2.9 SUMMARIZE OF REACTION AND SECTIONAL FORCE

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 完成後反力 **

Reaction after Construction Completion

		* 60 *			* 65 *			* 70 *			* 75 *	
	Rx(kN)	Ry(kN)	Rm(kNm)	Rx(kN)	Ry(kN)	Rm(kNm)	Rx(kN)	Ry(kN)	Rm(kNm)	Rx(kN)	Ry(kN)	Rm(kNm)
D 構造系完成時	0	1931	0	12	3246	-90	102	3665	-38	87	3586	-108
D 橋面工施工時	0	2314	0	30	4490	-68	105	4710	-22	64	4835	-103
Dクリープ終了時	0	2242	0	269	4538	618	252	4675	310	27	5031	-77
** 水平反力 (Rx) 最大最小 **												
D+SD MAX	0	2242	0	269	4538	618	252	4675	310	27	5031	-77
D+SD MIN	0	2242	0	269	4538	618	252	4675	310	27	5031	-77
D+L+SD MAX	0	2242	0	421	6497	221	394	6434	-38	179	6789	-396
D+L+SD MIN	0	2242	0	109	6261	897	98	6325	640	-188	6706	163
D+T+SD MAX	0	2335	0	360	4525	814	301	4688	389	57	4920	-68
D+T+SD MIN	0	2232	0	152	4448	413	204	4696	227	17	5073	-78
D+L+T+SD MAX	0	2335	0	513	6485	417	443	6447	42	209	6677	-385
D+L+T+SD MIN	0	2232	0	-7	6172	691	50	6346	556	-197	6748	162
D+TY+SW+SD MAX	0	2252	0	360	4525	814	301	4688	389	36	4990	-76
D+TY+SW+SD MIN	0	2232	0	178	4550	423	204	4662	231	17	5073	-78
D+L+TY+SW+SD MAX	0	2252	0	513	6485	417	443	6447	42	189	6747	-394
D+L+TY+SW+SD MIN	0	2232	0	18	6274	701	50	6312	560	-197	6748	162
D+EQ+SD (R)	82	2164	263	1172	4325	2408	1205	4829	1967	1037	4574	1430
D+EQ+SD (L)	-82	2319	-263	-634	4750	-1171	-700	4521	-1347	-983	5488	-1584
** 鉛直反力 (Ry) 最大最小 **												
D+SD MAX	0	2242	0	269	4538	618	252	4675	310	27	5031	-77
D+SD MIN	0	2242	0	269	4538	618	252	4675	310	27	5031	-77
D+L+SD MAX	0	3825	0	274	7489	491	259	7528	317	-3	7919	-115
D+L+SD MIN	0	2073	0	314	4275	577	182	4259	303	-6	4753	-1
D+T+SD MAX	0	2335	0	178	4550	423	300	4721	385	17	5073	-78
D+T+SD MIN	0	2232	0	335	4423	805	204	4662	231	57	4920	-68
D+L+T+SD MAX	0	3919	0	183	7502	295	307	7574	392	-12	7961	-116
D+L+T+SD MIN	0	2063	0	380	4160	763	134	4246	224	24	4642	8
D+TY+SW+SD MAX	0	2252	0	178	4550	423	301	4688	389	17	5073	-78
D+TY+SW+SD MIN	0	2232	0	360	4525	814	204	4662	231	36	4990	-76
D+L+TY+SW+SD MAX	0	3836	0	183	7502	295	307	7541	396	-12	7961	-116
D+L+TY+SW+SD MIN	0	2063	0	405	4262	773	134	4246	224	4	4711	0
D+EQ+SD (R)	82	2164	263	1172	4325	2408	1205	4829	1967	1037	4574	1430
D+EQ+SD (L)	-82	2319	-263	-634	4750	-1171	-700	4521	-1347	-983	5488	-1584
** 曲げ反力 (Rm) 最大最小 **												
D+SD MAX	0	2242	0	269	4538	618	252	4675	310	27	5031	-77
D+SD MIN	0	2242	0	269	4538	618	252	4675	310	27	5031	-77
D+L+SD MAX	0	2242	0	129	6300	929	108	6422	685	-172	6918	204
D+L+SD MIN	0	2242	0	402	6528	191	385	6444	-85	174	6888	-416
D+T+SD MAX	0	2335	0	360	4525	814	301	4688	389	57	4920	-68
D+T+SD MIN	0	2232	0	152	4448	413	204	4696	227	17	5073	-78
D+L+T+SD MAX	0	2335	0	220	6288	1125	156	6435	764	-142	6806	214
D+L+T+SD MIN	0	2232	0	286	6439	-14	336	6465	-169	164	6929	-417
D+TY+SW+SD MAX	0	2252	0	360	4525	814	301	4688	389	36	4990	-76
D+TY+SW+SD MIN	0	2232	0	178	4550	423	204	4662	231	17	5073	-78
D+L+TY+SW+SD MAX	0	2252	0	220	6288	1125	156	6435	764	-163	6876	205
D+L+TY+SW+SD MIN	0	2232	0	311	6541	-4	336	6432	-165	164	6929	-417
D+EQ+SD (R)	82	2164	263	1172	4325	2408	1205	4829	1967	1037	4574	1430
D+EQ+SD (L)	-82	2319	-263	-634	4750	-1171	-700	4521	-1347	-983	5488	-1584

D Immediately After Construction Completion
D Superimposed Dead Load Completion
D After Completion of Creep effect

Horizontal Reaction (Rx) MAX/MIN

Vertical Reaction (Rv) MAX/MIN

Moment Reaction (Rm) MAX/MIN

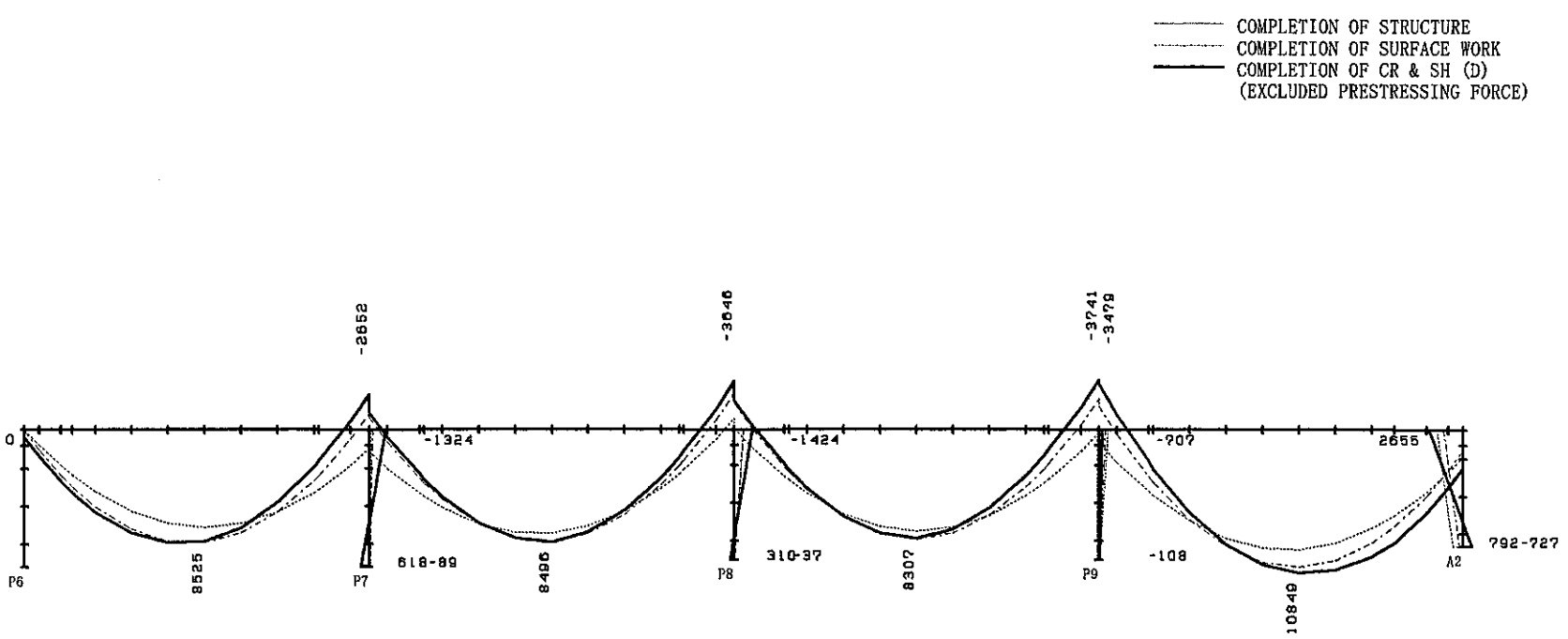
*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 完成後反力 **

		Rx(kN)	Ry(kN)	Rm(kNm)
		* 80 *		*
D 構造系完成時		-201	2222	792
D 橋面工施工時		-198	2665	288
Dクリープ終了時		-548	2528	-727
** 水平反力 (Rx) 最大最小 **				
D+SD	MAX	-548	2528	-727
D+SD	MIN	-548	2528	-727
D+L+SD	MAX	-244	3988	-2685
D+L+SD	MIN	-643	2316	-364
D+T+SD	MAX	-412	2614	20
D+T+SD	MIN	-678	2496	-1083
D+L+T+SD	MAX	-108	4075	-1938
D+L+T+SD	MIN	-773	2284	-720
D+TY+SW+SD	MAX	-418	2560	-371
D+TY+SW+SD	MIN	-678	2496	-1083
D+L+TY+SW+SD	MAX	-114	4020	-2329
D+L+TY+SW+SD	MIN	-773	2284	-720
D+EQ+SD	(R)	1638	3121	4777
D+EQ+SD	(L)	-2734	1934	-6231
** 鉛直反力 (Ry) 最大最小 **				
D+SD	MAX	-548	2528	-727
D+SD	MIN	-548	2528	-727
D+L+SD	MAX	-285	4389	-2496
D+L+SD	MIN	-641	2308	-342
D+T+SD	MAX	-412	2614	20
D+T+SD	MIN	-678	2496	-1083
D+L+T+SD	MAX	-150	4475	-1749
D+L+T+SD	MIN	-772	2276	-698
D+TY+SW+SD	MAX	-418	2560	-371
D+TY+SW+SD	MIN	-678	2496	-1083
D+L+TY+SW+SD	MAX	-155	4421	-2140
D+L+TY+SW+SD	MIN	-772	2276	-698
D+EQ+SD	(R)	1638	3121	4777
D+EQ+SD	(L)	-2734	1934	-6231
** 曲げ反力 (Rm) 最大最小 **				
D+SD	MAX	-548	2528	-727
D+SD	MIN	-548	2528	-727
D+L+SD	MAX	-614	2330	-296
D+L+SD	MIN	-268	4073	-2751
D+T+SD	MAX	-412	2614	20
D+T+SD	MIN	-678	2496	-1083
D+L+T+SD	MAX	-479	2417	451
D+L+T+SD	MIN	-398	4041	-3107
D+TY+SW+SD	MAX	-418	2560	-371
D+TY+SW+SD	MIN	-678	2496	-1083
D+L+TY+SW+SD	MAX	-484	2362	60
D+L+TY+SW+SD	MIN	-398	4041	-3107
D+EQ+SD	(R)	1638	3121	4777
D+EQ+SD	(L)	-2734	1934	-6231

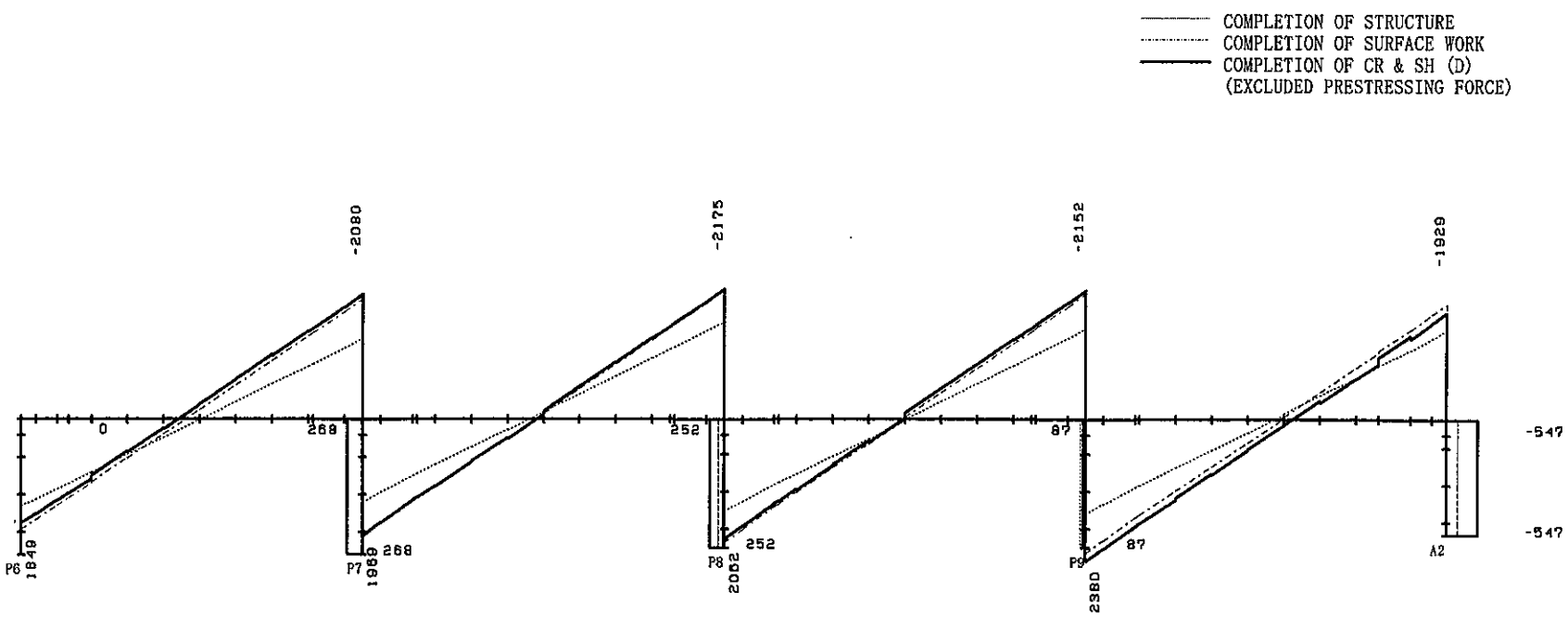
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING MOMENT AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 5424.7 KNM



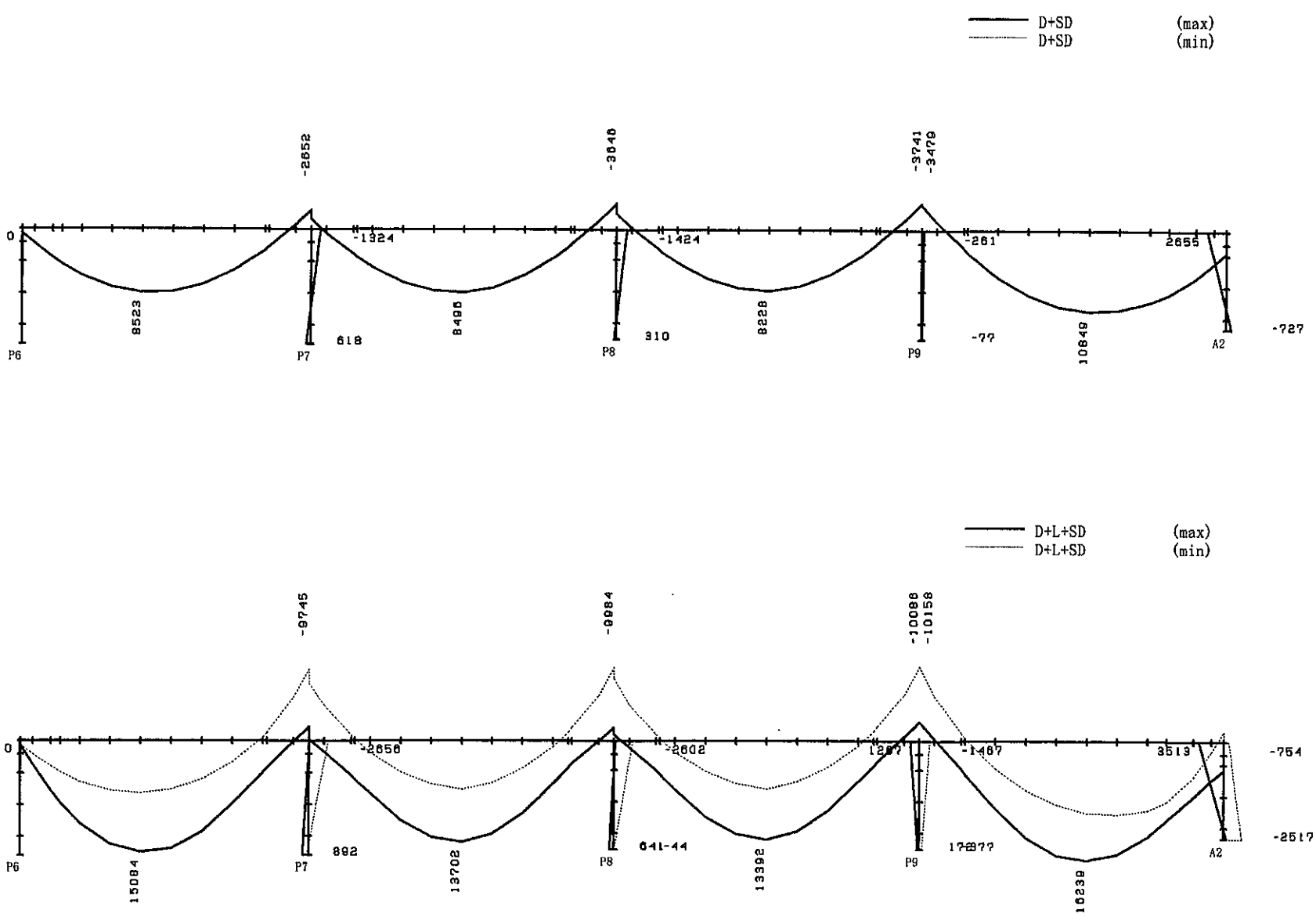
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
SHEARING FORCE AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 1190.2 KN



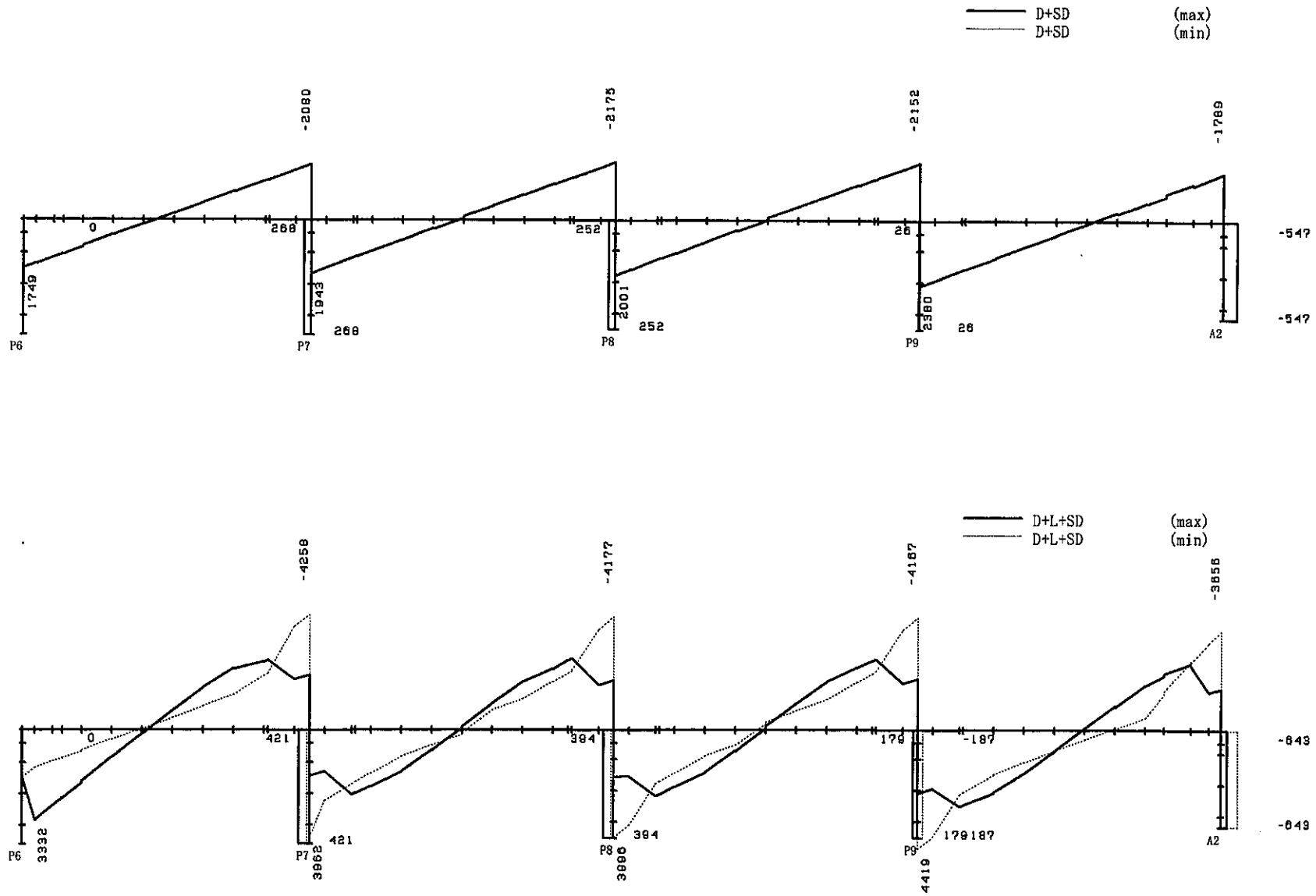
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING MOMENT AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 8119.7 KNM



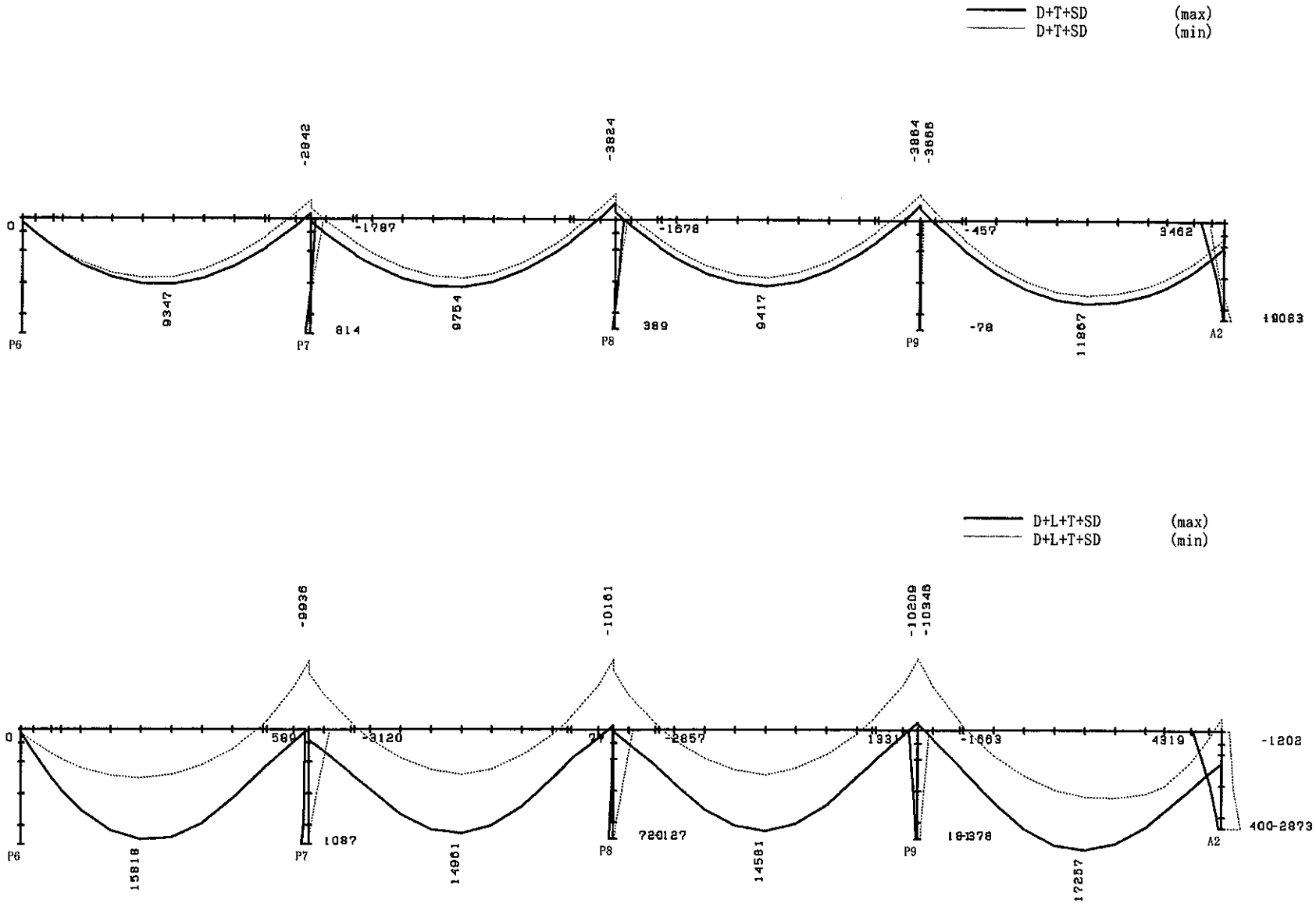
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
SHEARING FORCE AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 2209.7 KN



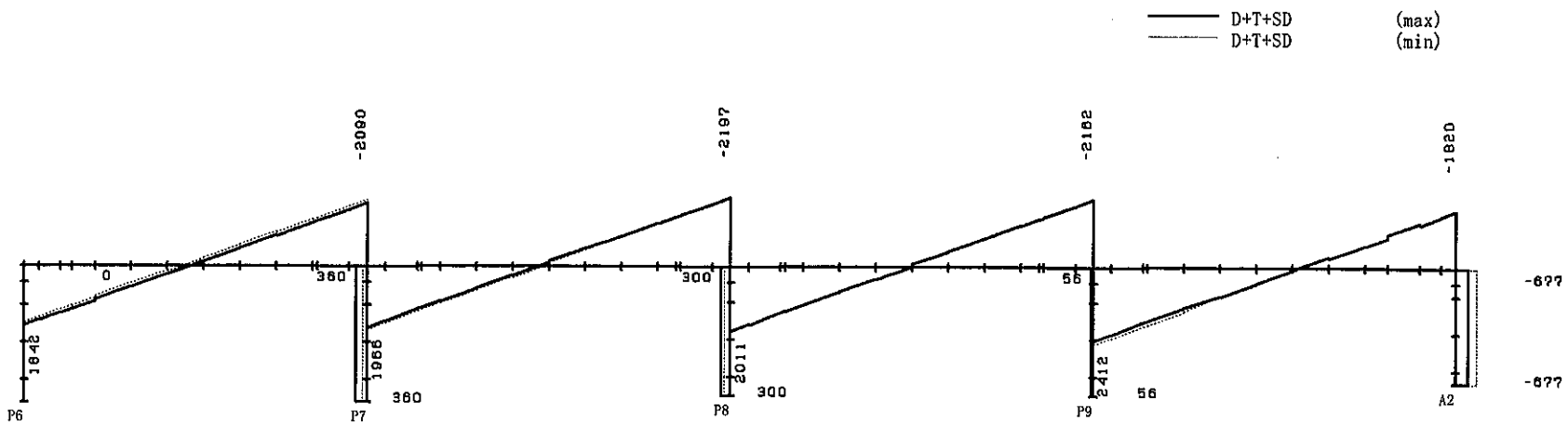
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING MOMENT AFTER CONSTRUCTION

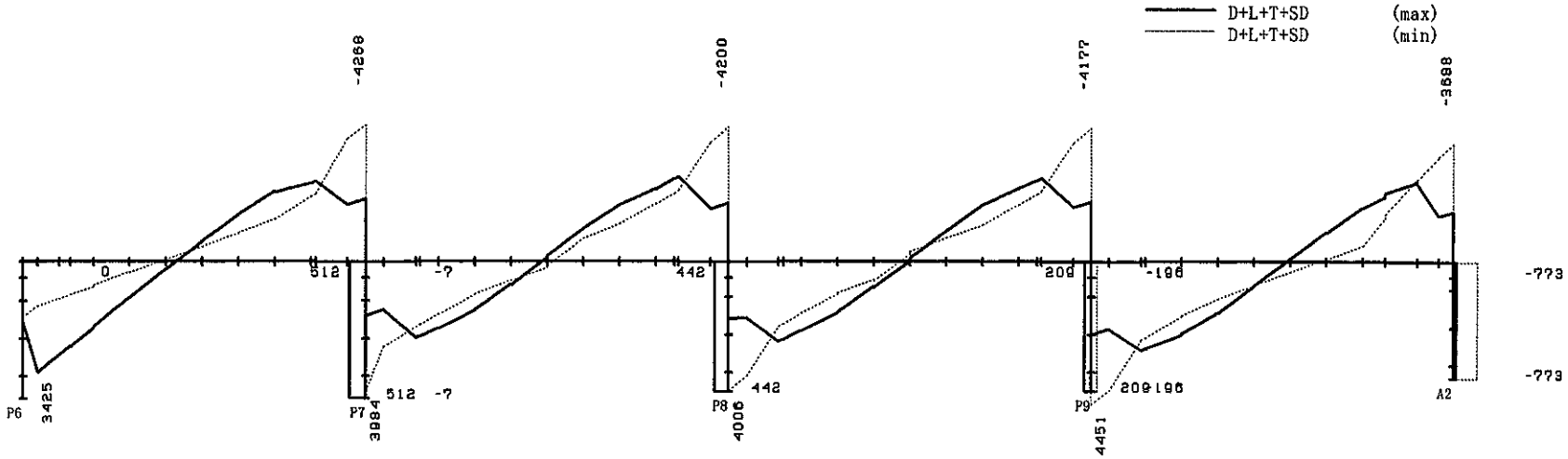
SCALE=1/ 380
1CM= 8628.9 KNM



BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
SHEARING FORCE AFTER CONSTRUCTION

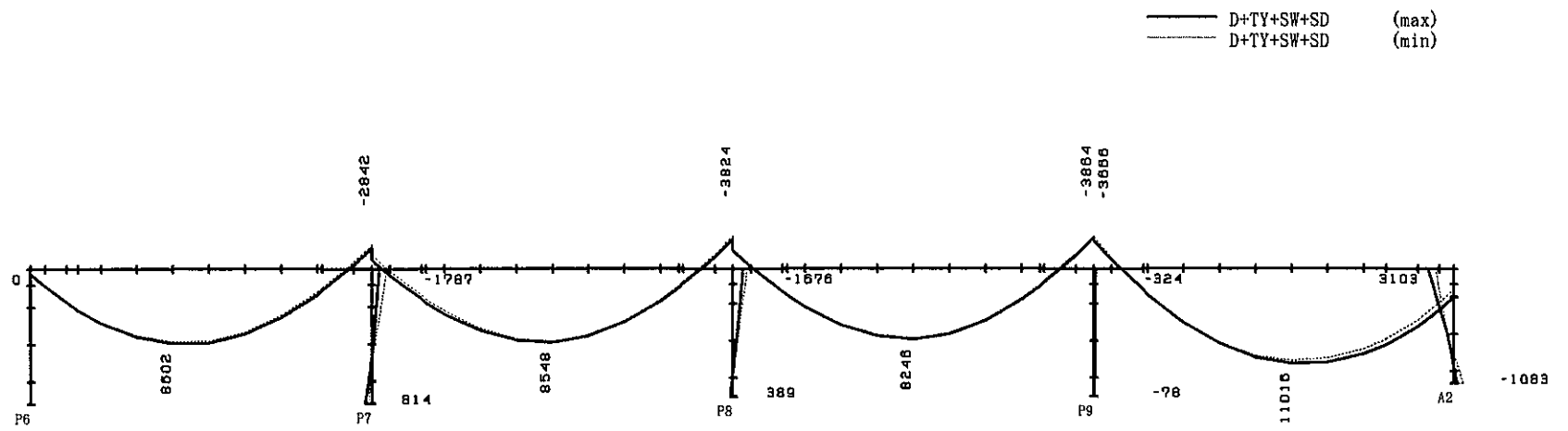
SCALE=1/ 380
1CM= 2225.5 KN

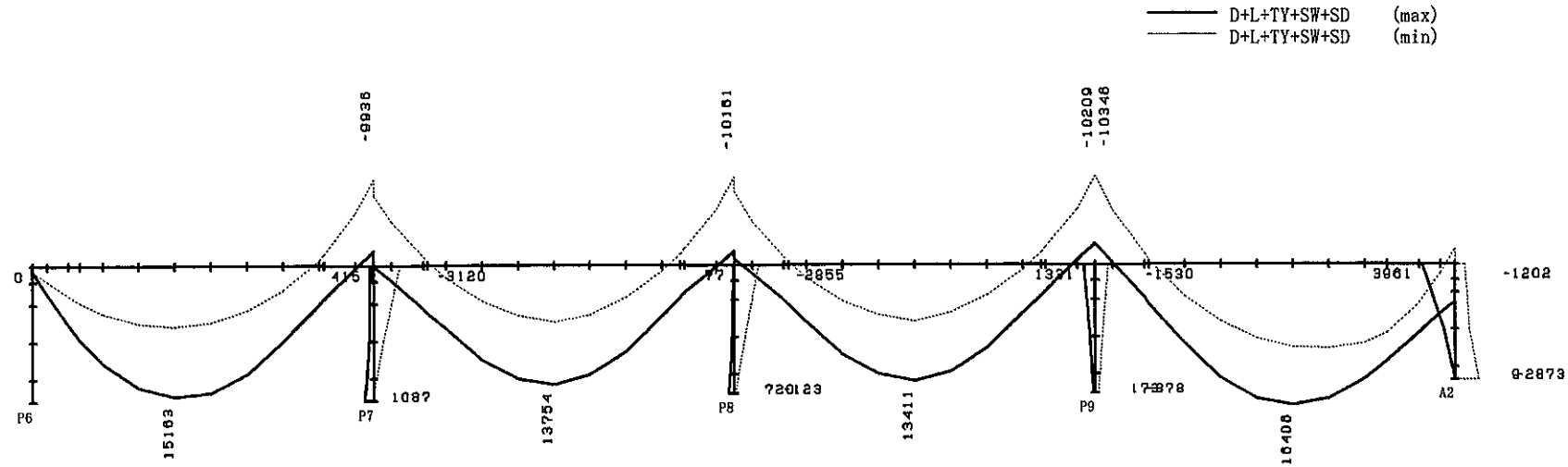




BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING MOMENT AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 8203.4 KNM





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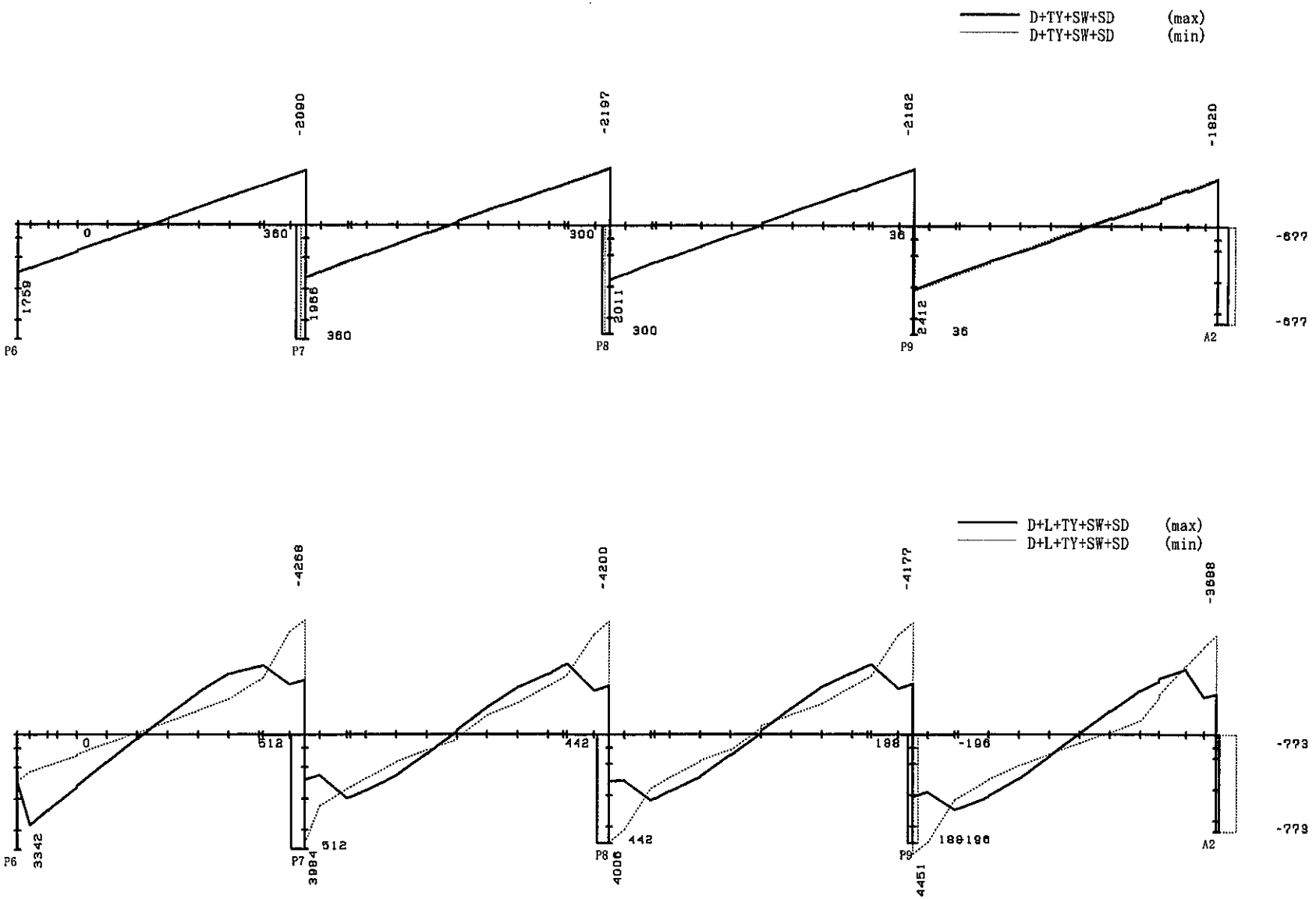
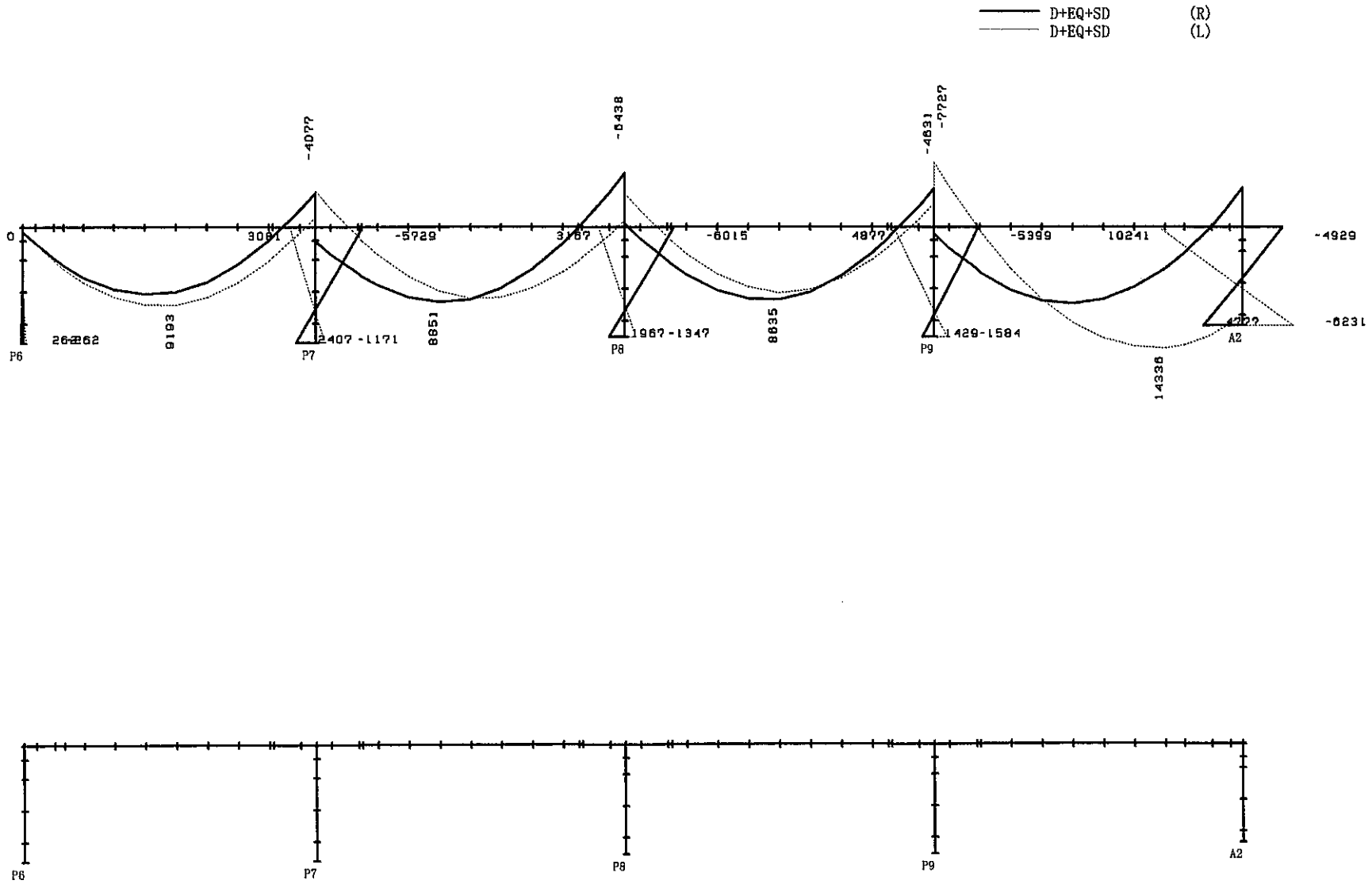
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
SHEARING FORCE AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 2225.5 KN



