EARTHQUAKE RECONSTRUCTION AND REHABILITATION AUTHORITY (ERRA)
THE ISLAMIC REPUBLIC OF PAKISTAN

No.

URGENT REHABILITATION PROJECT: WEST BANK BYPASS DESIGN

UNDER

THE URGENT DEVELOPMENT STUDY ON REHABILITATION AND RECONSTRUCTION IN MUZAFFARABAD CITY

IN

THE ISLAMIC REPUBLIC OF PAKISTAN

FINAL REPORT

Appendix C:

Structural Calculation (Naluchi Bridge)

MARCH 2008

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

SD
JR
08-014

APPENDIX C
Table of Contents

Design Calculation of Superstructure

1. DESIGN CRITERIA

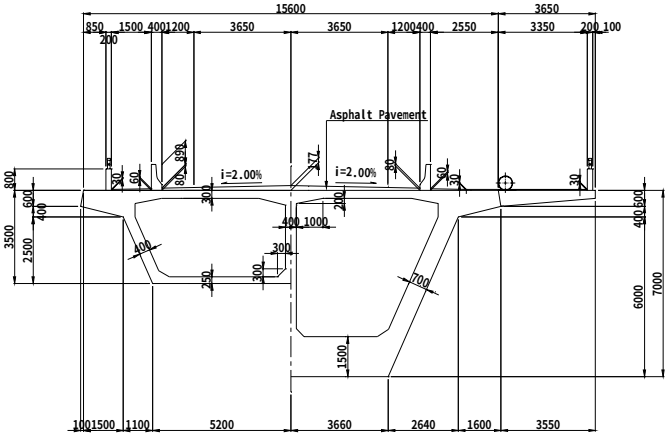
1.1 Design Criteria

Design Criteria of East Side Approach Bridge are shown as follows.

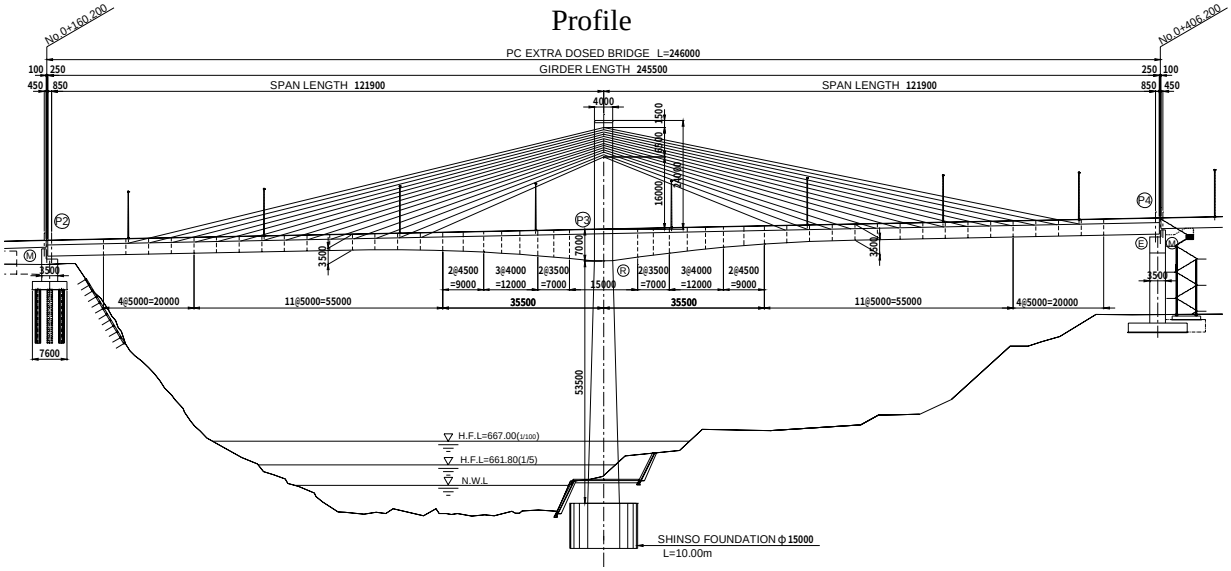
Superstructure	: 2Spans Continuous Extra Dosed PC-Box Girder
Bridge Length	: 246.000m
Girder Length	: 245.500m
Span Length	: 2@121.900
Bridge Width	: 15.600m
Effective Width	: Carriage Way 9.70m
	: Foot Way 2 x 1.50m
Live Load	: Class-A, Class-AA
Curvature	: R=∞
Gradient	: i=2.000% ↙
Super Elevation	: i = 2.000% ↙ ↘
Skew Angle	: θ = 90 deg
Support Condition	: P2 Elastmeric Support
	: P3 Rigidity Connected
	: P4 Elastmeric Support
Asphalt Pavement	: Carriage Way 80mm～
	Foot Way 30mm～

Bridge Profile

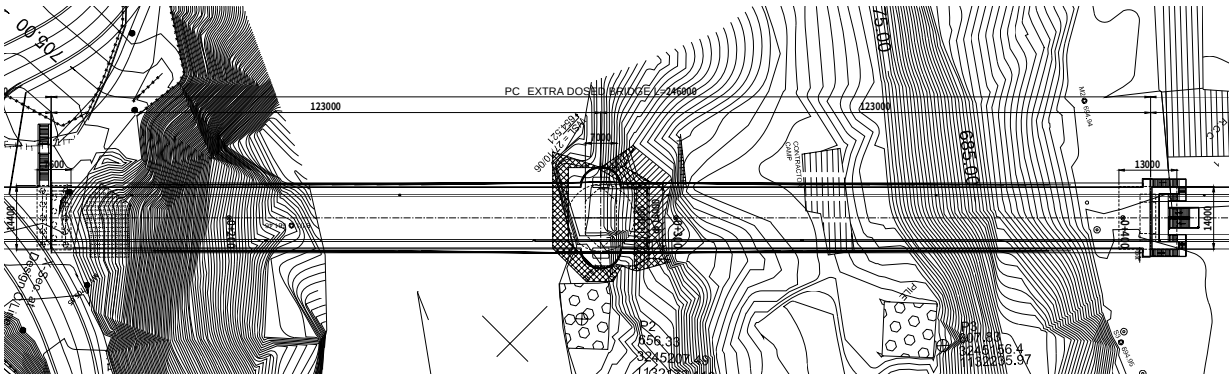
Typical Cross Section



Profile



Plan



1.2 Materials Property

1.2.1 Concrete

Table 1.3.1 Material Property of Concrete

(N/mm^2)

	PC-Box girder PC	Cross beam PC	Deck slab PC	Pylon RC
Class	D2-2	D2-2	D2-2	A3
28Days Cylinder Strength	40	40	40	40
Modulus of Elasticity	3.10×10^4	3.10×10^4	3.10×10^4	3.10×10^4
Allowable Compression Stress	16.00	16.00	16.00	16.00
Allowable Tensile Stress	-3.16	-3.16	-3.16	-
Temperature coefficient	10×10^{-6}	10×10^{-6}	10×10^{-6}	10×10^{-6}
Allowable Shear Stress	0.51	0.51	0.51	0.51

1.2.2 PC Cable

Table 1.3.2 Material Property of PC Cable

	Unit	Longitudinal 12S15.2	Transverse 4S15.2	Cross Beam 12S15.2
Ultimate Strength	N/mm^2	1860	1860	1860
Minimum Breaking Strength	kN	3128.4	1042.8	3128.4
Minimum Yeild Strength	kN	2815.6	938.5	2815.6
Friction coefficient per 1 meter	1/m	0.0020	0.0020	0.0020
Friction coefficient per 1 radian	1/Rad	0.250	0.250	0.250
Set Losses	mm	9	9	9
Relaxation	%	1.5	1.5	1.5
Modulus of Elasticity	$x10^5N/mm^2$	2.0	2.0	2.0
Sectional area	mm^2	1664.4	554.8	1664.4
Diameter of sheath	mm	75	65	75

1.2.3 Stay Cable

Table 1.3.3 Material Property of Stay Cable

	Unit	S1～S3 27S15.2	S4～S12 19S15.2
Ultimate Strength	N/mm^2	1860	1860
Minimum Breaking Strength	kN	7038.9	4953.3
Minimum Yeild Strength	kN	6335	4458.0
Modulus of Elasticity	$x10^5N/mm^2$	2.0	2.0
Sectional area	mm^2	3744.9	2635.3

1.2.4 Reinforcement

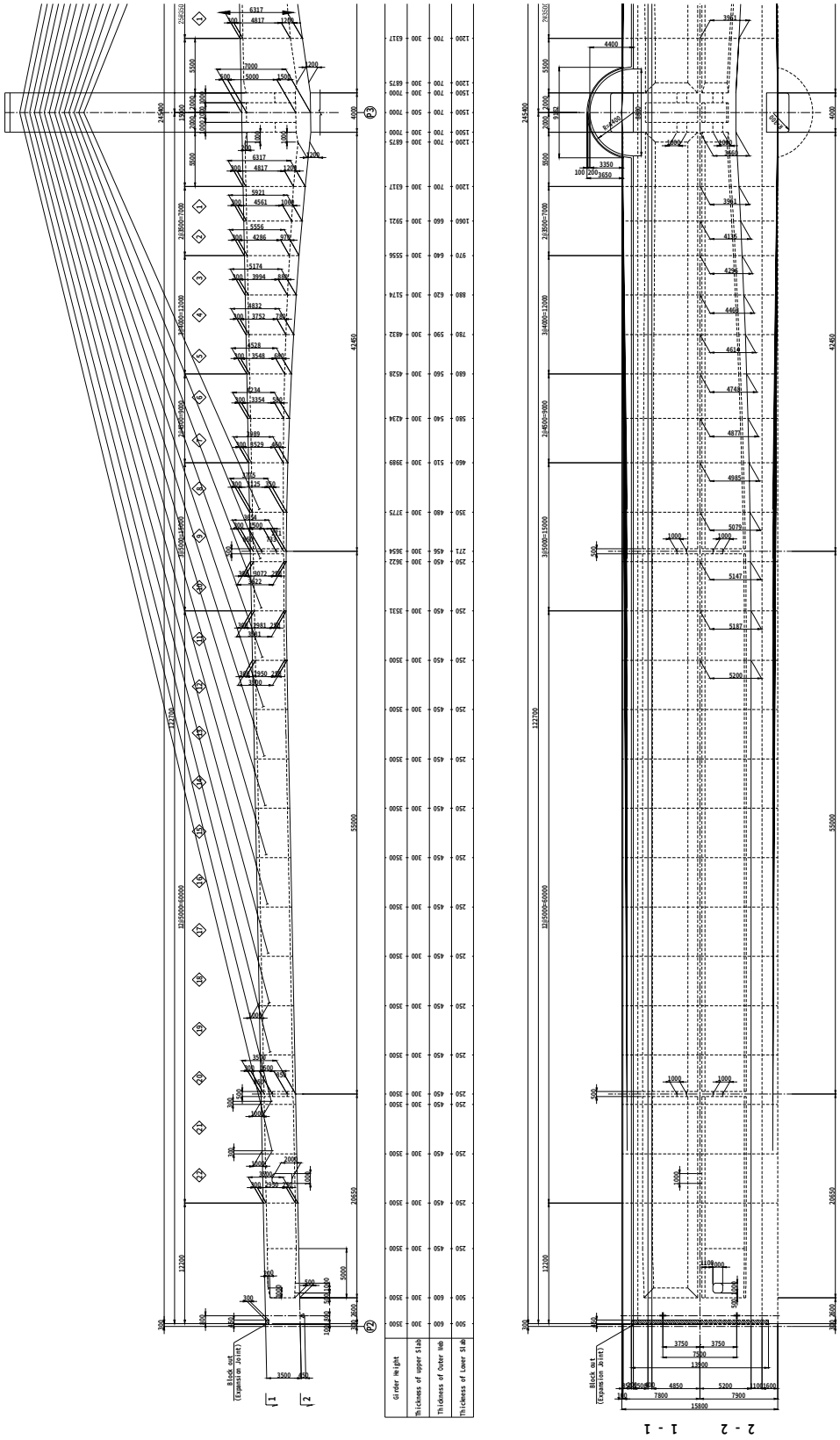
Table 1.3.4 Material Property of Reinforcement

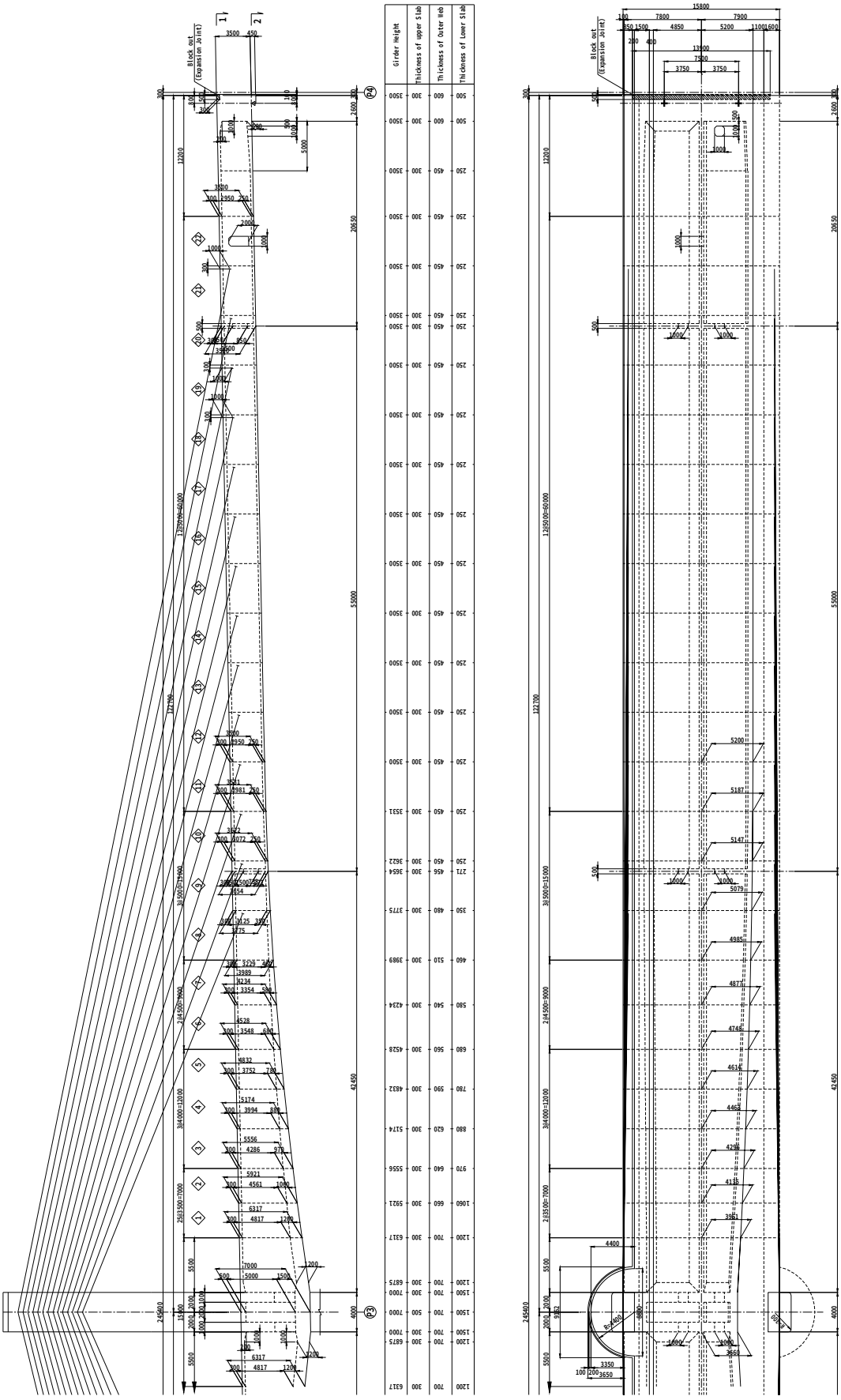
(N/mm^2)

Yield strength	420
Modulus of Elasticity ($\times10^5$)	2.0
Allowable Tensile Stress	168

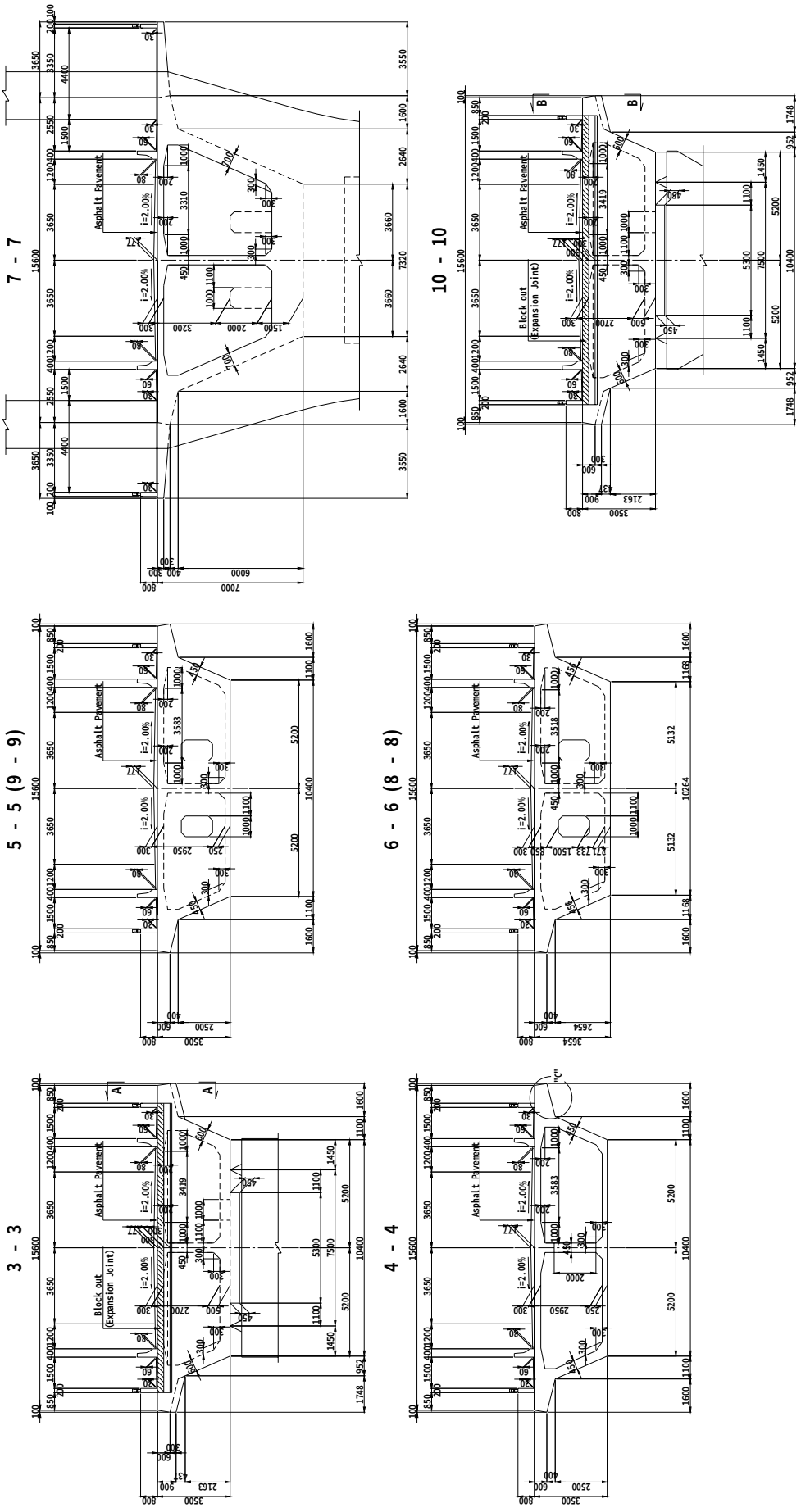
2. DESIGN CALCULATION OF SUPERSTRUCTURE

2.1 General Arrangement of Superstructure





Naluchi Superstructure-5


7 - 7
10 - 10
5 - 5 (9 - 9)
6 - 6 (8 - 8)
3 - 3
4 - 4
Asphalt Pavement
Block out
(Expansion Joint)
i=2.00%

2.2 Analysis Model

Analysis model for Superstructure design which consideration as plane flame model shown as follows.

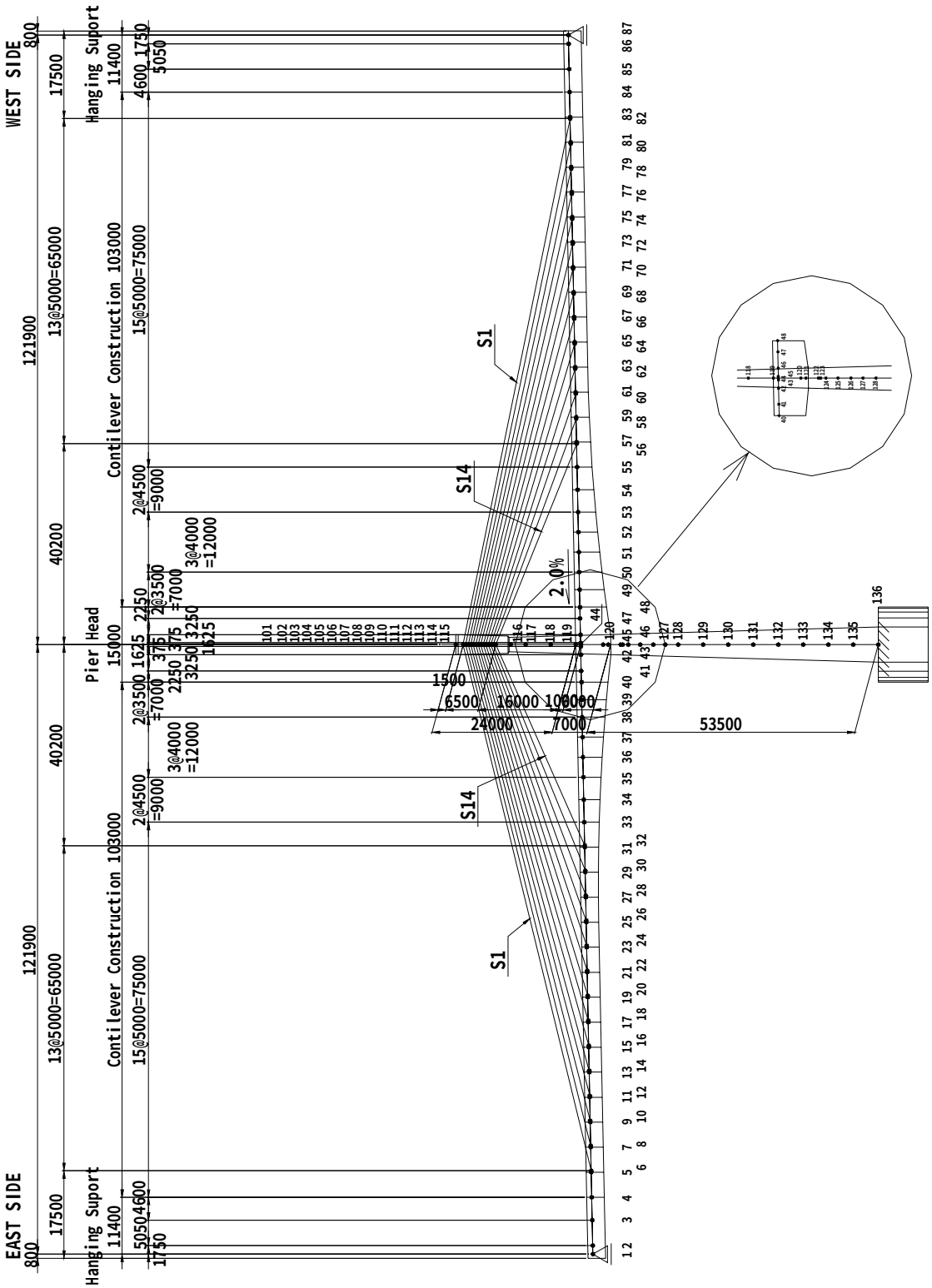


Figure 2.2.1 Analysis Frame Model

2.3 Loadings

2.3.1 Dead Load

(1) Unit Weight

Unit weight for calculate dead load that should be taken as following value.

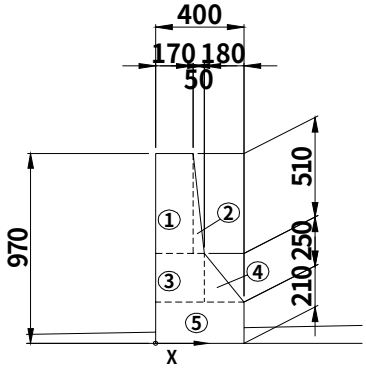
Reinforced Concrete	24.5N/m^3
Plain Concrete	23.0N/m^3
Structural Steel	77.0N/m^3
Asphalt Pavement	22.5N/m^3

(2) Self-weight of Girder

The self-weight of girder calculate according to section area, the software for design calculation that calculate girder self-weight automatically used input data.

(3) Surfacing

a. Parapet of Carriage Way



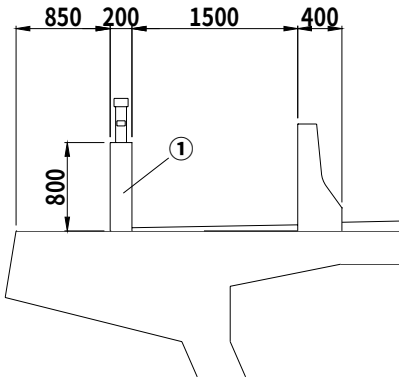
	A	X
①	0.170×0.510×1.0=0.087	0.085
②	0.050×0.510×0.5=0.013	0.187
③	0.220×0.250×1.0=0.055	0.110
④	0.180×0.250×0.5=0.023	0.280
⑤	0.400×0.210×1.0=0.084	0.200
Total	0.261	

$X = \sum AX / \sum A =$ 0.146 m

$P = 0.261 \times 24.5 =$ 6.395 kN/m

b. Parapet of Foot Way

Concrete barrier



	A	X	AX
①	0.200×0.800×1.0=0.160	0.100	0.01600
Total	0.160		0.01600

X = ∑ AX/∑ A = 0.1 m

P = 0.160 × 24.5 = 3.92 kN/m

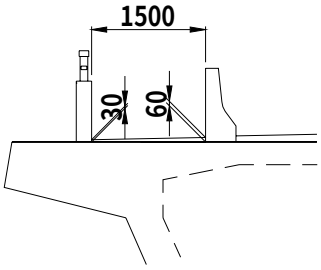
M = 0.100 × 3.920 = 0.392 kN・m/m

Steel Railing

W= 0.300kN/m

c. Asphalt Pavement

Foot Way (t=30mm~60mm)



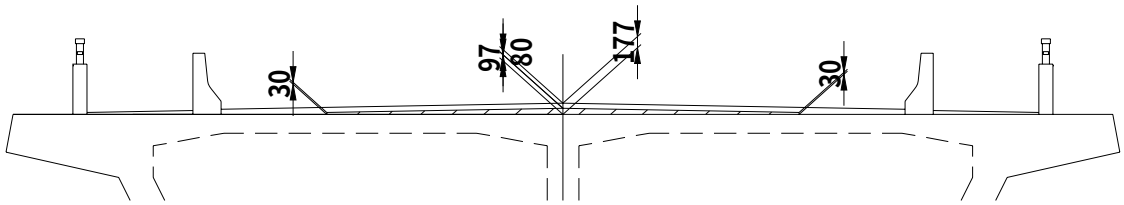
W = 0.03 × 22.5 = 0.675 kN/m^2

W = 0.06 × 22.5= 1.35 kN/m^2

Carriage Way (t=80mm)

W = 0.08 × 22.5 = 1.800 kN/m^2

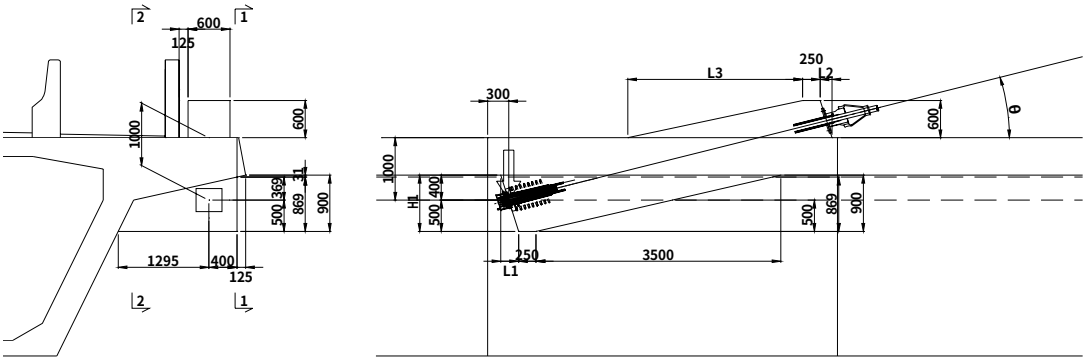
d. Leveling Concrete



W = 0.03 × 23.0 = 0.69 kN/m 2

W = 0.097 × 23.0 = 2.231 kN/m 2

e. Anchorage of Stay Cable

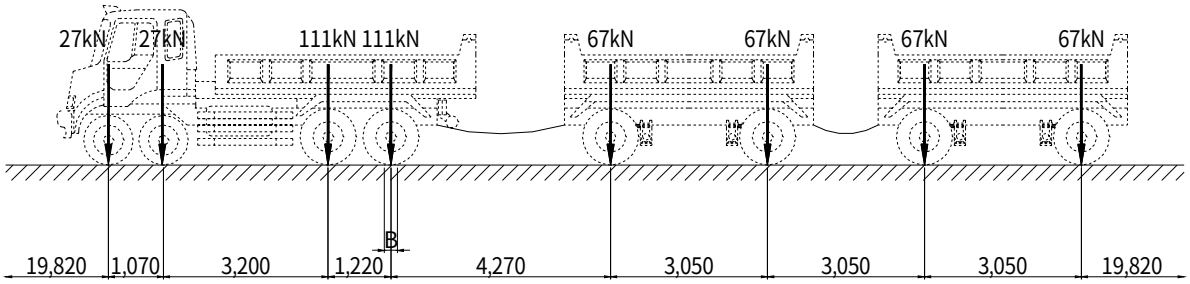


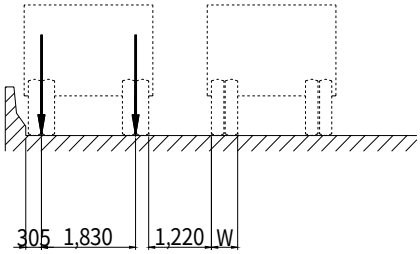
				S1	S2	S3	S4	S5	S6	S7
Angle of Stay Cable			θ(°)	12.588	12.923	13.293	13.702	14.158	14.668	15.243
Lower side Anchorage	1-1 Section	L1(m)		0.890	0.892	0.893	0.894	0.896	0.898	0.901
		Area	A1(m^2)	2.072	2.073	2.073	2.073	2.074	2.075	2.076
	2-2 Section	L1(m)		0.512	0.513	0.514	0.515	0.516	0.517	0.518
		Area	A2(m^2)	0.739	0.739	0.740	0.740	0.740	0.740	0.741
	Concrete Volume		Vl(m^3)	2.154	2.155	2.156	2.156	2.157	2.157	2.159
	Weight of Anchorage		Wl(kN)	52.773	52.798	52.822	52.822	52.847	52.847	52.896
Upper side Anchorage	L2(m)			0.615	0.616	0.617	0.618	0.619	0.620	0.622
	L3(m)			2.500	2.500	2.500	2.500	2.500	2.500	2.500
	Area		Au(m^2)	1.085	1.085	1.085	1.085	1.086	1.086	1.087
	Concrete Volume		Vu(m^3)	0.651	0.651	0.651	0.651	0.652	0.652	0.652
	Weight of Anchorage		Wu(kN)	15.950	15.950	15.950	15.950	15.974	15.974	15.974
Total Weight of Anchorage			W(kN)	68.723	68.747	68.772	68.772	68.821	68.821	68.870

				S8	S9	S10	S11	S12	S13	S14
Angle of Stay Cable			θ(°)	15.897	16.645	17.510	18.522	19.720	21.158	22.916
Lower side Anchorage	1-1 Section	L1(m)		0.904	0.907	0.911	0.916	0.923	0.932	0.943
		Area	A1(m^2)	2.078	2.079	2.081	2.083	2.086	2.090	2.095
	2-2 Section	L1(m)		0.520	0.522	0.524	0.527	0.531	0.536	0.543
		Area	A2(m^2)	0.741	0.742	0.742	0.743	0.744	0.745	0.747
	Concrete Volume		Vl(m^3)	2.161	2.162	2.164	2.166	2.169	2.173	2.178
	Weight of Anchorage		Wl(kN)	52.945	52.969	53.018	53.067	53.141	53.239	53.361
Upper side Anchorage	L2(m)			0.624	0.626	0.629	0.633	0.637	0.643	0.651
	L3(m)			2.500	2.500	2.000	2.000	2.000	2.000	2.000
	Area		Au(m^2)	1.087	1.088	0.939	0.940	0.941	0.943	0.945
	Concrete Volume		Vu(m^3)	0.652	0.653	0.563	0.564	0.565	0.566	0.567
	Weight of Anchorage		Wu(kN)	15.974	15.999	13.794	13.818	13.843	13.867	13.892
Total Weight of Anchorage			W(kN)	68.919	68.968	66.812	66.885	66.983	67.106	67.253

2.3.2 Live Load

a. Class-A Loading





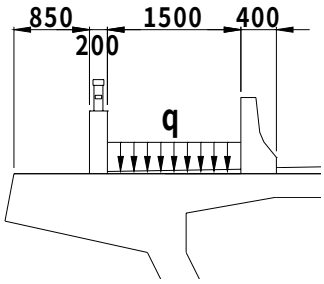
Class of Loading	Axle Load	Ground Contact Area	
		B	W
	kN	mm	mm
A	111	254	508
	67	203	381
	27	152	203

b. Impact Factor

i= 15.24/(L+38) L: Span Length (m)

	Span(m)	Impact
P2～P3	121.900	0.095
P3～P4	121.900	0.095

c. Foot Way Loading

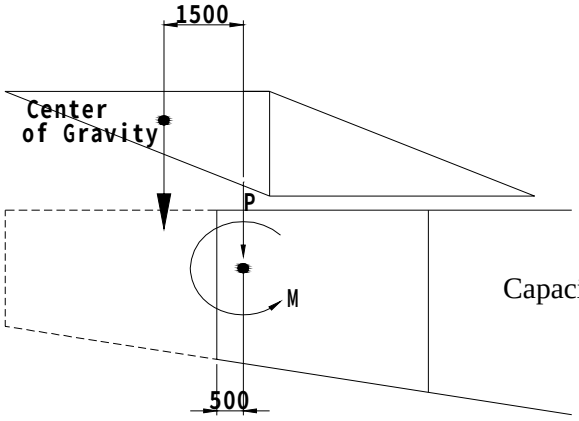


q: Foot way loading (Pa)
L: Loaded Length(m)
W: Sidewalk Width(m)

$q = (1435 + 43800 / L) \times (16.7 - W) / 15.2$

	Span(m)	W(m)	q(kN/m^2)
P2～P3	121.900	1.500	1.79
P3～P4	121.900	1.500	1.79

2.3.3 Design Loading of Traveler



Capacity of Moment : 650 tf.m

Traveller Weight	P=		1300	kN
Moment	M=	1.5xP=	1950	kNm

2.3.4 Calculation Sequence

In this bridge, structure changes in each stage of construction. Therefore, it is necessary to perform the check of safety in the structure form in each construction stage.

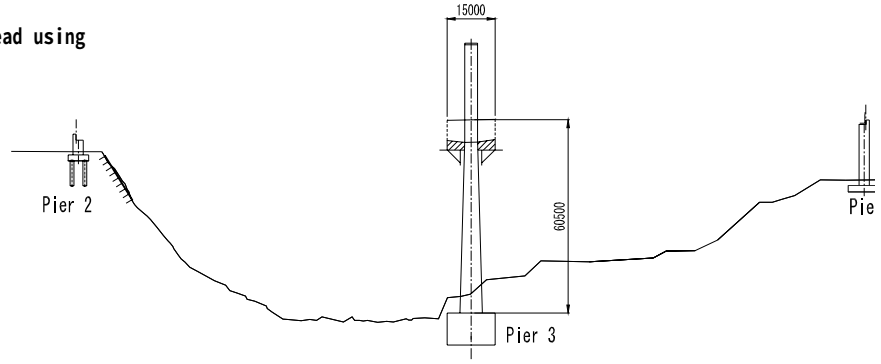
The construction step of this bridge and the material age of concrete are shown below.

Step	Days	Amount Days	Description
STEP-1	90	90	Construct Capital at P3 Pier
STEP-2	15	105	Set Traveler
STEP-3	13	118	Construct Block-1 and Pre-stressing
STEP-4	3	121	Moving Traveler
STEP-5	13	134	Construct Block-2 and Pre-stressing
STEP-6	3	137	Moving Traveler
STEP-7	13	150	Construct Block-3 and Pre-stressing
STEP-8	3	153	Moving Traveler
STEP-9	13	166	Construct Block-4 and Pre-stressing
STEP-10	3	169	Moving Traveler
STEP-11	13	182	Construct Block-5 and Pre-stressing
STEP-12	3	185	Moving Traveler
STEP-13	13	198	Construct Block-6 and Pre-stressing
STEP-14	3	201	Moving Traveler
STEP-15	13	214	Construct Block-7 and Pre-stressing
STEP-16	3	217	Moving Traveler
STEP-17	13	230	Construct Block-8 and Pre-stressing

Step	Days	Amount Days	Description
STEP-18	3	233	Pre-stressing Stay Cable - S14
STEP-19	3	236	Moving Traveler
STEP-20	13	249	Construct Block-9 and Pre-stressing
STEP-21	3	252	Pre-stressing Stay Cable - S13
STEP-22	3	255	Moving Traveler
STEP-23	13	268	Construct Block-10 and Pre-stressing
STEP-24	3	271	Pre-stressing Stay Cable - S12
STEP-25	3	274	Moving Traveler
STEP-26	13	287	Construct Block-11 and Pre-stressing
STEP-27	3	290	Pre-stressing Stay Cable - S11
STEP-28	3	293	Moving Traveler
STEP-29	13	306	Construct Block-12 and Pre-stressing
STEP-30	3	309	Pre-stressing Stay Cable - S10
STEP-31	3	312	Moving Traveler
STEP-32	13	325	Construct Block-13 and Pre-stressing
STEP-33	3	328	Pre-stressing Stay Cable - S9
STEP-34	3	331	Moving Traveler
STEP-35	13	344	Construct Block-14 and Pre-stressing
STEP-36	3	347	Pre-stressing Stay Cable - S8
STEP-37	3	350	Moving Traveler
STEP-38	13	363	Construct Block-15 and Pre-stressing
STEP-39	3	366	Pre-stressing Stay Cable - S7
STEP-40	3	369	Moving Traveler
STEP-41	13	382	Construct Block-16 and Pre-stressing
STEP-42	3	385	Pre-stressing Stay Cable - S6
STEP-43	3	388	Moving Traveler
STEP-44	13	401	Construct Block-17 and Pre-stressing
STEP-45	3	404	Pre-stressing Stay Cable - S5
STEP-46	3	407	Moving Traveler
STEP-47	13	420	Construct Block-18 and Pre-stressing
STEP-48	3	423	Pre-stressing Stay Cable - S4
STEP-49	3	426	Moving Traveler
STEP-50	13	439	Construct Block-19 and Pre-stressing
STEP-51	3	442	Pre-stressing Stay Cable - S3
STEP-52	3	445	Moving Traveler
STEP-53	13	458	Construct Block-20 and Pre-stressing
STEP-54	3	461	Pre-stressing Stay Cable - S2
STEP-55	3	464	Moving Traveler
STEP-56	13	477	Construct Block-21 and Pre-stressing
STEP-57	3	480	Pre-stressing Stay Cable - S1
STEP-58	3	483	Moving Traveler
STEP-59	13	496	Construct Block-22 and Pre-stressing
STEP-60	15	511	Removing Traveler
STEP-61	30	541	Set Hanging Support
STEP-62	3	544	Pre-stressing Side Span Cable
STEP-63	15	559	Remove Hanging Support
STEP-64	90	649	Surfacing

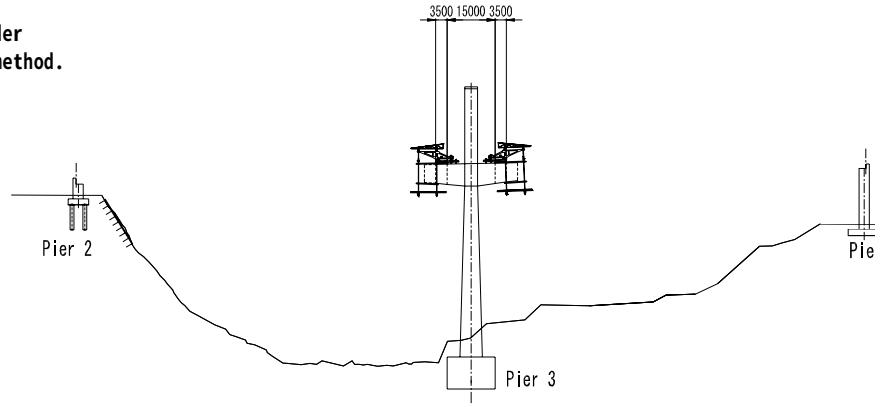
STEP-1 : Construct of Pier-3

- **Construction of Shinso Foundation**
- **Construction of Pier-3**
- **Construction of Pier Head using cantilever support**



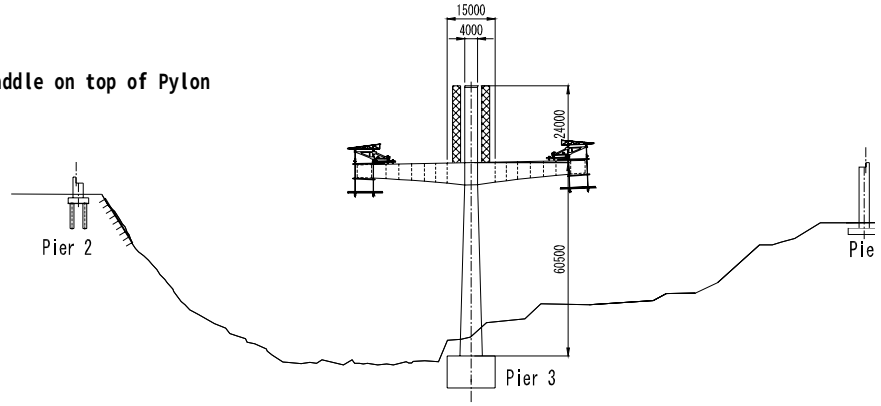
STEP-2 : Erection of Traveller Form

- **Set up of Travelling Form (Capacity 600tfm)**
- **Construction of PC Girder by Blanced Cantilever method.**



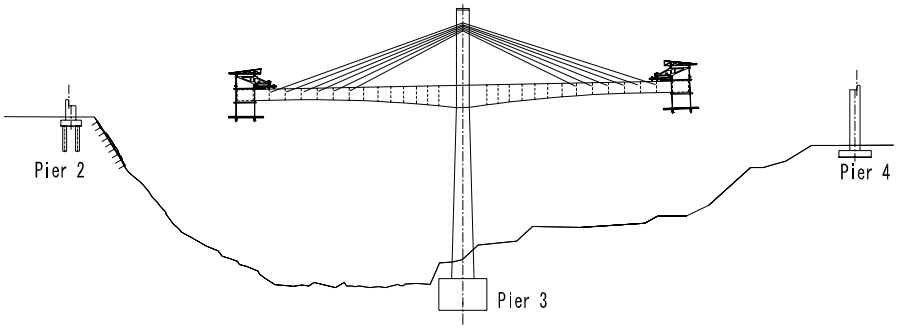
STAGE-3～12 : Construction of Pylon

- **Construction of PC girder by Blanced Cantilever method,simultaneously construction of Pylon**
- **Installation of Steel Saddle on top of Pylon**



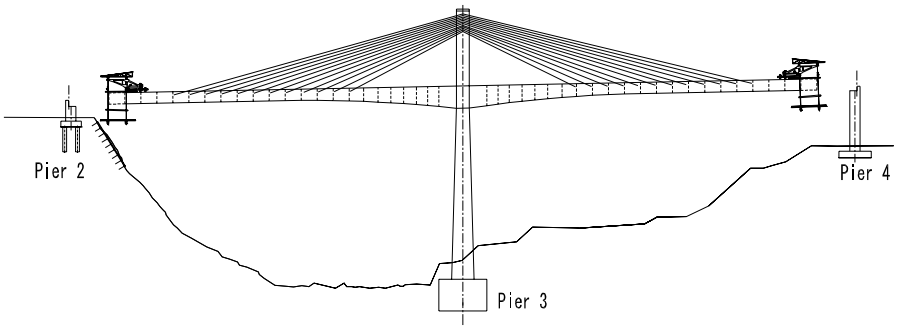
STAGE-13～59 : Constion P.C. Box Girder by Balanced cantilever works and stay cable installation

- **Construction of P.C. Box Girder**
- **Installation of Stay Cable**



STAGE-60～61 : Balanced cantilever works and installation of span cables.

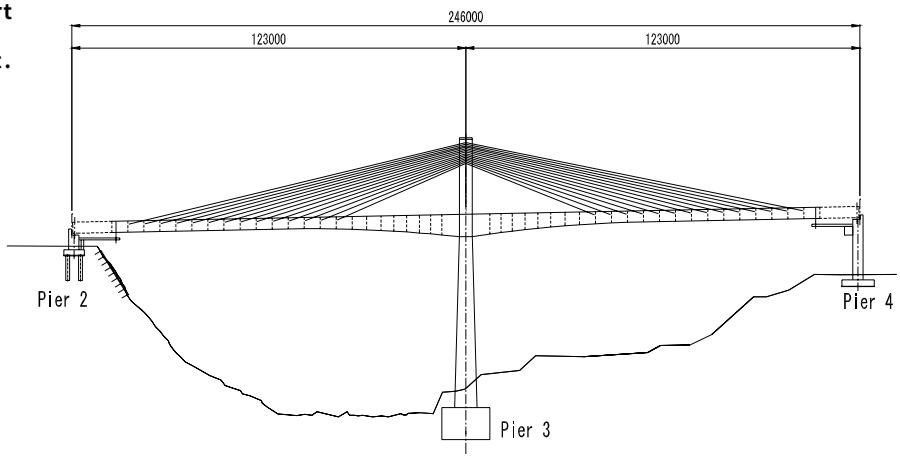
- **Removal of Travelling Form**



TAGE-62～63 : Election of suspended scaffolding and completion of P.C. girder.

Set up of Suspension Support

Construction of End Segment.



2.4 Calculation Result of Sectional Force

2.4.1 List of Sectional Force per Each Section

Membar No.	Joint No.	Self-Weight (D)			Surfacing (D)			Secondary Force by Pre-stress (D)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
1-i	1	-101	3410	68	0	2083	42	0	-269	-5
1-j	2	5233	2684	54	3547	1971	39	-470	-269	-5
2-i	2	5233	2684	54	3547	1971	39	-470	-269	-5
2-j	3	13792	805	16	12602	1651	33	-1813	-269	-5
3-i	3	13792	805	16	12602	1651	33	-1813	-269	-5
3-j	4	13932	-743	-15	19519	1356	27	-3049	-269	-5
4-i	4	13932	-743	-15	19519	1356	27	-3049	-269	-5
4-j	5	6006	-2426	-49	25501	1036	21	-4392	-269	-5
5-i	5	6006	-2426	-49	25501	1036	21	-4392	-269	-5
5-j	6	5263	-2527	-51	25809	1017	20	-4472	-269	-5
6-i	6	5264	-716	8403	25809	1048	158	-4472	-336	-308
6-j	7	-1822	-2298	8371	30027	747	152	-6051	-336	-308
7-i	7	-1822	-2298	8371	30027	747	152	-6051	-336	-308
7-j	8	-2527	-2399	8369	30248	728	152	-6151	-336	-308
8-i	8	-2527	-907	16825	30248	770	336	-6151	-420	-675
8-j	9	-10507	-2488	16793	33160	469	330	-8125	-420	-675
9-i	9	-10507	-2488	16793	33160	469	330	-8125	-420	-675
9-j	10	-11268	-2589	16791	33298	450	330	-8251	-420	-675
10-i	10	-11268	-663	25276	33297	504	561	-8251	-521	-1105
10-j	11	-18103	-2245	25244	34960	203	555	-10699	-521	-1105
11-i	11	-18103	-2245	25244	34960	203	555	-10699	-521	-1105
11-j	12	-18791	-2346	25242	35019	184	555	-10855	-521	-1105
12-i	12	-18791	-369	33672	35018	251	832	-10855	-639	-1592
12-j	13	-24244	-1951	33640	35493	-49	826	-13858	-639	-1592
13-i	13	-24244	-1951	33640	35493	-49	826	-13858	-639	-1592
13-j	14	-24844	-2052	33638	35475	-69	825	-14050	-639	-1592
14-i	14	-24844	-2	42080	35475	12	1145	-14050	-774	-2131
14-j	15	-28569	-1583	42048	34823	-289	1139	-17690	-774	-2131
15-i	15	-28569	-1583	42048	34823	-289	1139	-17690	-774	-2131
15-j	16	-29060	-1684	42046	34733	-308	1139	-17922	-774	-2131
16-i	16	-29059	415	50371	34733	-214	1500	-17922	-927	-2718
16-j	17	-30828	-1167	50340	33018	-515	1494	-22281	-927	-2718
17-i	17	-30828	-1167	50340	33018	-515	1494	-22281	-927	-2718
17-j	18	-31193	-1268	50338	32861	-534	1493	-22559	-927	-2718
18-i	18	-31193	882	58526	32860	-427	1890	-22559	-1097	-3345
18-j	19	-30763	-699	58495	30147	-728	1884	-27716	-1097	-3345
19-i	19	-30763	-699	58495	30147	-728	1884	-27716	-1097	-3345
19-j	20	-30988	-800	58493	29926	-747	1884	-28045	-1097	-3345
20-i	20	-30987	768	64274	29926	-661	2187	-28046	-1229	-3813
20-j	21	-31095	-814	64242	26112	-962	2181	-33825	-1229	-3813
21-i	21	-31095	-814	64242	26112	-962	2181	-33825	-1229	-3813
21-j	22	-31354	-915	64240	25820	-981	2180	-34194	-1229	-3813
22-i	22	-31354	726	69994	25820	-886	2501	-34194	-1375	-4301
22-j	23	-31656	-855	69963	20949	-1187	2495	-40656	-1375	-4301
23-i	23	-31656	-855	69963	20949	-1187	2495	-40656	-1375	-4301
23-j	24	-31928	-956	69961	20590	-1206	2494	-41068	-1375	-4301
24-i	24	-31928	762	75662	20590	-1101	2828	-41068	-1533	-4807
24-j	25	-32062	-819	75631	14706	-1402	2822	-48275	-1533	-4807
25-i	25	-32062	-819	75631	14706	-1402	2822	-48275	-1533	-4807
25-j	26	-32323	-920	75629	14282	-1421	2821	-48735	-1533	-4807
26-i	26	-32322	886	81257	14282	-1308	3161	-48735	-1706	-5326
26-j	27	-31881	-699	81225	7425	-1609	3155	-56754	-1706	-5326

Membar No.	Joint No.	Self-Weight (D)			Surfacing (D)			Secondary Force by Pre-stress (D)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
27-i	27	-31881	-699	81225	7425	-1609	3155	-56754	-1706	-5326
27-j	28	-32106	-800	81223	6939	-1628	3154	-57266	-1706	-5326
28-i	28	-32106	1170	86948	6939	-1507	3494	-57266	-1893	-5853
28-j	29	-30342	-422	86916	-854	-1808	3488	-66167	-1893	-5853
29-i	29	-30342	-422	86916	-854	-1808	3488	-66167	-1893	-5853
29-j	30	-30484	-525	86914	-1400	-1827	3488	-66735	-1893	-5853
30-i	30	-30484	1179	92523	-1400	-1700	3820	-66735	-2096	-6382
30-j	31	-28830	-499	92490	-10097	-2001	3814	-76591	-2096	-6382
31-i	31	-28830	-499	92490	-10097	-2001	3814	-76591	-2096	-6382
31-j	32	-28996	-610	92487	-10701	-2020	3814	-77220	-2096	-6382
32-i	32	-28996	1640	98016	-10700	-1886	4132	-77220	-2316	-6905
32-j	33	-25541	-196	97979	-20275	-2187	4126	-88106	-2316	-6905
33-i	33	-25541	-196	97979	-20275	-2187	4126	-88106	-2316	-6905
33-j	34	-30670	-2112	97941	-29538	-2443	4121	-98529	-2316	-6905
34-i	34	-30670	-2112	97941	-29538	-2443	4121	-98529	-2316	-6905
34-j	35	-44789	-4186	97900	-39825	-2699	4116	-108952	-2316	-6905
35-i	35	-44789	-4186	97900	-39825	-2699	4116	-108952	-2316	-6905
35-j	36	-65447	-6163	97860	-51136	-2955	4110	-118217	-2316	-6905
36-i	36	-65447	-6163	97860	-51136	-2955	4110	-118217	-2316	-6905
36-j	37	-94290	-8278	97818	-63471	-3211	4105	-127481	-2316	-6905
37-i	37	-94290	-8278	97818	-63471	-3211	4105	-127481	-2316	-6905
37-j	38	-131861	-10524	97773	-76831	-3467	4100	-136746	-2316	-6905
38-i	38	-131861	-10524	97773	-76831	-3467	4100	-136746	-2316	-6905
38-j	39	-172298	-12596	97731	-91215	-3723	4095	-144853	-2316	-6905
39-i	39	-172298	-12596	97731	-91215	-3723	4095	-144853	-2316	-6905
39-j	40	-220200	-14797	97687	-106623	-3979	4090	-152959	-2316	-6905
40-i	40	-220200	-14797	97687	-106623	-3979	4090	-152959	-2316	-6905
40-j	41	-255151	-16267	97658	-115740	-4123	4087	-158171	-2316	-6905
41-i	41	-255151	-16267	97658	-115740	-4123	4087	-158171	-2316	-6905
41-j	42	-311513	-18416	97615	-129481	-4331	4083	-165699	-2316	-6905
42-i	42	-311513	-19590	97592	-129481	-4331	4083	-165699	-2316	-6905
42-j	43	-344233	-20672	97570	-136605	-4435	4081	-169462	-2316	-6905
43-i	43	-344233	-20672	97570	-136605	-4435	4081	-169462	-2316	-6905
43-j	44	-352033	-20922	97565	-138273	-4459	4080	-170331	-2316	-6905
44-i	44	-348447	20896	98574	-137817	4448	4289	-171076	2329	-6855
44-j	45	-340656	20646	98569	-136153	4424	4289	-170203	2329	-6855
45-i	45	-340656	20646	98569	-136153	4424	4289	-170203	2329	-6855
45-j	46	-307979	19564	98547	-129047	4320	4287	-166418	2329	-6855
46-i	46	-307979	18390	98524	-129047	4320	4287	-166418	2329	-6855
46-j	47	-251701	16241	98481	-115341	4112	4283	-158847	2329	-6855
47-i	47	-251701	16241	98481	-115341	4112	4283	-158847	2329	-6855
47-j	48	-216809	14770	98451	-106249	3968	4280	-153606	2329	-6855
48-i	48	-216809	14770	98451	-106249	3968	4280	-153606	2329	-6855
48-j	49	-168998	12570	98407	-90885	3712	4275	-145453	2329	-6855
49-i	49	-168998	12570	98407	-90885	3712	4275	-145453	2329	-6855
49-j	50	-128652	10498	98366	-76545	3456	4269	-137300	2329	-6855
50-i	50	-128652	10498	98366	-76545	3456	4269	-137300	2329	-6855
50-j	51	-91185	8252	98321	-63229	3200	4264	-127983	2329	-6855
51-i	51	-91185	8252	98321	-63229	3200	4264	-127983	2329	-6855
51-j	52	-62446	6137	98279	-50938	2944	4259	-118665	2329	-6855
52-i	52	-62446	6137	98279	-50938	2944	4259	-118665	2329	-6855
52-j	53	-41892	4160	98239	-39670	2688	4254	-109348	2329	-6855
53-i	53	-41892	4160	98239	-39670	2688	4254	-109348	2329	-6855
53-j	54	-27890	2086	98198	-29427	2432	4249	-98866	2329	-6855

