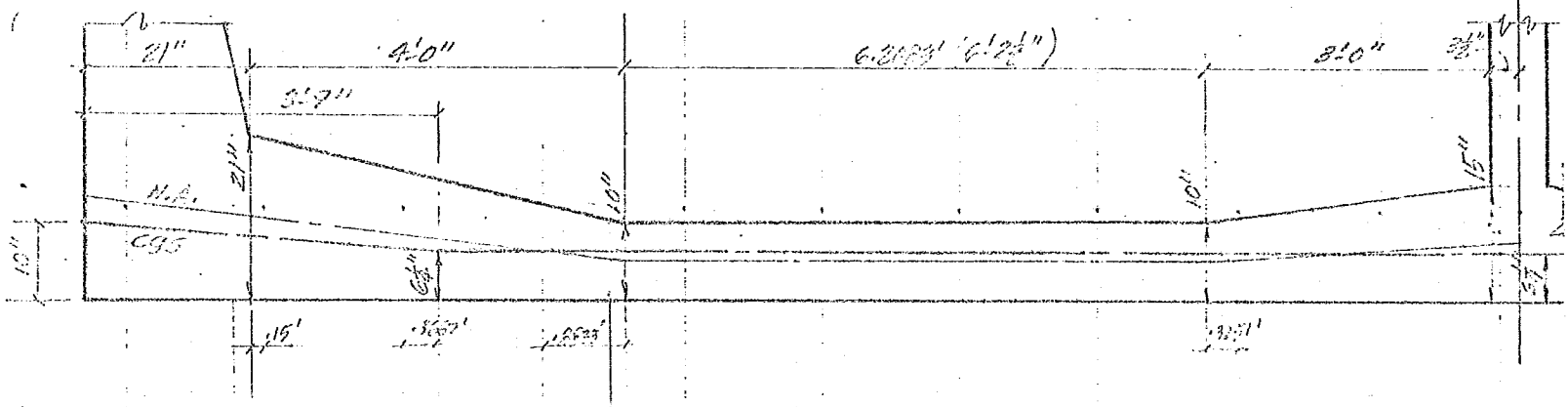
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project ..... Sheet No. 101 of ..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

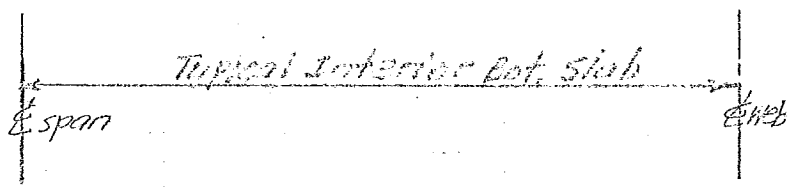
BOT. SLAB ~ EXT. CELL



	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
t in	24.667	20.588	16.508	12.43	10"			10	10.542	13.014	15.486
I in⁴	15008	8726	4,499	1920	1000			1000	1171	2204	3,714
e"	12.33-9.583' -2.75	10.2498-8.1 -2.194	8.2542-6.6167 -1.637	6.2116-6.25 .035	1.25			1.25	5.271-6.25 .979	6.557-6.25 -.257	7.749-6.25 -1.493
Pe^k	-16.88	-13.466	-10.051	.217	7.67			7.67	6.01	-1.578	-9.164

$P = 148.5^{ksi}(.868^{in^2})\frac{1}{1.75'} = 73.656^{k}/1'\text{-}9''$ span.

4~.6" strands @ 1'-9"



33003257

DOT Form 232-007 Revised 10/82 Sheet No.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 102 of..... sheets

S. R. ..... Made by ..... Check by ..... Date 4/83 Supv. YFC/KTS

Bot slab Ext cell — Face of support (21" From Ext. Wall Face)
(Approx. ·1L/4.)

$M_{DL} = 2.06^{k'}$ Tension @ C.F.

$M_{L+I} = -1.63^{k'}$ +3.19 3.26

$M_H = 16.29^{k'}$

$M_{NW} = 30\%(20.30) = 6.09^{k'}$

$M_T = \pm 4.66$

$M_{DM} = -20.27^{k'}$

M_S 5.84$^{k'}$ 4.64$^{k'}$ Tension I.F.
CASE A

$M_S = -5.84 + (5.84 - 4.64)\cdot 1 = -5.72^{k'}$ Tension I.F.