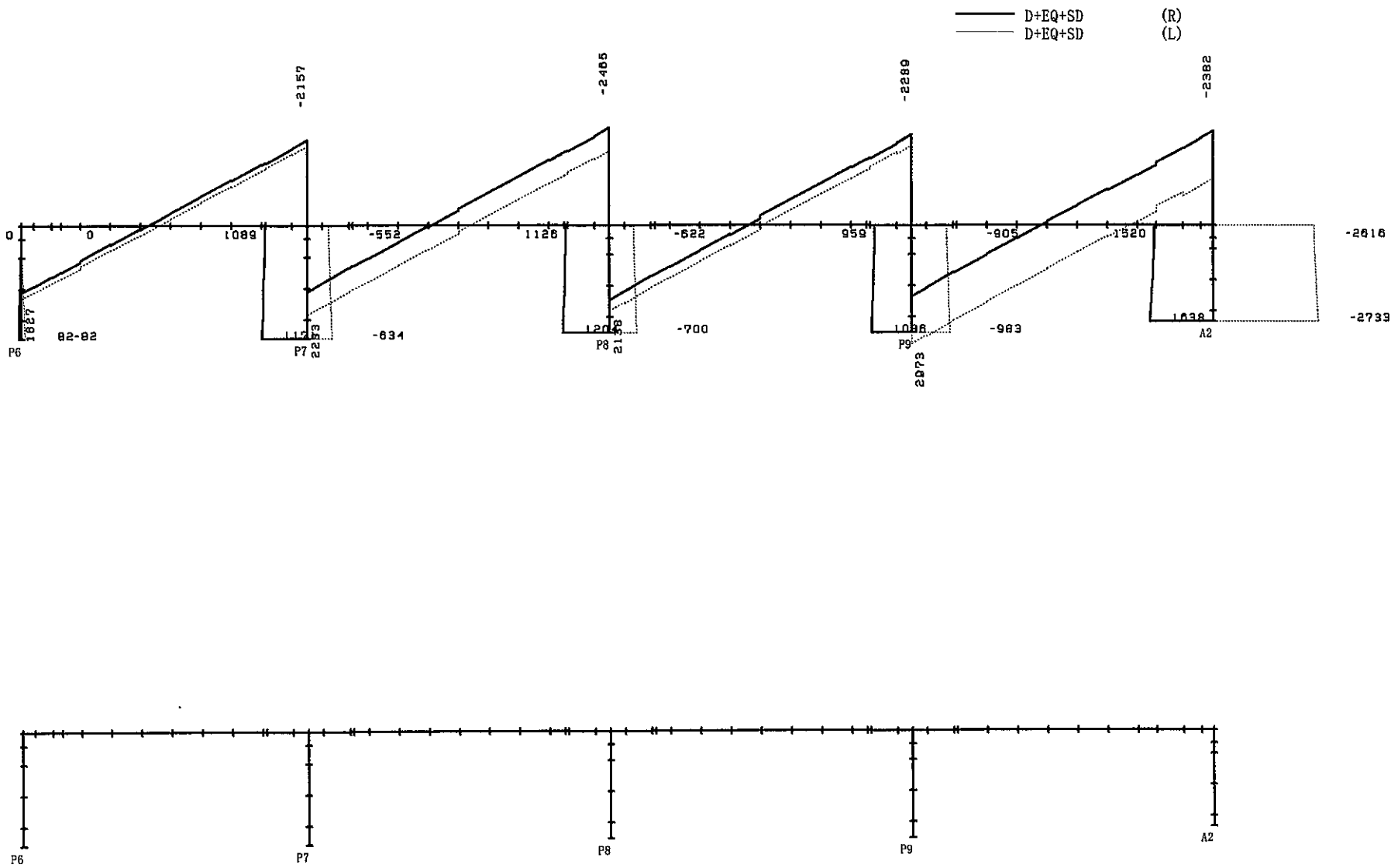
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING MOMENT AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 7168.0 KNM



BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
SHEARING FORCE AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 1486.9 KN



2.10 STRESS DESIGN

2.10.1 Converted Section Properties

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

コンクリート設計基準強度 (N/mm2)	35.0
鉄筋の降伏点強度 (N/mm2)	390.0
引張鉄筋計算時プレストレス有効率	0.950
スターラップの間隔 (m)	0.125
むく断面ねじり鉄筋かぶり (m)	0.0550
斜引張鉄筋設計荷重時制限値 (N/mm2)	120.0

せん断検討時桁高変化 = 無視

Concrete Compressive Strength	(N/mm2)
Yield Strength of Re-bar	(N/mm2)
Pre-stress Effective Ratio on Calculation of Tension Re-bar	
Interval of Stirrup	
Cover of Torsion Re-bar	
Limited Value on Calculation of Diagonal Tension Re-bar	

Variable of Girder Height = Neglect

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
2	2	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735	
3	3	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735	
4	4	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735	
5	5	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735	
6	6	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735	
7	7	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735	
8	8	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735	
9	9	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	
10	10	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	39.280	0.0000	78.560	-0.0765	
11	11	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	39.280	0.0000	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数

Section Number Method of Crack Width Control Cover Pitch of Re-bar Diameter of Re-bar
(A) Upper Fiber Lower Fiber Upper Fiber Lower Fiber Upper Fiber Lower Fiber

12	12		(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)		
		54.407	0.0645	0.000	0.0000	39.280	-0.1765	78.560	-0.0765		

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
13	13	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	39.280	-0.1765	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
15	15	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	39.280	-0.1765	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
16	16	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	39.280	-0.1765	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
17	17	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
18	18	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
19	19	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
20	20	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
21	21	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
22	22	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

断面		ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数
23	23	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6	許容ひび割れ幅係数

24	24	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

			C(cm)		CS(cm)		径(cm)			
断面		ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6	許容ひび割れ幅係数
25	25	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560	-0.0765	

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
26	26	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
27	27	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
29	29	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
30	30	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
31	31	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
32	32	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
33	33	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
34	34	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
35	35	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数
36	36	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	78.560 -0.0765

断面	ひび割れ制御	C(cm) 上縁	C(cm) 下縁	CS(cm) 上縁	CS(cm) 下縁	径(cm) 上縁	径(cm) 下縁	EPS*10-6 許容ひび割れ幅係数

37	37		(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)		
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735		

			C(cm)		CS(cm)		径(cm)			
断面		ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6	許容ひび割れ幅係数
38	38	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360	-0.0735	

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		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
39	39	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360 -0.0735

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
40	40	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360 -0.0735

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
41	41	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360 -0.0735

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
43	43	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360 -0.0735

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
44	44	(A)	5.80	6.40	25.00	10.00	1.30	1.90	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	0.000	0.0000	45.360 -0.0735

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
45	45	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	78.560	-0.1765	78.560 -0.0765

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
46	46	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	78.560	-0.1765	78.560 -0.0765

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
47	47	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	78.560	-0.1765	78.560 -0.0765

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
48	48	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	78.560	-0.1765	78.560 -0.0765

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数
49	49	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0 0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2) YS4(m)
		54.407	0.0645	0.000	0.0000	78.560	-0.1765	78.560 -0.0765

		C(cm)		CS(cm)		径(cm)		
断面	ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6 許容ひび割れ幅係数

50	50		(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)		
		54.407	0.0645	0.000	0.0000	78.560	-0.1765	78.560	-0.0765		

			C(cm)		CS(cm)		径(cm)			
断面	ひび割れ制御		上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6	許容ひび割れ幅係数
51	51		(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)		
		54.407	0.0675	0.000	0.0000	78.560	-0.1765	78.560	-0.0765		

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			C(cm)		CS(cm)		径(cm)			
断面		ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6	許容ひび割れ幅係数
52	52	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0675	0.000	0.0000	78.560	-0.1765	78.560	-0.0765	

			C(cm)		CS(cm)		径(cm)			
断面		ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6	許容ひび割れ幅係数
53	53	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0675	0.000	0.0000	78.560	-0.1765	78.560	-0.0765	

			C(cm)		CS(cm)		径(cm)			
断面		ひび割れ制御	上縁	下縁	上縁	下縁	上縁	下縁	EPS*10-6	許容ひび割れ幅係数
54	54	(A)	5.80	6.40	25.00	10.00	1.30	2.50	0.0	0.003500
		AS1(cm2)	YS1(m)	AS2(cm2)	YS2(m)	AS3(cm2)	YS3(m)	AS4(cm2)	YS4(m)	
		54.407	0.0675	0.000	0.0000	78.560	-0.1765	78.560	-0.0765	

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

せん断ひび割れ幅制御法(A)　Method of Crack Width Control due to Shear Force (A)

断面番号		配置スターラップ断面積 (cm2) せん断用	ねじり用	** ねじりモーメント (kNm) ** 死荷重	活荷重 MAX	活荷重 MIN	PS+CR+SH	雪
2	2	11.340	2.835	0.0	416.0	-506.9	0.0	0.0
3	3	11.340	2.835	0.0	376.6	-453.9	0.0	0.0
4	4	11.340	2.835	0.0	273.6	-324.5	0.0	0.0
5	5	11.340	2.835	0.0	280.2	-167.1	0.0	0.0
6	6	11.340	2.835	0.0	245.3	-155.3	0.0	0.0
7	7	11.340	2.835	0.0	187.8	-180.3	0.0	0.0
8	8	11.340	2.835	0.0	276.9	-230.4	0.0	0.0
9	9	11.340	2.835	0.0	325.3	-270.1	0.0	0.0
10	10	11.340	2.835	0.0	313.6	-272.8	0.0	0.0
11	11	11.340	2.835	0.0	293.9	-270.2	0.0	0.0
12	12	11.340	2.835	0.0	265.8	-265.8	0.0	0.0
13	13	19.640	4.910	0.0	265.8	-265.8	0.0	0.0
15	15	19.640	4.910	0.0	208.9	-245.9	0.0	0.0
16	16	11.340	2.835	0.0	213.5	-248.2	0.0	0.0
17	17	11.340	2.835	0.0	248.2	-269.2	0.0	0.0
18	18	11.340	2.835	0.0	269.2	-281.4	0.0	0.0
19	19	11.340	2.835	0.0	281.4	-246.1	0.0	0.0
20	20	11.340	2.835	0.0	246.1	-188.4	0.0	0.0
21	21	11.340	2.835	0.0	188.4	-172.1	0.0	0.0
22	22	11.330	2.835	0.0	246.1	-188.4	0.0	0.0
23	23	11.340	2.835	0.0	281.4	-246.1	0.0	0.0
24	24	11.340	2.835	0.0	269.2	-281.4	0.0	0.0
25	25	11.340	2.835	0.0	248.2	-269.2	0.0	0.0
26	26	11.340	2.835	0.0	213.5	-248.2	0.0	0.0
27	27	19.640	4.910	0.0	208.9	-245.9	0.0	0.0
29	29	19.640	4.910	0.0	208.9	-245.9	0.0	0.0
30	30	11.340	2.835	0.0	213.5	-248.2	0.0	0.0
31	31	11.340	2.835	0.0	248.2	-269.2	0.0	0.0
32	32	11.340	2.835	0.0	269.2	-281.4	0.0	0.0
33	33	11.340	2.835	0.0	281.4	-246.1	0.0	0.0
34	34	11.340	2.835	0.0	246.1	-188.4	0.0	0.0
35	35	11.340	2.835	0.0	188.4	-172.1	0.0	0.0
36	36	11.340	2.835	0.0	246.1	-188.4	0.0	0.0
37	37	11.340	2.835	0.0	281.4	-246.1	0.0	0.0
38	38	11.340	2.835	0.0	269.2	-281.4	0.0	0.0
39	39	11.340	2.835	0.0	248.2	-269.2	0.0	0.0
40	40	11.340	2.835	0.0	213.5	-248.2	0.0	0.0
41	41	19.640	4.910	0.0	208.9	-245.9	0.0	0.0
43	43	19.640	4.910	0.0	265.8	-265.8	0.0	0.0
44	44	11.340	2.835	0.0	265.8	-265.8	0.0	0.0
45	45	11.340	2.835	0.0	293.9	-270.2	0.0	0.0
46	46	11.340	2.835	0.0	313.6	-272.8	0.0	0.0
47	47	11.340	2.835	0.0	325.3	-270.1	0.0	0.0
48	48	11.340	2.835	0.0	276.9	-230.4	0.0	0.0
49	49	11.340	2.835	0.0	187.8	-180.3	0.0	0.0
50	50	11.340	2.835	0.0	245.3	-155.3	0.0	0.0
51	51	11.340	2.835	0.0	280.2	-167.1	0.0	0.0
52	52	19.640	4.910	0.0	273.6	-179.1	0.0	0.0
53	53	19.640	4.910	0.0	213.0	-210.1	0.0	0.0

Arranged Stirrup Area (cm2) / Torsional Force (kNm)

Section Number　for Shear Force　for Torsional Force　Dead Load　Live Load　PS+CR+SH　Snow

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 断面諸元 単位：m **

	断面 (1)			断面 (2)			断面 (3)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8424	5.8424	5.9616	5.8324	5.8952	6.0144	5.8324	5.8952	6.0144
Y0	0.3319	0.3319	0.3363	0.3309	0.3332	0.3385	0.3300	0.3323	0.3391
YU	-0.8681	-0.8681	-0.8637	-0.8691	-0.8668	-0.8615	-0.8700	-0.8677	-0.8609
I	0.5401	0.5401	0.5601	0.5374	0.5578	0.5768	0.5368	0.5573	0.5771
Z0	1.6274	1.6274	1.6655	1.6240	1.6742	1.7039	1.6269	1.6772	1.7019
ZU	-0.6221	-0.6221	-0.6485	-0.6183	-0.6435	-0.6696	-0.6171	-0.6423	-0.6704
R2	0.0924	0.0924	0.0940	0.0921	0.0946	0.0959	0.0920	0.0945	0.0960

	断面 (4)			断面 (5)			断面 (6)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8324	5.8952	6.0144	5.8324	5.8952	6.0144	5.8324	5.8952	6.0144
Y0	0.3295	0.3318	0.3394	0.3286	0.3309	0.3400	0.3284	0.3308	0.3401
YU	-0.8705	-0.8682	-0.8606	-0.8714	-0.8691	-0.8600	-0.8716	-0.8692	-0.8599
I	0.5359	0.5564	0.5777	0.5331	0.5537	0.5794	0.5324	0.5529	0.5799
Z0	1.6265	1.6769	1.7020	1.6224	1.6730	1.7043	1.6210	1.6717	1.7051
ZU	-0.6157	-0.6409	-0.6713	-0.6118	-0.6371	-0.6737	-0.6109	-0.6361	-0.6743
R2	0.0919	0.0944	0.0960	0.0914	0.0939	0.0963	0.0913	0.0938	0.0964

	断面 (7)			断面 (8)			断面 (9)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8324	5.8952	6.0144	5.8324	5.8952	6.0144	5.8291	5.9127	6.0319
Y0	0.3284	0.3308	0.3401	0.3286	0.3310	0.3400	0.3291	0.3342	0.3417
YU	-0.8716	-0.8692	-0.8599	-0.8714	-0.8690	-0.8600	-0.8709	-0.8658	-0.8583
I	0.5324	0.5529	0.5799	0.5332	0.5537	0.5794	0.5339	0.5673	0.5883
Z0	1.6210	1.6717	1.7051	1.6225	1.6731	1.7042	1.6225	1.6977	1.7218
ZU	-0.6109	-0.6361	-0.6743	-0.6119	-0.6372	-0.6736	-0.6130	-0.6552	-0.6854
R2	0.0913	0.0938	0.0964	0.0914	0.0939	0.0963	0.0916	0.0959	0.0975

	断面 (10)			断面 (11)			断面 (12)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8252	5.9335	6.0527	5.8252	5.9335	6.0527	5.8252	5.9335	6.0527
Y0	0.3311	0.3348	0.3394	0.3331	0.3367	0.3382	0.3326	0.3406	0.3415
YU	-0.8689	-0.8652	-0.8606	-0.8669	-0.8633	-0.8618	-0.8674	-0.8594	-0.8585
I	0.5400	0.5761	0.5867	0.5439	0.5799	0.5843	0.5426	0.5874	0.5915
Z0	1.6311	1.7210	1.7285	1.6329	1.7221	1.7278	1.6313	1.7248	1.7319
ZU	-0.6215	-0.6658	-0.6817	-0.6274	-0.6717	-0.6779	-0.6256	-0.6835	-0.6890
R2	0.0927	0.0971	0.0969	0.0934	0.0977	0.0965	0.0932	0.0990	0.0977

Section Property unit: m

Section (i)

Net Section Property | Converted Section Property

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 断面諸元　単位：m **

断面 (13)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	6.4552	6.5635	6.6827
YO	0.3746	0.3810	0.3793
YU	-0.8254	-0.8190	-0.8207
I	0.6840	0.7251	0.7294
ZO	1.8262	1.9032	1.9230
ZU	-0.8287	-0.8854	-0.8887
R2	0.1060	0.1105	0.1091

断面 (14)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	6.4724	6.4724	6.5916
YO	0.3757	0.3757	0.3739
YU	-0.8243	-0.8243	-0.8261
I	0.6904	0.6904	0.6948
ZO	1.8377	1.8377	1.8584
ZU	-0.8376	-0.8376	-0.8410
R2	0.1067	0.1067	0.1054

断面 (15)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	6.4552	6.5635	6.6827
YO	0.3745	0.3809	0.3793
YU	-0.8255	-0.8191	-0.8207
I	0.6839	0.7251	0.7294
ZO	1.8264	1.9034	1.9229
ZU	-0.8285	-0.8853	-0.8888
R2	0.1060	0.1105	0.1092

断面 (16)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8252	5.9335	6.0527
YO	0.3323	0.3402	0.3417
YU	-0.8677	-0.8598	-0.8583
I	0.5417	0.5865	0.5921
ZO	1.6303	1.7240	1.7325
ZU	-0.6243	-0.6821	-0.6898
R2	0.0930	0.0988	0.0978

断面 (17)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319
YO	0.3325	0.3375	0.3396
YU	-0.8675	-0.8625	-0.8604
I	0.5432	0.5764	0.5826
ZO	1.6338	1.7077	1.7157
ZU	-0.6261	-0.6683	-0.6771
R2	0.0932	0.0975	0.0966

断面 (18)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319
YO	0.3313	0.3364	0.3403
YU	-0.8687	-0.8636	-0.8597
I	0.5406	0.5739	0.5842
ZO	1.6318	1.7061	1.7167
ZU	-0.6223	-0.6645	-0.6795
R2	0.0927	0.0971	0.0968

断面 (19)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319
YO	0.3295	0.3346	0.3414
YU	-0.8705	-0.8654	-0.8586
I	0.5347	0.5681	0.5878
ZO	1.6229	1.6979	1.7217
ZU	-0.6143	-0.6565	-0.6846
R2	0.0917	0.0961	0.0975

断面 (20)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319
YO	0.3286	0.3337	0.3420
YU	-0.8714	-0.8663	-0.8580
I	0.5327	0.5661	0.5890
ZO	1.6210	1.6964	1.7226
ZU	-0.6113	-0.6535	-0.6865
R2	0.0914	0.0957	0.0977

断面 (21)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319
YO	0.3280	0.3331	0.3423
YU	-0.8720	-0.8669	-0.8577
I	0.5303	0.5638	0.5905
ZO	1.6169	1.6926	1.7249
ZU	-0.6082	-0.6504	-0.6885
R2	0.0910	0.0954	0.0979

断面 (22)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319
YO	0.3286	0.3337	0.3420
YU	-0.8714	-0.8663	-0.8580
I	0.5327	0.5661	0.5890
ZO	1.6210	1.6964	1.7226
ZU	-0.6113	-0.6535	-0.6865
R2	0.0914	0.0957	0.0977

断面 (23)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319
YO	0.3298	0.3349	0.3412
YU	-0.8702	-0.8651	-0.8588
I	0.5368	0.5702	0.5865
ZO	1.6277	1.7026	1.7189
ZU	-0.6169	-0.6592	-0.6829
R2	0.0921	0.0964	0.0972

断面 (24)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319
YO	0.3318	0.3369	0.3400
YU	-0.8682	-0.8631	-0.8600
I	0.5427	0.5759	0.5829
ZO	1.6355	1.7096	1.7145
ZU	-0.6250	-0.6672	-0.6778
R2	0.0931	0.0974	0.0966

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 断面諸元 単位：m **

	断面 (25)			断面 (26)			断面 (27)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319	5.8291	5.9127	6.0319	6.4591	6.5427	6.6619
Y0	0.3328	0.3378	0.3394	0.3330	0.3381	0.3392	0.3749	0.3789	0.3773
YU	-0.8672	-0.8622	-0.8606	-0.8670	-0.8619	-0.8608	-0.8251	-0.8211	-0.8227
I	0.5440	0.5772	0.5821	0.5442	0.5774	0.5820	0.6854	0.7163	0.7209
Z0	1.6348	1.7086	1.7152	1.6341	1.7078	1.7156	1.8285	1.8905	1.9104
ZU	-0.6273	-0.6695	-0.6763	-0.6277	-0.6699	-0.6761	-0.8307	-0.8724	-0.8763
R2	0.0933	0.0976	0.0965	0.0934	0.0977	0.0965	0.1061	0.1095	0.1082

	断面 (28)			断面 (29)			断面 (30)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	6.4724	6.4724	6.5916	6.4591	6.5427	6.6619	5.8291	5.9127	6.0319
Y0	0.3756	0.3756	0.3739	0.3748	0.3788	0.3774	0.3327	0.3378	0.3394
YU	-0.8244	-0.8244	-0.8261	-0.8252	-0.8212	-0.8226	-0.8673	-0.8622	-0.8606
I	0.6902	0.6902	0.6949	0.6854	0.7163	0.7209	0.5434	0.5766	0.5825
Z0	1.8375	1.8375	1.8585	1.8288	1.8908	1.9103	1.6333	1.7072	1.7161
ZU	-0.8373	-0.8373	-0.8413	-0.8306	-0.8723	-0.8763	-0.6266	-0.6688	-0.6768
R2	0.1066	0.1066	0.1054	0.1061	0.1095	0.1082	0.0932	0.0975	0.0966

	断面 (31)			断面 (32)			断面 (33)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319	5.8291	5.9127	6.0319	5.8291	5.9127	6.0319
Y0	0.3324	0.3375	0.3396	0.3313	0.3364	0.3403	0.3295	0.3346	0.3414
YU	-0.8676	-0.8625	-0.8604	-0.8687	-0.8636	-0.8597	-0.8705	-0.8654	-0.8586
I	0.5430	0.5763	0.5827	0.5405	0.5738	0.5842	0.5347	0.5681	0.5878
Z0	1.6335	1.7075	1.7159	1.6316	1.7060	1.7168	1.6229	1.6979	1.7217
ZU	-0.6259	-0.6681	-0.6772	-0.6222	-0.6644	-0.6796	-0.6143	-0.6565	-0.6846
R2	0.0932	0.0975	0.0966	0.0927	0.0970	0.0969	0.0917	0.0961	0.0975

	断面 (34)			断面 (35)			断面 (36)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8291	5.9127	6.0319	5.8291	5.9127	6.0319	5.8291	5.9127	6.0319
Y0	0.3286	0.3337	0.3420	0.3280	0.3331	0.3423	0.3286	0.3337	0.3420
YU	-0.8714	-0.8663	-0.8580	-0.8720	-0.8669	-0.8577	-0.8714	-0.8663	-0.8580
I	0.5327	0.5661	0.5890	0.5303	0.5638	0.5905	0.5327	0.5661	0.5890
Z0	1.6210	1.6964	1.7226	1.6169	1.6926	1.7249	1.6210	1.6964	1.7226
ZU	-0.6113	-0.6535	-0.6865	-0.6082	-0.6504	-0.6885	-0.6113	-0.6535	-0.6865
R2	0.0914	0.0957	0.0977	0.0910	0.0954	0.0979	0.0914	0.0957	0.0977

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 断面諸元 単位：m **

断面 (37)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8324	5.8952	6.0144
Y0	0.3303	0.3326	0.3389
YU	-0.8697	-0.8674	-0.8611
I	0.5389	0.5594	0.5758
Z0	1.6318	1.6820	1.6989
ZU	-0.6197	-0.6449	-0.6687
R2	0.0924	0.0949	0.0957

断面 (38)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8324	5.8952	6.0144
Y0	0.3323	0.3346	0.3377
YU	-0.8677	-0.8654	-0.8623
I	0.5448	0.5652	0.5721
Z0	1.6397	1.6895	1.6943
ZU	-0.6279	-0.6531	-0.6635
R2	0.0934	0.0959	0.0951

断面 (39)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8324	5.8952	6.0144
Y0	0.3333	0.3355	0.3371
YU	-0.8667	-0.8645	-0.8629
I	0.5462	0.5666	0.5713
Z0	1.6389	1.6886	1.6949
ZU	-0.6302	-0.6554	-0.6620
R2	0.0936	0.0961	0.0950

断面 (40)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8324	5.8952	6.0144
Y0	0.3335	0.3358	0.3369
YU	-0.8665	-0.8642	-0.8631
I	0.5464	0.5668	0.5712
Z0	1.6383	1.6879	1.6953
ZU	-0.6306	-0.6558	-0.6618
R2	0.0937	0.0961	0.0950

断面 (41)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	6.4624	6.5252	6.6444
Y0	0.3753	0.3769	0.3753
YU	-0.8247	-0.8231	-0.8247
I	0.6874	0.7068	0.7111
Z0	1.8316	1.8750	1.8945
ZU	-0.8335	-0.8587	-0.8623
R2	0.1064	0.1083	0.1070

断面 (42)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	6.4724	6.4724	6.5916
Y0	0.3757	0.3757	0.3739
YU	-0.8243	-0.8243	-0.8261
I	0.6904	0.6904	0.6948
Z0	1.8377	1.8377	1.8584
ZU	-0.8376	-0.8376	-0.8411
R2	0.1067	0.1067	0.1054

断面 (43)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	6.4624	6.5252	6.6444
Y0	0.3753	0.3769	0.3754
YU	-0.8247	-0.8231	-0.8246
I	0.6875	0.7069	0.7110
Z0	1.8320	1.8754	1.8943
ZU	-0.8336	-0.8588	-0.8622
R2	0.1064	0.1083	0.1070

断面 (44)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8324	5.8952	6.0144
Y0	0.3332	0.3355	0.3371
YU	-0.8668	-0.8645	-0.8629
I	0.5457	0.5661	0.5716
Z0	1.6378	1.6874	1.6956
ZU	-0.6296	-0.6549	-0.6624
R2	0.0936	0.0960	0.0950

断面 (45)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8213	5.9543	6.0735
Y0	0.3315	0.3423	0.3442
YU	-0.8685	-0.8577	-0.8558
I	0.5395	0.5959	0.6018
Z0	1.6273	1.7408	1.7483
ZU	-0.6212	-0.6948	-0.7033
R2	0.0927	0.1001	0.0991

断面 (46)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8213	5.9543	6.0735
Y0	0.3292	0.3400	0.3457
YU	-0.8708	-0.8600	-0.8543
I	0.5329	0.5896	0.6058
Z0	1.6187	1.7338	1.7527
ZU	-0.6120	-0.6856	-0.7092
R2	0.0915	0.0990	0.0998

断面 (47)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8213	5.9543	6.0735
Y0	0.3281	0.3390	0.3463
YU	-0.8719	-0.8610	-0.8537
I	0.5301	0.5869	0.6075
Z0	1.6155	1.7314	1.7540
ZU	-0.6080	-0.6816	-0.7117
R2	0.0911	0.0986	0.1000

断面 (48)

	純断面	換算断面	
	(C)	C+R	C+R+P
A	5.8213	5.9543	6.0735
Y0	0.3272	0.3381	0.3469
YU	-0.8728	-0.8619	-0.8531
I	0.5273	0.5843	0.6092
Z0	1.6114	1.7280	1.7561
ZU	-0.6042	-0.6779	-0.7140
R2	0.0906	0.0981	0.1003

*** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 断面諸元　単位：m **

	断面 (49)			断面 (50)			断面 (51)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8213	5.9543	6.0735	5.8213	5.9543	6.0735	5.8213	5.9543	6.0735
Y0	0.3271	0.3379	0.3470	0.3271	0.3379	0.3470	0.3271	0.3379	0.3470
YU	-0.8729	-0.8621	-0.8530	-0.8729	-0.8621	-0.8530	-0.8729	-0.8621	-0.8530
I	0.5265	0.5835	0.6096	0.5265	0.5835	0.6096	0.5265	0.5834	0.6096
Z0	1.6099	1.7267	1.7569	1.6099	1.7267	1.7569	1.6100	1.7264	1.7567
ZU	-0.6032	-0.6769	-0.7147	-0.6032	-0.6769	-0.7147	-0.6032	-0.6768	-0.7147
R2	0.0905	0.0980	0.1004	0.0905	0.0980	0.1004	0.0905	0.0980	0.1004

	断面 (52)			断面 (53)			断面 (54)		
	純断面	換算断面		純断面	換算断面		純断面	換算断面	
	(C)	C+R	C+R+P	(C)	C+R	C+R+P	(C)	C+R	C+R+P
A	5.8213	5.9543	6.0735	6.4513	6.5843	6.7035	6.4513	6.5843	6.7035
Y0	0.3271	0.3380	0.3470	0.3695	0.3785	0.3842	0.3703	0.3793	0.3837
YU	-0.8729	-0.8620	-0.8530	-0.8305	-0.8215	-0.8158	-0.8297	-0.8207	-0.8163
I	0.5269	0.5838	0.6094	0.6741	0.7259	0.7428	0.6747	0.7264	0.7425
Z0	1.6106	1.7270	1.7563	1.8245	1.9180	1.9334	1.8220	1.9152	1.9352
ZU	-0.6036	-0.6772	-0.7144	-0.8117	-0.8836	-0.9105	-0.8132	-0.8851	-0.9096
R2	0.0905	0.0980	0.1003	0.1045	0.1103	0.1108	0.1046	0.1103	0.1108

	断面 (55)			純断面	換算断面		純断面	換算断面	
	純断面	換算断面		(C)	C+R	C+R+P	(C)	C+R	C+R+P
	(C)	C+R	C+R+P						
A	6.4724	6.4724	6.5916						
Y0	0.3723	0.3723	0.3760						
YU	-0.8277	-0.8277	-0.8240						
I	0.6825	0.6825	0.6999						
Z0	1.8332	1.8332	1.8613						
ZU	-0.8246	-0.8246	-0.8494						
R2	0.1055	0.1055	0.1062						

2.10.2 Bending Stress under Construction Stage

BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns

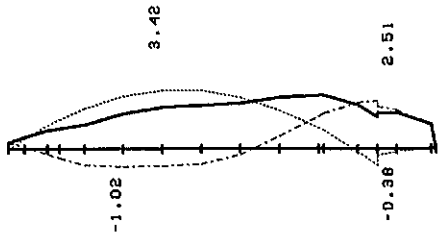
STRESS DURING ERECTION STAGE 2

SCALE=1/ 380

1CM= 4.5 N/MM2

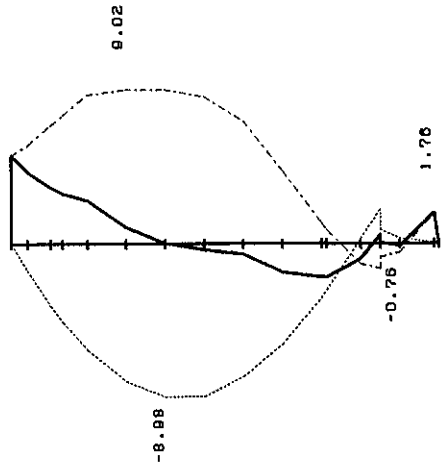
D+EL(ERECTION LOAD)
P(G)+P(S)
D+EL+P(G)+P(S)

TOP FIBER



D+EL(ERECTION LOAD)
P(G)+P(S)
D+EL+P(G)+P(S)

BOTTOM FIBER

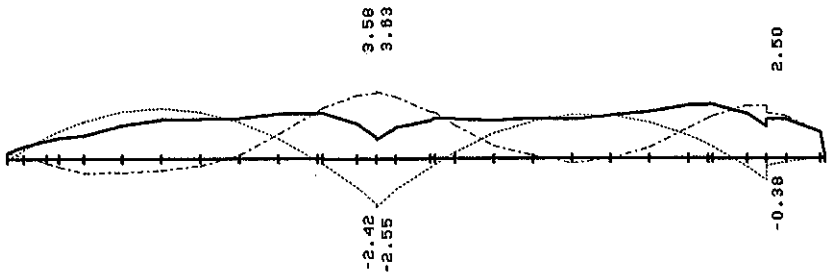


BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS DURING ERECTION STAGE 3

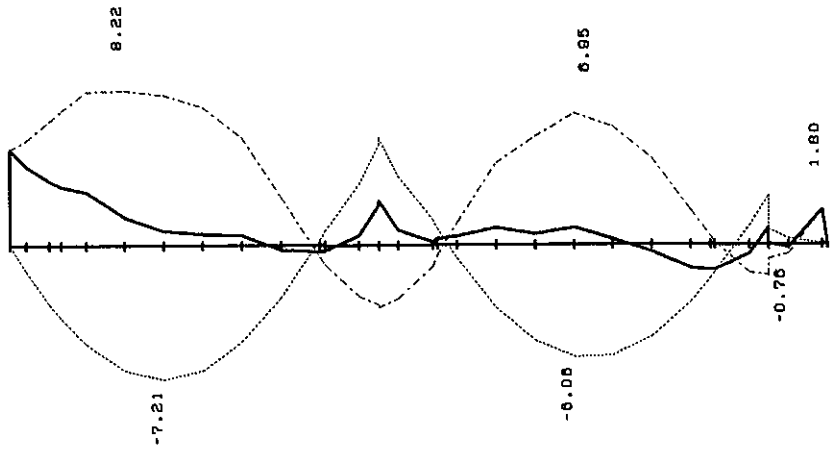
SCALE=1/ 380
1CM= 4.1 N/MM2

D+EL(ERECTION LOAD)
P(G)+P(S)
D+EL+P(G)+P(S)

TOP FIBER



BOTTOM FIBER



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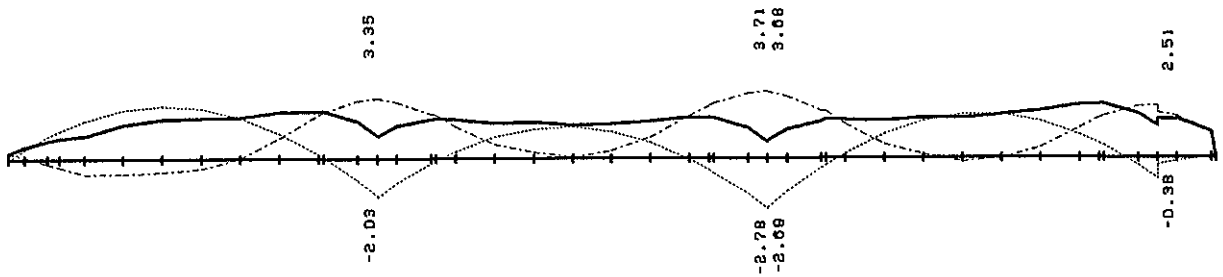
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS DURING ERECTION STAGE 4

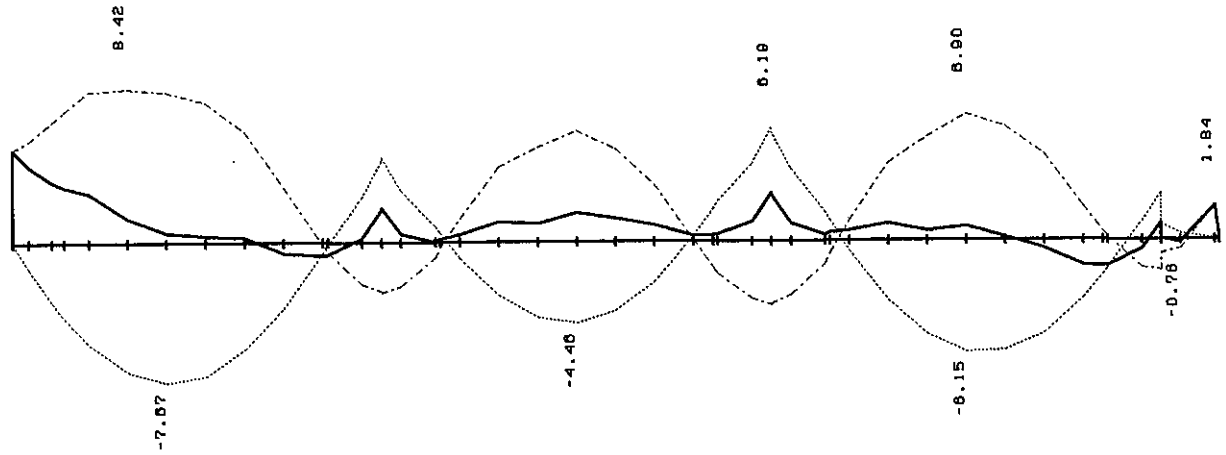
SCALE=1/ 380
1CM= 4.2 N/MM2

D+EL(ERECTION LOAD)
P(G)+P(S)
D+EL+P(G)+P(S)

TOP FIBER



BOTTOM FIBER



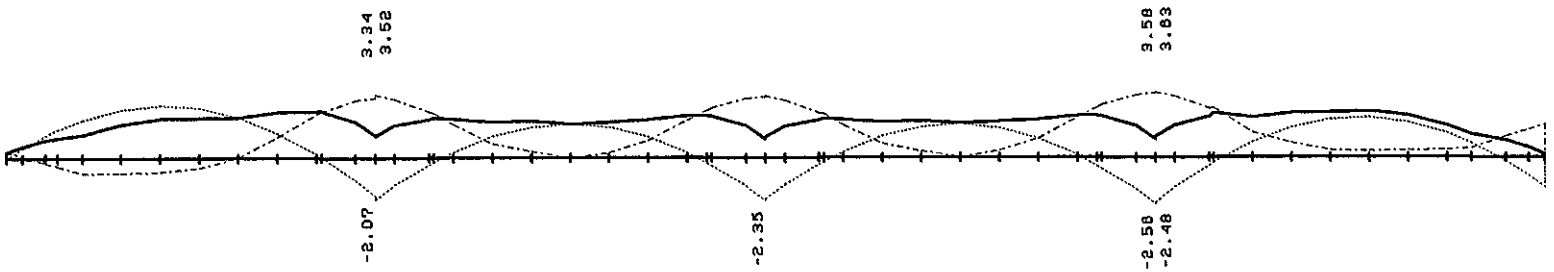
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns

STRESS DURING ERECTION STAGE 5

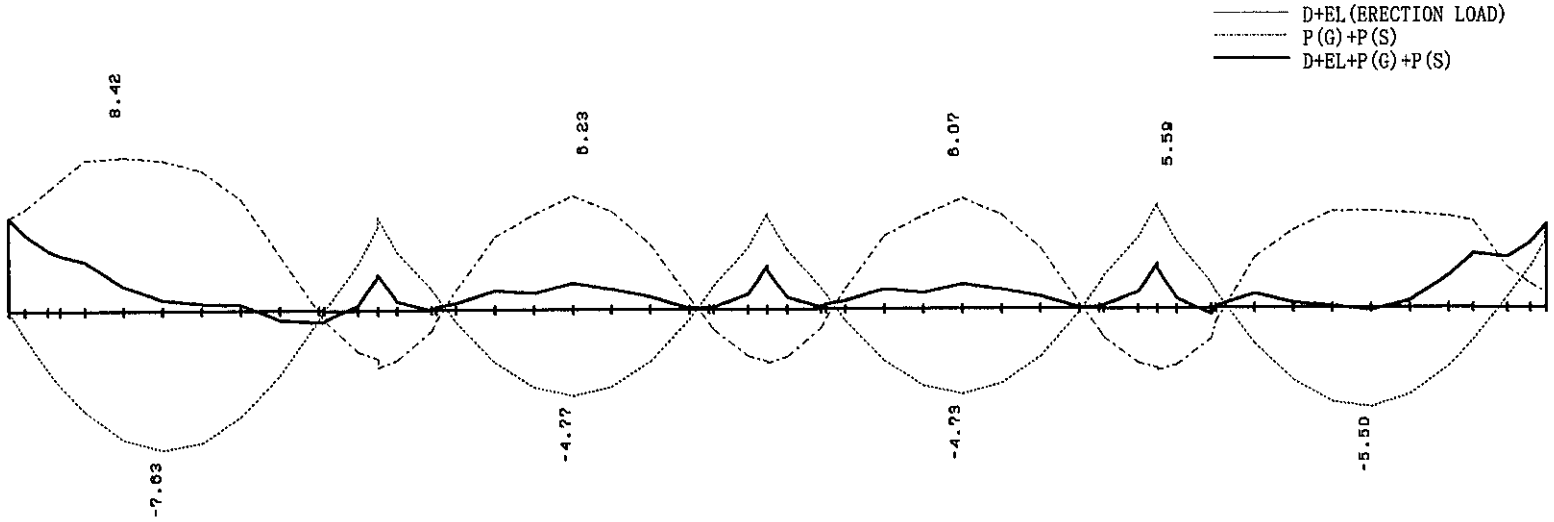
SCALE=1/ 380

1CM= 4.2 N/MM2

TOP FIBER



BOTTOM FIBER



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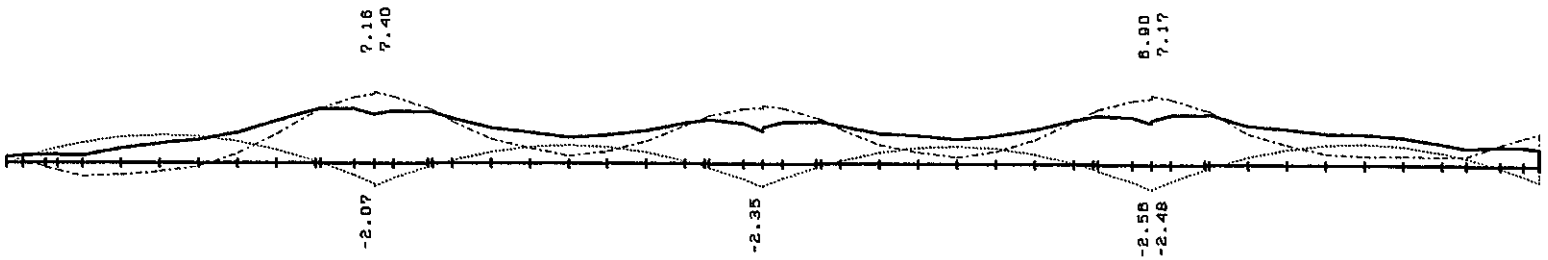
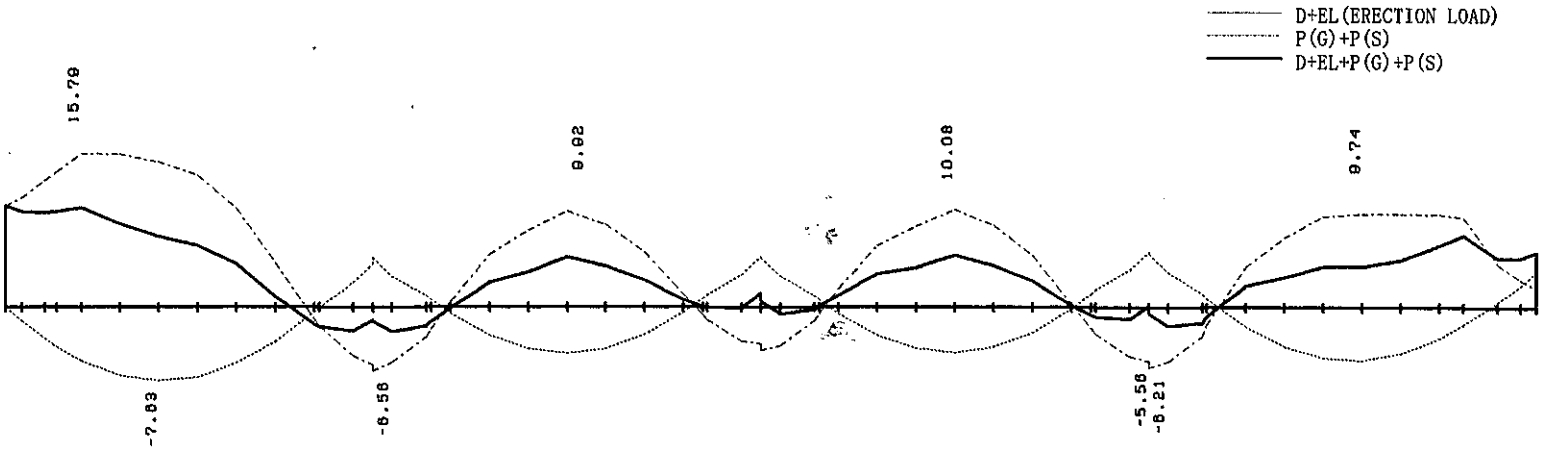
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS DURING ERECTION STAGE 6

SCALE=1/ 380
1CM= 7.9 N/MM2

TOP FIBER



BOTTOM FIBER

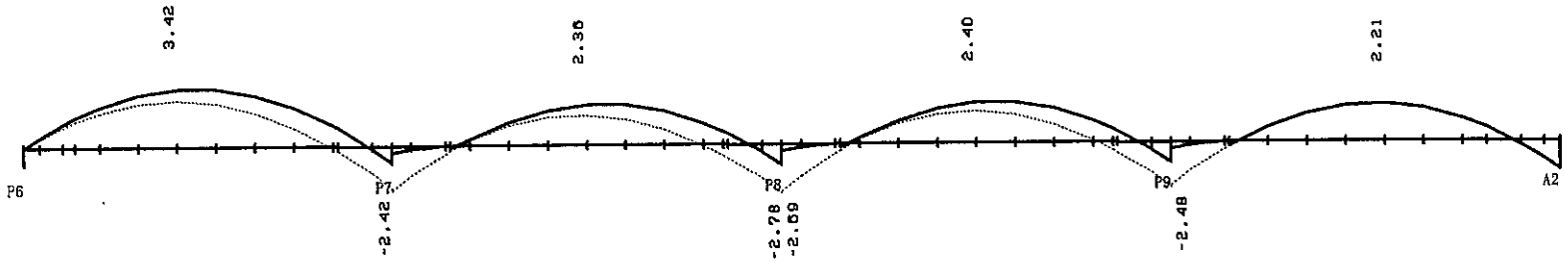


BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
MAX & MIN STRESS DURING ERECTION

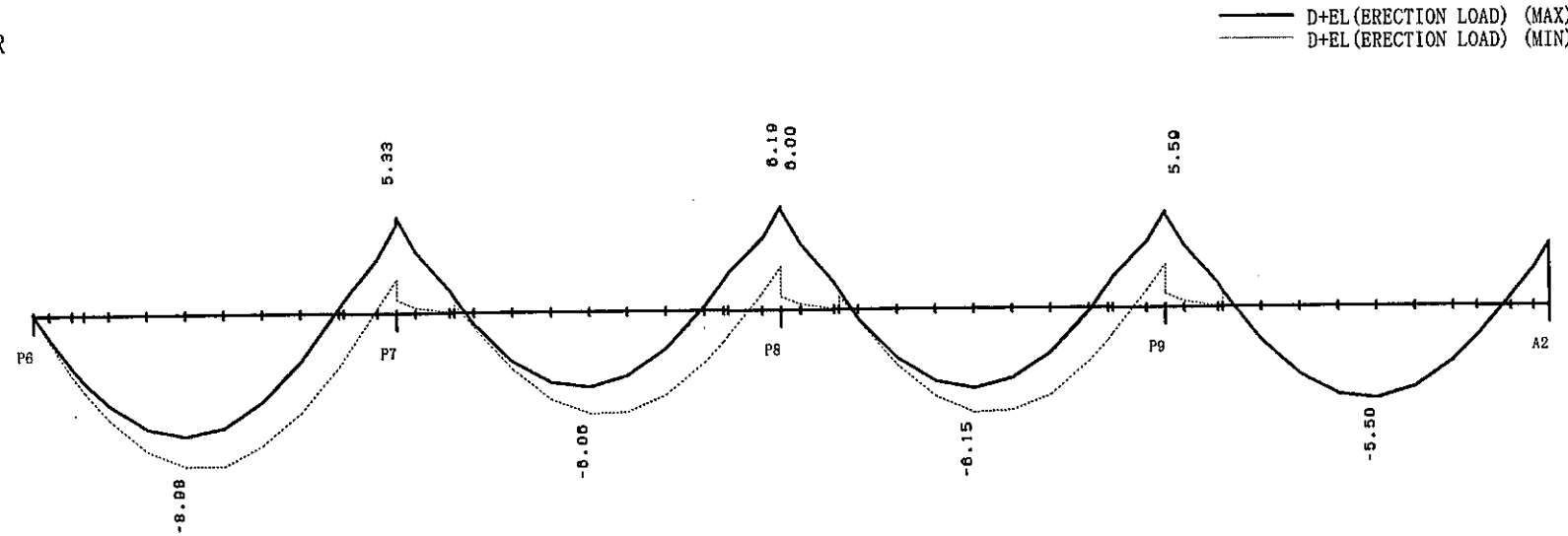
SCALE=1/ 380
1CM= 4.5 N/MM2

D+EL(ERECTION LOAD) (MAX)
D+EL(ERECTION LOAD) (MIN)

TOP FIBER



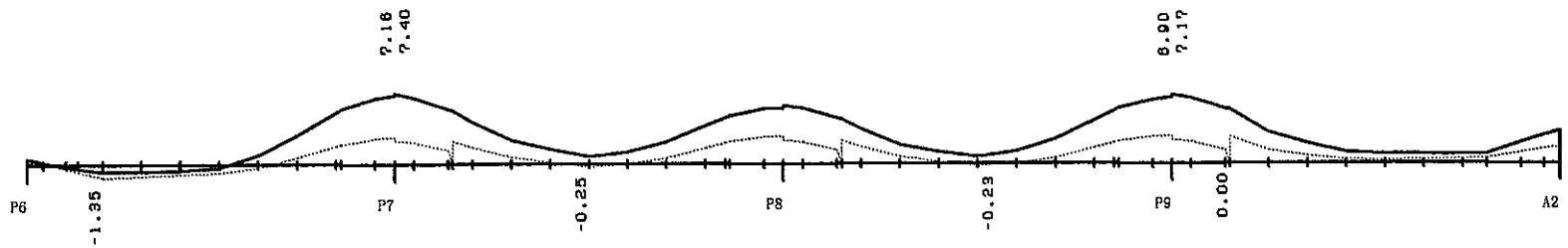
BOTTOM FIBER



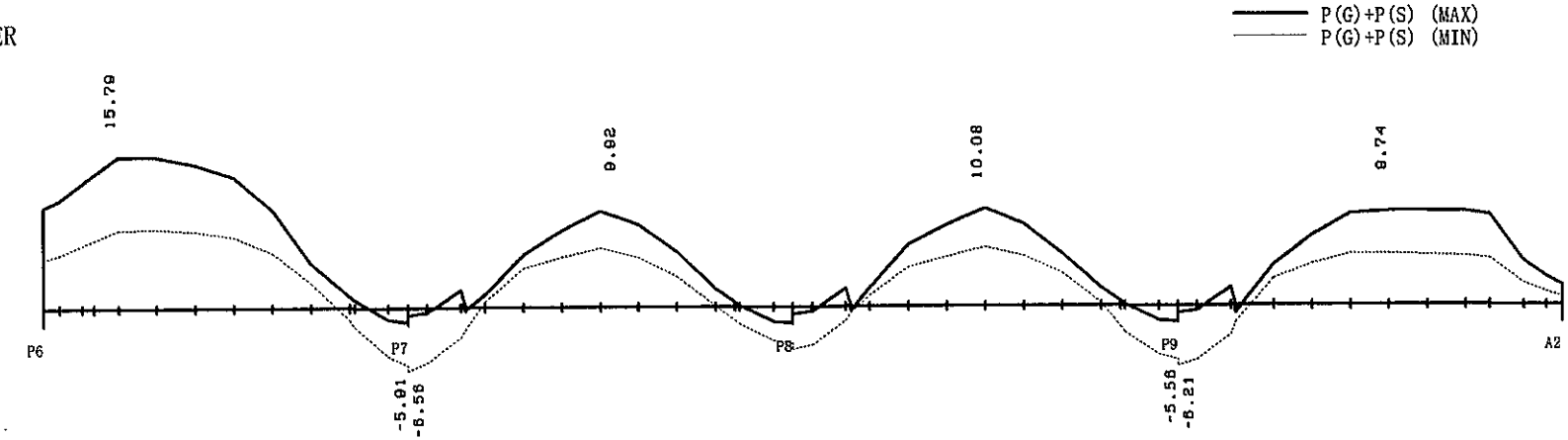
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
MAX & MIN STRESS DURING ERECTION

SCALE=1/ 380
1CM= 7.9 N/MM2

TOP FIBER



BOTTOM FIBER

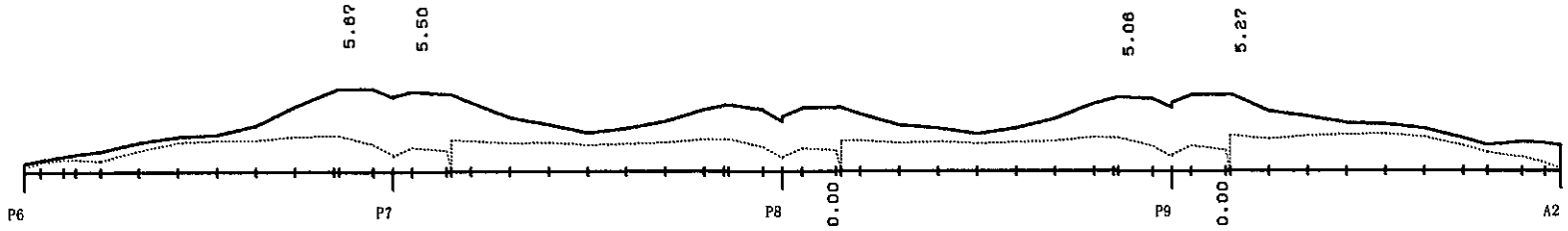


BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
MAX & MIN STRESS DURING ERECTION

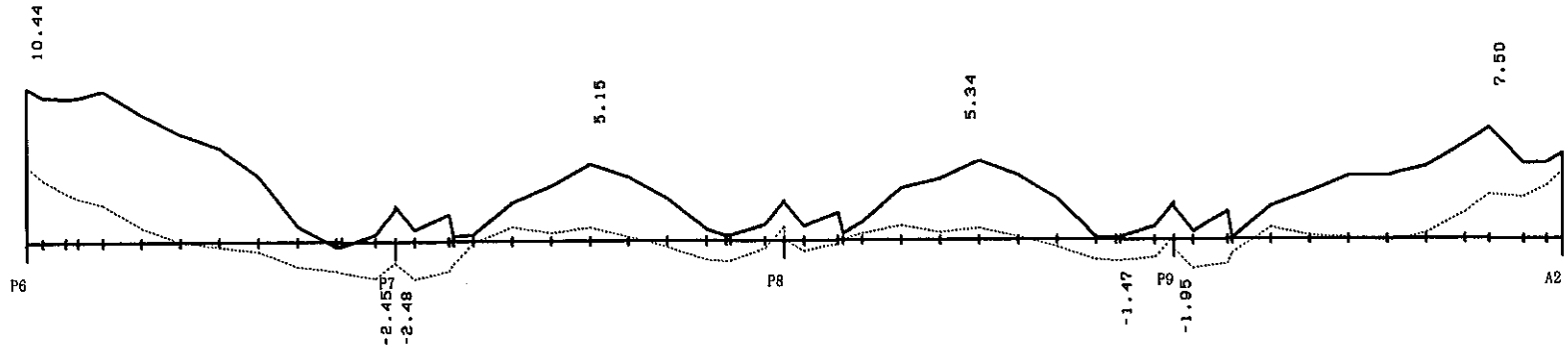
SCALE=1/ 380
1CM= 5.2 N/MM2

D+EL+P(G)+P(S) (MAX)
D+EL+P(G)+P(S) (MIN)

TOP FIBER



BOTTOM FIBER



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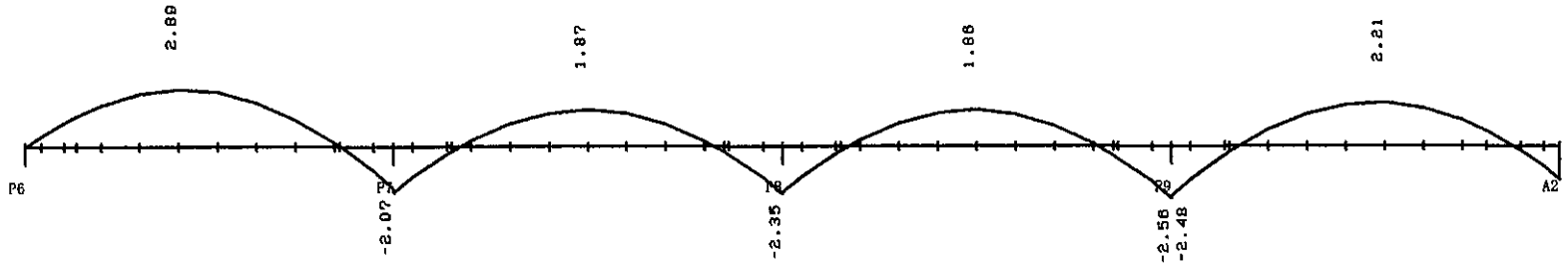
2.10.3 Bending Stress after Construction Completion Stage

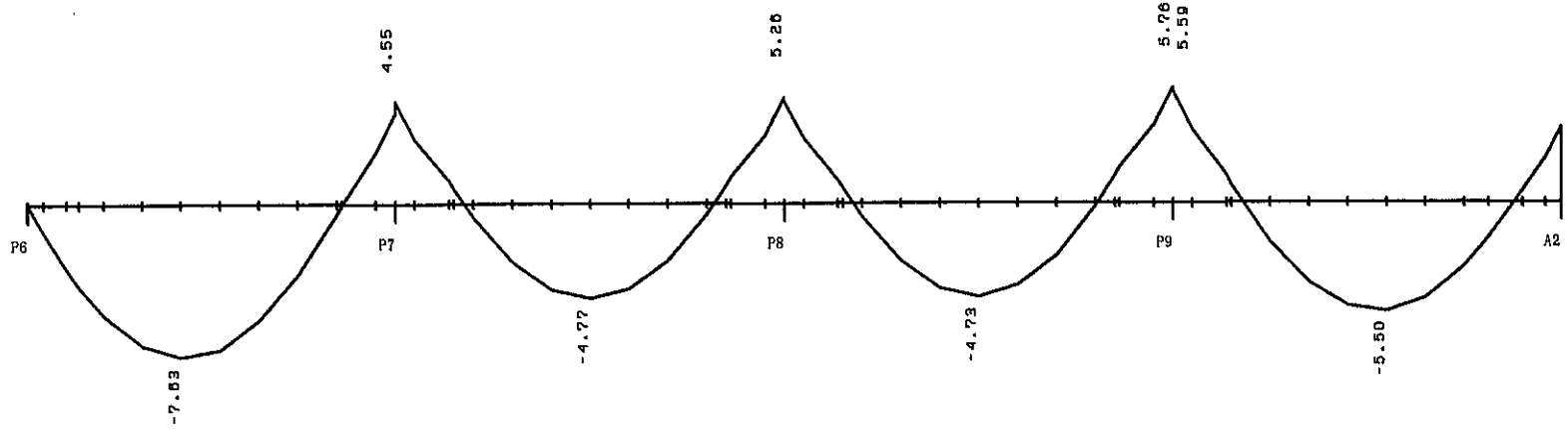
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING STRESS OF DEAD LOAD

SCALE=1/ 380
1CM= 3.814N/MM2

TOP FIBER MAX= 2.89N/MM2
MIN= -2.56N/MM2



BOTTOM FIBER MAX= 5.76N/MM2
MIN= -7.63N/MM2



BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns

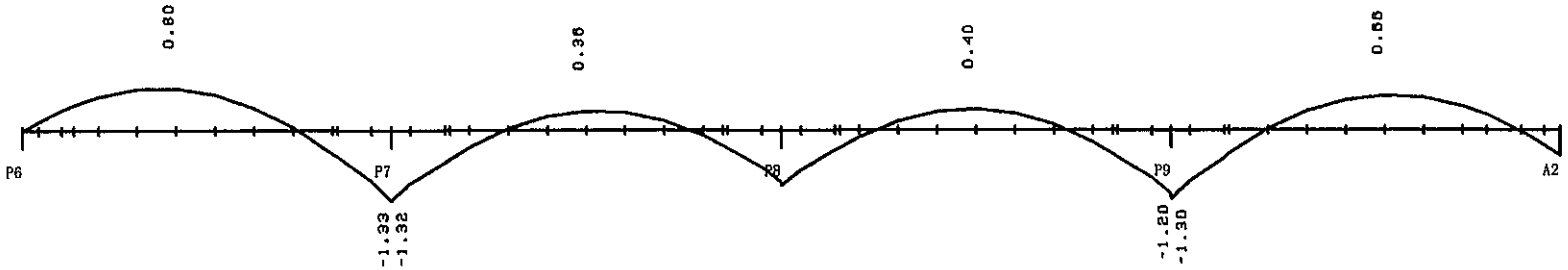
BENDING STRESS OF SURFACE WORK D1

SCALE=1/ 380

1CM= 1.467N/MM2

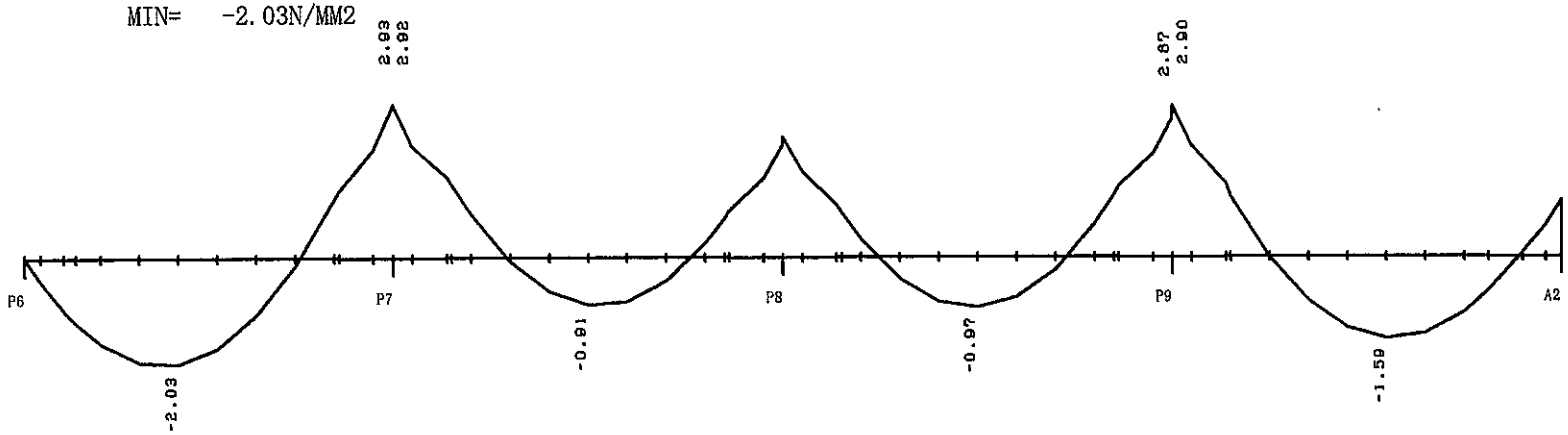
TOP FIBER MAX= 0.80N/MM2

MIN= -1.33N/MM2



BOTTOM FIBER MAX= 2.93N/MM2

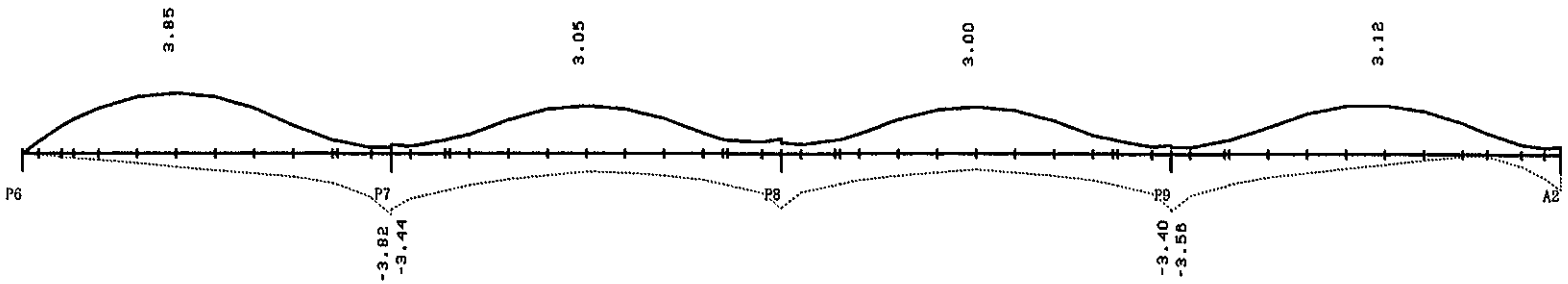
MIN= -2.03N/MM2



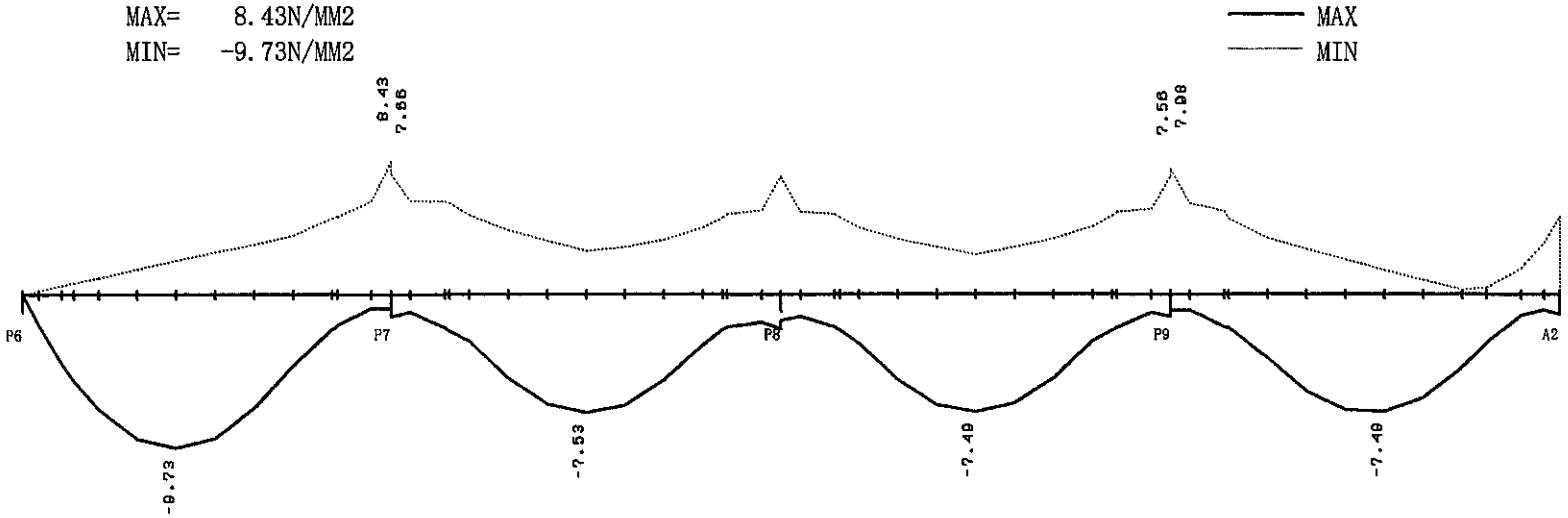
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING STRESS OF LIVE LOAD

SCALE=1/ 380
1CM= 4.865N/MM2

TOP FIBER MAX= 3.85N/MM2
MIN= -3.82N/MM2



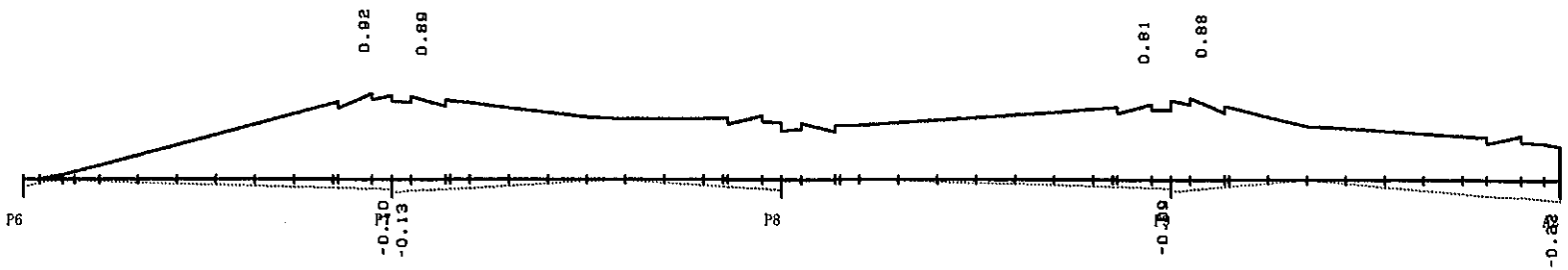
BOTTOM FIBER MAX= 8.43N/MM2
MIN= -9.73N/MM2



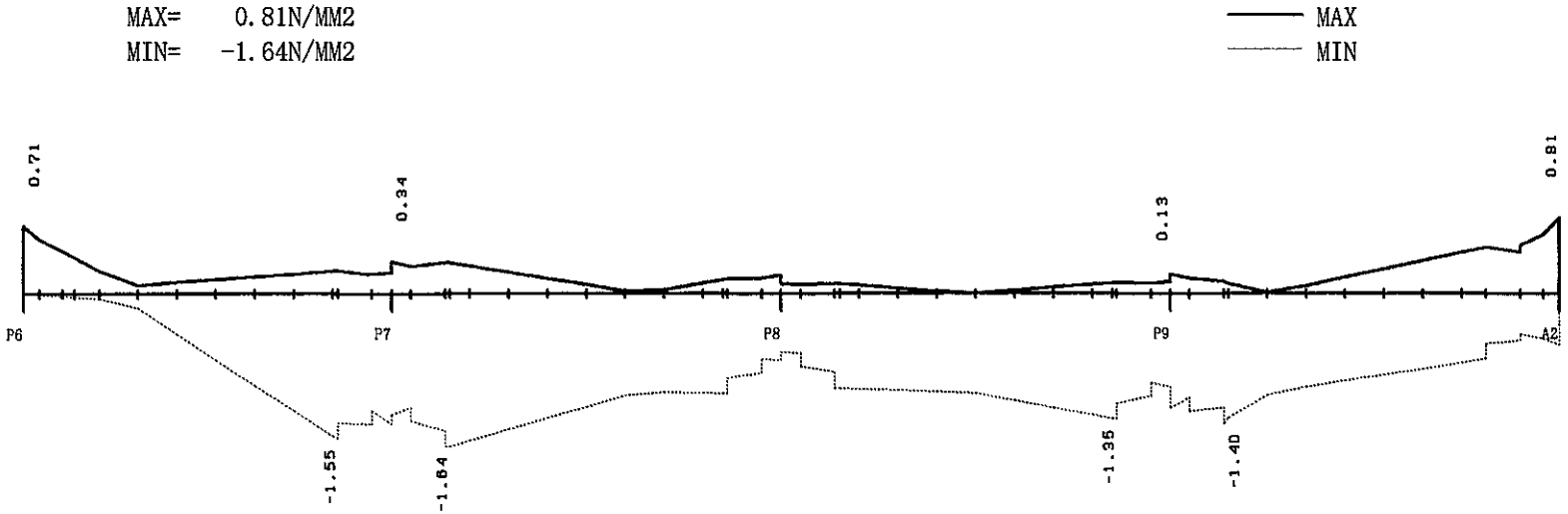
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING STRESS OF TEMP

SCALE=1/ 380
1CM= 0.822N/MM2

TOP FIBER
MAX= 0.92N/MM2
MIN= -0.22N/MM2



BOTTOM FIBER
MAX= 0.81N/MM2
MIN= -1.64N/MM2



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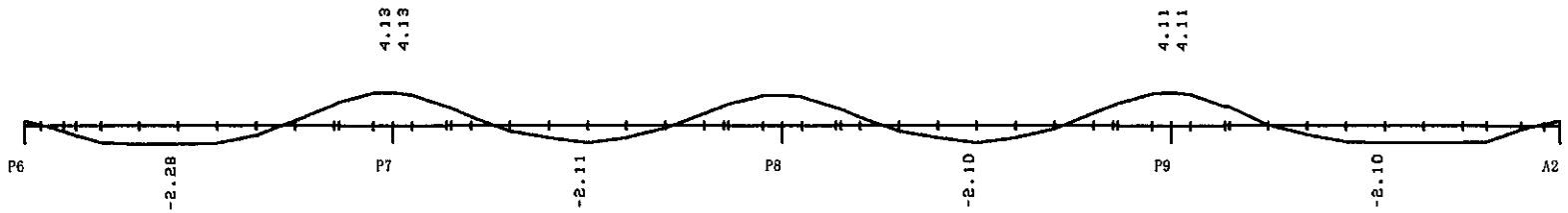
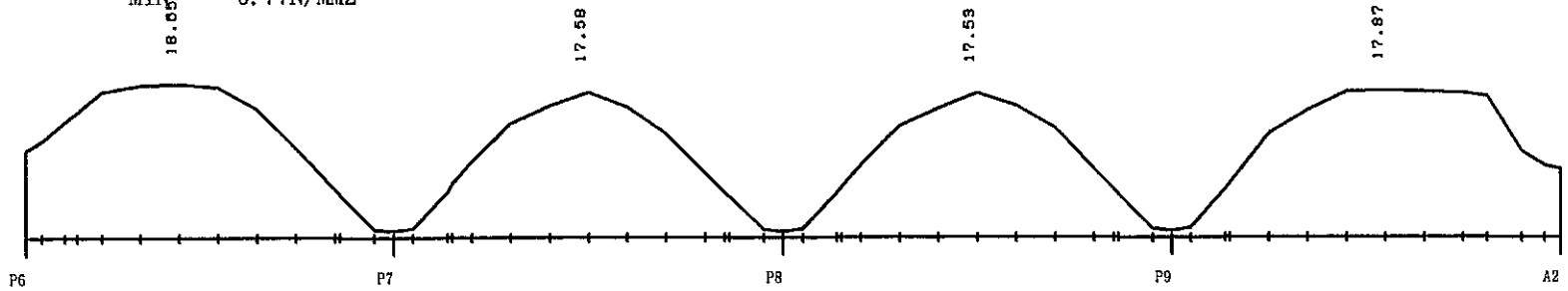
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING STRESS OF IN CABLE(PS)

SCALE=1/ 380
1CM= 9.324N/MM2

TOP FIBER MAX= 4.13N/MM2
MIN= -2.28N/MM2



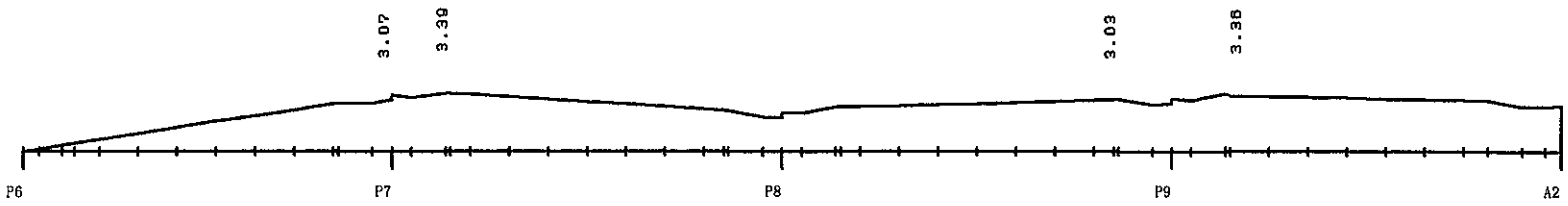
BOTTOM FIBER MAX= 18.65N/MM2
MIN= 0.77N/MM2



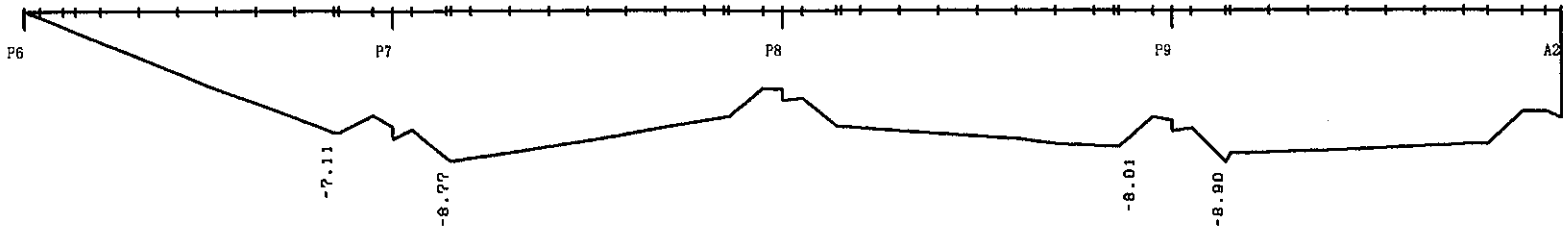
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING STRESS OF SECONDARY STRESS

SCALE=1/ 380
1CM= 4.452N/MM2

TOP FIBER MAX= 3.39N/MM2
MIN= 0.00N/MM2



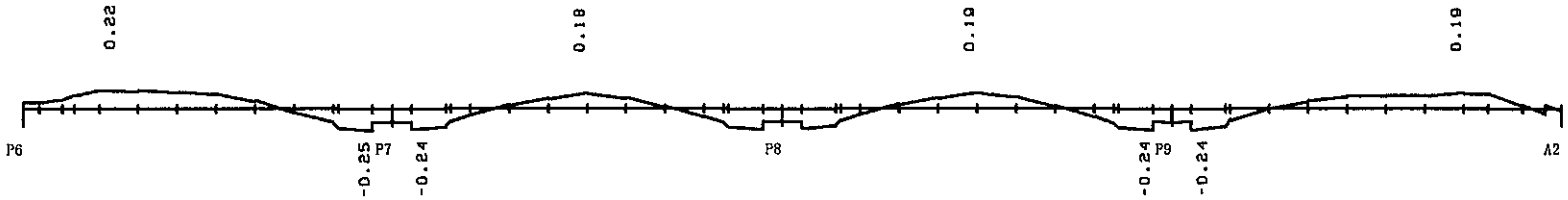
BOTTOM FIBER MAX= 0.00N/MM2
MIN= -8.90N/MM2



