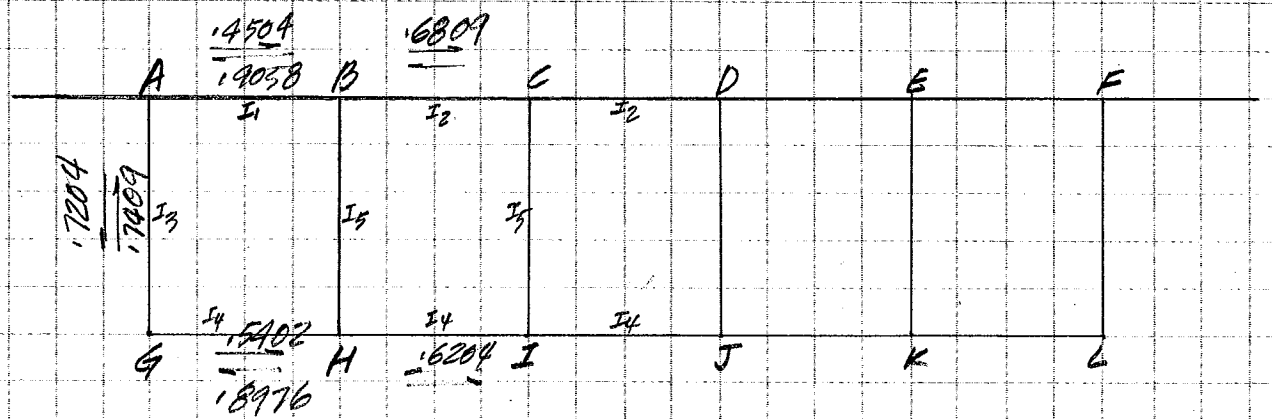
Secondary Moment: — Moment distribution.