Membar No.	Joint No.	Self-Weight (D)			Surfacing (D)			Secondary Force by Pre-stress (D)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
54-i	54	-27890	2086	98198	-29427	2432	4249	-98866	2329	-6855
54-j	55	-22879	170	98159	-20209	2176	4244	-88383	2329	-6855
55-i	55	-22879	170	98159	-20209	2176	4244	-88383	2329	-6855
55-j	56	-26456	-1666	98123	-10685	1875	4238	-77435	2329	-6855
56-i	56	-26457	573	92710	-10685	2011	3919	-77435	2107	-6335
56-j	57	-26301	461	92708	-10085	1992	3918	-76803	2107	-6335
57-i	57	-26301	461	92708	-10085	1992	3918	-76803	2107	-6335
57-j	58	-28131	-1216	92674	-1426	1691	3912	-66897	2107	-6335
58-i	58	-28131	480	87152	-1426	1821	3579	-66897	1902	-5809
58-j	59	-28003	378	87150	-882	1802	3579	-66326	1902	-5809
59-i	59	-28003	378	87150	-882	1802	3579	-66326	1902	-5809
59-j	60	-29976	-1215	87118	6883	1501	3573	-57384	1902	-5809
60-i	60	-29977	751	81484	6883	1624	3232	-57384	1713	-5284
60-j	61	-29767	649	81482	7368	1605	3232	-56870	1713	-5284
61-i	61	-29767	649	81482	7368	1605	3232	-56870	1713	-5284
61-j	62	-30438	-935	81451	14207	1304	3226	-48818	1713	-5284
62-i	62	-30439	868	75904	14207	1419	2885	-48818	1539	-4768
62-j	63	-30193	767	75902	14629	1400	2885	-48356	1539	-4768
63-i	63	-30193	767	75902	14629	1400	2885	-48356	1539	-4768
63-j	64	-30304	-814	75870	20504	1099	2879	-41122	1539	-4768
64-i	64	-30304	903	70241	20504	1205	2545	-41122	1379	-4265
64-j	65	-30048	802	70239	20862	1186	2545	-40708	1379	-4265
65-i	65	-30048	802	70239	20862	1186	2545	-40708	1379	-4265
65-j	66	-29996	-780	70207	25730	885	2539	-34226	1379	-4265
66-i	66	-29997	861	64519	25730	981	2218	-34225	1233	-3780
66-j	67	-29753	760	64517	26022	962	2218	-33855	1233	-3780
67-i	67	-29753	760	64517	26022	962	2218	-33855	1233	-3780
67-j	68	-29896	-821	64485	29838	661	2212	-28059	1233	-3780
68-i	68	-29897	748	58764	29838	748	1910	-28059	1100	-3315
68-j	69	-29688	647	58762	30060	729	1909	-27729	1100	-3315
69-i	69	-29688	647	58762	30060	729	1909	-27729	1100	-3315
69-j	70	-30364	-935	58730	32780	428	1903	-22559	1100	-3315
70-i	70	-30365	1219	50616	32780	537	1507	-22559	929	-2691
70-j	71	-30014	1118	50614	32938	517	1507	-22280	929	-2691
71-i	71	-30014	1118	50614	32938	517	1507	-22280	929	-2691
71-j	72	-28477	-464	50582	34663	217	1501	-17913	929	-2691
72-i	72	-28477	1641	42320	34663	311	1142	-17913	775	-2107
72-j	73	-28000	1540	42318	34754	292	1142	-17680	775	-2107
73-i	73	-28000	1540	42318	34754	292	1142	-17680	775	-2107
73-j	74	-24480	-42	42287	35418	-9	1136	-14036	775	-2107
74-i	74	-24480	2015	33898	35419	72	818	-14036	639	-1570
74-j	75	-23891	1914	33896	35437	52	818	-13844	639	-1570
75-i	75	-23891	1914	33896	35437	52	818	-13844	639	-1570
75-j	76	-18609	333	33864	34976	-248	812	-10839	639	-1570
76-i	76	-18610	2318	25479	34976	-182	538	-10839	521	-1086
76-j	77	-17929	2217	25477	34919	-201	538	-10682	521	-1086
77-i	77	-17929	2217	25477	34919	-201	538	-10682	521	-1086
77-j	78	-11226	635	25445	33268	-502	532	-8235	521	-1086
78-i	78	-11226	2571	16996	33269	-448	305	-8235	419	-659
78-j	79	-10470	2470	16994	33131	-467	304	-8109	419	-659
79-i	79	-10470	2470	16994	33131	-467	304	-8109	419	-659
79-j	80	-2575	889	16963	30230	-768	298	-6138	419	-659
80-i	80	-2575	2392	8519	30230	-726	119	-6138	335	-294
80-j	81	-1872	2291	8517	30010	-745	118	-6038	335	-294

Membar No.	Joint No.	Self-Weight (D)			Surfacing (D)			Secondary Force by Pre-stress (D)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
81-i	81	-1872	2291	8517	30010	-745	118	-6038	335	-294
81-j	82	5180	709	8485	25799	-1046	112	-4462	335	-294
82-i	82	5180	2532	51	25799	-1016	-20	-4462	268	5
82-j	83	5925	2431	49	25491	-1036	-21	-4382	268	5
83-i	83	5925	2431	49	25491	-1036	-21	-4382	268	5
83-j	84	13875	748	15	19512	-1356	-27	-3042	268	5
84-i	84	13875	748	15	19512	-1356	-27	-3042	268	5
84-j	85	13758	-800	-16	12598	-1650	-33	-1809	268	5
85-i	85	13758	-800	-16	12598	-1650	-33	-1809	268	5
85-j	86	5224	-2679	-54	3546	-1970	-39	-469	268	5
86-i	86	5224	-2679	-54	3546	-1970	-39	-469	268	5
86-j	87	-101	-3405	-68	0	-2082	-42	0	268	5
101-i	101	0	0	0	0	0	0	0	0	0
101-j	102	0	0	583	0	0	0	0	0	0
102-i	102	0	54	4354	0	-4	60	0	0	-134
102-j	103	27	54	4546	-2	-4	60	0	0	-134
103-i	103	27	102	8423	-2	-7	144	0	-1	-303
103-j	104	78	102	8614	-6	-7	144	0	-1	-303
104-i	104	78	144	12615	-6	-9	253	0	-2	-505
104-j	105	150	144	12805	-10	-9	253	-1	-2	-505
105-i	105	150	179	16904	-10	-10	387	-1	-4	-742
105-j	106	239	179	17093	-15	-10	387	-4	-4	-742
106-i	106	239	207	21339	-15	-9	548	-4	-7	-1013
106-j	107	343	207	21527	-20	-9	548	-7	-7	-1013
107-i	107	343	228	25868	-20	-7	736	-7	-10	-1320
107-j	108	457	228	26055	-23	-7	736	-12	-10	-1320
108-i	108	457	240	30498	-23	-4	952	-12	-13	-1660
108-j	109	577	240	30684	-25	-4	952	-18	-13	-1660
109-i	109	577	243	33960	-25	-1	1124	-18	-16	-1926
109-j	110	699	243	34144	-26	-1	1124	-26	-16	-1926
110-i	110	698	243	37566	-26	3	1316	-26	-19	-2217
110-j	111	820	243	37749	-25	3	1316	-36	-19	-2217
111-i	111	820	239	41325	-25	7	1526	-36	-23	-2535
111-j	112	940	239	41507	-21	7	1526	-47	-23	-2535
112-i	112	940	230	45251	-21	13	1754	-47	-27	-2882
112-j	113	1055	230	45432	-15	13	1754	-61	-27	-2882
113-i	113	1055	218	49504	-15	18	1998	-61	-32	-3259
113-j	114	1164	218	49684	-5	18	1998	-77	-32	-3259
114-i	114	1164	199	53993	-5	25	2255	-77	-37	-3667
114-j	115	1263	199	54172	7	25	2255	-95	-37	-3667
115-i	115	1263	172	58798	7	31	2525	-95	-43	-4108
115-j	116	1781	172	59847	99	31	2525	-223	-43	-4108
116-i	116	1781	172	59847	99	31	2525	-223	-43	-4108
116-j	117	2298	172	60793	191	31	2525	-351	-43	-4108
117-i	117	2298	172	60793	191	31	2525	-351	-43	-4108
117-j	118	3161	172	62372	345	31	2525	-565	-43	-4108
118-i	118	3161	172	62372	345	31	2525	-565	-43	-4108
118-j	119	4023	172	64087	499	31	2525	-778	-43	-4108
119-i	119	4023	172	64087	499	31	2525	-778	-43	-4108
119-j	44	4195	172	65702	530	31	2525	-821	-43	-4108
120-i	44	609	0	107532	73	0	11435	-75	0	537
120-j	120	609	0	114488	73	0	11435	-75	0	537
121-i	120	609	0	114488	73	0	11435	-75	0	537
121-j	121	609	0	115945	73	0	11435	-75	0	537

Membar No.	Joint No.	Self-Weight (D)			Surfacing (D)			Secondary Force by Pre-stress (D)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
122-i	121	609	0	115945	73	0	11435	-75	0	537
122-j	122	609	0	119458	73	0	11435	-75	0	537
123-i	122	609	0	119458	73	0	11435	-75	0	537
123-j	123	609	0	119837	73	0	11435	-75	0	537
124-i	123	609	0	119837	73	0	11435	-75	0	537
124-j	124	609	0	120864	73	0	11435	-75	0	537
125-i	124	609	0	120864	73	0	11435	-75	0	537
125-j	125	609	0	123085	73	0	11435	-75	0	537
126-i	125	609	0	123085	73	0	11435	-75	0	537
126-j	126	609	0	125423	73	0	11435	-75	0	537
127-i	126	609	0	125423	73	0	11435	-75	0	537
127-j	127	609	0	127409	73	0	11435	-75	0	537
128-i	127	609	0	127409	73	0	11435	-75	0	537
128-j	128	609	0	129448	73	0	11435	-75	0	537
129-i	128	609	0	129448	73	0	11435	-75	0	537
129-j	129	609	0	133408	73	0	11435	-75	0	537
130-i	129	609	0	133408	73	0	11435	-75	0	537
130-j	130	609	0	137411	73	0	11435	-75	0	537
131-i	130	609	0	137411	73	0	11435	-75	0	537
131-j	131	609	0	141456	73	0	11435	-75	0	537
132-i	131	609	0	141456	73	0	11435	-75	0	537
132-j	132	609	0	145531	73	0	11435	-75	0	537
133-i	132	609	0	145531	73	0	11435	-75	0	537
133-j	133	609	0	149630	73	0	11435	-75	0	537
134-i	133	609	0	149630	73	0	11435	-75	0	537
134-j	134	609	0	153760	73	0	11435	-75	0	537
135-i	134	609	0	153760	73	0	11435	-75	0	537
135-j	135	609	0	157926	73	0	11435	-75	0	537
136-i	135	609	0	157926	73	0	11435	-75	0	537
136-j	136	609	0	162122	73	0	11435	-75	0	537
201-i	6	0	0	-1161	0	0	-141	0	0	310
201-j	102	0	0	-1161	0	0	-141	0	0	310
202-i	8	0	0	-1183	0	0	-189	0	0	377
202-j	103	0	0	-1183	0	0	-189	0	0	377
203-i	10	0	0	-1317	0	0	-237	0	0	441
203-j	104	0	0	-1317	0	0	-237	0	0	441
204-i	12	0	0	-1276	0	0	-285	0	0	501
204-j	105	0	0	-1276	0	0	-285	0	0	501
205-i	14	0	0	-1205	0	0	-330	0	0	556
205-j	106	0	0	-1205	0	0	-330	0	0	556
206-i	16	0	0	-1104	0	0	-373	0	0	606
206-j	107	0	0	-1104	0	0	-373	0	0	606
207-i	18	-1	0	-985	0	0	-411	0	0	650
207-j	108	0	0	-985	0	0	-411	0	0	650
208-i	20	0	0	-610	0	0	-315	0	0	486
208-j	109	0	0	-610	0	0	-315	0	0	486
209-i	22	-1	0	-604	0	0	-334	0	0	509
209-j	110	0	0	-604	0	0	-334	0	0	509
210-i	24	-1	0	-577	0	0	-349	0	0	530
210-j	111	0	0	-577	0	0	-349	0	0	530
211-i	26	0	0	-533	0	0	-358	0	0	547
211-j	112	0	0	-533	0	0	-358	0	0	547
212-i	28	0	0	-478	0	0	-360	0	0	560
212-j	113	0	0	-478	0	0	-360	0	0	560

Membar No.	Joint No.	Self-Weight (D)			Surfacing (D)			Secondary Force by Pre-stress (D)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
213-i	30	0	0	-418	0	0	-356	0	0	566
213-j	114	0	0	-418	0	0	-356	0	0	566
214-i	32	0	0	-396	0	0	-345	0	0	567
214-j	115	0	0	-396	0	0	-345	0	0	567
301-i	82	0	0	-1143	0	0	-136	0	0	307
301-j	102	0	0	-1143	0	0	-136	0	0	307
302-i	80	0	0	-1156	0	0	-185	0	0	375
302-j	103	0	0	-1156	0	0	-185	0	0	375
303-i	78	0	0	-1282	0	0	-233	0	0	439
303-j	104	0	0	-1282	0	0	-233	0	0	439
304-i	76	0	0	-1232	0	0	-281	0	0	498
304-j	105	0	0	-1232	0	0	-281	0	0	498
305-i	74	0	0	-1153	0	0	-328	0	0	554
305-j	106	0	0	-1153	0	0	-328	0	0	554
306-i	72	0	0	-1042	0	0	-371	0	0	604
306-j	107	0	0	-1042	0	0	-371	0	0	604
307-i	70	1	0	-912	0	0	-411	0	0	647
307-j	108	0	0	-912	0	0	-411	0	0	647
308-i	68	0	0	-550	0	0	-315	0	0	484
308-j	109	0	0	-550	0	0	-315	0	0	484
309-i	66	1	0	-539	0	0	-335	0	0	507
309-j	110	0	0	-539	0	0	-335	0	0	507
310-i	64	1	0	-504	0	0	-350	0	0	528
310-j	111	0	0	-504	0	0	-350	0	0	528
311-i	62	0	0	-452	0	0	-359	0	0	545
311-j	112	0	0	-452	0	0	-359	0	0	545
312-i	60	0	0	-389	0	0	-362	0	0	557
312-j	113	0	0	-389	0	0	-362	0	0	557
313-i	58	0	0	-318	0	0	-358	0	0	564
313-j	114	0	0	-318	0	0	-358	0	0	564
314-i	56	0	0	-282	0	0	-347	0	0	565
314-j	115	0	0	-282	0	0	-347	0	0	565

Membar No.	Joint No.	Creep Effect (D)			Live Load Mmax (L)			Live Load Mmin (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
1-i	1	0	80	2	0	0	0	0	0	0
1-j	2	141	80	2	3240	1846	37	-537	-307	-6
2-i	2	141	80	2	3240	1846	28	-537	-307	-6
2-j	3	543	80	2	11679	1647	34	-2070	-307	-6
3-i	3	543	80	2	11679	1647	24	-2070	-307	-6
3-j	4	913	80	2	18062	1474	31	-3480	-307	-6
4-i	4	913	80	2	18062	1474	21	-3480	-307	-6
4-j	5	1315	80	2	23623	1088	26	-5013	-307	-6
5-i	5	1315	80	2	23623	1088	17	-5013	-307	-6
5-j	6	1339	80	2	23908	1078	22	-5105	-307	-6
6-i	6	1339	82	8	23908	1062	-55	-5105	-282	103
6-j	7	1724	82	8	27920	912	-52	-6432	-282	103
7-i	7	1724	82	8	27920	912	-57	-6432	-282	103
7-j	8	1748	82	8	28167	901	-53	-6517	-282	103
8-i	8	1748	84	20	28167	889	-114	-6517	-259	206
8-j	9	2146	84	20	31311	722	-109	-7733	-259	206
9-i	9	2146	84	20	31311	722	-114	-7733	-259	206
9-j	10	2171	84	20	31469	712	-110	-7810	-259	206
10-i	10	2171	88	34	31469	704	-152	-7810	-236	303
10-j	11	2584	88	34	33346	336	-147	-8920	-236	303
11-i	11	2584	88	34	33346	336	-155	-8920	-236	303
11-j	12	2611	88	34	33429	326	-151	-8991	-236	303
12-i	12	2611	93	54	33429	323	-171	-8990	-214	392
12-j	13	3046	93	54	34208	169	-164	-9998	-214	392
13-i	13	3046	93	54	34208	169	-172	-9998	-214	392
13-j	14	3074	93	54	34236	159	-168	-10062	-214	392
14-i	14	3074	99	78	34236	160	-168	-10062	-194	474
14-j	15	3538	99	78	34827	375	-151	-10974	-194	474
15-i	15	3538	99	78	34827	375	-157	-10974	-194	474
15-j	16	3567	99	78	34880	363	-152	-11032	-194	474
16-i	16	3567	106	107	34880	370	-135	-11032	-175	547
16-j	17	4067	106	107	35238	185	-128	-11854	-175	547
17-i	17	4067	106	107	35238	185	-134	-11854	-175	547
17-j	18	4098	106	107	35228	173	-129	-11907	-175	547
18-i	18	4098	115	140	35228	186	-93	-11907	-157	611
18-j	19	4640	115	140	34571	-438	-90	-12647	-157	611
19-i	19	4640	115	140	34571	-438	-99	-12647	-157	611
19-j	20	4674	115	140	34492	-449	-94	-12694	-157	611
20-i	20	4674	123	166	34492	-436	-55	-12694	-146	650
20-j	21	5251	123	166	32749	-605	-53	-13382	-146	650
21-i	21	5251	123	166	32749	-605	-62	-13382	-146	650
21-j	22	5288	123	166	32601	-616	-58	-13426	-146	650
22-i	22	5288	131	194	32601	-599	-6	-13426	-137	682
22-j	23	5903	131	194	29974	-750	-1	-14069	-137	682
23-i	23	5903	131	194	29974	-750	-6	-14069	-137	682
23-j	24	5942	131	194	29789	-760	-2	-14111	-137	682
24-i	24	5942	140	223	29789	-739	56	-14111	-129	707
24-j	25	6600	140	223	26456	-906	57	-14717	-129	707
25-i	25	6600	140	223	26456	-906	52	-14717	-129	707
25-j	26	6642	140	223	26214	-916	56	-14756	-129	707
26-i	26	6642	150	253	26214	-891	123	-14756	-123	725
26-j	27	7346	150	253	22052	-1049	122	-15335	-123	725
27-i	27	7346	150	253	22052	-1049	117	-15335	-123	725
27-j	28	7391	150	253	21762	-1059	121	-15372	-123	725

Membar No.	Joint No.	Creep Effect (D)			Live Load Mmax (L)			Live Load Mmin (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
28-i	28	7391	161	283	21762	-1030	194	-15372	-120	735
28-j	29	8147	161	283	16944	-1121	163	-16000	-291	814
29-i	29	8147	161	283	16944	-1121	158	-16000	-291	814
29-j	30	8195	161	283	16634	-1079	140	-16088	-295	816
30-i	30	8195	173	315	16634	-1049	208	-16088	-289	830
30-j	31	9008	173	315	12816	-699	20	-18435	-575	956
31-i	31	9008	173	315	12816	-699	15	-18435	-575	956
31-j	32	9060	173	315	12620	-700	18	-18609	-585	959
32-i	32	9060	186	346	12620	-680	57	-18609	-574	984
32-j	33	9935	186	346	10040	-551	3	-22131	-1096	1097
33-i	33	9935	186	346	10040	-550	-6	-22131	-1096	1097
33-j	34	10772	186	346	8287	-564	-20	-27757	-1369	1134
34-i	34	10772	186	346	8287	-564	-29	-27757	-1369	1134
34-j	35	11609	186	346	6615	-576	-34	-34122	-1467	1139
35-i	35	11609	186	346	6615	-576	-43	-34122	-1467	1139
35-j	36	12354	186	346	5181	-586	-40	-40251	-1574	1136
36-i	36	12354	186	346	5181	-586	-48	-40251	-1574	1136
36-j	37	13098	186	346	3828	-356	-37	-46879	-1725	1122
37-i	37	13098	186	346	3828	-355	-46	-46879	-1725	1122
37-j	38	13842	186	346	2556	-361	-30	-54583	-2270	1070
38-i	38	13842	186	346	2556	-361	-39	-54583	-2270	1070
38-j	39	14493	186	346	1618	-363	-24	-62803	-2395	1072
39-i	39	14493	186	346	1618	-363	-33	-62803	-2395	1072
39-j	40	15144	186	346	939	-248	-12	-71564	-2552	1076
40-i	40	15144	186	346	939	-248	-20	-71564	-2552	1076
40-j	41	15563	186	346	587	-247	-8	-77370	-2618	1077
41-i	41	15563	186	346	587	-247	-17	-77370	-2618	1077
41-j	42	16168	186	346	165	-245	-3	-86066	-2713	1078
42-i	42	16168	186	346	165	-245	-9	-86066	-2713	1078
42-j	43	16470	186	346	24	-244	-1	-90507	-2748	1078
43-i	43	16470	186	346	24	-244	-5	-90507	-2748	1078
43-j	44	16540	186	346	3	-243	0	-91539	-2753	1078
44-i	44	16717	-189	347	3	243	0	-91351	2749	1200
44-j	45	16647	-189	347	24	244	4	-90321	2744	1200
45-i	45	16647	-189	347	24	244	-1	-90321	2744	1200
45-j	46	16340	-189	347	165	245	3	-85886	2709	1199
46-i	46	16340	-189	347	165	245	-3	-85886	2709	1199
46-j	47	15727	-189	347	587	247	0	-77205	2614	1193
47-i	47	15727	-189	347	587	247	-9	-77205	2614	1193
47-j	48	15302	-189	347	938	248	-5	-71411	2548	1190
48-i	48	15302	-189	347	938	248	-13	-71411	2548	1190
48-j	49	14641	-189	347	1617	363	-12	-62663	2463	1186
49-i	49	14641	-189	347	1617	363	-21	-62663	2463	1186
49-j	50	13981	-189	347	2555	361	-19	-54436	2253	1172
50-i	50	13981	-189	347	2555	361	-28	-54436	2253	1172
50-j	51	13226	-189	347	3827	355	-25	-46744	1716	1203
51-i	51	13226	-189	347	3827	355	-35	-46744	1716	1203
51-j	52	12471	-189	347	5180	586	-26	-40153	1570	1212
52-i	52	12471	-189	347	5180	586	-34	-40153	1570	1212
52-j	53	11716	-189	347	6615	576	-21	-34039	1464	1211
53-i	53	11716	-189	347	6615	576	-30	-34039	1464	1211
53-j	54	10867	-189	347	8286	563	-7	-27691	1365	1201
54-i	54	10867	-189	347	8286	563	-16	-27691	1365	1201
54-j	55	10017	-189	347	10036	550	15	-22082	1093	1153

Membar No.	Joint No.	Creep Effect (D)			Live Load Mmax (L)			Live Load Mmin (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
55-i	55	10017	-189	347	10036	550	6	-22082	1093	1153
55-j	56	9130	-189	347	12611	679	92	-18573	572	1018
56-i	56	9130	-175	315	12611	700	34	-18573	583	993
56-j	57	9078	-175	315	12807	698	41	-18399	573	990
57-i	57	9078	-175	315	12807	698	36	-18399	573	990
57-j	58	8254	-175	315	16620	1048	258	-16062	288	852
58-i	58	8254	-163	284	16620	1078	170	-16062	293	838
58-j	59	8205	-163	284	16930	1120	200	-15974	289	836
59-i	59	8205	-163	284	16930	1120	195	-15974	289	836
59-j	60	7439	-163	284	21743	1029	241	-15353	118	750
60-i	60	7439	-152	252	21743	1059	149	-15353	122	740
60-j	61	7394	-152	252	22034	1049	154	-15317	122	740
61-i	61	7394	-152	252	22034	1049	149	-15317	122	740
61-j	62	6681	-152	252	26193	890	162	-14744	122	740
62-i	62	6681	-141	222	26193	916	77	-14744	128	723
62-j	63	6639	-141	222	26435	906	82	-14706	128	723
63-i	63	6639	-141	222	26435	906	77	-14706	128	723
63-j	64	5974	-141	222	29770	740	87	-14106	128	723
64-i	64	5974	-132	193	29770	761	11	-14106	135	698
64-j	65	5934	-132	193	29955	750	16	-14065	135	698
65-i	65	5934	-132	193	29955	750	11	-14065	135	698
65-j	66	5313	-132	193	32586	600	10	-13429	135	698
66-i	66	5313	-124	165	32586	617	-52	-13429	145	666
66-j	67	5276	-124	165	32734	606	-46	-13385	145	666
67-i	67	5276	-124	165	32734	606	-55	-13385	145	666
67-j	68	4694	-124	165	34482	437	-46	-12703	145	666
68-i	68	4694	-116	138	34482	450	-96	-12703	156	627
68-j	69	4659	-116	138	34562	439	-91	-12656	156	627
69-i	69	4659	-116	138	34562	439	-100	-12656	156	627
69-j	70	4113	-116	138	35205	-185	-92	-11922	156	627
70-i	70	4113	-107	105	35206	-173	-146	-11922	174	563
70-j	71	4081	-107	105	35217	-184	-141	-11870	174	563
71-i	71	4081	-107	105	35217	-184	-147	-11870	174	563
71-j	72	3579	-107	105	34823	-169	-142	-11053	174	563
72-i	72	3579	-99	76	34823	-163	-172	-11053	193	489
72-j	73	3549	-99	76	34779	-174	-168	-10995	193	489
73-i	73	3549	-99	76	34779	-174	-177	-10995	193	489
73-j	74	3082	-99	76	34239	-159	-172	-10086	193	489
74-i	74	3082	-93	51	34239	-158	-182	-10086	214	407
74-j	75	3054	-93	51	34213	-168	-178	-10022	214	407
75-i	75	3054	-93	51	34213	-168	-186	-10022	214	407
75-j	76	2617	-93	51	33443	-322	-180	-9016	214	407
76-i	76	2617	-88	32	33443	-325	-171	-9016	236	318
76-j	77	2590	-88	32	33360	-335	-166	-8945	236	318
77-i	77	2590	-88	32	33360	-335	-175	-8945	236	318
77-j	78	2175	-88	32	31486	-703	-169	-7836	236	318
78-i	78	2175	-85	17	31486	-712	-143	-7836	259	220
78-j	79	2150	-85	17	31328	-722	-138	-7758	259	220
79-i	79	2150	-85	17	31328	-722	-144	-7758	259	220
79-j	80	1752	-85	17	28185	-889	-136	-6540	259	220
80-i	80	1752	-82	5	28185	-902	-91	-6540	283	116
80-j	81	1727	-82	5	27937	-913	-87	-6456	283	116
81-i	81	1727	-82	5	27937	-913	-92	-6456	283	116
81-j	82	1341	-82	5	23924	-1062	-90	-5125	283	116

Membar No.	Joint No.	Creep Effect (D)			Live Load Mmax (L)			Live Load Mmin (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
82-i	82	1341	-81	-2	23924	-1079	-22	-5125	308	6
82-j	83	1317	-81	-2	23639	-1089	-17	-5033	308	6
83-i	83	1317	-81	-2	23639	-1089	-26	-5033	308	6
83-j	84	914	-81	-2	18072	-1475	-21	-3494	308	6
84-i	84	914	-81	-2	18072	-1475	-31	-3494	308	6
84-j	85	544	-81	-2	11648	-1648	-24	-2078	308	6
85-i	85	544	-81	-2	11648	-1648	-34	-2078	308	6
85-j	86	141	-81	-2	3170	-1806	-28	-539	308	6
86-i	86	141	-81	-2	3170	-1806	-36	-539	308	6
86-j	87	0	-81	-2	0	0	0	0	0	0
101-i	101	0	0	0	0	0	0	0	0	0
101-j	102	0	0	0	0	0	0	0	0	0
102-i	102	0	0	3	0	-169	11	0	168	5
102-j	103	0	0	3	84	168	5	-85	-169	11
103-i	103	0	0	8	84	314	13	-85	-315	24
103-j	104	0	0	8	241	314	13	-242	-315	24
104-i	104	0	1	15	241	435	25	-242	-436	39
104-j	105	1	1	15	458	435	25	-460	-436	39
105-i	105	1	1	25	458	531	40	-460	-532	58
105-j	106	1	1	25	724	531	40	-726	-532	58
106-i	106	1	2	37	723	601	59	-726	-603	79
106-j	107	2	2	37	1024	601	59	-1028	-603	79
107-i	107	2	2	52	1024	646	82	-1028	-647	104
107-j	108	3	2	52	1347	646	82	-1351	-647	104
108-i	108	3	3	70	1347	665	109	-1351	-665	132
108-j	109	5	3	70	1680	666	109	-1683	-665	132
109-i	109	5	4	85	1680	661	131	-1683	-660	153
109-j	110	7	4	85	2010	661	131	-2013	-660	153
110-i	110	7	4	102	2010	639	156	-2013	-637	177
110-j	111	9	4	102	2330	639	156	-2331	-637	177
111-i	111	9	5	120	2330	601	183	-2331	-597	204
111-j	112	11	5	120	2630	601	183	-2630	-597	204
112-i	112	11	6	140	2630	548	213	-2630	-542	232
112-j	113	14	6	140	2904	548	213	-2901	-542	232
113-i	113	14	7	163	2904	481	245	-2900	-473	262
113-j	114	18	7	163	3144	481	245	-3137	-473	262
114-i	114	18	7	187	3144	403	278	-3137	-394	293
114-j	115	21	7	187	3346	403	278	-3334	-394	293
115-i	115	21	8	214	3346	317	313	-3334	-306	326
115-j	116	46	8	214	4298	318	312	-4254	-307	325
116-i	116	46	8	214	4298	318	312	-4254	-307	325
116-j	117	70	8	214	5251	318	312	-5174	-307	325
117-i	117	70	8	214	5251	318	312	-5174	-307	325
117-j	118	111	8	214	6840	318	312	-6707	-307	325
118-i	118	111	8	214	6840	318	312	-6707	-307	325
118-j	119	151	8	214	8428	318	312	-8241	-307	325
119-i	119	151	8	214	8428	318	312	-8241	-307	325
119-j	44	160	8	214	8746	318	312	-8548	-307	325
120-i	44	-18	0	-161	36577	0	2840	-36552	0	2842
120-j	120	-18	0	-161	36577	0	2840	-36552	0	2842
121-i	120	-18	0	-161	36577	0	2840	-36552	0	2842
121-j	121	-18	0	-161	36577	0	2840	-36552	0	2842
122-i	121	-18	0	-161	36577	0	2840	-36552	0	2842
122-j	122	-18	0	-161	36577	0	2840	-36552	0	2842

Membar No.	Joint No.	Creep Effect (D)			Live Load Mmax (L)			Live Load Mmin (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
123-i	122	-18	0	-161	36577	0	2840	-36552	0	2842
123-j	123	-18	0	-161	36577	0	2840	-36552	0	2842
124-i	123	-18	0	-161	36577	0	2840	-36552	0	2842
124-j	124	-18	0	-161	36577	0	2840	-36552	0	2842
125-i	124	-18	0	-161	36577	0	2840	-36552	0	2842
125-j	125	-18	0	-161	36577	0	2840	-36552	0	2842
126-i	125	-18	0	-161	36577	0	2840	-36552	0	2842
126-j	126	-18	0	-161	36577	0	2840	-36552	0	2842
127-i	126	-18	0	-161	36577	0	2840	-36552	0	2842
127-j	127	-18	0	-161	36577	0	2840	-36552	0	2842
128-i	127	-18	0	-161	36577	0	2840	-36552	0	2842
128-j	128	-18	0	-161	36577	0	2840	-36552	0	2842
129-i	128	-18	0	-161	36577	0	2840	-36552	0	2842
129-j	129	-18	0	-161	36577	0	2840	-36552	0	2842
130-i	129	-18	0	-161	36577	0	2840	-36552	0	2842
130-j	130	-18	0	-161	36577	0	2840	-36552	0	2842
131-i	130	-18	0	-161	36577	0	2840	-36552	0	2842
131-j	131	-18	0	-161	36577	0	2840	-36552	0	2842
132-i	131	-18	0	-161	36577	0	2840	-36552	0	2842
132-j	132	-18	0	-161	36577	0	2840	-36552	0	2842
133-i	132	-18	0	-161	36577	0	2840	-36552	0	2842
133-j	133	-18	0	-161	36577	0	2840	-36552	0	2842
134-i	133	-18	0	-161	36577	0	2840	-36552	0	2842
134-j	134	-18	0	-161	36577	0	2840	-36552	0	2842
135-i	134	-18	0	-161	36577	0	2840	-36552	0	2842
135-j	135	-18	0	-161	36577	0	2840	-36552	0	2842
136-i	135	-18	0	-161	36577	0	2840	-36552	0	2842
136-j	136	-18	0	-161	36577	0	2840	-36552	0	2842
201-i	6	0	0	-7	0	0	68	0	0	-104
201-j	102	0	0	-7	0	0	-82	0	0	63
202-i	8	0	0	-12	0	0	50	0	0	-98
202-j	103	0	0	-12	0	0	-92	0	0	48
203-i	10	0	0	-15	0	0	32	0	0	-92
203-j	104	0	0	-15	0	0	-92	0	0	32
204-i	12	0	0	-20	0	0	13	0	0	-85
204-j	105	0	0	-20	0	0	-85	0	0	13
205-i	14	0	0	-25	0	0	-6	0	0	-78
205-j	106	0	0	-25	0	0	-78	0	0	-6
206-i	16	0	0	-30	0	0	-25	0	0	-70
206-j	107	0	0	-30	0	0	-70	0	0	-25
207-i	18	0	0	-34	0	0	-43	0	0	-62
207-j	108	0	0	-34	0	0	-62	0	0	-43
208-i	20	0	0	-27	0	0	-42	0	0	-37
208-j	109	0	0	-27	0	0	-37	0	0	-42
209-i	22	0	0	-29	0	0	-54	0	0	-31
209-j	110	0	0	-29	0	0	-31	0	0	-54
210-i	24	0	0	-30	0	0	-64	0	0	-24
210-j	111	0	0	-30	0	0	-24	0	0	-64
211-i	26	0	0	-32	0	0	-72	0	0	-17
211-j	112	0	0	-32	0	0	-17	0	0	-72
212-i	28	0	0	-33	0	0	-71	0	0	-30
212-j	113	0	0	-33	0	0	-10	0	0	-79
213-i	30	0	0	-34	0	0	-64	0	0	-40
213-j	114	0	0	-34	0	0	-3	0	0	-84

Membar No.	Joint No.	Creep Effect (D)			Live Load Mmax (L)			Live Load Mmin (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
214-i	32	0	0	-34	0	0	-45	0	0	-39
214-j	115	0	0	-34	0	0	3	0	0	-90
301-i	82	0	0	-7	0	0	-104	0	0	70
301-j	102	0	0	-7	0	0	65	0	0	-84
302-i	80	0	0	-12	0	0	-99	0	0	52
302-j	103	0	0	-12	0	0	49	0	0	-94
303-i	78	0	0	-15	0	0	-92	0	0	33
303-j	104	0	0	-15	0	0	33	0	0	-92
304-i	76	0	0	-20	0	0	-85	0	0	14
304-j	105	0	0	-20	0	0	14	0	0	-85
305-i	74	0	0	-25	0	0	-78	0	0	-5
305-j	106	0	0	-25	0	0	-5	0	0	-78
306-i	72	0	0	-30	0	0	-70	0	0	-24
306-j	107	0	0	-30	0	0	-24	0	0	-70
307-i	70	0	0	-35	0	0	-62	0	0	-43
307-j	108	0	0	-35	0	0	-43	0	0	-62
308-i	68	0	0	-28	0	0	-37	0	0	-43
308-j	109	0	0	-28	0	0	-43	0	0	-37
309-i	66	0	0	-29	0	0	-31	0	0	-55
309-j	110	0	0	-29	0	0	-55	0	0	-31
310-i	64	0	0	-31	0	0	-24	0	0	-65
310-j	111	0	0	-31	0	0	-65	0	0	-24
311-i	62	0	0	-32	0	0	-17	0	0	-74
311-j	112	0	0	-32	0	0	-75	0	0	-17
312-i	60	0	0	-33	0	0	-21	0	0	-72
312-j	113	0	0	-33	0	0	-81	0	0	-10
313-i	58	0	0	-34	0	0	-34	0	0	-65
313-j	114	0	0	-34	0	0	-86	0	0	-2
314-i	56	0	0	-34	0	0	-50	0	0	-42
314-j	115	0	0	-34	0	0	-91	0	0	5

Membar No.	Joint No.	Live Load Smax (L)			Live Load Smin (L)			Live Load Nmax (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
1-i	1	0	1917	32	0	-307	-6	0	1856	37
1-j	2	3232	1846	37	21	-310	0	3240	1846	37
2-i	2	3232	1846	28	21	-310	-6	3136	1792	34
2-j	3	11173	1655	33	906	-339	2	11670	1647	34
3-i	3	11173	1655	24	906	-339	-7	10915	1617	31
3-j	4	16944	1493	30	2286	-384	1	17944	1476	31
4-i	4	16944	1493	21	2286	-384	-8	16360	1441	27
4-j	5	21693	1326	27	4237	-455	0	23158	1300	27
5-i	5	21693	1327	22	4237	-455	-9	21550	1318	26
5-j	6	21930	1317	26	4367	-460	-4	21946	1317	26
6-i	6	21930	1301	-53	4367	-437	92	2690	184	106
6-j	7	24928	1155	-47	6174	-515	98	3548	175	106
7-i	7	24928	1155	-52	6174	-515	89	3335	174	106
7-j	8	25080	1146	-47	6265	-520	94	3387	174	106
8-i	8	25079	1134	-109	6265	-498	188	-6516	-259	206
8-j	9	26824	998	-101	7471	-578	195	-7732	-259	206
9-i	9	26824	998	-106	7471	-578	186	-7732	-259	206
9-j	10	26900	990	-101	7528	-583	190	-7810	-259	206
10-i	10	26900	982	-144	7528	-560	284	-7810	-236	303
10-j	11	27582	857	-135	8218	-638	289	-8919	-236	303
11-i	11	27582	857	-140	8218	-638	280	-8919	-236	303
11-j	12	27597	849	-135	8245	-643	285	-8990	-236	303
12-i	12	27597	845	-160	8245	-619	378	-8765	-220	392
12-j	13	27458	732	-152	8608	-702	376	-9799	-220	392
13-i	13	27458	732	-157	8608	-702	373	-9799	-220	392
13-j	14	27427	725	-152	8620	-708	373	-9865	-220	392
14-i	14	27427	725	-161	8620	-683	470	-2542	-396	477
14-j	15	26639	623	-154	9209	-770	458	-4403	-396	477
15-i	15	26639	623	-159	9209	-770	449	-4403	-396	477
15-j	16	26571	617	-154	9261	-777	453	-4522	-396	477
16-i	16	26571	621	-150	9261	-751	545	4112	-628	568
16-j	17	25332	530	-147	9834	-863	534	1160	-628	568
17-i	17	25332	530	-152	9834	-863	526	1160	-628	568
17-j	18	25245	524	-148	9841	-871	530	972	-628	568
18-i	18	25245	531	-132	9841	-845	623	2558	-651	660
18-j	19	23707	450	-135	9785	-971	619	-532	-653	660
19-i	19	23707	450	-140	9785	-971	610	-588	-651	660
19-j	20	23598	445	-136	9749	-980	615	-783	-651	660
20-i	20	23598	452	-121	9749	-959	682	2699	-602	723
20-j	21	21721	378	-124	8892	-1100	689	-192	-774	723
21-i	21	21721	378	-129	8892	-1100	680	-3010	-665	723
21-j	22	21593	373	-125	8802	-1109	685	-3209	-665	723
22-i	22	21593	382	-105	8802	-1087	755	2597	-573	784
22-j	23	19469	315	-107	6924	-1230	766	-933	-891	784
23-i	23	19469	315	-111	6924	-1230	757	-5105	-703	784
23-j	24	19329	311	-107	6766	-1239	762	-5316	-704	784
24-i	24	19329	321	-84	6766	-1215	834	3321	-773	848
24-j	25	17048	260	-84	3947	-1354	845	-1089	-1092	848
25-i	25	17048	260	-89	3947	-1353	836	-3635	-963	847
25-j	26	16900	256	-84	3735	-1362	841	-3923	-963	847
26-i	26	16900	267	-60	3735	-1336	915	4333	-1077	919
26-j	27	14622	213	-60	-118	-1476	917	-1286	-1396	919
27-i	27	14622	213	-65	-118	-1476	914	-742	-1293	918
27-j	28	14483	210	-61	-372	-1485	914	-1130	-1440	918

Membar No.	Joint No.	Live Load Smax (L)			Live Load Smin (L)			Live Load Nmax (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
28-i	28	14483	222	-36	-372	-1456	993	-146	-1299	995
28-j	29	12359	175	-39	-4596	-1592	986	-6838	-1471	995
29-i	29	12359	175	-44	-4596	-1592	983	-7449	-1434	994
29-j	30	12227	172	-39	-4879	-1600	982	-7879	-1435	994
30-i	30	12227	184	-17	-4879	-1570	1060	-7045	-1436	1070
30-j	31	10273	143	-20	-9544	-1705	1042	-13854	-1461	1070
31-i	31	10273	143	-25	-9544	-1705	1038	-13931	-1455	1069
31-j	32	10149	141	-21	-9100	-1715	1029	-14368	-1456	1069
32-i	32	10149	153	-1	-9100	-1683	1099	-13434	-1474	1140
32-j	33	8543	118	-10	-14488	-1838	1090	-20421	-1499	1140
33-i	33	8543	119	-18	-14488	-1838	1081	-20628	-1497	1140
33-j	34	7151	91	-23	-20803	-1997	1083	-27368	-1497	1140
34-i	34	7151	91	-32	-20803	-1996	1075	-27368	-1497	1140
34-j	35	5778	68	-31	-28281	-2162	1087	-34108	-1497	1140
35-i	35	5778	68	-39	-28281	-2162	1078	-34108	-1497	1140
35-j	36	4584	50	-32	-35780	-2309	1091	-40105	-1499	1140
36-i	36	4584	50	-41	-35780	-2309	1082	-40105	-1499	1140
36-j	37	3424	35	-30	-44363	-2453	1079	-46102	-1499	1140
37-i	37	3424	35	-38	-44363	-2453	1076	-46102	-1499	1140
37-j	38	2326	22	-24	-53215	-2598	1082	-52099	-1499	1140
38-i	38	2326	23	-32	-53215	-2598	1079	-52099	-1499	1140
38-j	39	1527	14	-17	-61345	-2720	1082	-57346	-1499	1140
39-i	39	1527	14	-26	-61345	-2720	1080	-57346	-1499	1140
39-j	40	926	8	-12	-69696	-2839	1077	-62593	-1499	1140
40-i	40	926	8	-19	-69696	-2839	1075	-62593	-1499	1140
40-j	41	582	5	-8	-75110	-2912	1069	-65967	-1499	1140
41-i	41	582	5	-16	-75110	-2912	1067	-65967	-1499	1140
41-j	42	164	1	-3	-83261	-3020	1058	-70839	-1499	1140
42-i	42	164	1	-9	-83261	-3020	1056	-70839	-1499	1140
42-j	43	24	0	-1	-87595	-3078	1054	-73275	-1499	1140
43-i	43	24	0	-5	-87595	-3078	1052	-73275	-1499	1140
43-j	44	3	0	0	-88641	-3092	1053	-73838	-1499	1140
44-i	44	-88401	3087	1185	3	0	0	-75208	1591	1214
44-j	45	-87367	3073	1186	24	0	4	-74612	1589	1214
45-i	45	-87367	3073	1185	24	0	-1	-74612	1588	1214
45-j	46	-83067	3016	1188	164	-1	3	-72037	1580	1214
46-i	46	-83067	3016	1186	164	-1	-3	-72033	1567	1214
46-j	47	-74944	2908	1196	581	-5	0	-66941	1563	1214
47-i	47	-74944	2908	1194	581	-5	-8	-66950	1558	1214
47-j	48	-69539	2835	1200	926	-8	-5	-63444	1558	1214
48-i	48	-69539	2835	1198	926	-8	-13	-63444	1558	1214
48-j	49	-61201	2716	1200	1526	-14	-10	-57990	1558	1214
49-i	49	-61201	2716	1198	1526	-14	-18	-57990	1558	1214
49-j	50	-53086	2594	1195	2325	-23	-17	-52535	1558	1214
50-i	50	-53086	2594	1192	2325	-22	-25	-52535	1558	1214
50-j	51	-44261	2450	1187	3423	-35	-24	-46302	1558	1214
51-i	51	-44261	2450	1184	3423	-35	-32	-46302	1558	1214
51-j	52	-35671	2304	1187	4583	-51	-27	-40068	1558	1214
52-i	52	-35671	2304	1178	4583	-51	-35	-40068	1558	1214
52-j	53	-28191	2157	1176	5777	-68	-26	-33835	1558	1214
53-i	53	-28191	2157	1168	5777	-68	-34	-33899	1548	1214
53-j	54	-20735	1992	1166	7150	-92	-19	-26938	1540	1214
54-i	54	-20735	1992	1158	7150	-92	-28	-27044	1536	1213
54-j	55	-14456	1834	1168	8540	-119	-6	-20163	1517	1213

Membar No.	Joint No.	Live Load Smax (L)			Live Load Smin (L)			Live Load Nmax (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
55-i	55	-14456	1834	1159	8540	-119	-15	-20212	1518	1213
55-j	56	-9823	1678	1192	10143	-154	9	-13136	1493	1213
56-i	56	-9823	1711	1115	10143	-141	-28	-13570	1518	1141
56-j	57	-9511	1702	1117	10266	-144	-23	-13115	1516	1141
57-i	57	-9511	1702	1113	10266	-144	-28	-13115	1516	1140
57-j	58	-4863	1567	1134	12218	-185	-8	-6046	1491	1140
58-i	58	-4863	1598	1054	12218	-172	-49	-7027	1492	1063
58-j	59	-4580	1589	1056	12349	-175	-44	-6580	1490	1063
59-i	59	-4580	1590	1053	12349	-175	-48	-6908	1474	1062
59-j	60	-366	1454	1062	14471	-222	-31	-40	1448	1062
60-i	60	-366	1483	980	14471	-210	-73	-760	1464	982
60-j	61	-114	1474	981	14610	-213	-68	-284	1465	982
61-i	61	-114	1474	978	14610	-213	-73	-731	1444	979
61-j	62	3732	1334	978	16887	-267	-58	5645	1302	979
62-i	62	3732	1361	893	16888	-256	-100	1283	1244	900
62-j	63	3944	1352	898	17036	-259	-95	1656	1243	900
63-i	63	3944	1352	889	17036	-259	-100	-1466	1080	898
63-j	64	6749	1213	892	19318	-320	-85	3573	1060	898
64-i	64	6749	1238	809	19318	-310	-126	382	964	827
64-j	65	6906	1229	814	19458	-314	-121	671	963	827
65-i	65	6906	1229	805	19458	-314	-126	-1602	863	824
65-j	66	8751	1084	806	21584	-381	-110	2087	699	824
66-i	66	8751	1107	726	21584	-372	-147	-441	774	760
66-j	67	8841	1098	731	21712	-377	-141	-209	773	760
67-i	67	8841	1098	722	21712	-377	-146	-1981	706	759
67-j	68	9709	958	727	23593	-451	-129	1378	693	759
68-i	68	9709	978	651	23593	-444	-161	24	680	695
68-j	69	9721	968	655	23702	-449	-156	228	679	695
69-i	69	9721	968	647	23702	-449	-161	7	672	695
69-j	70	9742	842	664	25244	-530	-144	3155	659	695
70-i	70	9742	869	561	25244	-523	-177	1950	660	601
70-j	71	9737	861	567	25331	-529	-172	2148	660	601
71-i	71	9737	861	558	25331	-529	-176	1998	655	601
71-j	72	9164	749	581	26575	-620	-166	5074	649	601
72-i	72	9164	774	480	26575	-616	-187	3958	648	505
72-j	73	8730	768	494	26643	-622	-182	4152	648	505
73-i	73	8730	768	491	26643	-622	-187	4152	648	505
73-j	74	8595	683	503	27436	-724	-181	7200	648	505
74-i	74	8595	708	404	27436	-724	-188	-2580	418	411
74-j	75	8583	702	405	27467	-731	-184	-2454	418	411
75-i	75	8583	702	402	27467	-731	-188	-2454	418	411
75-j	76	8219	619	408	27610	-844	-184	-491	418	411
76-i	76	8219	643	304	27610	-849	-175	-8571	247	318
76-j	77	8193	638	310	27595	-856	-171	-8497	247	318
77-i	77	8193	639	301	27595	-856	-176	-8497	247	318
77-j	78	7504	560	310	26917	-981	-173	-7336	247	318
78-i	78	7504	583	207	26917	-990	-146	-7836	259	220
78-j	79	7446	578	212	26840	-998	-141	-7758	259	220
79-i	79	7446	578	203	26840	-998	-146	-7758	259	220
79-j	80	6180	497	211	25097	-1134	-142	-6540	259	220
80-i	80	6180	520	107	25097	-1146	-96	-6540	283	116
80-j	81	6092	515	112	24946	-1156	-91	-6455	283	116
81-i	81	6092	515	103	24946	-1155	-96	-6455	283	116
81-j	82	4290	437	111	21946	-1302	-91	-5125	283	116

Membar No.	Joint No.	Live Load Smax (L)			Live Load Smin (L)			Live Load Nmax (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
82-i	82	4290	460	4	21946	-1318	-26	4033	455	9
82-j	83	4165	455	9	21708	-1328	-22	4169	455	9
83-i	83	4165	455	0	21708	-1327	-27	126	385	8
83-j	84	2007	384	8	16954	-1494	-21	2050	381	8
84-i	84	2007	384	-1	16954	-1493	-30	-887	338	7
84-j	85	651	337	7	11173	-1655	-24	666	335	7
85-i	85	651	337	-1	11173	-1655	-33	-1854	311	6
85-j	86	-301	311	6	3162	-1806	-28	-301	310	6
86-i	86	-301	311	3	3162	-1806	-36	-539	308	6
86-j	87	0	308	6	0	-1864	-31	0	308	6
101-i	101	0	0	0	0	0	0	0	0	0
101-j	102	0	0	0	0	0	0	0	0	0
102-i	102	0	168	5	0	-169	11	0	-38	16
102-j	103	84	168	5	-85	-169	11	-19	-38	16
103-i	103	84	314	13	-85	-315	24	-18	-69	37
103-j	104	241	314	13	-242	-315	24	-52	-69	37
104-i	104	241	435	25	-242	-436	39	-49	-92	64
104-j	105	458	435	25	-460	-436	39	-95	-92	64
105-i	105	458	531	40	-460	-532	58	-65	-79	98
105-j	106	724	531	40	-726	-532	58	-104	-79	98
106-i	106	723	601	59	-726	-603	79	-81	-71	138
106-j	107	1024	601	59	-1028	-603	79	-116	-71	138
107-i	107	1024	646	82	-1028	-647	104	-87	-59	185
107-j	108	1347	646	82	-1351	-647	104	-116	-59	185
108-i	108	1347	666	109	-1351	-665	132	-77	-41	240
108-j	109	1680	666	109	-1683	-665	132	-98	-41	240
109-i	109	1680	661	131	-1683	-660	153	-62	-25	283
109-j	110	2010	661	131	-2013	-660	153	-74	-25	283
110-i	110	2010	639	156	-2013	-637	177	-38	-10	332
110-j	111	2330	639	156	-2331	-637	177	-43	-10	332
111-i	111	2330	601	183	-2331	-597	203	-40	-8	385
111-j	112	2630	601	183	-2630	-597	203	-45	-8	385
112-i	112	2629	548	212	-2628	-542	231	-7	4	443
112-j	113	2903	548	212	-2899	-542	231	-5	4	443
113-i	113	2903	481	244	-2899	-474	261	-4	6	504
113-j	114	3143	481	244	-3136	-474	261	-1	6	504
114-i	114	3143	404	277	-3135	-394	292	1	8	569
114-j	115	3345	404	277	-3333	-394	292	5	8	569
115-i	115	3344	318	312	-3332	-307	325	5	10	636
115-j	116	4297	318	312	-4253	-307	325	37	10	636
116-i	116	4297	318	312	-4253	-307	325	37	10	636
116-j	117	5251	318	312	-5173	-307	325	68	10	636
117-i	117	5251	318	312	-5173	-307	325	68	10	636
117-j	118	6839	318	312	-6707	-307	325	120	10	636
118-i	118	6839	318	312	-6707	-307	325	120	10	636
118-j	119	8428	318	312	-8241	-307	325	173	10	636
119-i	119	8428	318	312	-8241	-307	325	173	10	636
119-j	44	8746	318	312	-8548	-307	325	183	10	636
120-i	44	-35419	0	3046	36321	0	2741	-16	0	5804
120-j	120	-35419	0	3046	36321	0	2741	-16	0	5804
121-i	120	-35419	0	3046	36396	0	2745	-16	0	5804
121-j	121	-35419	0	3046	36396	0	2745	-16	0	5804
122-i	121	-35419	0	3046	36396	0	2745	-16	0	5804
122-j	122	-35419	0	3046	36396	0	2745	-16	0	5804

Membar No.	Joint No.	Live Load Smax (L)			Live Load Smin (L)			Live Load Nmax (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
123-i	122	-35223	0	3035	36412	0	2772	-16	0	5804
123-j	123	-35223	0	3035	36412	0	2772	-16	0	5804
124-i	123	-35557	0	3068	36459	0	2763	-16	0	5804
124-j	124	-35557	0	3068	36459	0	2763	-16	0	5804
125-i	124	-35557	0	3068	36459	0	2763	-16	0	5804
125-j	125	-35557	0	3068	36459	0	2763	-16	0	5804
126-i	125	-35557	0	3068	36459	0	2763	-16	0	5804
126-j	126	-35557	0	3068	36459	0	2763	-16	0	5804
127-i	126	-35557	0	3068	36459	0	2763	-16	0	5804
127-j	127	-35557	0	3068	36459	0	2763	-16	0	5804
128-i	127	-35557	0	3068	36459	0	2763	-16	0	5804
128-j	128	-35557	0	3068	36459	0	2763	-16	0	5804
129-i	128	-35557	0	3068	36459	0	2763	-16	0	5804
129-j	129	-35557	0	3068	36459	0	2763	-16	0	5804
130-i	129	-35557	0	3068	36459	0	2763	-16	0	5804
130-j	130	-35557	0	3068	36459	0	2763	-16	0	5804
131-i	130	-35557	0	3068	36459	0	2763	-16	0	5804
131-j	131	-35557	0	3068	36459	0	2763	-16	0	5804
132-i	131	-35557	0	3068	36459	0	2763	-16	0	5804
132-j	132	-35557	0	3068	36459	0	2763	-16	0	5804
133-i	132	-35557	0	3068	36459	0	2763	-16	0	5804
133-j	133	-35557	0	3068	36459	0	2763	-16	0	5804
134-i	133	-35557	0	3068	36459	0	2763	-16	0	5804
134-j	134	-35557	0	3068	36459	0	2763	-16	0	5804
135-i	134	-35557	0	3068	36459	0	2763	-16	0	5804
135-j	135	-35557	0	3068	36459	0	2763	-16	0	5804
136-i	135	-35557	0	3068	36459	0	2763	-16	0	5804
136-j	136	-35557	0	3068	36459	0	2763	-16	0	5804
201-i	6	0	0	-104	0	0	68	0	0	68
201-j	102	0	0	-104	0	0	68	0	0	68
202-i	8	0	0	-98	0	0	50	0	0	50
202-j	103	0	0	-98	0	0	50	0	0	50
203-i	10	0	0	-92	0	0	32	0	0	34
203-j	104	0	0	-92	0	0	32	0	0	34
204-i	12	0	0	-85	0	0	13	0	0	23
204-j	105	0	0	-85	0	0	13	0	0	23
205-i	14	0	0	-78	0	0	-6	0	0	13
205-j	106	0	0	-78	0	0	-6	0	0	13
206-i	16	0	0	-70	0	0	-25	0	0	7
206-j	107	0	0	-70	0	0	-25	0	0	7
207-i	18	0	0	-62	0	0	-43	0	0	4
207-j	108	0	0	-62	0	0	-43	0	0	4
208-i	20	0	0	-37	0	0	-42	0	0	1
208-j	109	0	0	-37	0	0	-42	0	0	1
209-i	22	0	0	-31	0	0	-54	0	0	0
209-j	110	0	0	-31	0	0	-54	0	0	0
210-i	24	0	0	-24	0	0	-64	0	0	0
210-j	111	0	0	-24	0	0	-65	0	0	0
211-i	26	0	0	-17	0	0	-72	0	0	0
211-j	112	0	0	-17	0	0	-73	0	0	0
212-i	28	0	0	-10	0	0	-79	0	0	1
212-j	113	0	0	-10	0	0	-80	0	0	1
213-i	30	0	0	-3	0	0	-84	0	0	4
213-j	114	0	0	-3	0	0	-86	0	0	4

Membar No.	Joint No.	Live Load Smax (L)			Live Load Smin (L)			Live Load Nmax (L)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
214-i	32	0	0	3	0	0	-90	0	0	7
214-j	115	0	0	4	0	0	-90	0	0	7
301-i	82	0	0	70	0	0	-105	0	0	70
301-j	102	0	0	70	0	0	-103	0	0	70
302-i	80	0	0	52	0	0	-99	0	0	52
302-j	103	0	0	52	0	0	-97	0	0	52
303-i	78	0	0	33	0	0	-92	0	0	36
303-j	104	0	0	33	0	0	-92	0	0	36
304-i	76	0	0	14	0	0	-86	0	0	24
304-j	105	0	0	14	0	0	-85	0	0	24
305-i	74	0	0	-5	0	0	-78	0	0	14
305-j	106	0	0	-5	0	0	-78	0	0	14
306-i	72	0	0	-24	0	0	-70	0	0	8
306-j	107	0	0	-24	0	0	-70	0	0	8
307-i	70	0	0	-43	0	0	-62	0	0	4
307-j	108	0	0	-43	0	0	-62	0	0	4
308-i	68	0	0	-43	0	0	-38	0	0	1
308-j	109	0	0	-43	0	0	-37	0	0	1
309-i	66	0	0	-55	0	0	-31	0	0	0
309-j	110	0	0	-55	0	0	-31	0	0	0
310-i	64	0	0	-65	0	0	-24	0	0	0
310-j	111	0	0	-65	0	0	-24	0	0	0
311-i	62	0	0	-75	0	0	-17	0	0	0
311-j	112	0	0	-75	0	0	-17	0	0	0
312-i	60	0	0	-81	0	0	-10	0	0	2
312-j	113	0	0	-82	0	0	-10	0	0	2
313-i	58	0	0	-86	0	0	-2	0	0	4
313-j	114	0	0	-88	0	0	-2	0	0	4
314-i	56	0	0	-91	0	0	5	0	0	8
314-j	115	0	0	-91	0	0	5	0	0	8