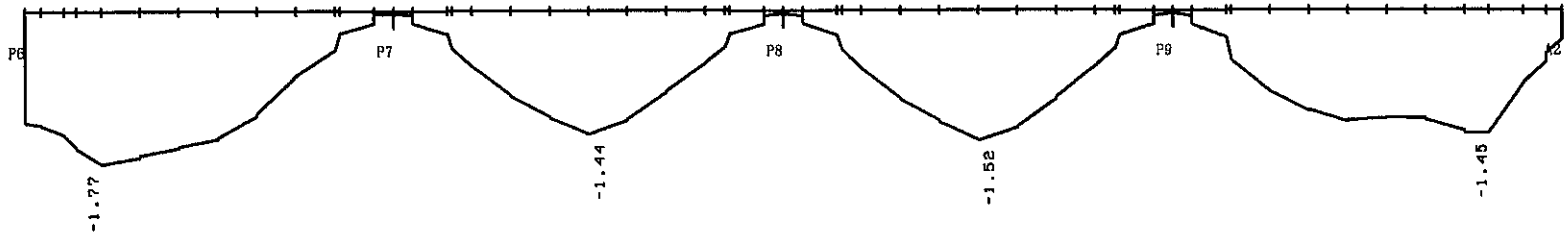
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING STRESS OF CREEP,SHRINKAGE(INTERNAL)

SCALE=1/ 380
1CM= 0.887N/MM2

TOP FIBER MAX= 0.22N/MM2
MIN= -0.25N/MM2



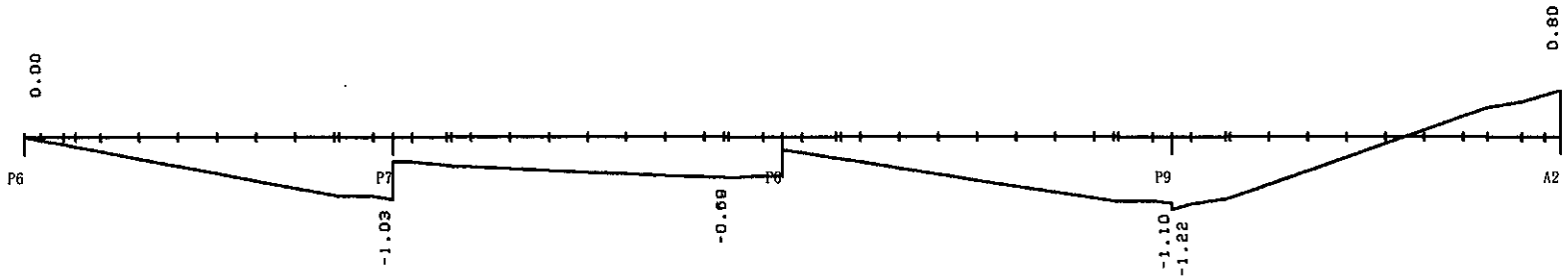
BOTTOM FIBER MAX= -0.03N/MM2
MIN= -1.77N/MM2



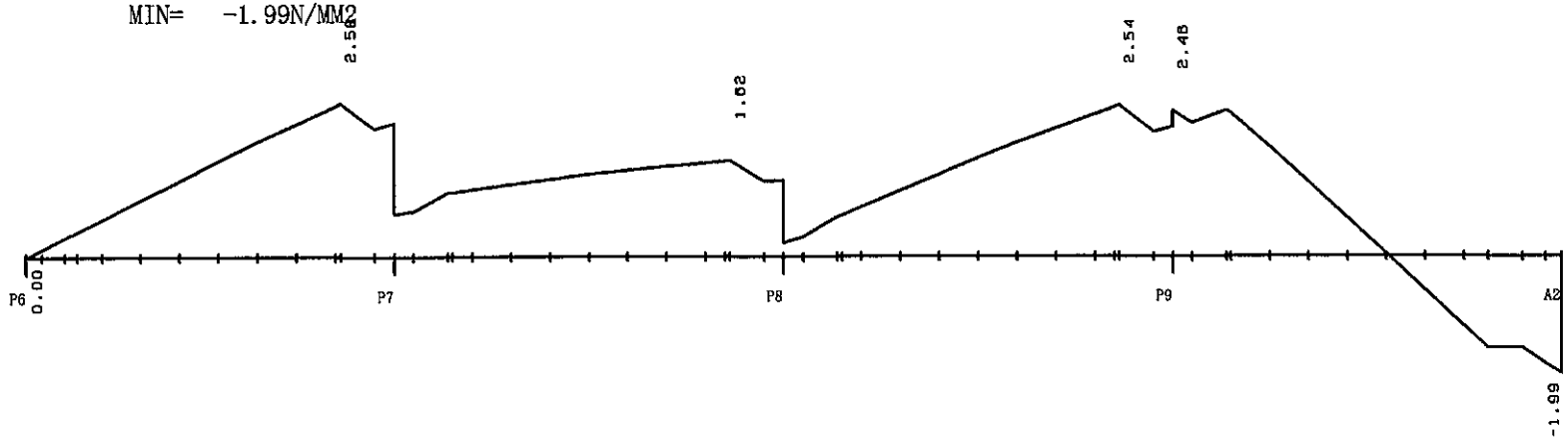
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING STRESS OF CREEP, SHRINKAGE(EXTERNAL)

SCALE=1/ 380
1CM= 1.291N/MM2

TOP FIBER MAX= 0.80N/MM2
MIN= -1.22N/MM2



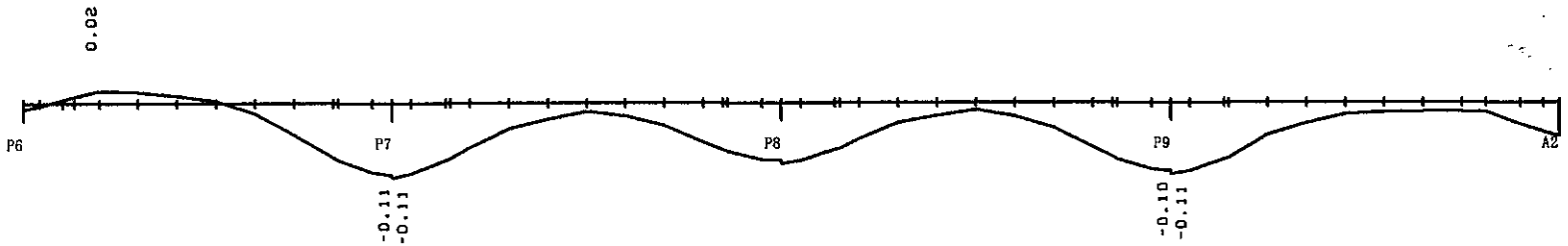
BOTTOM FIBER MAX= 2.58N/MM2
MIN= -1.99N/MM2



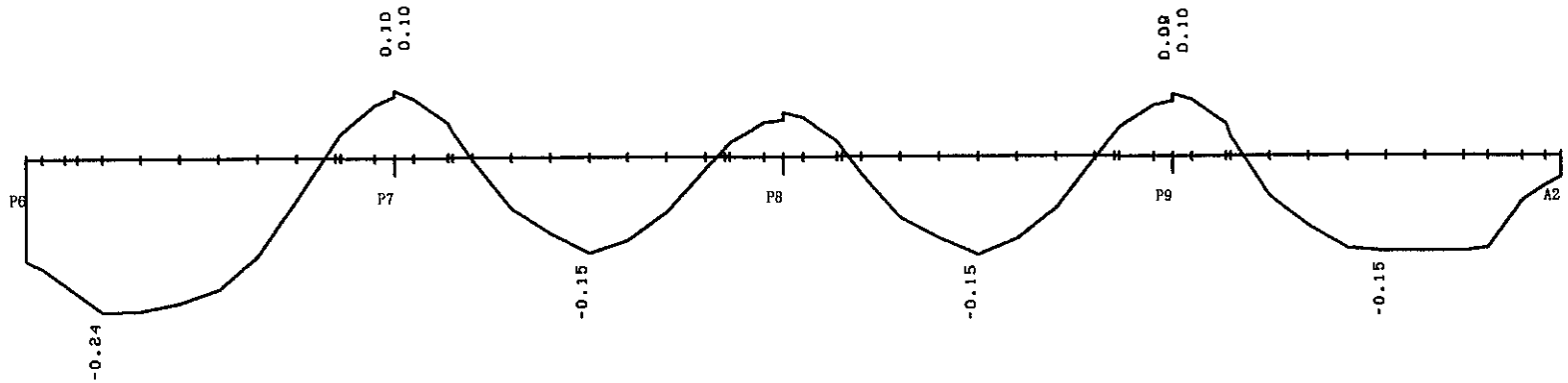
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
BENDING STRESS OF RELAXATION

SCALE=1/ 380
1CM= 0.119N/MM2

TOP FIBER MAX= 0.02N/MM2
MIN= -0.11N/MM2



BOTTOM FIBER MAX= 0.10N/MM2
MIN= -0.24N/MM2

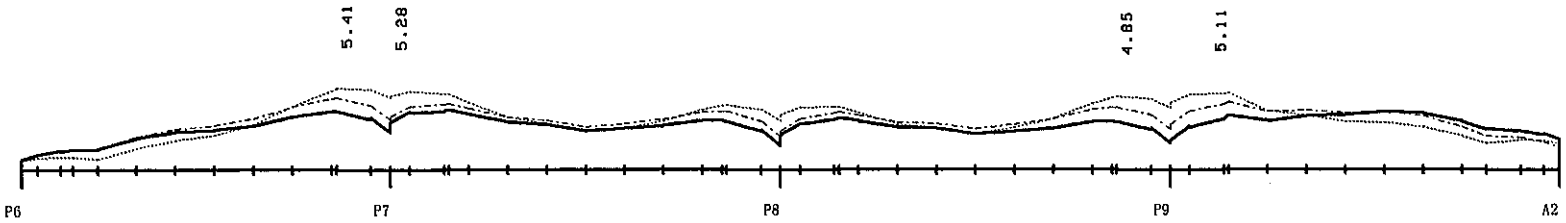


BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 5.1 N/MM2

COMPLETION OF STRUCTURE
COMPLETION OF SURFACE WORK
COMPLETION OF CR & SH (D)

TOP FIBER



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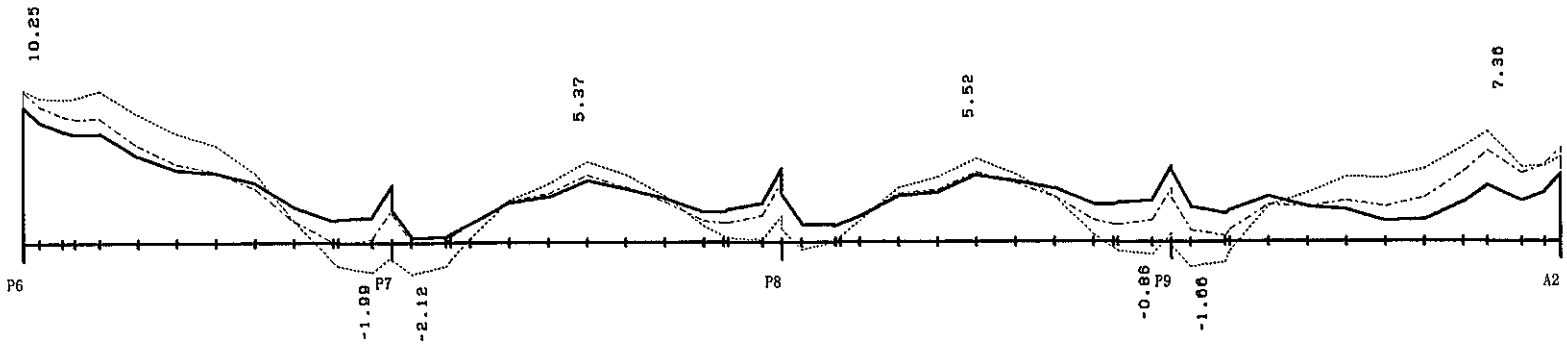
COMPLETION OF STRUCTURE
COMPLETION OF SURFACE WORK
COMPLETION OF CR & SH (D)

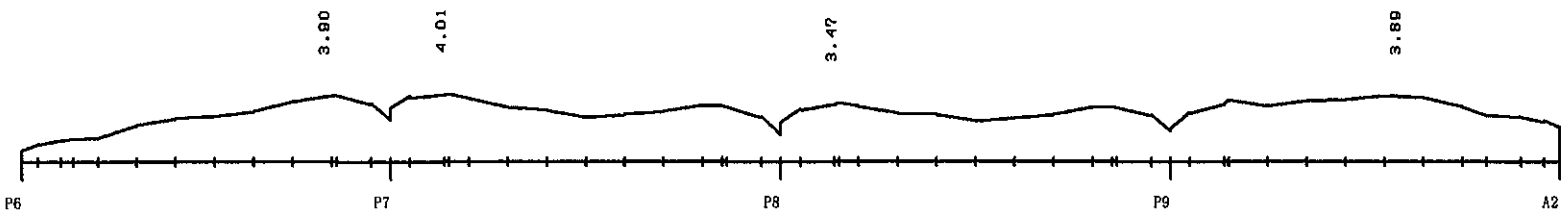
BOTTOM FIBER



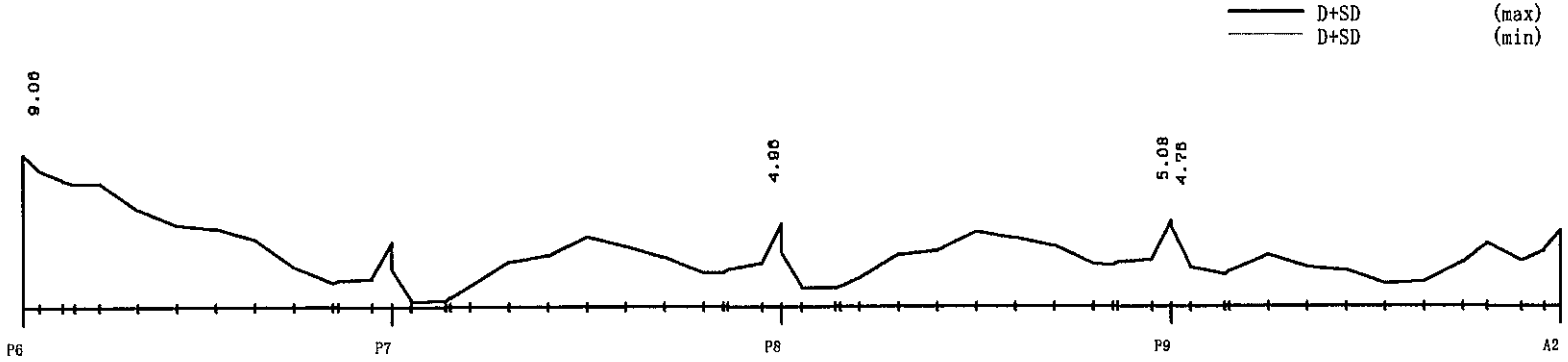
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 4.5 N/MM2

TOP FIBER



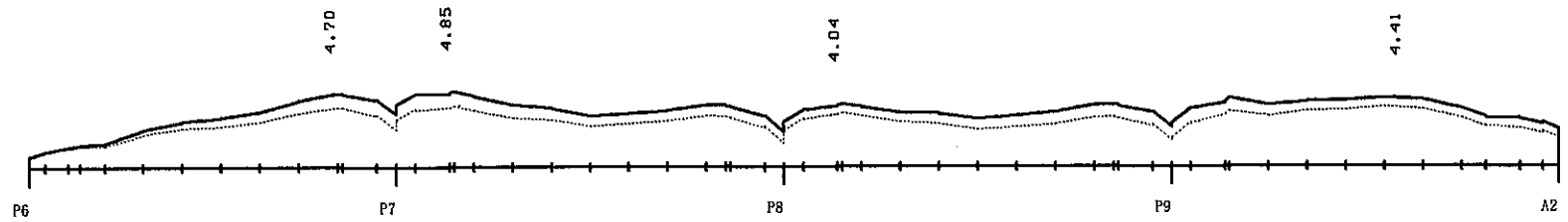
BOTTOM FIBER



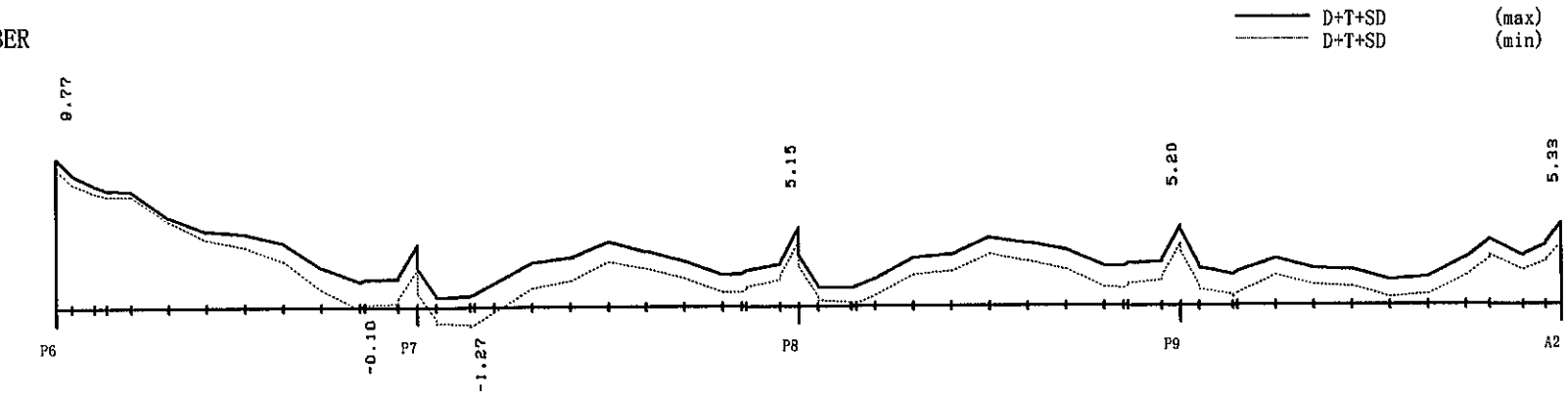
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 4.9 N/MM2

TOP FIBER



BOTTOM FIBER



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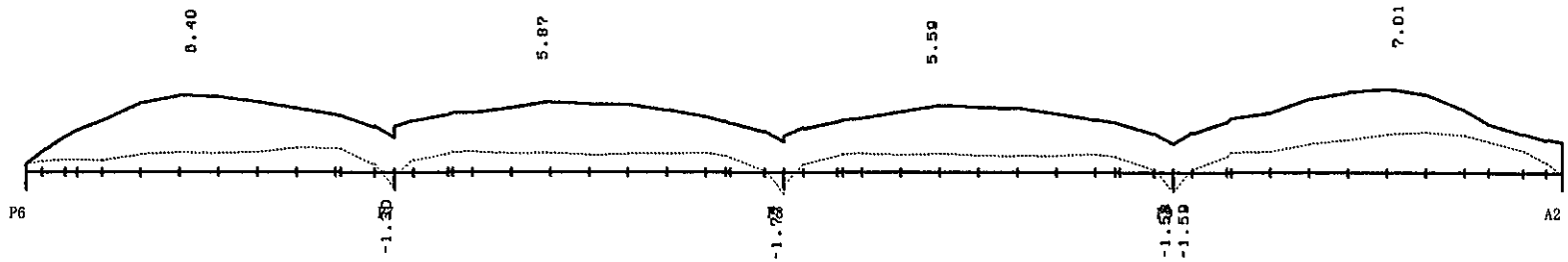
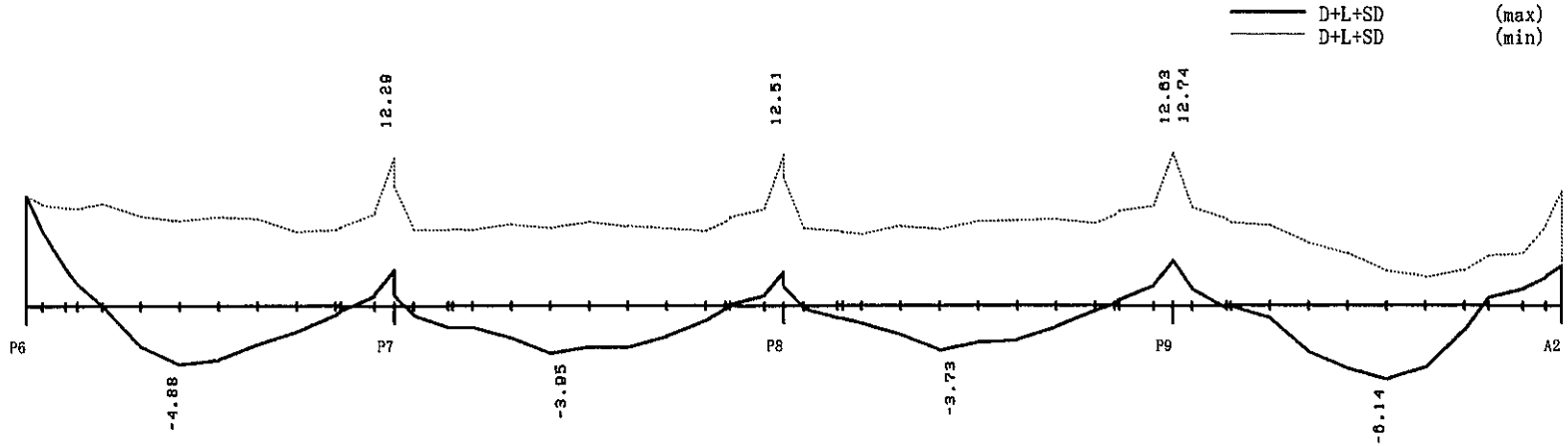
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 6.4 N/MM2

TOP FIBER



BOTTOM FIBER



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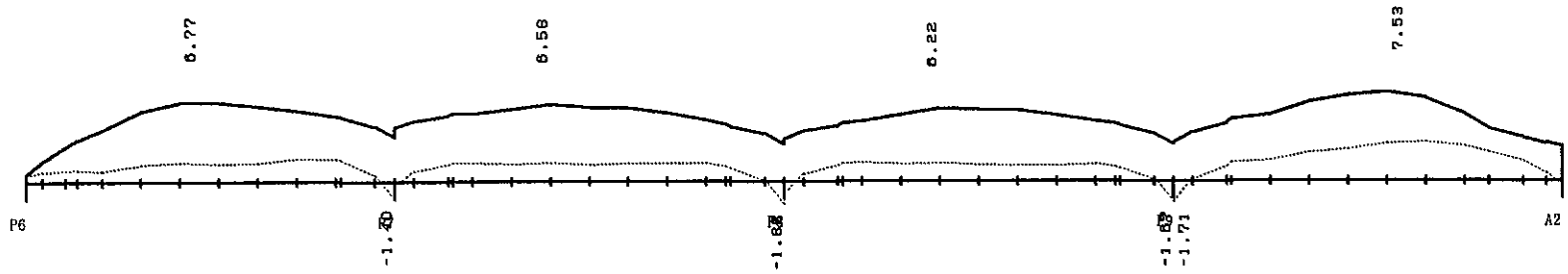
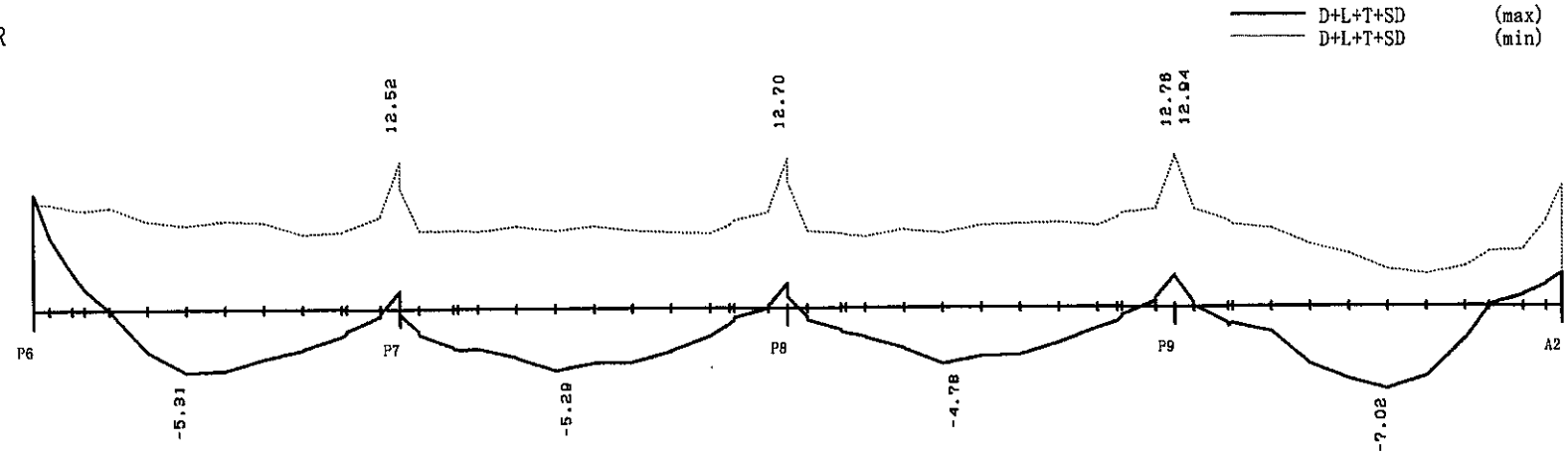
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 6.5 N/MM2

TOP FIBER



BOTTOM FIBER



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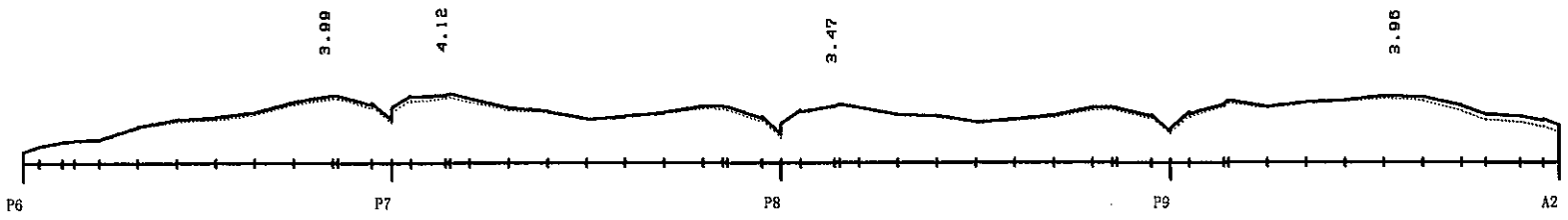
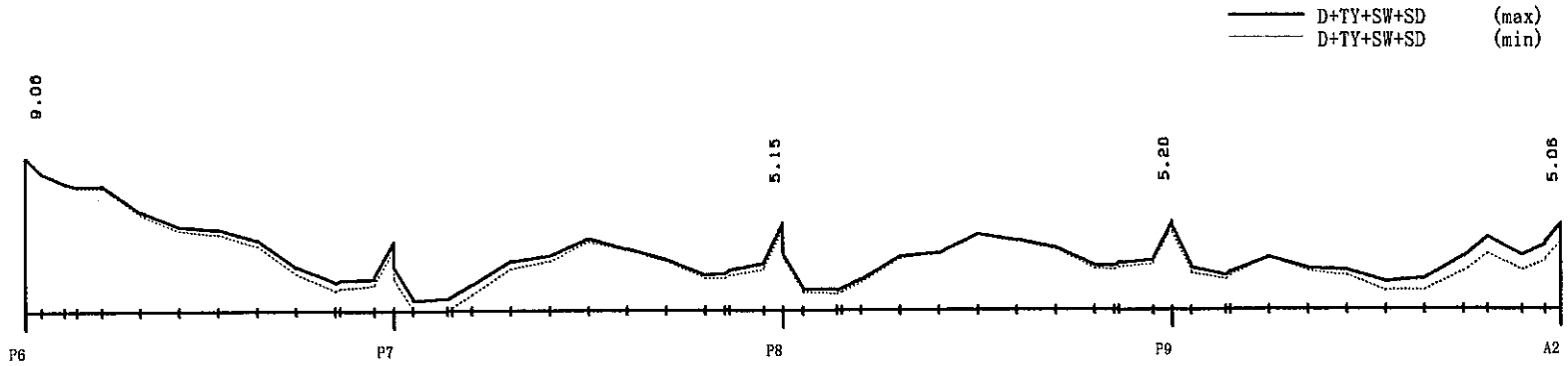
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 4.5 N/MM2

TOP FIBER



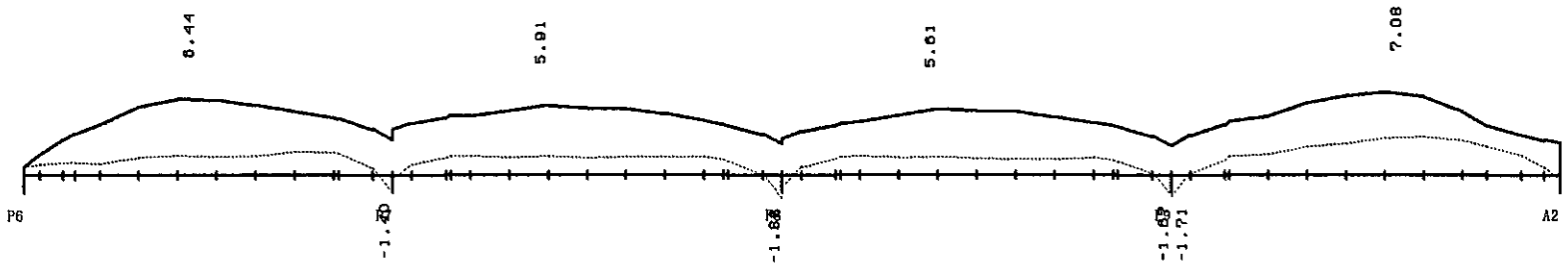
BOTTOM FIBER



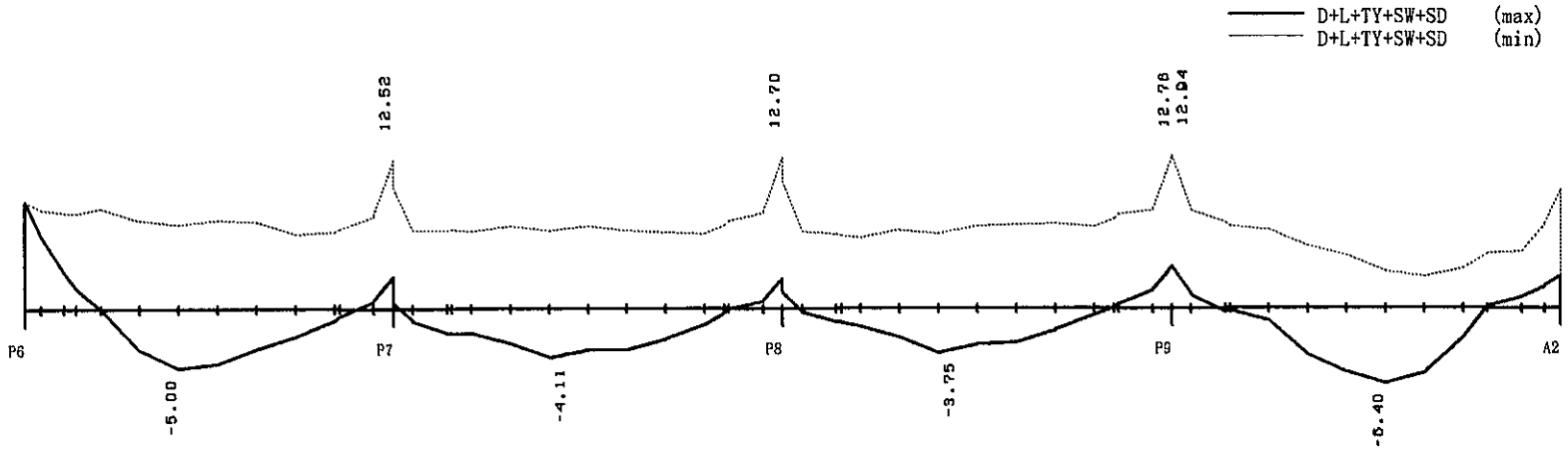
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 6.5 N/MM2

TOP FIBER



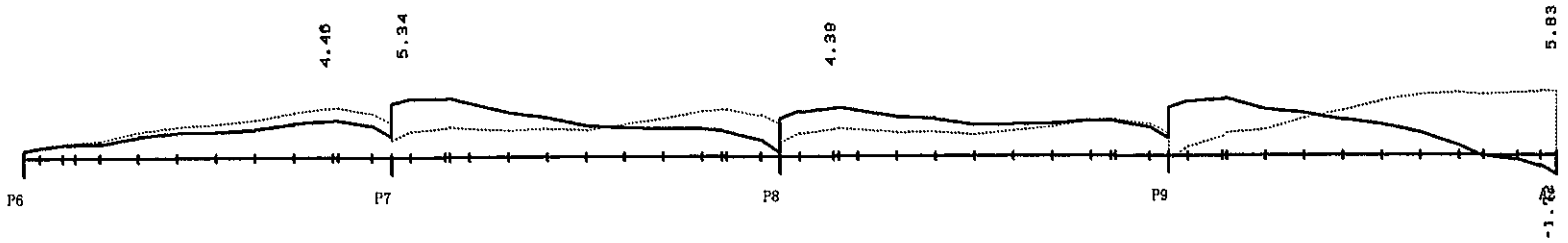
BOTTOM FIBER



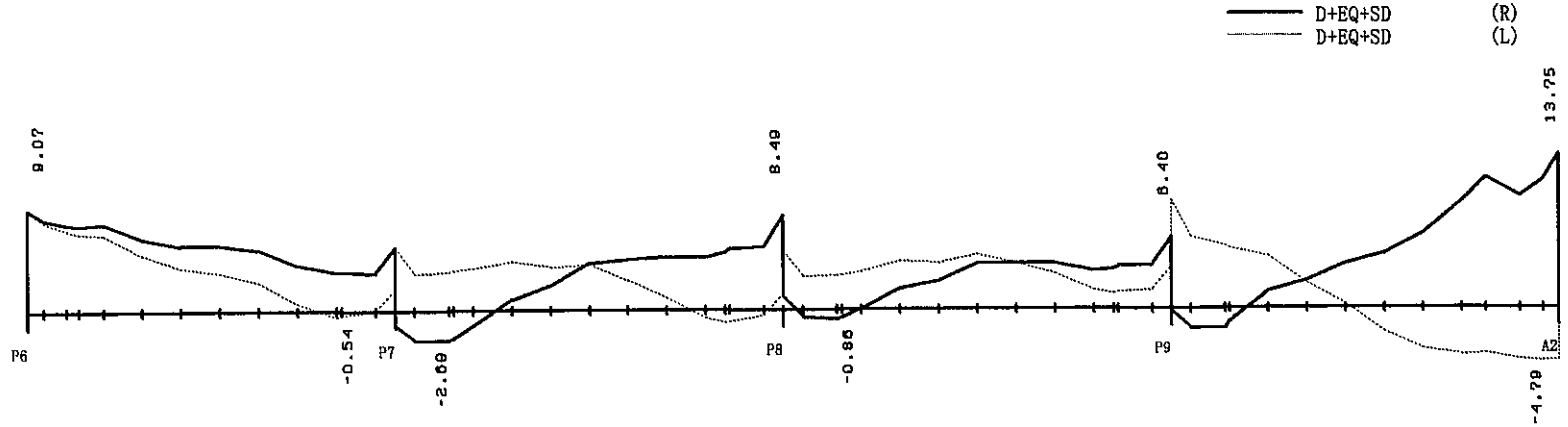
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
STRESS AFTER CONSTRUCTION

SCALE=1/ 380
1CM= 6.9 N/MM2

TOP FIBER



BOTTOM FIBER



2.10.4 Crack Width Control

** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns

Method of Crack control (A)　　Examination of Crack Width under Serviceability Limit (N/mm2)

