGHEST LOAD COND
65- 74	P1 -01	.281	5	0.0	-1.10	-8.81	0.00	24.33	-5.88	30.6	30.6	.276	4	.240	1
67- 68	WBN-01	.064	5	0.0	-1.57	.00	-.01	-4.53	-.42	1.4	1.4	.064	4	.059	1
68- 76	P2 -01	1.006	5	35.3	-9.86	-12.50	0.00	2.76	48.84	34.7	34.7	1.001	4	.916	1
69- 70	WBN-01	.011	4	0.0	-.01	.00	-.22	-79.00	-.42	1.4	1.4	.011	5	.011	1
70- 78	P2 -01	.672	5	35.3	-.79	-13.70	0.00	53.47	1.68	34.7	34.7	.665	4	.619	1
71- 72	WBN-01	.066	5	0.0	1.42	.00	-.00	-.26	-.42	1.4	1.4	.065	4	.061	1
72- 80	P2 -01	.921	4	35.3	7.96	11.93	0.00	.17	-44.60	34.7	34.7	.916	5	.859	1
73- 74	WBN-01	.013	4	0.0	2.67	.00	.21	75.05	-.42	1.4	1.4	.013	5	.011	1
74- 82	P2 -01	.675	5	35.3	-1.39	-13.06	0.00	-50.90	3.45	34.7	34.7	.667	4	.619	1
75- 76	WBN-01	.203	5	0.0	4.34	.00	.03	11.53	-.42	1.4	1.4	.202	4	.187	1
76- 103	P3 -01	6.615	5	0.0	-129.05	12.28	-.65	-8.77	-165.27	2.2	2.2	6.559	4	5.879	1
77- 78	WBN-01	.032	1	0.0	.08	.00	.61	214.32	-.42	1.4	1.4	.031	5	.031	4
78- 104	P3 -01	1.148	1	0.0	-13.56	.00	12.57	-169.20	-1.55	2.2	2.2	1.107	5	1.058	4
79- 80	WBN-01	.194	5	0.0	-4.17	.00	.00	.66	-.42	1.4	1.4	.195	4	.180	1
80- 102	P3 -01	5.645	4	0.0	169.97	11.63	-.23	-.57	159.96	2.2	2.2	5.544	5	4.497	1
81- 82	WBN-01	.038	4	0.0	.17	.00	-.64	-225.73	-.42	1.4	1.4	.037	5	.032	1
82- 101	P3 -01	1.490	5	0.0	-18.82	.31	13.05	175.36	-4.46	2.2	2.2	1.407	4	1.148	1

```
JYJ3G0G.   04/30/76. UNITED COMPUTING* 67. APEX/SL. 8.0.25

13.18.39$STRAN,CM100,T500,RT.
13.18.39$FL      64       0.000
13.18.39$AC3400CMR0023,277710GCC )B
13.18.39, 04/30/76,JYJ3G0G
13.18.39>FL     5592      0.001
13.18.39,GET,TAPE26=SPFILE(LIBRARY)
13.18.40,READY =   SPFILE
13.18.40,GET,STRAN=STRANS(LIBRARY)
13.18.41,DAF READY =          STRANS
13.18.41,GET,TAPE3=S771A1,
13.18.43,READY =   S771A1
13.18.43,RFL,170000,
13.18.43>FL     4096      0.001        0        0,
13.18.43$FL      176          5
13.18.43,STRAN,
13.18.43$FLS  61440      0.002
13.18.44>FLA  61440      0.359      336        8
13.18.46,FL REQUIRED TO LOAD     621178 ( 25679)
13.18.46,FL REQUIRED TO EXECUTE  52100H ( 2156A)
13.18.46$FL   61440      0.360
13.18.55,$SC START STRAN6
13.18.55,
13.18.55,  SSSSSSSSSSSSSSSSSSSSSSSSSSS
13.18.55, SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
13.18.55, SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
13.18.55, SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
13.18.55, SSSSSSS
13.18.55, SSSSSSS TTTTTTTTTTTTTTTTTTTTT
13.18.55, SSSSSSS TTTTTTTTTTTTTTTTTTTTT
13.18.55, SSSSSSS TTTTTTTTTTTTTTTTTTTTT
13.18.55, SSSSSSS TTTTTTTTTTTTTTTTTTTTT
13.18.55, SSSSSSS          TTTTTTT
13.18.55, SSSSSSSSSSSSSS TTTTTTT SSSSSS
13.18.55, SSSSSSSSSSSSSS TTTTTTT SSSSSS
13.18.55, SSSSSSSSSSSSSS TTTTTTT SSSSSS
13.18.55, SSSSSSSSSSSSSS TTTTTTT SSSSSS
13.18.55,                 TTTTTTT SSSSSS
13.18.55, SSSSSSSSSSSSSS TTTTTTT SSSSSS
13.18.55, SSSSSSSSSSSSSS TTTTTTT SSSSSS
13.18.55, SSSSSSSSSSSSSS TTTTTTT SSSSSS
13.18.55, SSSSSSSSSSSSSS TTTTTTT SSSSSS
13.18.55,
13.18.55,     SYNERCOM TECHNOLOGY, INC.
13.18.55,      S T R A E 6
13.18.55,         MOD 12
13.19.39,4-PILE ACMR STRUCTURE -- U.S. NAVY  (36-
13.19.39,IN, DIAMETER PILING) -- J.ATKINSON
13.19.39,04/30/76
13.19.39,...   5 UNITS      83 JOINTS     161 MEMBERS
13.19.39,...   3 BASIC LOADS GI    761 LOAD CARDS
13.19.39,...   2 COMBINED LOADS
13.19.39,...UNITY CHECK REQUESTED
13.19.55,UNIT  1, 20 JT ELIM,  5 JT FWD, CYCLE  1
13.20.31,UNIT  2, 20 JT ELIM, 24 JT FWD, CYCLE  1
13.21.03,UNIT  3, 20 JT ELIM, 13 JT FWD, CYCLE  1
13.21.44,UNIT  4, 20 JT ELIM,  2 JT FWD, CYCLE  1
13.22.09,UNIT  5,  3 JT ELIM,  0 JT FWD, CYCLE  1
13.22.11,BACKWARD SUBSTITUTION
13.23.15,PRINTING DEFLECTIONS
13.23.24,COMPUTING FORCES
13.24.09,COMPUTING UNITY CHECK
```

```
13.25.28.$RC    STRAN
13.25.29.STOP
13.25.29$SB*    6 440     25,010     17104     2459;
13.25.29$FI       35          2
13.25.29.COST.
13.25.29$FL    61440     25,010
13.25.30.              SERVICE UNITS*     182.2
13.25.30.              JOB COST=$        45.55
13.25.30$FL    12288     25,032          15          5
13.25.50.EXIT.
13.25.30$JTDO  2368      25,033
13.25.30.    *FL*   *CPU SEC, *DISC PRUS* DISC ACC
13.25.30.*P,F, PRUS*P,F, ACC *TAPE PRUS* TAPE ACC
```