Membar No.	Joint No.	Live Load Nmin (L)			Shrinkage (T)			Thermal Rise (T)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
1-i	1	0	-307	-6	0	471	9	0	-142	-3
1-j	2	-537	-307	-6	825	471	9	-248	-142	-3
2-i	2	22	-309	-6	825	471	9	-248	-142	-3
2-j	3	-1527	-310	-6	3182	471	9	-957	-142	-3
3-i	3	921	-337	-7	3182	471	9	-957	-142	-3
3-j	4	-641	-340	-7	5350	471	9	-1609	-142	-3
4-i	4	2329	-380	-8	5350	471	9	-1609	-142	-3
4-j	5	406	-385	-8	7706	471	9	-2317	-142	-3
5-i	5	4242	-455	-9	7706	471	9	-2317	-142	-3
5-j	6	4105	-455	-9	7848	471	9	-2360	-142	-3
6-i	6	21719	810	-58	7848	375	-422	-2360	-113	128
6-j	7	24205	492	-58	9612	375	-422	-2889	-113	128
7-i	7	25474	602	-62	9612	375	-422	-2889	-113	128
7-j	8	25582	358	-62	9724	375	-422	-2923	-113	128
8-i	8	27982	685	-114	9724	278	-848	-2923	-83	257
8-j	9	29804	298	-114	11031	278	-848	-3314	-83	257
9-i	9	31253	515	-118	11031	278	-848	-3314	-83	257
9-j	10	31335	271	-118	11115	278	-848	-3339	-83	257
10-i	10	31418	497	-152	11115	180	-1266	-3339	-54	382
10-j	11	32358	110	-152	11959	180	-1266	-3591	-54	382
11-i	11	33346	336	-155	11959	180	-1266	-3591	-54	382
11-j	12	33374	91	-155	12013	180	-1266	-3607	-54	382
12-i	12	33204	328	-171	12013	80	-1678	-3607	-24	506
12-j	13	33351	-59	-171	12389	80	-1678	-3719	-24	506
13-i	13	33548	-89	-173	12389	80	-1678	-3719	-24	506
13-j	14	33521	-91	-173	12412	80	-1678	-3726	-24	506
14-i	14	28097	142	-172	12412	-22	-2083	-3726	6	626
14-j	15	28214	-1	-172	12309	-22	-2083	-3696	6	626
15-i	15	29705	-132	-173	12309	-22	-2083	-3696	6	626
15-j	16	29665	-134	-173	12303	-22	-2083	-3694	6	626
16-i	16	17920	386	-164	12303	-126	-2483	-3694	37	744
16-j	17	19676	361	-164	11711	-126	-2483	-3520	37	744
17-i	17	19676	361	-164	11711	-126	-2483	-3520	37	744
17-j	18	19784	359	-164	11673	-126	-2483	-3509	37	744
18-i	18	17178	348	-150	11673	-233	-2877	-3509	68	859
18-j	19	18756	326	-150	10578	-233	-2877	-3188	68	859
19-i	19	18813	324	-151	10578	-233	-2877	-3188	68	859
19-j	20	18910	323	-151	10508	-233	-2877	-3167	68	859
20-i	20	15860	295	-134	10508	-311	-3153	-3167	91	938
20-j	21	17249	295	-134	9046	-311	-3153	-2741	91	938
21-i	21	20798	337	-135	9046	-311	-3153	-2741	91	938
21-j	22	20854	189	-135	8953	-311	-3153	-2714	91	938
22-i	22	13525	232	-113	8953	-392	-3427	-2714	114	1016
22-j	23	14617	232	-113	7108	-392	-3427	-2179	114	1016
23-i	23	18392	276	-115	7108	-392	-3427	-2179	114	1016
23-j	24	18431	128	-115	6991	-392	-3427	-2144	114	1016
24-i	24	9662	153	-93	6991	-478	-3699	-2144	138	1092
24-j	25	10381	153	-93	4745	-478	-3699	-1497	138	1092
25-i	25	15182	-268	-94	4745	-478	-3699	-1497	138	1092
25-j	26	15101	-269	-94	4601	-478	-3699	-1456	138	1092
26-i	26	6757	99	-78	4601	-568	-3971	-1456	162	1166
26-j	27	7223	99	-78	1931	-568	-3971	-693	162	1166
27-i	27	8418	-41	-78	1931	-568	-3971	-693	162	1166
27-j	28	8405	-42	-78	1760	-568	-3971	-644	162	1166

Membar No.	Joint No.	Live Load Nmin (L)			Shrinkage (T)			Thermal Rise (T)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
28-i	28	5945	84	-63	1760	-665	-4243	-644	188	1239
28-j	29	6340	84	-63	-1365	-665	-4243	241	188	1239
29-i	29	6465	76	-63	-1365	-665	-4243	241	188	1239
29-j	30	6488	75	-63	-1565	-665	-4243	297	188	1239
30-i	30	4917	68	-49	-1565	-769	-4515	297	215	1309
30-j	31	5235	68	-49	-5182	-769	-4515	1309	215	1309
31-i	31	5312	62	-49	-5182	-769	-4515	1309	215	1309
31-j	32	5331	61	-49	-5413	-769	-4515	1374	215	1309
32-i	32	4360	60	-36	-5413	-884	-4788	1374	244	1378
32-j	33	4641	60	-36	-9568	-884	-4788	2521	244	1378
33-i	33	4849	58	-36	-9568	-884	-4788	2521	244	1378
33-j	34	5057	34	-36	-13105	-884	-4788	3619	244	1378
34-i	34	5800	44	-37	-13105	-884	-4788	3619	244	1378
34-j	35	5636	-127	-37	-16641	-884	-4788	4717	244	1378
35-i	35	6578	-328	-44	-16641	-884	-4788	4717	244	1378
35-j	36	4545	-593	-44	-20178	-884	-4788	5693	244	1378
36-i	36	5154	-606	-49	-20178	-884	-4788	5693	244	1378
36-j	37	2686	-628	-49	-23714	-884	-4788	6669	244	1378
37-i	37	2496	-770	-52	-23714	-884	-4788	6669	244	1378
37-j	38	-767	-938	-52	-27251	-884	-4788	7645	244	1378
38-i	38	-296	-1112	-58	-27251	-884	-4788	7645	244	1378
38-j	39	-4279	-1190	-58	-30787	-884	-4788	8499	244	1378
39-i	39	-3451	-1136	-61	-30787	-884	-4788	8499	244	1378
39-j	40	-7785	-1273	-61	-34324	-884	-4788	9354	244	1378
40-i	40	-6099	-1283	-63	-34324	-884	-4788	9354	244	1378
40-j	41	-9000	-1295	-63	-36313	-884	-4788	9903	244	1378
41-i	41	-8923	-1295	-63	-36313	-884	-4788	9903	244	1378
41-j	42	-13162	-1313	-63	-39187	-884	-4788	10696	244	1378
42-i	42	-13162	-1313	-63	-39187	-884	-4788	10696	244	1378
42-j	43	-15303	-1322	-63	-40623	-884	-4788	11092	244	1378
43-i	43	-15303	-1322	-63	-40623	-884	-4788	11092	244	1378
43-j	44	-15799	-1324	-63	-40955	-884	-4788	11184	244	1378
44-i	44	-13762	1106	-13	-40913	885	-4765	11227	-245	1376
44-j	45	-13347	1105	-13	-40581	885	-4765	11135	-245	1376
45-i	45	-13347	1107	-13	-40581	885	-4765	11135	-245	1376
45-j	46	-11550	1105	-13	-39143	885	-4765	10737	-245	1376
46-i	46	-8766	1133	-13	-39143	885	-4765	10737	-245	1376
46-j	47	-5589	972	-13	-36267	885	-4765	9940	-245	1376
47-i	47	-3350	917	-17	-36267	885	-4765	9940	-245	1376
47-j	48	-1847	662	-17	-34276	885	-4765	9388	-245	1376
48-i	48	-2386	898	-21	-34276	885	-4765	9388	-245	1376
48-j	49	-128	636	-21	-30737	885	-4765	8530	-245	1376
49-i	49	-904	866	-25	-30737	885	-4765	8530	-245	1376
49-j	50	1242	604	-25	-27197	885	-4765	7672	-245	1376
50-i	50	2389	638	-28	-27197	885	-4765	7672	-245	1376
50-j	51	3235	71	-28	-23657	885	-4765	6691	-245	1376
51-i	51	3823	364	-35	-23657	885	-4765	6691	-245	1376
51-j	52	4151	-19	-35	-20118	885	-4765	5710	-245	1376
52-i	52	4568	93	-38	-20118	885	-4765	5710	-245	1376
52-j	53	4489	-47	-38	-16578	885	-4765	4730	-245	1376
53-i	53	5388	-47	-39	-16578	885	-4765	4730	-245	1376
53-j	54	5129	-63	-39	-13038	885	-4765	3626	-245	1376
54-i	54	5234	-59	-39	-13038	885	-4765	3626	-245	1376
54-j	55	4947	-65	-39	-9499	885	-4765	2523	-245	1376

Membar No.	Joint No.	Live Load Nmin (L)			Shrinkage (T)			Thermal Rise (T)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
55-i	55	4996	-65	-39	-9499	885	-4765	2523	-245	1376
55-j	56	4689	-65	-39	-5340	885	-4765	1371	-245	1376
56-i	56	5705	-74	-54	-5340	770	-4496	1371	-216	1308
56-j	57	5683	-74	-54	-5109	770	-4496	1306	-216	1308
57-i	57	5683	-74	-54	-5109	770	-4496	1306	-216	1308
57-j	58	5334	-74	-54	-1489	770	-4496	289	-216	1308
58-i	58	6471	-85	-69	-1489	665	-4228	289	-189	1238
58-j	59	6445	-85	-69	-1289	665	-4228	232	-189	1238
59-i	59	6451	-86	-69	-1289	665	-4228	232	-189	1238
59-j	60	6049	-86	-69	1838	665	-4228	-657	-189	1238
60-i	60	7614	-104	-85	1838	568	-3959	-657	-163	1166
60-j	61	7583	-104	-85	2008	568	-3959	-706	-163	1166
61-i	61	7629	-103	-85	2008	568	-3959	-706	-163	1166
61-j	62	7135	-105	-85	4680	568	-3959	-1473	-163	1166
62-i	62	13217	-196	-104	4680	478	-3691	-1473	-138	1093
62-j	63	13158	-197	-104	4823	478	-3691	-1514	-138	1093
63-i	63	13243	-194	-104	4823	478	-3691	-1514	-138	1093
63-j	64	12313	-198	-104	7070	478	-3691	-2164	-138	1093
64-i	64	17947	-285	-130	7070	392	-3422	-2164	-114	1017
64-j	65	17861	-286	-130	7188	392	-3422	-2199	-114	1017
65-i	65	18038	-282	-130	7188	392	-3422	-2199	-114	1017
65-j	66	16683	-289	-130	9032	392	-3422	-2736	-114	1017
66-i	66	19313	-329	-154	9032	311	-3151	-2736	-91	940
66-j	67	19214	-330	-154	9126	311	-3151	-2764	-91	940
67-i	67	19390	-324	-154	9126	311	-3151	-2764	-91	940
67-j	68	17830	-334	-154	10587	311	-3151	-3192	-91	940
68-i	68	19280	-356	-172	10588	233	-2878	-3192	-69	861
68-j	69	19173	-357	-172	10657	233	-2878	-3213	-69	861
69-i	69	19393	-350	-172	10657	233	-2878	-3213	-69	861
69-j	70	17705	-362	-172	11751	233	-2878	-3535	-69	861
70-i	70	20672	-410	-188	11751	126	-2487	-3535	-37	747
70-j	71	20549	-412	-188	11789	126	-2487	-3546	-37	747
71-i	71	20699	-407	-188	11789	126	-2487	-3546	-37	747
71-j	72	18729	-427	-188	12379	126	-2487	-3721	-37	747
72-i	72	22095	-479	-194	12379	21	-2090	-3721	-6	630
72-j	73	21951	-481	-194	12385	21	-2090	-3723	-6	630
73-i	73	21951	-481	-194	12385	21	-2090	-3723	-6	630
73-j	74	19631	-506	-194	12485	21	-2090	-3753	-6	630
74-i	74	27953	-694	-190	12485	-81	-1688	-3753	24	510
74-j	75	27744	-696	-190	12461	-81	-1688	-3745	24	510
75-i	75	30216	-655	-191	12461	-81	-1688	-3745	24	510
75-j	76	26867	-799	-191	12081	-81	-1688	-3633	24	510
76-i	76	30640	-777	-177	12081	-181	-1279	-3633	54	387
76-j	77	30406	-779	-177	12027	-181	-1279	-3616	54	387
77-i	77	30595	-786	-178	12027	-181	-1279	-3616	54	387
77-j	78	26648	-929	-178	11176	-181	-1279	-3362	54	387
78-i	78	30197	-919	-147	11176	-280	-863	-3362	84	262
78-j	79	29921	-921	-147	11092	-280	-863	-3337	84	262
79-i	79	30050	-929	-148	11092	-280	-863	-3337	84	262
79-j	80	25429	-1073	-148	9777	-280	-863	-2943	84	262
80-i	80	27529	-1099	-96	9777	-377	-439	-2943	113	134
80-j	81	27199	-1101	-96	9664	-377	-439	-2909	113	134
81-i	81	27342	-1109	-97	9664	-377	-439	-2909	113	134
81-j	82	21876	-1252	-97	7890	-377	-439	-2376	113	134

Membar No.	Joint No.	Live Load Nmin (L)			Shrinkage (T)			Thermal Rise (T)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
82-i	82	21962	-1318	-26	7890	-474	-9	-2376	143	3
82-j	83	21566	-1319	-26	7748	-474	-9	-2333	143	3
83-i	83	23174	-1301	-27	7748	-474	-9	-2333	143	3
83-j	84	16371	-1442	-27	5378	-474	-9	-1620	143	3
84-i	84	17955	-1477	-31	5378	-474	-9	-1620	143	3
84-j	85	10921	-1618	-31	3199	-474	-9	-963	143	3
85-i	85	11639	-1648	-34	3199	-474	-9	-963	143	3
85-j	86	3119	-1782	-34	829	-474	-9	-250	143	3
86-i	86	3170	-1806	-36	829	-474	-9	-250	143	3
86-j	87	0	-1816	-36	0	-474	-9	0	143	3
101-i	101	0	0	0	0	0	0	0	0	0
101-j	102	0	0	0	0	0	0	0	0	0
102-i	102	0	41	0	0	-2	-192	0	1	58
102-j	103	20	41	0	-1	-2	-192	0	1	58
103-i	103	16	62	-1	-1	-4	-387	0	2	117
103-j	104	47	62	-1	-3	-4	-387	1	2	117
104-i	104	39	73	-1	-3	-5	-584	1	3	177
104-j	105	75	73	-1	-5	-5	-584	3	3	177
105-i	105	62	77	-1	-5	-7	-784	3	3	237
105-j	106	101	77	-1	-9	-7	-784	4	3	237
106-i	106	77	70	-1	-9	-8	-988	4	4	297
106-j	107	112	70	-1	-13	-8	-988	6	4	297
107-i	107	85	60	-1	-13	-9	-1197	6	5	359
107-j	108	115	60	-1	-17	-9	-1197	8	5	359
108-i	108	78	44	-1	-17	-10	-1411	8	5	421
108-j	109	100	44	-1	-22	-10	-1411	11	5	421
109-i	109	90	41	0	-22	-10	-1567	11	6	466
109-j	110	111	41	0	-27	-10	-1567	14	6	466
110-i	110	88	34	0	-27	-10	-1730	14	6	513
110-j	111	105	34	0	-32	-10	-1730	17	6	513
111-i	111	80	26	0	-32	-11	-1901	17	6	560
111-j	112	93	26	0	-38	-11	-1901	20	6	560
112-i	112	70	19	0	-38	-11	-2082	20	7	610
112-j	113	80	19	0	-43	-11	-2082	24	7	610
113-i	113	58	14	0	-43	-11	-2275	24	7	662
113-j	114	65	14	0	-49	-11	-2275	27	7	662
114-i	114	48	10	0	-49	-12	-2485	27	7	716
114-j	115	53	10	0	-55	-12	-2485	31	7	716
115-i	115	39	7	0	-55	-12	-2714	31	8	773
115-j	116	59	7	0	-92	-12	-2714	54	8	773
116-i	116	59	7	0	-92	-12	-2714	54	8	773
116-j	117	79	7	0	-130	-12	-2714	78	8	773
117-i	117	79	7	0	-130	-12	-2714	78	8	773
117-j	118	111	7	0	-192	-12	-2714	117	8	773
118-i	118	111	7	0	-192	-12	-2714	117	8	773
118-j	119	144	7	0	-255	-12	-2714	156	8	773
119-i	119	144	7	0	-255	-12	-2714	156	8	773
119-j	44	151	7	0	-267	-12	-2714	164	8	773
120-i	44	0	0	0	-309	0	-945	120	0	284
120-j	120	0	0	0	-309	0	-945	120	0	284
121-i	120	0	0	0	-309	0	-945	120	0	284
121-j	121	0	0	0	-309	0	-945	120	0	284
122-i	121	0	0	0	-309	0	-945	120	0	284
122-j	122	0	0	0	-309	0	-945	120	0	284

Membar No.	Joint No.	Live Load Nmin (L)			Shrinkage (T)			Thermal Rise (T)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
123-i	122	0	0	0	-309	0	-945	120	0	284
123-j	123	0	0	0	-309	0	-945	120	0	284
124-i	123	0	0	0	-309	0	-945	120	0	284
124-j	124	0	0	0	-309	0	-945	120	0	284
125-i	124	0	0	0	-309	0	-945	120	0	284
125-j	125	0	0	0	-309	0	-945	120	0	284
126-i	125	0	0	0	-309	0	-945	120	0	284
126-j	126	0	0	0	-309	0	-945	120	0	284
127-i	126	0	0	0	-309	0	-945	120	0	284
127-j	127	0	0	0	-309	0	-945	120	0	284
128-i	127	0	0	0	-309	0	-945	120	0	284
128-j	128	0	0	0	-309	0	-945	120	0	284
129-i	128	0	0	0	-309	0	-945	120	0	284
129-j	129	0	0	0	-309	0	-945	120	0	284
130-i	129	0	0	0	-309	0	-945	120	0	284
130-j	130	0	0	0	-309	0	-945	120	0	284
131-i	130	0	0	0	-309	0	-945	120	0	284
131-j	131	0	0	0	-309	0	-945	120	0	284
132-i	131	0	0	0	-309	0	-945	120	0	284
132-j	132	0	0	0	-309	0	-945	120	0	284
133-i	132	0	0	0	-309	0	-945	120	0	284
133-j	133	0	0	0	-309	0	-945	120	0	284
134-i	133	0	0	0	-309	0	-945	120	0	284
134-j	134	0	0	0	-309	0	-945	120	0	284
135-i	134	0	0	0	-309	0	-945	120	0	284
135-j	135	0	0	0	-309	0	-945	120	0	284
136-i	135	0	0	0	-309	0	-945	120	0	284
136-j	136	0	0	0	-309	0	-945	120	0	284
201-i	6	0	0	-104	0	0	442	0	0	-134
201-j	102	0	0	-104	0	0	442	0	0	-134
202-i	8	0	0	-98	0	0	436	0	0	-132
202-j	103	0	0	-98	0	0	436	0	0	-132
203-i	10	0	0	-94	0	0	430	0	0	-129
203-j	104	0	0	-94	0	0	430	0	0	-129
204-i	12	0	0	-94	0	0	424	0	0	-127
204-j	105	0	0	-94	0	0	424	0	0	-127
205-i	14	0	0	-96	0	0	418	0	0	-124
205-j	106	0	0	-96	0	0	418	0	0	-124
206-i	16	0	0	-101	0	0	413	0	0	-122
206-j	107	0	0	-101	0	0	413	0	0	-122
207-i	18	0	0	-108	0	0	409	0	0	-119
207-j	108	0	0	-108	0	0	409	0	0	-119
208-i	20	0	0	-80	0	0	287	0	0	-83
208-j	109	0	0	-80	0	0	287	0	0	-83
209-i	22	0	0	-85	0	0	286	0	0	-81
209-j	110	0	0	-85	0	0	286	0	0	-81
210-i	24	0	0	-89	0	0	285	0	0	-80
210-j	111	0	0	-89	0	0	285	0	0	-80
211-i	26	0	0	-91	0	0	286	0	0	-78
211-j	112	0	0	-91	0	0	286	0	0	-78
212-i	28	0	0	-92	0	0	288	0	0	-77
212-j	113	0	0	-92	0	0	288	0	0	-77
213-i	30	0	0	-93	0	0	292	0	0	-76
213-j	114	0	0	-93	0	0	292	0	0	-76

Membar No.	Joint No.	Live Load Nmin (L)			Shrinkage (T)			Thermal Rise (T)		
		M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)	M (kN.m)	S (kN)	N (kN)
214-i	32	0	0	-93	0	0	296	0	0	-74
214-j	115	0	0	-93	0	0	296	0	0	-74
301-i	82	0	0	-105	0	0	441	0	0	-134
301-j	102	0	0	-105	0	0	441	0	0	-134
302-i	80	0	0	-99	0	0	434	0	0	-131
302-j	103	0	0	-99	0	0	434	0	0	-131
303-i	78	0	0	-94	0	0	428	0	0	-129
303-j	104	0	0	-94	0	0	428	0	0	-129
304-i	76	0	0	-95	0	0	421	0	0	-126
304-j	105	0	0	-95	0	0	421	0	0	-126
305-i	74	0	0	-96	0	0	415	0	0	-124
305-j	106	0	0	-96	0	0	415	0	0	-124
306-i	72	0	0	-101	0	0	410	0	0	-121
306-j	107	0	0	-101	0	0	410	0	0	-121
307-i	70	0	0	-108	0	0	405	0	0	-119
307-j	108	0	0	-108	0	0	405	0	0	-119
308-i	68	0	0	-81	0	0	284	0	0	-82
308-j	109	0	0	-81	0	0	284	0	0	-82
309-i	66	0	0	-85	0	0	283	0	0	-81
309-j	110	0	0	-85	0	0	283	0	0	-81
310-i	64	0	0	-89	0	0	282	0	0	-79
310-j	111	0	0	-89	0	0	282	0	0	-79
311-i	62	0	0	-91	0	0	283	0	0	-78
311-j	112	0	0	-91	0	0	283	0	0	-78
312-i	60	0	0	-93	0	0	285	0	0	-76
312-j	113	0	0	-93	0	0	285	0	0	-76
313-i	58	0	0	-94	0	0	288	0	0	-75
313-j	114	0	0	-94	0	0	288	0	0	-75
314-i	56	0	0	-94	0	0	293	0	0	-73
314-j	115	0	0	-94	0	0	293	0	0	-73

Membar No.	Joint No.	Temparature Difference (T)		
		M (kN.m)	S (kN)	N (kN)
1-i	1	-15033	214	-11190
1-j	2	-14659	214	-11190
2-i	2	-14659	827	-11190
2-j	3	-10523	827	-10961
3-i	3	-10523	214	-10961
3-j	4	-9540	214	-10961
4-i	4	-9540	214	-10961
4-j	5	-8472	214	-10961
5-i	5	-8472	214	-10961
5-j	6	-8408	214	-10961
6-i	6	-8408	217	-10945
6-j	7	-7386	217	-10945
7-i	7	-7386	217	-10945
7-j	8	-7321	217	-10945
8-i	8	-7321	221	-10930
8-j	9	-6284	221	-10930
9-i	9	-6284	221	-10930
9-j	10	-6217	221	-10930
10-i	10	-6217	224	-10916
10-j	11	-5165	224	-10916
11-i	11	-5165	224	-10916
11-j	12	-5098	224	-10916
12-i	12	-5098	227	-10904
12-j	13	-4031	227	-10904
13-i	13	-4031	227	-10904
13-j	14	-3963	227	-10904
14-i	14	-3963	230	-10892
14-j	15	-2882	230	-10892
15-i	15	-2882	230	-10892
15-j	16	-2813	230	-10892
16-i	16	-2813	233	-10880
16-j	17	-1718	233	-10880
17-i	17	-1718	233	-10880
17-j	18	-1648	233	-10880
18-i	18	-1648	236	-10867
18-j	19	-536	236	-10867
19-i	19	-536	236	-10867
19-j	20	-465	236	-10867
20-i	20	-465	239	-10858
20-j	21	659	239	-10858
21-i	21	659	239	-10858
21-j	22	730	239	-10858
22-i	22	730	242	-10847
22-j	23	1869	242	-10847
23-i	23	1869	242	-10847
23-j	24	1942	242	-10847
24-i	24	1942	246	-10836
24-j	25	3097	246	-10836
25-i	25	3097	219	-10836
25-j	26	3162	219	-10836
26-i	26	3162	225	-10824
26-j	27	4219	225	-10824
27-i	27	4219	182	-10824
27-j	28	4273	182	-10824

Membar No.	Joint No.	Temparature Difference (T)		
		M (kN.m)	S (kN)	N (kN)
28-i	28	4273	180	-10810
28-j	29	5120	180	-10810
29-i	29	5120	-193	-10810
29-j	30	5062	-193	-10814
30-i	30	5062	-146	-10800
30-j	31	4376	-146	-10841
31-i	31	4376	-224	-10841
31-j	32	4309	-224	-10844
32-i	32	4309	-181	-10830
32-j	33	3458	-181	-10872
33-i	33	3458	-254	-10872
33-j	34	2316	-254	-10918
34-i	34	2316	-241	-10918
34-j	35	1232	-241	-10949
35-i	35	1232	-308	-10949
35-j	36	1	-308	-10994
36-i	36	1	-343	-10994
36-j	37	-1372	-343	-11040
37-i	37	-1372	-361	-11040
37-j	38	-2817	-361	-11071
38-i	38	-2817	-416	-11071
38-j	39	-4274	-416	-11101
39-i	39	-4274	-539	-11101
39-j	40	-6159	-539	-11162
40-i	40	-6159	-319	-11162
40-j	41	-6876	-319	-11161
41-i	41	-6876	-327	-11161
41-j	42	-7941	-327	-11162
42-i	42	-7941	266	-11162
42-j	43	-7508	266	-11162
43-i	43	-7508	266	-11162
43-j	44	-7408	266	-11162
44-i	44	-7403	-267	-11171
44-j	45	-7503	-267	-11171
45-i	45	-7503	-267	-11171
45-j	46	-7936	-267	-11171
46-i	46	-7936	327	-11171
46-j	47	-6873	327	-11171
47-i	47	-6873	319	-11171
47-j	48	-6156	319	-11171
48-i	48	-6156	538	-11171
48-j	49	-4272	538	-11111
49-i	49	-4272	416	-11111
49-j	50	-2816	416	-11080
50-i	50	-2816	361	-11080
50-j	51	-1372	361	-11050
51-i	51	-1372	343	-11050
51-j	52	-1	343	-11004
52-i	52	-1	307	-11004
52-j	53	1230	307	-10958
53-i	53	1230	240	-10958
53-j	54	2312	240	-10928
54-i	54	2312	254	-10928
54-j	55	3453	254	-10882

Membar No.	Joint No.	Temparature Difference (T)		
		M (kN.m)	S (kN)	N (kN)
55-i	55	3453	181	-10882
55-j	56	4302	181	-10839
56-i	56	4302	224	-10854
56-j	57	4369	224	-10851
57-i	57	4369	146	-10851
57-j	58	5055	146	-10810
58-i	58	5055	193	-10824
58-j	59	5113	193	-10820
59-i	59	5113	-180	-10820
59-j	60	4265	-180	-10820
60-i	60	4265	-182	-10833
60-j	61	4211	-182	-10833
61-i	61	4211	-225	-10833
61-j	62	3155	-225	-10833
62-i	62	3155	-219	-10846
62-j	63	3089	-219	-10846
63-i	63	3089	-246	-10846
63-j	64	1934	-246	-10846
64-i	64	1934	-242	-10857
64-j	65	1862	-242	-10857
65-i	65	1862	-242	-10857
65-j	66	724	-242	-10857
66-i	66	724	-239	-10867
66-j	67	652	-239	-10867
67-i	67	652	-239	-10867
67-j	68	-472	-239	-10867
68-i	68	-472	-236	-10876
68-j	69	-542	-236	-10876
69-i	69	-542	-236	-10876
69-j	70	-1653	-236	-10876
70-i	70	-1653	-233	-10889
70-j	71	-1723	-233	-10889
71-i	71	-1723	-233	-10889
71-j	72	-2818	-233	-10889
72-i	72	-2818	-230	-10901
72-j	73	-2887	-230	-10901
73-i	73	-2887	-230	-10901
73-j	74	-3968	-230	-10901
74-i	74	-3968	-227	-10913
74-j	75	-4036	-227	-10913
75-i	75	-4036	-227	-10913
75-j	76	-5102	-227	-10913
76-i	76	-5102	-224	-10925
76-j	77	-5169	-224	-10925
77-i	77	-5169	-224	-10925
77-j	78	-6221	-224	-10925
78-i	78	-6221	-221	-10938
78-j	79	-6287	-221	-10938
79-i	79	-6287	-221	-10938
79-j	80	-7324	-221	-10938
80-i	80	-7324	-217	-10953
80-j	81	-7389	-217	-10953
81-i	81	-7389	-217	-10953
81-j	82	-8410	-217	-10953

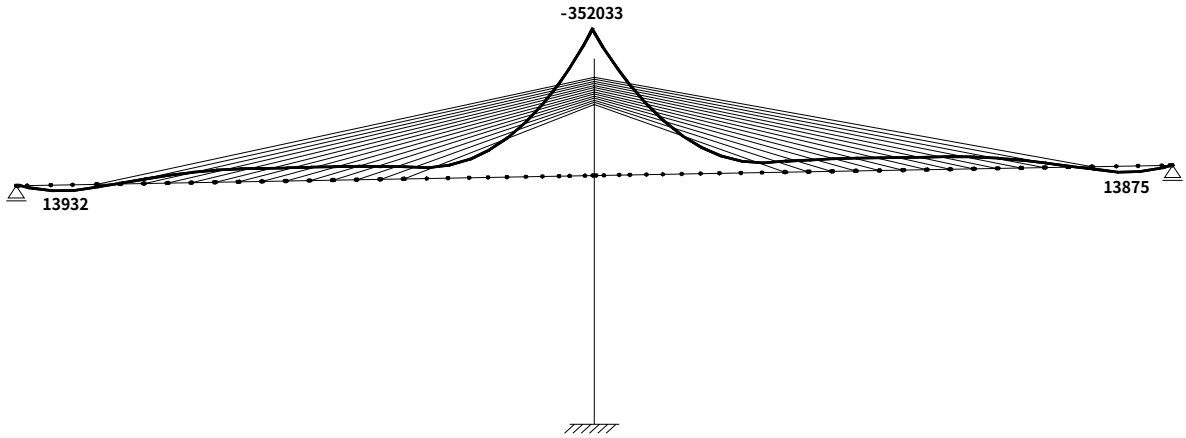
Membar No.	Joint No.	Temparature Difference (T)		
		M (kN.m)	S (kN)	N (kN)
82-i	82	-8410	-213	-10970
82-j	83	-8475	-213	-10970
83-i	83	-8475	-213	-10970
83-j	84	-9542	-213	-10970
84-i	84	-9542	-213	-10970
84-j	85	-10524	-213	-10970
85-i	85	-10524	-827	-10970
85-j	86	-14659	-827	-11198
86-i	86	-14659	-213	-11198
86-j	87	-15033	-213	-11198
101-i	101	0	0	0
101-j	102	0	0	0
102-i	102	0	0	7
102-j	103	0	0	7
103-i	103	0	0	14
103-j	104	0	0	14
104-i	104	0	0	21
104-j	105	0	0	21
105-i	105	0	0	27
105-j	106	0	0	27
106-i	106	0	0	33
106-j	107	0	0	33
107-i	107	0	0	39
107-j	108	0	0	39
108-i	108	0	0	46
108-j	109	1	0	46
109-i	109	1	0	51
109-j	110	1	0	51
110-i	110	1	0	57
110-j	111	1	0	57
111-i	111	1	0	64
111-j	112	1	0	64
112-i	112	1	0	73
112-j	113	1	0	73
113-i	113	1	1	82
113-j	114	2	1	82
114-i	114	2	1	94
114-j	115	2	1	94
115-i	115	2	1	106
115-j	116	6	1	106
116-i	116	6	1	106
116-j	117	9	1	106
117-i	117	9	1	106
117-j	118	15	1	106
118-i	118	15	1	106
118-j	119	21	1	106
119-i	119	21	1	106
119-j	44	23	1	106
120-i	44	18	0	-427
120-j	120	18	0	-427
121-i	120	18	0	-427
121-j	121	18	0	-427
122-i	121	18	0	-427
122-j	122	18	0	-427

Membar No.	Joint No.	Temparature Difference (T)		
		M (kN.m)	S (kN)	N (kN)
123-i	122	18	0	-427
123-j	123	18	0	-427
124-i	123	18	0	-427
124-j	124	18	0	-427
125-i	124	18	0	-427
125-j	125	18	0	-427
126-i	125	18	0	-427
126-j	126	18	0	-427
127-i	126	18	0	-427
127-j	127	18	0	-427
128-i	127	18	0	-427
128-j	128	18	0	-427
129-i	128	18	0	-427
129-j	129	18	0	-427
130-i	129	18	0	-427
130-j	130	18	0	-427
131-i	130	18	0	-427
131-j	131	18	0	-427
132-i	131	18	0	-427
132-j	132	18	0	-427
133-i	132	18	0	-427
133-j	133	18	0	-427
134-i	133	18	0	-427
134-j	134	18	0	-427
135-i	134	18	0	-427
135-j	135	18	0	-427
136-i	135	18	0	-427
136-j	136	18	0	-427
201-i	6	0	0	-17
201-j	102	0	0	-17
202-i	8	0	0	-15
202-j	103	0	0	-15
203-i	10	0	0	-14
203-j	104	0	0	-14
204-i	12	0	0	-13
204-j	105	0	0	-13
205-i	14	0	0	-12
205-j	106	0	0	-12
206-i	16	0	0	-12
206-j	107	0	0	-12
207-i	18	0	0	-13
207-j	108	0	0	-13
208-i	20	0	0	-10
208-j	109	0	0	-10
209-i	22	0	0	-11

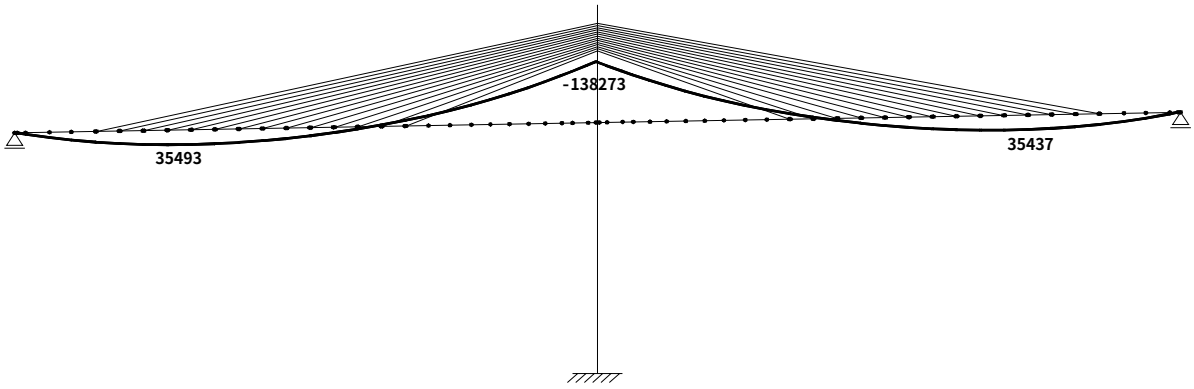
Membar No.	Joint No.	Temparature Difference (T)		
		M (kN.m)	S (kN)	N (kN)
209-j	110	0	0	-11
210-i	24	0	0	-12
210-j	111	0	0	-12
211-i	26	0	0	-13
211-j	112	0	0	-13
212-i	28	0	0	-14
212-j	113	0	0	-14
213-i	30	0	0	-15
213-j	114	0	0	-15
214-i	32	0	0	-16
214-j	115	0	0	-16
301-i	82	0	0	-17
301-j	102	0	0	-17
302-i	80	0	0	-15
302-j	103	0	0	-15
303-i	78	0	0	-14
303-j	104	0	0	-14
304-i	76	0	0	-13
304-j	105	0	0	-13
305-i	74	0	0	-12
305-j	106	0	0	-12
306-i	72	0	0	-12
306-j	107	0	0	-12
307-i	70	0	0	-13
307-j	108	0	0	-13
308-i	68	0	0	-10
308-j	109	0	0	-10
309-i	66	0	0	-11
309-j	110	0	0	-11
310-i	64	0	0	-12
310-j	111	0	0	-12
311-i	62	0	0	-13
311-j	112	0	0	-13
312-i	60	0	0	-14
312-j	113	0	0	-14
313-i	58	0	0	-15
313-j	114	0	0	-15
314-i	56	0	0	-16
314-j	115	0	0	-16

2.4.2 Bending Moment DIagram per Each Loadings

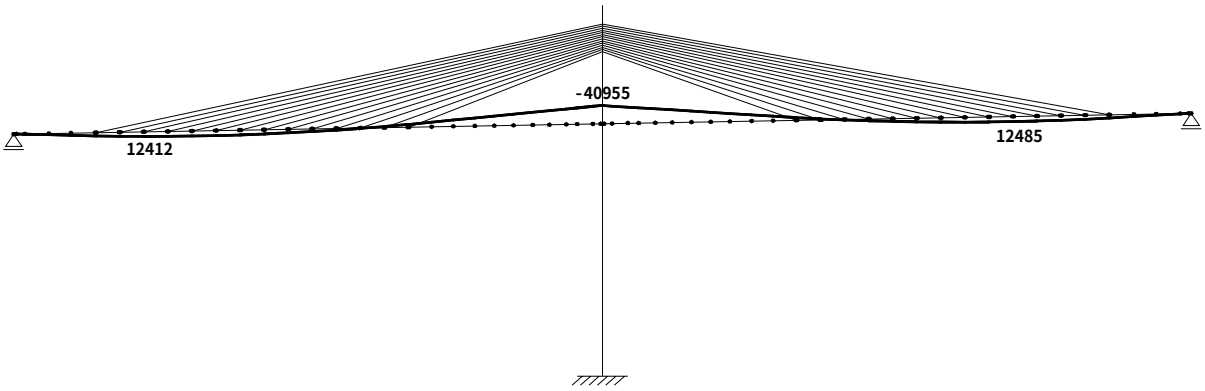
1) Self Weight (D)



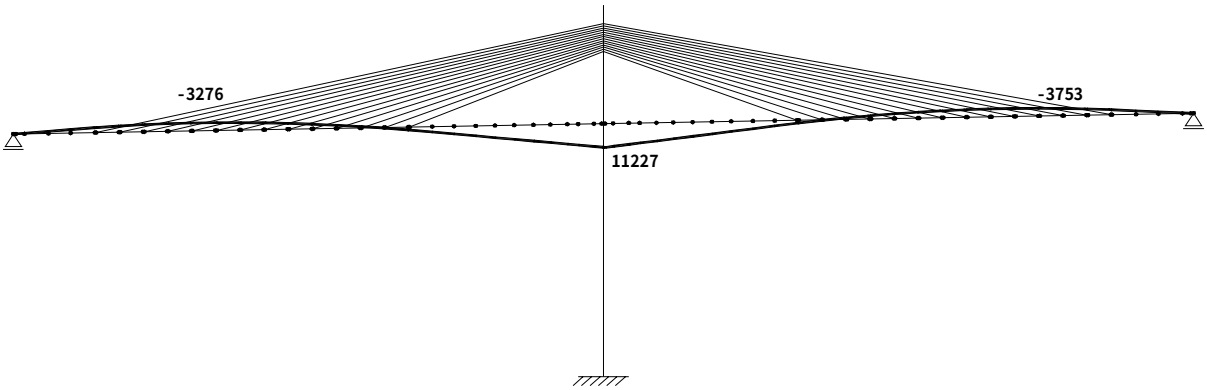
2) Surfacing (D)



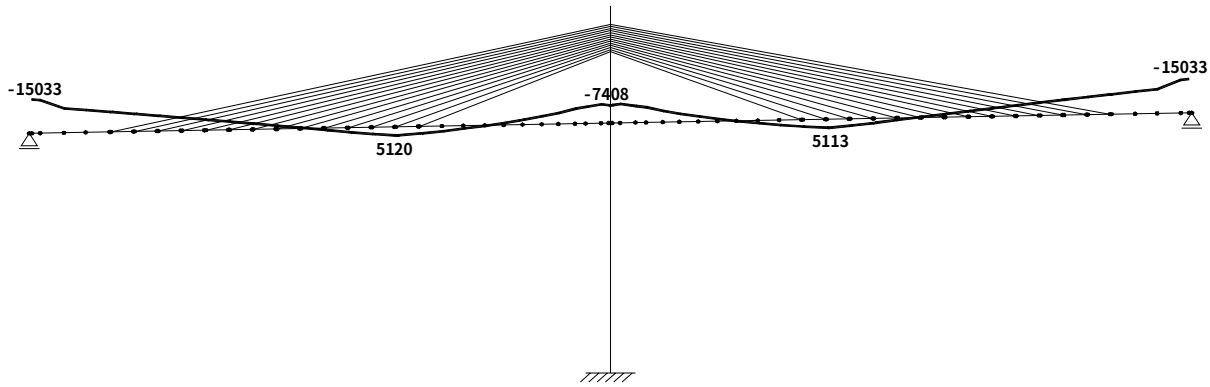
3) Shrinkage (S)



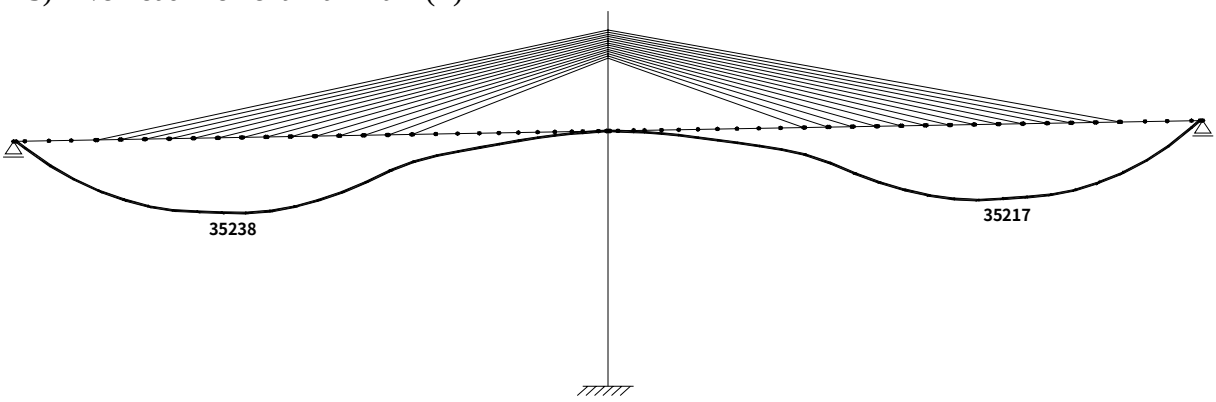
4) Temparature Rise (T)



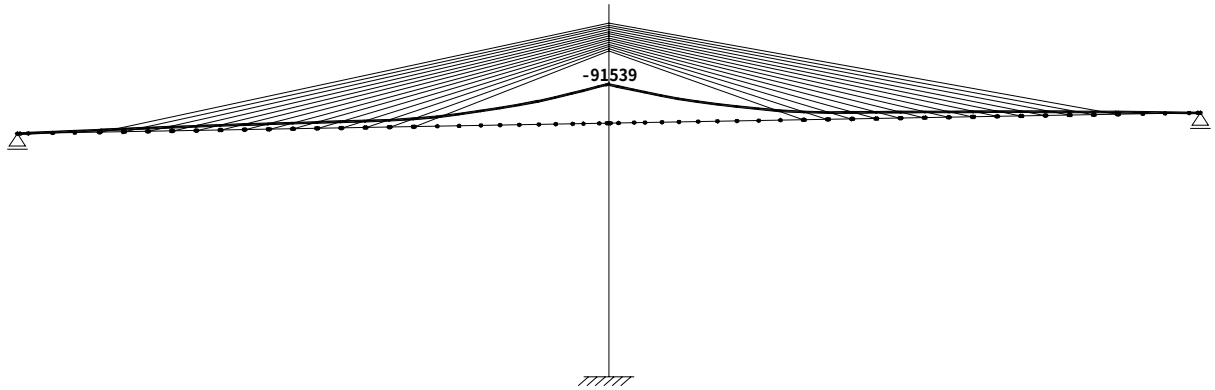
5) Temparature Difference (T)



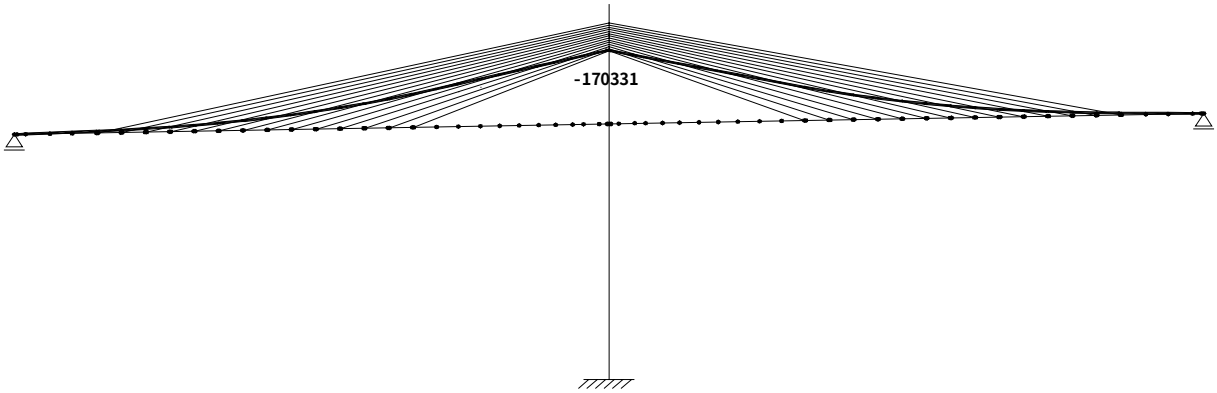
5) Live Load Moment Maximum (L)



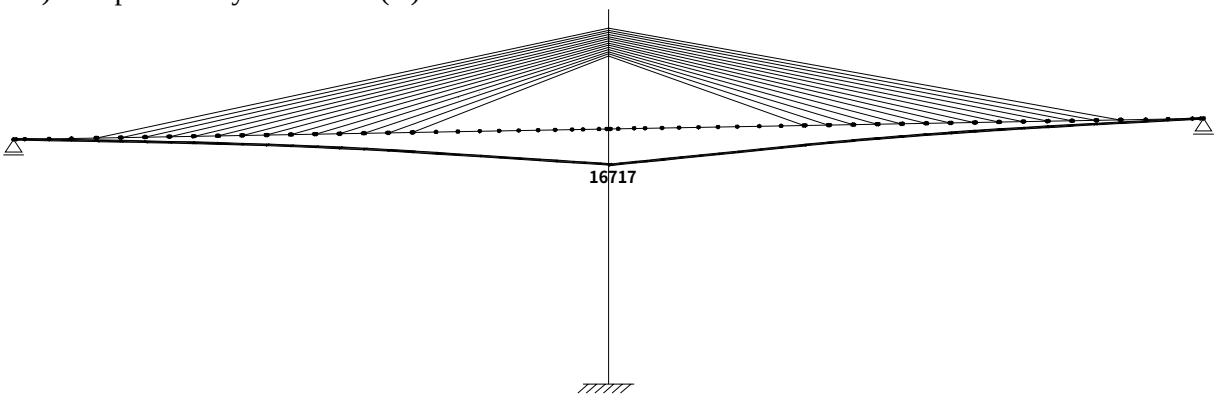
6) Live Load Moment Miniimum (L)



7) Secondary Force by Pre-Stress (D)

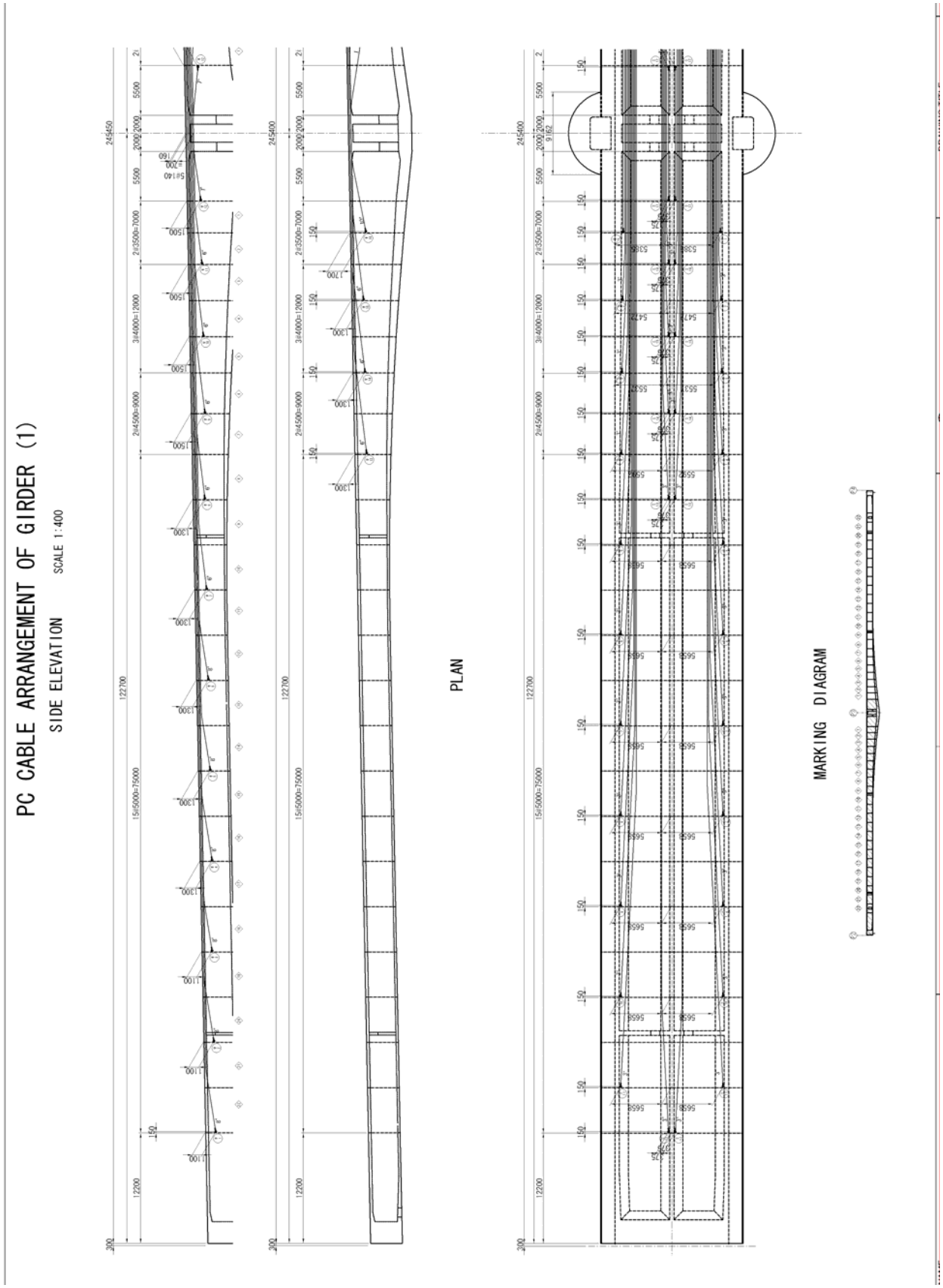


8) Creep Effect by Pre-Stress (D)



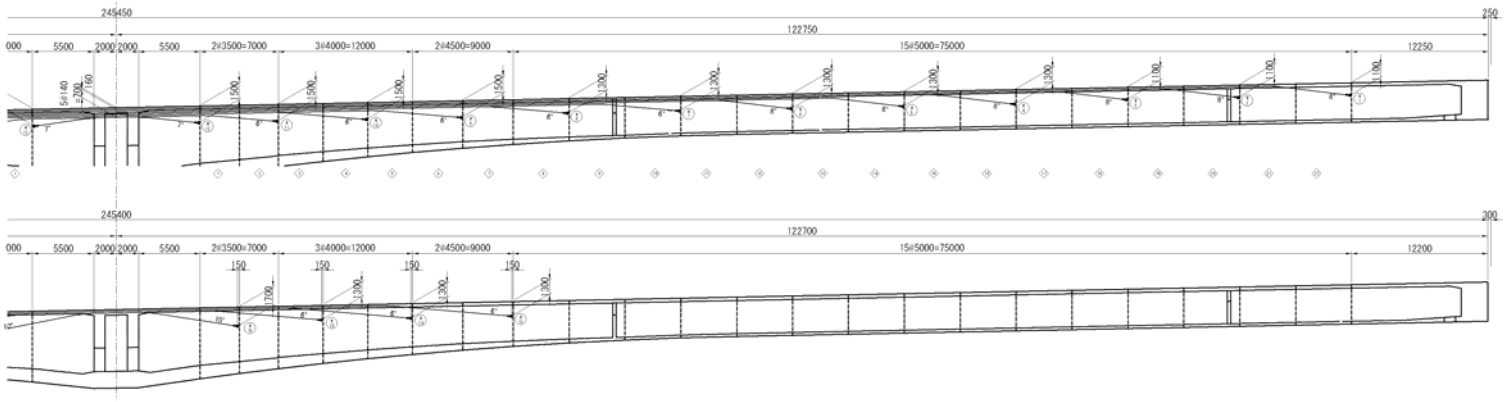
2.4.3 Calculation of Pre-Stress

1) Arrangement of Internal PC Cable

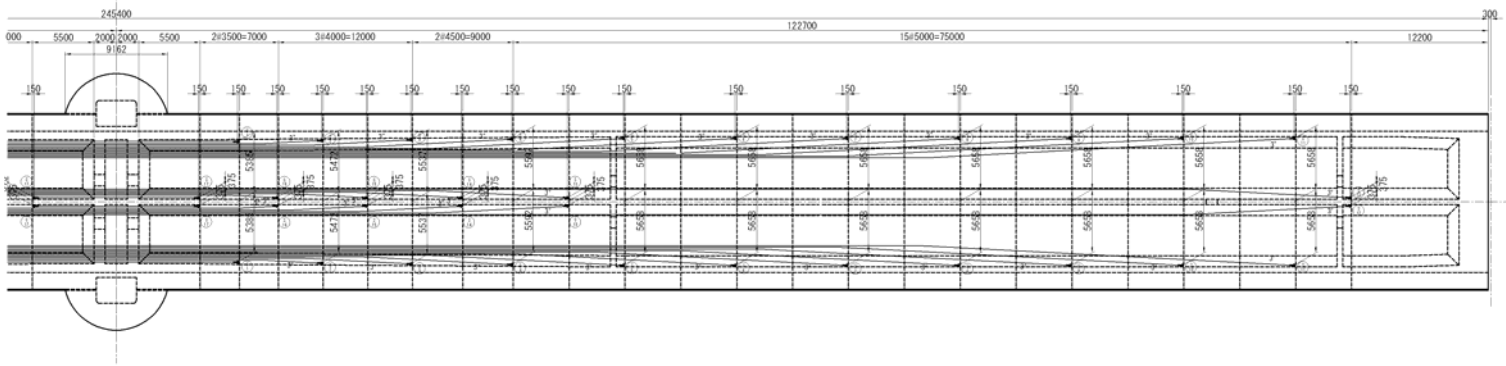


PC CABLE ARRANGEMENT OF GIRDER (2)

SIDE ELEVATION SCALE 1:400



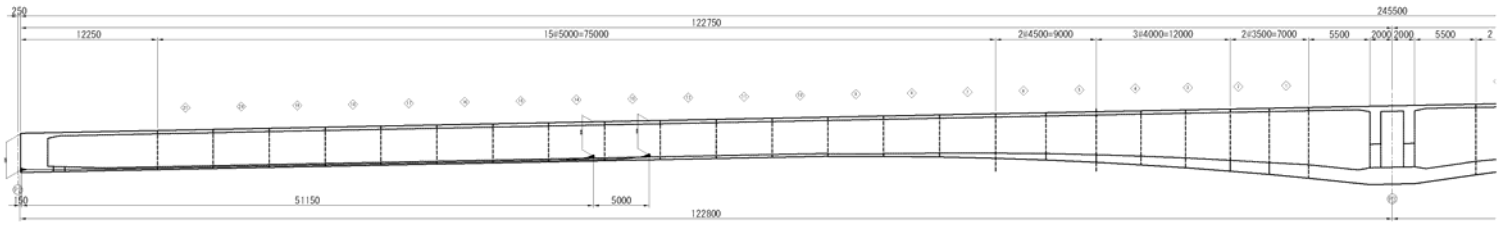
PLAN



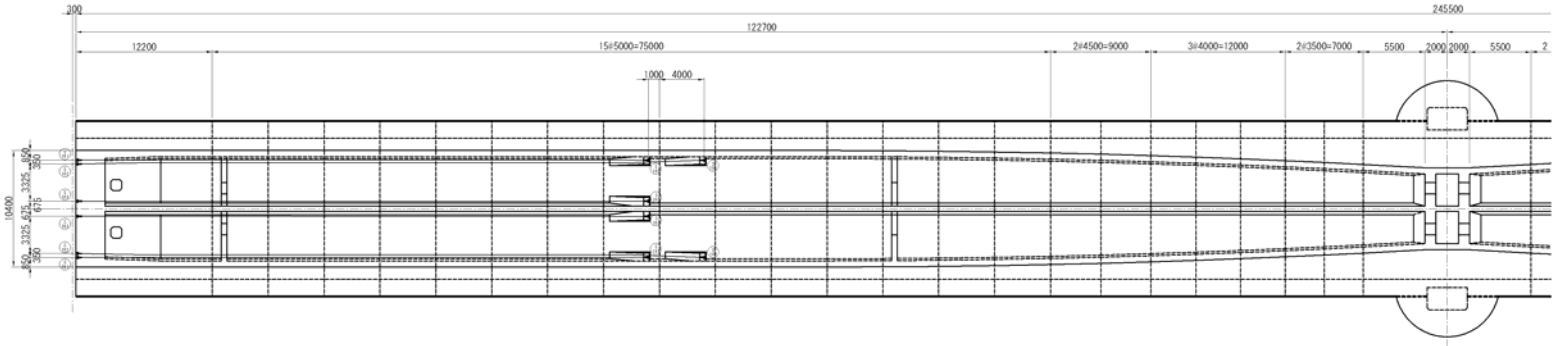
LOCATION DIAGRAM

PC CABLE ARRANGEMENT OF GIRDER (3)