Section　　Load Combination

** 方法 (A) 設計荷重時曲げひび割れ幅の検討 (N/mm2) **

断面	荷重組み合わせ		N(kN)	M(kNm)	X(m)	SIG-C	SIG-S	SIG-P	C(cm)	CS(cm)	FAI(cm)	SIG-S	EPS-SH	W(cm)	WA(cm)
6	D+L+SD	MAX	-18574.7	4467.0	0.452	7.22	68.	1053.	6.40	10.00	1.90	68.	0.0	0.0106<	0.0224
6	D+L+T+SD	MAX	-18574.7	4526.2	0.445	7.32	70.	1055.	6.40	10.00	1.90	70.	0.0	0.0110<	0.0224
6	D+L+TY+SW+SD	MAX	-18574.7	4526.2	0.445	7.32	70.	1055.	6.40	10.00	1.90	70.	0.0	0.0110<	0.0224
6	D+L+SD	MAX	-18719.2	4467.0	0.457	7.22	67.	1052.	6.40	10.00	1.90	67.	0.0	0.0104<	0.0224
6	D+L+T+SD	MAX	-18719.2	4526.2	0.449	7.32	69.	1054.	6.40	10.00	1.90	69.	0.0	0.0108<	0.0224
6	D+L+TY+SW+SD	MAX	-18719.2	4526.2	0.449	7.32	69.	1054.	6.40	10.00	1.90	69.	0.0	0.0108<	0.0224
7	D+L+SD	MAX	-18888.5	5502.4	0.368	8.92	116.	1105.	6.40	10.00	1.90	116.	0.0	0.0181<	0.0224
7	D+L+T+SD	MAX	-18888.5	5581.7	0.363	9.05	120.	1108.	6.40	10.00	1.90	120.	0.0	0.0187<	0.0224
7	D+L+TY+SW+SD	MAX	-18888.5	5581.7	0.363	9.05	120.	1108.	6.40	10.00	1.90	120.	0.0	0.0187<	0.0224
7	D+L+SD	MAX	-18961.4	5502.4	0.369	8.92	115.	1104.	6.40	10.00	1.90	115.	0.0	0.0180<	0.0224
7	D+L+T+SD	MAX	-18961.4	5581.7	0.364	9.05	119.	1108.	6.40	10.00	1.90	119.	0.0	0.0186<	0.0224
7	D+L+TY+SW+SD	MAX	-18961.4	5581.7	0.364	9.05	119.	1108.	6.40	10.00	1.90	119.	0.0	0.0186<	0.0224
8	D+L+SD	MAX	-19087.4	5236.1	0.388	8.52	102.	1107.	6.40	10.00	1.90	102.	0.0	0.0160<	0.0224
8	D+L+T+SD	MAX	-19087.4	5335.6	0.380	8.68	107.	1111.	6.40	10.00	1.90	107.	0.0	0.0168<	0.0224
8	D+L+TY+SW+SD	MAX	-19087.4	5335.6	0.380	8.68	107.	1111.	6.40	10.00	1.90	107.	0.0	0.0168<	0.0224
8	D+L+SD	MAX	-19150.4	5236.1	0.389	8.52	102.	1107.	6.40	10.00	1.90	102.	0.0	0.0159<	0.0224
8	D+L+T+SD	MAX	-19150.4	5335.6	0.381	8.68	107.	1111.	6.40	10.00	1.90	107.	0.0	0.0167<	0.0224
8	D+L+TY+SW+SD	MAX	-19150.4	5335.6	0.381	8.68	107.	1111.	6.40	10.00	1.90	107.	0.0	0.0167<	0.0224
9	D+L+SD	MAX	-19231.8	4439.3	0.490	7.04	57.	1089.	6.40	10.00	2.50	57.	0.0	0.0088<	0.0224
9	D+L+T+SD	MAX	-19231.8	4558.9	0.474	7.22	62.	1093.	6.40	10.00	2.50	62.	0.0	0.0096<	0.0224
9	D+L+TY+SW+SD	MAX	-19231.8	4558.9	0.474	7.22	62.	1093.	6.40	10.00	2.50	62.	0.0	0.0096<	0.0224
9	D+L+SD	MAX	-19366.6	4439.3	0.494	7.05	56.	1088.	6.40	10.00	2.50	56.	0.0	0.0087<	0.0224
9	D+L+T+SD	MAX	-19366.6	4558.9	0.478	7.23	61.	1092.	6.40	10.00	2.50	61.	0.0	0.0095<	0.0224
9	D+L+TY+SW+SD	MAX	-19366.6	4558.9	0.478	7.23	61.	1092.	6.40	10.00	2.50	61.	0.0	0.0095<	0.0224
10	D+L+SD	MAX	-19157.3	3683.8	0.611	5.97	32.	1082.	6.40	10.00	2.50	32.	0.0	0.0049<	0.0224
10	D+L+T+SD	MAX	-13152.0	3861.3	0.355	6.27	85.	1120.	6.40	10.00	2.50	85.	0.0	0.0132<	0.0224
10	D+L+TY+SW+SD	MAX	-19157.3	3823.6	0.577	6.17	37.	1085.	6.40	10.00	2.50	37.	0.0	0.0057<	0.0224
10	D+L+SD	MAX	-19222.4	3683.8	0.614	5.97	31.	1082.	6.40	10.00	2.50	31.	0.0	0.0048<	0.0224
10	D+L+T+SD	MAX	-13217.1	3861.3	0.357	6.27	85.	1119.	6.40	10.00	2.50	85.	0.0	0.0131<	0.0224
10	D+L+TY+SW+SD	MAX	-19222.4	3823.6	0.580	6.17	36.	1085.	6.40	10.00	2.50	36.	0.0	0.0056<	0.0224
11	D+L+T+SD	MAX	-13087.1	3085.6	0.436	5.05	50.	1092.	6.40	10.00	2.50	50.	0.0	0.0077<	0.0224
11	D+L+T+SD	MAX	-13067.4	3085.6	0.435	5.05	50.	1092.	6.40	10.00	2.50	50.	0.0	0.0077<	0.0224
12	D+L+T+SD	MAX	-13051.2	2913.5	0.495	4.65	37.	1085.	6.40	10.00	2.50	37.	0.0	0.0057<	0.0224
12	D+L+T+SD	MAX	-13115.8	2799.3	0.528	4.48	32.	1083.	6.40	10.00	2.50	32.	0.0	0.0049<	0.0224
15	D+L+T+SD	MAX	-12293.2	3253.4	0.482	4.40	37.	1054.	6.40	10.00	2.50	37.	0.0	0.0057<	0.0224
15	D+L+T+SD	MAX	-11721.5	3379.3	0.425	4.64	48.	1059.	6.40	10.00	2.50	48.	0.0	0.0074<	0.0224
16	D+L+SD	MAX	-17377.8	3146.5	0.676	5.13	21.	1029.	6.40	10.00	2.50	21.	0.0	0.0033<	0.0224
16	D+L+T+SD	MAX	-11305.8	3473.8	0.349	5.55	77.	1063.	6.40	10.00	2.50	77.	0.0	0.0119<	0.0224
16	D+L+TY+SW+SD	MAX	-17286.1	3361.7	0.608	5.42	29.	1033.	6.40	10.00	2.50	29.	0.0	0.0044<	0.0224
16	D+L+SD	MAX	-17369.3	3146.5	0.676	5.13	21.	1029.	6.40	10.00	2.50	21.	0.0	0.0033<	0.0224
16	D+L+T+SD	MAX	-11298.2	3588.1	0.339	5.74	84.	1067.	6.40	10.00	2.50	84.	0.0	0.0129<	0.0224
16	D+L+TY+SW+SD	MAX	-17278.1	3361.7	0.608	5.42	29.	1033.	6.40	10.00	2.50	29.	0.0	0.0045<	0.0224
17	D+L+SD	MAX	-18086.2	3225.4	0.674	5.34	22.	1026.	6.40	10.00	2.50	22.	0.0	0.0035<	0.0224
17	D+L+T+SD	MAX	-12015.1	3656.6	0.328	6.19	94.	1071.	6.40	10.00	2.50	94.	0.0	0.0146<	0.0224
17	D+L+TY+SW+SD	MAX	-17995.0	3434.9	0.604	5.64	30.	1031.	6.40	10.00	2.50	30.	0.0	0.0047<	0.0224
17	D+L+SD	MAX	-18052.8	3225.1	0.672	5.34	23.	1026.	6.40	10.00	2.50	23.	0.0	0.0035<	0.0224
17	D+L+T+SD	MAX	-11981.7	3656.3	0.327	6.20	95.	1071.	6.40	10.00	2.50	95.	0.0	0.0146<	0.0224
17	D+L+TY+SW+SD	MAX	-17961.5	3434.6	0.602	5.64	31.	1031.	6.40	10.00	2.50	31.	0.0	0.0047<	0.0224
18	D+L+SD	MAX	-18105.7	3219.7	0.683	5.34	22.	1021.	6.40	10.00	2.50	22.	0.0	0.0033<	0.0224
18	D+L+T+SD	MAX	-12034.6	3609.6	0.345	5.96	85.	1065.	6.40	10.00	2.50	85.	0.0	0.0130<	0.0224
18	D+L+TY+SW+SD	MAX	-18014.5	3406.6	0.621	5.59	28.	1025.	6.40	10.00	2.50	28.	0.0	0.0044<	0.0224

** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 方法 (A) 設計荷重時曲げひび割れ幅の検討 (N/mm2) **

断面	荷重組み合わせ		N(kN)	M(kNm)	X(m)	SIG-C	SIG-S	SIG-P	C(cm)	CS(cm)	FAI(cm)	SIG-S	EPS-SH	W(cm)	WA(cm)
18	D+L+SD	MAX	-18087.7	3219.7	0.682	5.33	22.	1021.	6.40	10.00	2.50	22.	0.0	0.0034<	0.0224
18	D+L+T+SD	MAX	-12016.6	3609.6	0.345	5.96	85.	1065.	6.40	10.00	2.50	85.	0.0	0.0131<	0.0224
18	D+L+TY+SW+SD	MAX	-17996.5	3406.6	0.620	5.59	28.	1026.	6.40	10.00	2.50	28.	0.0	0.0044<	0.0224
19	D+L+SD	MAX	-18346.0	3927.9	0.537	6.28	43.	1010.	6.40	10.00	2.50	43.	0.0	0.0066<	0.0224
19	D+L+T+SD	MAX	-12274.9	4235.5	0.325	6.70	103.	1058.	6.40	10.00	2.50	103.	0.0	0.0159<	0.0224
19	D+L+TY+SW+SD	MAX	-18254.7	4069.9	0.509	6.48	49.	1015.	6.40	10.00	2.50	49.	0.0	0.0076<	0.0224
19	D+L+SD	MAX	-18272.0	3927.9	0.534	6.28	44.	1010.	6.40	10.00	2.50	44.	0.0	0.0067<	0.0224
19	D+L+T+SD	MAX	-12200.9	4235.5	0.324	6.70	104.	1058.	6.40	10.00	2.50	104.	0.0	0.0160<	0.0224
19	D+L+TY+SW+SD	MAX	-18180.7	4069.9	0.506	6.48	50.	1015.	6.40	10.00	2.50	50.	0.0	0.0077<	0.0224
20	D+L+SD	MAX	-18297.5	4798.9	0.427	7.53	77.	1021.	6.40	10.00	2.50	77.	0.0	0.0119<	0.0224
20	D+L+T+SD	MAX	-12226.3	5024.0	0.294	7.79	138.	1069.	6.40	10.00	2.50	138.	0.0	0.0213<	0.0224
20	D+L+TY+SW+SD	MAX	-18206.2	4895.7	0.416	7.67	82.	1024.	6.40	10.00	2.50	82.	0.0	0.0126<	0.0224
20	D+L+SD	MAX	-18202.0	4798.9	0.425	7.53	78.	1021.	6.40	10.00	2.50	78.	0.0	0.0120<	0.0224
20	D+L+T+SD	MAX	-12130.9	5024.0	0.293	7.79	139.	1070.	6.40	10.00	2.50	139.	0.0	0.0215<	0.0224
20	D+L+TY+SW+SD	MAX	-18110.7	4895.7	0.414	7.67	83.	1025.	6.40	10.00	2.50	83.	0.0	0.0127<	0.0224
21	D+L+SD	MAX	-18238.9	4471.0	0.468	6.98	61.	1053.	6.40	10.00	2.50	61.	0.0	0.0095<	0.0224
21	D+L+T+SD	MAX	-12167.8	4613.7	0.317	7.04	113.	1085.	6.40	10.00	2.50	113.	0.0	0.0174<	0.0224
21	D+L+TY+SW+SD	MAX	-18147.6	4522.8	0.460	7.05	64.	1055.	6.40	10.00	2.50	64.	0.0	0.0099<	0.0224
21	D+L+SD	MAX	-18207.6	4471.0	0.467	6.98	62.	1053.	6.40	10.00	2.50	62.	0.0	0.0095<	0.0224
21	D+L+T+SD	MAX	-12136.5	4613.7	0.317	7.04	113.	1085.	6.40	10.00	2.50	113.	0.0	0.0174<	0.0224
21	D+L+TY+SW+SD	MAX	-18116.3	4522.8	0.459	7.05	64.	1055.	6.40	10.00	2.50	64.	0.0	0.0099<	0.0224
22	D+L+SD	MAX	-17913.5	4453.1	0.453	7.01	65.	1020.	6.40	10.00	2.50	65.	0.0	0.0101<	0.0224
22	D+L+T+SD	MAX	-11842.4	4513.3	0.309	7.01	116.	1061.	6.40	10.00	2.50	116.	0.0	0.0179<	0.0224
22	D+L+TY+SW+SD	MAX	-17822.3	4459.9	0.450	7.01	66.	1021.	6.40	10.00	2.50	66.	0.0	0.0102<	0.0224
22	D+L+SD	MAX	-18007.5	4453.1	0.456	7.01	65.	1020.	6.40	10.00	2.50	65.	0.0	0.0100<	0.0224
22	D+L+T+SD	MAX	-11936.3	4513.3	0.311	7.01	115.	1060.	6.40	10.00	2.50	115.	0.0	0.0178<	0.0224
22	D+L+TY+SW+SD	MAX	-17916.2	4459.9	0.452	7.02	65.	1020.	6.40	10.00	2.50	65.	0.0	0.0101<	0.0224
23	D+L+SD	MAX	-17639.8	3764.4	0.532	6.07	42.	992.	6.40	10.00	2.50	42.	0.0	0.0065<	0.0224
23	D+L+T+SD	MAX	-11751.2	3818.8	0.336	6.14	91.	1012.	6.40	10.00	2.50	91.	0.0	0.0140<	0.0224
23	D+L+TY+SW+SD	MAX	-17731.1	3802.7	0.528	6.12	43.	993.	6.40	10.00	2.50	43.	0.0	0.0067<	0.0224
23	D+L+SD	MAX	-17718.5	3764.4	0.535	6.07	42.	992.	6.40	10.00	2.50	42.	0.0	0.0065<	0.0224
23	D+L+T+SD	MAX	-11829.9	3818.8	0.338	6.14	90.	1011.	6.40	10.00	2.50	90.	0.0	0.0139<	0.0224
23	D+L+TY+SW+SD	MAX	-17809.8	3802.7	0.532	6.13	43.	992.	6.40	10.00	2.50	43.	0.0	0.0066<	0.0224
24	D+L+T+SD	MAX	-17555.1	2910.2	0.752	4.92	15.	971.	6.40	10.00	2.50	15.	0.0	0.0024<	0.0224
24	D+L+T+SD	MAX	-17562.2	2910.2	0.752	4.92	15.	971.	6.40	10.00	2.50	15.	0.0	0.0024<	0.0224
30	D+L+T+SD	MAX	-16000.4	2537.6	0.804	4.33	11.	912.	6.40	10.00	2.50	11.	0.0	0.0017<	0.0224
30	D+L+T+SD	MAX	-15963.2	2537.6	0.801	4.33	11.	912.	6.40	10.00	2.50	11.	0.0	0.0017<	0.0224
31	D+L+T+SD	MAX	-16697.5	2645.2	0.805	4.52	11.	963.	6.40	10.00	2.50	11.	0.0	0.0017<	0.0224
31	D+L+T+SD	MAX	-16647.5	2644.9	0.801	4.52	11.	964.	6.40	10.00	2.50	11.	0.0	0.0018<	0.0224
32	D+L+SD	MAX	-16903.4	2866.7	0.733	4.81	16.	969.	6.40	10.00	2.50	16.	0.0	0.0025<	0.0224
32	D+L+T+SD	MAX	-16763.8	2908.1	0.709	4.85	18.	970.	6.40	10.00	2.50	18.	0.0	0.0028<	0.0224
32	D+L+TY+SW+SD	MAX	-16763.8	2908.1	0.709	4.85	18.	970.	6.40	10.00	2.50	18.	0.0	0.0028<	0.0224
32	D+L+SD	MAX	-16860.4	2866.7	0.730	4.80	16.	969.	6.40	10.00	2.50	16.	0.0	0.0025<	0.0224
32	D+L+T+SD	MAX	-16720.8	2908.1	0.706	4.84	18.	970.	6.40	10.00	2.50	18.	0.0	0.0028<	0.0224
32	D+L+TY+SW+SD	MAX	-16720.8	2908.1	0.706	4.84	18.	970.	6.40	10.00	2.50	18.	0.0	0.0028<	0.0224
33	D+L+SD	MAX	-17411.0	3635.6	0.556	5.83	37.	988.	6.40	10.00	2.50	37.	0.0	0.0058<	0.0224
33	D+L+T+SD	MAX	-17271.4	3657.1	0.546	5.85	39.	989.	6.40	10.00	2.50	39.	0.0	0.0060<	0.0224
33	D+L+TY+SW+SD	MAX	-17271.4	3657.1	0.546	5.85	39.	989.	6.40	10.00	2.50	39.	0.0	0.0060<	0.0224
33	D+L+SD	MAX	-17316.9	3635.6	0.552	5.82	38.	988.	6.40	10.00	2.50	38.	0.0	0.0058<	0.0224
33	D+L+T+SD	MAX	-17177.3	3657.1	0.542	5.85	40.	989.	6.40	10.00	2.50	40.	0.0	0.0061<	0.0224
33	D+L+TY+SW+SD	MAX	-17177.3	3657.1	0.542	5.85	40.	989.	6.40	10.00	2.50	40.	0.0	0.0061<	0.0224

** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

** 方法 (A) 設計荷重時曲げひび割れ幅の検討 (N/mm2) **

断面	荷重組み合わせ		N(kN)	M(kNm)	X(m)	SIG-C	SIG-S	SIG-P	C(cm)	CS(cm)	FAI(cm)	SIG-S	EPS-SH	W(cm)	WA(cm)
34	D+L+SD	MAX	-17474.2	4561.5	0.429	7.16	73.	1017.	6.40	10.00	2.50	73.	0.0	0.0112<	0.0224
34	D+L+T+SD	MAX	-11355.1	4588.2	0.297	7.12	124.	1050.	6.40	10.00	2.50	124.	0.0	0.0192<	0.0224
34	D+L+TY+SW+SD	MAX	-17334.7	4563.0	0.426	7.16	74.	1018.	6.40	10.00	2.50	74.	0.0	0.0114<	0.0224
34	D+L+SD	MAX	-17364.0	4561.5	0.427	7.16	74.	1017.	6.40	10.00	2.50	74.	0.0	0.0113<	0.0224
34	D+L+T+SD	MAX	-11244.9	4588.2	0.295	7.12	125.	1050.	6.40	10.00	2.50	125.	0.0	0.0194<	0.0224
34	D+L+TY+SW+SD	MAX	-17224.5	4563.0	0.423	7.16	75.	1018.	6.40	10.00	2.50	75.	0.0	0.0115<	0.0224
35	D+L+SD	MAX	-17747.4	4187.6	0.489	6.56	53.	1047.	6.40	10.00	2.50	53.	0.0	0.0082<	0.0224
35	D+L+T+SD	MAX	-11907.4	4261.0	0.331	6.52	98.	1075.	6.40	10.00	2.50	98.	0.0	0.0152<	0.0224
35	D+L+TY+SW+SD	MAX	-17887.0	4205.9	0.491	6.59	53.	1046.	6.40	10.00	2.50	53.	0.0	0.0082<	0.0224
35	D+L+SD	MAX	-17692.5	4187.6	0.488	6.56	54.	1047.	6.40	10.00	2.50	54.	0.0	0.0083<	0.0224
35	D+L+T+SD	MAX	-11852.5	4261.0	0.330	6.52	99.	1075.	6.40	10.00	2.50	99.	0.0	0.0152<	0.0224
35	D+L+TY+SW+SD	MAX	-17832.1	4205.9	0.490	6.59	54.	1047.	6.40	10.00	2.50	54.	0.0	0.0083<	0.0224
36	D+L+SD	MAX	-17747.2	4041.8	0.503	6.40	50.	1008.	6.40	10.00	2.50	50.	0.0	0.0077<	0.0224
36	D+L+T+SD	MAX	-11907.2	4165.1	0.330	6.48	98.	1041.	6.40	10.00	2.50	98.	0.0	0.0152<	0.0224
36	D+L+TY+SW+SD	MAX	-17886.7	4080.2	0.502	6.46	50.	1008.	6.40	10.00	2.50	50.	0.0	0.0078<	0.0224
36	D+L+SD	MAX	-17829.5	4041.8	0.506	6.40	49.	1008.	6.40	10.00	2.50	49.	0.0	0.0076<	0.0224
36	D+L+T+SD	MAX	-11989.5	4165.1	0.331	6.48	98.	1041.	6.40	10.00	2.50	98.	0.0	0.0150<	0.0224
36	D+L+TY+SW+SD	MAX	-17969.1	4080.2	0.505	6.46	50.	1008.	6.40	10.00	2.50	50.	0.0	0.0077<	0.0224
37	D+L+SD	MAX	-17780.6	3230.2	0.647	5.40	25.	991.	6.40	10.00	1.90	25.	0.0	0.0039<	0.0224
37	D+L+T+SD	MAX	-11940.6	3403.2	0.350	5.80	81.	1033.	6.40	10.00	1.90	81.	0.0	0.0126<	0.0224
37	D+L+TY+SW+SD	MAX	-17920.2	3288.4	0.637	5.49	27.	991.	6.40	10.00	1.90	27.	0.0	0.0042<	0.0224
37	D+L+SD	MAX	-17876.2	3230.2	0.653	5.41	25.	990.	6.40	10.00	1.90	25.	0.0	0.0039<	0.0224
37	D+L+T+SD	MAX	-12036.2	3403.2	0.353	5.79	80.	1032.	6.40	10.00	1.90	80.	0.0	0.0125<	0.0224
37	D+L+TY+SW+SD	MAX	-18015.8	3288.4	0.642	5.50	26.	991.	6.40	10.00	1.90	26.	0.0	0.0041<	0.0224
38	D+L+T+SD	MAX	-11999.5	2559.1	0.475	4.36	38.	1009.	6.40	10.00	1.90	38.	0.0	0.0059<	0.0224
38	D+L+T+SD	MAX	-12027.3	2559.1	0.477	4.36	37.	1009.	6.40	10.00	1.90	37.	0.0	0.0058<	0.0224
44	D+L+T+SD	MAX	-11722.4	2309.3	0.539	3.90	27.	1070.	6.40	10.00	1.90	27.	0.0	0.0042<	0.0224
44	D+L+T+SD	MAX	-11639.9	2423.5	0.489	4.12	34.	1073.	6.40	10.00	1.90	34.	0.0	0.0053<	0.0224
45	D+L+T+SD	MAX	-13085.4	2505.9	0.642	4.00	19.	1061.	6.40	10.00	2.50	19.	0.0	0.0029<	0.0224
46	D+L+T+SD	MAX	-13499.8	3044.8	0.539	4.67	32.	1079.	6.40	10.00	2.50	32.	0.0	0.0049<	0.0224
46	D+L+T+SD	MAX	-13492.8	3044.8	0.538	4.66	32.	1080.	6.40	10.00	2.50	32.	0.0	0.0049<	0.0224
47	D+L+SD	MAX	-19609.0	4947.9	0.484	7.40	61.	1106.	6.40	10.00	2.50	61.	0.0	0.0095<	0.0224
47	D+L+T+SD	MAX	-19478.8	4988.2	0.477	7.44	64.	1108.	6.40	10.00	2.50	64.	0.0	0.0098<	0.0224
47	D+L+TY+SW+SD	MAX	-19478.8	4988.2	0.477	7.44	64.	1108.	6.40	10.00	2.50	64.	0.0	0.0098<	0.0224
47	D+L+SD	MAX	-19664.9	4947.9	0.485	7.40	61.	1106.	6.40	10.00	2.50	61.	0.0	0.0094<	0.0224
47	D+L+T+SD	MAX	-19534.7	4988.2	0.478	7.45	63.	1107.	6.40	10.00	2.50	63.	0.0	0.0098<	0.0224
47	D+L+TY+SW+SD	MAX	-19534.7	4988.2	0.478	7.45	63.	1107.	6.40	10.00	2.50	63.	0.0	0.0098<	0.0224
48	D+L+SD	MAX	-19656.0	5887.3	0.420	8.51	90.	1122.	6.40	10.00	2.50	90.	0.0	0.0138<	0.0224
48	D+L+T+SD	MAX	-19525.8	5991.1	0.411	8.63	94.	1125.	6.40	10.00	2.50	94.	0.0	0.0145<	0.0224
48	D+L+TY+SW+SD	MAX	-19525.8	5991.1	0.411	8.63	94.	1125.	6.40	10.00	2.50	94.	0.0	0.0145<	0.0224
48	D+L+SD	MAX	-19736.2	5887.3	0.421	8.51	89.	1122.	6.40	10.00	2.50	89.	0.0	0.0138<	0.0224
48	D+L+T+SD	MAX	-19606.1	5991.1	0.413	8.63	93.	1125.	6.40	10.00	2.50	93.	0.0	0.0144<	0.0224
48	D+L+TY+SW+SD	MAX	-19606.1	5991.1	0.413	8.63	93.	1125.	6.40	10.00	2.50	93.	0.0	0.0144<	0.0224
49	D+L+SD	MAX	-19362.8	6449.7	0.388	9.15	109.	1131.	6.40	10.00	2.50	109.	0.0	0.0169<	0.0224
49	D+L+T+SD	MAX	-19232.6	6617.0	0.378	9.35	116.	1136.	6.40	10.00	2.50	116.	0.0	0.0179<	0.0224
49	D+L+TY+SW+SD	MAX	-19232.6	6617.0	0.378	9.35	116.	1136.	6.40	10.00	2.50	116.	0.0	0.0179<	0.0224
49	D+L+SD	MAX	-19418.9	6449.7	0.388	9.16	109.	1131.	6.40	10.00	2.50	109.	0.0	0.0168<	0.0224
49	D+L+T+SD	MAX	-19288.7	6617.0	0.379	9.36	116.	1136.	6.40	10.00	2.50	116.	0.0	0.0178<	0.0224
49	D+L+TY+SW+SD	MAX	-19288.7	6617.0	0.379	9.36	116.	1136.	6.40	10.00	2.50	116.	0.0	0.0178<	0.0224
50	D+L+SD	MAX	-19221.2	5666.5	0.428	8.18	84.	1102.	6.40	10.00	2.50	84.	0.0	0.0129<	0.0224
50	D+L+T+SD	MAX	-19091.1	5897.3	0.411	8.46	92.	1108.	6.40	10.00	2.50	92.	0.0	0.0142<	0.0224

** BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns ***

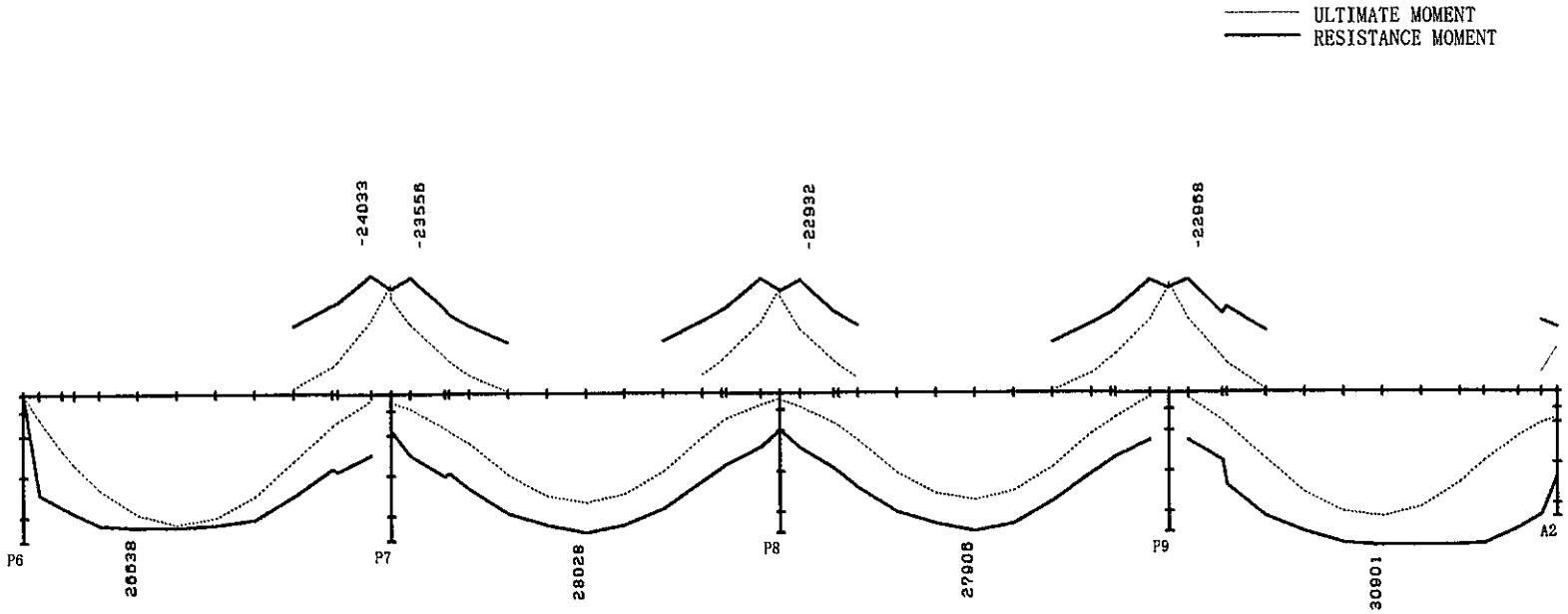
** 方法 (A) 設計荷重時曲げひび割れ幅の検討 (N/mm2) **

断面	荷重組み合わせ		N(kN)	M(kNm)	X(m)	SIG-C	SIG-S	SIG-P	C(cm)	CS(cm)	FAI(cm)	SIG-S	EPS-SH	W(cm)	WA(cm)
50	D+L+TY+SW+SD	MAX	-19091.1	5897.3	0.411	8.46	92.	1108.	6.40	10.00	2.50	92.	0.0	0.0142<	0.0224
50	D+L+SD	MAX	-19129.6	5666.5	0.426	8.18	84.	1102.	6.40	10.00	2.50	84.	0.0	0.0130<	0.0224
50	D+L+T+SD	MAX	-18999.5	5897.3	0.410	8.45	93.	1109.	6.40	10.00	2.50	93.	0.0	0.0143<	0.0224
50	D+L+TY+SW+SD	MAX	-18999.5	5897.3	0.410	8.45	93.	1109.	6.40	10.00	2.50	93.	0.0	0.0143<	0.0224
51	D+L+SD	MAX	-18923.9	3403.2	0.724	5.51	19.	1037.	6.40	10.00	2.50	19.	0.0	0.0029<	0.0224
51	D+L+T+SD	MAX	-18793.7	3697.5	0.652	5.81	26.	1042.	6.40	10.00	2.50	26.	0.0	0.0041<	0.0224
51	D+L+TY+SW+SD	MAX	-18793.7	3697.5	0.652	5.81	26.	1042.	6.40	10.00	2.50	26.	0.0	0.0041<	0.0224
51	D+L+SD	MAX	-18765.6	3403.2	0.717	5.50	20.	1037.	6.40	10.00	2.50	20.	0.0	0.0030<	0.0224
51	D+L+T+SD	MAX	-18635.4	3697.5	0.645	5.80	27.	1043.	6.40	10.00	2.50	27.	0.0	0.0042<	0.0224
51	D+L+TY+SW+SD	MAX	-18635.4	3697.5	0.645	5.80	27.	1043.	6.40	10.00	2.50	27.	0.0	0.0042<	0.0224

2.10.5 Safety Ratio of Bending Fracture

BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
ULTIMATE RESISTANCE BENDING MOMENT

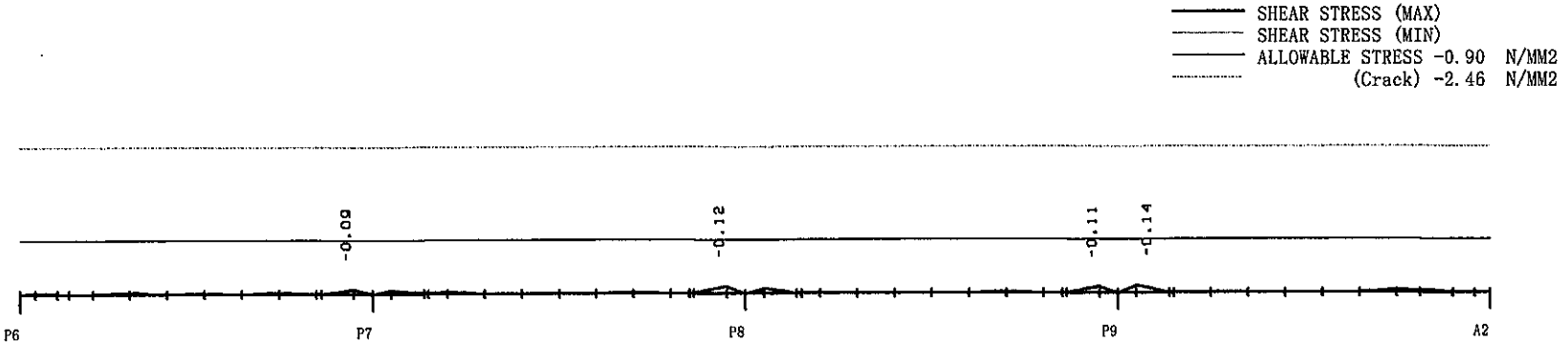
SCALE=1/ 380
1CM= 15450.9 KNM

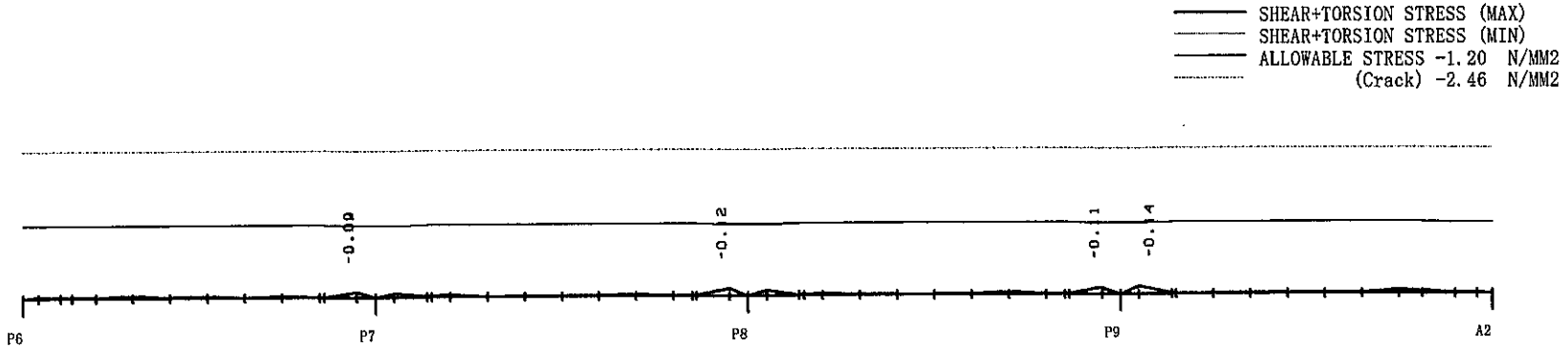


2.10.6 Shear and Torsinal Stress

BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
DIAGONAL TENSILE STRESS D+SD
SECTION G-G

SCALE=1/ 380
1CM= 1.2 N/MM2





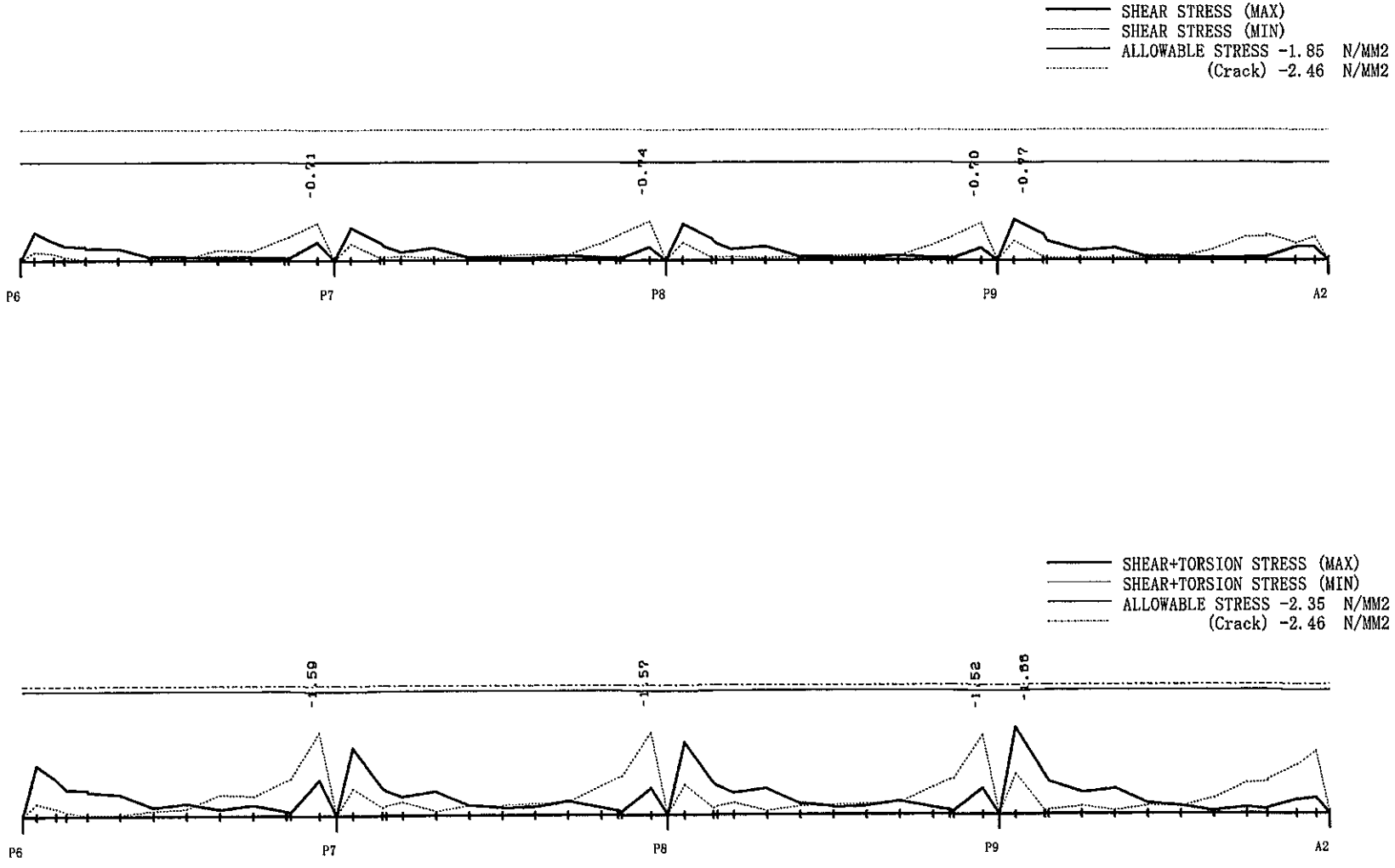
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns

DIAGONAL TENSILE STRESS D+L+SD

SECTION G-G

SCALE=1/ 380

1CM= 1.2 N/MM2



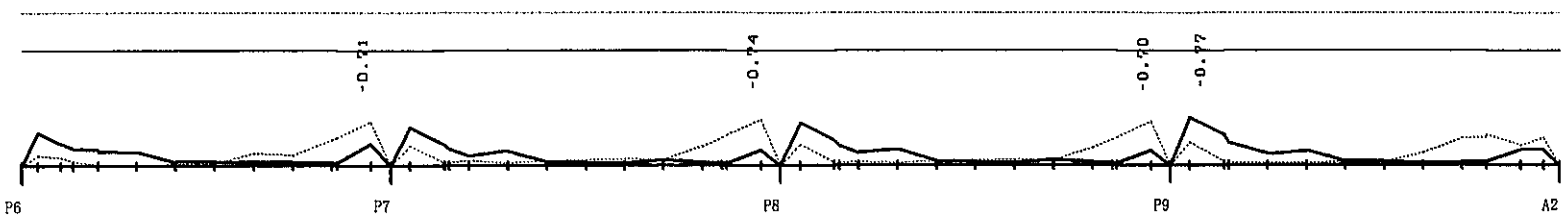
BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns

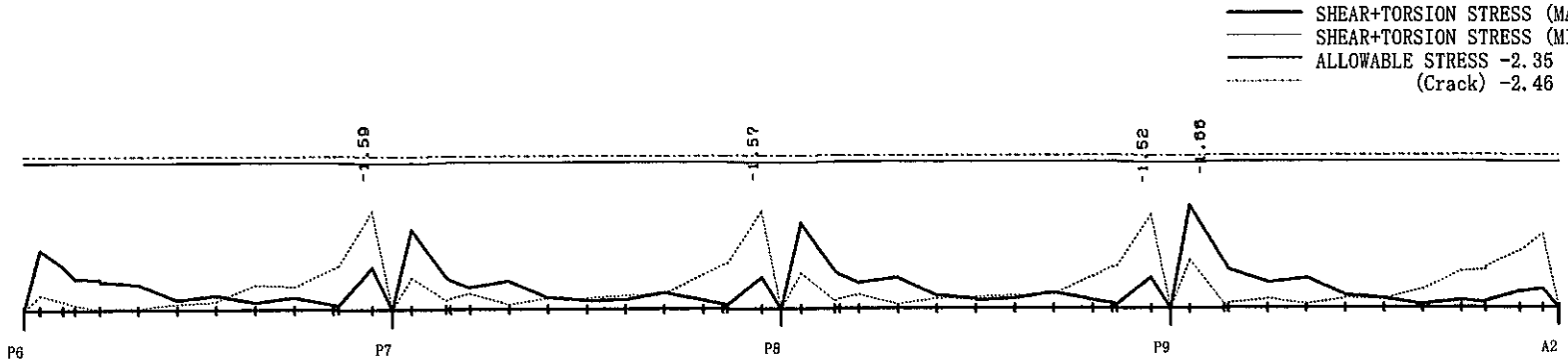
DIAGONAL TENSILE STRESS D+L+SW+SD

SECTION G-G

SCALE=1/ 380

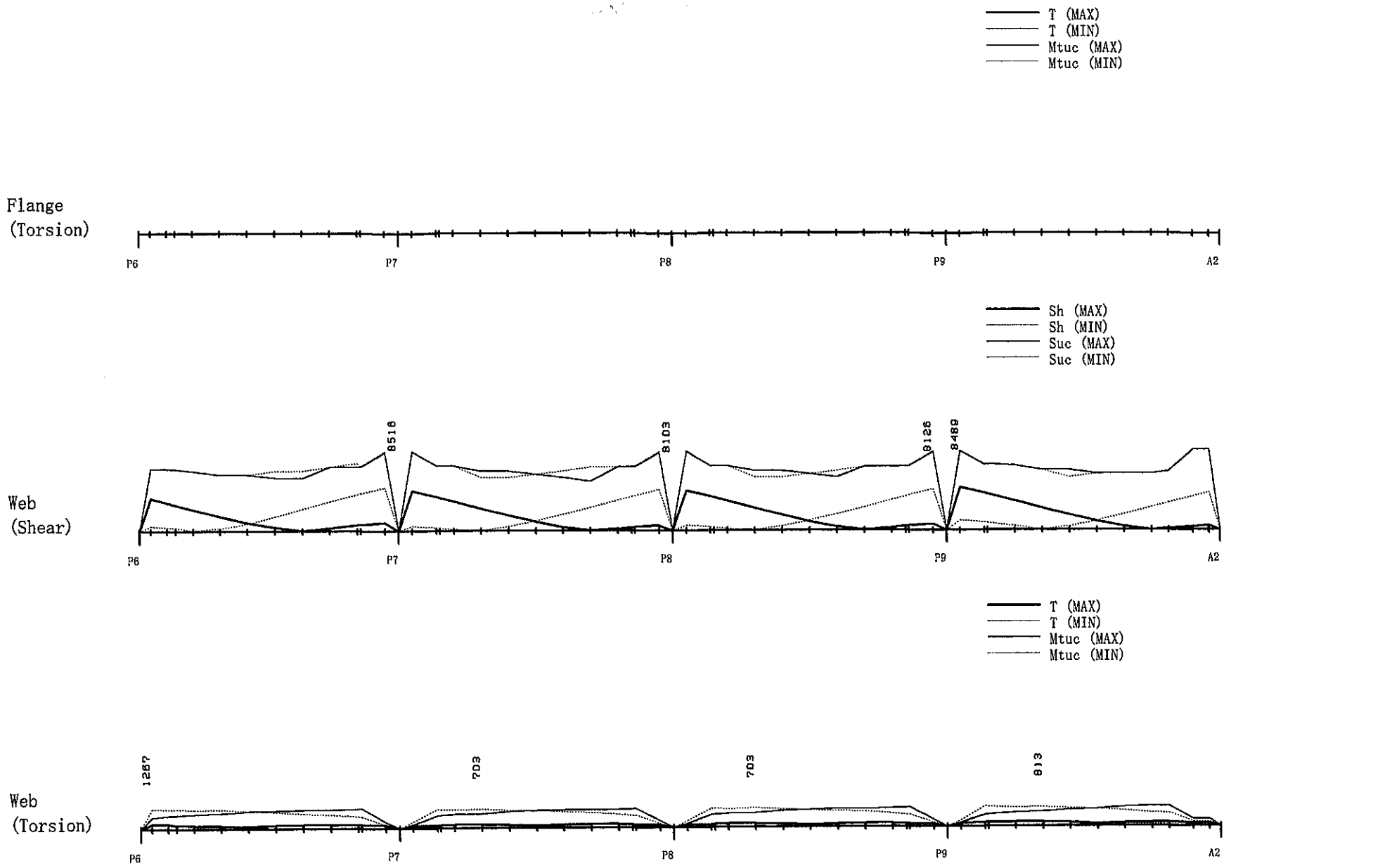
1CM= 1.2 N/MM2





BALARAJA Flyover 4 Span Continuous P6-A2 B=13.0m 2columns
ULTIMATE MEAN SHEAR STRESS (D1)