Stiffness Factor

(A) $K_{AB} = \frac{14.4638\,E\,I_1}{14.83} = .9751 I_1$ D.F. = .80

$K_{AG} = \frac{12.1439\,E\,I_3}{28.83} = .2438 I_1$ = .20

(B) $K_{BA} = \frac{7.1922\,EI_1}{14.83} = .4849 I_1$ D.F. = .634

$K_{BC} = \frac{8.8754\,EI_2}{14.83} = .2524 I_1$ = .330

$K_{BH} = \frac{4\,EI_5}{28.83} = .0275 I_1$ = .036

(C) $K_{CB} = \frac{8.8754\,EI_2}{14.83} = .5983 I_2$ D.F. = .474

$K_{CD} = K_{CB} = .5983 I_2$ = .474

$K_{CI} = \frac{4\,EI_5}{28.83} = .0653 I_2$ = .052

(G) $K_{GA} = \frac{11.8077\,EI_3}{28.83} = .4095 I_3$ D.F. = .308

$K_{GH} = \frac{13.6595\,E\,I_4}{14.83} = .9211 I_3$ = .692

AB $I_1 = (12)^3 = 1728$ in^4

BC $I_2 = (9)^3 = 729$ in^4

AG $I_3 = (10)^3 = 1000$ in^4

GH $I_4 = (10)^3 = 1000$ in^4

BH $I_5 = (7)^3 = 343$ in^4

33003183

(H) $K_{HG} = \frac{8.2207 E I_4}{14.83} = .5542 I_4$ D.F. = .527

$K_{HI} = \frac{6.6817 E I_4}{14.83} = .4505 I_4$ = .428

$K_{HB} = \frac{4 E I_5}{28.83} = .0476 I_4$ = .045

(I) $K_{IH} = \frac{6.6817 E I_4}{14.83} = .4505 I_4$ D.F. = .475

$K_{IJ} = K_{IH} = .4505 I_4$ = .475

$K_{IC} = \frac{4 E I_5}{28.83} = .0476 I_4$ = .050

33003184

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

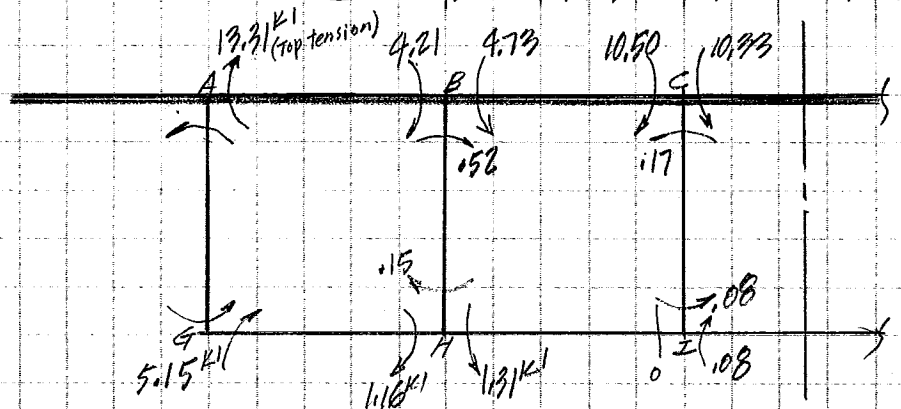
Project ..... Sheet No. 29 of ..... sheets

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

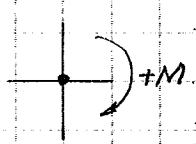
Rdwy. slab - Secondary Moments.

	A			B			C	
	.45			.681				
	AG .20		.906	BH .036			CI .052	
		AB .80	BA .624		BC .330	CB .474		CD .474
FEM		-42.62	-11.18	-2.43	8.75	-8.75		8.75
Distr.	8.52	34.10	1.54	.09	.80	—		—
C.O.		1.40	15.35			.55		
	-.28	-1.12	-9.73	-.55	-5.07	-.26	-.03	-.26
C.O.		-8.82	-.50	.68	-.18	-3.45		
	1.76	7.06	.43	.02	.23	1.64	.17	1.64
C.O.		.39	3.18	.93	1.12	.15		
	-.08	-.31	-2.73	-.15	-1.42	-.07	-.01	-.07
C.O.		-2.47	-.14	.11	-.05	-.97		
	.49	1.98	.12	.01	.06	.46	.05	.46
Σ_1	10.41	-10.41	-3.66	-.58	4.29	-10.70	.18	10.52
C.O.	5.15(.74)= 3.82		-1.38			.31		
Distr.	-.76	-3.06	.87	.05	.46	-.15	-.01	-.15
		.79	-.28		-.10	.08		
	-.16	-.63	.24	.01	.13	-.04	0	-.04
Σ_2	13.31	-13.31	-4.21	-.52	4.73	-10.50	.17	10.33

	G			H			I	
	.720	.540		.620				
	GA .308		.878	HB .045			IC .05	
		GH .692	HG .527		HI .428	IH .475		IJ .475
C.O.	10.41(.72)= 7.50			.58(.5)= -.29			.18(.5)= .09	
Distr.	-2.31	-5.19	.15	.01	.13	-.04	-.01	-.04
		.13	-2.80	.03	-.03	.08		
	-.04	-.09	1.49	.13	1.21	-.04	0	-.04
Σ	5.15	-5.15	-1.16	-.15	1.31	0	.08	-.08



sign convention



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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