SIDE ELEVATION SCALE 1:400



PLAN

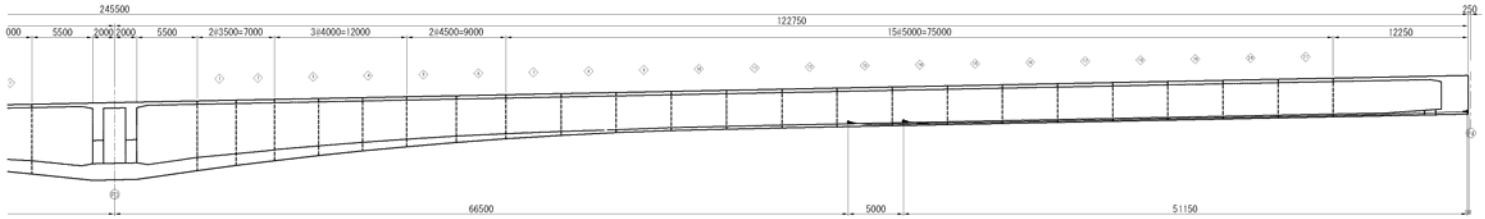


LOCATION DIAGRAM

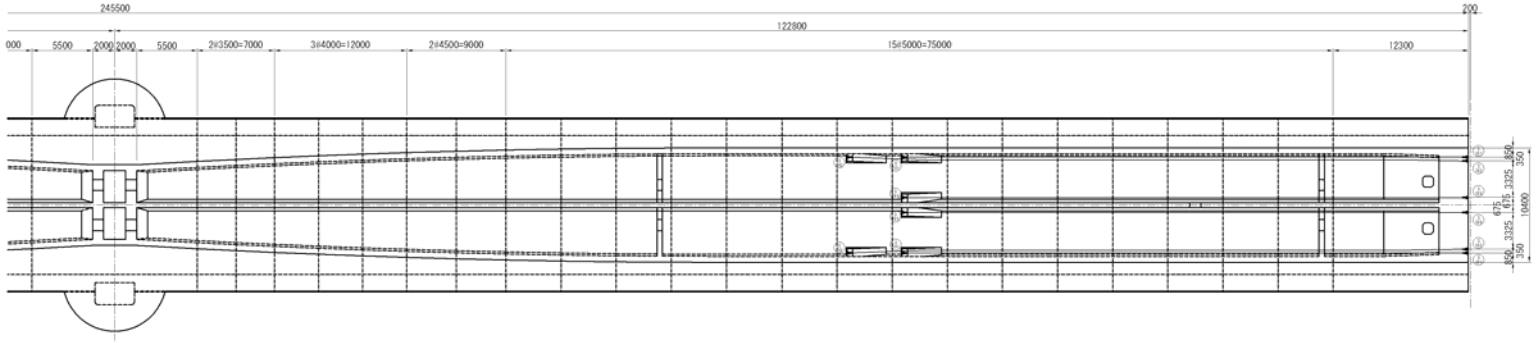
PROJECT NAME: DRAWING TITLE: DATE OF DWG:

PC CABLE ARRANGEMENT OF GIRDER (4)

SIDE ELEVATION SCALE 1:400



PLAN



LOCATION DIAGRAM

2.5 Design of Girder

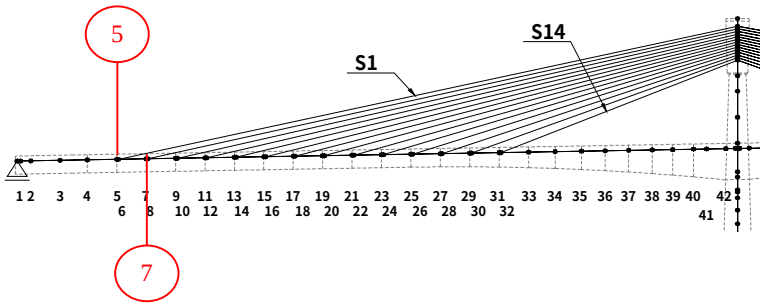
2.5.1 Service Load Design

1) Checking Bending Stress

		S1-Block Joint No. 5				S2-Block Joint No. 7			
		Sectional Force		σcu	σcl	Sectional Force		σcu	σcl
		M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)	M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)
Self Weight + Stay Cable	D	-18776	-79	-1.11	1.73	-34319	8211	-1.42	3.79
Creep Effect of Self Weight	D	24782	30	1.45	-2.26	32497	160	1.91	-2.96
Surfacing	D	28573	24	1.67	-2.61	33962	83	1.99	-3.10
Creep Effect of Sufracing	D	-3330	-4	-0.20	0.30	-4277	64	-0.25	0.40
2ndary Force by Prestress	D	2796	3	0.17	-0.26	3481	-116	0.20	-0.33
Creep Effect of 2ndary Force	D	-7208	-9	-0.42	0.66	-9532	-192	-0.57	0.86
Effective Prestress	D	-16629	18439	0.39	2.91	-10938	21996	0.99	2.65
Losses of Prestress	D	1317	2	0.08	-0.12	1724	8	0.10	-0.16
CLASS-A Live Load Mmax	L	23623	26	1.39	-2.16	27920	-57	1.63	-2.56
CLASS-A Live Load Mmin	L	-5013	-6	-0.29	0.46	-6432	103	-0.37	0.60
CLASS-A Live Load Nmax	L	23158	27	1.36	-2.11	3335	106	0.20	-0.30
CLASS-A Live Load Nmin	L	406	-8	0.02	-0.04	25474	-62	1.49	-2.33
Shrinkage	S	7605	9	0.45	-0.70	9477	-425	0.52	-0.90
Thermal Rise	T	-2317	-3	-0.14	0.21	-2889	128	-0.16	0.27
Temparature Difference	T	-8472	-10961	0.25	-0.03	-7386	-10945	0.31	-0.13
Group-I (L-Mmax)				3.41	-1.81			4.58	-1.41
Group-I (L-Mmin)				1.73	0.81			2.59	1.74
Group-I (L-Nmax)				3.38	-1.76			3.16	0.85
Group-I (L-Nmin)				2.05	0.31			4.44	-1.19
Allowable Stress for Group-I				-3.16<σ<16.00				-3.16<σ<16.00	
Group-IV (L-Mmax, T-Rise)				3.72	1.79			4.95	1.79
Group-IV (L-Mmin, T-Rise)				2.04	1.79			2.95	1.79
Group-IV (L-Nmax, T-Rise)				3.69	2.07			3.52	2.07
Group-IV (L-Nmin, T-Rise)				2.36	2.07			4.80	2.07
Group-IV (L-Mmax, T-Down)				3.99	-2.71			5.27	-2.58
Group-IV (L-Mmin, T-Down)				2.31	-0.10			3.27	0.57
Group-IV (L-Nmax, T-Down)				3.96	-2.67			3.84	-0.32
Group-IV (L-Nmin, T-Down)				2.63	-0.59			5.12	-2.36
Group-IV (L-Mmax, T-Rise, T-Diff.)				3.97	-2.32			5.26	-2.17
Group-IV (L-Mmin, T-Rise, T-Diff.)				2.29	0.29			3.26	0.98
Group-IV (L-Nmax, T-Rise, T-Diff.)				3.94	-2.28			3.84	0.09
Group-IV (L-Nmin, T-Rise, T-Diff.)				2.60	-0.20			5.12	-1.94
Group-IV (L-Mmax, T-Down, T-Diff.)				4.24	-2.75			5.58	-2.71
Group-IV (L-Mmin, T-Down, T-Diff.)				2.56	-0.13			3.58	0.44
Group-IV (L-Nmax, T-Down, T-Diff.)				4.21	-2.70			4.15	-0.46
Group-IV (L-Nmin, T-Down, T-Diff.)				2.88	-0.63			5.44	-2.49
Allowable Stress for Group-IV				-3.95<σ<20.00				-3.95<σ<20.00	

*) Group-I : ΣD + L

Group-I : ΣD + L + S + T



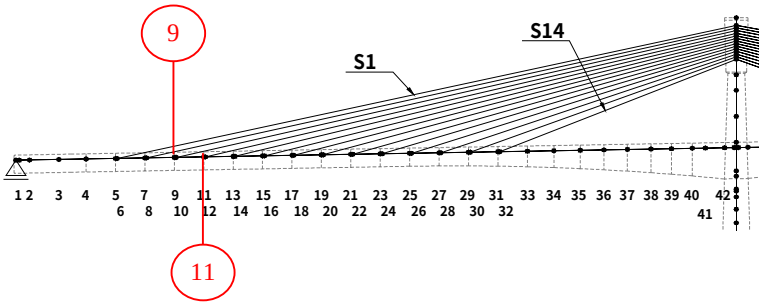
Service Load Design

1. Checking Bending Stress

		S3-Block Joint No. 9				S4-Block Joint No. 11			
		Sectional Force		σcu	σcl	Sectional Force		σcu	σcl
		M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)	M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)
Self Weight + Stay Cable	D	-50874	16496	-1.78	5.94	-66527	24787	-2.10	8.01
Creep Effect of Self Weight	D	40368	298	2.38	-3.67	48424	457	2.86	-4.39
Surfacing	D	37849	164	2.22	-3.45	40263	268	2.37	-3.66
Creep Effect of Sufracing	D	-5122	155	-0.29	0.48	-5835	268	-0.32	0.55
2ndary Force by Prestress	D	4020	-277	0.22	-0.39	4327	-477	0.22	-0.44
Creep Effect of 2ndary Force	D	-12145	-398	-0.74	1.08	-15026	-628	-0.92	1.33
Effective Prestress	D	-6495	25574	1.51	2.50	-2023	29151	2.05	2.35
Losses of Prestress	D	2146	20	0.13	-0.20	2584	34	0.15	-0.23
CLASS-A Live Load Mmax	L	31311	-114	1.82	-2.87	33346	-155	1.93	-3.06
CLASS-A Live Load Mmin	L	-7733	206	-0.44	0.72	-8920	303	-0.50	0.84
CLASS-A Live Load Nmax	L	-7732	206	-0.44	0.72	-8919	303	-0.50	0.84
CLASS-A Live Load Nmin	L	31253	-118	1.82	-2.86	33346	-155	1.93	-3.06
Shrinkage	S	10860	-853	0.57	-1.06	11749	-1275	0.59	-1.17
Thermal Rise	T	-3314	257	-0.18	0.32	-3591	382	-0.18	0.36
Temparature Difference	T	-6284	-10930	0.38	-0.23	-5165	-10916	0.45	-0.33
Group-I (L-Mmax)				5.47	-0.57			6.24	0.46
Group-I (L-Mmin)				3.22	3.02			3.81	4.35
Group-I (L-Nmax)				3.22	3.02			3.81	4.35
Group-I (L-Nmin)				5.47	-0.57			6.24	0.46
Allowable Stress for Group-I				-3.16<σ<16.00				-3.16<σ<16.00	
Group-IV (L-Mmax, T-Rise)				5.87	1.79			6.66	1.79
Group-IV (L-Mmin, T-Rise)				3.61	1.79			4.22	1.79
Group-IV (L-Nmax, T-Rise)				3.61	2.07			4.22	2.07
Group-IV (L-Nmin, T-Rise)				5.87	2.07			6.66	2.07
Group-IV (L-Mmax, T-Down)				6.22	-1.95			7.02	-1.06
Group-IV (L-Mmin, T-Down)				3.96	1.64			4.59	2.83
Group-IV (L-Nmax, T-Down)				3.96	1.64			4.59	2.83
Group-IV (L-Nmin, T-Down)				6.22	-1.94			7.02	-1.06
Group-IV (L-Mmax, T-Rise, T-Diff.)				6.25	-1.54			7.10	-0.68
Group-IV (L-Mmin, T-Rise, T-Diff.)				3.99	2.06			4.67	3.21
Group-IV (L-Nmax, T-Rise, T-Diff.)				3.99	2.06			4.67	3.21
Group-IV (L-Nmin, T-Rise, T-Diff.)				6.25	-1.53			7.10	-0.68
Group-IV (L-Mmax, T-Down, T-Diff.)				6.60	-2.18			7.46	-1.40
Group-IV (L-Mmin, T-Down, T-Diff.)				4.34	1.41			5.03	2.50
Group-IV (L-Nmax, T-Down, T-Diff.)				4.34	1.41			5.03	2.50
Group-IV (L-Nmin, T-Down, T-Diff.)				6.60	-2.17			7.46	-1.40
Allowable Stress for Group-IV				-3.95<σ<20.00				-3.95<σ<20.00	

*) Group-I : ΣD + L

Group-I : ΣD + L + S + T



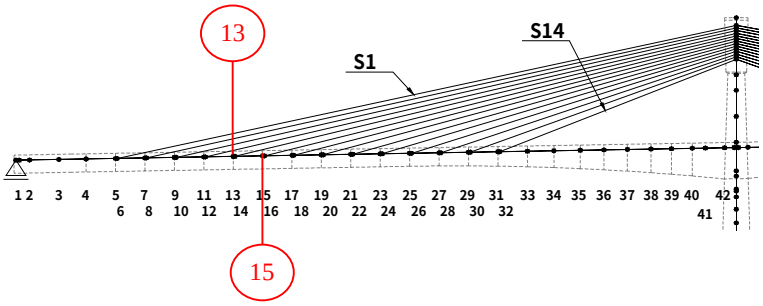
Service Load Design

1. Checking Bending Stress

		S5-Block Joint No. 13				S6-Block Joint No. 15			
		Sectional Force		σcu	σcl	Sectional Force		σcu	σcl
		M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)	M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)
Self Weight + Stay Cable	D	-80905	33035	-2.34	9.96	-93633	41311	-2.48	11.76
Creep Effect of Self Weight	D	56661	605	3.35	-5.14	65064	737	3.85	-5.90
Surfacing	D	41235	393	2.43	-3.74	40796	539	2.42	-3.69
Creep Effect of Sufracing	D	-6387	403	-0.34	0.61	-6747	557	-0.35	0.66
2ndary Force by Prestress	D	4351	-713	0.21	-0.46	4041	-981	0.17	-0.45
Creep Effect of 2ndary Force	D	-18209	-879	-1.13	1.60	-21731	-1151	-1.35	1.90
Effective Prestress	D	2465	32730	2.58	2.20	6916	36278	3.11	2.06
Losses of Prestress	D	3046	54	0.18	-0.27	3538	78	0.21	-0.32
CLASS-A Live Load Mmax	L	34208	-172	1.98	-3.14	34827	-157	2.02	-3.19
CLASS-A Live Load Mmin	L	-9998	392	-0.55	0.94	-10974	474	-0.60	1.04
CLASS-A Live Load Nmax	L	-9799	392	-0.54	0.92	-4403	477	-0.22	0.44
CLASS-A Live Load Nmin	L	33548	-173	1.94	-3.08	29705	-173	1.72	-2.73
Shrinkage	S	12133	-1690	0.58	-1.23	12005	-2099	0.55	-1.25
Thermal Rise	T	-3719	506	-0.18	0.38	-3696	626	-0.17	0.38
Temparature Difference	T	-4031	-10904	0.51	-0.43	-2882	-10892	0.58	-0.54
Group-I (L-Mmax)				6.93	1.63			7.59	2.83
Group-I (L-Mmin)				4.39	5.71			4.97	7.06
Group-I (L-Nmax)				4.40	5.69			5.35	6.46
Group-I (L-Nmin)				6.89	1.69			7.29	3.30
Allowable Stress for Group-I				-3.16<σ<16.00				-3.16<σ<16.00	
Group-IV (L-Mmax, T-Rise)				7.33	1.79			7.96	1.79
Group-IV (L-Mmin, T-Rise)				4.79	1.79			5.34	1.79
Group-IV (L-Nmax, T-Rise)				4.81	2.07			5.73	2.07
Group-IV (L-Nmin, T-Rise)				7.29	2.07			7.66	2.07
Group-IV (L-Mmax, T-Down)				7.69	0.02			8.30	1.20
Group-IV (L-Mmin, T-Down)				5.15	4.10			5.68	5.42
Group-IV (L-Nmax, T-Down)				5.17	4.08			6.06	4.82
Group-IV (L-Nmin, T-Down)				7.65	0.08			8.00	1.66
Group-IV (L-Mmax, T-Rise, T-Diff.)				7.84	0.34			8.55	1.43
Group-IV (L-Mmin, T-Rise, T-Diff.)				5.31	4.42			5.92	5.66
Group-IV (L-Nmax, T-Rise, T-Diff.)				5.32	4.40			6.31	5.06
Group-IV (L-Nmin, T-Rise, T-Diff.)				7.80	0.40			8.25	1.89
Group-IV (L-Mmax, T-Down, T-Diff.)				8.20	-0.41			8.88	0.66
Group-IV (L-Mmin, T-Down, T-Diff.)				5.67	3.67			6.26	4.89
Group-IV (L-Nmax, T-Down, T-Diff.)				5.68	3.65			6.65	4.29
Group-IV (L-Nmin, T-Down, T-Diff.)				8.16	-0.35			8.58	1.13
Allowable Stress for Group-IV				-3.95<σ<20.00				-3.95<σ<20.00	

*) Group-I : ΣD + L

Group-I : ΣD + L + S + T



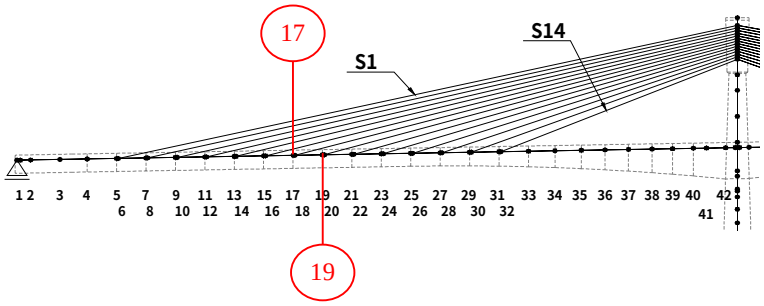
Service Load Design

1. Checking Bending Stress

		S7-Block Joint No. 17				S8-Block Joint No. 19			
		Sectional Force		σcu	σcl	Sectional Force		σcu	σcl
		M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)	M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)
Self Weight + Stay Cable	D	-104442	49491	-2.52	13.37	-113056	57551	-2.43	14.72
Creep Effect of Self Weight	D	73614	849	4.36	-6.67	82293	943	4.87	-7.48
Surfacing	D	38980	706	2.32	-3.51	35819	889	2.15	-3.22
Creep Effect of Sufracing	D	-6884	730	-0.35	0.68	-6769	918	-0.33	0.69
2ndary Force by Prestress	D	3348	-1278	0.10	-0.41	2223	-1598	0.01	-0.32
Creep Effect of 2ndary Force	D	-25628	-1440	-1.60	2.24	-29939	-1747	-1.88	2.62
Effective Prestress	D	11288	39753	3.63	1.91	29746	36127	4.45	-0.06
Losses of Prestress	D	4067	107	0.25	-0.36	4640	140	0.28	-0.42
CLASS-A Live Load Mmax	L	35238	-134	2.04	-3.23	34571	-99	2.01	-3.18
CLASS-A Live Load Mmin	L	-11854	547	-0.65	1.12	-12647	611	-0.69	1.21
CLASS-A Live Load Nmax	L	1160	568	0.11	-0.06	-588	660	0.01	0.10
CLASS-A Live Load Nmin	L	19676	-164	1.13	-1.81	18813	-151	1.08	-1.74
Shrinkage	S	11351	-2503	0.48	-1.22	10156	-2903	0.38	-1.15
Thermal Rise	T	-3520	744	-0.15	0.38	-3188	859	-0.12	0.36
Temparature Difference	T	-1718	-10880	0.65	-0.64	-536	-10867	0.72	-0.75
Group-I (L-Mmax)				8.23	4.02			9.14	3.35
Group-I (L-Mmin)				5.54	8.37			6.45	7.73
Group-I (L-Nmax)				6.30	7.19			7.15	6.63
Group-I (L-Nmin)				7.32	5.44			8.22	4.79
Allowable Stress for Group-I				-3.16<σ<16.00				-3.16<σ<16.00	
Group-IV (L-Mmax, T-Rise)				8.56	1.79			9.40	1.79
Group-IV (L-Mmin, T-Rise)				5.87	1.79			6.70	1.79
Group-IV (L-Nmax, T-Rise)				6.63	2.07			7.41	2.07
Group-IV (L-Nmin, T-Rise)				7.65	2.07			8.48	2.07
Group-IV (L-Mmax, T-Down)				8.86	2.43			9.64	1.85
Group-IV (L-Mmin, T-Down)				6.17	6.78			6.95	6.23
Group-IV (L-Nmax, T-Down)				6.93	5.59			7.65	5.13
Group-IV (L-Nmin, T-Down)				7.95	3.85			8.72	3.29
Group-IV (L-Mmax, T-Rise, T-Diff.)				9.21	2.54			10.12	1.81
Group-IV (L-Mmin, T-Rise, T-Diff.)				6.52	6.89			7.42	6.19
Group-IV (L-Nmax, T-Rise, T-Diff.)				7.28	5.70			8.13	5.09
Group-IV (L-Nmin, T-Rise, T-Diff.)				8.30	3.96			9.20	3.25
Group-IV (L-Mmax, T-Down, T-Diff.)				9.51	1.79			10.36	1.10
Group-IV (L-Mmin, T-Down, T-Diff.)				6.82	6.14			7.67	5.48
Group-IV (L-Nmax, T-Down, T-Diff.)				7.58	4.95			8.37	4.38
Group-IV (L-Nmin, T-Down, T-Diff.)				8.60	3.20			9.44	2.54
Allowable Stress for Group-IV				-3.95<σ<20.00				-3.95<σ<20.00	

*) Group-I : ΣD + L

Group-I : ΣD + L + S + T



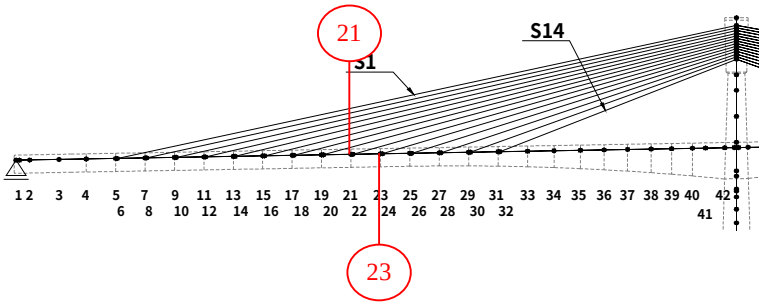
Service Load Design

1. Checking Bending Stress

		S9-Block Joint No. 21				S10-Block Joint No. 23			
		Sectional Force		σcu	σcl	Sectional Force		σcu	σcl
		M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)	M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)
Self Weight + Stay Cable	D	-122158	63236	-2.55	15.96	-131591	68888	-2.69	17.25
Creep Effect of Self Weight	D	91063	1006	5.39	-8.30	99934	1075	5.91	-9.11
Surfacing	D	31267	1028	1.90	-2.80	25343	1176	1.56	-2.24
Creep Effect of Sufracing	D	-6449	1059	-0.30	0.67	-5910	1208	-0.26	0.63
2ndary Force by Prestress	D	752	-1839	-0.09	-0.21	-1090	-2089	-0.22	-0.06
Creep Effect of 2ndary Force	D	-34577	-1974	-2.16	3.03	-39566	-2212	-2.47	3.47
Effective Prestress	D	40869	36016	5.10	-1.09	44918	39558	5.61	-1.20
Losses of Prestress	D	5251	166	0.32	-0.47	5903	194	0.36	-0.53
CLASS-A Live Load Mmax	L	32749	-62	1.90	-3.01	29974	-6	1.74	-2.75
CLASS-A Live Load Mmin	L	-13382	650	-0.73	1.28	-14069	682	-0.77	1.34
CLASS-A Live Load Nmax	L	-3010	723	-0.12	0.33	-5105	784	-0.24	0.53
CLASS-A Live Load Nmin	L	20798	-135	1.20	-1.92	18392	-115	1.06	-1.70
Shrinkage	S	8556	-3183	0.26	-1.02	6543	-3462	0.13	-0.86
Thermal Rise	T	-2741	938	-0.09	0.32	-2179	1016	-0.05	0.28
Temparature Difference	T	659	-10858	0.79	-0.86	1869	-10847	0.86	-0.97
Group-I (L-Mmax)				9.51	3.79			9.54	5.48
Group-I (L-Mmin)				6.87	8.08			7.03	9.57
Group-I (L-Nmax)				7.48	7.13			7.56	8.76
Group-I (L-Nmin)				8.81	4.88			8.86	6.53
Allowable Stress for Group-I				-3.16<σ<16.00				-3.16<σ<16.00	
Group-IV (L-Mmax, T-Rise)				9.68	1.79			9.62	1.79
Group-IV (L-Mmin, T-Rise)				7.05	1.79			7.11	1.79
Group-IV (L-Nmax, T-Rise)				7.66	2.07			7.63	2.07
Group-IV (L-Nmin, T-Rise)				8.98	2.07			8.93	2.07
Group-IV (L-Mmax, T-Down)				9.86	2.45			9.72	4.35
Group-IV (L-Mmin, T-Down)				7.23	6.74			7.21	8.44
Group-IV (L-Nmax, T-Down)				7.84	5.79			7.74	7.63
Group-IV (L-Nmin, T-Down)				9.16	3.54			9.04	5.40
Group-IV (L-Mmax, T-Rise, T-Diff.)				10.47	2.23			10.48	3.93
Group-IV (L-Mmin, T-Rise, T-Diff.)				7.84	6.52			7.97	8.03
Group-IV (L-Nmax, T-Rise, T-Diff.)				8.45	5.58			8.50	7.21
Group-IV (L-Nmin, T-Rise, T-Diff.)				9.77	3.33			9.80	4.99
Group-IV (L-Mmax, T-Down, T-Diff.)				10.65	1.59			10.58	3.38
Group-IV (L-Mmin, T-Down, T-Diff.)				8.02	5.88			8.07	7.48
Group-IV (L-Nmax, T-Down, T-Diff.)				8.63	4.93			8.60	6.66
Group-IV (L-Nmin, T-Down, T-Diff.)				9.95	2.68			9.90	4.44
Allowable Stress for Group-IV				-3.95<σ<20.00				-3.95<σ<20.00	

*) Group-I : ΣD + L

Group-I : ΣD + L + S + T



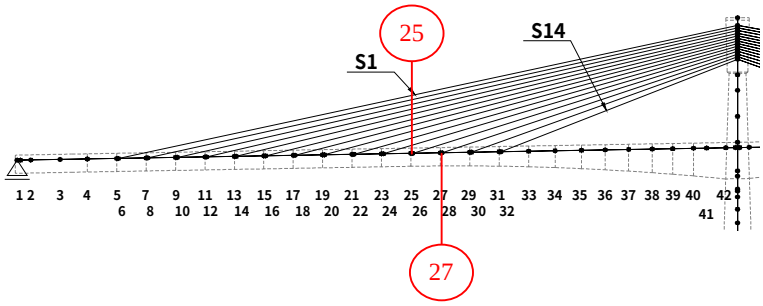
Service Load Design

1. Checking Bending Stress

		S11-Block Joint No. 25				S12-Block Joint No. 27			
		Sectional Force		σcu	σcl	Sectional Force		σcu	σcl
		M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)	M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)
Self Weight + Stay Cable	D	-140977	74486	-2.84	18.54	-149893	80010	-2.87	19.61
Creep Effect of Self Weight	D	108915	1145	6.44	-9.93	118011	1214	6.89	-10.63
Surfacing	D	18068	1330	1.15	-1.56	9462	1486	0.65	-0.75
Creep Effect of Sufracing	D	-5133	1360	-0.20	0.57	-4102	1514	-0.13	0.48
2ndary Force by Prestress	D	-3334	-2347	-0.37	0.13	-6013	-2610	-0.55	0.35
Creep Effect of 2ndary Force	D	-44941	-2459	-2.80	3.95	-50741	-2716	-3.13	4.41
Effective Prestress	D	48967	43096	6.12	-1.31	53414	46605	6.61	-1.41
Losses of Prestress	D	6600	223	0.40	-0.59	7346	253	0.44	-0.65
CLASS-A Live Load Mmax	L	26456	52	1.54	-2.43	22052	117	1.27	-1.99
CLASS-A Live Load Mmin	L	-14717	707	-0.80	1.40	-15335	725	-0.83	1.45
CLASS-A Live Load Nmax	L	-3635	847	-0.15	0.40	-742	918	0.03	0.13
CLASS-A Live Load Nmin	L	15182	-94	0.88	-1.40	8418	-78	0.48	-0.77
Shrinkage	S	4096	-3739	-0.04	-0.65	1190	-4016	-0.23	-0.40
Thermal Rise	T	-1497	1092	-0.01	0.22	-693	1166	0.05	0.15
Temparature Difference	T	3097	-10836	0.94	-1.08	4219	-10824	1.00	-1.17
Group-I (L-Mmax)				9.43	7.38			9.19	9.42
Group-I (L-Mmin)				7.09	11.21			7.09	12.86
Group-I (L-Nmax)				7.74	10.21			7.94	11.55
Group-I (L-Nmin)				8.77	8.41			8.39	10.64
Allowable Stress for Group-I				-3.16<σ<16.00				-3.16<σ<16.00	
Group-IV (L-Mmax, T-Rise)				9.39	1.79			9.01	1.79
Group-IV (L-Mmin, T-Rise)				7.05	1.79			6.91	1.79
Group-IV (L-Nmax, T-Rise)				7.70	2.07			7.76	2.07
Group-IV (L-Nmin, T-Rise)				8.72	2.07			8.21	2.07
Group-IV (L-Mmax, T-Down)				9.40	6.51			8.92	8.87
Group-IV (L-Mmin, T-Down)				7.06	10.34			6.82	12.31
Group-IV (L-Nmax, T-Down)				7.71	9.34			7.67	11.00
Group-IV (L-Nmin, T-Down)				8.74	7.54			8.12	10.09
Group-IV (L-Mmax, T-Rise, T-Diff.)				10.32	5.87			10.01	7.99
Group-IV (L-Mmin, T-Rise, T-Diff.)				7.98	9.70			7.91	11.43
Group-IV (L-Nmax, T-Rise, T-Diff.)				8.63	8.69			8.76	10.12
Group-IV (L-Nmin, T-Rise, T-Diff.)				9.66	6.90			9.21	9.22
Group-IV (L-Mmax, T-Down, T-Diff.)				10.34	5.43			9.92	7.70
Group-IV (L-Mmin, T-Down, T-Diff.)				7.99	9.27			7.82	11.14
Group-IV (L-Nmax, T-Down, T-Diff.)				8.65	8.26			8.67	9.82
Group-IV (L-Nmin, T-Down, T-Diff.)				9.67	6.46			9.12	8.92
Allowable Stress for Group-IV				-3.95<σ<20.00				-3.95<σ<20.00	

*) Group-I : ΣD + L

Group-I : ΣD + L + S + T



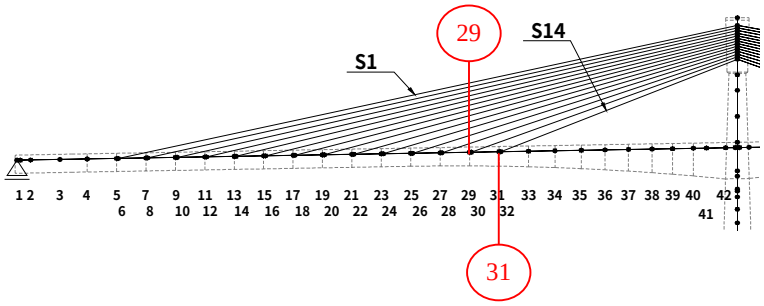
Service Load Design

1. Checking Bending Stress

		S13-Block Joint No. 29				S14-Block Joint No. 31			
		Sectional Force		σcu	σcl	Sectional Force		σcu	σcl
		M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)	M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)
Self Weight + Stay Cable	D	-157570	85634	-2.65	20.22	-165408	91137	-2.44	17.76
Creep Effect of Self Weight	D	127228	1282	7.18	-11.10	136578	1352	7.01	-9.47
Surfacing	D	-456	1642	0.09	0.16	-11671	1794	-0.47	0.94
Creep Effect of Sufracing	D	-2803	1665	-0.04	0.37	-1225	1810	0.06	0.21
2ndary Force by Prestress	D	-9157	-2872	-0.73	0.60	-12798	-3132	-0.88	0.69
Creep Effect of 2ndary Force	D	-57010	-2981	-3.39	4.80	-63792	-3250	-3.45	4.25
Effective Prestress	D	58785	50035	7.03	-1.50	72067	53493	7.34	-1.46
Losses of Prestress	D	8147	283	0.47	-0.70	9008	315	0.48	-0.61
CLASS-A Live Load Mmax	L	16944	158	0.95	-1.48	12816	15	0.65	-0.90
CLASS-A Live Load Mmin	L	-16000	814	-0.83	1.47	-18435	956	-0.87	1.35
CLASS-A Live Load Nmax	L	-7449	994	-0.34	0.73	-13931	1069	-0.63	1.05
CLASS-A Live Load Nmin	L	6465	-63	0.35	-0.57	5312	-49	0.26	-0.38
Shrinkage	S	-2209	-4294	-0.44	-0.12	-6140	-4572	-0.62	0.13
Thermal Rise	T	241	1239	0.10	0.07	1309	1309	0.15	-0.01
Temparature Difference	T	5120	-10810	1.05	-1.23	4376	-10841	1.05	-1.02
Group-I (L-Mmax)				8.92	11.37			8.30	11.41
Group-I (L-Mmin)				7.14	14.31			6.79	13.65
Group-I (L-Nmax)				7.63	13.57			7.03	13.35
Group-I (L-Nmin)				8.32	12.27			7.92	11.93
Allowable Stress for Group-I				-3.16<σ<16.00				-3.16<σ<16.00	
Group-IV (L-Mmax, T-Rise)				8.59	1.79			7.84	1.79
Group-IV (L-Mmin, T-Rise)				6.81	1.79			6.33	1.79
Group-IV (L-Nmax, T-Rise)				7.30	2.07			6.56	2.07
Group-IV (L-Nmin, T-Rise)				7.99	2.07			7.46	2.07
Group-IV (L-Mmax, T-Down)				8.38	11.18			7.54	11.54
Group-IV (L-Mmin, T-Down)				6.60	14.13			6.02	13.79
Group-IV (L-Nmax, T-Down)				7.09	13.39			6.26	13.48
Group-IV (L-Nmin, T-Down)				7.78	12.09			7.15	12.06
Group-IV (L-Mmax, T-Rise, T-Diff.)				9.64	10.09			8.89	10.50
Group-IV (L-Mmin, T-Rise, T-Diff.)				7.86	13.03			7.38	12.75
Group-IV (L-Nmax, T-Rise, T-Diff.)				8.35	12.29			7.62	12.44
Group-IV (L-Nmin, T-Rise, T-Diff.)				9.04	10.99			8.51	11.02
Group-IV (L-Mmax, T-Down, T-Diff.)				9.43	9.95			8.59	10.51
Group-IV (L-Mmin, T-Down, T-Diff.)				7.65	12.89			7.08	12.76
Group-IV (L-Nmax, T-Down, T-Diff.)				8.14	12.15			7.31	12.45
Group-IV (L-Nmin, T-Down, T-Diff.)				8.83	10.85			8.21	11.03
Allowable Stress for Group-IV				-3.95<σ<20.00				-3.95<σ<20.00	

*) Group-I : ΣD + L

Group-I : ΣD + L + S + T



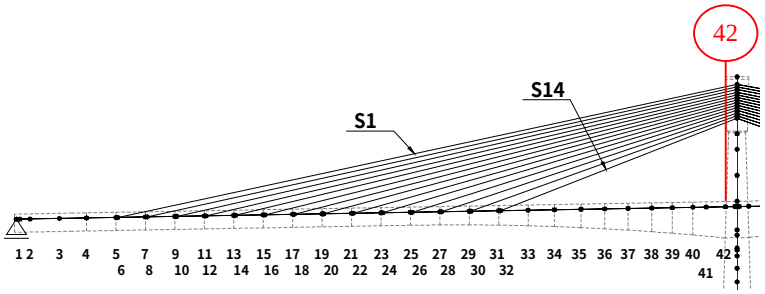
Service Load Design

1. Checking Bending Stress

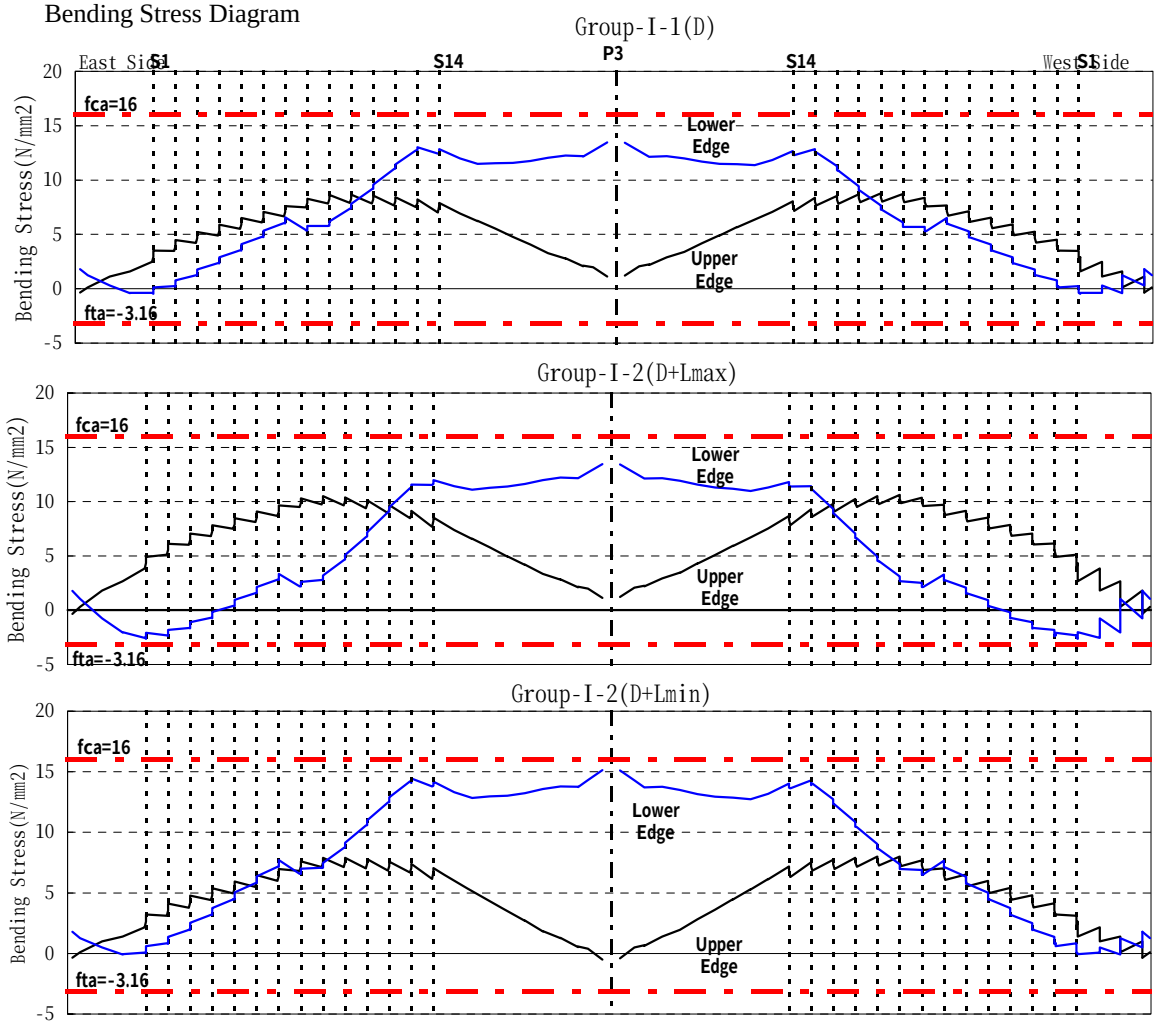
		P3(L) Joint No. 42			
		Sectional Force		σcu	σcl
		M (kN.m)	N(kN)	(N/mm^2)	(N/mm^2)
Self Weight + Stay Cable	D	-521478	96156	-6.97	13.69
Creep Effect of Self Weight	D	209964	1435	4.18	-3.98
Surfacing	D	-149065	1896	-2.83	2.93
Creep Effect of Sufracing	D	13255	1948	0.33	-0.18
2ndary Force by Prestress	D	-45097	-3384	-1.04	0.75
Creep Effect of 2ndary Force	D	-120602	-3521	-2.51	2.19
Effective Prestress	D	324638	107579	10.61	-2.26
Losses of Prestress	D	16168	346	0.33	-0.30
CLASS-A Live Load Mmax	L	165	-9	0.00	0.00
CLASS-A Live Load Mmin	L	-86066	1078	-1.63	1.69
CLASS-A Live Load Nmax	L	-70839	1140	-1.33	1.40
CLASS-A Live Load Nmin	L	-13162	-63	-0.26	0.25
Shrinkage	S	-41137	-4852	-0.98	0.61
Thermal Rise	T	10696	1378	0.26	-0.16
Temparature Difference	T	-7941	-11162	0.99	-0.26
Group-I (L-Mmax)				2.11	12.83
Group-I (L-Mmin)				0.47	14.53
Group-I (L-Nmax)				0.77	14.24
Group-I (L-Nmin)				1.85	13.09
Allowable Stress for Group-I				-3.16<σ<16.00	
Group-IV (L-Mmax, T-Rise)				1.39	1.79
Group-IV (L-Mmin, T-Rise)				-0.25	1.79
Group-IV (L-Nmax, T-Rise)				0.05	2.07
Group-IV (L-Nmin, T-Rise)				1.13	2.07
Group-IV (L-Mmax, T-Down)				0.87	13.60
Group-IV (L-Mmin, T-Down)				-0.77	15.29
Group-IV (L-Nmax, T-Down)				-0.47	15.00
Group-IV (L-Nmin, T-Down)				0.61	13.85
Group-IV (L-Mmax, T-Rise, T-Diff.)				2.37	13.03
Group-IV (L-Mmin, T-Rise, T-Diff.)				0.74	14.73
Group-IV (L-Nmax, T-Rise, T-Diff.)				1.04	14.44
Group-IV (L-Nmin, T-Rise, T-Diff.)				2.11	13.29
Group-IV (L-Mmax, T-Down, T-Diff.)				1.86	13.34
Group-IV (L-Mmin, T-Down, T-Diff.)				0.22	15.04
Group-IV (L-Nmax, T-Down, T-Diff.)				0.52	14.75
Group-IV (L-Nmin, T-Down, T-Diff.)				1.60	13.60
Allowable Stress for Group-IV				-3.95<σ<20.00	

*) Group-I : ΣD + L

Group-I : ΣD + L + S + T



Bending Stress Diagram



2.5.2 Load Factor Design

1) Checking Flexural Strength

Group-I : D+L , Group-IV : D+L+T

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
1-i	Group- I	Mmax	149.6	-130.7	-69627.8	532.80	12.00
		Mmin	149.6	-130.7	-69627.8	532.80	12.00
	Group-IV	Mmax	-14400.8	-19673.7	-43668.9	2.22	8.60
		Mmin	-14400.8	-19673.7	-43668.9	2.22	8.60
1-j	Group- I	Mmax	208.1	19036.3	108542.6	5.70	10.10
		Mmin	114.5	10841.4	108392.6	10.00	10.10
	Group-IV	Mmax	179.6	16540.1	108488.0	6.56	10.10
		Mmin	-14430.6	-8071.0	-43076.2	5.34	8.40
2-i	Group- I	Mmax	188.8	19036.3	108501.7	5.70	10.10
		Mmin	114.5	10841.4	108392.6	10.00	10.10
	Group-IV	Mmax	168.0	16540.1	108474.4	6.56	10.10
		Mmin	-14430.6	-8071.0	-43075.1	5.34	8.40
2-j	Group- I	Mmax	144.7	61937.5	109814.3	1.77	10.10
		Mmin	57.3	32102.6	109700.7	3.42	10.10
	Group-IV	Mmax	118.6	53020.3	109780.3	2.07	10.10
		Mmin	66.3	35146.9	109712.1	3.12	10.10
3-i	Group- I	Mmax	123.2	61937.5	109780.3	1.77	10.10
		Mmin	57.3	32102.6	109700.7	3.42	10.10
	Group-IV	Mmax	105.8	53020.3	109757.5	2.07	10.10
		Mmin	66.3	35146.9	109712.1	3.12	10.10
3-j	Group- I	Mmax	88.9	86517.4	109734.8	1.27	10.10
		Mmin	9.4	39771.9	109632.5	2.76	10.10
	Group-IV	Mmax	66.1	72895.0	109712.1	1.51	10.10
		Mmin	18.4	44890.8	109643.9	2.44	10.10
4-i	Group- I	Mmax	67.6	86517.4	109712.1	1.27	10.10
		Mmin	9.4	39771.9	109632.5	2.76	10.10
	Group-IV	Mmax	53.3	72895.0	109689.3	1.50	10.10
		Mmin	18.4	44890.8	109643.9	2.44	10.10
4-j	Group- I	Mmax	27.2	97750.5	112781.2	1.15	12.30
		Mmin	-42.7	35608.9	112697.5	3.16	12.30
	Group-IV	Mmax	-14241.3	69196.7	94604.5	1.37	9.50
		Mmin	-33.7	42982.8	112697.5	2.62	12.30
5-i	Group- I	Mmax	7.3	97750.5	112757.6	1.15	12.30
		Mmin	-42.7	35608.9	112695.6	3.16	12.30
	Group-IV	Mmax	-14253.2	69196.7	94582.7	1.37	9.50
		Mmin	-33.7	42982.8	112713.9	2.62	12.30
5-j	Group- I	Mmax	14.3	97903.0	113488.4	1.16	13.40
		Mmin	-45.8	34945.1	113402.7	3.25	13.40
	Group-IV	Mmax	-14250.3	69240.6	95491.6	1.38	10.50
		Mmin	-36.8	42454.3	113422.6	2.67	13.40
6-i	Group- I	Mmax	10060.2	97902.8	125911.3	1.29	15.50
		Mmin	10403.4	34945.2	126342.0	3.62	15.50
	Group-IV	Mmax	-4286.6	69240.5	108096.3	1.56	12.50
		Mmin	10146.9	42454.4	126019.0	2.97	15.50

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
6-j	Group- I	Mmax	10017.5	103469.9	124271.0	1.20	15.30
		Mmin	10354.5	28926.8	124676.8	4.31	15.40
	Group-IV	Mmax	-4331.8	73333.1	106410.6	1.45	12.40
		Mmin	10098.0	38278.2	124363.8	3.25	15.30
7-i	Group- I	Mmax	10006.3	103469.9	124256.1	1.20	15.30
		Mmin	10354.5	28926.8	124685.1	4.31	15.40
	Group-IV	Mmax	-4338.5	73333.1	106408.9	1.45	12.40
		Mmin	10098.0	38278.2	124372.1	3.25	15.30
7-j	Group- I	Mmax	10013.2	103415.9	125036.4	1.21	16.30
		Mmin	10351.4	28152.0	125445.2	4.46	16.30
	Group-IV	Mmax	-4335.6	73192.4	107384.9	1.47	13.50
		Mmin	10094.9	37621.0	125138.6	3.33	16.30
8-i	Group- I	Mmax	20082.3	103415.8	137211.8	1.33	18.20
		Mmin	20776.9	28152.2	138038.8	4.90	18.30
	Group-IV	Mmax	5638.9	73192.4	119684.4	1.64	15.40
		Mmin	20263.7	37621.1	137426.8	3.65	18.20
8-j	Group- I	Mmax	20043.4	103132.0	136848.3	1.33	18.10
		Mmin	20727.9	18406.9	137672.7	7.48	18.20
	Group-IV	Mmax	5596.0	72030.7	119329.5	1.66	15.40
		Mmin	20214.7	29442.5	137051.9	4.65	18.10
9-i	Group- I	Mmax	20032.3	103132.0	136833.4	1.33	18.10
		Mmin	20727.9	18406.9	137668.5	7.48	18.20
	Group-IV	Mmax	5589.3	72030.7	119319.3	1.66	15.40
		Mmin	20214.7	29442.5	137058.5	4.66	18.10
9-j	Group- I	Mmax	20039.2	102629.8	137444.6	1.34	19.00
		Mmin	20724.8	17394.3	138270.7	7.95	19.20
	Group-IV	Mmax	5592.2	71509.9	120073.5	1.68	16.30
		Mmin	20211.6	28529.8	137651.3	4.82	19.10
10-i	Group- I	Mmax	30176.7	102629.8	149464.4	1.46	21.00
		Mmin	31163.2	17394.6	150625.0	8.66	21.20
	Group-IV	Mmax	15620.3	71510.0	132169.7	1.85	18.20
		Mmin	30402.5	28530.1	149726.1	5.25	21.10
10-j	Group- I	Mmax	30138.5	98245.6	149147.1	1.52	20.90
		Mmin	31114.2	6529.3	150294.5	23.02	21.10
	Group-IV	Mmax	15577.8	67188.5	131800.7	1.96	18.10
		Mmin	30353.5	18957.8	149397.8	7.88	21.00
11-i	Group- I	Mmax	30119.6	98245.6	149130.2	1.52	20.90
		Mmin	31114.2	6529.3	150298.2	23.02	21.10
	Group-IV	Mmax	15566.5	67188.5	131797.6	1.96	18.10
		Mmin	30353.5	18957.8	149401.7	7.88	21.00
11-j	Group- I	Mmax	30126.6	97495.4	149599.1	1.53	21.80
		Mmin	31111.1	5445.1	150748.9	27.69	22.00
	Group-IV	Mmax	15569.4	66474.3	132392.0	1.99	19.00
		Mmin	30350.4	17956.2	149852.6	8.35	21.80
12-i	Group- I	Mmax	40237.1	97495.4	161089.2	1.65	23.40
		Mmin	41458.2	5445.5	162467.8	29.84	23.60
	Group-IV	Mmax	25553.5	66474.4	144215.7	2.17	20.90
		Mmin	40459.9	17956.5	161341.6	8.99	23.50

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
12-j	Group- Ⅰ	Mmax	40203.2	89650.3	160832.2	1.79	23.40
		Mmin	41409.2	-6276.7	-256528.7	40.87	35.50
	Group-Ⅳ	Mmax	25513.5	59483.5	143888.2	2.42	20.80
		Mmin	40410.9	7256.3	161057.9	22.20	23.40
13-i	Group- Ⅰ	Mmax	40184.2	89650.3	160809.1	1.79	23.40
		Mmin	41409.2	-6276.7	-256520.9	40.87	35.50
	Group-Ⅳ	Mmax	25502.1	59483.5	143887.1	2.42	20.80
		Mmin	40410.9	7256.3	161061.3	22.20	23.40
13-j	Group- Ⅰ	Mmax	40191.4	88711.3	161019.8	1.82	24.00
		Mmin	41406.1	-7415.5	-273472.5	36.88	41.00
	Group-Ⅳ	Mmax	25505.2	58618.2	144346.5	2.46	21.60
		Mmin	40407.8	6182.7	161271.6	26.08	24.00
14-i	Group- Ⅰ	Mmax	50357.8	88711.4	172394.9	1.94	25.50
		Mmin	51751.0	-7415.2	-291823.2	39.35	57.50
	Group-Ⅳ	Mmax	35531.5	58618.3	155794.7	2.66	23.30
		Mmin	50525.3	6183.0	172584.7	27.91	25.50
14-j	Group- Ⅰ	Mmax	50347.1	79798.7	172174.3	2.16	25.50
		Mmin	51702.0	-19590.3	-292020.4	14.91	57.60
	Group-Ⅳ	Mmax	35505.4	50556.6	155535.7	3.08	23.20
		Mmin	37944.5	-18594.6	-267339.8	14.38	37.50
15-i	Group- Ⅰ	Mmax	50334.2	79798.7	172155.0	2.16	25.50
		Mmin	51702.0	-19590.3	-292006.8	14.91	57.60
	Group-Ⅳ	Mmax	35497.7	50556.6	155528.3	3.08	23.20
		Mmin	37944.5	-18594.6	-267332.9	14.38	37.50
15-j	Group- Ⅰ	Mmax	50341.6	78871.3	172335.4	2.19	26.10
		Mmin	51698.9	-20758.0	-307569.7	14.82	70.50
	Group-Ⅳ	Mmax	35500.9	49670.7	155737.3	3.14	23.80
		Mmin	37941.3	-19619.5	-284182.9	14.48	43.70
16-i	Group- Ⅰ	Mmax	60394.4	78871.4	183502.8	2.33	27.60
		Mmin	61874.1	-20757.6	-321010.8	15.46	93.90
	Group-Ⅳ	Mmax	45401.8	49670.8	166824.8	3.36	25.30
		Mmin	48221.5	-19619.2	-302021.0	15.39	62.30
16-j	Group- Ⅰ	Mmax	60361.4	69052.4	183268.0	2.65	27.60
		Mmin	61825.1	-33136.8	-321274.0	9.70	94.00
	Group-Ⅳ	Mmax	45362.4	40738.4	166564.3	4.09	25.20
		Mmin	48172.6	-29632.4	-302226.0	10.20	62.40
17-i	Group- Ⅰ	Mmax	60348.5	69052.4	183250.5	2.65	27.60
		Mmin	61825.1	-33136.8	-321257.7	9.69	94.10
	Group-Ⅳ	Mmax	45354.7	40738.4	166552.5	4.09	25.20
		Mmin	48172.6	-29632.4	-302210.4	10.20	62.40
17-j	Group- Ⅰ	Mmax	60355.2	67963.7	183386.7	2.70	28.20
		Mmin	61822.0	-34317.6	-332532.3	9.69	105.60
	Group-Ⅳ	Mmax	45357.5	39734.8	166737.8	4.20	25.80
		Mmin	48169.4	-30662.2	-317525.4	10.36	75.70
18-i	Group- Ⅰ	Mmax	70275.7	67963.7	194318.5	2.86	29.80
		Mmin	71803.1	-34317.2	-341292.0	9.95	127.40
	Group-Ⅳ	Mmax	55112.9	39735.0	177582.6	4.47	27.30
		Mmin	58260.3	-30661.8	-329326.8	10.74	98.00

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
18-j	Group- I	Mmax	70233.2	55823.9	157338.8	2.82	27.80
		Mmin	71754.1	-46639.3	-344967.4	7.40	121.40
	Group-IV	Mmax	55067.8	29193.9	140463.9	4.81	25.50
		Mmin	58211.3	-40478.1	-332939.9	8.23	92.40
19-i	Group- I	Mmax	70213.7	55823.9	157316.2	2.82	27.90
		Mmin	71754.1	-46639.3	-344978.0	7.40	121.40
	Group-IV	Mmax	55056.2	29193.9	140454.8	4.81	25.50
		Mmin	58211.3	-40478.1	-332952.1	8.23	92.40
19-j	Group- I	Mmax	70220.1	54576.6	157455.4	2.89	28.40
		Mmin	71751.0	-47816.5	-355230.0	7.43	133.40
	Group-IV	Mmax	55058.7	28081.4	140634.8	5.01	26.00
		Mmin	58208.2	-41495.3	-343916.5	8.29	103.90
20-i	Group- I	Mmax	77254.8	54576.7	165206.6	3.03	29.50
		Mmin	78784.3	-47816.1	-360505.8	7.54	149.30
	Group-IV	Mmax	61967.9	28081.6	148312.9	5.28	27.10
		Mmin	65323.2	-41495.0	-349982.4	8.43	119.10
20-j	Group- I	Mmax	77210.0	36669.0	146600.4	4.00	28.50
		Mmin	78735.3	-63434.8	-362658.9	5.72	146.20
	Group-IV	Mmax	61921.5	12597.1	129628.4	10.29	26.10
		Mmin	65274.2	-54499.1	-352007.7	6.46	116.10
21-i	Group- I	Mmax	77190.5	36669.0	146575.3	4.00	28.60
		Mmin	78735.3	-63434.8	-362685.4	5.72	146.30
	Group-IV	Mmax	61909.8	12597.1	129623.8	10.29	26.10
		Mmin	65274.2	-54499.1	-352036.5	6.46	116.10
21-j	Group- I	Mmax	77196.8	35056.2	146697.8	4.18	29.10
		Mmin	78732.2	-64822.3	-371939.6	5.74	158.40
	Group-IV	Mmax	61912.3	11170.8	129784.1	11.62	26.70
		Mmin	65271.1	-55719.8	-362236.7	6.50	128.00
22-i	Group- I	Mmax	84218.3	35056.4	154419.3	4.40	30.20
		Mmin	85712.2	-64821.9	-376089.2	5.80	174.60
	Group-IV	Mmax	68801.7	11171.0	137430.7	12.30	27.70
		Mmin	72337.7	-55719.3	-367543.8	6.60	143.70
22-j	Group- I	Mmax	84180.7	12224.6	154182.1	12.61	30.20
		Mmin	85663.3	-83348.8	-376428.6	4.52	174.60
	Group-IV	Mmax	85502.3	-16684.4	-376340.4	22.56	174.20
		Mmin	86390.5	-73940.4	-376822.8	5.10	176.30
23-i	Group- I	Mmax	84169.6	12224.6	154170.4	12.61	30.20
		Mmin	85663.3	-83348.8	-376453.8	4.52	174.60
	Group-IV	Mmax	85495.6	-16684.4	-376361.5	22.56	174.20
		Mmin	86390.5	-73940.4	-376847.9	5.10	176.30
23-j	Group- I	Mmax	84175.9	10339.3	154269.9	14.92	30.70
		Mmin	85660.2	-84922.0	-384609.1	4.53	186.80
	Group-IV	Mmax	85498.2	-18364.5	-384534.6	20.94	186.40
		Mmin	86387.3	-75433.4	-384939.7	5.10	188.50
24-i	Group- I	Mmax	91137.0	10339.5	161874.5	15.66	32.00
		Mmin	92549.6	-84921.5	-384622.2	4.53	198.60
	Group-IV	Mmax	92507.6	-18364.2	-384636.0	20.94	198.50
		Mmin	93353.8	-75433.0	-384355.3	5.10	199.50