SCALE=1/ 380
1CM= 10632.2 kN, kNm



2.10.7 Summary of Design Result

SUMMARY OF DESIGN RESULT (BALARAJA P6-A2)

					Unit	Design Section										Limited Value
						P6 -P7	P7		P7 - P8	P8		P8 - P9	P9		P9 - A2	
						Span center	Left	Right	Span center	Left	Right	Span center	Left	Right	Span center	
						7	13	15	21	27	29	35	41	43	49	
FLEXTURE	D	Bending Moment		M	KNm	8,524	-666	525	8,497	-1,558	-307	8,228	-1,673	-1,178	10,849	
		Stress	Upper	σco	N/mm2	2.54	3.40	3.80	2.60	2.60	3.07	2.39	2.71	2.86	3.88	< 16.4
			Lower	σcu	N/mm2	4.85	1.69	0.35	4.12	2.58	1.17	4.44	2.78	2.33	1.34	> -1.39
	D+T	Bending Moment		M	KNm	9,257	999	2,151	9,755	-1,712	796	9,417	-1,787	-1,333	11,868	
		Stress	Upper	σco	N/mm2	2.49	3.31	3.68	2.59	2.50	3.05	2.35	2.63	2.76	3.8	< 16.4
			Lower	σcu	N/mm2	4.42	0.30	-1.01	2.91	1.74	0.40	3.36	1.68	1.07	0.47	> -1.39
	D+L	Bending Moment		M	KNm	15,084	-5,917	-4,791	13,703	-6,221	-4,889	13,393	-6,333	-6,144	16,239	
		Crack Width		W	cm	0.0181	-	-	0.0095	-	-	0.0083	-	-	0.0169	w < wa
				Wa	cm	0.0224										
	D+L+T	Bending Moment		M	KNm	15,818	-6,097	-5,042	14,961	-6,376	-4,955	14,582	-6,446	-6,299	17,258	
		Crack Width		W	cm	0.0187	-	-	0.0174	-	-	0.0152	-	-	0.0179	w < wa
				Wa	cm	0.0224										
	Ultimate	Bending Moment		M	KNm	25,997	-14,966	-14,129	21,915	-14,454	-12,995	21,512	-14,781	-15,039	25,175	
		Resistance Moment		Mu	KNm	26,638	-23,975	-23,519	28,028	-23,197	-22,879	27,906	-22,809	-22,913	30,902	
		Safety (F=Mu/M)				1.02	1.60	1.66	1.28	1.60	1.76	1.30	1.54	1.52	1.23	> 1.0
SHEAR & TORSION	D	Diagonal Tensile Stress	Shear or Torsion		N/mm2	0.00	-0.09	-0.07	0.00	-0.12	-0.09	0.00	-0.11	-0.14	0.00	< 0.90
			Shear and Torsion		N/mm2	0.00	-0.09	-0.07	0.00	-0.12	-0.09	0.00	-0.11	-0.14	0.00	< 1.20
	D+L	Mean Shear Stress			N/mm2	0.33	1.11(1.59)	1.00(1.29)	0.36	1.10(1.57)	1.03(1.38)	0.35	1.09(1.52)	1.15(1.16)	0.31	< 0.50 (< 2.46)
		Diagonal Tensile Stress	Shear or Torsion		N/mm2	-0.23	-0.71	-0.76	-0.09	-0.74	-0.69	-0.09	-0.70	-0.77	-1.08	< 1.85
			Shear and Torsion		N/mm2	-0.48	-1.59	-1.29	-0.23	-1.57	-1.38	-0.21	-1.52	-1.66	-1.23	< 2.35
	Ultimate	Mean Shear Stress			N/mm2	0.72	2.43	2.23	0.82	2.32	2.24	0.82	2.32	2.41	0.77	< 4.65
		Compressive Fracture of Web	Sh		KN	1,714	8,516	7,917	1,943	8,103	7,900	1,951	8,126	8,490	1,822	
			Suc		KN	11,105	15,611	15,662	11,075	15,554	15,612	11,075	15,587	15,678	11,075	
			Safety (F=Suc/Sh)			6.48	1.83	1.98	5.70	1.92	1.98	5.68	1.92	1.85	6.08	> 1.0
		Diagonal Tensile Fracture	Sh		KN	1,714	8,516	7,917	1,943	8,103	7,900	1,951	8,126	8,490	1,822	
			Suc		KN	5,397	9,268	9,402	5,563	9,141	9,220	5,495	9,162	9,243	5,338	
			Safety (F=Suc/Sh)			3.15	1.09	1.19	2.86	1.13	1.17	2.82	1.13	1.09	2.93	> 1.0
PC Tendons Arrangement					nos.	16										
Re-bar Arrangement		Longitudinal Re-bar	Upper side of Slab			D13@250										
			Gider bottom	2nd Layer		—	D25-4 nos.	D25-4 nos.	---	---	---	---	---	---	D25-8 nos.	
				1st Layer		D19-8 nos.	D25-8 nos.	D25-8 nos.	D25-8 nos.	D25-8 nos.	D25-8 nos.	D25-8 nos.	D19-8 nos.	D19-8 nos.	D25-8 nos.	
		St irrup				D19@ 250	D25@ 125	D25@ 125	D19@ 250	D25@ 125	D25@ 125	D19@ 250	D25@ 125	D25@ 125	D19@ 250	

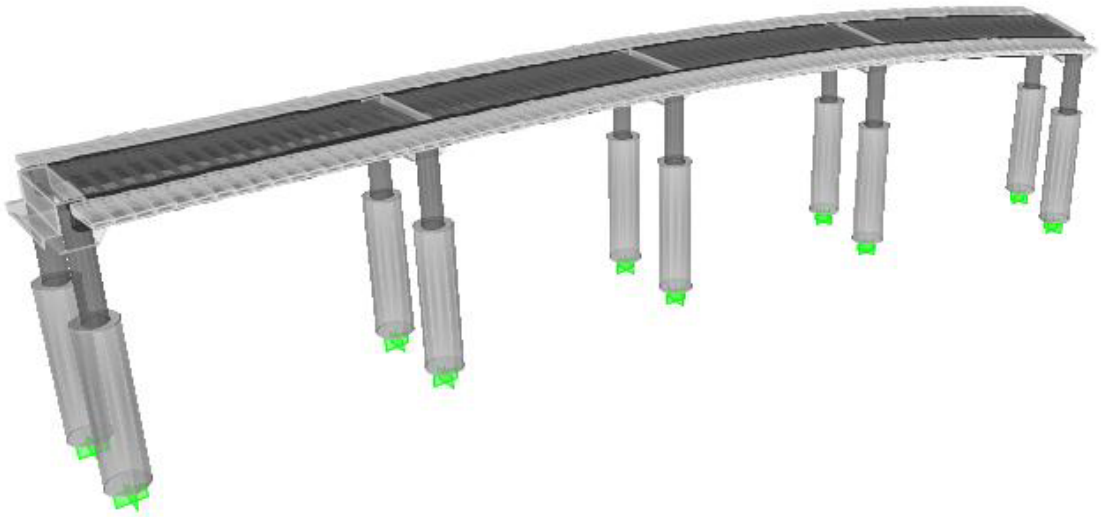
Summary of Reaction for Bearing Shoe Design

			MERAK					BALARAJA		NAGREG		PETERONGAN		TANGGULANGIN		GEBANG	
			P4(L)	P4(R)	P8(L)	PB3(L)	P13(R)	P3(L)	P6(R)	P4(L)	P8(R)	P4(L)	P7(R)	P2(L)	P6(R)	P4(L)	P12(R)
Reaction (KN)	Self Weight		799	796	808	830	1,118	1,572	1,547	1,564	1,530	1,571	1,530	1,549	1,559	1,084	1,067
	Superimposed dead Load		237	278	279	244	302	394	391	390	379	390	391	379	395	287	287
	D (Total of Dead Load)		1,036	1,074	1,087	1,074	1,420	1,966	1,938	1,954	1,909	1,961	1,921	1,928	1,954	1,371	1,354
	L (Live Load)	MAX	721	722	722	734	1,129	1,392	1,389	1,387	1,374	1,393	1,398	1,384	1,399	985	983
		MIN	-68	-70	-70	-71	-113	-151	-149	-150	-150	-156	-157	-160	-156	-113	-113
	D + L	MAX	1,757	1,796	1,809	1,808	2,549	3,358	3,327	3,341	3,283	3,354	3,319	3,312	3,353	2,356	2,337
		MIN	968	1,004	1,017	1,003	1,307	1,815	1,789	1,804	1,759	1,805	1,764	1,768	1,798	1,258	1,241
	T (Temperature Effect)	MAX	51	49	49	47	67	85	93	93	96	90	92	92	82	68	68
		MIN	-9	-6	-6	-6	-4	-6	-10	-10	-6	-7	-9	-4	-4	-4	-4
	D + L + T	MAX	1,808	1,845	1,858	1,855	2,616	3,443	3,420	3,434	3,379	3,444	3,411	3,404	3,435	2,424	2,405
		MIN	959	998	1,011	997	1,303	1,809	1,779	1,794	1,753	1,798	1,755	1,764	1,794	1,254	1,237
	EQ (Earthquake)	→	63	-95	94	70	-29	97	-78	84	-15	65	-72	13	-90	70	-68
		←	-63	95	-94	-70	30	-97	77	-85	14	-64	73	-14	90	-69	67
	D + EQ	→	1,099	979	1,181	1,144	1,391	2,063	1,860	2,038	1,894	2,026	1,849	1,941	1,864	1,441	1,286
		←	973	1,169	993	1,004	1,450	1,869	2,015	1,869	1,923	1,897	1,994	1,914	2,044	1,302	1,421
	Design Reaction of each Flyover for Bearing shoe	MAX	904	923	929	928	1,308	1,722	1,710	1,717	1,690	1,722	1,706	1,702	1,718	1,212	1,203
		MIN	480	499	506	499	652	905	890	897	877	899	878	882	897	627	619
	Design Reaction for Bearing shoe	MAX	**929**				**1,308**	**1,722**								**1,212**	
		MIN	**480**				**652**	**877**								**619**	
Displacement (mm)	Superimposed dead Load		0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
	Creep and Shrinkage		17	13	14	14	22	18	21	22	13	23	24	14	17	22	22
	Live Load		-1	-1	-1	-1	-4	-3	-2	-3	-4	-3	-2	-4	-4	-3	-3
	Temperature Effect		-5	-4	-4	-4	-6	-5	-4	-7	-3	-6	-8	-3	-5	-7	-7
	Earthquake		± 24	± 35	± 35	± 26	± 11	± 36	± 36	± 39	± 30	± 44	± 45	± 42	± 50	± 94	± 89

PART 2

BALARAJA FLYOVER A1-P3

NORTH JAVA CORRIDOR FLYOVER PROJECT



KATAHIRA & ENGINEERS
INTERNATIONAL

Contents

CHAPTER 1 DESIGN CONDITIONS

1.1 DESIGN CONDITION

(1) Road Name : North Java Corridor (Serang – Balaraja – Tangerang)

(2) Bridge Name : Balaraja Flyover

(3) Road Class : 1

(4) Bridge Type : Pre-stressed Reinforcement Concrete (PRC) 3 span continuous Double Trapezoid Girder (A1 – P3) and PRC 4 span continuous Double Trapezoid Girder (P6 – A2)

(5) Design Speed : 40 km/hr

(6) Bridge Width : 13.0m (0.75m+5.5m+0.5m+5.5m+0.75m)

(7) Pavement : Asphalt, thickness=75mm and additional 50mm for future resurfacing

(8) Bridge Angle : 90 degree

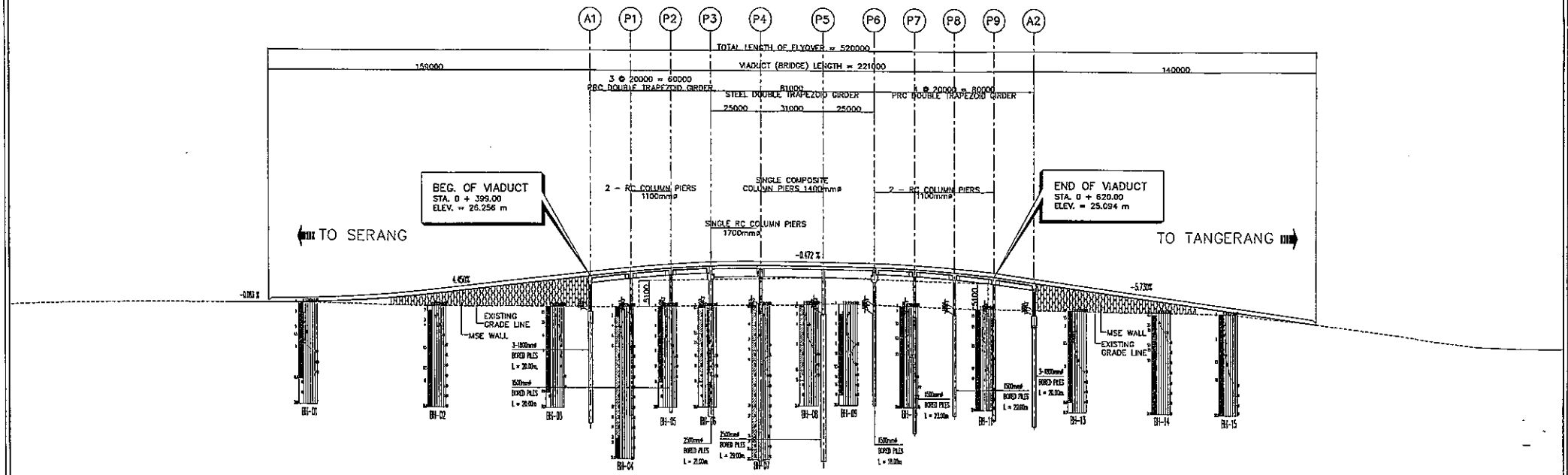
(9) Horizontal curvature : A1 – P3, R=∞ and P6 – A2, R=85m

(10) Vertical Grade : A1 – P3, I = 4.436% ↙ and P6 – A2, I = 5.772% ↘

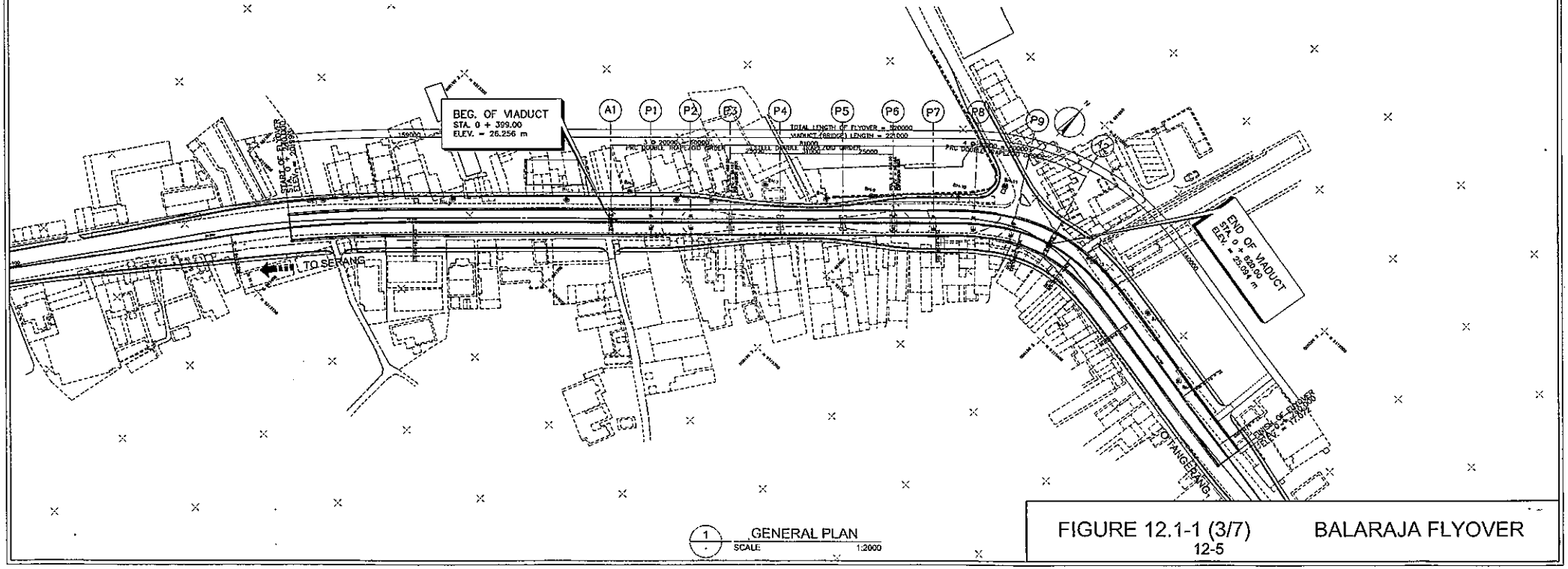
(11) Cross Slope : A1 – P3, I = 2% and P6 – A2, I = 2% to 5.7%

(12) Span Composition : A1 – P3, 3@20m and P6 – A2, 4@20m

1.2 GENERAL VIEW



2 GENERAL ELEVATION
SCALE H = 1 : 2000; V = 1 : 800



1 GENERAL PLAN
SCALE 1:2000

FIGURE 12.1-1 (3/7) BALARAJA FLYOVER

1.3 MATERIALS PROPERTIES AND ALLOWABLE STRESS

1.3.1 Materials Properties

(1) Concrete

Concrete Compressive strength: The 28-days compressive strength and corresponding elastic modulus Ec, shall be as shown below:

Concrete Class	Characteristic Compressive Strength MPa	Application of Structure	Elastic Modulus Ec (x 10^4 MPa)
A-2	35	PRC Girder and Slab	3.18
B-1	30	Curb, wheel guard, railing and attachment etc.	2.94

The coefficient of thermal expansion shall be 1.0 x 10^5 (per deg Celsius).

(2) Reinforcing Steel

Type	Grade	Yield Point (N/mm^2)	Application standard		
			SII	JIS	BS
Round Bars	SR 24	240	SII 0136	G 3112	BS 4449
Deformed Bars	SD 40	390	SII 0136	G 3112	BS 4449

(3) Pre-stressing Tendons

The type of pre-stressing of tendons shown below shall be used.

Notation	Utilization	Nominal Diameter (mm)	Yield Strength (kg/mm^2)	Braking Strength (kg/mm^2)	Application Standard	
					JIS	ASTM
PC 7 Wire Strand SWPR 7B	PRC Girder	T 12.7	160	190	G 3536	A 416
PC 19 Wire Strand SWPR 19	Diaphragm of PC I-Girder and T-Girder	T 21.8	160	190	G 3536	A 416

Modulus of elasticity: 2.0 x 10^5 MPa
Coefficient of thermal expansion = 1.2 x 10^5 (per deg Celsius).

1.3.2 Allowable Stress

(1) Concrete

(a) Method of Crack Width Control

1.3.2 Allowable Stress

(1) Concrete

(a) Method of Crack Width Control

Partial Pre-stressed Concrete Member (Method of Crack Width Control)

	Bending Moment		Shear & Torsional Force	
	Verified Items	Limited Value	Verified Items	Limited Value
Method A	Crack Width	0.0035 C C: Cover	Diagonal Tensile Stress of Concrete	Design Tension Strength of Concrete
Method B	Concrete Tensile Stress	ftk= k1x0.23xfck^(2/3)/gc	Diagonal Tensile Stress of Concrete	Design Tension Strength of Concrete
Method C	Concrete Tensile Stress	None of Tensile Stress	Diagonal Tensile Stress of Concrete	Design Tension Strength of Concrete

For Girder

D (Permanent Loads)	Method B	Verified the Concrete Tensile Stress	Less than 1.39 N/mm2
D+T (Permanent Loads + Temperature effect)			
D+L (Permanent Loads + Live Load)	Method A	Crack Width Control	0.0035 C C: Cover
D+L+T			

ftk=k1x0.23xfck^(2/3)/gc=0.6/(1.2^(1/3))x0.23x35^(2/3)/1.0=1.39N/mm2

For Slab

D (Permanent Loads)	Method C	Verified the Concrete Tensile Stress	None of Tensile Stress
D+T (Permanent + Temperature effect)	Method B	Verified the Concrete Tensile Stress	Less than 2.21 N/mm2
D+L (Permanent + Live Load)			
D+L+T (Permanent + Live + Temperature)			
D+W (Permanent + Wind Load)	Method A	Crack Width Control	0.0035 C C: Cover
D+T+C (Permanent + Live + Collision Load)			

ftk=k1x0.23xfck^(2/3)/gc=0.6/(0.3^(1/3))x0.23x35^(2/3)/1.0=2.21N/mm2

(b) Allowable Stress

Designation			Concrete Strength (MPa)				
			30.0	35.0	40.0	45.0	50.0
Compression Stress due to Bending	Immediately after pre-stressing	For Rectangular sections	15.0	17.0	19.0	21.0	21.0
		For T and Box sections	14.0	16.0	18.0	20.0	20.0
	Other Case	For Rectangular sections	12.0	13.5	15.0	17.0	17.0
		For T and Box sections	11.0	12.5	14.0	16.0	16.0
Compression Stress due to Axial Load	Immediately after pre-stressing		12.0	12.5	14.5	16.0	18.0
	Other Case		8.5	9.5	11.0	13.5	13.5
Tensile Stress due to Bending	Immediately after pre-stressing		1.2	1.3	1.5	1.8	1.8
	In case without Traffic Load		0.0	0.0	0.0	0.0	0.0
	Slabs and Joints between Pre-cast Segments		0.0	0.0	0.0	0.0	0.0
	Other Case		1.2	1.3	1.5	1.8	1.8
Tensile Stress due to Axial Load			0.0	0.0	0.0	0.0	0.0
Shear Stress	Shear and Torsion Considered Separately		0.8	0.9	1.0	1.2	1.2
	Shear and Torsion Considered Simultaneously		1.1	1.2	1.3	1.5	1.5
Bond Stress	Round Bars		0.9	0.9	1.0	1.0	1.0
	Deformed Bars		1.8	1.9	2.0	2.0	2.0

(2) Reinforcing Steel

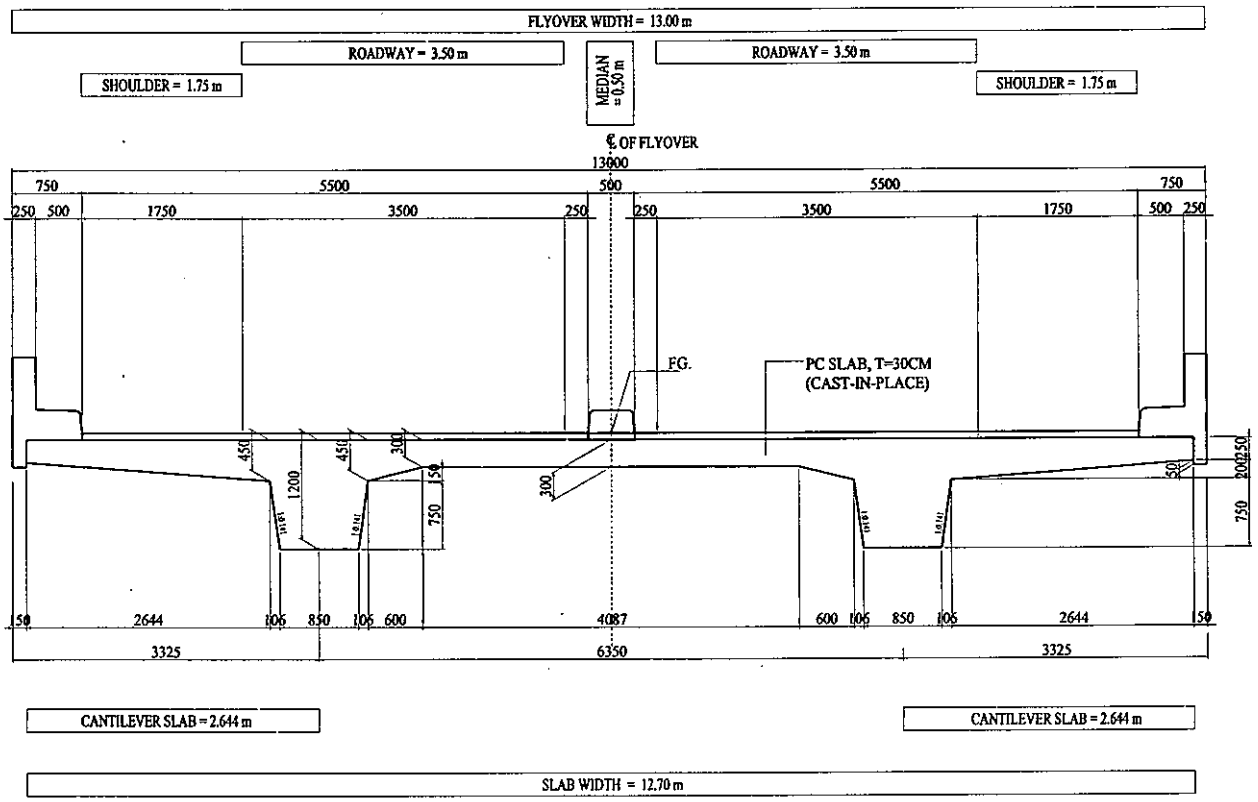
Grade	Yield strength fsy (MPa)	Allowable stress (MPa)	
		Tension $0.5 \times fsy \leq 170$	Compression $0.5 \times fsy \leq 110$
BJTD 40	400	170	110
BJTD 24	240	120	110

(3) Pre-stressing Tendons

	Nominal diameter	During pre-stressing	After pre-stressing	Under design load
PC wire SWPR 1 A	Ø 7	1215	1085	930
PC wire SWPR 1 A	Ø 8	1170	1050	900
PC 7-wire Strand SWPR 7 A	T 12.4	1350	1225	1050
PC 7-wire Strand SWPR 7 B	T 12.7	1440	1330	1140
PC 7-wire Strand SWPR 7 B	T 15.2	1440	1330	1140
PC 19-wire Strand SWPR 19	T 19.3	1440	1330	1140
PC bar SBPR 785 / 1030	Ø	720	680	600

1.4 TYPICAL CROSS SECTION

1.4. TYPICAL CROSS SECTION



1.5 CODES AND STANDARDS

Design Codes and Standards are as followings:

- Bridge Design Code, Draft, Volume 1 and Volume 2 – Bridge Management System 1992, Direktorat Jenderal Bina Marga Departemen Pekerjann Umum.
- Bridge Design Manual, Draft, Volume 1 and Volume 2 – Bridge Management System 1992, Direktorat Jenderal Bina Marga Departemen Pekerjann Umum.
- Pembebanan untuk jembatan, RSNI4.

  (Loading for Bridges)
- Standar perencanaan ketahanan gempa untuk jembatan, SNI.

  (Design Standard of Earthquake Resistance for Bridges)
- Perencanaan struktur beton untuk jembatan, RSNI

  (Design of Concrete Structure for Bridge)
- Perencanaan struktur baja untuk jembatan, ASNI4

  (Design of Steel Structure for Bridge)
- AASHTO LRFD Bridge Design Specifications, 3rd Edition.

For design requirements not covered by the above Codes and Standards the following references will be used as required:

- Japanese Specifications for Highway Bridges
- AS 5100, Bridge Design, Australian Standard, 2004
- EN 1994 Eurocode 4: Design of Composite Steel and Concrete Structures
- FHWA-IF-99-025, "Drilled Shafts: Construction Procedures and Design Methods", 1999
- FHWA-NHI-00-043, "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, Design & Construction Guidelines", 2001
- NCHRP Report 529, "Guidelines and Recommended Standard for Geofoam Applications in Highway Embankments", Transport Research Board, 2004

CHAPTER 2 DESIGN OF MAIN GIRDER

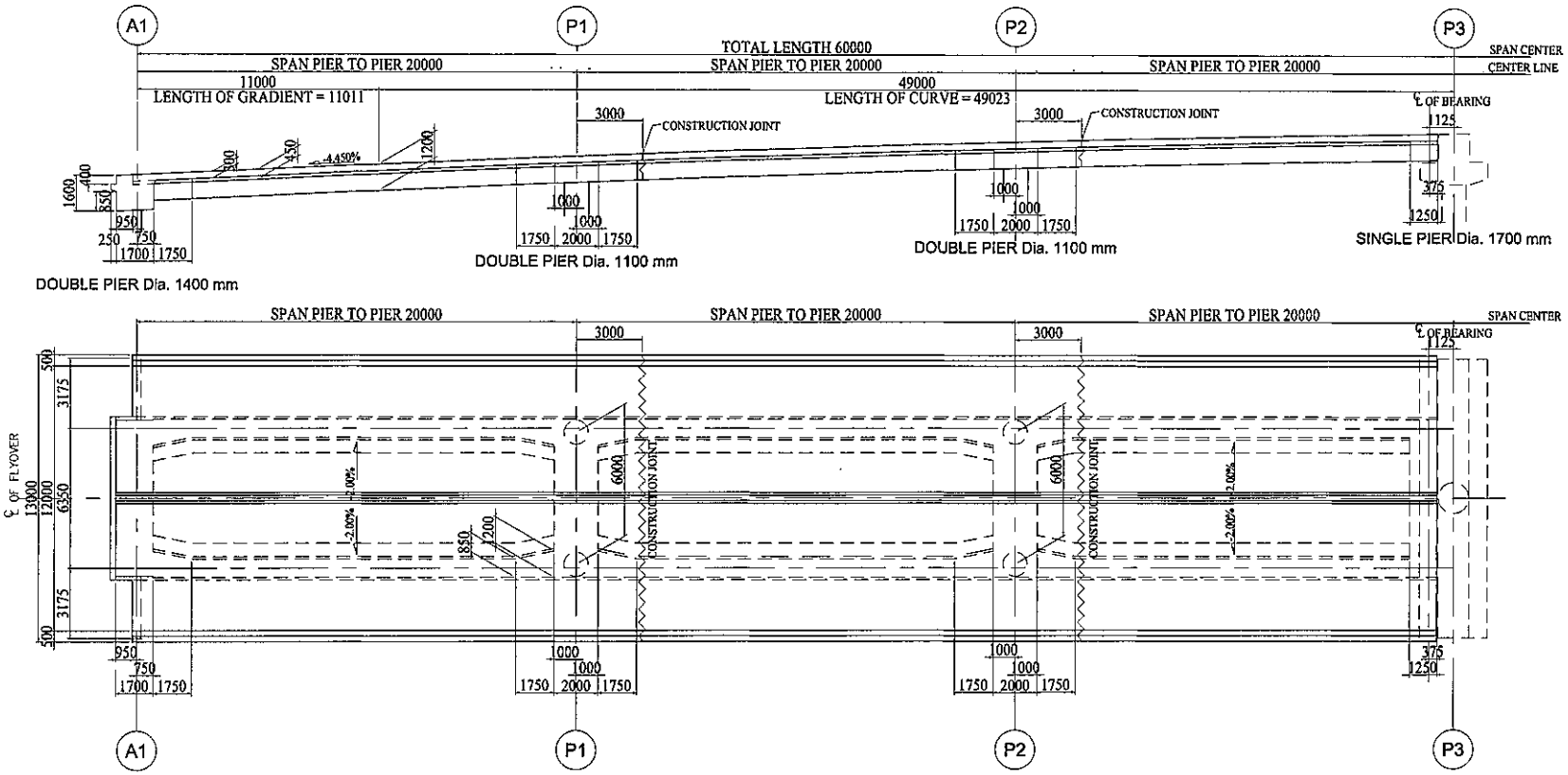
2.1 STRUCTURAL DIMENSIONS AND ANALYSIS MODEL

2.1.1 Structural Dimensions

CHAPTER 2 DESIGN OF MAIN GIRDER

2.1 STRUCTURAL DIMENSIONS AND ANALYSIS MODEL

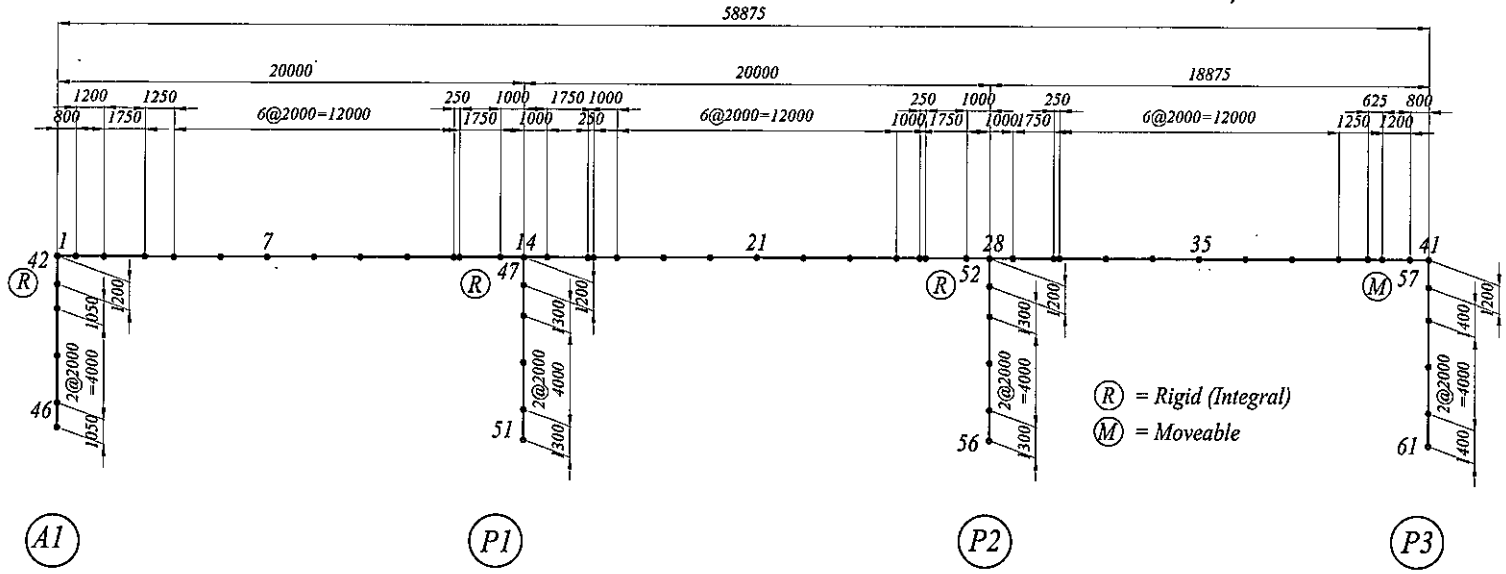
2.1.1 Structural Dimensions



2.1.2 Analysis Model

(1) Analysis Model

STRUCTURAL ANALYSIS MODEL
(BALARAJA FLYOVER 3 SPAN CONTINUOUS A1-P3 B= 13.0m 2 Columns)



2 RC columns, θ 1400 mm	2 RC columns, θ 1100 mm	2RC columns, θ 1100 mm	1 RC column, θ 1700 mm
3 nos. θ 1800 mm Bored Piles	2 nos. θ 1500 mm Bored Piles	2 nos. θ 1500 mm Bored Piles	1 nos. θ 2500 mm Bored Pile

Spring Constant at bottom of Pier

Design Section	Kx (kN/m)	Ky (kN/m)	Kθ (kN/rad)	Kxθ (kN/rad)
46	1.81×10^5	3.25×10^6	1.77×10^7	-1.12×10^6
51	7.34×10^4	1.60×10^6	6.06×10^6	-4.26×10^5
56	7.34×10^4	1.60×10^6	6.06×10^6	-4.26×10^5
61	1.62×10^5	1.18×10^6	2.01×10^7	-1.11×10^6

(2) Structural Dimension of Abutment and Pier

JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL

DESIGNED BY		CHECKED BY		SUBMITTED BY	
Name	A. GOURLEY	Name	T. OKUMURA	Name	M. KIUCHI
Sign		Sign		Sign	
Date		Date		Date	

REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS

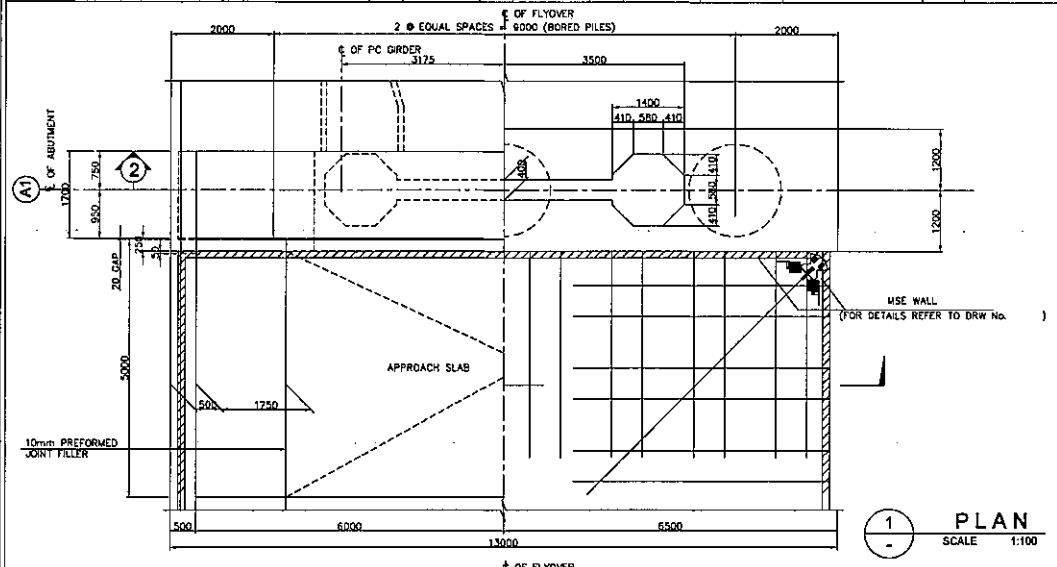
APPROVED BY: Ir. HERRY VAZA M.Eng.Sc (NIP. : 110038400) | Sign | Date

PROJECT AND LOCATION :
DETAILED DESIGN STUDY OF
NORTH JAVA CORRIDOR FLYOVER PROJECT
BALARAJA FLYOVER - CONTRACT PACKAGE 1
(MERAK - BALARAJA)
BANTEN PROVINCE