11.78 case B 2.73

$M_S = -11.78 + (11.78 - 2.73)\cdot 1 = -10.88^{k'}$

$t = 20.59''$ $e = -2.194$ $M_{pe} = -13.46^{k'}$ Tension I.F.

33003258

DOT FORM 232-007
REVISED 9/81

Sheet No.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake wash. Floating Bridge - Stage II Sheet No. 102 of sheets
S. R. 90 Made by YMT. Check by Date Supv. YRC/RTS

Transverse Design — pontoon D near Wall 5
Section at .1 L14

$t = 20.59''$ $c = -2.19$ $M_{pe} = -13.46^{k'}$
$A = 20.59(12) = 247$ $S = \frac{12}{6}(20.59)^2 = 848^{in^3}$

Group 5①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	2.06	"	
M_H	16.29	"	
M_L	-1.63 +3.19	"	
M_{pe}	-13.46	"	
M_{2nd}	-5.72	-10.88	
	(-.83)	(-5.99)	
	-2.46 2.36	-7.62 -2.80	

Group 5③: 5① + .3 wave 125%

	Case A	Case B	Case C
5①	2.36		
3W	6.09		
	8.45		

Group 5④: 5① + T 125%

	Case A	Case B	Case C
5①		-7.62	
T		-4.66	
		-12.28	

Group 5⑥: 5③ + T 140%

	Case A	Case B	Case C
5③	8.45		
T	4.66		
	13.11		

$f = -\frac{73.66}{247} \pm \frac{13.11(12)}{848} = -.298 \pm -.186 = -.484^{ksi}$ Max $< 2.0^{ksi}$
$= -.113^{ksi}$ Min. 0^{ksi}
OK -

Flood Damage

Group 5⑦: 5① + DM

	Case A	Case B	Case C
5①		-7.62	
DM		-20.27	
		-27.89	

Group 5⑨: 5③ + DM

	Case A	Case B	Case C
5③			
DM			

$f = -.298 \pm \frac{27.89(12)}{848} = -.298 \pm -.395 = -.693^{ksi}$ Max $< 2.0^{ksi}$
$= +.097^{ksi}$ Min. $+.212^{ksi}$

33003259

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 104 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Bot Slab Ext cell .2L14

$M_{DL} = 2.58^{k'}$

$M_{L+I} = -1.41^{k'} + 2.72^{k'}$

$M_H = 7.47^{k'}$

$M_{NW} = 30\%(-8.07) = -2.42^{k'}$

$M_T = \pm 3.87$

$M_{DM} = -10.89^{k'}$

M_S case A $= -5.84 + (5.84 - 4.64) \cdot 2 = -5.60$ tension I.F.

" B $= -11.78 + (11.78 - 2.73) \cdot 2 = -9.97$ "

$t = 16.51''$ $M_{pe} = -10.05^{k'}$

33003260

DOT FORM 232-007 REVISED 9/81

Sheet No. 3

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 105 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at .2614

$t = 16.51''$ $e = -1.64''$ $M_{pe} = -10.05^{k'}$
$A = 16.51(12) = 198$ $S = \frac{12}{6}(16.51)^2 = 545$

Group 5①: $D + H + (L + I) + M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	2.58	"	
M_H	7.47	"	
M_L	-1.41 +2.72	"	
M_{pe}	-10.05	"	
M_{grd}	-5.60	-9.97	
	(-5.60)	(-9.97)	
	-7.01 -2.88	-11.38 -7.25	

Group 5③: 5① + .3 wave 125%

	Case A	Case B	Case C
5①		-11.38	
.3W		-2.42	
		-13.80	

Group 5④: 5① + T 125%

	Case A	Case B	Case C
5①			
T	3.87		

Group 5⑥: 5③ + T 140%

	Case A	Case B	Case C
5③	-13.80		
T	-3.87		
	-17.67		

$f = -\frac{73.66}{198} \pm \frac{17.67(12)}{545} = -.372 \pm -.389 = -.761$ ksi Max < 2.0 ksi
$= +.017$ ksi Min. 0 ksi
small tension I.F Face.