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
24-j	Group- I	Mmax	91090.5	-16610.4	-385706.8	23.22	197.30
		Mmin	92500.6	-105955.6	-385236.5	3.64	199.00
	Group-IV	Mmax	92460.1	-41573.2	-385249.7	9.27	198.90
		Mmin	93304.8	-95098.0	-384968.2	4.05	200.00
25-i	Group- I	Mmax	91079.4	-16610.4	-385817.4	23.23	197.40
		Mmin	92500.6	-105955.6	-385343.0	3.64	199.10
	Group-IV	Mmax	92453.4	-41573.2	-385358.7	9.27	199.10
		Mmin	93304.8	-95098.0	-385075.0	4.05	200.10
25-j	Group- I	Mmax	91085.5	-18784.7	-389410.5	20.73	203.00
		Mmin	92497.4	-107688.8	-388915.5	3.61	204.70
	Group-IV	Mmax	92455.9	-43483.3	-388929.9	8.94	204.70
		Mmin	93301.7	-96743.8	-388632.7	4.02	205.70
26-i	Group- I	Mmax	97958.4	-18784.3	-386901.5	20.60	211.30
		Mmin	99264.1	-107688.3	-386438.3	3.59	212.90
	Group-IV	Mmax	99367.4	-43482.9	-386401.8	8.89	213.10
		Mmin	100149.6	-96743.4	-386123.1	3.99	214.10
26-j	Group- I	Mmax	97907.6	-49658.9	-391498.7	7.88	212.90
		Mmin	99215.0	-130789.8	-391033.1	2.99	214.50
	Group-IV	Mmax	99317.3	-69744.9	-390996.5	5.61	214.70
		Mmin	100100.6	-118348.6	-390716.5	3.30	215.70
27-i	Group- I	Mmax	97896.4	-49658.9	-391610.5	7.89	213.10
		Mmin	99215.0	-130789.8	-391140.5	2.99	214.70
	Group-IV	Mmax	99310.6	-69744.9	-391106.5	5.61	214.80
		Mmin	100100.6	-118348.6	-390824.1	3.30	215.80
27-j	Group- I	Mmax	97902.3	-52075.1	-395285.9	7.59	218.50
		Mmin	99211.9	-132655.6	-394698.9	2.98	220.10
	Group-IV	Mmax	99312.9	-71844.9	-394653.4	5.49	220.20
		Mmin	100097.4	-120118.9	-394301.3	3.28	221.10
28-i	Group- I	Mmax	104900.9	-52074.8	-391615.3	7.52	226.90
		Mmin	106075.4	-132655.1	-391081.0	2.95	228.30
	Group-IV	Mmax	106342.6	-71844.5	-390959.6	5.44	228.70
		Mmin	107046.2	-120118.5	-390638.5	3.25	229.50
28-j	Group- I	Mmax	104784.8	-85616.1	-404368.2	4.72	230.90
		Mmin	106197.8	-157105.4	-403721.6	2.57	232.70
	Group-IV	Mmax	103033.0	-100670.5	-405167.0	4.02	228.80
		Mmin	103879.5	-143498.3	-404781.4	2.82	229.80
29-i	Group- I	Mmax	104773.6	-85616.1	-404474.1	4.72	231.10
		Mmin	106197.8	-157105.4	-403822.5	2.57	232.80
	Group-IV	Mmax	103026.3	-100670.5	-405271.3	4.03	229.00
		Mmin	103879.5	-143498.3	-404882.5	2.82	230.00
29-j	Group- I	Mmax	104731.4	-88156.3	-412663.3	4.68	233.80
		Mmin	106198.8	-159163.1	-411960.6	2.59	235.60
	Group-IV	Mmax	102999.8	-103014.3	-413490.0	4.01	231.70
		Mmin	103878.9	-145552.9	-413070.8	2.84	232.80
30-i	Group- I	Mmax	111556.1	-88156.0	-408482.1	4.63	242.20
		Mmin	112905.9	-159162.6	-407822.0	2.56	243.90
	Group-IV	Mmax	109672.9	-103014.0	-409397.7	3.97	239.90
		Mmin	110481.6	-145552.5	-409005.3	2.81	240.90

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
30-j	Group- I	Mmax	111096.3	-122739.2	-490482.2	4.00	209.60
		Mmin	113126.9	-190553.7	-489915.4	2.57	212.60
	Group-IV	Mmax	109376.8	-135591.1	-490942.0	3.62	207.20
		Mmin	110593.4	-176217.3	-490621.7	2.78	208.90
31-i	Group- I	Mmax	111085.1	-122739.2	-490605.3	4.00	209.80
		Mmin	113126.9	-190553.7	-490034.7	2.57	212.80
	Group-IV	Mmax	109370.2	-135591.1	-490961.7	3.62	207.20
		Mmin	110593.4	-176217.3	-490741.7	2.78	209.10
31-j	Group- I	Mmax	111087.8	-125259.4	-499620.5	3.99	217.40
		Mmin	113129.6	-193025.8	-498576.4	2.58	219.70
	Group-IV	Mmax	109370.4	-138024.6	-500497.7	3.63	215.50
		Mmin	110593.6	-178622.0	-499872.7	2.80	216.80
32-i	Group- I	Mmax	117729.2	-125259.1	-494094.8	3.94	225.40
		Mmin	119741.0	-193025.4	-493061.4	2.55	227.70
	Group-IV	Mmax	115888.9	-138024.3	-495039.2	3.59	223.20
		Mmin	117094.1	-178621.6	-494421.0	2.77	224.60
32-j	Group- I	Mmax	117556.5	-158012.6	-575348.8	3.64	177.50
		Mmin	119930.8	-227823.5	-576382.2	2.53	182.30
	Group-IV	Mmax	115763.1	-170024.1	-574478.5	3.38	173.80
		Mmin	117185.5	-211846.4	-575171.0	2.72	176.80
33-i	Group- I	Mmax	117536.5	-158012.6	-574109.8	3.63	178.20
		Mmin	119930.8	-227823.5	-575133.9	2.52	183.10
	Group-IV	Mmax	115751.2	-170024.1	-573250.4	3.37	174.50
		Mmin	117185.5	-211846.4	-573943.2	2.71	177.50
33-j	Group- I	Mmax	117449.4	-200505.6	-660106.1	3.29	130.90
		Mmin	119953.4	-278721.7	-661591.1	2.37	135.30
	Group-IV	Mmax	101482.4	-209409.3	-649664.6	3.10	106.30
		Mmin	102982.5	-256266.9	-650752.1	2.54	108.30
34-i	Group- I	Mmax	117429.7	-200505.6	-658566.0	3.28	132.10
		Mmin	119953.4	-278721.7	-660209.0	2.37	136.30
	Group-IV	Mmax	101470.6	-209409.3	-647624.8	3.09	108.10
		Mmin	102982.5	-256266.9	-648714.8	2.53	110.20
34-j	Group- I	Mmax	117357.9	-256195.1	-751139.5	2.93	116.50
		Mmin	119903.1	-344595.9	-753111.5	2.19	119.70
	Group-IV	Mmax	101363.3	-266480.9	-730323.8	2.74	97.90
		Mmin	102888.0	-319439.9	-732734.4	2.29	99.40
35-i	Group- I	Mmax	117338.3	-256195.1	-749496.0	2.93	117.90
		Mmin	119903.1	-344595.9	-751462.2	2.18	121.10
	Group-IV	Mmax	101351.5	-266480.9	-729669.4	2.74	99.20
		Mmin	102888.0	-319439.9	-732075.6	2.29	100.80
35-j	Group- I	Mmax	117287.3	-317541.6	-836310.9	2.63	109.10
		Mmin	119839.6	-416128.8	-840394.8	2.02	111.60
	Group-IV	Mmax	101238.3	-329448.6	-809583.8	2.46	96.30
		Mmin	102767.3	-388510.1	-812195.8	2.09	97.40
36-i	Group- I	Mmax	117268.3	-317541.6	-835717.0	2.63	110.20
		Mmin	119839.6	-416128.8	-839767.8	2.02	112.80
	Group-IV	Mmax	101226.9	-329448.6	-809195.3	2.46	97.20
		Mmin	102767.3	-388510.1	-811802.1	2.09	98.30

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
36-j	Group- I	Mmax	117232.3	-390680.9	-935769.5	2.40	111.60
		Mmin	119746.2	-500715.6	-940060.5	1.88	113.50
	Group-IV	Mmax	101121.2	-404464.3	-907711.5	2.24	101.30
		Mmin	102627.2	-470383.7	-910373.8	1.94	102.20
37-i	Group- I	Mmax	117212.3	-390680.9	-935326.5	2.39	112.40
		Mmin	119746.2	-500715.6	-939626.0	1.88	114.30
	Group-IV	Mmax	101109.2	-404464.3	-907412.1	2.24	102.00
		Mmin	102627.2	-470383.7	-910082.8	1.93	102.80
37-j	Group- I	Mmax	117180.7	-476322.5	-1043025.6	2.19	116.60
		Mmin	119569.7	-600315.6	-1047393.7	1.74	118.20
	Group-IV	Mmax	101024.5	-492147.8	-1012992.8	2.06	107.40
		Mmin	102455.7	-566429.4	-1015684.6	1.79	108.10
38-i	Group- I	Mmax	117161.2	-476322.5	-1042672.9	2.19	117.20
		Mmin	119569.7	-600315.6	-1047058.5	1.74	118.80
	Group-IV	Mmax	101012.8	-492147.8	-1012758.3	2.06	107.90
		Mmin	102455.7	-566429.4	-1015469.8	1.79	108.60
38-j	Group- I	Mmax	117135.0	-561804.5	-1165250.3	2.07	124.50
		Mmin	119514.1	-701597.3	-1169798.6	1.67	126.00
	Group-IV	Mmax	100933.6	-579817.3	-1133789.4	1.96	115.50
		Mmin	102358.9	-663564.1	-1136592.7	1.71	116.30
39-i	Group- I	Mmax	117116.0	-561804.5	-1164898.3	2.07	125.20
		Mmin	119514.1	-701597.3	-1169459.8	1.67	126.70
	Group-IV	Mmax	100922.2	-579817.3	-1133579.0	1.96	116.10
		Mmin	102358.9	-663564.1	-1136404.0	1.71	116.80
39-j	Group- I	Mmax	117097.3	-657448.0	-1286282.3	1.96	130.40
		Mmin	119459.4	-814777.8	-1290987.0	1.58	131.60
	Group-IV	Mmax	100806.5	-678430.6	-1253292.8	1.85	122.80
		Mmin	102221.6	-772683.5	-1256179.8	1.63	123.40
40-i	Group- I	Mmax	117081.3	-657448.0	-1337707.9	2.03	136.10
		Mmin	119459.3	-814777.8	-1342379.7	1.65	137.50
	Group-IV	Mmax	100796.9	-678430.6	-1305267.7	1.92	127.60
		Mmin	102221.5	-772683.5	-1308143.8	1.69	128.30
40-j	Group- I	Mmax	117063.9	-724689.5	-1454070.6	2.01	150.30
		Mmin	119418.8	-893856.1	-1458798.9	1.63	152.10
	Group-IV	Mmax	100770.5	-747013.0	-1420335.5	1.90	139.10
		Mmin	102181.3	-848357.1	-1423316.9	1.68	140.00
41-i	Group- I	Mmax	117046.1	-724689.5	-1454032.9	2.01	150.30
		Mmin	119418.8	-893856.1	-1458799.1	1.63	152.10
	Group-IV	Mmax	100759.9	-747013.0	-1420311.3	1.90	139.10
		Mmin	102181.3	-848357.1	-1423317.0	1.68	140.00
41-j	Group- I	Mmax	117014.8	-830016.6	-1561639.5	1.88	161.50
		Mmin	119361.0	-1017138.2	-1566657.8	1.54	163.70
	Group-IV	Mmax	100715.7	-854387.2	-1524632.5	1.78	147.60
		Mmin	102121.3	-966487.7	-1527889.0	1.58	148.70
42-i	Group- I	Mmax	116970.8	-830016.6	-1561546.0	1.88	161.40
		Mmin	119330.2	-1017138.2	-1566595.4	1.54	163.70
	Group-IV	Mmax	100677.1	-854387.2	-1524545.2	1.78	147.60
		Mmin	102090.6	-966487.7	-1527814.2	1.58	148.70

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
42-j	Group- I	Mmax	116958.3	-888758.3	-1562266.2	1.76	161.40
		Mmin	119299.4	-1085210.7	-1567269.2	1.44	163.70
	Group-IV	Mmax	100657.3	-912958.6	-1525130.3	1.67	147.60
		Mmin	102059.8	-1030649.0	-1528373.6	1.48	148.70
43-i	Group- I	Mmax	116947.7	-888758.3	-1562241.7	1.76	161.40
		Mmin	119299.3	-1085210.7	-1567269.2	1.44	163.70
	Group-IV	Mmax	100650.9	-912958.6	-1525114.0	1.67	147.60
		Mmin	102059.7	-1030649.0	-1528373.6	1.48	148.70
43-j	Group- I	Mmax	116951.9	-902645.2	-1562251.5	1.73	161.40
		Mmin	119292.0	-1101289.6	-1567255.7	1.42	163.60
	Group-IV	Mmax	100650.6	-926816.2	-1525114.0	1.65	147.60
		Mmin	102052.5	-1045819.7	-1528357.6	1.46	148.70
44-i	Group- I	Mmax	118634.1	-898110.5	-1565843.6	1.74	163.00
		Mmin	121238.6	-1096347.5	-1571332.8	1.43	165.50
	Group-IV	Mmax	102323.0	-922331.4	-1528981.9	1.66	148.90
		Mmin	103883.4	-1041090.9	-1532583.1	1.47	150.10
44-j	Group- I	Mmax	118636.8	-884235.7	-1565844.1	1.77	163.00
		Mmin	121231.3	-1080283.8	-1571303.5	1.45	165.50
	Group-IV	Mmax	102321.8	-908485.5	-1528981.9	1.68	148.90
		Mmin	103876.1	-1025933.7	-1532567.6	1.49	150.10
45-i	Group- I	Mmax	118626.2	-884235.7	-1565820.3	1.77	163.00
		Mmin	121231.1	-1080283.8	-1571303.5	1.45	165.50
	Group-IV	Mmax	102315.5	-908485.5	-1528965.9	1.68	148.90
		Mmin	103876.0	-1025933.7	-1532567.6	1.49	150.10
45-j	Group- I	Mmax	118603.8	-825546.6	-1565149.4	1.90	163.00
		Mmin	121197.5	-1012277.4	-1570589.9	1.55	165.50
	Group-IV	Mmax	102289.7	-849964.7	-1528385.7	1.80	148.80
		Mmin	103843.5	-961831.1	-1531968.0	1.59	150.10
46-i	Group- I	Mmax	118559.8	-825546.6	-1565057.9	1.90	162.90
		Mmin	121166.8	-1012277.4	-1570526.5	1.55	165.40
	Group-IV	Mmax	102251.1	-849964.7	-1528295.1	1.80	148.80
		Mmin	103812.9	-961831.1	-1531900.4	1.59	150.00
46-j	Group- I	Mmax	118503.8	-720324.6	-1457763.4	2.02	151.40
		Mmin	121094.5	-889132.6	-1462935.1	1.65	153.40
	Group-IV	Mmax	102193.8	-742691.6	-1424075.2	1.92	140.00
		Mmin	103745.8	-843820.9	-1427341.7	1.69	141.00
47-i	Group- I	Mmax	118486.0	-720324.6	-1457726.5	2.02	151.40
		Mmin	121094.4	-889132.6	-1462934.9	1.65	153.40
	Group-IV	Mmax	102183.1	-742691.6	-1424051.4	1.92	140.00
		Mmin	103745.8	-843820.9	-1427341.7	1.69	141.00
47-j	Group- I	Mmax	118451.1	-653155.6	-1341584.3	2.05	136.90
		Mmin	121045.7	-810153.3	-1346666.1	1.66	138.40
	Group-IV	Mmax	102144.5	-674179.0	-1309136.7	1.94	128.30
		Mmin	103698.9	-768232.9	-1312266.4	1.71	129.00
48-i	Group- I	Mmax	118435.0	-653155.6	-1290136.7	1.98	131.10
		Mmin	121045.7	-810153.3	-1295333.4	1.60	132.40
	Group-IV	Mmax	102134.9	-674179.0	-1257145.7	1.86	123.40
		Mmin	103698.9	-768232.9	-1260328.3	1.64	124.00

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
48-j	Group- I	Mmax	118373.5	-557624.9	-1168131.6	2.09	126.00
		Mmin	120973.2	-697113.5	-1173061.3	1.68	127.60
	Group-IV	Mmax	102152.0	-575674.4	-1136791.9	1.97	116.70
		Mmin	103709.5	-659239.0	-1139842.7	1.73	117.50
49-i	Group- I	Mmax	118354.6	-557624.9	-1168424.8	2.10	125.30
		Mmin	120973.2	-697113.5	-1173409.8	1.68	127.00
	Group-IV	Mmax	102140.7	-575674.4	-1136960.9	1.98	116.10
		Mmin	103709.5	-659239.0	-1140043.0	1.73	116.90
49-j	Group- I	Mmax	118298.7	-472255.2	-1045840.5	2.21	118.00
		Mmin	120883.3	-595927.4	-1050532.1	1.76	119.70
	Group-IV	Mmax	102122.9	-488113.2	-1015914.0	2.08	108.50
		Mmin	103671.3	-562202.5	-1018810.8	1.81	109.30
50-i	Group- I	Mmax	118279.2	-472255.2	-1046127.7	2.22	117.30
		Mmin	120883.3	-595927.4	-1050878.9	1.76	119.10
	Group-IV	Mmax	102111.2	-488113.2	-1016106.8	2.08	107.90
		Mmin	103671.3	-562202.5	-1019033.4	1.81	108.70
50-j	Group- I	Mmax	118219.8	-386741.8	-937759.0	2.42	113.10
		Mmin	120886.2	-496482.1	-942267.9	1.90	115.20
	Group-IV	Mmax	102089.2	-400553.5	-909838.4	2.27	102.50
		Mmin	103686.5	-466296.5	-912665.7	1.96	103.50
51-i	Group- I	Mmax	118199.8	-386741.8	-938145.8	2.43	112.30
		Mmin	120886.2	-496482.1	-942715.2	1.90	114.40
	Group-IV	Mmax	102077.2	-400553.5	-910087.7	2.27	101.90
		Mmin	103686.5	-466296.5	-912952.4	1.96	102.80
51-j	Group- I	Mmax	118157.6	-313730.0	-837680.8	2.67	111.10
		Mmin	120843.8	-412102.9	-841873.0	2.04	113.90
	Group-IV	Mmax	102086.6	-325661.1	-811157.3	2.49	97.80
		Mmin	103695.9	-384594.2	-813881.1	2.12	98.90
52-i	Group- I	Mmax	118138.6	-313730.0	-838236.0	2.67	110.00
		Mmin	120843.8	-412102.9	-842519.5	2.04	112.70
	Group-IV	Mmax	102075.3	-325661.1	-811516.7	2.49	96.90
		Mmin	103695.9	-384594.2	-814278.0	2.12	98.00
52-j	Group- I	Mmax	118110.6	-252512.0	-750788.0	2.97	118.90
		Mmin	120782.1	-340731.5	-752813.2	2.21	122.30
	Group-IV	Mmax	102094.6	-262817.3	-731601.1	2.78	100.00
		Mmin	103695.1	-315667.7	-734094.2	2.33	101.70
53-i	Group- I	Mmax	118090.9	-252512.0	-752408.3	2.98	117.40
		Mmin	120782.1	-340731.5	-754471.1	2.21	120.80
	Group-IV	Mmax	102082.8	-262817.3	-732231.1	2.79	98.60
		Mmin	103695.1	-315667.7	-734767.2	2.33	100.30
53-j	Group- I	Mmax	118078.4	-196968.8	-659363.6	3.35	133.20
		Mmin	120701.0	-275038.6	-661062.1	2.40	137.60
	Group-IV	Mmax	102090.4	-205886.2	-648463.1	3.15	109.00
		Mmin	103661.5	-252656.1	-649587.9	2.57	111.10
54-i	Group- I	Mmax	118058.7	-196968.8	-660840.9	3.36	132.00
		Mmin	120701.0	-275038.6	-662400.7	2.41	136.60
	Group-IV	Mmax	116284.5	-208891.8	-659784.7	3.16	128.90
		Mmin	103661.5	-252656.1	-651628.0	2.58	109.20

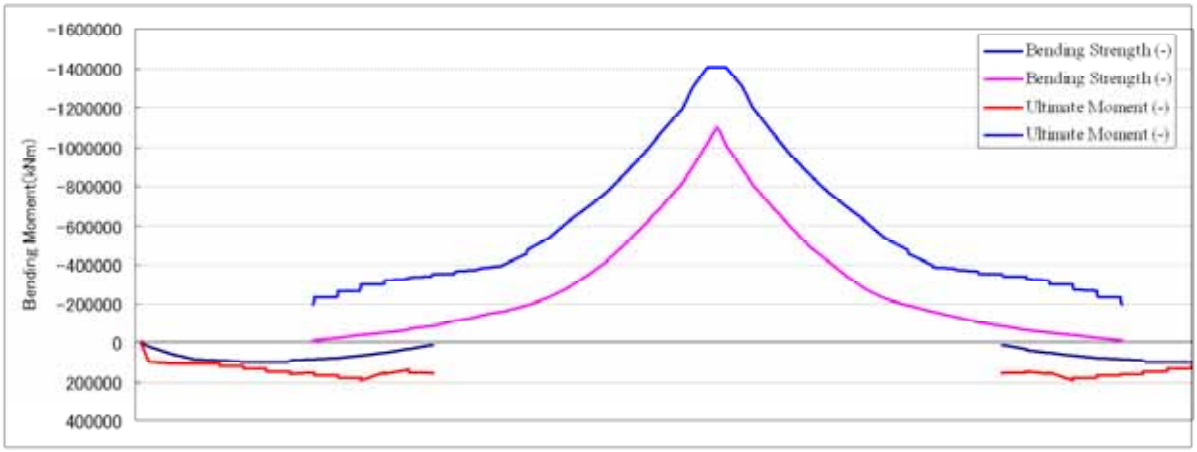
Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
54-j	Group- I	Mmax	118070.1	-154625.2	-574838.3	3.72	179.30
		Mmin	120539.3	-224321.5	-575957.9	2.57	184.40
	Group-IV	Mmax	116268.3	-166636.6	-573980.8	3.44	175.60
		Mmin	117747.6	-208390.1	-574687.1	2.76	178.60
55-i	Group- I	Mmax	118050.1	-154625.2	-576058.7	3.73	178.50
		Mmin	120539.3	-224321.5	-577197.4	2.57	183.70
	Group-IV	Mmax	116256.4	-166636.6	-575198.7	3.45	174.80
		Mmin	117747.6	-208390.1	-575915.9	2.76	177.90
55-j	Group- I	Mmax	118181.2	-122033.9	-493808.7	4.05	225.70
		Mmin	120190.3	-189702.6	-492775.1	2.60	228.10
	Group-IV	Mmax	116312.6	-134787.3	-494768.3	3.67	223.50
		Mmin	117516.2	-175326.2	-494150.5	2.82	224.90
56-i	Group- I	Mmax	111640.0	-122034.2	-499282.1	4.09	217.80
		Mmin	113721.3	-189703.0	-498217.9	2.63	220.20
	Group-IV	Mmax	109909.7	-134787.6	-500167.8	3.71	215.90
		Mmin	111156.6	-175326.6	-499529.9	2.85	217.30
56-j	Group- I	Mmax	111651.7	-119528.6	-490308.9	4.10	210.40
		Mmin	113710.9	-187246.3	-489732.5	2.62	213.40
	Group-IV	Mmax	109915.4	-132368.1	-490790.6	3.71	207.90
		Mmin	111149.0	-172936.4	-490449.0	2.84	209.70
57-i	Group- I	Mmax	111640.6	-119528.6	-490190.0	4.10	210.20
		Mmin	113710.9	-187246.3	-489610.2	2.61	213.20
	Group-IV	Mmax	109908.7	-132368.1	-490670.0	3.71	207.70
		Mmin	111149.0	-172936.4	-490326.6	2.84	209.50
57-j	Group- I	Mmax	112071.1	-85176.6	-408168.5	4.79	242.70
		Mmin	113360.1	-156096.7	-407537.6	2.61	244.30
	Group-IV	Mmax	110146.0	-100011.7	-409105.9	4.09	240.30
		Mmin	110918.2	-142498.3	-408730.3	2.87	241.30
58-i	Group- I	Mmax	105308.3	-85177.0	-412322.9	4.84	234.40
		Mmin	106757.6	-156097.2	-411627.8	2.64	236.10
	Group-IV	Mmax	103550.4	-100012.0	-413163.5	4.13	232.20
		Mmin	104418.6	-142498.8	-412748.9	2.90	233.30
58-j	Group- I	Mmax	105369.4	-82653.8	-404116.1	4.89	231.70
		Mmin	106749.9	-154057.5	-403483.3	2.62	233.40
	Group-IV	Mmax	103585.7	-97685.0	-404930.2	4.15	229.50
		Mmin	104412.7	-140461.3	-404552.6	2.88	230.50
59-i	Group- I	Mmax	105358.2	-82653.8	-404018.1	4.89	231.50
		Mmin	106749.9	-154057.5	-403381.0	2.62	233.20
	Group-IV	Mmax	103579.0	-97685.0	-404829.9	4.14	229.30
		Mmin	104412.7	-140461.3	-404450.1	2.88	230.30
59-j	Group- I	Mmax	105408.3	-49388.1	-391334.1	7.92	227.40
		Mmin	106513.2	-129886.8	-390830.7	3.01	228.70
	Group-IV	Mmax	106808.5	-69158.4	-390696.9	5.65	229.10
		Mmin	107470.4	-117383.4	-390394.4	3.33	229.90
60-i	Group- I	Mmax	98476.8	-49388.4	-394976.6	8.00	219.10
		Mmin	99759.2	-129887.4	-394401.4	3.04	220.60
	Group-IV	Mmax	99863.3	-69158.8	-394353.9	5.70	220.70
		Mmin	100631.6	-117383.9	-394009.0	3.36	221.60

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
60-j	Group- Ⅰ	Mmax	98485.0	-46990.8	-391317.4	8.33	213.70
		Mmin	99756.1	-128041.0	-390863.6	3.05	215.30
	Group-Ⅳ	Mmax	99867.0	-67077.6	-390824.1	5.83	215.40
		Mmin	100628.4	-115633.0	-390548.0	3.38	216.40
61-i	Group- Ⅰ	Mmax	98473.9	-46990.8	-391211.7	8.33	213.50
		Mmin	99756.1	-128041.0	-390754.2	3.05	215.10
	Group-Ⅳ	Mmax	99860.3	-67077.6	-390717.2	5.82	215.20
		Mmin	100628.4	-115633.0	-390442.6	3.38	216.20
61-j	Group- Ⅰ	Mmax	98453.0	-16409.2	-386679.8	23.56	211.80
		Mmin	99707.1	-105243.4	-386234.0	3.67	213.40
	Group-Ⅳ	Mmax	99828.1	-41111.8	-386191.0	9.39	213.50
		Mmin	100579.4	-94330.5	-385923.5	4.09	214.50
62-i	Group- Ⅰ	Mmax	91635.4	-16409.5	-389170.6	23.72	203.50
		Mmin	93037.4	-105244.0	-388678.6	3.69	205.20
	Group-Ⅳ	Mmax	92989.1	-41112.2	-388695.5	9.45	205.20
		Mmin	93829.0	-94331.0	-388400.4	4.12	206.20
62-j	Group- Ⅰ	Mmax	91643.4	-14254.5	-385557.1	27.05	198.00
		Mmin	93034.3	-103531.2	-385093.3	3.72	199.70
	Group-Ⅳ	Mmax	92992.6	-39221.8	-385107.0	9.82	199.60
		Mmin	93825.9	-92705.5	-384828.9	4.15	200.60
63-i	Group- Ⅰ	Mmax	91632.2	-14254.5	-385452.6	27.04	197.80
		Mmin	93034.3	-103531.2	-384984.5	3.72	199.50
	Group-Ⅳ	Mmax	92985.9	-39221.8	-385000.7	9.82	199.50
		Mmin	93825.9	-92705.5	-384720.4	4.15	200.50
63-j	Group- Ⅰ	Mmax	91606.6	12392.9	162370.9	13.10	32.00
		Mmin	92985.4	-82817.3	-384443.6	4.64	199.00
	Group-Ⅳ	Mmax	92951.0	-16320.3	-384455.4	23.56	198.90
		Mmin	93777.0	-73358.7	-384180.5	5.24	199.90
64-i	Group- Ⅰ	Mmax	84691.5	12392.6	154812.3	12.49	30.80
		Mmin	86182.7	-82817.8	-384864.1	4.65	188.00
	Group-Ⅳ	Mmax	86004.4	-16320.7	-384783.4	23.58	187.60
		Mmin	86897.7	-73359.2	-385171.0	5.25	189.70
64-j	Group- Ⅰ	Mmax	84699.2	14258.6	154747.9	10.85	30.30
		Mmin	86179.6	-81265.5	-376723.8	4.64	175.80
	Group-Ⅳ	Mmax	86007.7	-14660.4	-376630.3	25.69	175.40
		Mmin	86894.6	-71886.8	-377106.4	5.25	177.50
65-i	Group- Ⅰ	Mmax	84688.0	14258.6	154744.8	10.85	30.30
		Mmin	86179.6	-81265.5	-376698.4	4.64	175.80
	Group-Ⅳ	Mmax	86001.1	-14660.4	-376601.6	25.69	175.40
		Mmin	86894.6	-71886.8	-377080.4	5.25	177.50
65-j	Group- Ⅰ	Mmax	84637.8	36786.6	154861.5	4.21	30.30
		Mmin	86130.6	-63064.7	-376336.4	5.97	175.60
	Group-Ⅳ	Mmax	69192.5	12935.0	137845.3	10.66	27.80
		Mmin	72731.6	-53998.0	-367845.0	6.81	144.60
66-i	Group- Ⅰ	Mmax	77671.3	36786.4	147204.2	4.00	29.10
		Mmin	79228.7	-63065.1	-372277.0	5.90	159.50
	Group-Ⅳ	Mmax	62366.7	12934.7	130268.5	10.07	26.70
		Mmin	65743.9	-53998.4	-362625.7	6.72	129.00

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
66-j	Group- I	Mmax	77679.1	38380.0	147114.6	3.83	28.60
		Mmin	79225.6	-61698.3	-363029.9	5.88	147.40
	Group-IV	Mmax	62370.1	14341.9	130130.0	9.07	26.20
		Mmin	65740.8	-52798.2	-352418.5	6.67	117.10
67-i	Group- I	Mmax	77659.6	38380.0	147093.3	3.83	28.60
		Mmin	79225.6	-61698.3	-363003.4	5.88	147.30
	Group-IV	Mmax	62358.4	14341.9	130117.1	9.07	26.20
		Mmin	65740.8	-52798.2	-352389.7	6.67	117.10
67-j	Group- I	Mmax	77632.0	55987.5	165602.4	2.96	29.60
		Mmin	79176.7	-46404.0	-360813.5	7.78	150.20
	Group-IV	Mmax	62322.3	29525.1	148687.2	5.04	27.10
		Mmin	65691.9	-40114.8	-350320.2	8.73	119.90
68-i	Group- I	Mmax	70645.7	55987.4	157898.6	2.82	28.40
		Mmin	72214.3	-46404.4	-355623.9	7.66	134.40
	Group-IV	Mmax	55470.0	29524.9	141065.4	4.78	26.10
		Mmin	58648.5	-40115.2	-344326.7	8.58	104.80
68-j	Group- I	Mmax	70653.5	57216.0	157805.4	2.76	27.90
		Mmin	72211.1	-45247.5	-345368.6	7.63	122.40
	Group-IV	Mmax	55473.4	30618.5	140914.5	4.60	25.50
		Mmin	58645.4	-39118.0	-333340.3	8.52	93.30
69-i	Group- I	Mmax	70634.0	57216.0	157780.9	2.76	27.90
		Mmin	72211.1	-45247.5	-345357.6	7.63	122.40
	Group-IV	Mmax	55461.7	30618.5	140905.7	4.60	25.50
		Mmin	58645.4	-39118.0	-333329.1	8.52	93.20
69-j	Group- I	Mmax	70601.1	69024.1	194656.2	2.82	29.80
		Mmin	72162.2	-33242.8	-341638.4	10.28	128.20
	Group-IV	Mmax	55422.4	40841.1	177914.3	4.36	27.30
		Mmin	58596.5	-29615.2	-329677.9	11.13	98.70
70-i	Group- I	Mmax	60731.4	69024.0	183785.6	2.66	28.20
		Mmin	62268.8	-33243.2	-332981.1	10.02	106.60
	Group-IV	Mmax	45732.0	40841.0	167134.6	4.09	25.80
		Mmin	48594.5	-29615.6	-318215.6	10.74	76.70
70-j	Group- I	Mmax	60738.8	70097.3	183677.5	2.62	27.70
		Mmin	62265.7	-32081.3	-321689.7	10.03	95.00
	Group-IV	Mmax	45735.1	41828.0	166978.6	3.99	25.30
		Mmin	48591.3	-28604.4	-302906.7	10.59	63.30
71-i	Group- I	Mmax	60725.8	70097.3	183672.1	2.62	27.60
		Mmin	62265.7	-32081.3	-321706.0	10.03	94.90
	Group-IV	Mmax	45727.4	41828.0	166978.7	3.99	25.30
		Mmin	48591.3	-28604.4	-302922.5	10.59	63.30
71-j	Group- I	Mmax	60686.5	79552.4	183805.7	2.31	27.70
		Mmin	62216.8	-19997.6	-321382.2	16.07	94.60
	Group-IV	Mmax	45684.2	50429.4	167120.2	3.31	25.30
		Mmin	48542.4	-18882.8	-302587.7	16.02	63.00
72-i	Group- I	Mmax	50681.2	79552.3	172695.1	2.17	26.10
		Mmin	52116.6	-19998.0	-308265.8	15.41	71.40
	Group-IV	Mmax	35841.6	50429.2	156099.9	3.10	23.80
		Mmin	38338.5	-18883.2	-284944.9	15.09	44.20

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
72-j	Group- I	Mmax	50688.0	80480.8	172543.9	2.14	25.50
		Mmin	52113.5	-18847.0	-292706.1	15.53	58.50
	Group-IV	Mmax	35844.4	51309.3	155914.7	3.04	23.30
		Mmin	38335.4	-17874.7	-268072.5	15.00	37.80
73-i	Group- I	Mmax	50668.5	80480.8	172526.3	2.14	25.50
		Mmin	52113.5	-18847.0	-292721.2	15.53	58.40
	Group-IV	Mmax	35832.7	51309.3	155902.9	3.04	23.30
		Mmin	38335.4	-17874.7	-268079.8	15.00	37.80
73-j	Group- I	Mmax	50629.2	89252.9	172676.1	1.93	25.50
		Mmin	52064.5	-6933.5	-292387.3	42.17	58.10
	Group-IV	Mmax	35789.6	59185.1	156060.7	2.64	23.30
		Mmin	50820.4	6719.9	172891.0	25.73	25.60
74-i	Group- I	Mmax	40503.4	89252.9	161353.6	1.81	24.00
		Mmin	41783.1	-6933.9	-274206.0	39.55	41.40
	Group-IV	Mmax	25812.9	59185.0	144671.7	2.44	21.70
		Mmin	40766.0	6719.6	161644.8	24.06	24.00
74-j	Group- I	Mmax	40510.3	90182.0	161166.4	1.79	23.40
		Mmin	41780.0	-5809.0	-257228.2	44.28	35.80
	Group-IV	Mmax	25815.8	60038.9	144249.5	2.40	20.90
		Mmin	40762.9	7779.3	161458.0	20.75	23.50
75-i	Group- I	Mmax	40491.3	90182.0	161150.4	1.79	23.40
		Mmin	41780.0	-5809.0	-257234.0	44.28	35.80
	Group-IV	Mmax	25804.5	60038.9	144230.0	2.40	20.90
		Mmin	40762.9	7779.3	161455.4	20.75	23.40
75-j	Group- I	Mmax	40456.4	97831.0	161317.2	1.65	23.40
		Mmin	41731.0	5695.5	162747.3	28.57	23.60
	Group-IV	Mmax	25763.9	66825.6	144425.5	2.16	20.90
		Mmin	40714.0	18261.8	161609.2	8.85	23.50
76-i	Group- I	Mmax	30376.7	97831.0	149852.3	1.53	21.80
		Mmin	31436.5	5695.2	151095.7	26.53	22.00
	Group-IV	Mmax	15819.5	66825.6	132651.8	1.99	19.00
		Mmin	30657.0	18261.6	150184.7	8.22	21.90
76-j	Group- I	Mmax	30383.7	98570.9	149430.2	1.52	21.00
		Mmin	31433.4	6768.7	150670.1	22.26	21.20
	Group-IV	Mmax	15822.5	67529.2	132091.8	1.96	18.10
		Mmin	30653.9	19252.3	149753.6	7.78	21.00
77-i	Group- I	Mmax	30364.8	98570.9	149411.0	1.52	21.00
		Mmin	31433.4	6768.7	150672.0	22.26	21.20
	Group-IV	Mmax	15811.2	67529.2	132078.7	1.96	18.10
		Mmin	30653.9	19252.3	149750.2	7.78	21.00
77-j	Group- I	Mmax	30328.7	102794.7	149606.5	1.46	21.00
		Mmin	31384.5	17467.2	150849.9	8.64	21.30
	Group-IV	Mmax	15769.9	71685.9	132312.6	1.85	18.20
		Mmin	30605.0	28655.3	149930.8	5.23	21.10
78-i	Group- I	Mmax	20199.6	102794.8	137605.6	1.34	19.10
		Mmin	20988.5	17466.9	138539.5	7.93	19.20
	Group-IV	Mmax	5764.1	71685.9	120245.9	1.68	16.30
		Mmin	20456.6	28655.1	137910.0	4.81	19.10

Member No.	Combination Group		Factored Force		Flexural Strength	φMn / Mu	Neutral Axis
			Nu(kN)	Mu(kN.m)	φMn(kN.m)		(cm)
78-j	Group- I	Mmax	20206.8	103289.9	137038.3	1.33	18.10
		Mmin	20985.4	18472.6	137979.7	7.47	18.30
	Group-IV	Mmax	5767.1	72199.3	119534.2	1.66	15.40
		Mmin	20453.5	29560.5	137338.1	4.65	18.20
79-i	Group- I	Mmax	20195.7	103289.9	137021.3	1.33	18.10
		Mmin	20985.4	18472.6	137973.6	7.47	18.30
	Group-IV	Mmax	5760.5	72199.3	119520.7	1.66	15.40
		Mmin	20453.5	29560.5	137331.9	4.65	18.20
79-j	Group- I	Mmax	20162.2	103462.8	137266.4	1.33	18.20
		Mmin	20936.5	28109.3	138194.8	4.92	18.40
	Group-IV	Mmax	5720.8	73246.5	119750.5	1.63	15.40
		Mmin	20404.5	37625.3	137556.5	3.66	18.30
80-i	Group- I	Mmax	10073.2	103462.9	125077.8	1.21	16.30
		Mmin	10524.2	28109.1	125622.5	4.47	16.40
	Group-IV	Mmax	-4259.9	73246.5	107446.6	1.47	13.50
		Mmin	10249.3	37625.2	125293.5	3.33	16.30
80-j	Group- I	Mmax	10080.4	103513.3	124342.2	1.20	15.30
		Mmin	10521.1	28881.0	124875.3	4.32	15.40
	Group-IV	Mmax	-4256.9	73383.4	106510.9	1.45	12.40
		Mmin	10246.2	38279.0	124539.4	3.25	15.30



(2) Calculation of Required Reinforcement

a. Required Shear Reinforcement

Member No	S(kN)	N(kN)	M(kN.m)	Sh(kN)	Sc(kN)	σs (N/mm^2)	Awmin (cm^2)	Awreq (cm^2)	As (cm^2)
1-i	11,640	219	-131	11,640	0	420	33.000	92.591	138.886
1-j	10,397	208	19,021	10,397	6,262	420	33.000	33.033	49.549
2-i	10,397	189	19,021	10,397	6,262	420	33.000	33.034	49.551
2-j	7,122	142	60,849	7,122	3,888	420	27.000	27.381	41.072
3-i	7,123	124	60,849	7,123	3,886	420	27.000	27.395	41.093
3-j	4,375	87	84,108	4,375	3,530	420	27.000	8.437	12.656
4-i	4,375	68	84,108	4,375	3,544	420	27.000	8.350	12.525
4-j	1,411	28	93,583	1,411	3,416	420	27.000	0.000	0.000
5-i	1,411	18	93,583	1,411	3,418	420	27.000	0.000	0.000
5-j	1,234	25	93,634	1,234	3,384	420	27.000	0.000	0.000
6-i	3,381	10,067	93,634	3,381	3,602	420	27.000	6.963	10.445
6-j	617	10,031	97,011	617	3,534	420	27.000	0.000	0.000
7-i	617	10,020	97,011	617	3,533	420	27.000	0.000	0.000
7-j	441	10,027	96,749	441	3,507	420	27.000	0.000	0.000
8-i	2,176	20,099	96,749	2,176	3,720	420	27.000	0.000	0.000
8-j	-566	20,066	93,440	-566	3,747	420	27.000	0.000	0.000
9-i	-566	20,056	93,440	-566	3,748	420	27.000	0.000	0.000
9-j	-741	20,063	92,763	-741	3,727	420	27.000	0.000	0.000
10-i	1,559	30,202	92,763	1,559	3,950	420	27.000	0.000	0.000
10-j	-1,160	30,173	85,801	-1,160	4,047	420	27.000	0.000	0.000
11-i	-1,160	30,162	85,801	-1,160	4,048	420	27.000	0.000	0.000
11-j	-1,333	30,170	84,904	-1,333	4,032	420	27.000	0.000	0.000
12-i	1,034	40,272	84,904	1,034	4,275	420	27.000	0.000	0.000
12-j	-1,659	40,241	75,086	-1,659	4,480	420	27.000	0.000	0.000
13-i	-1,659	40,231	75,086	-1,659	4,481	420	27.000	0.000	0.000
13-j	-1,830	40,238	74,021	-1,830	4,473	420	27.000	0.000	0.000
14-i	633	50,389	74,022	633	4,753	420	27.000	0.000	0.000
14-j	-2,035	50,355	62,140	-2,035	5,123	420	27.000	0.000	0.000
15-i	-2,035	50,345	62,140	-2,035	5,123	420	27.000	0.000	0.000
15-j	-2,205	50,352	60,951	-2,205	5,123	420	27.000	0.000	0.000
16-i	323	60,381	60,951	323	5,123	420	27.000	0.000	0.000
16-j	-2,322	60,339	47,696	-2,322	5,123	420	27.000	0.000	0.000
17-i	-2,322	60,328	47,696	-2,322	5,123	420	27.000	0.000	0.000
17-j	-2,490	60,335	46,442	-2,490	5,123	420	27.000	0.000	0.000
18-i	103	70,214	46,442	103	5,123	420	27.000	0.000	0.000
18-j	-2,520	70,157	32,421	-2,520	5,123	420	27.000	0.000	0.000
19-i	-2,520	70,147	32,421	-2,520	5,123	420	27.000	0.000	0.000
19-j	-2,687	70,153	31,113	-2,687	5,123	420	27.000	0.000	0.000
20-i	-793	77,136	31,113	-793	5,123	420	27.000	0.000	0.000
20-j	-6,608	78,845	-14,888	-6,608	5,123	420	27.000	6.084	9.126

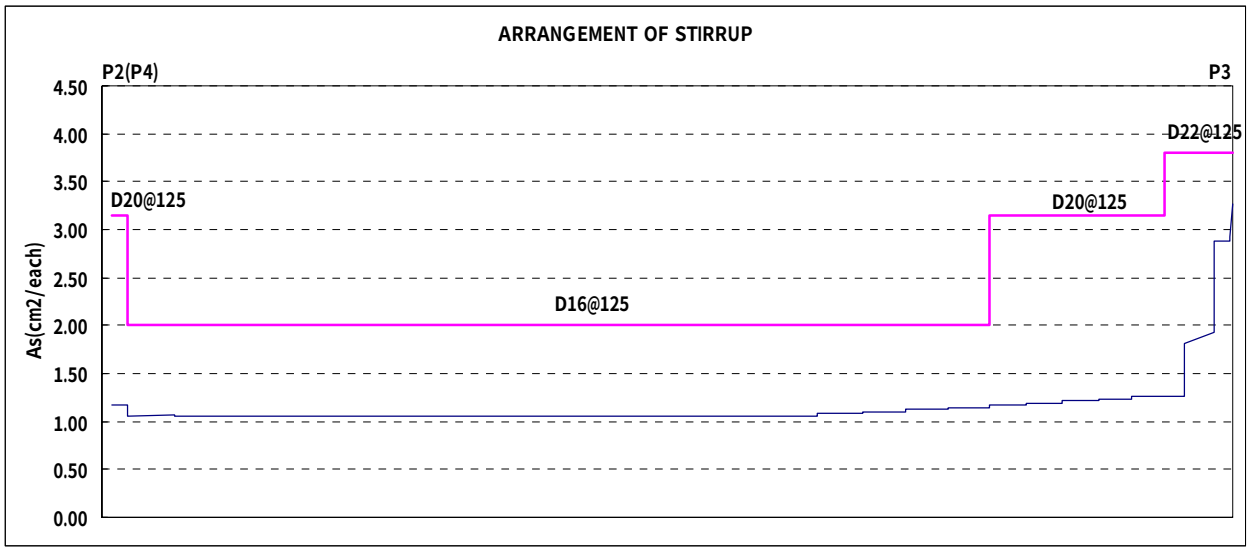
Member No	S(kN)	N(kN)	M(kN.m)	Sh(kN)	Sc(kN)	σs (N/mm^2)	Awmin (cm^2)	Awreq (cm^2)	As (cm^2)
21-i	-6,607	78,826	-14,888	-6,607	5,123	420	27.000	6.063	9.095
21-j	-6,784	78,833	-16,374	-6,784	5,123	420	27.000	5.624	8.436
22-i	-1,583	84,032	11,383	-1,583	5,123	420	27.000	0.000	0.000
22-j	-7,528	85,873	-37,540	-7,528	5,123	420	27.000	12.827	19.241
23-i	-7,528	85,854	-37,540	-7,528	5,123	420	27.000	12.805	19.208
23-j	-7,704	85,861	-39,364	-7,704	5,123	420	27.000	12.370	18.555
24-i	-2,266	90,863	-12,102	-2,266	5,123	420	27.000	0.000	0.000
24-j	-8,346	92,830	-65,153	-8,283	5,123	420	27.000	18.258	27.387
25-i	-8,346	92,811	-65,153	-8,283	5,123	420	27.000	18.235	27.353
25-j	-8,521	92,818	-67,259	-8,396	5,126	420	27.000	17.274	25.925
26-i	-2,832	97,594	-38,693	-2,760	5,126	420	27.000	0.000	0.000
26-j	-9,065	99,666	-97,419	-8,745	5,169	420	27.000	20.819	31.508
27-i	-9,065	99,658	-97,419	-8,745	5,169	420	27.000	20.796	31.475
27-j	-9,241	99,657	-99,751	-8,740	5,177	420	27.000	18.867	28.596
28-i	-3,189	104,438	-67,516	-2,850	5,177	420	27.000	0.000	0.000
28-j	-9,587	106,607	-131,953	-8,695	5,304	420	27.000	18.341	28.485
29-i	-9,587	106,600	-131,953	-8,695	5,304	420	27.000	18.319	28.450
29-j	-9,763	106,596	-134,431	-8,625	5,334	420	27.080	15.768	24.551
30-i	-7,718	113,443	-134,430	-6,580	5,334	420	27.080	0.164	0.255
30-j	-10,583	113,352	-170,792	-8,887	5,777	420	28.200	15.014	24.316
31-i	-10,583	113,344	-170,792	-8,887	5,777	420	28.200	14.997	24.289
31-j	-10,774	113,320	-171,920	-8,794	5,814	420	28.280	9.527	15.483
32-i	-4,060	117,645	-130,149	-2,561	5,814	420	28.280	0.000	0.000
32-j	-11,157	119,957	-210,703	-8,557	6,369	420	29.400	4.554	7.798
33-i	-11,157	119,938	-210,703	-8,557	6,369	420	29.400	4.521	7.743
33-j	-14,366	119,885	-263,036	-10,601	7,042	420	30.600	12.122	22.051
34-i	-14,366	119,866	-263,036	-10,601	7,042	420	30.600	12.095	22.002
34-j	-17,796	119,831	-331,266	-12,569	7,734	420	31.400	17.661	34.385
35-i	-17,796	119,812	-331,266	-12,568	7,734	420	31.400	17.630	34.326
35-j	-21,018	119,782	-405,716	-14,167	8,574	420	32.600	21.482	44.665
36-i	-21,018	119,764	-405,716	-14,167	8,574	420	32.600	21.462	44.623
36-j	-24,414	119,695	-494,492	-15,680	9,437	420	33.800	21.636	48.201
37-i	-24,414	119,689	-494,492	-15,680	9,441	420	33.800	21.590	48.098
37-j	-27,980	119,636	-596,530	-17,158	9,963	420	34.600	24.314	58.205
38-i	-27,980	119,630	-596,530	-17,158	9,966	420	34.600	24.278	58.119
38-j	-31,230	119,577	-697,571	-18,313	10,613	420	35.400	24.588	62.763
39-i	-31,230	119,572	-697,571	-18,313	10,617	420	35.400	24.551	62.669
39-j	-34,639	119,502	-809,813	-19,317	11,522	420	37.000	22.297	60.755
40-i	-34,639	119,498	-809,813	-19,317	11,541	420	37.000	22.138	60.322
40-j	-36,898	119,444	-888,011	-20,055	11,977	420	37.000	20.886	59.444

Member No	S(kN)	N(kN)	M(kN.m)	Sh(kN)	Sc(kN)	σs (N/mm^2)	Awmin (cm^2)	Awreq (cm^2)	As (cm^2)
41-i	-36,898	119,440	-888,011	-20,055	11,978	420	37.000	20.884	59.439
41-j	-40,195	119,359	-1,010,065	-31,162	12,381	420	37.000	63.313	191.315
42-i	-41,721	119,324	-1,010,065	-32,688	12,381	420	37.000	69.326	209.484
42-j	-43,389	119,288	-1,077,883	-43,389	12,066	420	37.000	114.883	347.146
43-i	-43,389	119,284	-1,077,883	-43,389	12,066	420	37.000	114.883	347.146
43-j	-43,775	119,279	-1,093,989	-43,775	11,995	420	37.000	116.680	352.577
44-i	43,732	121,248	-1,088,931	43,732	12,036	420	37.000	133.384	403.052
44-j	43,346	121,243	-1,072,865	43,346	12,106	420	37.000	131.577	397.592
45-i	43,346	121,240	-1,072,865	43,346	12,106	420	37.000	131.578	397.593
45-j	41,680	121,217	-1,005,173	32,691	12,423	420	37.000	86.758	262.159
46-i	40,154	121,181	-1,005,173	31,164	12,422	420	37.000	80.747	243.996
46-j	36,857	121,141	-883,284	20,104	12,021	420	37.000	38.870	110.626
47-i	36,857	121,136	-883,284	20,104	12,021	420	37.000	38.870	110.629
47-j	34,598	121,108	-805,177	19,364	11,586	420	37.000	39.381	107.305
48-i	34,598	121,103	-805,177	19,364	11,566	420	37.000	39.454	107.505
48-j	31,190	121,046	-693,076	18,356	10,661	420	35.400	42.019	107.259
49-i	31,190	121,041	-693,076	18,356	10,657	420	35.400	42.038	107.308
49-j	27,939	120,974	-592,180	17,196	10,015	420	34.600	41.515	99.383
50-i	27,939	120,968	-592,180	17,196	10,011	420	34.600	41.533	99.427
50-j	24,373	120,892	-490,328	15,713	9,495	420	33.800	40.033	89.187
51-i	24,373	120,886	-490,328	15,713	9,490	420	33.800	40.055	89.236
51-j	20,975	120,830	-401,667	14,192	8,574	420	32.600	39.820	82.791
52-i	20,975	120,812	-401,667	14,192	8,574	420	32.600	39.815	82.781
52-j	17,753	120,749	-327,386	12,587	7,734	420	31.400	36.001	70.093
53-i	17,753	120,731	-327,386	12,587	7,734	420	31.400	36.003	70.097
53-j	14,324	120,666	-259,349	10,612	7,042	420	30.600	30.554	55.581
54-i	14,324	120,647	-259,349	10,612	7,042	420	30.600	30.550	55.575
54-j	11,116	120,612	-207,239	8,559	6,369	420	29.400	20.782	35.592
55-i	11,116	120,593	-207,239	8,559	6,369	420	29.400	20.790	35.605
55-j	8,001	120,609	-170,247	6,040	5,814	420	28.280	6.392	10.388
56-i	10,719	114,023	-170,247	8,758	5,814	420	28.280	26.298	42.741
56-j	10,528	114,024	-167,492	8,865	5,777	420	28.200	30.541	49.464
57-i	10,529	114,017	-167,492	8,866	5,777	420	28.200	30.525	49.437
57-j	7,664	114,011	-131,386	6,552	5,334	420	27.080	16.131	25.115
58-i	9,701	107,261	-131,387	8,589	5,334	420	27.080	31.720	49.386
58-j	9,525	107,263	-128,927	8,653	5,304	420	27.000	33.321	51.749
59-i	9,525	107,255	-128,927	8,653	5,304	420	27.000	33.300	51.716
59-j	6,768	107,226	-97,013	6,282	5,177	420	27.000	15.146	22.955
60-i	9,175	100,313	-97,014	8,688	5,177	420	27.000	34.055	51.616
60-j	8,999	100,313	-94,701	8,688	5,169	420	27.000	34.991	52.958