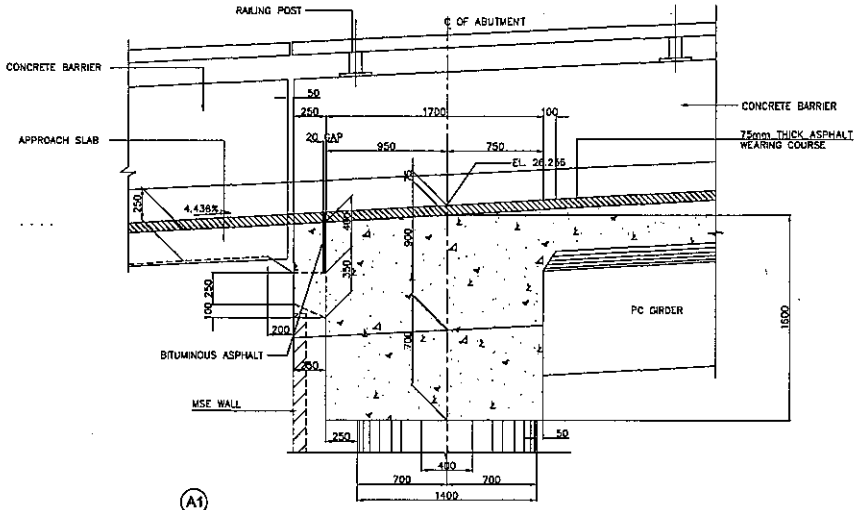
SCALE : 1 : 100 / 1 : 40 / FULL SIZE A3

DRAWING TITLE :
ABUTMENT LAYOUT & DIMENSIONS
(ABUT. A1)

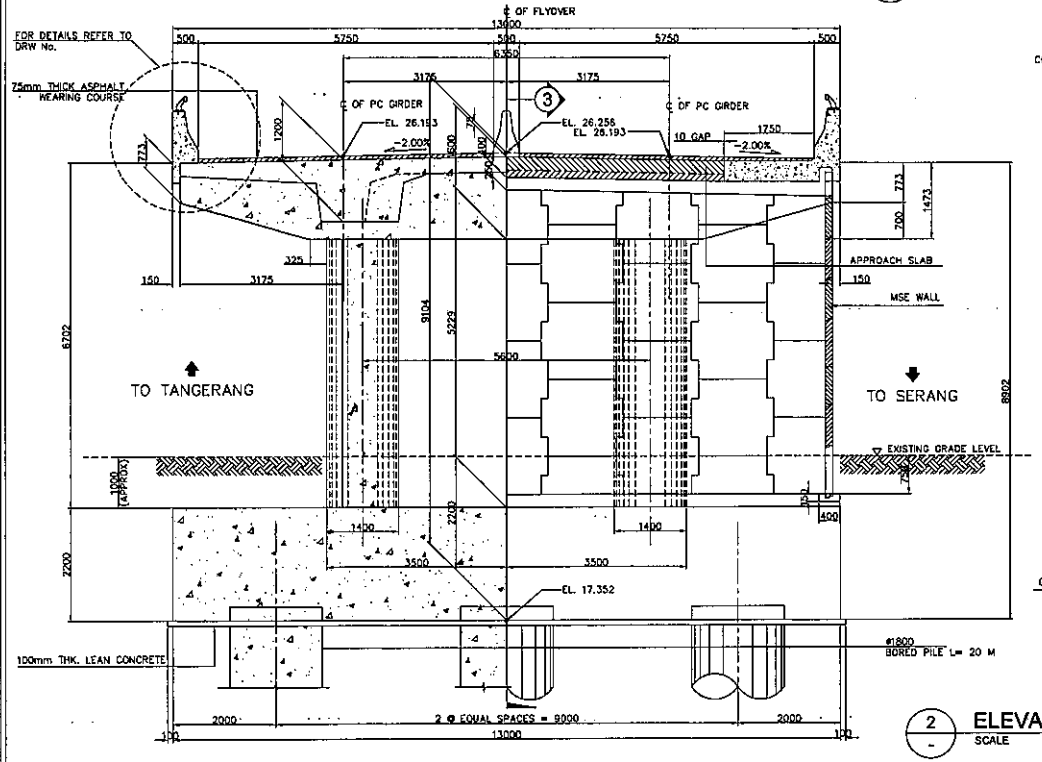
DRAWING NO : BSB-001
SHEET NO : 01 / 055



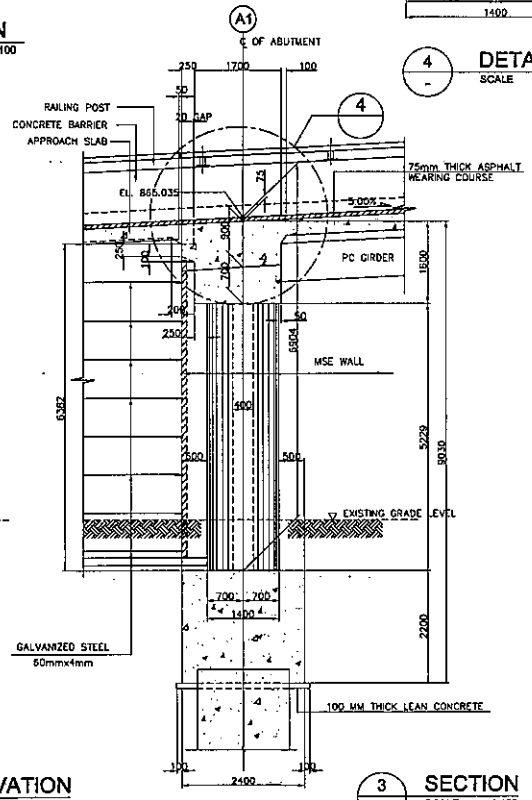
1 PLAN SCALE 1:100



4 DETAIL SCALE 1:40

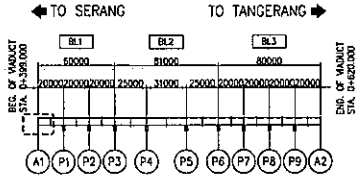


2 ELEVATION SCALE 1:100



3 SECTION SCALE 1:100

NOTES :
1. ALL DIMENSIONS ARE IN MILLIMETER
2. ELEVATIONS ARE IN METERS



KEY PLAN SCALE 1:4000

JAPAN INTERNATIONAL COOPERATION AGENCY / KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY	CHECKED BY	SUBMITTED BY
	Name: A. GOURLEY	Name: S. GOSE	Name: M. KIUCHI
	Sign:	Sign:	Sign:
	Date:	Date:	Date:

REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS

APPROVED BY: Ir. HERRY VAZA M,Eng.Sc (NIP. : .11003400) — Sign: — Date:

PROJECT AND LOCATION :
DETAILED DESIGN STUDY OF
NORTH JAVA CORRIDOR FLYOVER PROJECT
BALARAJA FLYOVER - CONTRACT PACKAGE 1
(MERAK - BALARAJA)
BANTEN PROVINCE

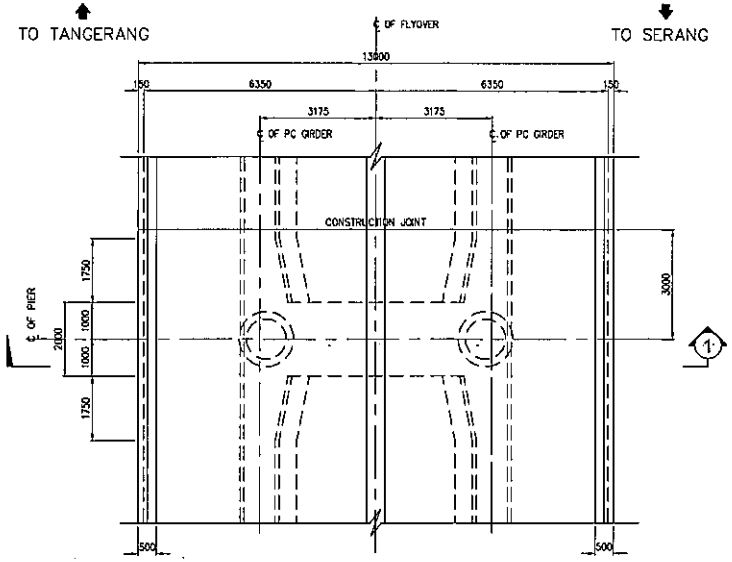
SCALE : 1 : 40 / 1 : 60 / 1 : 150 / 1 : 2000 — FULL SIZE A3

DRAWING TITLE :
PIER LAYOUT
P1,P2 (FIXED)

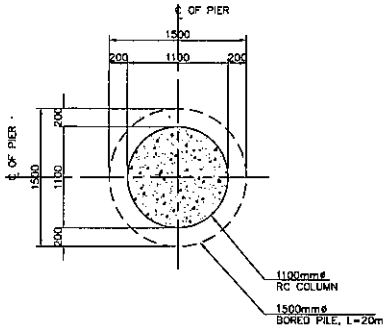
DRAWING NO : 000-000
SHEET NO : 0 / 000

TO TANGERANG

TO SERANG



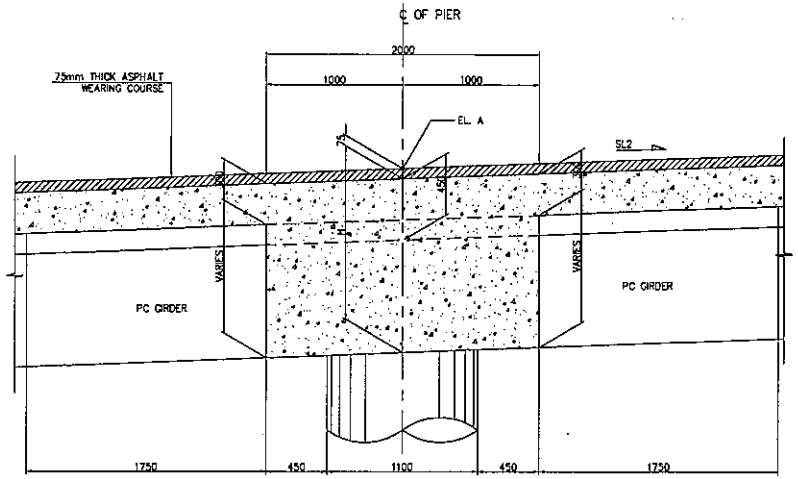
2 — PLAN
SCALE : 1:150



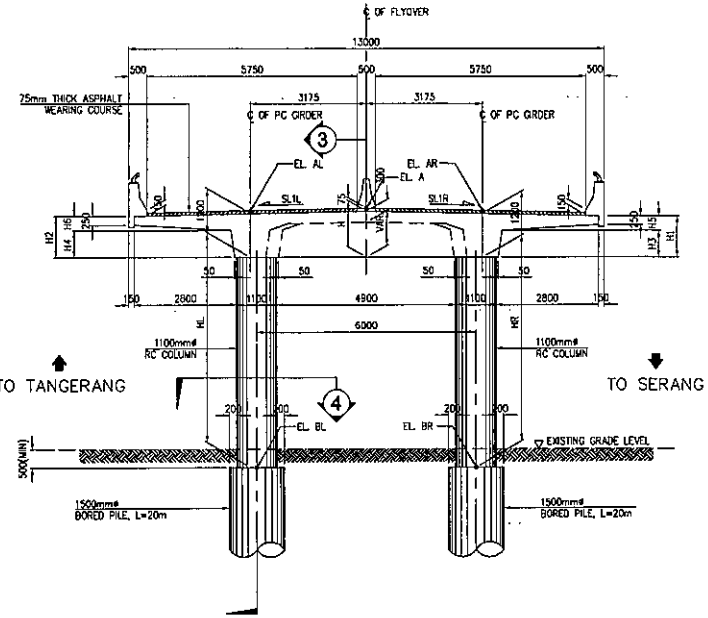
4 — SECTION
SCALE : 1:60

SCHEDULE OF PIERS (FIXED)

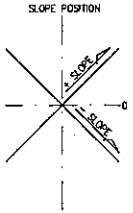
PIER	EL. A	EL. AL	EL. AR	EL. BL	EL. BR	SL 1L	SL 1R	SL2	H	HL	HR	H1	H2	H3	H4	H5	H6
P1	27.121	27.056	27.056	19.254	19.254	-2.000%	-2.000%	+4.450%	1264	6528	6528	1137	1137	739	739	397	397
P2	27.777	27.714	27.714	19.910	19.910	-2.000%	-2.000%	+4.450%	1264	6529	6529	1137	1137	739	739	397	397

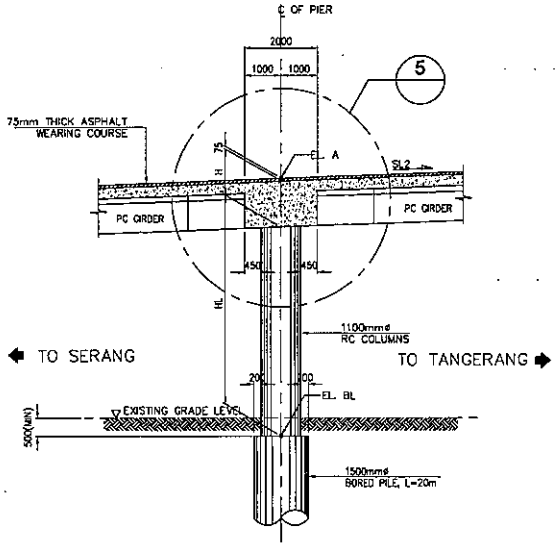


5 — DETAIL
SCALE : 1:40



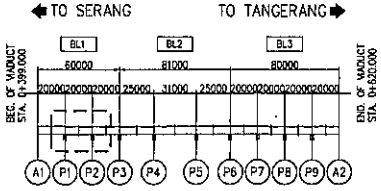
1 — ELEVATION
SCALE : 1:150





3 — SECTION
SCALE : 1:150

NOTES :
1. ALL DIMENSIONS ARE IN MILLIMETER
2. ELEVATIONS ARE IN METERS



* — PROFIL
SCALE : 1:2000

17

JAPAN INTERNATIONAL COOPERATION AGENCY / KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY	CHECKED BY	SUBMITTED BY
	Name: A. GOURLEY	Name: S. GOSE	Name: M. KIUCHI
	Sign:	Sign:	Sign:
	Date:	Date:	Date:

REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS

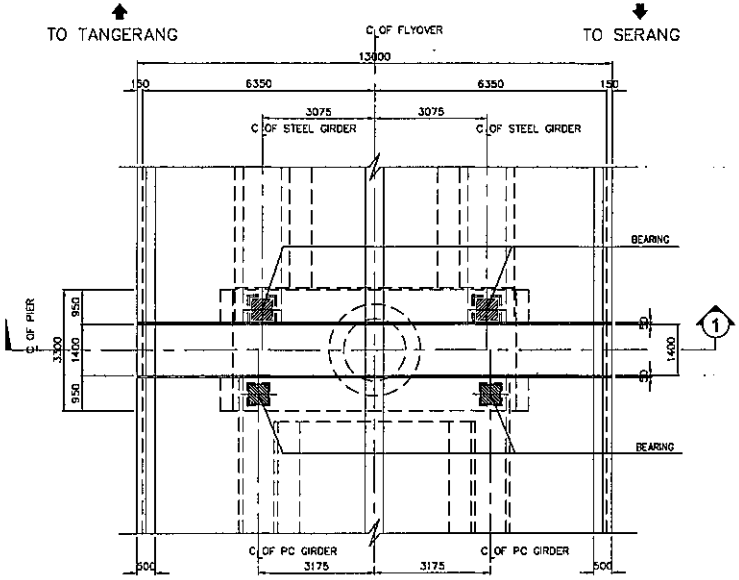
APPROVED BY: Ir. HERRY VAZA M,Eng.Sc, NIP. : 110038400 — Sign: — Date:

PROJECT AND LOCATION :
DETAILED DESIGN STUDY OF
NORTH JAVA CORRIDOR FLYOVER PROJECT
BALARAJA FLYOVER - CONTRACT PACKAGE 1
(MERAK - BALARAJA)
BANTEN PROVINCE

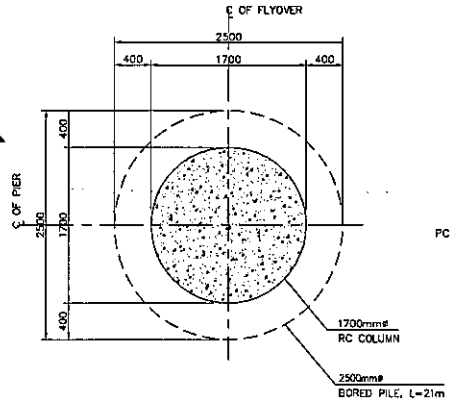
SCALE : 1 : 40 / 1 : 60 / 1 : 150 / 1 : 4000 — FULL SIZE A3

DRAWING TITLE :
PIER LAYOUT
P3 (EXP.)

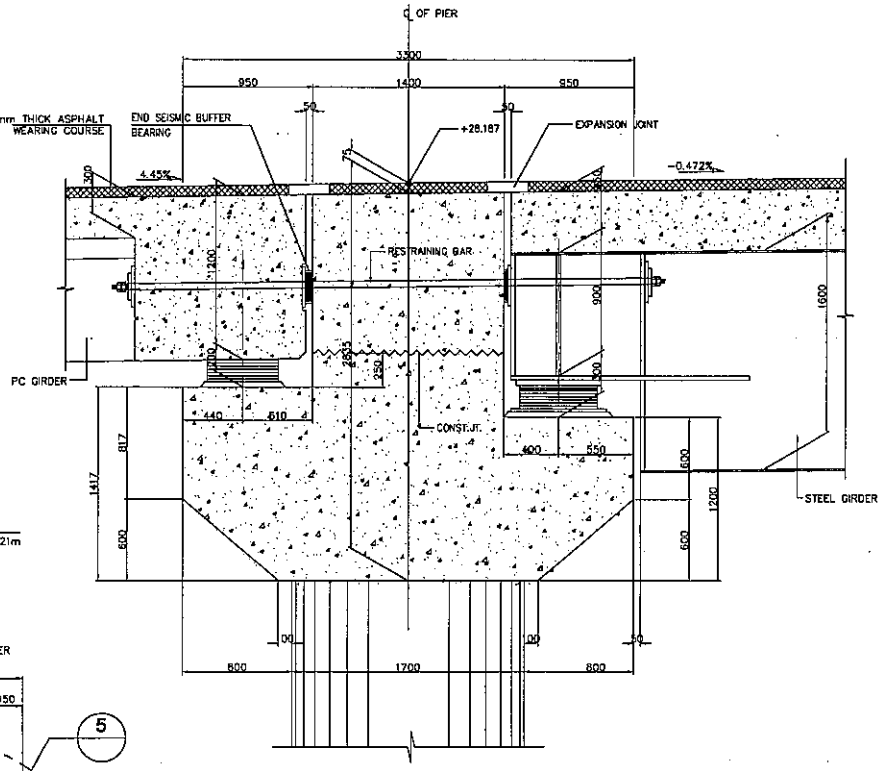
DRAWING NO : 000-000
SHEET NO : 0 / 000



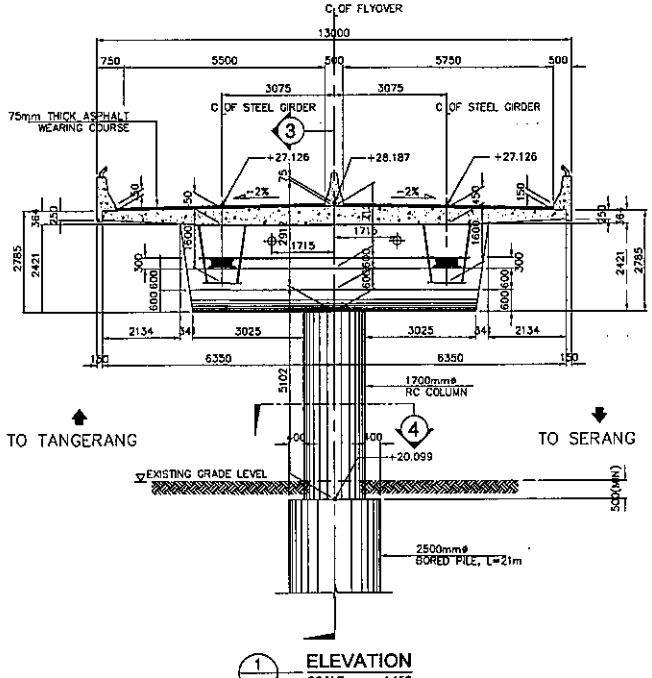
2 - PLAN
SCALE : 1:150



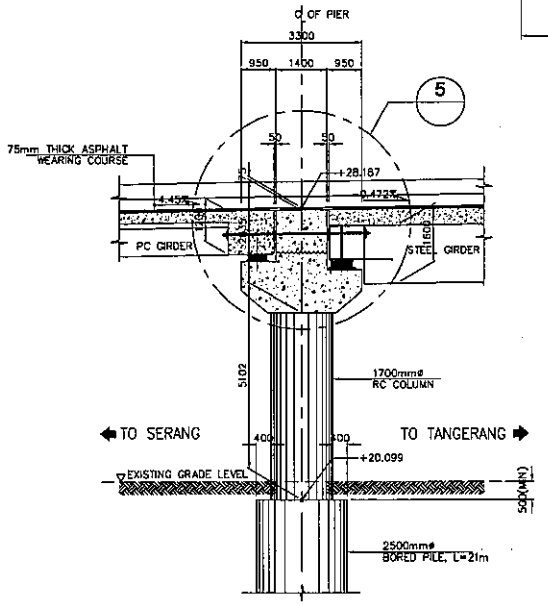
4 - SECTION
SCALE : 1:60



5 - DETAIL
SCALE : 1:40

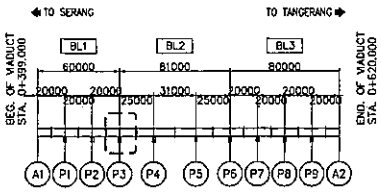


1 - ELEVATION
SCALE : 1:150

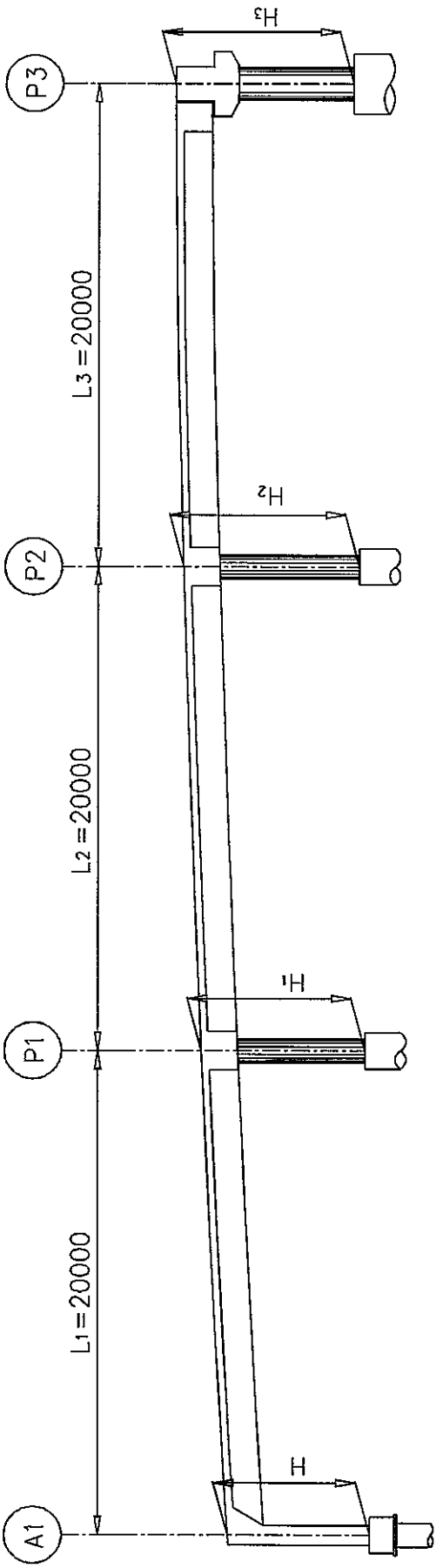


3 - SECTION
SCALE : 1:150

NOTES :
1. ALL DIMENSIONS ARE IN MILIMETER
2. ELEVATIONS ARE IN METERS



* - KEY PLAN
SCALE : 1:4000



FRAME A1-P3

L_1 = 20 m
L_2 = 20 m
L_3 = 20 m

H = 7.329 m (7.3)
H_1 = 7.792 m (7.8)
H_2 = 7.792 m (7.8)
H_3 = 8.013 m (8.0)

(3) Spring Constant of Foundation

SUMMARY OF SPRING CONSTANT ANALYSIS FOR NORTH JAVA FLYOVER

SPRING CONSTANT ANALYSIS FOR MERAK FLYOVER - SINGLE PILE - SECTION P13-A2

BORED PILE	PILE DIA. 2500 MM		PILE DIA. 1800 MM (ABUTMENT)		PILE DIA.1500 MM	
	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT
AXIAL	P = 4000 kN Δz = 0.00399 m	K_v = 1.00E+06 kN/m	P = 4000 kN Δz = 0.00648 m	K_v = 6.17E+05 kN/m	P = 4000 kN Δz = 0.00755 m	K_v = 5.30E+05 kN/m
LATERAL	P = 400 kN Δx = 7.72E-03 m	K_h = 5.18E+04 kN/m	P = 400 kN Δx = 2.21E-02 m	K_h = 1.81E+04 kN/m	P = 400 kN Δx = 3.81E-02 m	K_h = 1.05E+04 kN/m
	P = 400 kN θ = 0.00081 rad	$K_{h\theta}$ = 4.93E+05 kN/rad	P = 400 kN θ = 0.00252 rad	$K_{h\theta}$ = 1.59E+05 kN/rad	P = 400 kN θ = 0.00459 rad	$K_{h\theta}$ = 8.71E+04 kN/rad
MOMENT	M = 400 kN.m θ = 0.00003 rad	K_θ = 1.45E+07 kN.m/rad	M = 400 kN.m θ = 0.00010 rad	K_θ = 4.19E+06 kN.m/rad	M = 400 kN.m θ = 0.00019 rad	K_θ = 2.13E+06 kN.m/rad

SPRING CONSTANT ANALYSIS FOR MERAK FLYOVER - SINGLE PILE - SECTION A1 - P9

BORED PILE	PILE DIA. 2500 MM		PILE DIA. 1800 MM (ABUTMENT)		PILE DIA.1500 MM	
	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT
AXIAL	P = 4000 kN Δz = 0.00333 m	K_v = 1.20E+06 kN/m	P = 4000 kN Δz = 0.00492 m	K_v = 8.13E+05 kN/m	P = 4000 kN Δz = 0.00573 m	K_v = 6.98E+05 kN/m
LATERAL	P = 400 kN Δx = 4.54E-03 m	K_h = 8.81E+04 kN/m	P = 400 kN Δx = 1.23E-02 m	K_h = 3.25E+04 kN/m	P = 400 kN Δx = 2.09E-02 m	K_h = 1.91E+04 kN/m
	P = 400 kN θ = 0.00056 rad	$K_{h\theta}$ = 7.10E+05 kN/rad	P = 400 kN θ = 0.00170 rad	$K_{h\theta}$ = 2.35E+05 kN/rad	P = 400 kN θ = 0.00306 rad	$K_{h\theta}$ = 1.31E+05 kN/rad
MOMENT	M = 400 kN.m θ = 0.00002 rad	K_θ = 1.75E+07 kN.m/rad	M = 400 kN.m θ = 0.00008 rad	K_θ = 5.10E+06 kN.m/rad	M = 400 kN.m θ = 0.00015 rad	K_θ = 2.60E+06 kN.m/rad

X 2

SPRING CONSTANT ANALYSIS FOR MERAK FLYOVER - SINGLE PILE - SECTION P9 - P13

BORED PILE	PILE DIA. 2500 MM		PILE DIA. 1800 MM (ABUTMENT)		PILE DIA.1500 MM	
	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT
AXIAL	P = 4000 kN Δz = 0.00377 m	K_v = 1.06E+06 kN/m	P = 4000 kN Δz = 0.00606 m	K_v = 6.60E+05 kN/m	P = 4000 kN Δz = 0.00704 m	K_v = 5.68E+05 kN/m
LATERAL	P = 400 kN Δx = 6.36E-03 m	K_h = 6.29E+04 kN/m	P = 400 kN Δx = 1.73E-02 m	K_h = 2.31E+04 kN/m	P = 400 kN Δx = 2.89E-02 m	K_h = 1.38E+04 kN/m
	P = 400 kN θ = 0.00069 rad	$K_{h\theta}$ = 5.81E+05 kN/rad	P = 400 kN θ = 0.00206 rad	$K_{h\theta}$ = 1.94E+05 kN/rad	P = 400 kN θ = 0.00366 rad	$K_{h\theta}$ = 1.09E+05 kN/rad
MOMENT	M = 400 kN.m θ = 0.00003 rad	K_θ = 1.53E+07 kN.m/rad	M = 400 kN.m θ = 0.00009 rad	K_θ = 4.49E+06 kN.m/rad	M = 400 kN.m θ = 0.00017 rad	K_θ = 2.31E+06 kN.m/rad

SPRING CONSTANT ANALYSIS FOR BALARAJA FLYOVER - SINGLE PILE

BORED PILE	PILE DIA. 2500 MM		PILE DIA. 1800 MM (ABUTMENT)		PILE DIA.1500 MM	
	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT
AXIAL	P = 4000 kN Δz = 0.00338 m	K_v = 1.18E+06 kN/m	P = 4000 kN Δz = 0.00369 m	K_v = 1.08E+06 kN/m	P = 4000 kN Δz = 0.00500 m	K_v = 8.00E+05 kN/m
LATERAL	P = 400 kN Δx = 0.00247 m	K_h = 1.62E+05 kN/m	P = 400 kN Δx = 0.00663 m	K_h = 6.03E+04 kN/m	P = 400 kN Δx = 0.0109 m	K_h = 3.67E+04 kN/m
	P = 400 kN θ = 0.00036 rad	$K_{h\theta}$ = 1.11E+06 kN/rad	P = 400 kN θ = 0.00107 rad	$K_{h\theta}$ = 3.74E+05 kN/rad	P = 400 kN θ = 0.00188 rad	$K_{h\theta}$ = 2.13E+05 kN/rad
MOMENT	M = 400 kN.m θ = 0.00002 rad	K_θ = 2.01E+07 kN.m/rad	M = 400 kN.m θ = 0.00007 rad	K_θ = 5.89E+06 kN.m/rad	M = 400 kN.m θ = 0.00013 rad	K_θ = 3.03E+06 kN.m/rad

SPRING CONSTANT ANALYSIS FOR NAGREG FLYOVER

BORED PILE	PILE DIA. 2500 MM		PILE DIA. 1800 MM (ABUTMENT)		PILE DIA.1500 MM	
	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT
AXIAL	P = 4000 kN Δz = 0.00274 m	K_v = 1.46E+06 kN/m	P = 4000 kN Δz = 0.00312 m	K_v = 1.28E+06 kN/m	P = 4000 kN Δz = 0.00395 m	K_v = 1.01E+06 kN/m
LATERAL	P = 400 kN Δx = 0.00251 m	K_h = 1.59E+05 kN/m	P = 400 kN Δx = 0.0058 m	K_h = 6.90E+04 kN/m	P = 400 kN Δx = 0.00921 m	K_h = 4.34E+04 kN/m
	P = 400 kN θ = 0.00036 rad	$K_{h\theta}$ = 1.12E+06 kN/rad	P = 400 kN θ = 0.00096 rad	$K_{h\theta}$ = 4.16E+05 kN/rad	P = 400 kN θ = 0.00167 rad	$K_{h\theta}$ = 2.40E+05 kN/rad
MOMENT	M = 400 kN.m θ = 0.00002 rad	K_θ = 1.98E+07 kN.m/rad	M = 400 kN.m θ = 0.00007 rad	K_θ = 6.11E+06 kN.m/rad	M = 400 kN.m θ = 0.00013 rad	K_θ = 3.15E+06 kN.m/rad

SPRING CONSTANT ANALYSIS FOR GEBANG FLYOVER

BORED PILE	PILE DIA. 2500 MM		PILE DIA. 1800 MM (ABUTMENT)		PILE DIA.1500 MM	
	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT
AXIAL	P = 4000 kN Δz = 0.00307 m	K_v = 1.30E+06 kN/m	P = 4000 kN Δz = 0.00367 m	K_v = 1.09E+06 kN/m	P = 4000 kN Δz = 0.00474 m	K_v = 8.44E+05 kN/m
LATERAL	P = 400 kN Δx = 1.28E-02 m	K_h = 3.13E+04 kN/m	P = 400 kN Δx = 3.31E-02 m	K_h = 1.21E+04 kN/m	P = 400 kN Δx = 5.58E-02 m	K_h = 7.17E+03 kN/m
	P = 400 kN θ = 0.00110 rad	$K_{h\theta}$ = 3.64E+05 kN/rad	P = 400 kN θ = 0.00314 rad	$K_{h\theta}$ = 1.27E+05 kN/rad	P = 400 kN θ = 0.00561 rad	$K_{h\theta}$ = 7.13E+04 kN/rad
MOMENT	M = 400 kN.m θ = 0.00003 rad	K_θ = 1.25E+07 kN.m/rad	M = 400 kN.m θ = 0.00011 rad	K_θ = 3.77E+06 kN.m/rad	M = 400 kN.m θ = 0.00021 rad	K_θ = 1.93E+06 kN.m/rad

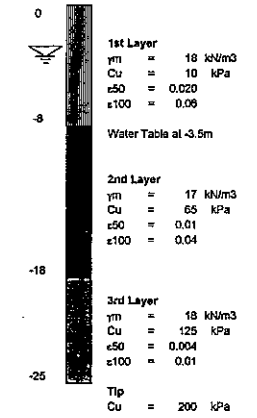
SPRING CONSTANT ANALYSIS FOR PETERONGAN FLYOVER

BORED PILE	PILE DIA. 2500 MM		PILE DIA. 1800 MM (ABUTMENT)		PILE DIA.1500 MM	
	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT
AXIAL	P = 4000 kN Δz = 0.00290 m	K_v = 1.38E+06 kN/m	P = 4000 kN Δz = 0.00371 m	K_v = 1.08E+06 kN/m	P = 4000 kN Δz = 0.00437 m	K_v = 9.15E+05 kN/m
LATERAL	P = 400 kN Δx = 4.01E-03 m	K_h = 9.98E+04 kN/m	P = 400 kN Δx = 0.01140 m	K_h = 3.51E+04 kN/m	P = 400 kN Δx = 1.98E-02 m	K_h = 2.02E+04 kN/m
	P = 400 kN θ = 0.00054 rad	$K_{h\theta}$ = 7.46E+05 kN/rad	P = 400 kN θ = 0.00166 rad	$K_{h\theta}$ = 2.41E+05 kN/rad	P = 400 kN θ = 0.00306 rad	$K_{h\theta}$ = 1.31E+05 kN/rad
MOMENT	M = 400 kN.m θ = 0.00002 rad	K_θ = 1.80E+07 kN.m/rad	M = 400 kN.m θ = 0.00008 rad	K_θ = 5.19E+06 kN.m/rad	M = 400 kN.m θ = 0.00015 rad	K_θ = 2.61E+06 kN.m/rad

SPRING CONSTANT ANALYSIS FOR TANGGULANGIN FLYOVER

BORED PILE	PILE DIA. 2500 MM		PILE DIA. 1800 MM (ABUTMENT)		PILE DIA.1500 MM	
	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT	LOAD & DEFORMATION	SPRING CONSTANT
AXIAL	P = 4000 kN Δz = 0.00292 m	K_v = 1.37E+06 kN/m	P = 4000 kN Δz = 0.00412 m	K_v = 9.71E+05 kN/m	P = 4000 kN Δz = 0.00536 m	K_v = 7.46E+05 kN/m
LATERAL	P = 400 kN Δx = 5.16E-03 m	K_h = 7.75E+04 kN/m	P = 400 kN Δx = 0.01320 m	K_h = 3.03E+04 kN/m	P = 400 kN Δx = 2.05E-02 m	K_h = 1.95E+04 kN/m
	P = 400 kN θ = 0.00058 rad	$K_{h\theta}$ = 6.96E+05 kN/rad	P = 400 kN θ = 0.00166 rad	$K_{h\theta}$ = 2.41E+05 kN/rad	P = 400 kN θ = 0.00287 rad	$K_{h\theta}$ = 1.39E+05 kN/rad
MOMENT	M = 400 kN.m θ = 0.00002 rad	K_θ = 1.64E+07 kN.m/rad	M = 400 kN.m θ = 0.00008 rad	K_θ = 4.87E+06 kN.m/rad	M = 400 kN.m θ = 0.00016 rad	K_θ = 2.53E+06 kN.m/rad

SOIL DATA INPUT



Soil Properties

1st Layer
γm = 18 kN/m3
Cu = 10 kPa
ε50 = 0.020
ε100 = 0.06

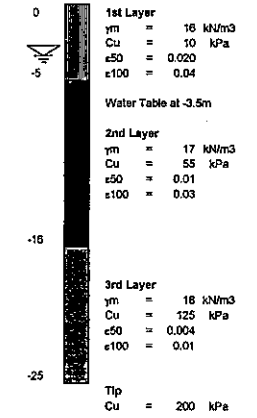
Water Table at -3.5m

2nd Layer
γm = 17 kN/m3
Cu = 65 kPa
ε50 = 0.01
ε100 = 0.04

3rd Layer
γm = 18 kN/m3
Cu = 125 kPa
ε50 = 0.004
ε100 = 0.01

Tip
Cu = 200 kPa

Soil Layer Model
Lateral = Clay (O'Neill)
Axial = Drilled Shaft Clay
Torsional = Hyperbolic



Soil Properties

1st Layer
γm = 16 kN/m3
Cu = 10 kPa
ε50 = 0.020
ε100 = 0.04

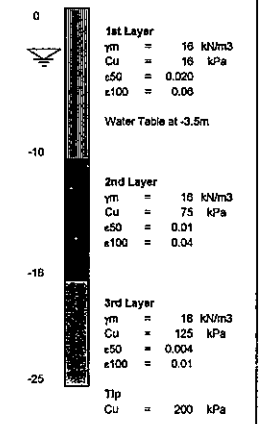
Water Table at -3.5m

2nd Layer
γm = 17 kN/m3
Cu = 55 kPa
ε50 = 0.01
ε100 = 0.03

3rd Layer
γm = 18 kN/m3
Cu = 125 kPa
ε50 = 0.004
ε100 = 0.01

Tip
Cu = 200 kPa

Soil Layer Model
Lateral = Clay (O'Neill)
Axial = Drilled Shaft Clay
Torsional = Hyperbolic



Soil Properties

1st Layer
γm = 16 kN/m3
Cu = 16 kPa
ε50 = 0.020
ε100 = 0.06

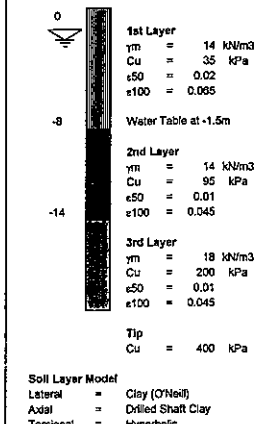
Water Table at -3.5m

2nd Layer
γm = 16 kN/m3
Cu = 75 kPa
ε50 = 0.01
ε100 = 0.04

3rd Layer
γm = 18 kN/m3
Cu = 125 kPa
ε50 = 0.004
ε100 = 0.01

Tip
Cu = 200 kPa

Soil Layer Model
Lateral = Clay (O'Neill)
Axial = Drilled Shaft Clay
Torsional = Hyperbolic



Soil Properties

1st Layer
γm = 14 kN/m3
Cu = 35 kPa
ε50 = 0.02
ε100 = 0.065

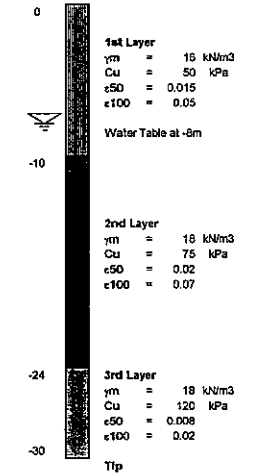
Water Table at -1.5m

2nd Layer
γm = 14 kN/m3
Cu = 95 kPa
ε50 = 0.01
ε100 = 0.045

3rd Layer
γm = 18 kN/m3
Cu = 200 kPa
ε50 = 0.01
ε100 = 0.045

Tip
Cu = 400 kPa

Soil Layer Model
Lateral = Clay (O'Neill)
Axial = Drilled Shaft Clay
Torsional = Hyperbolic