Flood Damage

Group 5⑦: 5① + DM

	Case A	Case B	Case C
5①		-11.38	
DM			

Group 5⑨: 5③ + DM

	Case A	Case B	Case C
5③		-13.80	
DM		-10.89	
		-24.69	

$f = -\frac{73.66}{198} \pm -\frac{24.69(12)}{545} = -.372 \pm -.544 = -.916$ ksi Max < 2.0 ksi
$= +.171$ ksi Min. +.213 ksi
O.K.

33003261

Form 232-007

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 106 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Bot Slab Ext. cell .3 L/4

$M_{DL} = 2.71^{k'}$

$M_{L+I} = -1.19$ 2.30

$M_H = 1.04$

$M_{NW} = 30\%(13.41) = 4.02$

$M_T = \pm 3.08$

$M_{DM} = -3.91^{k'}$

M_s case A $= -5.84 + (5.84 - 4.69) \cdot .3 = -5.48^{k'}$ tension I.F.

B $= -11.78 + (11.78 - 2.73) \cdot .3 = -9.07$ "

$t = 12.43''$ $c = .0345$ $M_{pe} = .22^{k'}$

33003262

DOT FORM 232-007
REVISED 9/81

Sheet No. 5

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 107 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at .34

$t = 12.43''$ $e = .035$ $M_{pe} = .217$

$A = 12.43(12) = 149$ $S = \frac{12}{6}(12.43)^2 = 309$

Group S①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	2.71		
M_H	1.04		
M_L	-1.19	2.30	
M_{pe}	.22		
M_{2nd}	-5.48	-9.07	
	(-1.51)	-5.10)	
	-2.70	.79	-6.29 -2.80

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	.79	-6.29	
.3W	4.02	4.02	
	4.81	-2.27	

Group S④: S① + T 125%

	Case A	Case B	Case C
S①		-6.29	
T		-3.08	
		-9.37	

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③	4.81		
T	3.08		
	7.89		

$f = -\frac{73.66}{149} \pm \frac{-937(1.4)}{309} = -.494 + -.364 = -.858$ ksi Max < 2.0 ksi

$= -.131$ ksi Min. 0 ksi

O.K.

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①		-6.29	
DM		-3.91	
		-10.20 small.	

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③			
DM			

$f = \pm = \pm =$ ksi Max < 2.0 ksi

$=$ ksi Min. +.212 ksi

33003263

Form 232-007

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 108 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Bot. slab Ext. cell .4L14

$M_D = 2.5^{K'}$

$M_{L+I} = -.96$, 1.83

$M_H = -2.99^{K'}$

$M_{NW} = 30\%(10.09) = 3.03^{K'}$

$M_T = \pm 2.29$

$M_{DM} = .83$, $-.28^{K'}$

M_s case A $-5.84 + (5.84 - 4.64).4 = -5.36^{K'}$ tension I.F.

" B $-11.78 + (11.78 - 2.73).4 = -8.16$ "

$t = 10''$ $M_{pe} = 7.67^{K'}$

33003264

DOT FORM 232-007 REVISED 9/81

Sheet No. 7

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake wash. Floating Bridge - Stage II Sheet No. 109 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at .4 L14

$t = 10''$ $e = 1.25$ $M_{pe} = 7.67$ tension o.F.
$A = 12(10) = 120$ $S = \frac{12}{6}(10)^2 = 200$

Group S① : D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	2.5		
M_H	-2.99		
M_L	-.96	1.83	
M_{pe}	7.67		
M_{2nd}	-5.36 (1.82)	-8.16 (-.98)	
	.86	3.65	-1.94 .85

Group S③ : S① + .3 Wave 125%

	Case A	Case B	Case C
S①	3.65		
.3W	3.03		
	6.68		

Group S④ : S① + T 125%

	Case A	Case B	Case C
S①	3.65		
T	2.29		
	5.94		

Group S⑥ : S③ + T 140%

	Case A	Case B	Case C
S③	6.68		
T	2.29		
	8.97		

$$f = -\frac{73.66}{120} \pm \frac{8.97(12)}{200} = -.614 \pm .538 = -1.152^{ksi} \text{ Max} < 2.0^{ksi}$$
$$= -.076^{ksi} \text{ Min.} \quad 0^{ksi}$$
0.K.