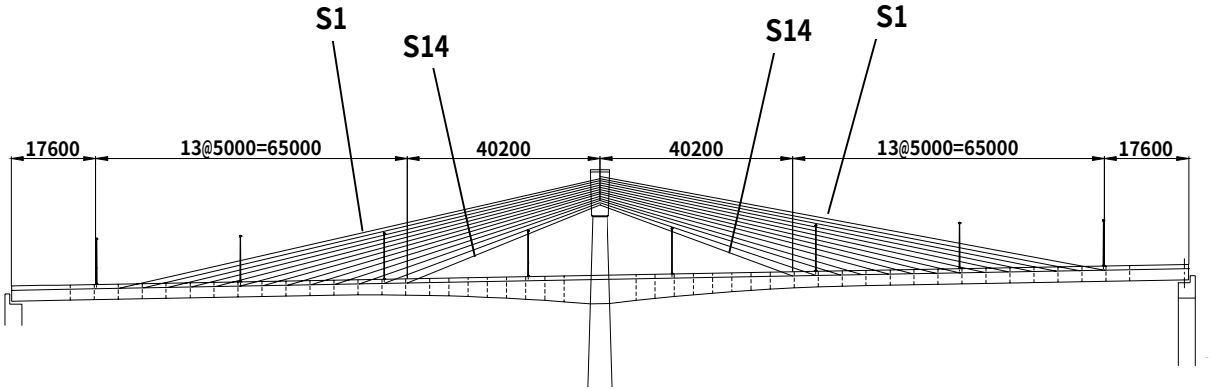
Member No	S(kN)	N(kN)	M(kN.m)	Sh(kN)	Sc(kN)	σs (N/mm^2)	Awmin (cm^2)	Awreq (cm^2)	As (cm^2)
61-i	8,999	100,305	-94,701	8,688	5,169	420	27.000	34.970	52.926
61-j	6,245	100,256	-64,848	6,124	5,126	420	27.000	13.892	20.851
62-i	8,453	93,438	-64,848	8,332	5,126	420	27.000	31.413	47.146
62-j	8,277	93,445	-62,762	8,217	5,123	420	27.000	31.375	47.062
63-i	8,277	93,426	-62,762	8,217	5,123	420	27.000	31.355	47.032
63-j	5,529	93,382	-37,306	5,529	5,123	420	27.000	8.638	12.956
64-i	7,635	86,451	-37,307	7,635	5,123	420	27.000	25.363	38.044
64-j	7,459	86,458	-35,505	7,459	5,123	420	27.000	24.803	37.205
65-i	7,459	86,439	-35,505	7,459	5,123	420	27.000	24.784	37.176
65-j	4,699	86,392	-14,722	4,699	5,123	420	27.000	1.492	2.238
66-i	6,713	79,384	-14,723	6,713	5,123	420	27.000	17.483	26.225
66-j	6,537	79,391	-13,257	6,537	5,123	420	27.000	16.924	25.386
67-i	6,537	79,372	-13,257	6,537	5,123	420	27.000	16.906	25.359
67-j	3,785	79,335	2,404	3,785	5,123	420	27.000	0.000	0.000
68-i	5,710	72,288	2,403	5,710	5,123	420	27.000	9.532	14.297
68-j	5,533	72,295	3,485	5,533	5,123	420	27.000	8.972	13.457
69-i	5,533	72,276	3,485	5,533	5,123	420	27.000	8.953	13.430
69-j	2,811	72,264	13,908	2,811	5,123	420	27.000	0.000	0.000
70-i	5,452	62,284	13,908	5,452	5,123	420	27.000	8.038	12.058
70-j	5,279	62,293	14,943	5,279	5,123	420	27.000	7.537	11.305
71-i	5,280	62,274	14,943	5,280	5,123	420	27.000	7.518	11.277
71-j	2,588	62,276	23,982	2,588	5,123	420	27.000	0.000	0.000
72-i	5,170	52,111	23,981	5,170	5,123	420	27.000	5.242	7.862
72-j	4,999	52,140	24,063	4,999	5,123	420	27.000	4.764	7.146
73-i	4,999	52,133	24,063	4,999	5,123	420	27.000	4.747	7.120
73-j	2,367	52,111	33,688	2,367	5,123	420	27.000	0.000	0.000
74-i	4,894	41,787	33,688	4,894	5,123	420	27.000	2.483	3.724
74-j	4,726	41,787	34,645	4,726	5,123	420	27.000	2.034	3.052
75-i	4,726	41,780	34,645	4,726	5,123	420	27.000	2.019	3.028
75-j	2,099	41,744	43,159	2,099	5,123	420	27.000	0.000	0.000
76-i	4,536	31,417	43,159	4,536	5,123	420	27.000	0.000	0.000
76-j	4,369	31,425	44,021	4,369	5,123	420	27.000	0.000	0.000
77-i	4,370	31,406	44,021	4,370	5,123	420	27.000	0.000	0.000
77-j	1,752	31,377	50,800	1,752	5,123	420	27.000	0.000	0.000
78-i	4,131	20,964	50,800	4,131	4,722	420	27.000	0.000	0.000
78-j	3,964	20,972	51,512	3,964	4,746	420	27.000	0.000	0.000
79-i	3,964	20,953	51,512	3,964	4,743	420	27.000	0.000	0.000
79-j	1,341	20,922	55,746	1,341	4,597	420	27.000	0.000	0.000
80-i	3,164	10,506	55,746	3,164	4,216	420	27.000	0.000	0.000
80-j	2,996	10,513	56,142	2,996	4,255	420	27.000	0.000	0.000

Note)

S: shear force
N: axial force
M: bendidng moment
Sh: shear force considered with effective height
Sc: shear force beared by concrete
σs: limit of tensile stress bear shear force by stir
Awmin: minimum requirement stirrup area
Awreq: required stirrup area due to shear force
As: required area of longitudinal reinforcement



2.6 Design of Summary of Stay Cable

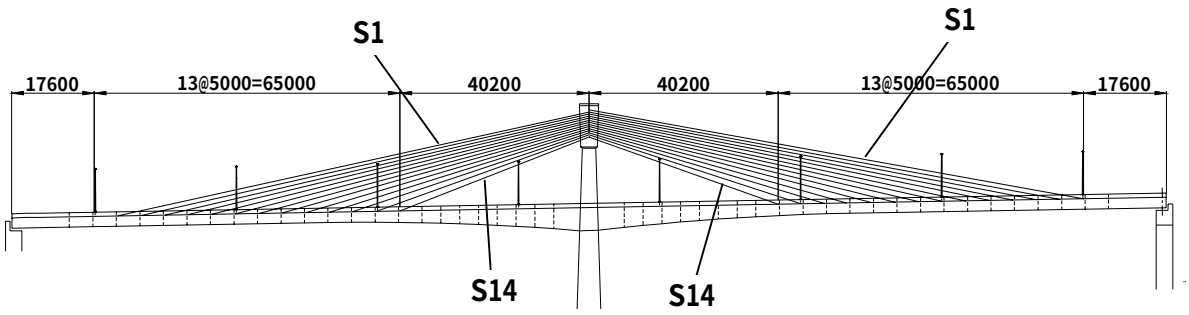


2.6.1 Summary of Tensile Force for Both Side Stay Cable Total (per both side)

No.	Initial Prestress **D** (kN)	Self Weight **D** (kN)	Surfacing **D** (kN)	Shrinkage **D** (kN)	2ndary Force **D** (kN)	Loss by Creep **D** (kN)	Live Load Nmax **L** (kN)	Live Load Nmin **L** (kN)	Temparature Rise **T** (kN)	Temparature Difference **T** (kN)
S1(E)	7500	1161	141	-442	-310	7	104	-68	134	17
S2(E)	7500	1183	189	-436	-377	12	98	-50	132	15
S3(E)	7400	1317	237	-430	-441	15	94	-34	129	14
S4(E)	7400	1276	285	-424	-501	20	94	-23	127	13
S5(E)	7500	1205	330	-418	-556	25	96	-13	124	12
S6(E)	7500	1104	373	-413	-606	30	101	-7	122	12
S7(E)	7500	985	411	-409	-650	34	108	-4	119	13
S8(E)	5400	610	315	-287	-486	27	80	-1	83	10
S9(E)	5400	604	334	-286	-509	29	85	0	81	11
S10(E)	5400	577	349	-285	-530	30	89	0	80	12
S11(E)	5400	533	358	-286	-547	32	91	0	78	13
S12(E)	5600	478	360	-288	-560	33	92	-1	77	14
S13(E)	5600	418	356	-292	-566	34	93	-4	76	15
S14(E)	5600	396	345	-296	-567	34	93	-7	74	16
S1(W)	7500	1143	136	-441	-307	7	105	-70	134	17
S2(W)	7500	1156	185	-434	-375	12	99	-52	131	15
S3(W)	7400	1282	233	-428	-439	15	94	-36	129	14
S4(W)	7400	1232	281	-421	-498	20	95	-24	126	13
S5(W)	7500	1153	328	-415	-554	25	96	-14	124	12
S6(W)	7500	1042	371	-410	-604	30	101	-8	121	12
S7(W)	7500	912	411	-405	-647	35	108	-4	119	13
S8(W)	5400	550	315	-284	-484	28	81	-1	82	10
S9(W)	5400	539	335	-283	-507	29	85	0	81	11
S10(W)	5400	504	350	-282	-528	31	89	0	79	12
S11(W)	5400	452	359	-283	-545	32	91	0	78	13
S12(W)	5600	389	362	-285	-557	33	93	-2	76	14
S13(W)	5600	318	358	-288	-564	34	94	-4	75	15
S14(W)	5600	318	358	-288	-564	34	94	-4	73	16

*) E : East Side Stay Cable
W : West Side Stay Cable

2.6.2 Checking of Tensile Force for Service Load Design



Tensile Force of Stay Cable per Both Side

No..	Nos.of Strand	Tensile Force(kN)					
		Group-I			Group-IV		
		ΣD + Lmax (kN)	ΣD + Lmin (kN)	Allowable Tensile Force (kN)	ΣD+Lmax + T (kN)	ΣD+Lmin + T (kN)	Allowable Tensile Force (kN)
S1(E)	27S15.2	8,161	7,989	8,359	8,312	8,006	10,448
S2(E)	27S15.2	8,168	8,020	8,359	8,315	8,035	10,448
S3(E)	27S15.2	8,193	8,064	8,359	8,336	8,078	10,448
S4(E)	27S15.2	8,150	8,033	8,359	8,290	8,046	10,448
S5(E)	27S15.2	8,182	8,073	8,359	8,318	8,085	10,448
S6(E)	27S15.2	8,088	7,980	8,359	8,222	7,992	10,448
S7(E)	27S15.2	7,980	7,869	8,359	8,112	7,882	10,448
S8(E)	19S15.2	5,660	5,578	5,882	5,752	5,588	7,352
S9(E)	19S15.2	5,658	5,572	5,882	5,749	5,583	7,352
S10(E)	19S15.2	5,629	5,541	5,882	5,721	5,553	7,352
S11(E)	19S15.2	5,580	5,489	5,882	5,671	5,502	7,352
S12(E)	19S15.2	5,716	5,622	5,882	5,807	5,636	7,352
S13(E)	19S15.2	5,643	5,546	5,882	5,734	5,562	7,352
S14(E)	19S15.2	5,605	5,505	5,882	5,695	5,520	7,352
S1(W)	27S15.2	8,143	7,968	8,359	8,294	7,985	10,448
S2(W)	27S15.2	8,142	7,991	8,359	8,289	8,006	10,448
S3(W)	27S15.2	8,159	8,029	8,359	8,302	8,043	10,448
S4(W)	27S15.2	8,109	7,990	8,359	8,248	8,003	10,448
S5(W)	27S15.2	8,132	8,023	8,359	8,268	8,035	10,448
S6(W)	27S15.2	8,030	7,922	8,359	8,164	7,934	10,448
S7(W)	27S15.2	7,913	7,801	8,359	8,044	7,814	10,448
S8(W)	19S15.2	5,605	5,523	5,882	5,697	5,533	7,352
S9(W)	19S15.2	5,598	5,512	5,882	5,689	5,523	7,352
S10(W)	19S15.2	5,564	5,475	5,882	5,655	5,487	7,352
S11(W)	19S15.2	5,507	5,415	5,882	5,598	5,428	7,352
S12(W)	19S15.2	5,634	5,540	5,882	5,725	5,554	7,352
S13(W)	19S15.2	5,550	5,453	5,882	5,641	5,468	7,352
S14(W)	19S15.2	5,550	5,453	5,882	5,640	5,469	7,352

Allowable Tensile Force = 0.6 x fpu x Ap x 2

	Ap (mm^2)	fpu (N/mm^2)	Group-I Ta(kN) 2·0.6fpu·Ap	Group-IV Ta(kN) 2·0.6fpu·Ap·1.25
27S15.2	3744.9	1860	8,359	10,448
19S15.2	2635.3	1860	5,882	7,352

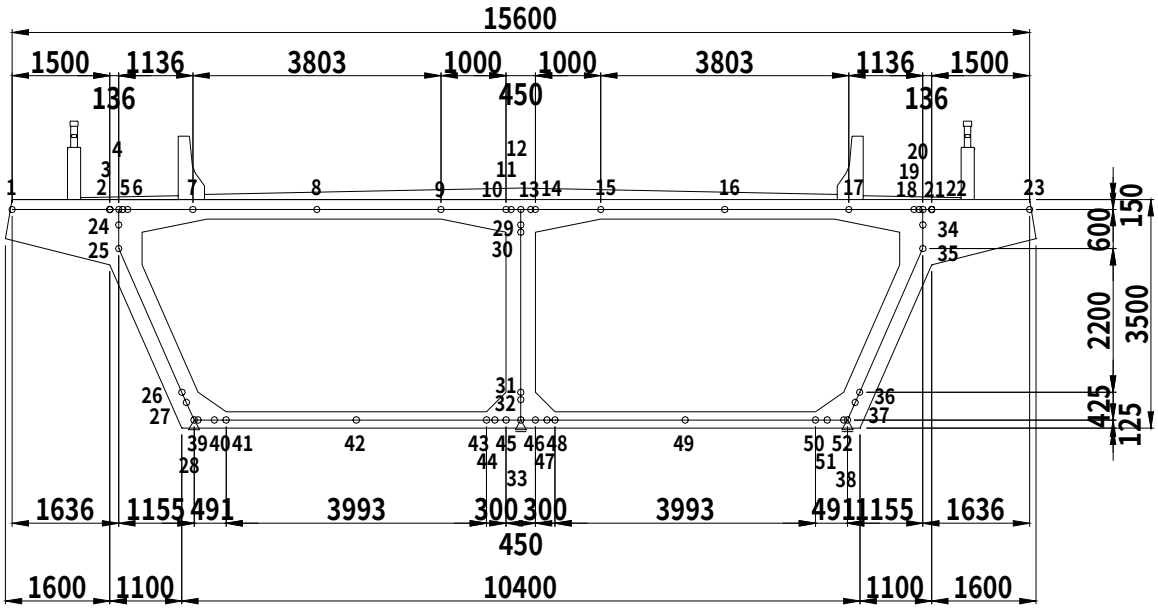
2.7 Design of Cross Section

2.7.1 Analysis model

Cross section design should be analyzed by plain flame method.

Modeling of each member, plain flame configure as centurial axis of each member. Analysis model is shown as following figure.

a. Intermediate Span



2.7.2 Loadings

a. Unit weight

Self-weight of girder and wearing surface load should be considered as distribution load.

Unit weight for calculate load intensity which should be taken as following value.

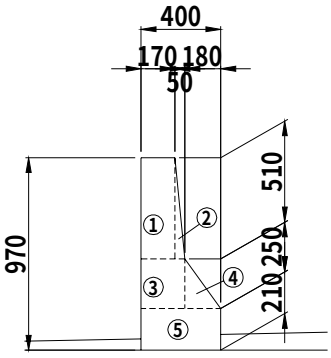
Reinforced Concrete	24.5 kN/m^3
Leveling Concrete	23.0 kN/m^3
Asphalt Pavement	22.5 kN/m^3

b. Girder self-weight

Load of girder self-weigh is calculated automatically by design calculation software. Load intensity is collected from section area of each member.

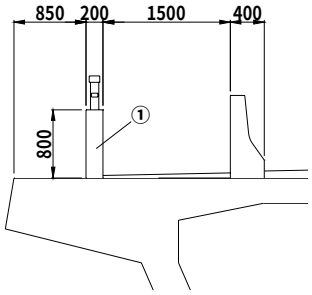
c. Wearing surface

Concrete barrier for carriage way



	A	X	AX
①	0.170×0.510×1.0=0.087	0.085	0.007
②	0.050×0.510×0.5=0.013	0.187	0.002
③	0.220×0.250×1.0=0.055	0.110	0.006
④	0.180×0.250×0.5=0.023	0.280	0.006
⑤	0.400×0.210×1.0=0.084	0.200	0.017
Total	0.261		0.038

Concrete barrier for foot way



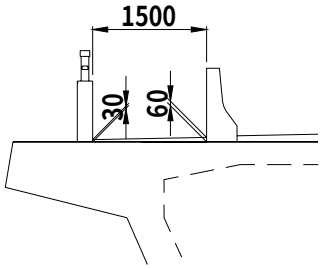
	A	X	AX
①	0.200×0.800×1.0=0.160	0.100	0.01600
Total	0.160		0.01600

Steel railing for foot way barrier

W= 0.30 kN/m

Asphalt Pavement

Foot way(t = 30mm)



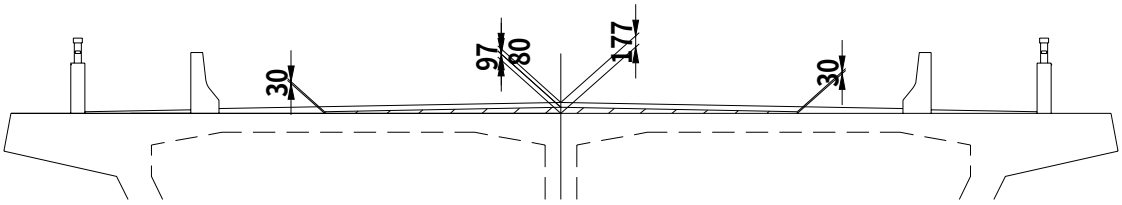
W = 0.03 × 22.5 = 0.675 kN/m 2

W = 0.06 × 22.5= 1.35 kN/m 2

Carriage way(t = 80mm)

W= 0.080 x 22.5 = 1.80 kN/m^2

Leveling concrete



W = 0.03 × 23.0 = 0.69 kN/m 2

W = 0.097 × 23.0 = 2.231 kN/m 2

d. Temperature difference

Temperature difference between top fiber of girder to lower fiber of girder should be taken as following value.

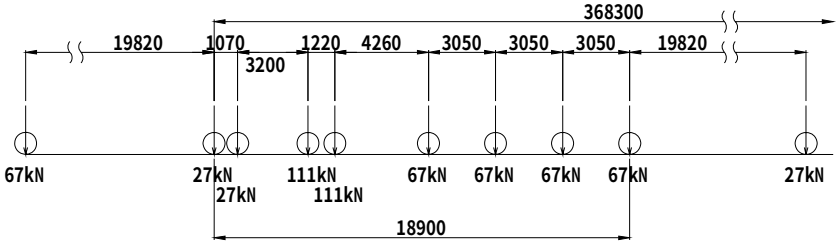
Temperature difference T= 5.0 Degree Celsius

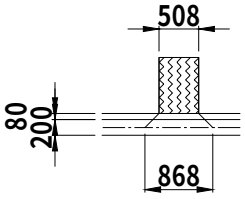
e. Live Load

Load Intensity due to Live Load

For section design, live load is according to Class A Loading. And load should be taken from most heavy axle load of Class A Loading. So that reason, loading for section design is taken as 111kN axle load.

Loading for plain frame model, which act distributed from road surface to centurial axis of slab for 45 degree.





Loaded width of wheel load	0.508m
Distance from surface to centurial axis of slab	0.180m
Distribution width at centurial axis of slab	0.868m

Loading at centurial axis of slab

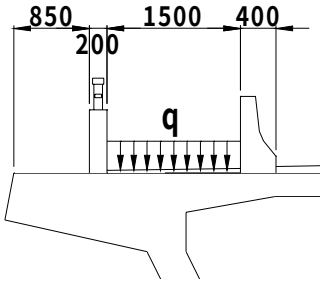
w = 111 / 2 / 0.868 = 63.940kN/m (half side of axle load)

Impact coefficient

i = 15.24/(L+38)

L = 5.583m , i = 0.350

Pedestrian Live Load



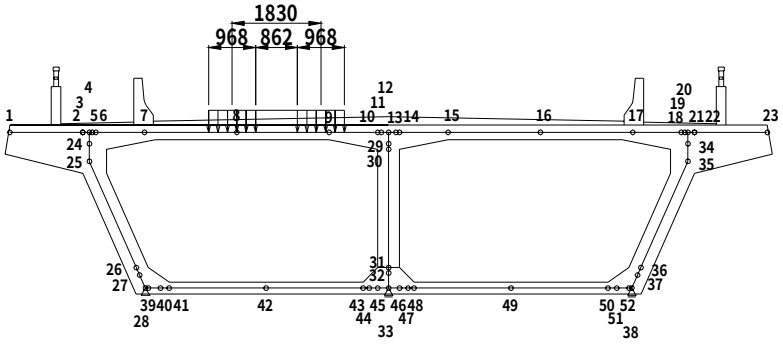
q: Foot way loading (Pa)
L: Loaded Length(m)
W: Sidewalk Width(m)

q = (1435 + 43800 / L) x (16.7 - W) / 15.2

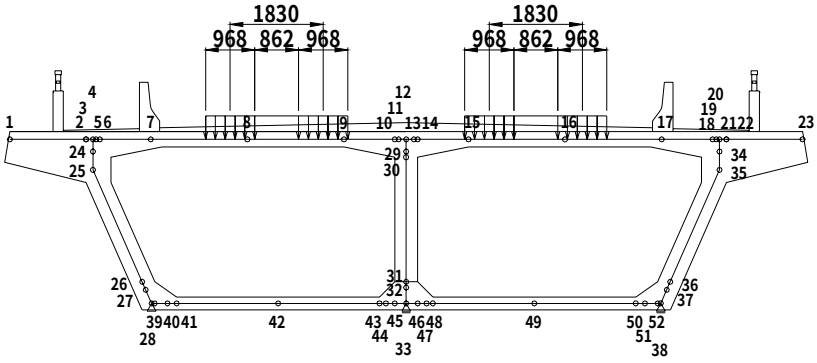
	Span(m)	W(m)	q(kN/m^2)
P2～P3	121.900	1.500	1.79
P3～P4	121.900	1.500	1.79

Loading Diagram of CLASS-A

CASE-1 Calculation for Maximum Bending Moment



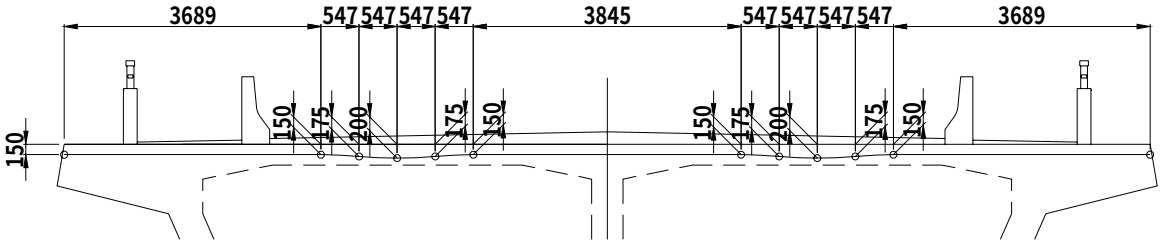
CASE-2 Calculation for Minimum Bending Moment



2.7.3 Arrangement of PC Cable

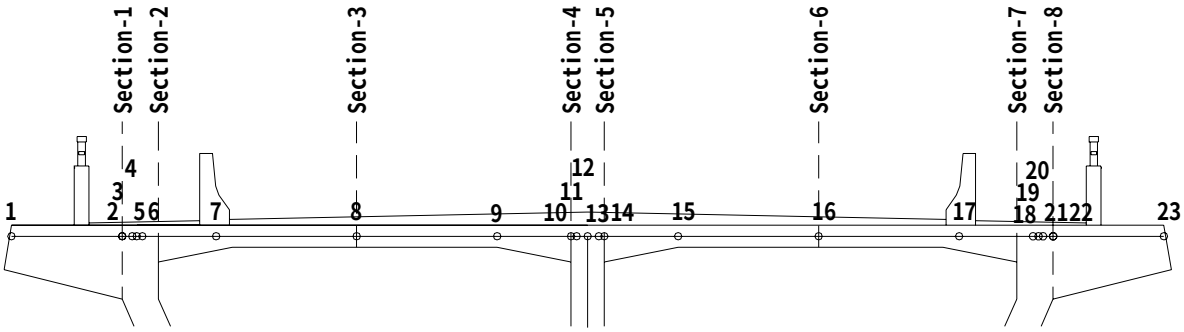
Type of PC Cable: 4S15.2

Spacing of PC Cable: 500mm



2.7.4 Calculation Result

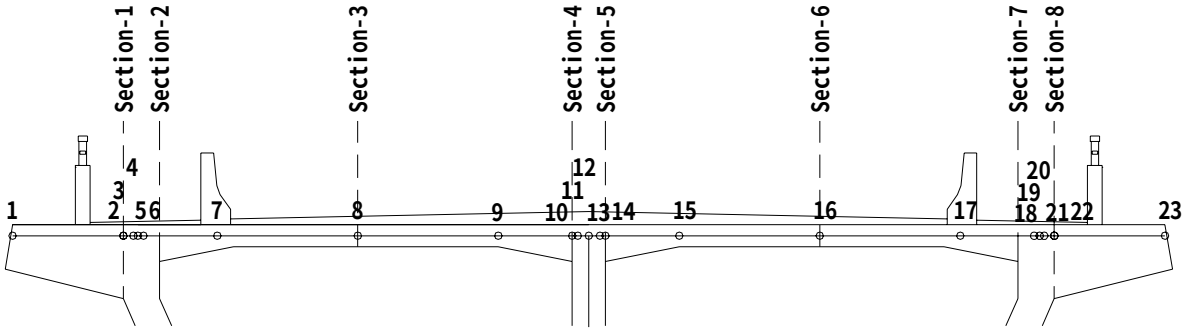
a. Bending Moment



Summary of Bending Moment (kNm)

Section	Self Weight of Girder	Surfacing	2ndary Force by Pre-Stress	Live Load with Impact (Maximum)	Live Load with Impact (Minimum)
1	-20.644	-2.392	0.000	0.000	-53.333
2	-21.227	-7.898	14.289	0.000	-141.601
3	7.828	3.170	9.537	51.291	0.000
4	-26.638	-11.701	5.018	0.000	-141.601
5	-26.638	-11.701	5.018	0.000	-141.601
6	7.828	3.170	9.537	51.291	0.000
7	-21.227	-7.898	14.289	0.000	-141.601
8	-20.644	-2.392	0.000	0.000	-53.333

b. Bending Stress for Service Load Design



(N/mm^2)

Section No.		Dead Load		D.L + L.L		Thermal Effect	
		Upper Edge	Lower Edge	Upper Edge	Lower Edge	Upper Edge	Lower Edge
1	Max	2.38	-0.76	2.06	-0.44	2.06	-0.44
	Min	2.38	-0.76	2.06	-0.44	2.06	-0.44
2	Max	3.15	-0.03	3.15	-0.03	3.05	0.08
	Min	3.15	-0.03	-0.26	3.37	-0.36	3.48
3	Max	1.67	3.70	5.09	0.27	5.01	0.37
	Min	1.67	3.70	1.67	3.70	1.59	3.80
4	Max	3.02	0.38	3.02	0.38	3.07	0.34
	Min	3.02	0.38	-0.39	3.78	-0.34	3.74
5	Max	3.02	0.38	3.02	0.38	3.07	0.34
	Min	3.02	0.38	-0.39	3.78	-0.34	3.74
6	Max	1.67	3.70	5.09	0.27	5.01	0.37
	Min	1.67	3.70	1.67	3.70	1.59	3.80
7	Max	3.15	-0.03	3.15	-0.03	3.05	0.08
	Min	3.15	-0.03	-0.26	3.37	-0.36	3.48
8	Max	2.38	-0.76	2.06	-0.44	2.06	-0.44
	Min	2.38	-0.76	2.06	-0.44	2.06	-0.44

*) Allowable Stress: $-3.16 < fc < 16$

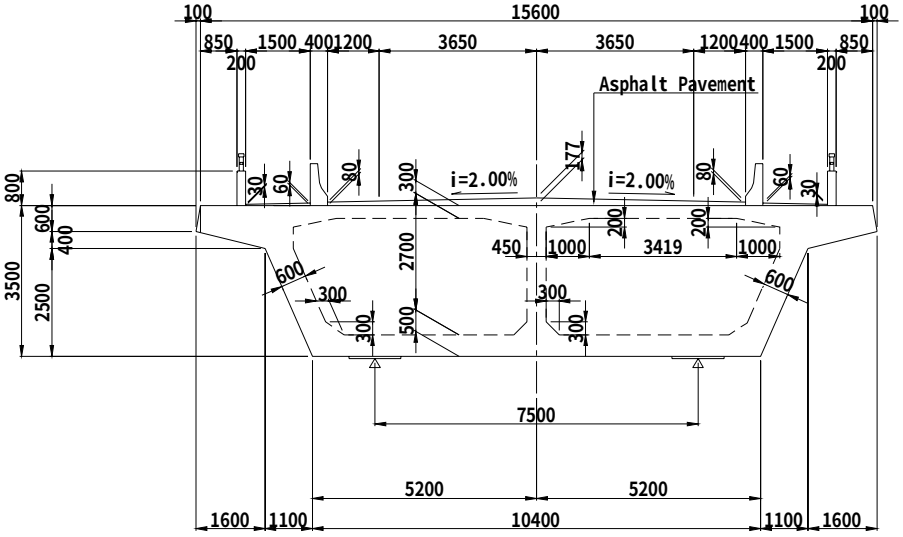
2.8 Design of Cross Beam

2.8.1 Analysis Model

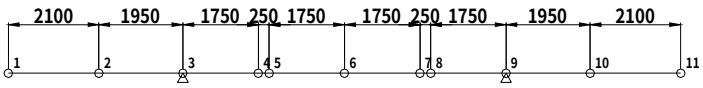
Design calculation for cross beam analysis model should be considered two type of support condition is apply for model.

Model-1 : Cross beam support by bearing and overlying load affect web as concentrate load

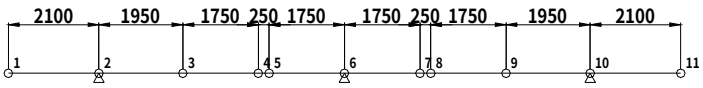
Model-2 : Cross beam support by web and overlying load affect as distribution load



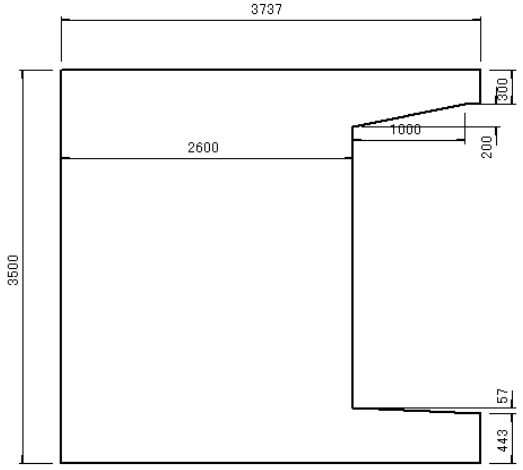
Support position considered as bearing position



Support position considered as center of web



(1) Effective section of Cross Beam



A (m^2)	10.0772.
Iz (m^4)	11.5941.
yu (m)	1.7627.
yl (m)	-1.7373.
B (m)	3.7370.
H (m)	3.5000.
bw (m)	2.6000.

(2) Loadings

1) Dead Load

a :Self-weight and surfacing

Standard section of cross beam

A = 1.138 × 1 × (0.300 + 0.500) + 2.600 × 3.500
+ 1/2 × 1.000 × 0.200 - 1/2 × (0.50 - 0.443) ×1.13
= 10.078 (m2)

W = 10.078 × 24.5 = 246.911 (kN/m)

Base of cantilever slab

W = 3.738 × 1.000 × 24.5 = 91.581 (kN/m)

'Tip of cantilever slab

W = 3.738 × 0.625 × 24.5 = 57.238 (kN/m)

b.Asphalt pavement

Carriage way

W = 3.738 × 0.080 × 22.5 = 6.728 (kN/m)

Foot way

W = 3.738 × 0.030 × 22.5 = 2.523 (kN/m)

W = 3.738 × 0.060 × 22.5 = 5.046 (kN/m)

c.Leveling concrete

W = 3.738 × 0.030 × 23.0 = 2.579 (kN/m)

W = 3.738 × 0.060 × 23.0 = 5.158 (kN/m)

d.Concrete barrier and steel railing

Concrete barrier for carriage way (Left side)

P = 3.738 × 6.393 = 23.897 (kN)

Concrete barrier for carriage way (Right side)

P = 3.738 × 6.393 = 23.897 (kN)

Concrete barrier for foot way (left side)

P = 3.738 × 3.920 = 14.653 (kN)

Concrete barrier for foot way (Right side)

P = 3.738 × 3.920 = 14.653 (kN)

Steel railing

P = 3.738 × 0.300 = 1.121 (kN) one side

Foot way live load (consider as concentrate load)

P = 3.738 × 2.685 = 10.037 (kN) one side

e. Outlying dead load diffuse from web

The posision of bearing assumed as support. The force due to outlying dead load diffuded from web which consider as reaction force affect on web or distribution l affect on slab girder.

$\Sigma Rd = 7{,}894.287$ (kN)

$\Sigma Wd = 3{,}380.276$ (kN)

Concentrate load

$Pd = (\Sigma Rd - \Sigma Wd) / nw$

Distribution load

$qd = (\Sigma Rd - \Sigma Wd) / B$

where

ΣRd : Reaction force due to dead load calculated by overall bridge model

ΣWd : Dead load affect on effective width directory

nw : Nos of web = 3 nos

B : Slab girder widtl = 10.400 m

$Pd = (7{,}894.287 - 3{,}380.276) \times 1/3 = 1{,}504.670$ (kN)

$qd = (7{,}894.287 - 3{,}380.276) \times 1/10.400 = 434.040$ (kN/m)

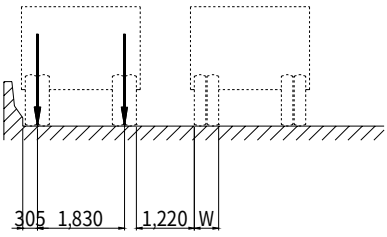
2) Live Load

a.Class A Load affect on effective width

$$i = \frac{15.24}{38 + L} = \frac{15.24}{38 + 7.500} = 0.335$$

i : impact coefficient (max 0.30)

$P = 111 \times 1.300 = 144.300$ (kN)



Class of Loading	Axle Load	Ground Contact Area	
		B	W
	kN	mm	mm
A	111	254	508
	67	203	381
	27	152	203

b.Class A Loading affected beyond effective width

The posision of bearing assumed as support. The force due to outlying Class A Loading diffuded from web, which consider as reaction force affect on web or distribution load affect on slab girder.

$\Sigma Rl = 1929.433$ (kN)

Concentrate load

$Pl = (\Sigma Rl - \Sigma Wl) / nw$

Distribution load

$ql = (\Sigma Rl - \Sigma Wl) / B$

where

ΣRl : Reaction force due to dead load calculated by overall bridge model
ΣWl : Dead load affect on effective width directory
nw : Nos of web = 3 nos
B : Slab girder width = 10.400 m

Class A Loading one lane

$P = (1{,}929.433 - 144.300 \times 2) / 3 = 546.944$ (kN)

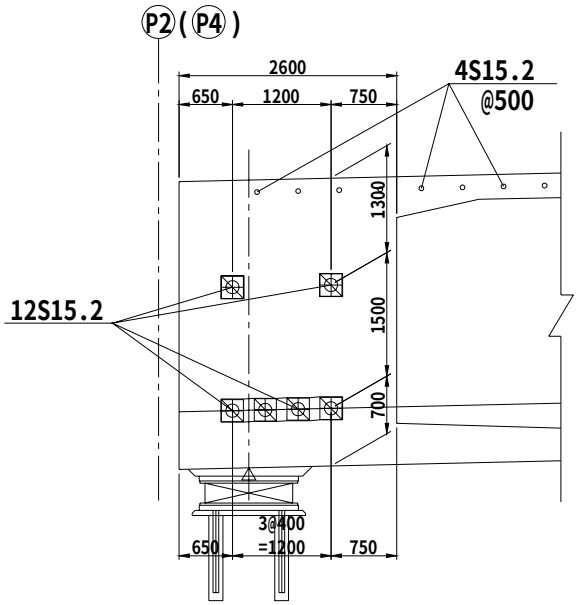
$q = (1{,}929.433 - 144.300 \times 2) / 10.400 = 157.772$ (kN/m)

Class A Loading two lane

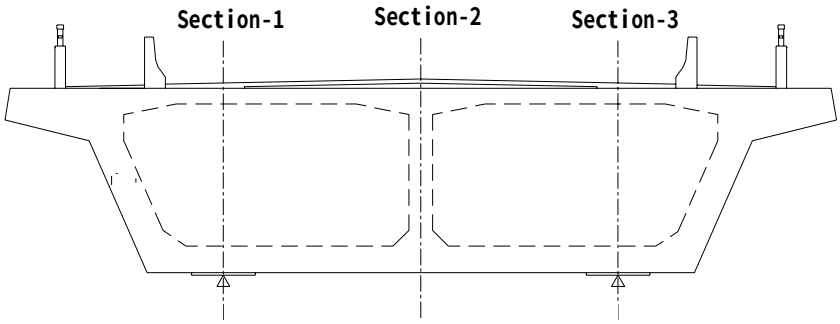
$P = (1{,}929.433 - 144.300 \times 4) / 3 = 450.744$ (kN)

$q = (1{,}929.433 - 144.300 \times 4) / 10.400 = 130.022$ (kN/m)

2.8.2 Arrangement of PC Cable



2.8.3 Calculation Result



(1) Bending Stress

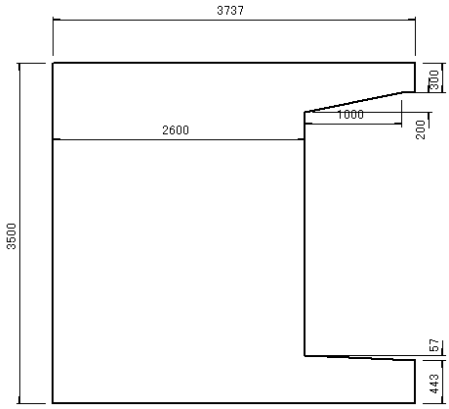
Load Case-1 Minimum Moment (N/mm^2)

Section No.		Dead Load		Dead Load + Live Load	
		Upper Edge	Lower Edge	Upper Edge	Lower Edge
1	Max	1.58	0.72	1.55	0.75
	Min	1.58	0.72	1.49	0.81
2	Max	1.85	0.45	1.84	0.46
	Min	1.85	0.45	1.84	0.46
3	Max	1.58	0.72	1.55	0.75
	Min	1.58	0.72	1.49	0.81

Load Case-2 Maximum Moment (N/mm^2)

Section No.		Dead Load		Dead Load + Live Load	
		Upper Edge	Lower Edge	Upper Edge	Lower Edge
1	Max	2.12	0.18	2.10	0.30
	Min	2.12	0.18	2.00	0.20
2	Max	2.30	0.01	2.31	0.19
	Min	2.30	0.01	2.11	-0.01
3	Max	2.12	0.18	2.10	0.30
	Min	2.12	0.18	2.00	0.20

(2) Required Shear Reinforcement



bw=2.60m

Checking for Shear Force	Section Force	2487.50 kN
	Shear Stress	0.27 N/mm2
	Allowable Shear Stress	0.51 N/mm2
	Minimum Stirrup Area	52.0 cm2
Strength Design	Section Force	4165.8 kN
	Required Stirrup Area	0.0 cm2
	Minimum Stirrup Area	52.0 cm2

2.8.4 Design of Cross Beam at P3

. Summary of Axial Force

1) Difference of Axial Force

(1) Bending Sterss at Gravity of Bottom Slab

P3 Leftside

Girder Height： 7.000 m

Thickness of Bottom Slab： 1.500 m

	Bending Stress		
	Upper Edge (N/mm^2)	Gravity of Bottom Slab (N/mm^2)	Lower Edge (N/mm^2)
Dead Load + Live Load Maximum	2.06	4.98	5.33
Dead Load + Live Load Minimum	0.44	6.61	7.35

P3 Rightside

Girder Height： 7.000 m

Thickness of Bottom Slab： 1.500 m

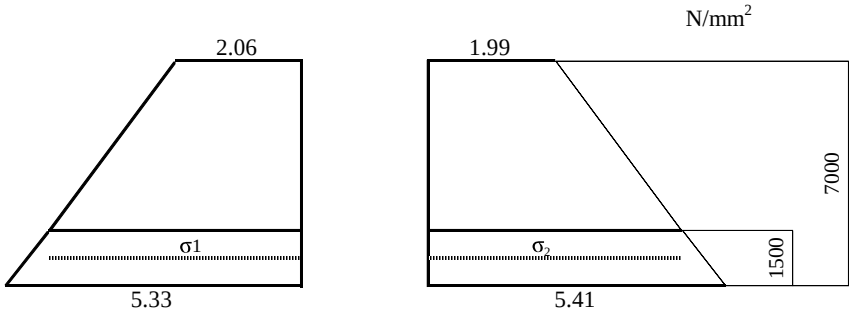
	Bending Stress		
	Upper Edge (N/mm^2)	Gravity of Bottom Slab (N/mm^2)	Lower Edge (N/mm^2)
Dead Load + Live Load Maximum	1.99	5.04	5.41
Dead Load + Live Load Minimum	0.38	6.67	7.42

(2) Difference of Axial Force

N/mm^2

	D.L + L.L Max		D.L + L.L Min	
	Stress	Diffrence	Stress	Diffrence
P3 Pier	4.98	**0.06**	6.61	0.06
	5.04		6.67	

3. Design of Bottom Slab



σ_1= 4.98 N/mm^2 σ_2= 5.04 N/mm^2

N1 = $\sigma_1 \times t$ = 4.98 × 1500= 7469 N/mm

N2 = $\sigma_2 \times t$ = 5.04 × 1500= 7565 N/mm

Maximum Difference

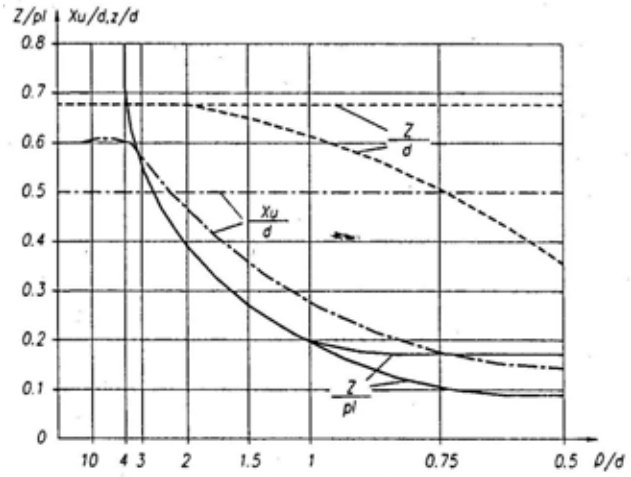
ΔN= N1-N2= 7469 - 7565= -96 N/mm

Maximum Difference

ΔN = P = 96 N/mm

L/d = 7.110 /4.000= 1.778

Z/PL = 0.35



∴Z = 0.35 ×P×L

= 0.35 × 96 × 7110= 238629 N

Required PC Steel

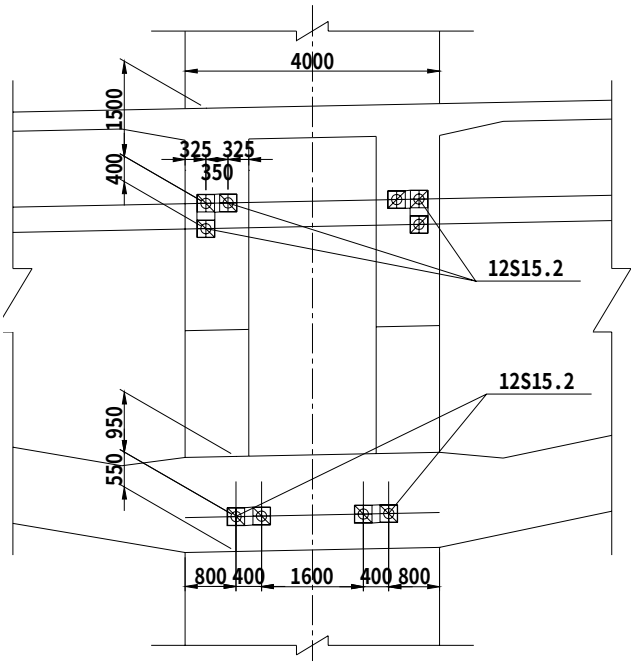
PC Steel Type 12S15.2

Pe = 1498 kN

Required Nos of PC Steel (12S15.2)

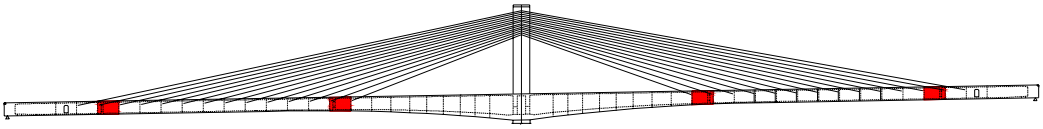
$N = \frac{Z}{Pe} = \frac{238.6}{1498.0} = 0.2$ Nos

Arrangement of PC Steel 4 Nos



2.8.5 Design of Intermediate Cross Beam

1. Layout of Diaphragm



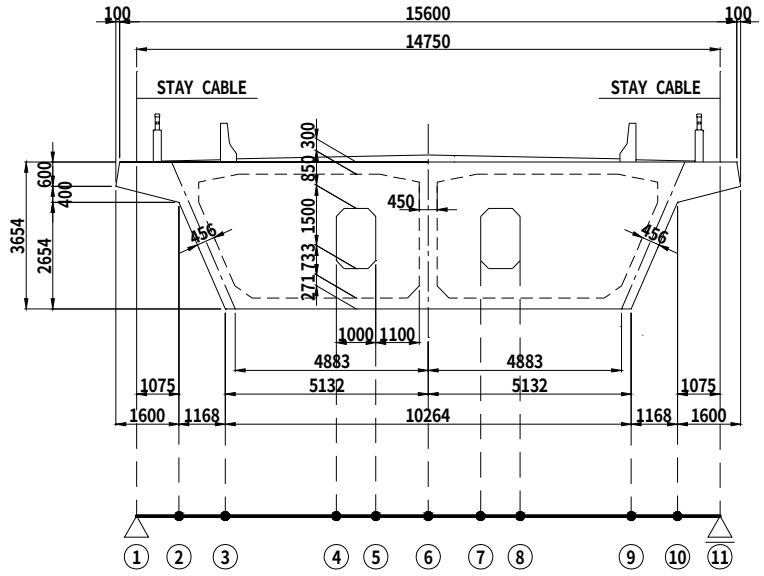
TYPE-1	Block No.9	Stay Cable No.	S13
TYPE-2	Block No.20	Stay Cable No.	S2

2. Vertical Force for Stay Cable

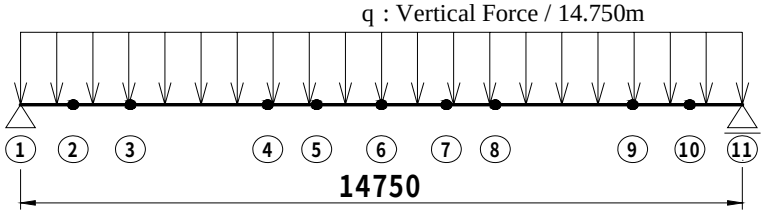
	T(kN) (D+L)	Stay Angle(Rad)	Vertical Force(kN)	
S2(L)	8168	0.24455	1978	* Design Diaphragm
S13(L)	5643	0.38667	2128	* Design Diaphragm
S13(R)	5550	0.35189	1913	
S2(R)	8142	0.20655	1670	

Note) "T" is Both Side Tensile Force

3. Analysis Model for Cross Beam



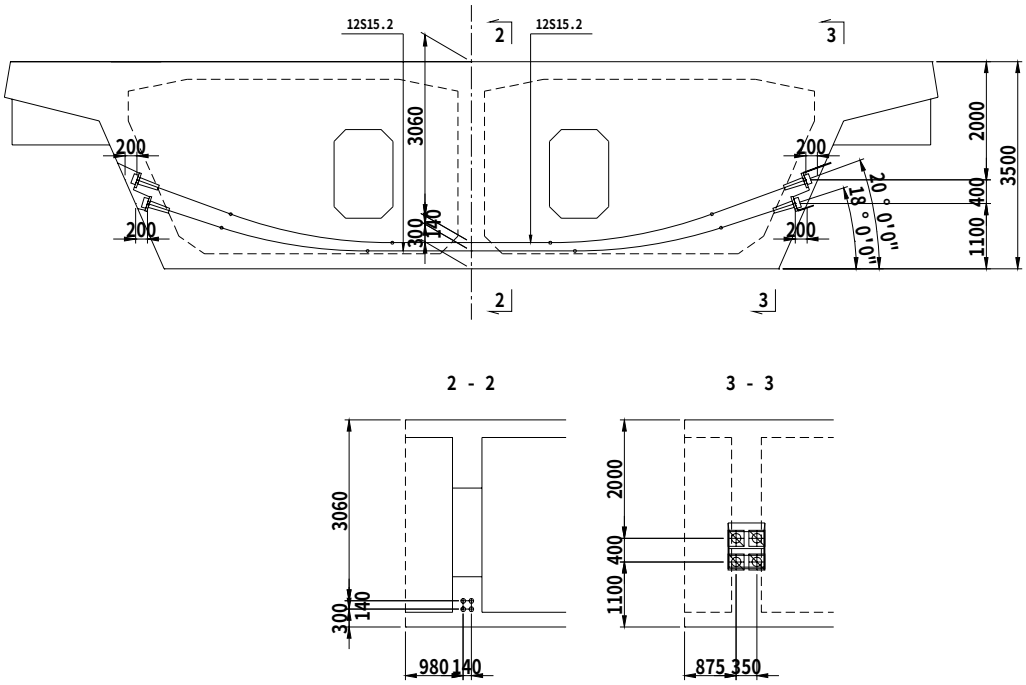
4. Loadings



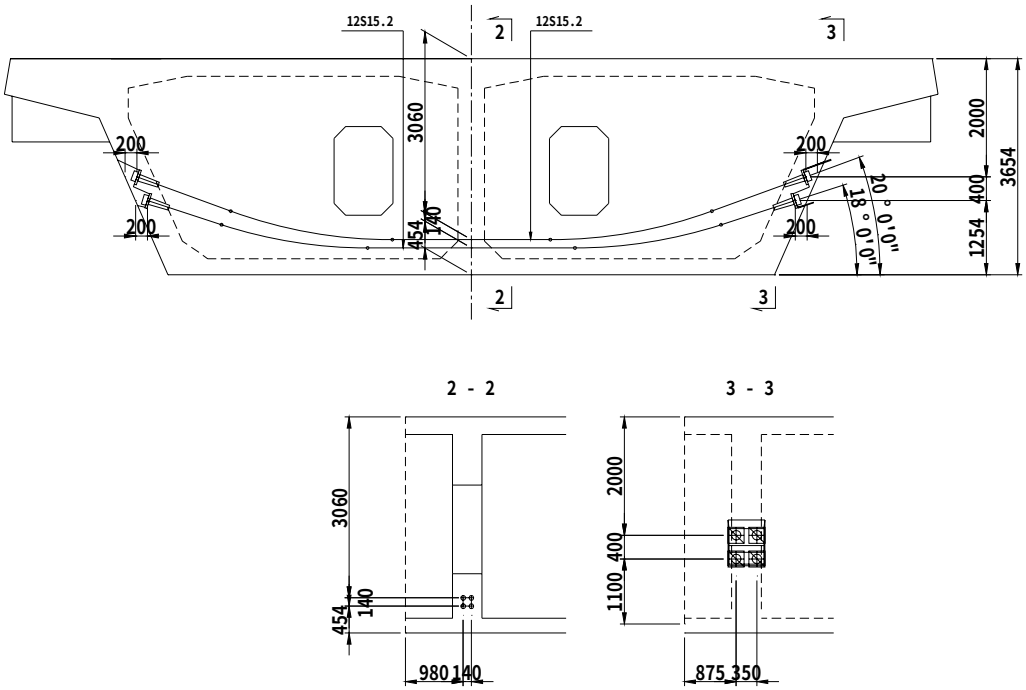
S13: q= 2128 / 14.750= 144.3 kN/m
S2: q= 1978 / 14.750= 134.1 kN/m

5. Arrangement of PC Cable

BLOCK 20 (S2)



BLOCK 9 (S13)



6. Checking of Bending Stress

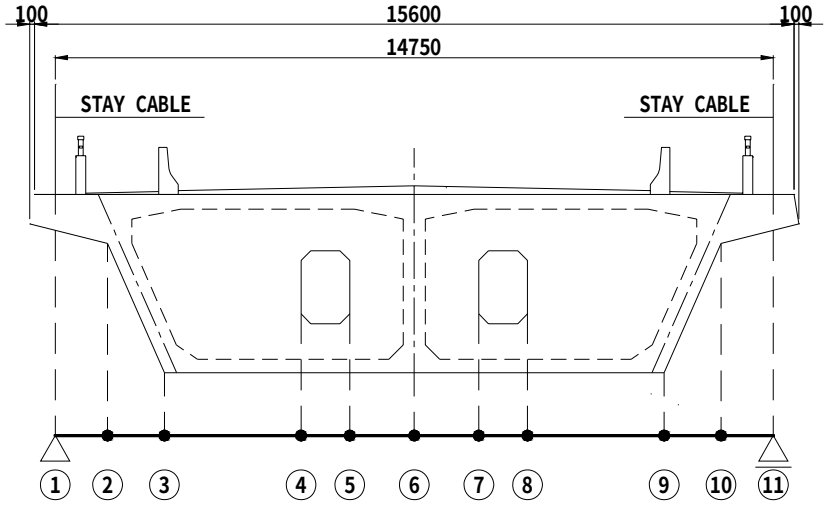


Table of Bending Stress

BLOCK 20 (S2) N/mm^2

	3-i	3-j	4-i	4-j	5-i	5-j	6-i	6-j	7-i	7-j	8-i	8-j
Upper Edge	1.14	0.36	0.72	0.73	0.37	0.40	0.40	0.37	0.73	0.72	0.36	1.14
Lower Edge	2.21	3.04	3.61	3.61	3.04	3.01	3.01	3.04	3.61	3.61	3.04	2.21

*) Allowable Bending Stress -3.16 < fc < 16

BLOCK 9 (S13) N/mm^2

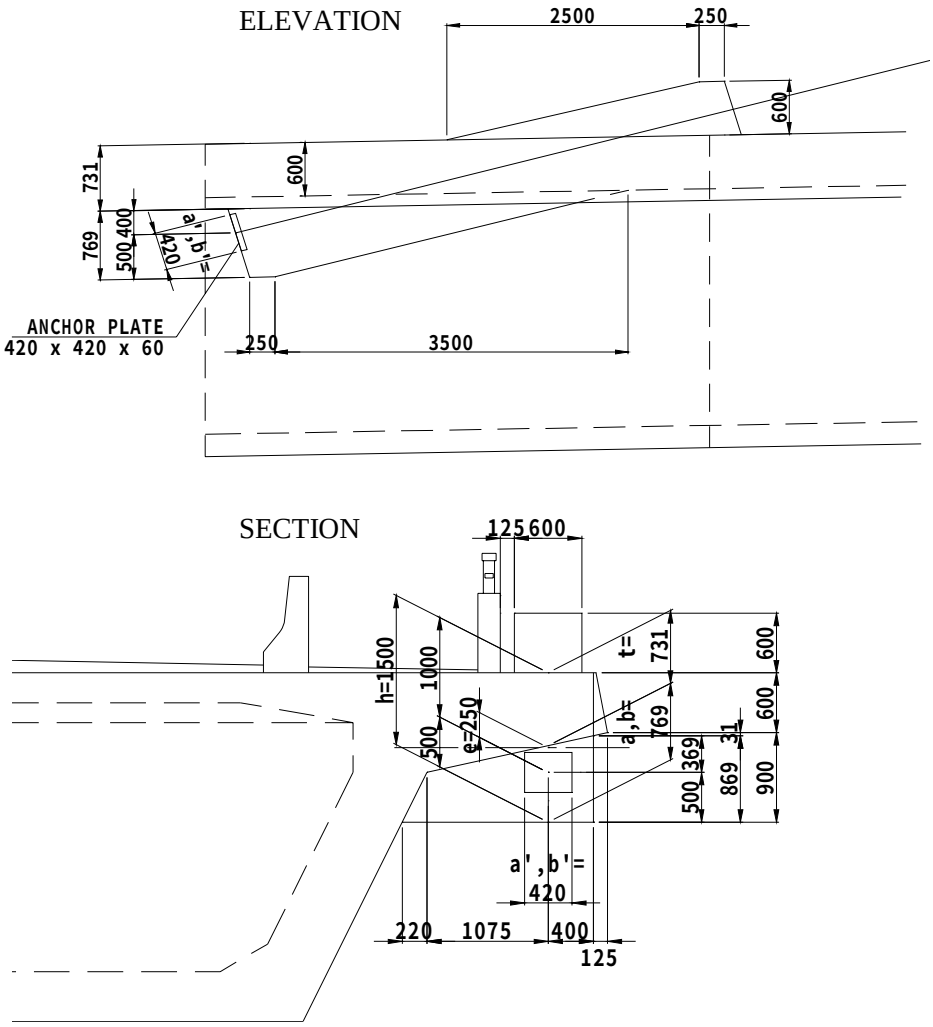
	3-i	3-j	4-i	4-j	5-i	5-j	6-i	6-j	7-i	7-j	8-i	8-j
Upper Edge	1.28	0.65	1.01	1.03	0.66	0.69	0.69	0.66	1.03	1.01	0.65	1.28
Lower Edge	1.96	2.62	3.08	3.07	2.62	2.58	2.58	2.62	3.07	3.08	2.62	1.96

*) Allowable Bending Stress -3.16 < fc < 16

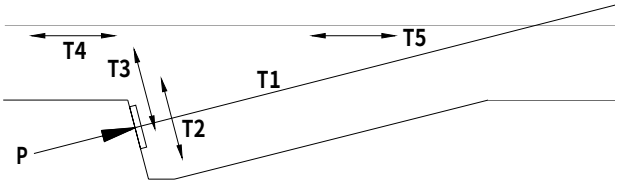
2.9 Design of Anchorage

2.8.1 Design Anchorage

Design Anchorage is "S1" Anchorage. Stay Cable is 27S15.2.