Soil Properties

1st Layer
γm = 16 kN/m3
Cu = 50 kPa
ε50 = 0.015
ε100 = 0.05

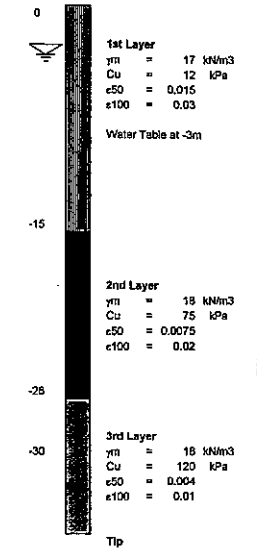
Water Table at -8m

2nd Layer
γm = 18 kN/m3
Cu = 75 kPa
ε50 = 0.02
ε100 = 0.07

3rd Layer
γm = 18 kN/m3
Cu = 120 kPa
ε50 = 0.008
ε100 = 0.02

Tip
Cu = 200 kPa

Soil Layer Model
Lateral = Clay (O'Neill)
Axial = Drilled Shaft Clay
Torsional = Hyperbolic



Soil Properties

1st Layer
γm = 17 kN/m3
Cu = 12 kPa
ε50 = 0.015
ε100 = 0.03

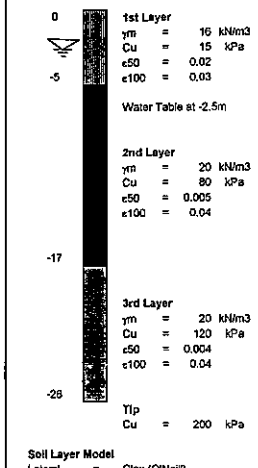
Water Table at -3m

2nd Layer
γm = 18 kN/m3
Cu = 75 kPa
ε50 = 0.0075
ε100 = 0.02

3rd Layer
γm = 18 kN/m3
Cu = 120 kPa
ε50 = 0.004
ε100 = 0.01

Tip
Cu = 200 kPa

Soil Layer Model
Lateral = Clay (O'Neill)
Axial = Drilled Shaft Clay
Torsional = Hyperbolic



Soil Properties

1st Layer
γm = 16 kN/m3
Cu = 15 kPa
ε50 = 0.02
ε100 = 0.03

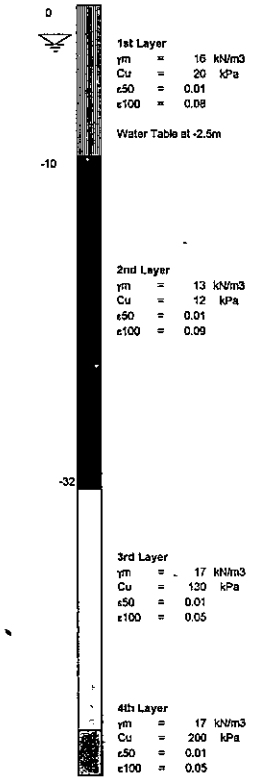
Water Table at -2.5m

2nd Layer
γm = 20 kN/m3
Cu = 80 kPa
ε50 = 0.005
ε100 = 0.04

3rd Layer
γm = 20 kN/m3
Cu = 120 kPa
ε50 = 0.004
ε100 = 0.04

Tip
Cu = 200 kPa

Soil Layer Model
Lateral = Clay (O'Neill)
Axial = Drilled Shaft Clay
Torsional = Hyperbolic



Soil Properties

1st Layer
γm = 16 kN/m3
Cu = 20 kPa
ε50 = 0.01
ε100 = 0.08

Water Table at -2.5m

2nd Layer
γm = 13 kN/m3
Cu = 12 kPa
ε50 = 0.01
ε100 = 0.09

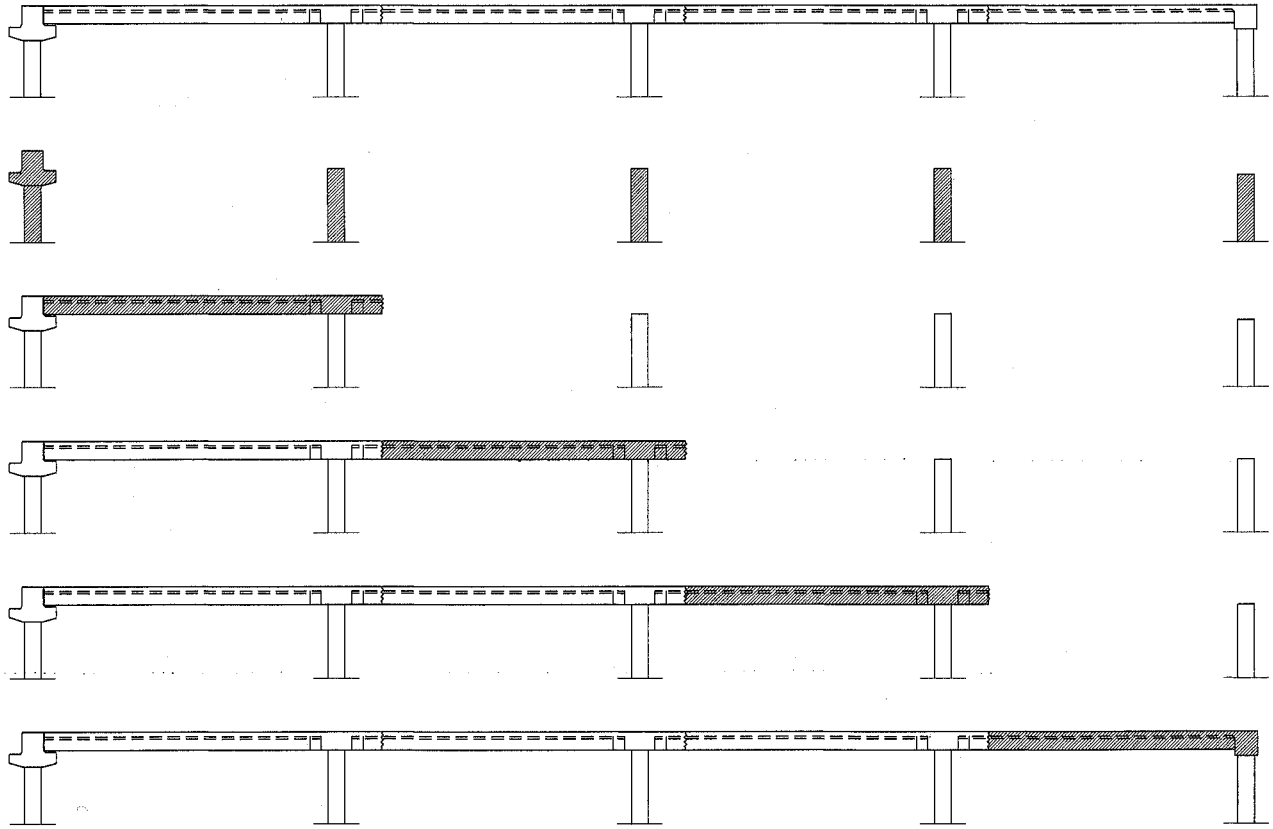
3rd Layer
γm = 17 kN/m3
Cu = 120 kPa
ε50 = 0.01
ε100 = 0.05

4th Layer
γm = 17 kN/m3
Cu = 200 kPa
ε50 = 0.01
ε100 = 0.05

Tip
Cu = 300 kPa

Soil Layer Model
Lateral = Clay (O'Neill)
Axial = Drilled Shaft Clay
Torsional = Hyperbolic

2.1.3 Construction Sequence and Time Schedule for Design



Stage 1 (30 days)
Substructure

Stage 2 (15 days)
Superstructure
1st span
Pre-stressing & Coupling

Stage 3 (15 days)
Superstructure
2nd span
Pre-stressing & Coupling

Stage 4 (15 days)
Superstructure
3rd span
Pre-stressing & Coupling

Stage 5 (15 days)
Superstructure
4th span
Pre-stressing & Coupling

Stage 6 (15 days)
Pre-stressing completion Fly Over
To bridge Surface Contruction 30 days
Completion of Bridge Surface
Contruction to first
Live Leading 30 days.

2.1.4 Loadings

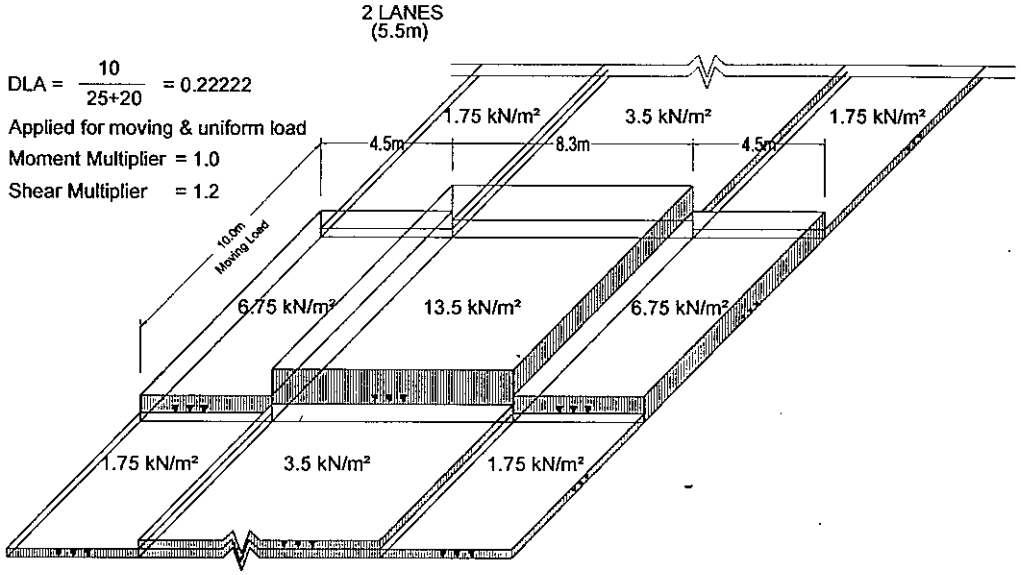
(1) Self weight of Girder including Slab

Self weight shall be calculated by computer automatically design by using the unit weight 25 kN/m3

(4) Live Load (Refer to Comparison Study Report)

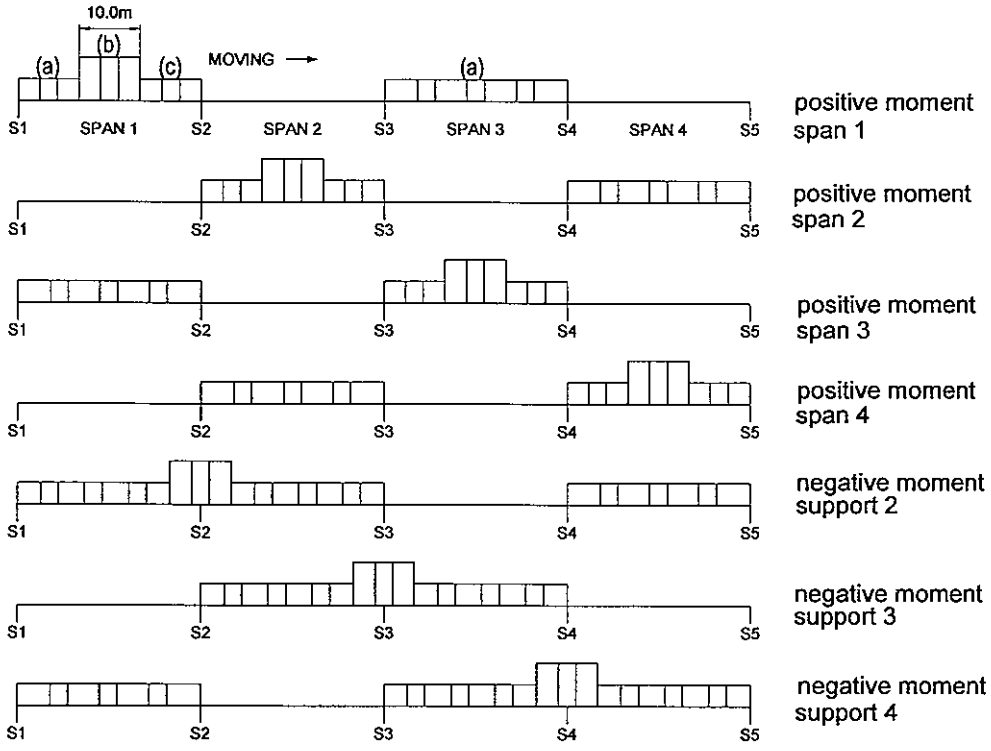
The applied live load equivalent of the design load of the Project is established from the comparison cases to be the JRA Live Load over the full carriageway width with multiplication factor 1.35.

JAPAN BRIDGE LOADING
('L' LOADING)

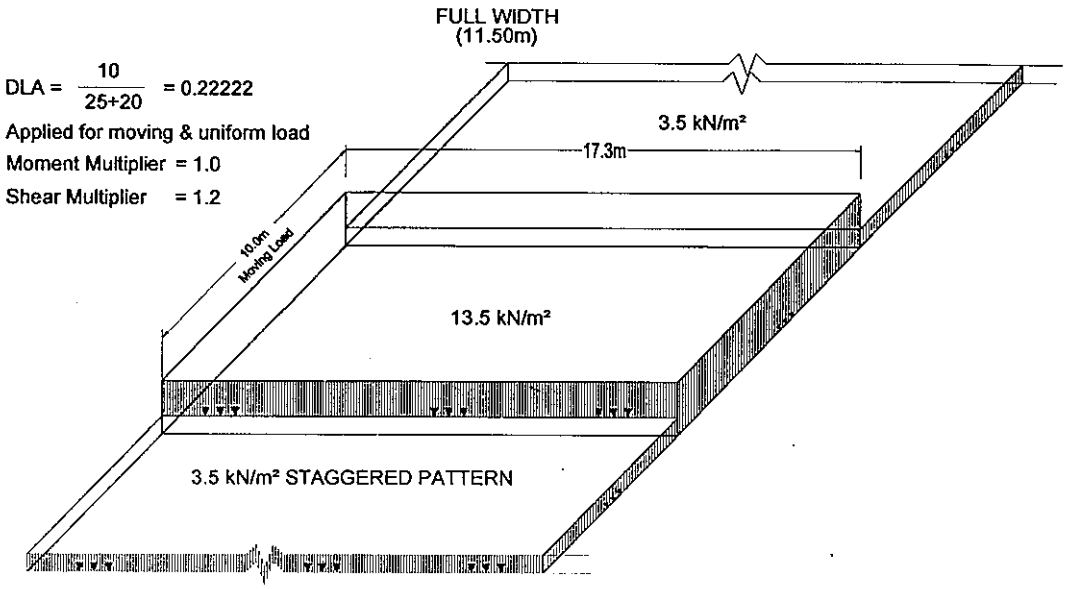


APPLICATION TO 11.50 m' ROADWAY WIDTH FOR EACH GIRDER

	(a)	(b)	(c)
no impact	14.875 kN/m'	57.375 kN/m'	14.875 kN/m'
with impact	18.181 kN/m'	70.125 kN/m'	18.181 kN/m'

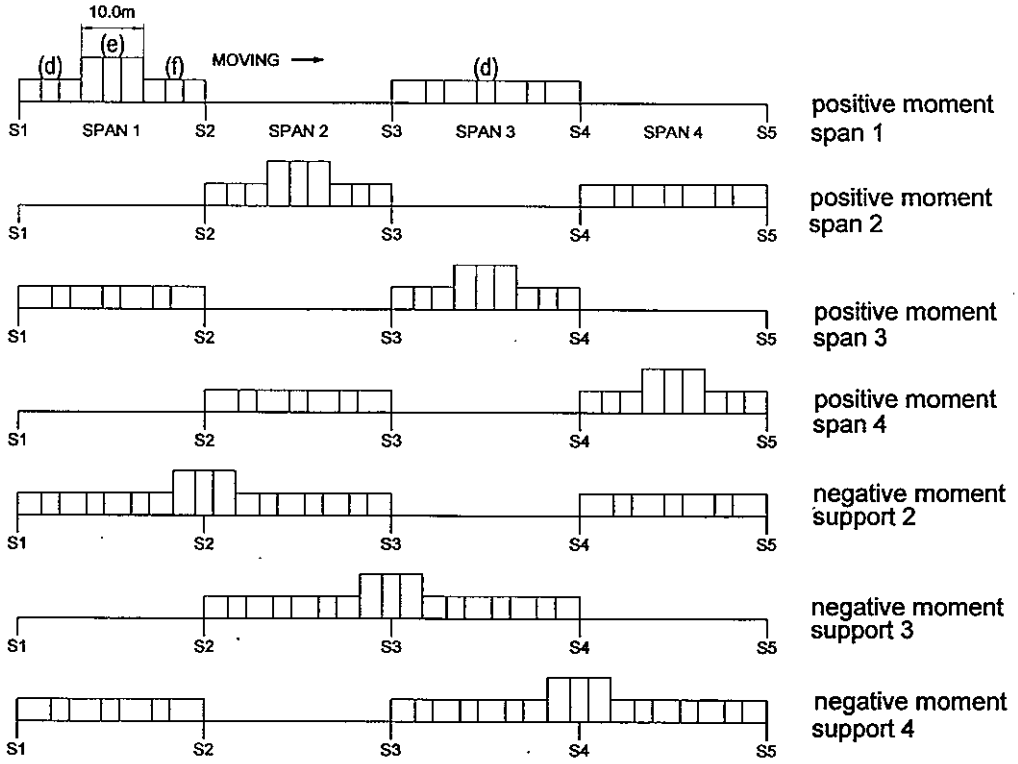


JAPAN BRIDGE LOADING
('L' LOADING)

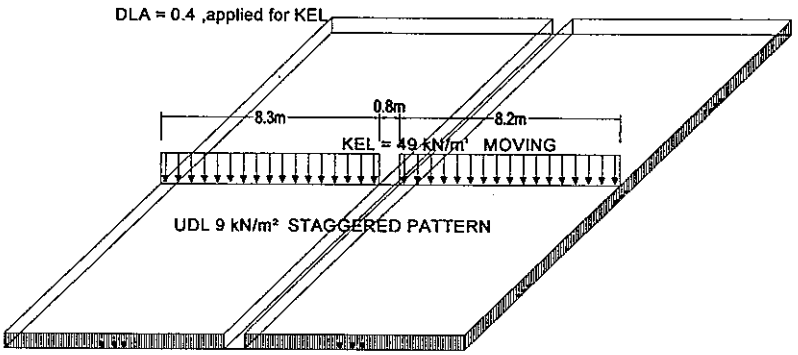


APPLICATION TO 11.50 m' ROADWAY WIDTH FOR EACH DIRDER

no impact	20.125 kN/m'	77.625 kN/m'	20.125 kN/m'
with impact	24.597 kN/m'	94.875 kN/m'	24.597 kN/m'
	(d)	(e)	(f)

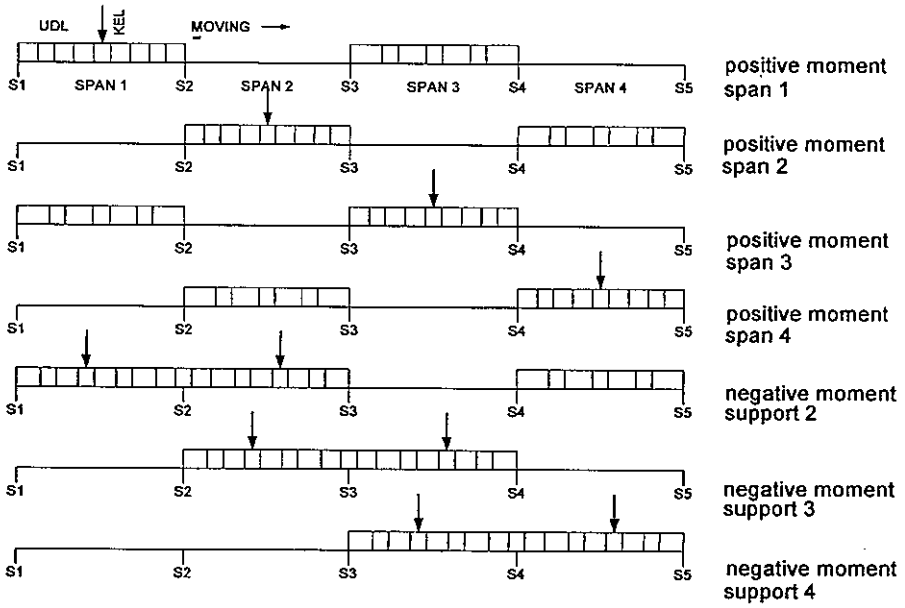


INDONESIA BRIDGE LOADING
('D' LOADING)



APPLICATION TO 11.50 m' ROADWAY WIDTH FOR EACH GIRDER

no impact	UDL = 49.50 kN/m'	KEL = 269.50 kN/m'
with impact	UDL = 49.50 kN/m'	KEL = 377.30 kN/m'



II.3. COMPARISON CASE

Case 1: Regulated JRA Live Load for 2 lanes

Case 2: JRA Live Load for 3 lanes

Case 3: JRA Live Load for full carriage width

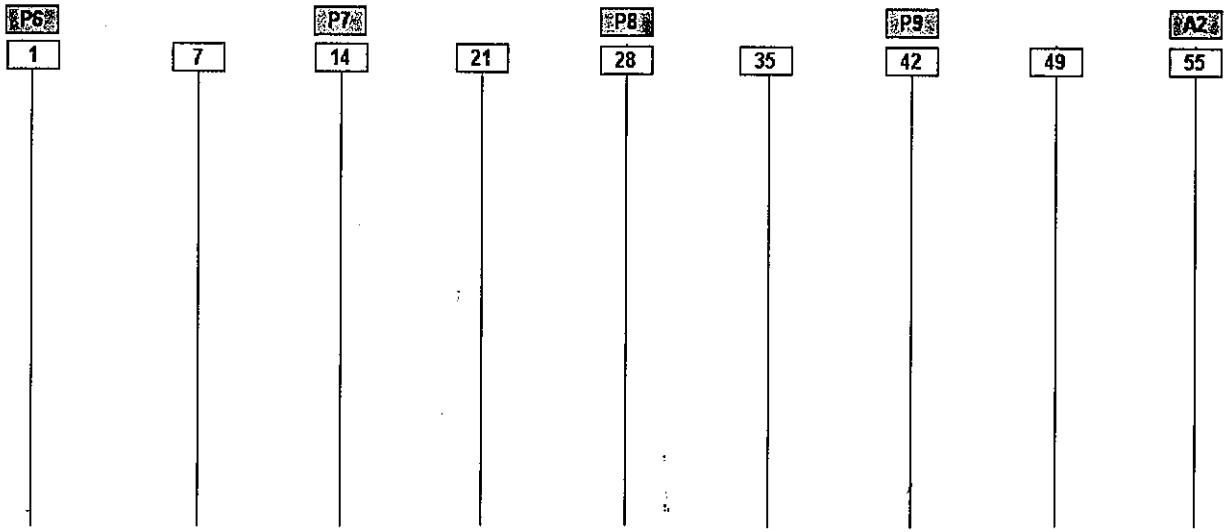
Case 4: 1.35 x Case 3

Case 5: Design Code Live Load

Please refer to comparison table and figures in the following pages.

COMPARISON OF BENDING MOMENT RESULTS

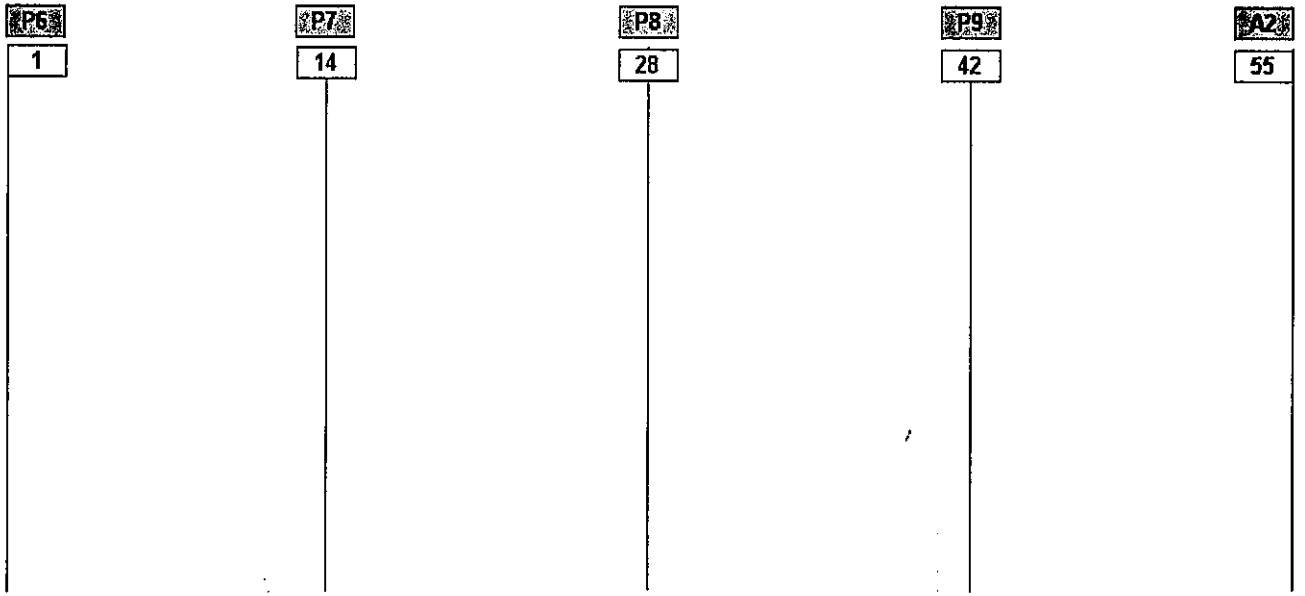
BALARAJA FLYOVER



JAPANESE	Case-1	Regulated, W = 5.5m (2 lane)	4,304	64%	-3,820	58%	3,466	63%	-3,452	56%	3,488	61%	-3,428	50%	3,740	61%	-1,894	64%
	Case-2	W = 8.25m (3 lane)	5,196	78%	-4,864	74%	4,128	75%	-4,356	71%	4,264	74%	-4,714	68%	4,574	75%	-2,468	83%
	Case-3	W = 11.5 (full)	5,822	87%	-5,168	78%	4,688	86%	-4,670	76%	4,720	82%	-5,082	74%	5,062	83%	-2,696	91%
	Case-4	W = 11.5m (full) x 1.35	7,860	117%	-6,977	106%	6,329	115%	-6,305	102%	6,372	111%	-6,861	99%	6,834	112%	-3,640	123%
	Case-5	North Java Criteria	**6,694**		**-6,590**		**5,482**		**-6,162**		**5,755**		**-6,901**		**6,118**		**-2,960**	
AASHTO	1 - OLD 1994		2,400	36%	-2,536	38%	1,809	33%	2,218	36%	1,797	31%	-2,448	35%	2,037	33%	-677	23%
	2 - NEW 2004		5,023	75%	-4,948	75%	3,778	69%	4,344	70%	3,755	65%	-4,815	70%	4,249	69%	-1,463	49%

COMPARISON OF SHEAR RESULTS

BALARAJA FLYOVER



JRA (FULL LOADED)	853	104%	1,042	109%	956	111%	987	108%	954	107%	1,010	106%	993	108%	956	105%
JRA (FULL LOADED) x 1.35	1108.9	136%	1,407	147%	1,291	150%	1,332	146%	1,288	145%	1,364	143%	1,341	146%	1,291	142%
DESIGN CRITERIA	**817**		**954**		**863**		**911**		**888**		**956**		**918**		**911**	

(5) Temperature Effect

Temperature change per year: 10 °C

Temperature change per day: 5 °C

(6) Earthquake (Static Analysis, refer to Structural Design Criteria)

$$T_{EQ} = K_h \cdot I \cdot W_T$$

where:

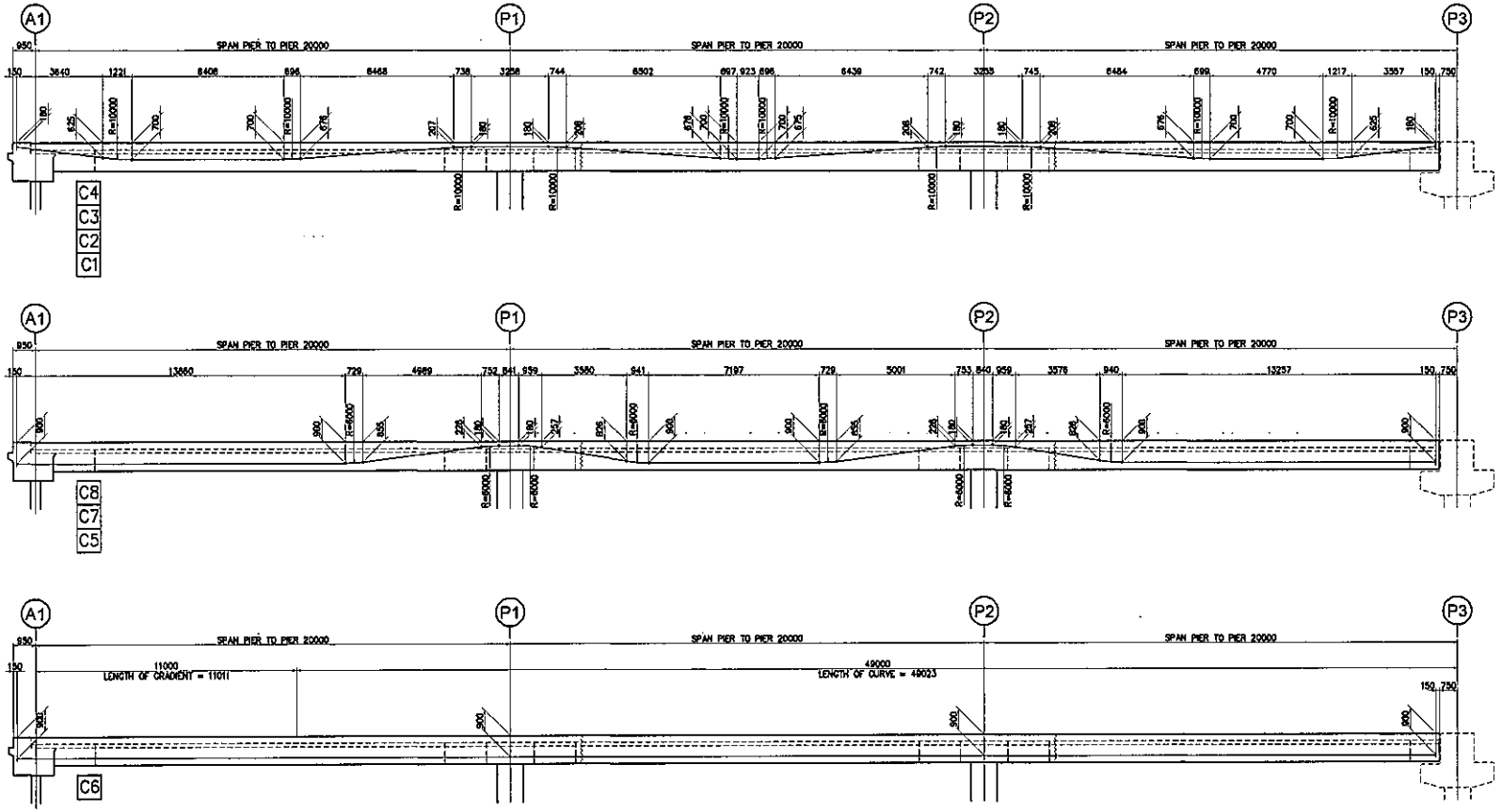
$$K_h = C_{plastic} \cdot S$$

and:

T_{EQ}	=	Total base shear force in the direction being considered (kN)
K_h	=	Coefficient of horizontal seismic loading
$C_{plastic}$	=	Plastic base shear coefficient for the appropriate zone, period and site conditions
I	=	Importance factor (refer Table 2.2.4-5)
S	=	Structural type number (refer Table 2.2.4-6)
W_T	=	Total nominal weight of structure subject to seismic acceleration, taken as dead load plus superimposed dead load (kN)

	Zone	$C_{plastic}$ (max)	S	K_h	I	K_h x I
MERAK	2	0.21	1.225	0.257	1.2	0.31
BALARAJA NAGREG GEBANG	3	0.18	1.225	0.221	1.2	0.27
PETERONGAN TANGGULANGIN	4	0.15	1.225	0.184	1.2	0.22

2.1.5 Arrangement and Detail of Longitudinal PC Tendons



ARRANGEMENT END DETAIL OF LONGITUDINAL PC CABLES FOR BALARAJA FLYOVER (A1–P3)

2.2 Summary of Design Result

SUMMARY OF DESIGN RESULT (BALARAJA A1-P3)

					Unit	Design Section							Limited Value
						A1-P1	P1		P1 - P2	P2		P2 - P3	
						Span center	Left	Right	Span center	Left	Right	Span center	
						7	13	15	21	27	29	35	
FLEXTURE	D	Bending Moment		M	KNm	10,221	-1,314	-1,537	8,411	273	-154	8,801	
		Stress	Upper	σco	N/mm2	3.60	3.01	2.69	2.54	3.81	3.50	2.64	< 16.4
			Lower	σcu	N/mm2	2.11	2.39	2.78	4.28	0.51	1.19	4.59	> -1.39
	D+T	Bending Moment		M	KNm	11,155	-1,402	-1,687	9,716	1,809	1,372	9,473	
		Stress	Upper	σco	N/mm2	3.55	2.95	2.60	2.54	3.73	3.45	2.61	< 16.4
			Lower	σcu	N/mm2	1.37	1.29	1.72	3.00	-0.73	-0.04	4.24	> -1.39
	D+L	Bending Moment		M	KNm	15,767	-6,240	-6,162	13,561	-4,941	-5,379	15,395	
		Crack Width		W	cm	0.0169	-	-	0.0088	-	-	0.0198	w < wa
				Wa	cm	0.0224							
	D+L+T	Bending Moment		M	KNm	16,701	-6,327	-6,312	14,867	-5,123	-5,492	16,067	
		Crack Width		W	cm	0.0176	-	-	0.0168	0.0037	-	0.0202	w < wa
				Wa	cm	0.0224							
	Ultimate	Bending Moment		M	KNm	24,895	-15,147	-14,291	21,554	-14,381	-14,689	26,175	
		Resistance Moment		Mu	KNm	29,509	-23,244	-22,810	28,006	-24,060	-24,187	26,638	
		Safety (F=Mu/M)				1.19	1.53	1.60	1.30	1.67	1.65	1.02	> 1.0
SHEAR & TORSION	D	Diagonal Tensile Stress	Shear or Torsion		N/mm2	0.00	-0.13	-0.10	0.00	-0.08	-0.08	0.00	< 0.90
			Shear and Torsion		N/mm2	0.00	-0.13	-0.10	0.00	-0.08	-0.08	0.00	< 1.20
	D+L	Mean Shear Stress			N/mm2	0.30	1.15(1.64)	1.07(1.36)	0.36	1.02(1.43)	1.08(1.58)	0.34	< 0.50 (< 2.46)
		Diagonal Tensile Stress	Shear or Torsion		N/mm2	-0.78	-0.75	-0.68	-0.09	-0.63	-0.69	-0.33	< 1.85
			Shear and Torsion		N/mm2	-0.98	-1.64	-1.36	-0.22	-1.43	-1.58	-0.59	< 2.35
	Ultimate	Mean Shear Stress			N/mm2	0.75	2.41	2.28	0.81	2.24	2.41	0.74	< 4.65
		Compressive Fracture of Web	Sh		KN	1,780	8,448	8,063	1,918	7,883	8,499	1,756	
			Suc		KN	11,075	15,610	15,661	11,075	15,588	15,678	11,105	
			Safety (F=Suc/Sh)			6.22	1.85	1.94	1.94	1.98	1.84	6.32	> 1.0
		Diagonal Tensile Fracture	Sh		KN	1,780	8,448	8,063	1,918	7,883	8,499	1,756	
			Suc		KN	5,344	9,219	9,271	5,568	9,368	9,321	5,389	
			Safety (F=Suc/Sh)			3.00	1.09	1.15	2.90	1.19	1.19	3.07	> 1.0
PC Tendons Arrangement					nos.	16							
Re-bar Arrangement		Longitudinal Re-bar	Upper side of Slab			D13@250							
			Gider bottom	2nd Layer		D25-4 nos.	---	---	---	D25-8 nos.	D25-8 nos.	---	
				1st Layer		D25-8 nos.	D19-8 nos.	D19-8 nos.	D19-8 nos.	D25-8 nos.	D25-8 nos.	D25-8 nos.	
		St irrup				D19@ 250	D25@ 125	D25@ 125	D19@ 250	D25@ 125	D25@ 125	D19@ 250	

Summary of Reaction for Bearing Shoe Design

			MERAK					BALARAJA		NAGREG		PETERONGAN		TANGGULANGIN		GEBANG	
			P4(L)	P4(R)	P8(L)	PB3(L)	P13(R)	P3(L)	P6(R)	P4(L)	P8(R)	P4(L)	P7(R)	P2(L)	P6(R)	P4(L)	P12(R)
Reaction (KN)	Self Weight		799	796	808	830	1,118	1,572	1,547	1,564	1,530	1,571	1,530	1,549	1,559	1,084	1,067
	Superimposed dead Load		237	278	279	244	302	394	391	390	379	390	391	379	395	287	287
	D (Total of Dead Load)		1,036	1,074	1,087	1,074	1,420	1,966	1,938	1,954	1,909	1,961	1,921	1,928	1,954	1,371	1,354
	L (Live Load)	MAX	721	722	722	734	1,129	1,392	1,389	1,387	1,374	1,393	1,398	1,384	1,399	985	983
		MIN	-68	-70	-70	-71	-113	-151	-149	-150	-150	-156	-157	-160	-156	-113	-113
	D + L	MAX	1,757	1,796	1,809	1,808	2,549	3,358	3,327	3,341	3,283	3,354	3,319	3,312	3,353	2,356	2,337
		MIN	968	1,004	1,017	1,003	1,307	1,815	1,789	1,804	1,759	1,805	1,764	1,768	1,798	1,258	1,241
	T (Temperature Effect)	MAX	51	49	49	47	67	85	93	93	96	90	92	92	82	68	68
		MIN	-9	-6	-6	-6	-4	-6	-10	-10	-6	-7	-9	-4	-4	-4	-4
	D + L + T	MAX	1,808	1,845	1,858	1,855	2,616	3,443	3,420	3,434	3,379	3,444	3,411	3,404	3,435	2,424	2,405
		MIN	959	998	1,011	997	1,303	1,809	1,779	1,794	1,753	1,798	1,755	1,764	1,794	1,254	1,237
	EQ (Earthquake)	→	63	-95	94	70	-29	97	-78	84	-15	65	-72	13	-90	70	-68
		←	-63	95	-94	-70	30	-97	77	-85	14	-64	73	-14	90	-69	67
	D + EQ	→	1,099	979	1,181	1,144	1,391	2,063	1,860	2,038	1,894	2,026	1,849	1,941	1,864	1,441	1,286
		←	973	1,169	993	1,004	1,450	1,869	2,015	1,869	1,923	1,897	1,994	1,914	2,044	1,302	1,421
	Design Reaction of each Flyover for Bearing shoe	MAX	904	923	929	928	1,308	1,722	1,710	1,717	1,690	1,722	1,706	1,702	1,718	1,212	1,203
		MIN	480	499	506	499	652	905	890	897	877	899	878	882	897	627	619
	Design Reaction for Bearing shoe	MAX	**929**				**1,308**	**1,722**								**1,212**	
		MIN	**480**				**652**	**877**								**619**	
Displacement (mm)	Superimposed dead Load		0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
	Creep and Shrinkage		17	13	14	14	22	18	21	22	13	23	24	14	17	22	22
	Live Load		-1	-1	-1	-1	-4	-3	-2	-3	-4	-3	-2	-4	-4	-3	-3
	Temperature Effect		-5	-4	-4	-4	-6	-5	-4	-7	-3	-6	-8	-3	-5	-7	-7
	Earthquake		± 24	± 35	± 35	± 26	± 11	± 36	± 36	± 39	± 30	± 44	± 45	± 42	± 50	± 94	± 89