Flood Damage

Group S⑦ : S① + DM

	Case A	Case B	Case C
S①			
DM	small		

Group S⑨ : S③ + DM

	Case A	Case B	Case C
S③			
DM			

$f = \_\_\_ \pm \_\_\_ = \_\_\_ \pm \_\_\_ = \_\_\_^{ksi}$ Max < 2.0 ksi
$= \_\_\_^{ksi}$ Min. +.212 ksi

33003265

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 110 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Bot. Ext cell $\cdot 5L_W$

$M_{DL} = 2.07^{k'}$

$M_{LL+I} = -.74^{k'}, +1.37^{k'}$

$M_H = -4.63$

$M_{NHM} = 30\%(6.86) = 2.06^{k'}$

$M_T = \pm 1.49$

$M_{DM} = 7.97$

M_S case A $-5.89 + (5.89 - 4.64) \cdot .5 = -5.24^{k'}$

case B $-11.78 + (11.78 - 2.73) \cdot .5 = -7.26^{k'}$

$t = 10''$ $M_{PE} = 7.67^{k'}$

33003266

DOT FORM 232-007
REVISED 9/81

Sheet No. 9

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 111 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YPC/RTS

Transverse Design — pontoon D near Wall 5
Section at .5L14

$t = 10''$ $c = 1.25$ $M_{pe} = 7.67$ tension o.F.
$A = 120$ $S = 200$

Group S①: $D + H + (L + I) + M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	2.07		
M_H	-4.63		
M_L	-.74 +1.37		
M_{pe}	7.67		
M_{grd}	-5.24	-7.26	
	(-.13)	(-2.15)	
	-.87 1.24	-2.89 -.78	

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	1.24		
.3W	2.06		
	3.30		

Group S④: S① + T 125%

	Case A	Case B	Case C
S①		-2.89	
T		-1.49	
		-4.38	

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③	3.30		
T	1.49		
	4.79		

$$f = \frac{-73.66}{120} \pm \frac{-4.79(12)}{200} = -.614 \pm -.287 = -.901 \text{ ksi Max} < 2.0 \text{ ksi}$$
$$= -.326 \text{ ksi Min.} \quad 0 \text{ ksi}$$
O.K.

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①	1.24		
DM	7.97		
	9.21		

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③	3.30		
DM	7.97		
	11.27		

$$f = -.614 \pm \frac{11.27(12)}{200} = -.614 \pm .676 = -1.29 \text{ ksi Max} < 2.0 \text{ ksi}$$
$$= +.062 < \text{ksi Min.} \quad +.213 \text{ ksi}$$
O.K.

3300326 7

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 12 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Bot. slab Ext cell .8 Lin

$M_D = -.86^{k'}$

$M_{L+I} = -.19^{k'} \quad +.14^{k'}$

$M_H = 4.82$

$M_{NH} = -2.34^{k'}$

$M_T = \pm .89$

$M_{DM} = -4.91 \quad , 1.54$

M_S case A $= -5.84 + (5.84 - 4.69).8 = -4.88^{k'}$ Tension I.F

$= -11.78 + (11.78 - 2.73).8 = -4.54$

$t = 10.54'$ $M_{PE} = 6.01^{k'}$ Tension O.F.

33003268

DOT FORM 232-007 REVISED 9/81

Sheet No. 11

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 113 of sheets
S. R. 90 Made by YMT. Check by Date Supv. YKC/RTS

Transverse Design — pontoon D near Wall 5
Section at .8L,a

$t = 10.54''$ $e = .98$ $M_{pe} = 6.01$ Tension o.F.

$A = 10.54(12) = 126$ $S = \frac{12}{6}(10.54^2) = 222$

Group S①: $D + H + (L + I) + M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-.86		
M_H	4.82		
M_L	-.19 +.14		
M_{pe}	6.01		
M_{2nd}	-4.88	-4.54	
	(5.09)	(5.43)	
	4.9 5.23	5.24 5.57	

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	4.9	5.57	
.3W	-2.34	-2.34	
	2.55	3.23	

Group S④: S① + T 125%

	Case A	Case B	Case C
S①		5.57	
T		.89	
		6.56	

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③		3.23	
T		.89	
		4.12	

$$f = \frac{-73.66}{126} \pm \frac{-6.56(12)}{222} = -.585 \pm -.355 = -.939 \text{ ksi Max} < 2.0 \text{ ksi}$$
$$= -.230 \text{ ksi Min. } 0 \text{ ksi}$$

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①		5.57	
DM		1.54	
		7.11	

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③	2.25		
DM	-4.91		
	-2.66		

$$f = -.585 \pm \frac{7.11(12)}{222} = -.585 \pm -.384 = -.969 \text{ ksi Max} < 2.0 \text{ ksi}$$
$$= -.200 \text{ ksi Min. } +.213 \text{ ksi}$$

O.K.