2.8.2 Tensile Force around Anchorage



T1 : Tensile Force Transverse Direction
T2,T3 : Tensile Force Vertical Direction
T4,T5 : Tensile Fprce Longitudinal Direction
P : Tensile Force
a : Anchorage Height
b : Anchorage Width
a',b' : Anchor Plate Size
t : Total Thickness

2.8.3 Design Condition

P	=	4179	kN/each	(0.6 fpu)
n	=	1	Nos	
∑P	=	4179	kN	
a	=	0.769	m	
b	=	0.769	m	
a',b'	=	0.420	m	
t	=	0.731	m	
h	=	1.500	m	
e	=	0.250	m	

Allowable Stress of Re-Bar fsa = 168 N/mm^2

2.8.4 Re-Bar For T1

T1= 0.25P * (a-a') / a = 474.2 kN

Required Re-Bar

Asreq= T1 / fsa = 474200 / 168 = 2823 mm^2

Bar Arrangement

D20 - 10 Nos

As= 314.2 × 10 = 3142 mm^2 < 2823 OK

2.8.5 Re-Bar for T2 & T3

T2+T3= 0.25p*(b-b')/b+0.1p = 892.1 kN

Required Re-Bar

Asreq= ΣT / fsa = 892100 / 168 = 5310 mm^2

Bar Arrangement

D22 - 14 Nos

As= 380.1 × 14 = 5322 mm2 < 5310 OK

2.8.6 Re-Bar for T4 & T5

T4= 0.5 * P - σc * b * t

Where σc : Minimum Stress at Upper Edge for D.L+LL

= 3.10 N/mm^2

T4= 0.500 × 4179

- 3100 × 0.769 × 0.731

= 347.023 kN

Required Re-Bar

Asreq= T4 / fsa = 347023 / 168 = 2066 mm^2

Calculate T5

M= P × e

P	=	4179	kN				
e	=	250	mm				
A	=	769	×	1500	=	1153500	mm^2
W	=	769	×	1500 ^{2} / 6	=	2.88E+08	mm^3

T5= M / W * b1 * t/2

= 4179308 × 250 / 2.88E+08 × 769 × 731 /2

= 1018358 N

Required Re-Bar

Asreq= T5 / fsa = 1018358 / 168 = 6062 mm^2

T4+T5 Required Re-Bar = 2066 + 6062 = 8128 mm^2

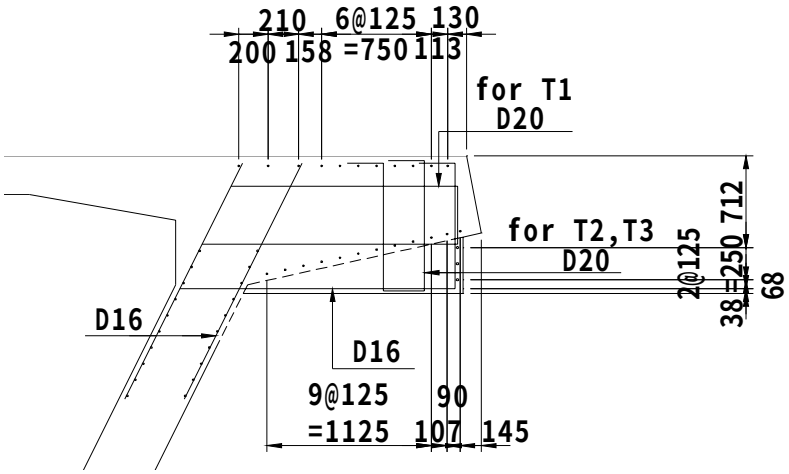
Bar Arrangement

D22 - 22 Nos

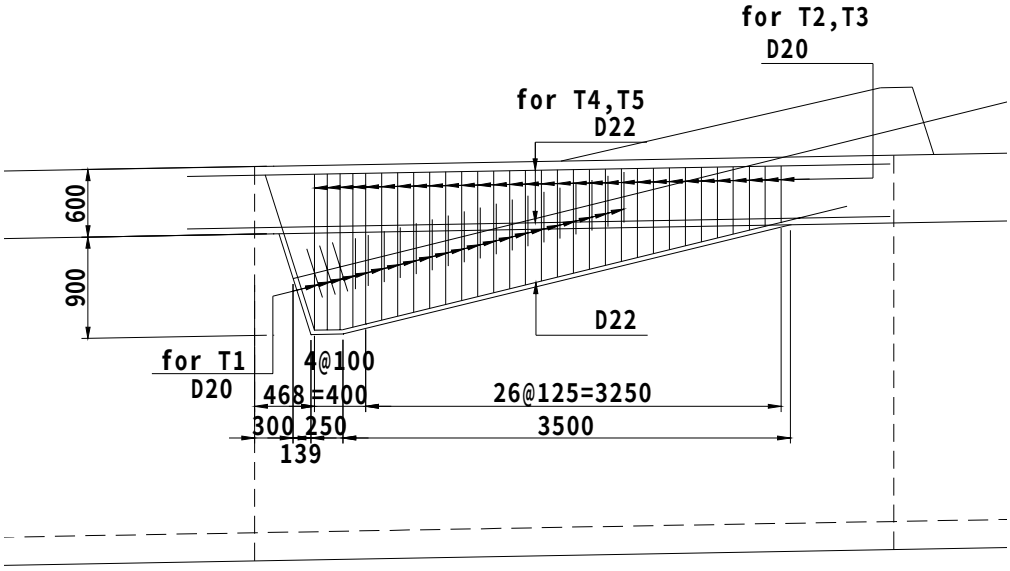
As= 380.1 × 22 = 8363 mm^2 < 8128 OK

2.8.7 Bar Arrangement of Anchorage

SECTION



ELAVATION



2.10 Reaction of Superstructure

Summary of Reaction at Bearing

Loadings	P2 Ry(kN)	P4 Ry(kN)
Self Weight of Girder	3846.194	3846.241
Creep Effect of Self Weight	1515.733	1510.689
Surface Dead Load	2270.873	2270.491
Creep Effect of Surfacing	-203.662	-203.82
Shrinkage	465.149	467.711
Thermal Rise	-141.725	-142.711
Difference of Temperature	213.671	213.525
Internal Pre-stress	168.891	169.059
Creep Effect of Pre-Stress	-437.506	-437.059
Creep Losses of Pre-Stress	80.413	80.561
Live Load CLASS-A (without Impact) Max	1546.637	1547.356
Impact Max	147.394	93.708
Footway Live Load Max	235.402	235.543
Live Load CLASS-A (without Impact) Min	-239.409	-240.34
Impact Min	-22.816	-22.904
Footway Live Load Min	-44.532	-44.705

2.11 Displacement of Superstructure at End of Girder

Loadings	P2 δ X(mm)	P4 δ X(mm)
Self Weight of Girder	**-0.010**	**0.008**
Creep Effect of Self Weight	**7.608**	**-7.123**
Surfacing Dead Load	**0.214**	**-0.204**
Creep Effect of Surfacing	**0.479**	**-0.472**
Shrinlkage	**37.621**	**-37.878**
Thermal Rise	**-11.939**	**12.038**
Difference of Temperature	**-2.204**	**2.221**
Internal Pre-Stress	**1.237**	**-1.250**
Creep Effect of Pre-Stress	**7.531**	**-7.576**
Creep Loses of Pre-Stress	**-0.733**	**0.723**

Note) Direction of Displacement +: →

-: ←

2.11 Design of Pylon

2.11.1 Summary of Sectional Force at Base of Pylon

Symbol	Description	Sectional Force					
		Longitudinal Direction			Transverse Direction		
		M(kNm)	S(kN)	N(kN)	M(kNm)	S(kN)	N(kN)
D	Self Weight	2011	86	32043	12894	678	32043
D	Surfacing	249	15	1262	0	0	1262
D	Prestress	-389	-21	-2054	0	0	-2054
D	Creep Effect	76	4	107	0	0	107
L	CLASS-A Live Load (Mmax)	3420	159	156	0	0	156
L	CLASS-A Live Load (Mmin)	-4121	-153	162	0	0	162
L	CLASS-A Live Load (Nmax)	86	5	318	0	0	318
L	CLASS-A Live Load (Nmin)	0	0	0	0	0	0
W	Wind Load	0	0	0	8022	837	0
WL	Wind Load on Live Load	0	0	0	2383	251	0
LF	Longitudinal Force	0	0	0	0	0	0
S	Shrinkage	-127	-6	-1357	0	0	0
T	Temparature Rise	78	4	387	0	0	0
T	Temparature Down	-78	-4	-387	0	0	0

2.11.2 Combination Load for Service Load Design

Group		Longitudinal Direction			Transverse Direction			Calc Stress
		M(kNm)	S(kN)	N(kN)	M(kNm)	S(kN)	N(kN)	
I	Mmax	5368	243	31514	12894	678	31514	Calc
	Mmin	-2173	-69	31521	12894	678	31521	-
	Nmin	1948	84	31358	12894	678	31358	-
II		1948	84	31358	20916	1515	31358	Calc.
III	Mmax	5368	243	31514	17684	1180	31514	Calc
	Mmin	-2173	-69	31521	17684	1180	31521	-
	Nmin	2034	90	31676	17684	1180	31676	-
IV	Mmax	5318	241	30544	12894	678	31514	-
	Mmin	-2378	-79	29777	12894	678	31521	-
	Nmin	1829	79	29933	12894	678	31676	-
V		1898	82	30388	20916	1515	31358	-
VI	Mmax	5318	241	30544	17684	1180	31514	-
	Mmin	-2378	-79	29777	17684	1180	31521	-
	Nmin	1985	87	30706	17684	1180	31676	-

2.11.3 Combination Load for Load Factor Design

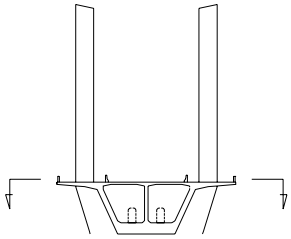
Group		Longitudinal Direction			Transverse Direction			Check
		M(kNm)	S(kN)	N(kN)	M(kNm)	S(kN)	N(kN)	
I	Mmax	9957	455	41104	16762	881	40969	Check
	Mmin	-6414	-223	41118	16762	881	40977	-
	Nmin	2719	121	41456	16762	881	41179	-
II		2532	110	40766	27190	1969	40766	Check
III	Mmax	6978	316	40969	22989	1534	40969	Check
	Mmin	-2825	-90	40977	22989	1534	40977	-
	Nmin	2644	116	41179	22989	1534	41179	-
IV	Mmax	6914	313	39707	16762	881	40969	-
	Mmin	-2889	-93	39716	16762	881	40977	-
	Nmin	2580	113	39918	16762	881	41179	-
V		2373	103	37985	26145	1893	39198	-
VI	Mmax	6648	301	38180	22105	1475	39393	-
	Mmin	-2973	-99	37221	22105	1475	39401	-
	Nmin	2481	109	38383	22105	1475	39596	-

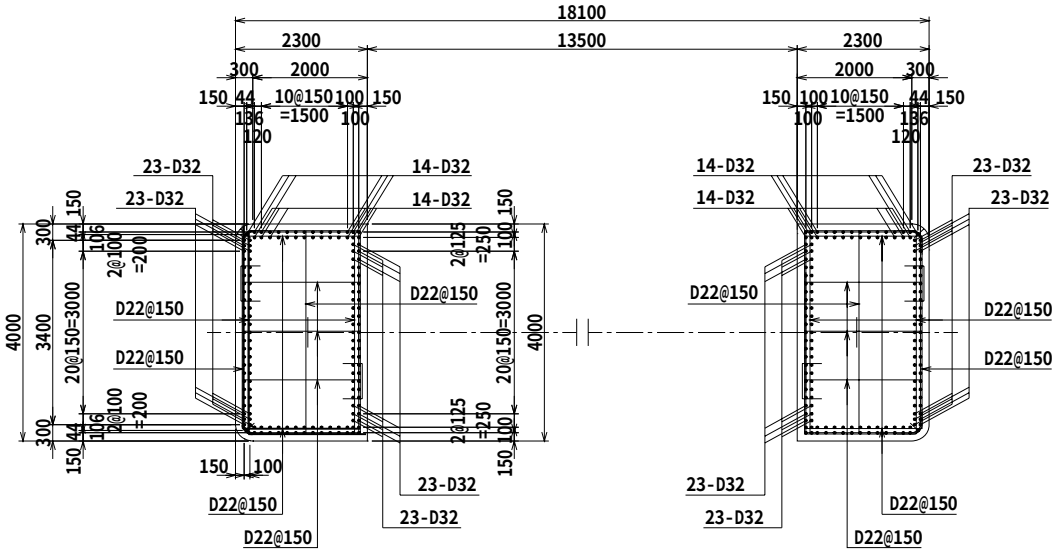
2.11.4 Sectional Force for Seismic Design

Group	Longitudinal Direction			Transverse Direction		
	M(kNm)	S(kN)	N(kN)	M(kNm)	S(kN)	N(kN)
Seismic Design	80551	2843	59812	42647	2943	62279

2.11.5 Check of Stress for Service Load Design and Seicmic Design

Bar Arrangement of Pylon





Longitudinal Direction	14-D32 x 2Layer	22519 mm^2 / 1Pylon
Transverse Direction	23-D32 x 2Layer	36995 mm^2 / 1Pylon

1) Calculation of Stress for Service Load Design and Seismic Design

Stress Equation

$$\sigma_c = \frac{M}{\frac{b \cdot x}{2} \cdot \left(\frac{h}{2}-\frac{x}{3}\right)+n \cdot As' \cdot \frac{(x-d') \cdot (h/2-d')}{x}+n \cdot As \cdot \frac{(x-d) \cdot (h/2-d)}{x}}$$

$$\sigma_s = n \cdot \sigma_c \cdot \frac{d-x}{x}$$

$$x^2+\frac{2 \cdot n}{b}\left\{As' \cdot (x-d')+As \cdot (x-d)\right\}=0.0$$

in which,

x : Distance from edge on compression side to neutral axis (mm)
h : Height of Member (mm)
b : Width in section (mm)
d : Effective height (mm)
d' : Concrete Cover (mm)
As : Sectional area of reinforcing bar arranged on tension side (mm^2)
As': Sectional area of reinforcing bar arranged on compression side (mm^2)
n : Elastic Modulus Ratio of Reinforce and Concrete , n = 15.00
e : Axis force eccentric distance (mm)
σc: Compressive Stress of Concrete (N/mm^2)
σs: Tensile Stress of Reinforcing (N/mm^2)
M: Bending Moment (kN.m)

Calculation Result of Bending Stress (Biaxial Analysis)

		ML (kNm)	MT (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	5367.6	12894.0	31514.3	6.47	-90.70	16.00	168.00	OK
	Group-II	2532.0	27190.5	31358.4	8.25	-112.86	20.00	210.00	OK
	Group-III	6977.9	22988.8	31514.3	7.79	-107.67	20.00	210.00	OK
Sesmic Design	Longitudinal	80551.0	4264.7	59812.0	18.91	-265.96	34.00	378.00	OK
	Transverse	8055.1	42647.0	62279.0	24.72	-327.61	34.00	378.00	OK

ML: Longitudinal Direction Moment
MT: Transverse Direction Moment

4) Calculation of Strength for Load Factor Design

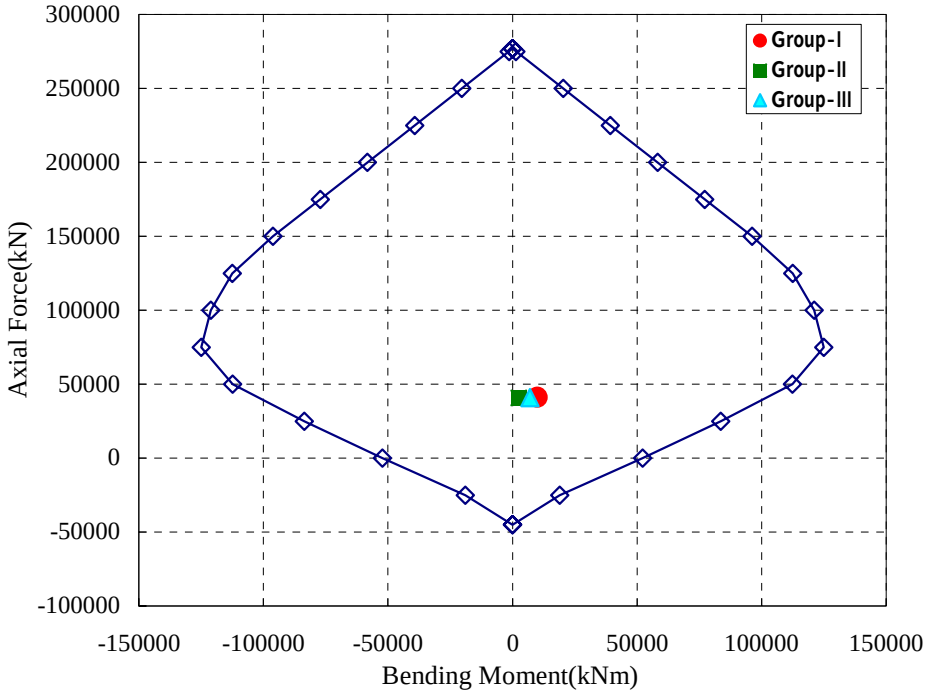
*) Flexural Strength

Longitudinal Direction

Factored Sectional Force for Load Factor Design

		Bending Moment	Axial Force
Load Factor Design	Group-I	9956.6 kNm	41104.3 kN
	Group-II	2532.0 kNm	40765.9 kN
	Group-III	6977.9 kNm	40968.5 kN

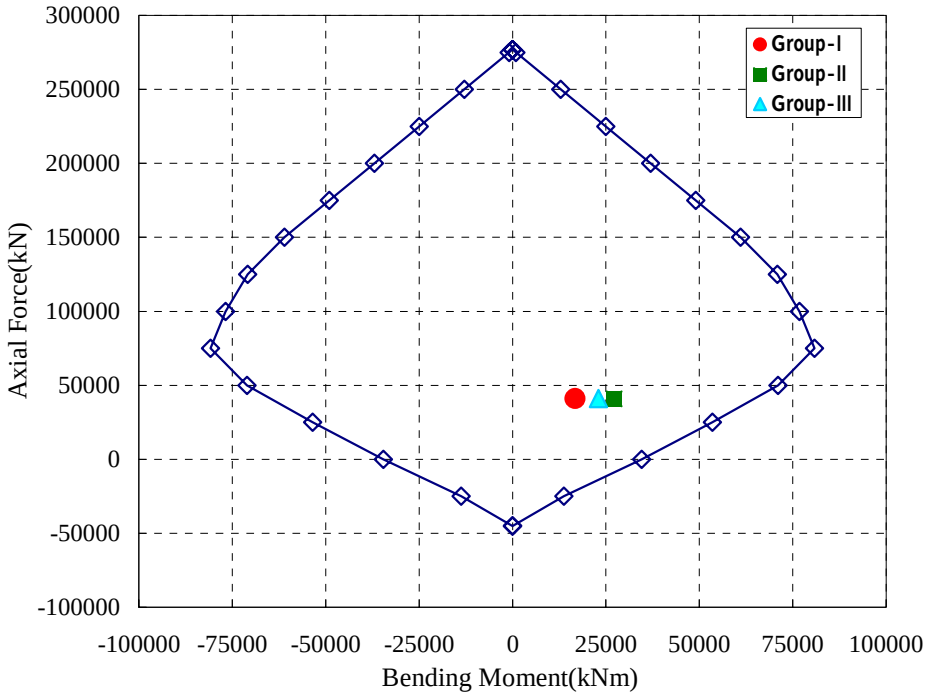
Interaction of Longitudinal Direction



Transverse Direction

Factored Sectional Force for Load Factor Design

		Bending Moment	Axial Force
Load Factor Design	Group-I	16762.2 kNm	40968.5 kN
	Group-II	27190.5 kNm	40765.9 kN
	Group-III	22988.8 kNm	40968.5 kN



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

'n= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=1/6x $\sqrt{}$ f'c)

= 1/6 x $\sqrt{}$ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

		Longitudinal Direction	Transverse Direction
Load Factor Design	Group-I	454.5 kN	881.4 kN
	Group-II	109.6 kN	1969.1 kN
	Group-III	316.2 kN	1534.0 kN
Seismic Design		2843.0 kN	2943.0 kN

Calculation of Shear Strength

vc = 1/6x √ f'c = 1/6x √ (40) = 1.05N/mm^2 -> 1050kN/m^2

fy = 420 N/mm^2 -> 420000 kN/m^2

s = 1.000 m

Longitudinal Direction

		Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Load Factor Design	Group-I	454.5	2.300	3.850	7903.1	0.0	0.0
	Group-II	109.6	2.300	3.850	7903.1	0.0	0.0
	Group-III	316.2	2.300	3.850	7903.1	0.0	0.0
Seismic Design		2843.0	2.300	3.850	7903.1	0.0	0.0

Arrangement of Stir D22 -ctc.150 15205 mm^2/m > 0 mm^2/m

Transverse Direction

		Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Load Factor Design	Group-I	881.4	4.000	2.150	5965.0	0.0	0.0
	Group-II	1969.1	4.000	2.150	5965.0	0.0	0.0
	Group-III	1534.0	4.000	2.150	5965.0	0.0	0.0
Seismic Design		2943.0	4.000	2.150	5965.0	0.0	0.0

Arrangement of Stir D22 -ctc.150 12671 mm^2/m > 0 mm^2/m

Design Calculation of Substructure

1. DESIGN CONDITION

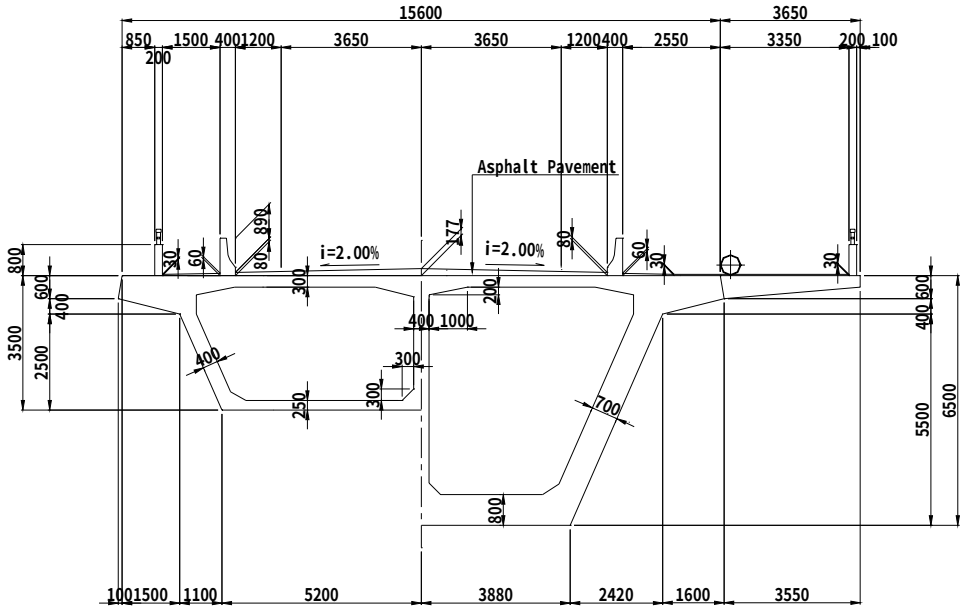
1.1 Design Criteria

Design criteria of Naluchi Bridge shown as following.

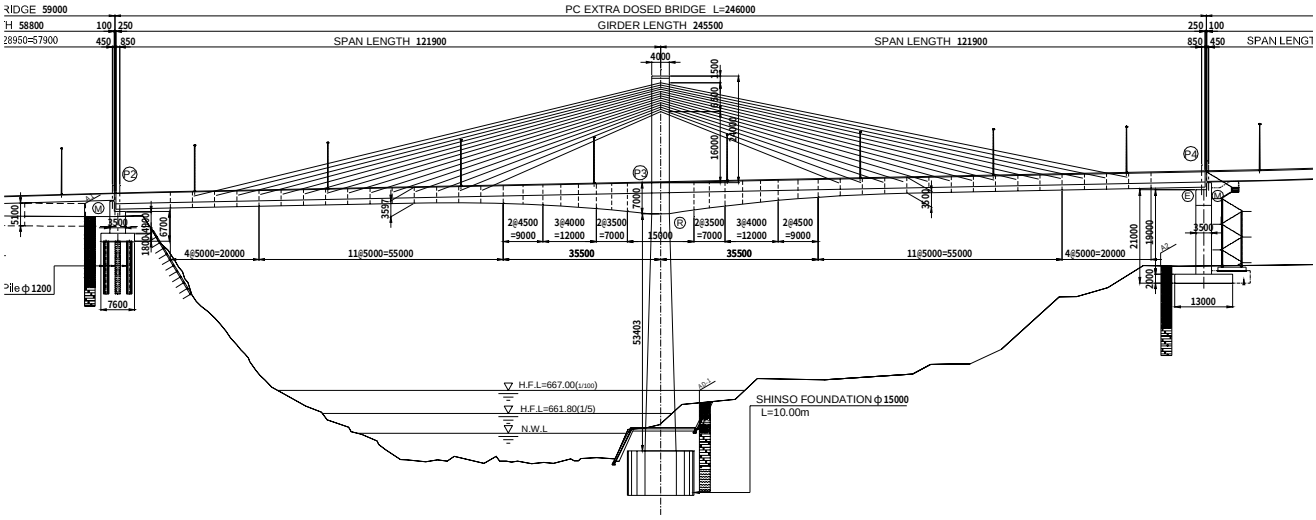
Superstructure	: PC Extra Dosed Bridge	
Bridge Length	: 246.000m	
Girder Length	: 245.500m	
Span Length	: 2@28.950	
Bridge Width	: 121.900m	
Effective Width	: Carriage Way	9.70m
	: Foot Way	2 x 1.50m
Live Load	: Class-A, Class-AA	
Curvature	: R=∞	
Gradient	: i=2.000% ↙ ～ 5.564% ↙	
Super Elevation	: i = 2.000% ↙ ↘ ～ 5.200% ↙	
Skew Angle	: θ = 90 deg	
Support Condition	: P2,P4	Elastomeric Bearing
	: P3	Rigid
Asphalt Pavement	: Carriage Way	80mm～
	Foot Way	30mm～
Substructure	: P2	Column type pier
	P3	Hollow pier
	P4	Column type pier
Foundation	: P2	Pile foundation (Board Pile)
	P3	Shinso pile foundation
	P4	Spread Footing

1.2 Bridge Profile

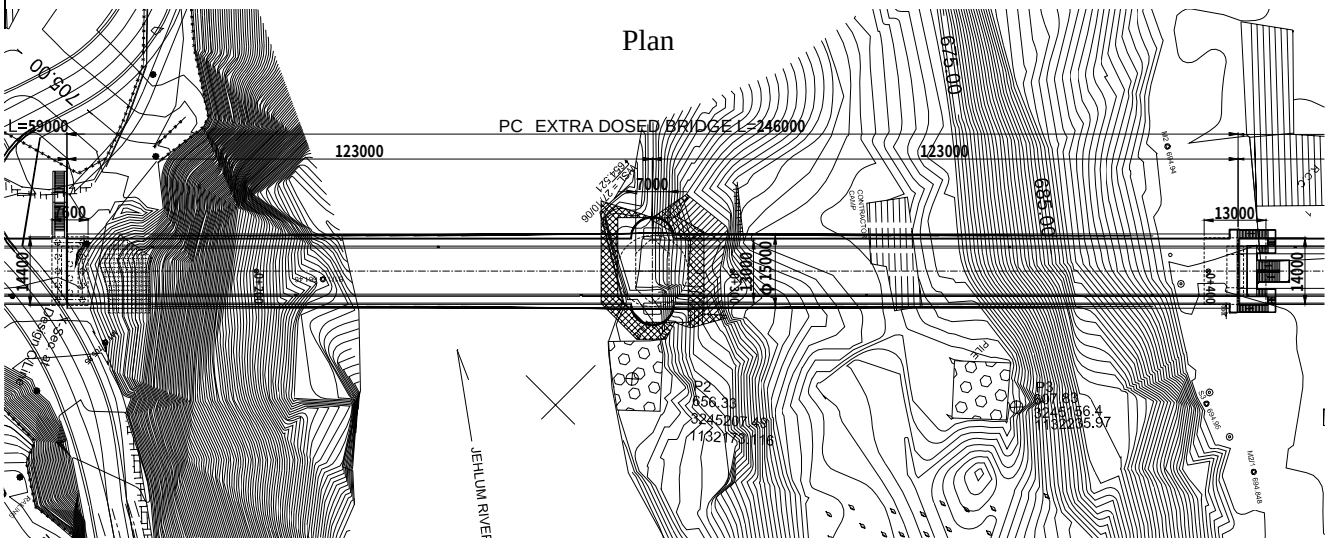
Typical Cross Section



Profile



Plan



1.3 Materials Property

1.3.1 Concrete

Table 1.3.1 Material Property of Concrete

Concrete (N/mm^2)

	Wall Column RC	Footing, Pilecap RC	Concrete Pile (cast in situ) RC	Pier Shaft for P3 RC
Class	A1-1	A1-2	A2-2	A2-3
28Days Cylinder Strength	24	24	30	24
Modulus of Elasticity	2.50×10^4	2.50×10^4	2.95×10^4	2.95×10^4
Allowable Compression Stress	9.60	9.60	12.00	9.60
Allowable Tensile Stress	-2.45	-	-	-
Temperature coefficient	10×10^{-6}	10×10^{-6}	10×10^{-6}	10×10^{-6}
Allowable Shear Stress	0.39	0.39	0.44	0.39
Maximum Average Shear Stress	2.16	2.16	2.50	2.16

1.3.2 Reinforcement

Table 1.3.2 Material Property of Reinforcement

(N/mm^2)

Yield strength	420
Modulus of Elasticity （$\times10^5$）	2.0
Allowable Tensile Stress	168

1.3.3 Seismic Design Condition

For Naluchi Bridge seismic design, the design section force should be taken as maximum response section force which calculate from dynamic analysis.

The maximum response section force calculated by dynamic analysis as following below.

a:P2 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
LG	Initial Force	16207	0	0	0	0	0
	Seismic Force	3522	7263	0	0	0	31577
	Total	19729	7263	0	0	0	31577
TR	Initial Force	16207	0	0	0	0	0
	Seismic Force	0	0	3815	1621	76670	0
	Total	16207	0	3815	1621	76670	0

b:P3 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
LG	Initial Force	173030	0	0	0	0	280
	Seismic Force	3430	19750	0	0	0	680948
	Total	176460	19750	0	0	0	681228
TR	Initial Force	172987	0	0	0	0	0
	Seismic Force	0	0	15386	17503	704291	0
	Total	172987	0	15386	17503	704291	0

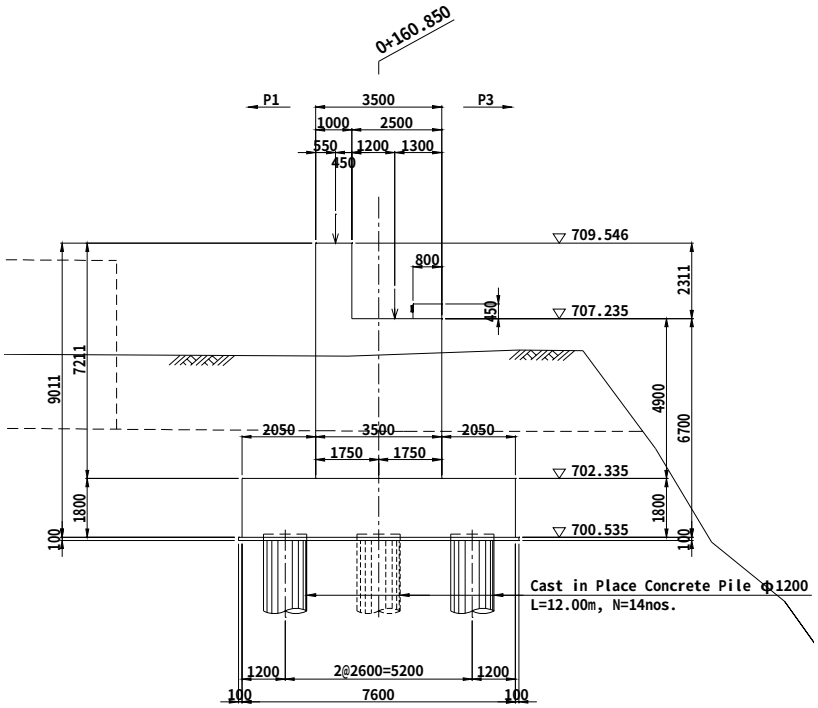
c:P4 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
LG	Initial Force	25310	0	0	0	0	0
	Seismic Force	3608	7812	0	0	0	127514
	Total	28918	7812	0	0	0	127514
TR	Initial Force	25310	0	0	0	0	0
	Seismic Force	0	0	8914	2541	130314	0
	Total	25310	0	8914	2541	130314	0

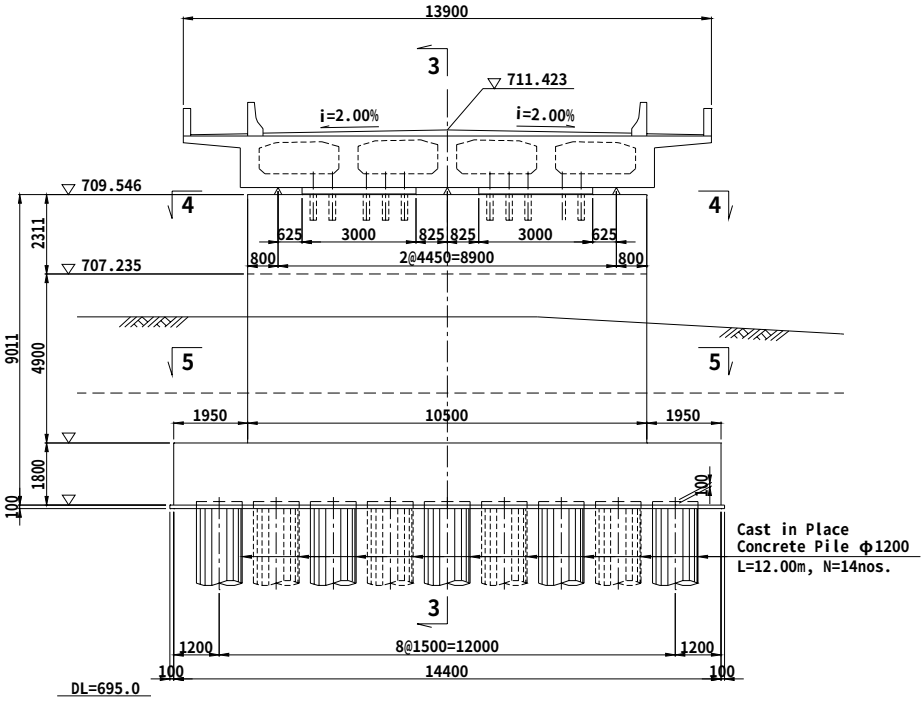
2. Design of P2 Pier

2.1 General Arrangement

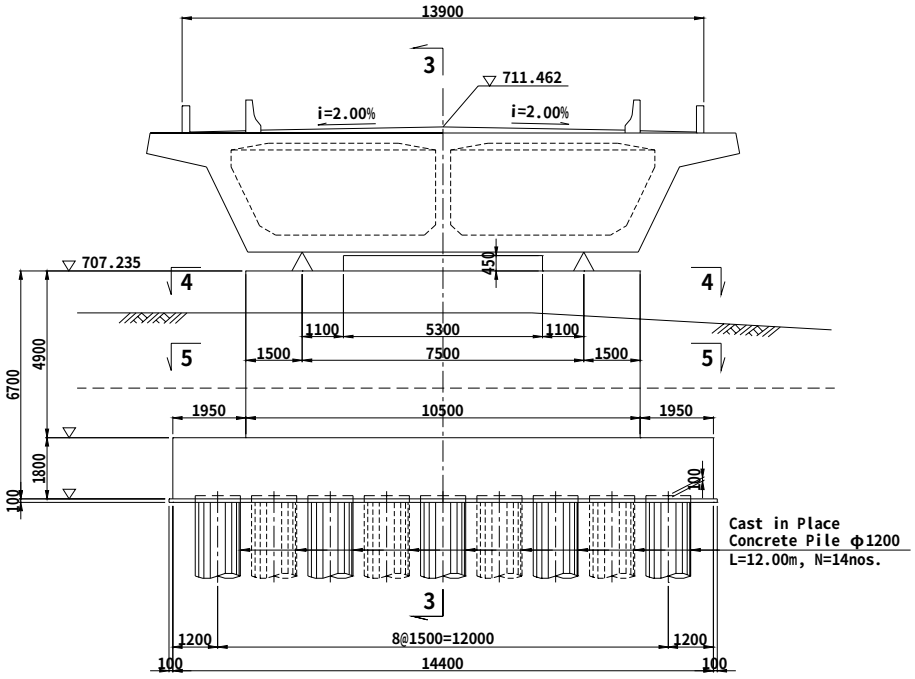
Side Elevation



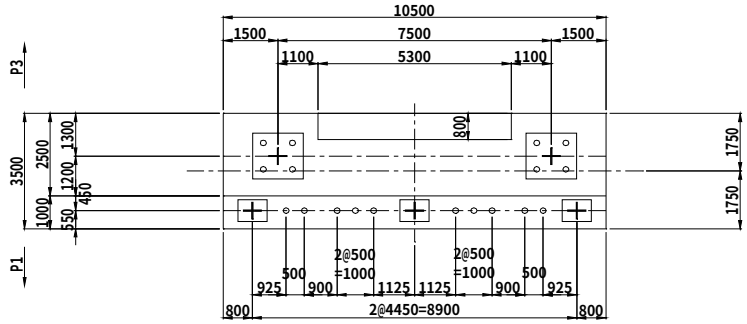
Front Elevation - 1

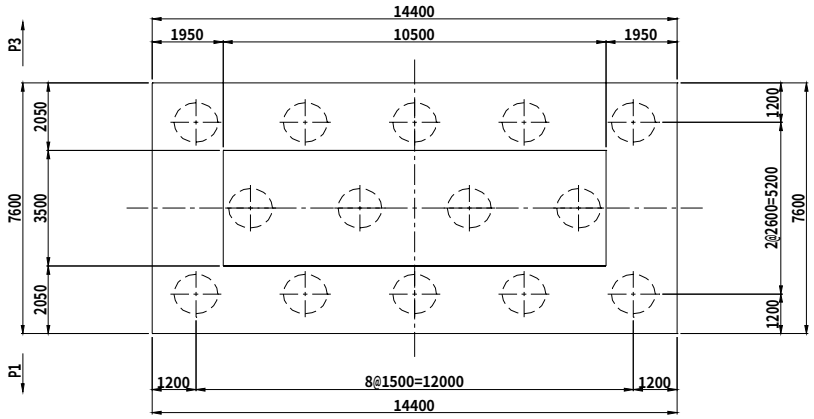


Front Elevation - 2

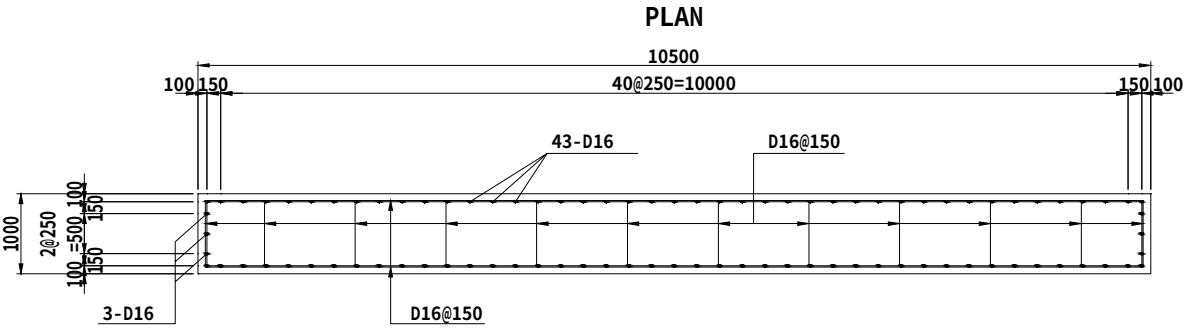


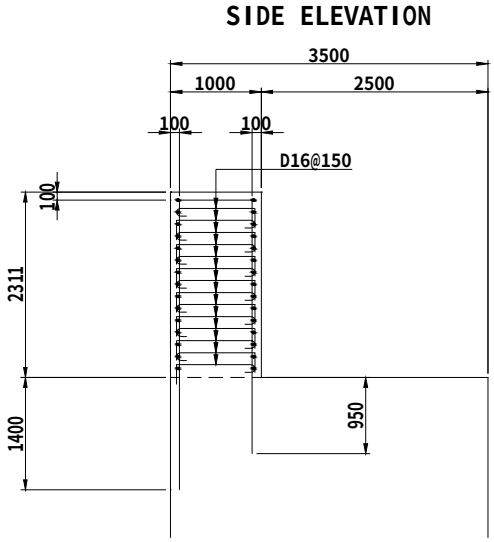
Plan

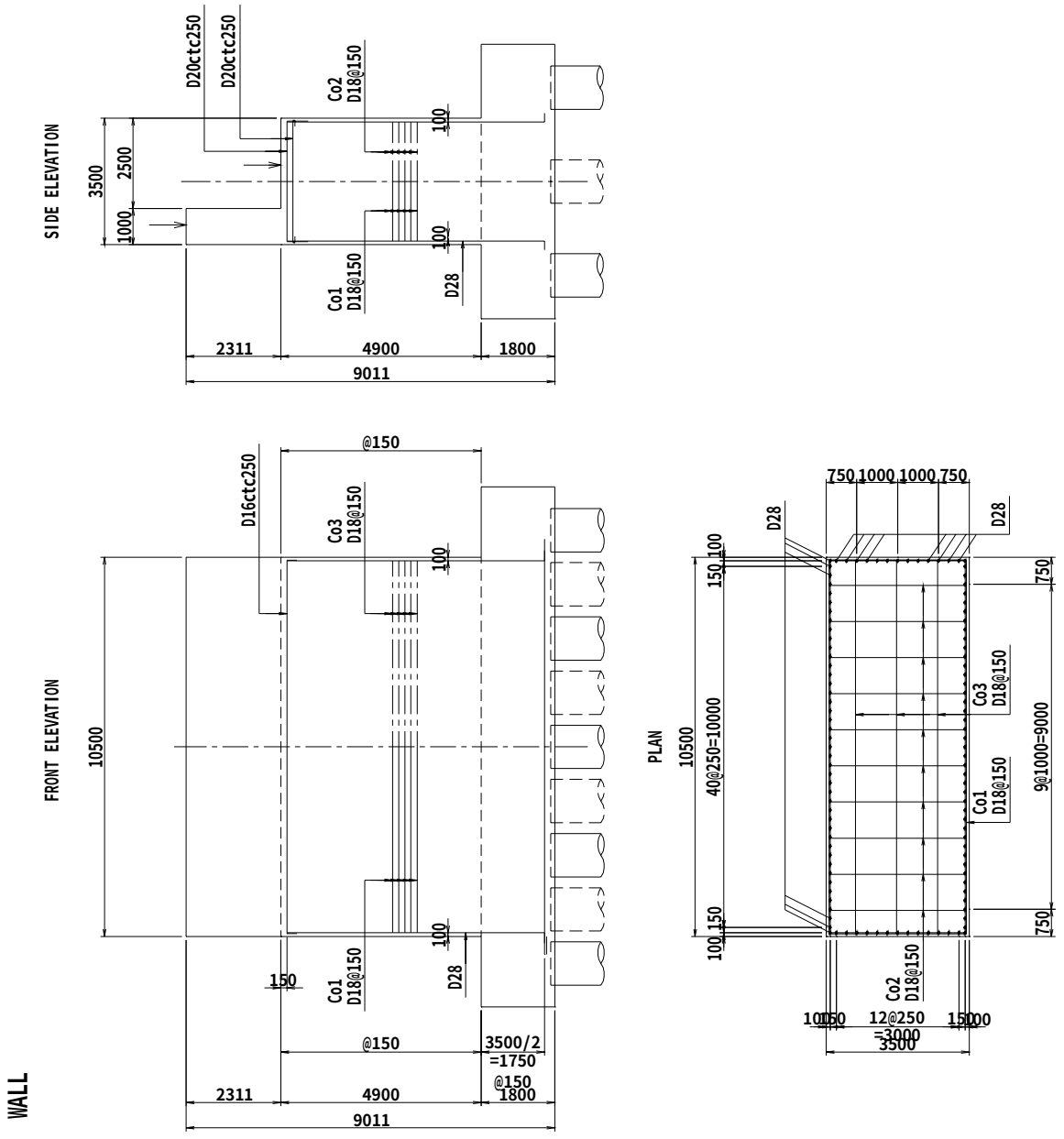




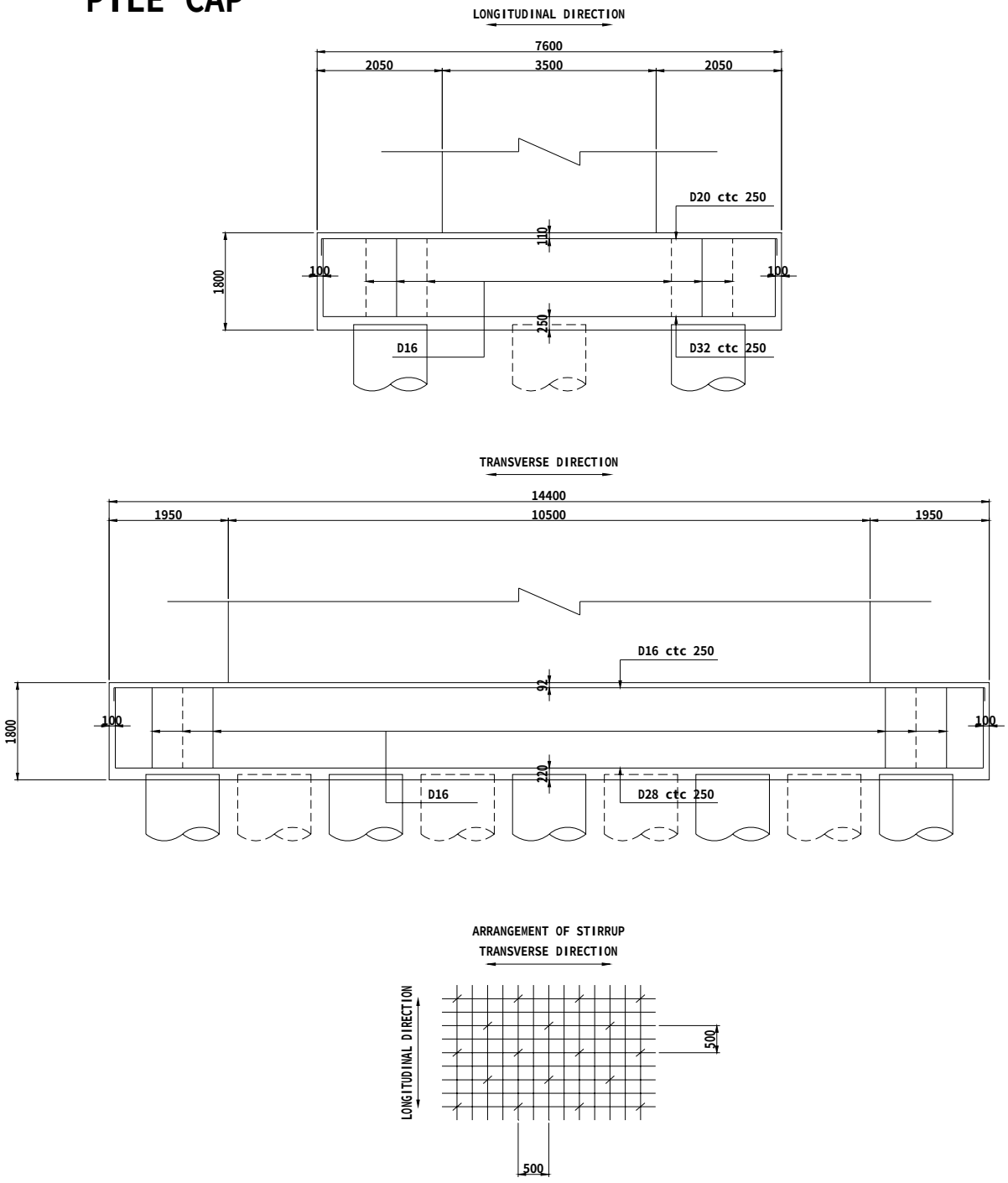
2.2 Bar Arrangement



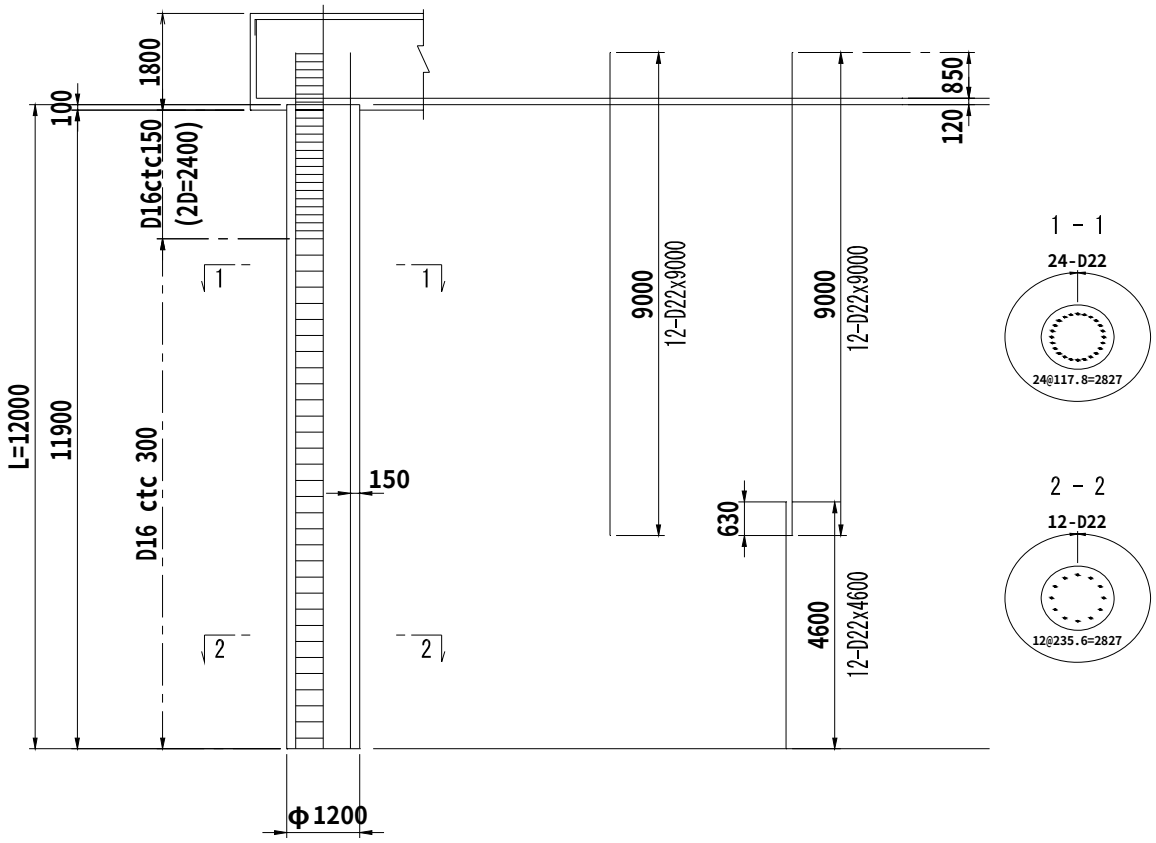



WALL
SIDE ELEVATION
D20ctc250
D20ctc250
Co2
D18@150
100
3500
2500
1000
100
Co1
D18@150
D28
2311
4900
1800
9011
FRONT ELEVATION
@150
D16ctc250
Co3
D18@150
100
10500
100
150
Co1
D18@150
D28
@150
3500/2
=1750
@150
2311
4900
1800
9011
PLAN
750 1000 1000 750
D28
D28
150 100
750
Co3
D18@150
10500
40@250=10000
9@1000=9000
Co1
D18@150
100 150
750
Co2
D18@150
100
150
12@250
=3000
150
3500

PILE CAP


LONGITUDINAL DIRECTION
7600
2050
3500
2050
D20 ctc 250
110
1800
100
100
250
D16
D32 ctc 250
TRANSVERSE DIRECTION
14400
1950
10500
1950
D16 ctc 250
92
1800
100
100
220
D16
D28 ctc 250
ARRANGEMENT OF STIRRUP
TRANSVERSE DIRECTION
LONGITUDINAL DIRECTION
500
500

BORED PILE ϕ1200



2.3 Loading Data

2.3.1 Reaction from Superstructure

(1)Vertical Force

Loadings		Eest side	Naluchi side	Total	Gravity of Longitudinal(m)	
Mark	Type of Loading	(kN)	(kN)	(kN)	Eest side	Naluchi side
D	Self Weight of Girder	2500	5370	7870	1.200	0.950
	Prestress	160	-270	-110	1.200	0.950
	Creep Effect	0	90	90	1.200	0.950
	Total	2660	5190	7850	1.200	0.950
	Eccentric Distance for Longitudinal Direction					0.221
SD	Surfacing	720	2070	2790	1.200	0.950
	Eccentric Distance for Longitudinal Direction					0.395
L	CLASS-A Loading Maximum	640	1550	2190	1.200	0.950
	Impuct Factor	30	150	180	1.200	0.950
	Footway Load	110	240	350	1.200	0.950
	Total	1500	4010	5510	1.200	0.950
	Eccentric Distance for Longitudinal Direction					0.165
S	Shrinkage	0	470	470	1.200	0.950
	Eccentric Distance for Longitudinal Direction					0.950
T	Temparature Change(Rise)	0	0	0	1.200	0.950
T	Temparature Difference	160	80	240	1.200	0.950
	Eccentric Distance for Longitudinal Direction					-0.483

(2)Horizontal Force

1)Longitudinal Direction

Loadings		Eest side	Naluchi side	Total
Mark	Type of Loading	(kN)	(kN)	(kN)
S	Shrinkage	0	0	0
T	Temparature Change (Rise)	0	0	0
T	Temparature Difference	0	0	0
LF	Longitudanl Force	40	90	130

2)Transverse Direction

Loadings		Eest side	Naluchi side	Total
Mark	Type of Loading	(kN)	(kN)	(kN)
CF	Centrifugal Force	0	0	0

2.3.2 Force at Bottom of Wall

(1)Concrete Volume and Self Weight of Substructure

Division	Calculation formula Width × Height × Depth	Volume Vi(m^3)	Gravity x(m)	Gravity y(m)	Vi x x	Vi x y
1	1.000 x 2.311 x 10.500	24.266	-0.750	6.056	-18.199	146.940
2	3.500 x 4.900 x 10.500	180.075	0.000	2.450	0.000	441.184
3						
4						
Σ		204.341	-0.089	2.878	-18.199	588.123

Self Weight of Substructure 24.5 x ΣV = 5006.342 kN

(2) Buoyancy

Division	Calculation formula Width × Height × Depth	Volume Vi(m^3)
1		-
2		-
3		-
4		-
Σ		0.000

Buoyancy -10 x ΣV = 0.000 kN

(3) Superstructure Reaction

Load		V (kN)	H (kN)	xi (m)	yi (m)
Self Weight of Girder	D	7850.0	0.0	0.221	7.211
Surfacing	SD	2790.0	0.0	0.395	7.211
Shrinkage	S	470.0	0.0	0.950	7.211
Live Load (CLASS-A)	L	5510.0	0.0	0.165	7.211
Longitidinal Force	LF	0.0	130.0	0.000	10.960
Centrifugal Force	CF	0.0	0.0	0.000	10.960
Temparature Change	T	0.0	0.0	0.000	7.211
Temparature Difference	T	240.0	0.0	-0.483	7.211

(4) Summary of Force For Service Load Design

1) Longitudinal Direction

Group-I	D+SD+L+CF+E+B					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	-0.089	2.878	-445.9
Self Weight of Girder	D(Super)	7850.0	0.0	0.221	7.211	1738.5
Surfacing	SD	2790.0	0.0	0.395	7.211	1102.5
Live Load CLASS-A	L	5510.0	0.0	0.165	7.211	907.0
Centrifugal Force	CF	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Total		21156.3	0.0	-	-	3302.1

Group-II	D+SD+E+B+W					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	-0.089	2.878	-445.9
Self Weight of Girder	D(Super)	7850.0	0.0	0.221	7.211	1738.5
Surfacing	SD	2790.0	0.0	0.395	7.211	1102.5
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Total		15646.3	0.0	-	-	2395.1

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	-0.089	2.878	-445.9
Self Weight of Girder	D(Super)	7850.0	0.0	0.221	7.211	1738.5
Surfacing	SD	2790.0	0.0	0.395	7.211	1102.5
Live Load CLASS-A	L	5510.0	0.0	0.165	7.211	907.0
Centrifugal Force	CF	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	0.0	130.0	0.000	10.960	1424.8
Total		21156.3	130.0	-	-	4726.9

Group-IV	D+SD+L+CF+E+B+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	-0.089	2.878	-445.9
Self Weight of Girder	D(Super)	7850.0	0.0	0.221	7.211	1738.5
Surfacing	SD	2790.0	0.0	0.395	7.211	1102.5
Live Load CLASS-A	L	5510.0	0.0	0.165	7.211	907.0
Centrifugal Force	CF	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	240.0	0.0	-0.483	7.211	-116.0
Total		21396.3	0.0	-	-	3186.1

Group-V	D+SD+E+B+W+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	-0.089	2.878	-445.9
Self Weight of Girder	D(Super)	7850.0	0.0	0.221	7.211	1738.5
Surfacing	SD	2790.0	0.0	0.395	7.211	1102.5
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	240.0	0.0	-0.483	7.211	-116.0
Total		15886.3	0.0	-	-	2279.1