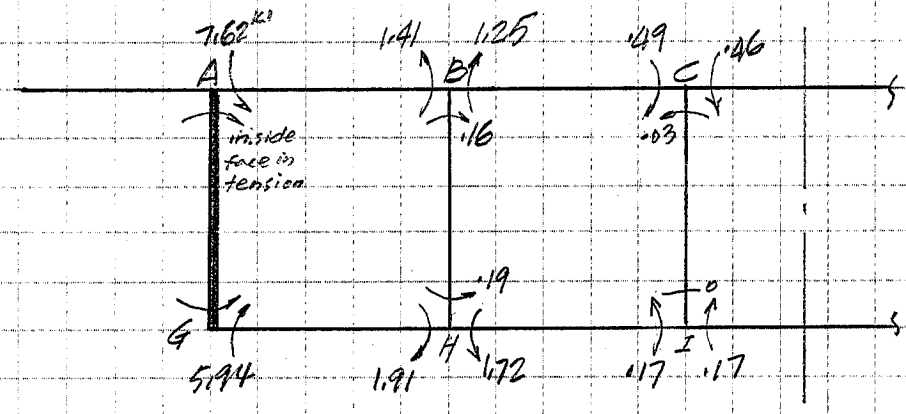
Project ..... Sheet No. 30 of ..... sheets

S. R. ..... Made by ..... Check by ..... Date 4/83 Supv. [illegible]

Vertical Wall – Secondary Moment

Bot. slab | Vert Wall | Rdwy. slab

	I			H			G	A		B			C	
	IC .05			HB .045			GA .308	AG .20		BH .036			CI .052	
IJ .475		IH .475	HI .428		HG .527	GH .692			AB .80	BA .634		BC .330	CB .474		CD .474
							7.67	-7.67							
						-5.31	-2.36	1.53	6.14						
					-2.87		1.10	-1.75		2.76					
			1.23	.13	1.51	-.76	-.34	.35	1.40	-1.75	-.10	-.91			
		.08			-.41	1.36	.25	-.25	-1.59	.63			-.62		
-.04	0	-.04	.18	.02	.21	-1.11	-.50	.37	1.47	-.40	-.02	-.21	.30	.02	.30
		.10	-.02		-.60	.19	.27	-.37	-.36	.66		.20	-.14		
-.05	.0	-.05	.27	.03	.32	-.32	-.14	.15	.58	-.55	-.03	-.28	.07	0	.07
		.10	-.03		-.17	.29	.11	-.10	-.49	.26		.05	-.19		
-.08	0	-.08	.09	.01	.10	-.28	-.12	.12	.47	-.20	-.01	-.10	.09	.01	.09
-.17	0	.17	1.72	.19	-1.91	-5.94	5.94	-7.62	7.62	1.41	-.16	-1.25	-.49	.03	.46



33003186

DOT Form 232-007 Revised 10/82

Sheet No. 4

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

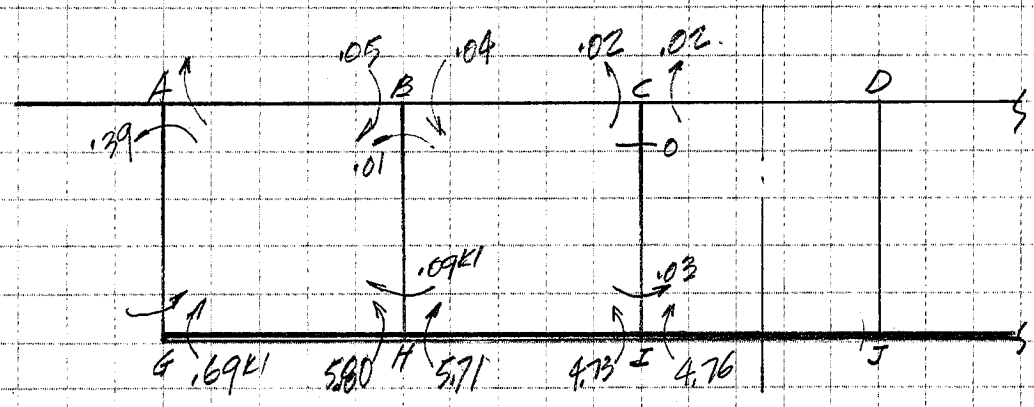
Project ..... Sheet No. 31 of ..... sheets
S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Bot. Slab, Vert. wall, Rdwy. Slab