33003269

Form 232-003

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 114 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Bot. slab, Ext cell .96 ix

$M_D = -2.45^{k'}$

$M_{L+I} = -.56, \; +.31^{k'}$

$M_H = 12.75^{k'}$

$M_{NW} = 30\%(-5.24) = -1.57^{k'}$

$M_T = \pm 1.68$

$M_{DM} = -12.29, \; +1.72$

M_S case A $= -5.84 + (5.84 - 4.64) .9 = -4.76^{k'}$ Tension I.F.

B $= -11.78 + (11.78 - 2.73) .9 = -3.64$ "

$t = 13.01$ $M_{pe} = -1.578^{k'}$ Tension I.F.

33003270

DOT FORM 232-007
REVISED 9/81

Sheet No. 13

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 115 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YRC/RTS

Transverse Design — pontoon D near Wall 5
Section at .944

$t = 13.01$ $e = -.257$ $M_{pe} = -1.58^{k'}$ Tension I.F.
$A = 13.01(12) = 156$ $S = \frac{12}{6}(13.01)^2 = 339$

Group S①: $D + H + (L + I) + M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-2.45		
M_H	12.75		
M_L	-.56	+.31	
M_{pe}	-1.58		
M_{end}	-4.76	-3.64	
	(3.96)	(5.08)	
	3.40	4.27	4.52 5.39

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	3.40	5.39	
.3W	-1.57	-1.57	
	1.83	3.82	

Group S④: S① + T 125%

	Case A	Case B	Case C
S①		5.39	
T		1.68	
		7.07	

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③		3.82	
T		1.68	
		5.50	

$f = \frac{-73.66}{156} \pm \frac{-7.07(12)}{339} = -.472 \pm -.250 = -.722^{ksi}$ Max $< 2.0^{ksi}$
$= -.222^{ksi}$ Min. 0^{ksi}
O.K. -

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①	3.40		
DM	-12.29		
	-8.89		

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③	1.83		
DM	-12.29		
	-10.46		

$f = -.472 \pm \frac{10.46(12)}{339} = -.472 \pm -.370 = -.842^{ksi}$ Max $< 2.0^{ksi}$
$= -.102^{ksi}$ Min. $+.212^{ksi}$
O.K. -

33003271

Form 232-007

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 116 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at 4.0 L4

$t = 15.49''$ $e = -1.49$ $M_{pe} = -9.16^{K'}$
$A = 15.49(12) = 186$ $S = \frac{12}{6}(15.49)^2 = 480$

Group S①: $D + H + (L + I) + M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-4.40		
M_H	23.08		
M_L	-1.04	.49	
M_{pe}	-9.16		
M_{grd}	-4.64	-2.73	
	(4.88)	(6.79)	
	3.84 5.37	5.75 7.28	

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	3.84	7.28	
.3W	-2.42	-2.42	
30%(-8.07) = -2.42	1.42	4.86	

Group S④: S① + T 125%

	Case A	Case B	Case C
S①		7.28	
T		2.47	
		9.75	

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③		4.86	
T		2.47	
		7.33	

$f = \frac{-73.66}{186} \pm \frac{-9.75(12)}{480} = -.396 \pm -.244 = -.640^{ksi}$ Max $< 2.0^{ksi}$
$= -.152^{ksi}$ Min. 0^{ksi}
O.K.

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①			
DM			

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③	1.42		
DM	-22.06		
	-20.64		

$f = -.396 \pm \frac{20.64(12)}{480} = -.396 \pm -.516 = -.912^{ksi}$ Max $< 2.0^{ksi}$
$= +.120 < ^{ksi}$ Min. $+.213^{ksi}$
O.K.

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