.620 .54 .720 .45 .681

.741 .898 .906

	I			H			G	A		B			C		
		IC .05			HB .045			GA .308	AG .20		BH .036			CI .052	
	IJ .475		IH .475	HI .428		HG .527	GH .692			AB .80	BA .634		BC .330	CB .474		CD .474
FEM	-4.96	0	4.96	-4.96	1.07	6.03	-1.56									
Distr.				-.46	-.05	-.56	1.08	.48								
C.O.			-.28			.58	-.51		.36							
	.13	.02	.13	-.25	-.03	-.30	.35	.16	-.07	-.29						
C.O.			-.15	.08		.19	-.28	-.05	.12		-.13			.04		
	.07	.01	.07	-.12	-.01	-.14	.23	.10	-.02	-.10	.08	.01	.04	-.02	.0	-.02
Σ	-4.76	.03	4.73	-5.71	-.09	5.80	-.69	.69	.39	-.39	-.05	.01	.04	.02	0	-.02



33003187

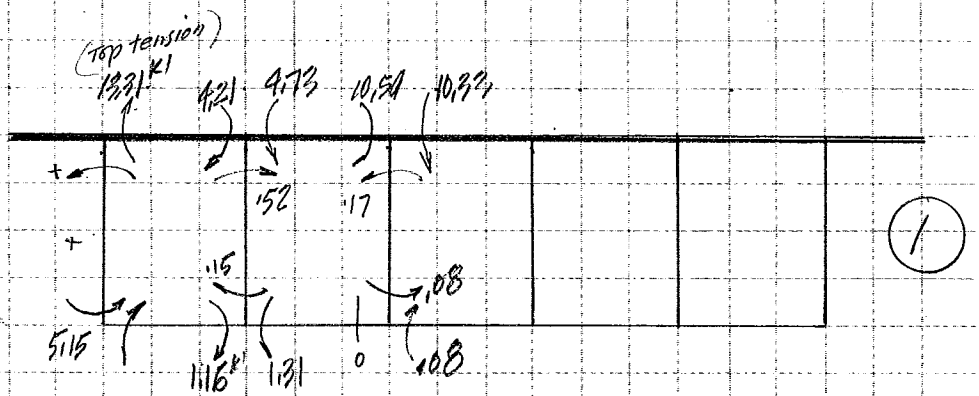
Transv. Analysis — pontoon D Secondary Moments.
TWO construction possibilities

Case A : Side wall segments precast & prestressed prior to fit into pontoon structure then applying transv. P/S.

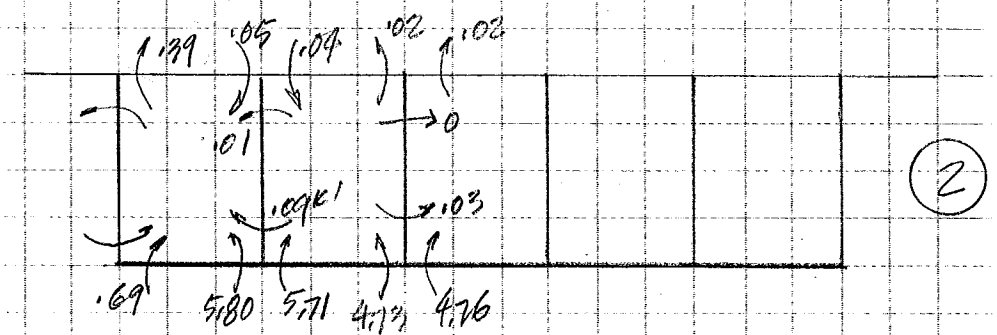
Case B : Entire pontoon structure cast-in-place then transv. and vertical P/S applies.
(Here assuming cantilever slab would be possible)
C.I.P.

CASE A.

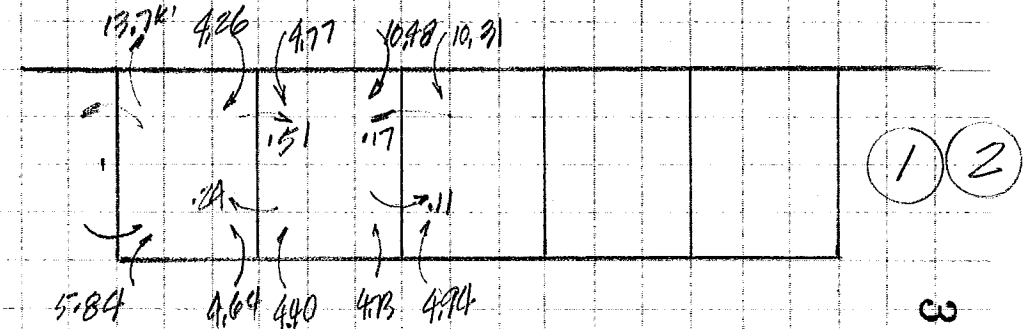
P/S Top slab
4~.6"φ strands @1'-9" +
$P = A_s^* f_s = 76.27^k/'$



P/S Bot. slab :
4~.6φ strand @1'-11"
$P = 69.25^k/'$



Case A Final
P/S condition.



33003188

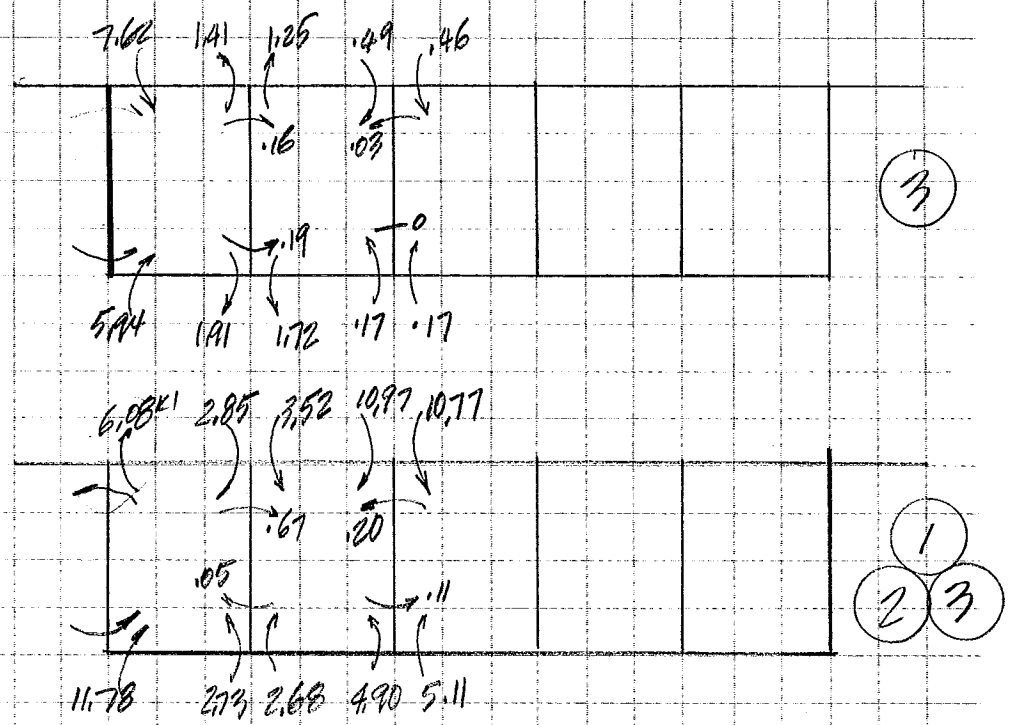
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project ..... Sheet No. 33 of ..... sheets

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

Case B

$1\frac{3}{8}$" Φ P.T. Bar @ 1'-11"
p = 69.6 K/Ft



CASE B. Final
P/S condition

33003189