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	-0.089	2.878	-445.9
Self Weight of Girder	D(Super)	7850.0	0.0	0.221	7.211	1738.5
Surfacing	SD	2790.0	0.0	0.395	7.211	1102.5
Live Load CLASS-A	L	5510.0	0.0	0.165	7.211	907.0
Centrifugal Force	CF	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	0.0	130.0	0.000	10.960	1424.8
Shrinkage	S	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	240.0	0.0	-0.483	7.211	-116.0
Total		21396.3	130.0	-	-	4610.9

2) Transvers Direction

Group-I	D+SD+L+CF+E+B					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	7850.0	0.0	0.000	7.211	0.0
Surfacing	SD	2790.0	0.0	0.000	7.211	0.0
Live Load CLASS-A	L	5510.0	0.0	0.000	7.211	0.0
Centrifugal Force	CF	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Total		21156.3	0.0	-	-	0.0

Group-II	D+SD+E+B+W					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	7850.0	0.0	0.000	7.211	0.0
Surfacing	SD	2790.0	0.0	0.000	7.211	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Total		15646.3	0.0	-	-	0.0

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	7850.0	0.0	0.000	7.211	0.0
Surfacing	SD	2790.0	0.0	0.000	7.211	0.0
Live Load CLASS-A	L	5510.0	0.0	0.000	7.211	0.0
Centrifugal Force	CF	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	0.0	0.0	0.000	10.960	0.0
Total		21156.3	0.0	-	-	0.0

Group-IV	D+SD+L+CF+E+B+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	7850.0	0.0	0.000	7.211	0.0
Surfacing	SD	2790.0	0.0	0.000	7.211	0.0
Live Load CLASS-A	L	5510.0	0.0	0.000	7.211	0.0
Centrifugal Force	CF	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	240.0	0.0	0.000	7.211	0.0
Total		21396.3	0.0	-	-	0.0

Group-V	D+SD+E+B+W+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	7850.0	0.0	0.000	7.211	0.0
Surfacing	SD	2790.0	0.0	0.000	7.211	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	240.0	0.0	0.000	7.211	0.0
Total		15886.3	0.0	-	-	0.0

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	5006.3	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	7850.0	0.0	0.000	7.211	0.0
Surfacing	SD	2790.0	0.0	0.000	7.211	0.0
Live Load CLASS-A	L	5510.0	0.0	0.000	7.211	0.0
Centrifugal Force	CF	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	0.0	0.0	0.000	10.960	0.0
Shrinkage	S	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	240.0	0.0	0.000	7.211	0.0
Total		21396.3	0.0	-	-	0.0

(5) Summary of Force For Load Factor Design

1) Longitudinal Direction

Group-I	γ(D+SD+1.67L+CF+E+B)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	6508.2	0.0	-0.089	2.878	-579.6
Self Weight of Girder	D(Super)	1.300	10205.0	0.0	0.221	7.211	2260.1
Surfacing	SD	1.300	3627.0	0.0	0.395	7.211	1433.3
Live Load CLASS-A	L	2.171	11962.2	0.0	0.165	7.211	1969.1
Centrifugal Force	CF	1.300	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Total			32302.5	0.0	-	-	5082.8

Group-II	γ(D+SD+E+B+W)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	6508.2	0.0	-0.089	2.878	-579.6
Self Weight of Girder	D(Super)	1.300	10205.0	0.0	0.221	7.211	2260.1
Surfacing	SD	1.300	3627.0	0.0	0.395	7.211	1433.3
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.300	0.0	0.0	0.000	0.000	0.0
Total			20340.2	0.0	-	-	3113.7

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	6508.2	0.0	-0.089	2.878	-579.6
Self Weight of Girder	D(Super)	1.300	10205.0	0.0	0.221	7.211	2260.1
Surfacing	SD	1.300	3627.0	0.0	0.395	7.211	1433.3
Live Load CLASS-A	L	1.300	7163.0	0.0	0.165	7.211	1179.1
Centrifugal Force	CF	1.300	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.390	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	1.300	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	1.300	0.0	169.0	0.000	10.960	1852.2
Total			27503.2	169.0	-	-	6145.0

Group-IV	γ(D+SD+L+CF+E+B+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	6508.2	0.0	-0.089	2.878	-579.6
Self Weight of Girder	D(Super)	1.300	10205.0	0.0	0.221	7.211	2260.1
Surfacing	SD	1.300	3627.0	0.0	0.395	7.211	1433.3
Live Load CLASS-A	L	1.300	7163.0	0.0	0.165	7.211	1179.1
Centrifugal Force	CF	1.300	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	1.300	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	1.300	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	1.300	312.0	0.0	-0.483	7.211	-150.8
Total			27815.2	0.0	-	-	4142.0

Group-V	γ(D+SD+E+B+W+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.250	6257.9	0.0	-0.089	2.878	-557.3
Self Weight of Girder	D(Super)	1.250	9812.5	0.0	0.221	7.211	2173.1
Surfacing	SD	1.250	3487.5	0.0	0.395	7.211	1378.1
Earth Pressure	E	1.250	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.250	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	1.250	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	1.250	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	1.250	300.0	0.0	-0.483	7.211	-145.0
Total			19857.9	0.0	-	-	2848.9

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.250	6257.9	0.0	-0.089	2.878	-557.3
Self Weight of Girder	D(Super)	1.250	7850.0	0.0	0.221	7.211	1738.5
Surfacing	SD	1.250	2790.0	0.0	0.395	7.211	1102.5
Live Load CLASS-A	L	1.250	5510.0	0.0	0.165	7.211	907.0
Centrifugal Force	CF	1.250	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	1.250	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	1.250	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	1.250	0.0	130.0	0.000	10.960	1424.8
Shrinkage	S	1.250	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	1.250	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	1.250	240.0	0.0	-0.483	7.211	-116.0
Total			22647.9	130.0	-	-	4499.5

2) Transvers Direction

Group-I	γ(D+SD+1.67L+CF+E+B)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	6508.2	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	1.300	10205.0	0.0	0.000	7.211	0.0
Surfacing	SD	1.300	3627.0	0.0	0.000	7.211	0.0
Live Load CLASS-A	L	2.171	11962.2	0.0	0.000	7.211	0.0
Centrifugal Force	CF	1.300	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Total			32302.5	0.0	-	-	0.0

Group-II	γ(D+SD+E+B+W)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	6508.2	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	1.300	10205.0	0.0	0.000	7.211	0.0
Surfacing	SD	1.300	3627.0	0.0	0.000	7.211	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.300	0.0	0.0	0.000	0.000	0.0
Total			20340.2	0.0	-	-	0.0

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	6508.2	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	1.300	10205.0	0.0	0.000	7.211	0.0
Surfacing	SD	1.300	3627.0	0.0	0.000	7.211	0.0
Live Load CLASS-A	L	1.300	7163.0	0.0	0.000	7.211	0.0
Centrifugal Force	CF	1.300	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.390	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	1.300	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	1.300	0.0	0.0	0.000	10.960	0.0
Total			27503.2	0.0	-	-	0.0

Group-IV	γ(D+SD+L+CF+E+B+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	6508.2	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	1.300	10205.0	0.0	0.000	7.211	0.0
Surfacing	SD	1.300	3627.0	0.0	0.000	7.211	0.0
Live Load CLASS-A	L	1.300	7163.0	0.0	0.000	7.211	0.0
Centrifugal Force	CF	1.300	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	1.300	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	1.300	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	1.300	312.0	0.0	0.000	7.211	0.0
Total			27815.2	0.0	-	-	0.0

Group-V	γ(D+SD+E+B+W+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.250	6257.9	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	1.250	9812.5	0.0	0.000	7.211	0.0
Surfacing	SD	1.250	3487.5	0.0	0.000	7.211	0.0
Earth Pressure	E	1.250	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.250	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	1.250	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	1.250	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	1.250	300.0	0.0	0.000	7.211	0.0
Total			19857.9	0.0	-	-	0.0

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)						
Loadings		γ x β	γ･β･V_i (kN)	γ･β･H_i (kN)	Xi(m)	Yi(m)	M=Hi･Yi+Vi･Xi
Self Weight of Substructure	D(Sub)	1.250	6257.9	0.0	0.000	2.878	0.0
Self Weight of Girder	D(Super)	1.250	7850.0	0.0	0.000	7.211	0.0
Surfacing	SD	1.250	2790.0	0.0	0.000	7.211	0.0
Live Load CLASS-A	L	1.250	5510.0	0.0	0.000	7.211	0.0
Centrifugal Force	CF	1.250	0.0	0.0	0.000	10.960	0.0
Earth Pressure	E	1.250	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	1.250	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	1.250	0.0	0.0	0.000	10.960	0.0
Shrinkage	S	1.250	0.0	0.0	0.000	7.211	0.0
Temparature Change	T	1.250	0.0	0.0	0.000	7.211	0.0
Temparature Difference	T	1.250	240.0	0.0	0.000	7.211	0.0
Total			22647.9	0.0	-	-	0.0

(5) Summary of Force at Bottom of Wall

		Longitudinal Direction			Transverse Direction		
		V(kN)	H(kN)	M(kNm)	V(kN)	H(kN)	M(kNm)
Service Load Design	Group-I	21156.3	0.0	3302.1	21156.3	0.0	0.0
	Group-II	15646.3	0.0	2395.1	15646.3	0.0	0.0
	Group-III	21156.3	130.0	4726.9	21156.3	0.0	0.0
	Group-IV	21396.3	0.0	3186.1	21396.3	0.0	0.0
	Group-V	15886.3	0.0	2279.1	15886.3	0.0	0.0
	Group-VI	21396.3	130.0	4610.9	21396.3	0.0	0.0
Load Factor Design	Group-I	32302.5	0.0	5082.8	32302.5	0.0	0.0
	Group-II	20340.2	0.0	3113.7	20340.2	0.0	0.0
	Group-III	27503.2	169.0	6145.0	27503.2	0.0	0.0
	Group-IV	27815.2	0.0	4142.0	27815.2	0.0	0.0
	Group-V	19857.9	0.0	2848.9	19857.9	0.0	0.0
	Group-VI	22647.9	130.0	4499.5	22647.9	0.0	0.0
Seismic Design		19729.0	7263.0	31577.0	16207.0	3815.0	76670.0

*) Sectional Force of Seismic Design is Calculated by Dynamic Analysis.

2.4 Design of Foundation

2.4.1 Summary of Force at Center of Pile Group

(1)Concrete Volume and Self Weight of Spread Footing

Division	Calculation formula Width × Height × Depth	Volume $Vi(m^3)$	Gravity y(m)	Vi x y
1	7.600 x 14.400 x 1.800	196.99	0.900	177.293
Σ		196.99	0.900	177.293

Self Weight of Substructure 24.5 x ΣV = 4826.30 kN

(2) Backfill Soil Covering on Footing

Division	Calculation formula Width × Height × Depth	Volume $Vi(m^3)$
1	(7.600 x 14.400 - 3.500 x10.500)x 1.5	109.04
Σ		109.04

Weight of Soil on Spread Footing 19 x ΣV = 2071.67 kN

(3) Buoyancy

Division	Calculation formula Width × Height × Depth	Volume $Vi(m^3)$
1	7.600 x 14.400 x 0.000	0.00
Σ		0.00

Buoyancy -10 x ΣV = 0.000 kN

(4) Summary of Force at Bottom of Footing for Service Load Design

1) Longitudinal Direction

Group-I	D+SD+L+CF+E+B					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		21156.3	0.0	3302.1	1.800	3302.1
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		28054.3	0.0	-	-	3302.1

Group-II	D+SD+E+B+W					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		15646.3	0.0	2395.1	1.800	2395.1
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		22544.3	0.0	-	-	2395.1

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		21156.3	130.0	4726.9	1.800	4960.9
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		28054.3	130.0	-	-	4960.9

Group-IV	D+SD+L+CF+E+B+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		21396.3	0.0	3186.1	1.800	3186.1
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		28294.3	0.0	-	-	3186.1

Group-V	D+SD+E+B+W+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		15886.3	0.0	2279.1	1.800	2279.1
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		22784.3	0.0	-	-	2279.1

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		21396.3	130.0	4610.9	1.800	4844.9
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		28294.3	130.0	-	-	4844.9

2) Transvers Direction

Group-I	D+SD+L+CF+E+B					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		21156.3	0.0	0.0	1.800	0.0
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		28054.3	0.0	-	-	0.0

Group-II	D+SD+E+B+W					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		15646.3	0.0	0.0	1.800	0.0
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		22544.3	0.0	-	-	0.0

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		21156.3	0.0	0.0	1.800	0.0
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		28054.3	0.0	-	-	0.0

Group-IV	D+SD+L+CF+E+B+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		21396.3	0.0	0.0	1.800	0.0
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		28294.3	0.0	-	-	0.0

Group-V	D+SD+E+B+W+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		15886.3	0.0	0.0	1.800	0.0
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		22784.3	0.0	-	-	0.0

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		21396.3	0.0	0.0	1.800	0.0
Self Weight of Footing	D	4826.3	0.0	0.0	0.900	0.0
Backfill Soil Covering on Footing	D	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	0.900	0.0
Total		28294.3	0.0	-	-	0.0

(5) Summary of Force at Bottom of Footing for Load Factor Design

1) Longitudinal Direction

Group-I	γ(D+SD+1.67L+CF+E+B)						
Loadings			γ x β	$\gamma \cdot \beta \cdot V_i$ (kN)	$\gamma \cdot \beta \cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall			-	32302.5	0.0	5082.8	1.800	5082.8
Self Weight of Footing	D		1.300	6274.2	0.0	0.0	0.900	0.0
Backfill Soil	D		1.300	2693.2	0.0	0.0	3.635	0.0
Buoyancy	B		1.300	0.0	0.0	0.0	0.900	0.0
Total				41269.8	0.0	-	-	5082.8

Group-II	γ(D+SD+E+B+W)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	20340.2	0.0	3113.7	1.800	3113.7
Self Weight of Footing	D	1.300	4826.3	0.0	0.0	0.900	0.0
Backfill Soil	D	1.300	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	0.900	0.0
Total			27238.2	0.0	-	-	3113.7

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	27503.2	169.0	6145.0	1.800	6449.2
Self Weight of Footing	D	1.300	6274.2	0.0	0.0	0.900	0.0
Backfill Soil	D	1.300	2693.2	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	0.900	0.0
Total			36470.6	169.0	-	-	6449.2

Group-IV	γ(D+SD+L+CF+E+B+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	27815.2	0.0	4142.0	1.800	4142.0
Self Weight of Footing	D	1.300	4826.3	0.0	0.0	0.900	0.0
Backfill Soil	D	1.300	2071.7	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	0.900	0.0
Total			34713.2	0.0	-	-	4142.0

Group-V	γ(D+SD+E+B+W+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	19857.9	0.0	2848.9	1.800	2848.9
Self Weight of Footing	D	1.250	6032.9	0.0	0.0	0.900	0.0
Backfill Soil	D	1.250	2589.6	0.0	0.0	3.635	0.0
Buoyancy	B	1.250	0.0	0.0	0.0	0.900	0.0
Total			28480.4	0.0	-	-	2848.9

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	22647.9	130.0	4499.5	1.800	4733.5
Self Weight of Footing	D	1.250	6032.9	0.0	0.0	0.900	0.0
Backfill Soil	D	1.250	2589.6	0.0	0.0	3.635	0.0
Buoyancy	B	1.250	0.0	0.0	0.0	0.900	0.0
Total			31270.4	130.0	-	-	4733.5

2) Transvers Direction

Group-I	γ(D+SD+1.67L+CF+E+B)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	32302.5	0.0	0.0	1.800	0.0
Self Weight of Footing	D	1.300	6274.2	0.0	0.0	0.900	0.0
Backfill Soil	D	1.300	2693.2	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	0.900	0.0
Total			41269.8	0.0	-	-	0.0

Group-II	γ(D+SD+E+B+W)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	20340.2	0.0	0.0	1.800	0.0
Self Weight of Footing	D	1.300	6274.2	0.0	0.0	0.900	0.0
Backfill Soil	D	1.300	2693.2	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	0.900	0.0
Total			29307.6	0.0	-	-	0.0

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	27503.2	0.0	0.0	1.800	0.0
Self Weight of Footing	D	1.300	6274.2	0.0	0.0	0.900	0.0
Backfill Soil	D	1.300	2693.2	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	0.900	0.0
Total			36470.6	0.0	-	-	0.0

Group-IV	γ(D+SD+L+CF+E+B+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	27815.2	0.0	0.0	1.800	0.0
Self Weight of Footing	D	1.300	6274.2	0.0	0.0	0.900	0.0
Backfill Soil	D	1.300	2693.2	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	0.900	0.0
Total			36782.6	0.0	-	-	0.0

Group-V	γ(D+SD+E+B+W+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	19857.9	0.0	0.0	1.800	0.0
Self Weight of Footing	D	1.250	6032.9	0.0	0.0	0.900	0.0
Backfill Soil	D	1.250	2589.6	0.0	0.0	3.635	0.0
Buoyancy	B	1.250	0.0	0.0	0.0	0.900	0.0
Total			28480.4	0.0	-	-	0.0

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	22647.9	0.0	0.0	1.800	0.0
Self Weight of Footing	D	1.250	6032.9	0.0	0.0	0.900	0.0
Backfill Soil	D	1.250	2589.6	0.0	0.0	3.635	0.0
Buoyancy	B	1.250	0.0	0.0	0.0	0.900	0.0
Total			31270.4	0.0	-	-	0.0

(5) Summary of Force at Bottom of Footing

		Longitudinal Direction			Transverse Direction		
		V(kN)	H(kN)	M(kNm)	V(kN)	H(kN)	M(kNm)
Service Load Design	Group-I	28054.3	0.0	3302.1	28054.3	0.0	0.0
	Group-II	22544.3	0.0	2395.1	22544.3	0.0	0.0
	Group-III	28054.3	130.0	4960.9	28054.3	0.0	0.0
	Group-IV	28294.3	0.0	3186.1	28294.3	0.0	0.0
	Group-V	22784.3	0.0	2279.1	22784.3	0.0	0.0
	Group-VI	28294.3	130.0	4844.9	28294.3	0.0	0.0
Load Factor Design	Group-I	41269.8	0.0	5082.8	41269.8	0.0	0.0
	Group-II	27238.2	0.0	3113.7	29307.6	0.0	0.0
	Group-III	36470.6	169.0	6449.2	36470.6	0.0	0.0
	Group-IV	34713.2	0.0	4142.0	36782.6	0.0	0.0
	Group-V	28480.4	0.0	2848.9	28480.4	0.0	0.0
	Group-VI	31270.4	130.0	4733.5	31270.4	0.0	0.0
Seismic Design		29625.0	9248.8	46446.9	22909.0	5895.3	85413.8

*) Sectional Force of Seismic Design is Calculated by Dynamic Analysis.

2.4.2 Calculation of Pile Capacity

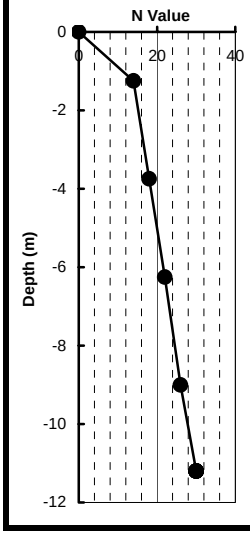
Substructure: P2 Pier

Pile Type 2 ("1"=Precast, "2"=Cast-in-situ) Dia: 1200 mm
2 ("1"=End-Bearing, "2"=Friction&End-Bearing)

Calculation Criteria

- Factor of Safety Required FS = 2.0
- Pile Embedded Length L = 11.900 m
- Pile Cross-Sectional Perimeter P = 3.770 m
- Pile Cross-Sectional Area A_b = 1.13 m^2
- Concrete Unit Weight g_c = 24.5 kN/m^3
- Soil Effective Unit Weight g_{eff} = 18.0 kN/m^3
- Ultimate Soil End Bearing Capacity q_u = 3000 kN/m2
- Soil Type of Bearing Point 1 ('1' = sand, '2' = clay)

SKIN FRICTION CAPACITY: Formula: $Q_s = S(f_s \cdot P \cdot d)$ for N > 0



Layer Number	Thickness ti(m)	Soil Type 1'=Sand, '2'=Clay		N	f_s kN/m^2	Q_s kN	
1	2.500	1	Sand	14.0	70.0	660	
2	2.500	1	Sand	18.0	90.0	848	
3	2.500	1	Sand	22.0	110.0	1037	
4	3.000	1	Sand	26.0	130.0	1470	
5	1.400	1	Sand	30.0	150.0	792	
6			-		-	-	
7			-		-	-	
8			-		-	-	
9			-		-	-	
10			-		-	-	
Total L=	11.900 m				Total Q_s =	4807	

End Bearing Capacity:

Type of Pile	Soil Type of B.P.	End Bearing Capacity	
Cast-in-situ Friction&End-bearing	Sand	3393 kN	

Ultimate Bearing Capacity (Q_{ult}): 8200 kN

Replaced Effective Weight of Soil (Ws): 108 kN

Buoyant Weighy of Pile (W): 195 kN

Allowable Bearing Capacity (Qall): 3959 kN
*Qall = (Q_{ult} - Ws)/FS + Ws - W

Design Uplift Capacity at Seismic Design(Qup): 1797 kN
*Qup = Q_S/3 + W

2.4.3 Calculation Result of Pile Reaction and Sectional Force

(1) Service Load Design

1) Summary of Stability

Longitudinal direction

Load Case		Group-I	Group-III	Gruop-VI
Actiing Force at Origin				
Vo	kN	28054.3	28054.3	28294.3
Ho	kN	0.0	130.0	130.0
Mo	kN.m	3302.1	4960.9	4844.9
Displacement at Origin				
δx	mm	0.20	0.38	0.37
δz	mm	5.88	5.88	5.93
α	rad	0.00009627	0.00015253	0.00014915
δf, δa	mm	0.20≦15.00	0.38≦15.00	0.37≦15.00
Vertical Reaction Force				
PNmax	kN	2312.31≦2619.00	2367.45≦2619.00	2381.28≦2619.00
PNmin	kN	2123.59≧0.00	2068.45≧0.00	2088.90≧0.00
Horizontal Reaction Force				
PH	kN	0.00	9.29	9.29
Bending moment of Pile				
Pile head Mt	kN.m	60.63	76.70	74.57
In the ground Mm	kN.m	-0.06	80.32	78.27

Transverse direction

Load Case		Group-I
Actiing Force at Origin		
Vo	kN	28054.3
Ho	kN	0.0
Mo	kN.m	0.0
Displacement at Origin		
δx	mm	0.00
δz	mm	5.88
α	rad	0
δf, δa	mm	0.00≦15.00
Vertical Reaction Force		
PNmax	kN	2217.95≦2619.00
PNmin	kN	2217.95≧0.00
Horizontal Reaction Force		
PH	kN	0.00
Bending moment of Pile		
Pile head Mt	kN.m	0.00
In the ground Mm	kN.m	0.00

2) Calculation Result of Pile's Sectinal Force

i) Longitudinal Direction Group-I

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	0.00	0.00
M (kN.m)	60.63	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	156745	75284
K2(kN/rad)	326833	0
K3(kN.m/m)	326833	0
K4(kN.m/rad)	1311300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	60.63	0.00
Mmax (kN.m)	-0.06	0.00
Z (m)	11.196	0.000
1/2Mmax(kN.m)	30.31	30.31
S (kN)	-9.50	-9.50
Z (m)	4.129	4.129

Mmax：Maximum bending moment of pile　　1/2Mmax = 1/2・max(Mmax,Mt)

Mt ：Moment of pile top

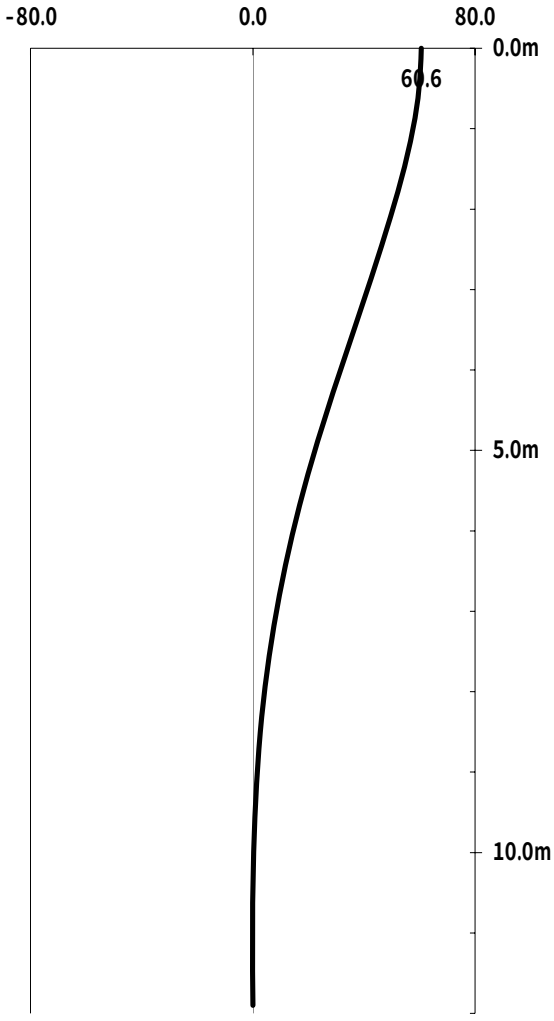
Sectional force of Pile

Z (m)	δx(mm)	M (kN.m)	S (kN)	δx(mm)	M (kN.m)	S (kN)
0.000	0.201	60.630	0.000	0.000	0.000	0.000
0.500	0.156	59.810	-3.130	0.000	0.000	0.000
1.000	0.116	57.620	-5.520	0.000	0.000	0.000
1.500	0.083	54.400	-7.260	0.000	0.000	0.000
2.000	0.054	50.450	-8.460	0.000	0.000	0.000
2.500	0.031	46.020	-9.200	0.000	0.000	0.000
3.000	0.012	41.280	-9.680	0.000	0.000	0.000
3.500	-0.003	36.400	-9.780	0.000	0.000	0.000
4.000	-0.014	31.550	-9.590	0.000	0.000	0.000
4.500	-0.022	26.850	-9.180	0.000	0.000	0.000
5.000	-0.027	22.390	-8.620	0.000	0.000	0.000
5.500	-0.031	18.280	-7.810	0.000	0.000	0.000
6.000	-0.032	14.600	-6.930	0.000	0.000	0.000
6.500	-0.032	11.350	-6.040	0.000	0.000	0.000
7.000	-0.031	8.550	-5.160	0.000	0.000	0.000
7.500	-0.029	6.180	-4.330	0.000	0.000	0.000
8.000	-0.027	4.250	-3.420	0.000	0.000	0.000
8.500	-0.024	2.750	-2.600	0.000	0.000	0.000
9.000	-0.020	1.630	-1.880	0.000	0.000	0.000
9.500	-0.017	0.850	-1.270	0.000	0.000	0.000
10.000	-0.013	0.340	-0.770	0.000	0.000	0.000
10.500	-0.010	0.060	-0.390	0.000	0.000	0.000
11.000	-0.006	-0.050	-0.080	0.000	0.000	0.000
11.500	-0.003	-0.050	0.090	0.000	0.000	0.000
11.900	0.000	0.000	0.130	0.000	0.000	0.000

Bending Moment Diagram

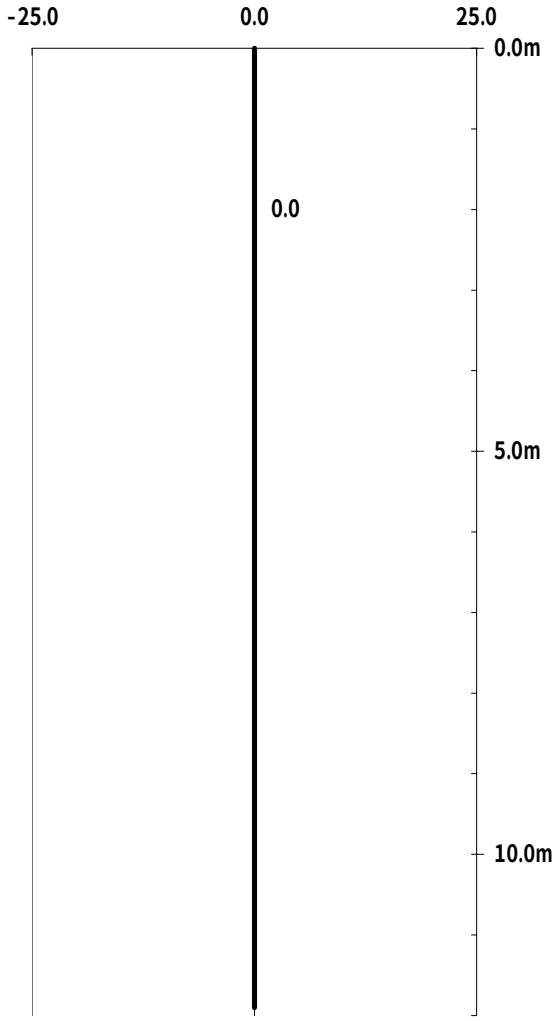
Pile head -Rigid connected

H= 0.000 kN
M= 60.630 kNm



Pile head -Hing connected

H= 0.000 kN
M= 0.000 kNm



ii) Longitudinal Direction Group-III

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	9.29	9.29
M (kN.m)	76.70	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	156745	75284
K2(kN/rad)	326833	0
K3(kN.m/m)	326833	0
K4(kN.m/rad)	1311300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	76.70	0.00
Mmax (kN.m)	80.32	12.99
Z (m)	0.831	3.310
1/2Mmax(kN.m)	40.16	40.16
S (kN)	-12.69	-12.69
Z (m)	4.954	4.954

Mmax：Maximum bending moment of pile 1/2Mmax = 1/2・max(Mmax,Mt)
Mt ：Moment of pile top

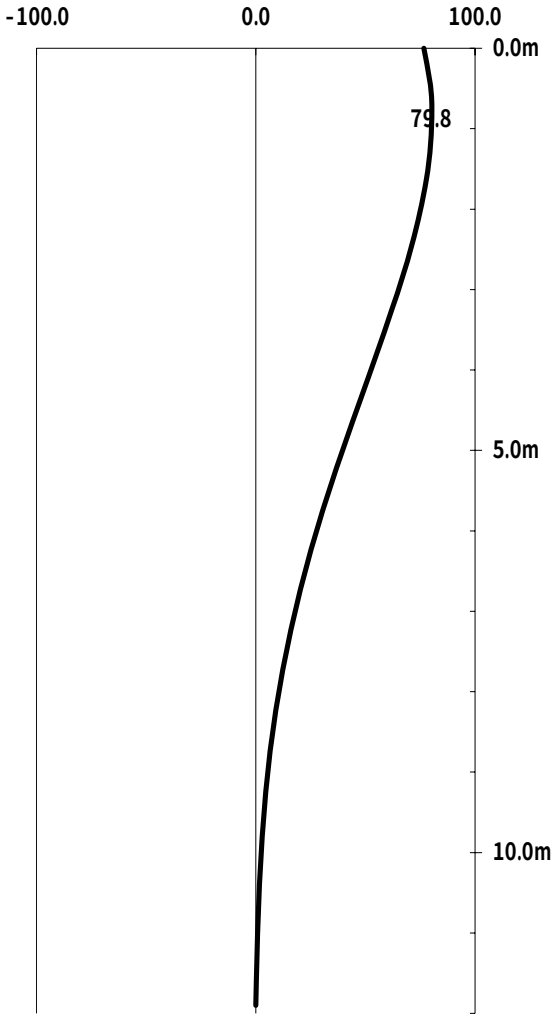
Sectional force of Pile

Z (m)	δx(mm)	M (kN.m)	S (kN)	δx(mm)	M (kN.m)	S (kN)
0.000	0.377	76.700	9.290	0.123	0.000	9.290
0.500	0.305	79.790	3.290	0.108	4.120	7.250
1.000	0.240	80.190	-1.500	0.093	7.290	5.480
1.500	0.183	78.470	-5.220	0.079	9.640	3.960
2.000	0.134	75.120	-8.010	0.066	11.290	2.690
2.500	0.093	70.590	-10.000	0.054	12.370	1.640
3.000	0.058	65.130	-11.700	0.043	12.910	0.550
3.500	0.030	59.010	-12.680	0.033	12.960	-0.300
4.000	0.007	52.550	-13.080	0.025	12.640	-0.950
4.500	-0.010	46.010	-13.030	0.017	12.040	-1.420
5.000	-0.023	39.570	-12.640	0.011	11.240	-1.740
5.500	-0.032	33.440	-11.870	0.007	10.300	-1.990
6.000	-0.038	27.740	-10.890	0.003	9.270	-2.120
6.500	-0.041	22.570	-9.790	0.000	8.200	-2.150
7.000	-0.042	17.960	-8.640	-0.002	7.140	-2.110
7.500	-0.041	13.930	-7.500	-0.004	6.110	-2.020
8.000	-0.038	10.510	-6.200	-0.005	5.130	-1.870
8.500	-0.035	7.710	-5.000	-0.005	4.240	-1.710
9.000	-0.031	5.490	-3.920	-0.005	3.420	-1.550
9.500	-0.026	3.760	-2.990	-0.005	2.690	-1.390
10.000	-0.021	2.470	-2.230	-0.004	2.030	-1.250
10.500	-0.016	1.510	-1.630	-0.003	1.430	-1.130
11.000	-0.010	0.820	-1.140	-0.002	0.890	-1.040
11.500	-0.004	0.330	-0.870	-0.001	0.390	-0.980
11.900	0.000	0.000	-0.800	0.000	0.000	-0.970

Bending Moment Diagram

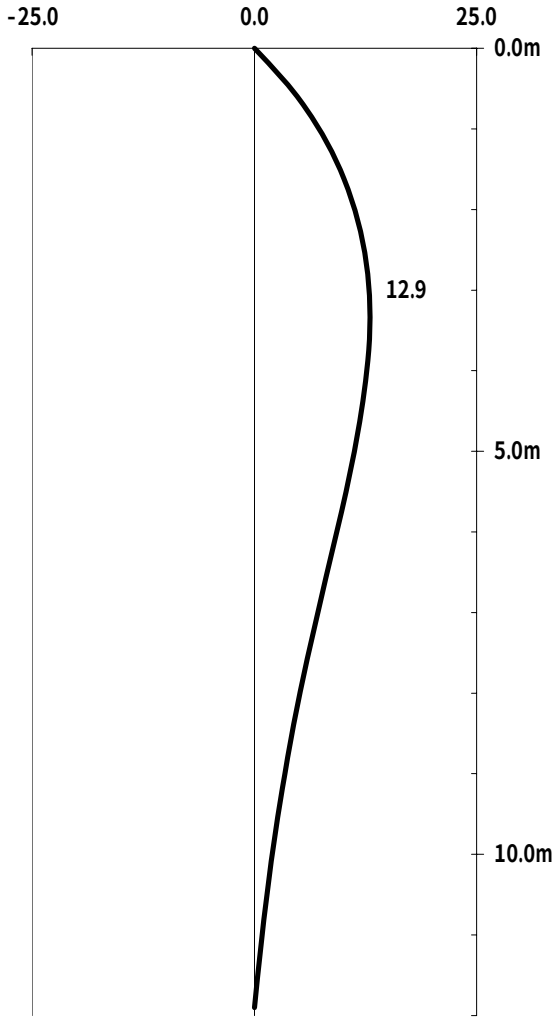
Pile head -Rigid connected

H= 9.290 kN
M= 76.700 kNm



Pile head -Hing connected

H= 9.290 kN
M= 0.000 kNm



iii) Longitudinal Direction Group-VI

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	9.29	9.29
M (kN.m)	74.57	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	156745	75284
K2(kN/rad)	326833	0
K3(kN.m/m)	326833	0
K4(kN.m/rad)	1311300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	74.57	0.00
Mmax (kN.m)	78.27	12.99
Z (m)	0.849	3.310
1/2Mmax(kN.m)	39.13	39.13
S (kN)	-12.37	-12.37
Z (m)	4.972	4.972

Mmax：Maximum bending moment of pile 1/2Mmax = 1/2・max(Mmax,Mt)
Mt ：Moment of pile top

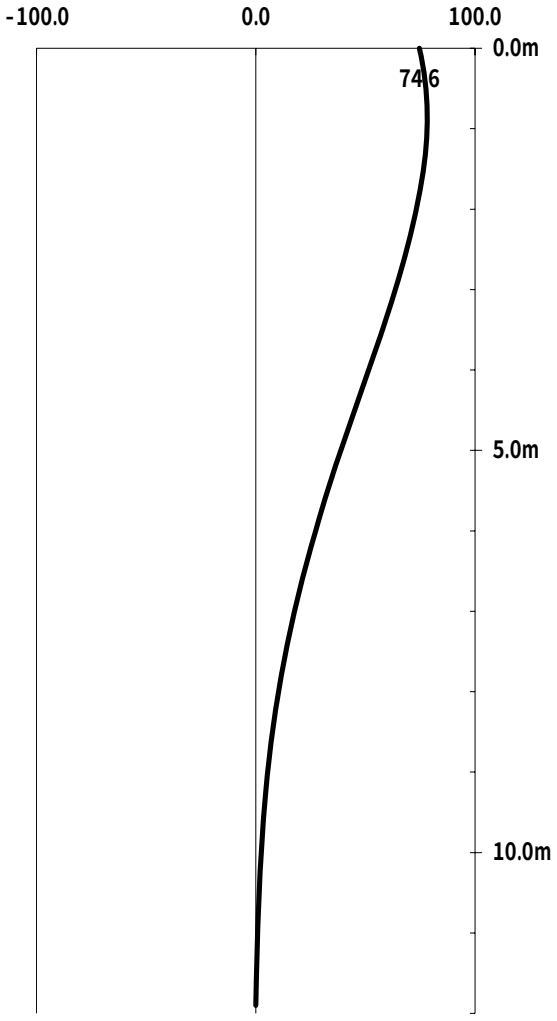
Sectional force of Pile

Z (m)	δx(mm)	M (kN.m)	S (kN)	δx(mm)	M (kN.m)	S (kN)
0.000	0.370	74.570	9.290	0.123	0.000	9.290
0.500	0.299	77.690	3.400	0.108	4.120	7.250
1.000	0.236	78.170	-1.310	0.093	7.290	5.480
1.500	0.181	76.560	-4.970	0.079	9.640	3.960
2.000	0.133	73.350	-7.710	0.066	11.290	2.690
2.500	0.092	68.970	-9.680	0.054	12.370	1.640
3.000	0.058	63.680	-11.360	0.043	12.910	0.550
3.500	0.030	57.730	-12.330	0.033	12.960	-0.300
4.000	0.008	51.440	-12.740	0.025	12.640	-0.950
4.500	-0.010	45.060	-12.710	0.017	12.040	-1.420
5.000	-0.022	38.790	-12.340	0.011	11.240	-1.740
5.500	-0.031	32.790	-11.590	0.007	10.300	-1.990
6.000	-0.037	27.230	-10.640	0.003	9.270	-2.120
6.500	-0.040	22.170	-9.580	0.000	8.200	-2.150
7.000	-0.041	17.660	-8.460	-0.002	7.140	-2.110
7.500	-0.040	13.710	-7.340	-0.004	6.110	-2.020
8.000	-0.037	10.360	-6.080	-0.005	5.130	-1.870
8.500	-0.034	7.610	-4.910	-0.005	4.240	-1.710
9.000	-0.030	5.430	-3.860	-0.005	3.420	-1.550
9.500	-0.025	3.730	-2.950	-0.005	2.690	-1.390
10.000	-0.020	2.450	-2.200	-0.004	2.030	-1.250
10.500	-0.015	1.510	-1.610	-0.003	1.430	-1.130
11.000	-0.010	0.830	-1.140	-0.002	0.890	-1.040
11.500	-0.004	0.330	-0.870	-0.001	0.390	-0.980
11.900	0.000	0.000	-0.810	0.000	0.000	-0.970

Bending Moment Diagram

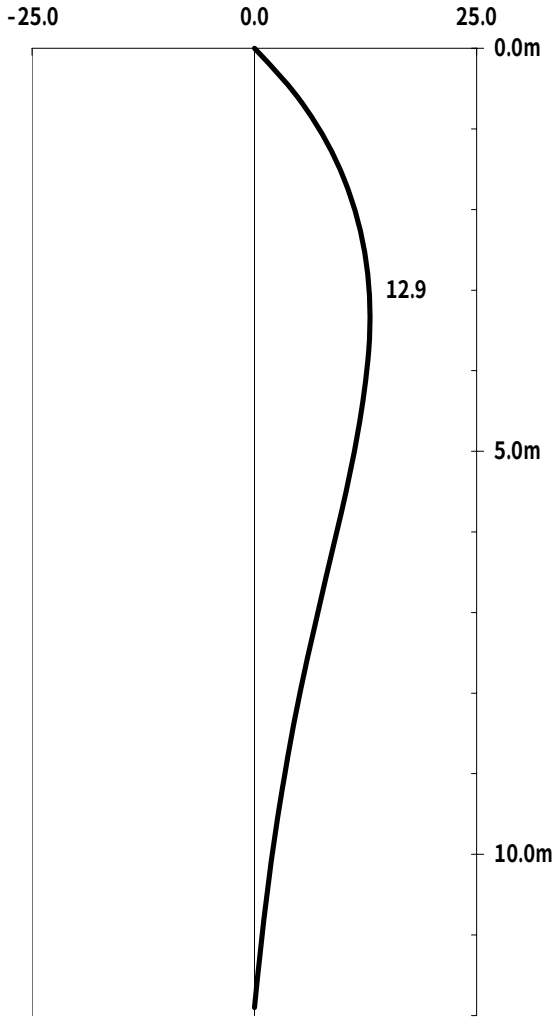
Pile head -Rigid connected

H= 9.290 kN
M= 74.570 kNm



Pile head -Hing connected

H= 9.290 kN
M= 0.000 kNm



iv) Transvwese Direction Group-I

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	0.00	0.00
M (kN.m)	0.00	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	156745	75284
K2(kN/rad)	326833	0
K3(kN.m/m)	326833	0
K4(kN.m/rad)	1311300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	0.00	0.00
Mmax (kN.m)	0.00	0.00
Z (m)	0.000	0.000
1/2Mmax(kN.m)	0.00	0.00
S (kN)	0.00	0.00
Z (m)	0.000	0.000

(2) Load Factor Design

1) Calculation Result of Pile's Sectinal Force

i) Longitudinal Direction Group-I

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	0.00	0.00
M (kN.m)	93.32	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	156745	75284
K2(kN/rad)	326833	0
K3(kN.m/m)	326833	0
K4(kN.m/rad)	1311300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	93.32	0.00
Mmax (kN.m)	-0.10	0.00
Z (m)	11.196	0.000
1/2Mmax(kN.m)	46.66	46.66
S (kN)	-14.63	-14.63
Z (m)	4.129	4.129

Mmax：Maximum bending moment of pile　　1/2Mmax = 1/2・max(Mmax,Mt)

Mt ：Moment of pile top

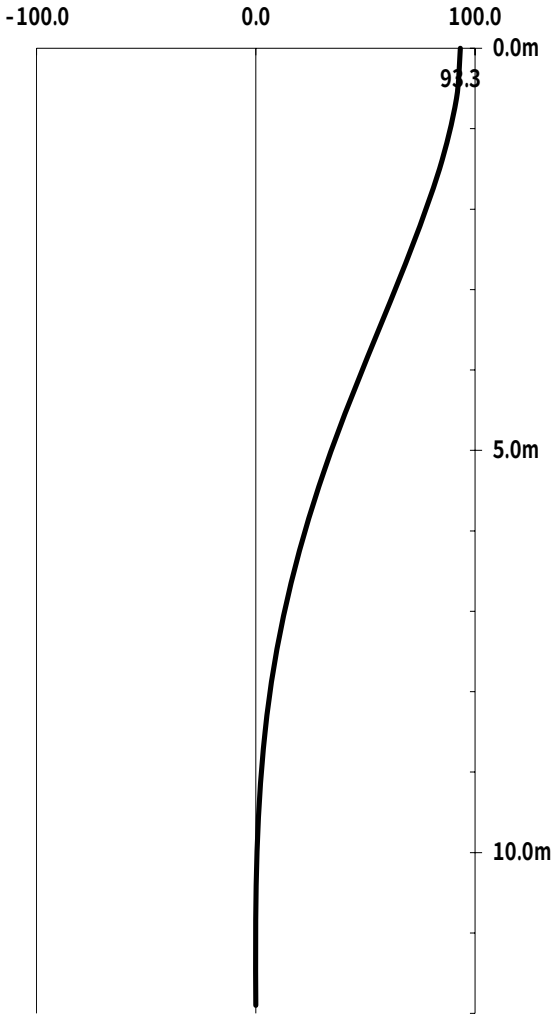
Sectional force of Pile

Z (m)	δx(mm)	M (kN.m)	S (kN)	δx(mm)	M (kN.m)	S (kN)
0.000	0.309	93.320	0.000	0.000	0.000	0.000
0.500	0.239	92.070	-4.820	0.000	0.000	0.000
1.000	0.179	88.700	-8.490	0.000	0.000	0.000
1.500	0.127	83.740	-11.170	0.000	0.000	0.000
2.000	0.084	77.660	-13.020	0.000	0.000	0.000
2.500	0.048	70.840	-14.170	0.000	0.000	0.000
3.000	0.019	63.540	-14.900	0.000	0.000	0.000
3.500	-0.004	56.030	-15.060	0.000	0.000	0.000
4.000	-0.021	48.560	-14.760	0.000	0.000	0.000
4.500	-0.034	41.330	-14.130	0.000	0.000	0.000
5.000	-0.042	34.470	-13.260	0.000	0.000	0.000
5.500	-0.047	28.140	-12.020	0.000	0.000	0.000
6.000	-0.049	22.470	-10.670	0.000	0.000	0.000
6.500	-0.049	17.480	-9.300	0.000	0.000	0.000
7.000	-0.048	13.170	-7.950	0.000	0.000	0.000
7.500	-0.045	9.510	-6.670	0.000	0.000	0.000
8.000	-0.041	6.540	-5.260	0.000	0.000	0.000
8.500	-0.036	4.230	-4.000	0.000	0.000	0.000
9.000	-0.031	2.510	-2.890	0.000	0.000	0.000
9.500	-0.026	1.310	-1.950	0.000	0.000	0.000
10.000	-0.021	0.530	-1.190	0.000	0.000	0.000
10.500	-0.015	0.090	-0.600	0.000	0.000	0.000
11.000	-0.010	-0.080	-0.130	0.000	0.000	0.000
11.500	-0.004	-0.070	0.140	0.000	0.000	0.000
11.900	0.000	0.000	0.200	0.000	0.000	0.000

Bending Moment Diagram

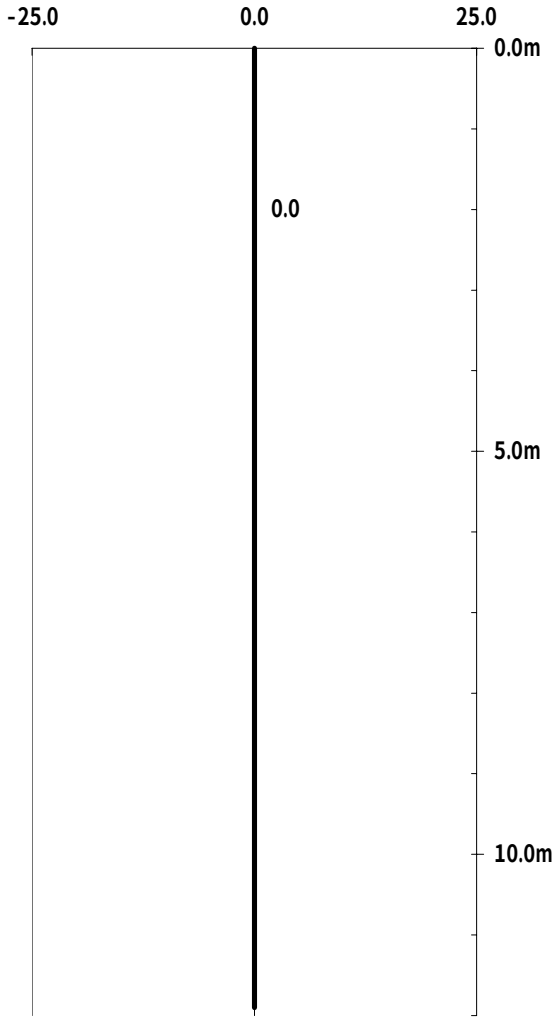
Pile head -Rigid connected

H= 0.000 kN
M= 93.320 kNm



Pile head -Hing connected

H= 0.000 kN
M= 0.000 kNm



ii) Longitudinal Direction Group-III

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	12.07	12.07
M (kN.m)	99.71	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	156745	75284
K2(kN/rad)	326833	0
K3(kN.m/m)	326833	0
K4(kN.m/rad)	1311300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	99.71	0.00
Mmax (kN.m)	104.42	16.89
Z (m)	0.831	3.310
1/2Mmax(kN.m)	52.21	52.21
S (kN)	-16.50	-16.50
Z (m)	4.954	4.954

Mmax：Maximum bending moment of pile 1/2Mmax = 1/2・max(Mmax,Mt)
Mt ：Moment of pile top

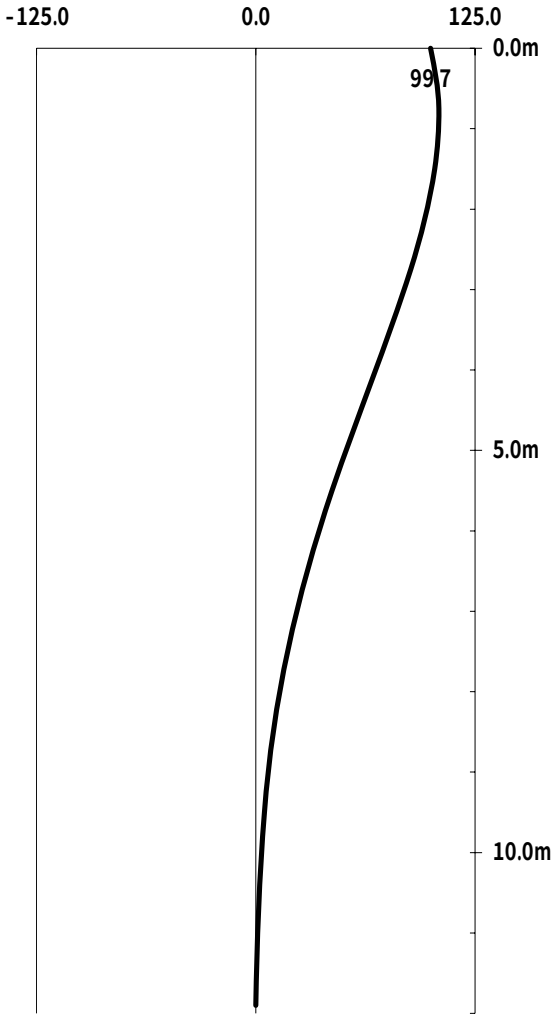
Sectional force of Pile

Z (m)	δx(mm)	M (kN.m)	S (kN)	δx(mm)	M (kN.m)	S (kN)
0.000	0.490	99.710	12.070	0.160	0.000	12.070
0.500	0.396	103.730	4.270	0.140	5.360	9.420
1.000	0.312	104.250	-1.950	0.121	9.480	7.120
1.500	0.239	102.010	-6.790	0.103	12.530	5.150
2.000	0.175	97.660	-10.420	0.085	14.680	3.500
2.500	0.121	91.770	-13.000	0.070	16.080	2.130
3.000	0.075	84.670	-15.210	0.055	16.780	0.720
3.500	0.038	76.720	-16.480	0.043	16.850	-0.390
4.000	0.009	68.320	-17.010	0.032	16.430	-1.230
4.500	-0.013	59.810	-16.940	0.023	15.650	-1.850
5.000	-0.030	51.450	-16.440	0.015	14.620	-2.270
5.500	-0.042	43.470	-15.430	0.008	13.400	-2.590
6.000	-0.049	36.060	-14.150	0.003	12.060	-2.750
6.500	-0.053	29.340	-12.730	0.000	10.670	-2.790
7.000	-0.054	23.350	-11.230	-0.003	9.280	-2.740
7.500	-0.053	18.100	-9.740	-0.005	7.940	-2.620
8.000	-0.050	13.660	-8.060	-0.006	6.670	-2.440
8.500	-0.045	10.020	-6.500	-0.007	5.510	-2.230
9.000	-0.040	7.130	-5.100	-0.007	4.450	-2.010
9.500	-0.034	4.890	-3.890	-0.006	3.490	-1.810
10.000	-0.027	3.210	-2.890	-0.005	2.640	-1.620
10.500	-0.020	1.960	-2.120	-0.004	1.870	-1.470
11.000	-0.013	1.070	-1.490	-0.003	1.160	-1.350
11.500	-0.006	0.430	-1.130	-0.001	0.510	-1.280
11.900	0.000	0.000	-1.040	0.000	0.000	-1.260

Bending Moment Diagram

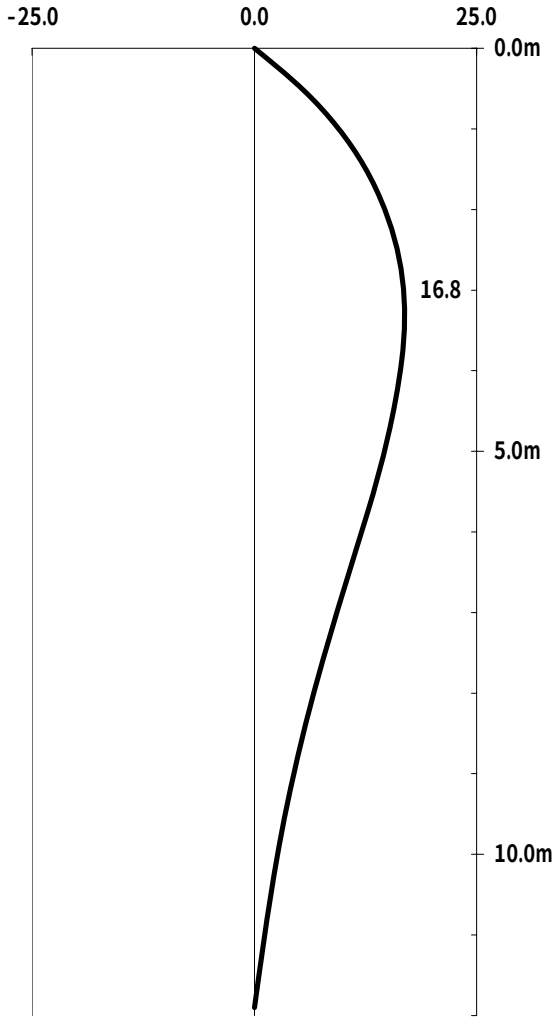
Pile head -Rigid connected

H= 12.070 kN
M= 99.710 kNm



Pile head -Hing connected

H= 12.070 kN
M= 0.000 kNm



iii) Longitudinal Direction Group-VI

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	9.29	9.29
M (kN.m)	72.53	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	156745	75284
K2(kN/rad)	326833	0
K3(kN.m/m)	326833	0
K4(kN.m/rad)	1311300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	72.53	0.00
Mmax (kN.m)	76.30	12.99
Z (m)	0.868	3.310
1/2Mmax(kN.m)	38.15	38.15
S (kN)	-12.06	-12.06
Z (m)	4.990	4.990

Mmax：Maximum bending moment of pile 1/2Mmax = 1/2・max(Mmax,Mt)
Mt ：Moment of pile top

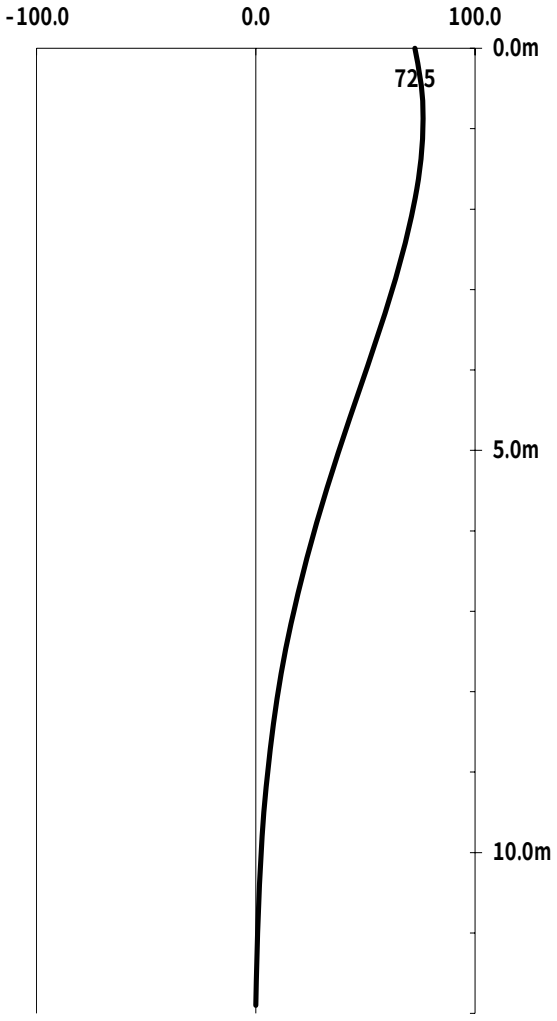
Sectional force of Pile

Z (m)	δx(mm)	M (kN.m)	S (kN)	δx(mm)	M (kN.m)	S (kN)
0.000	0.363	72.530	9.290	0.123	0.000	9.290
0.500	0.294	75.670	3.500	0.108	4.120	7.250
1.000	0.232	76.220	-1.120	0.093	7.290	5.480
1.500	0.178	74.720	-4.720	0.079	9.640	3.960
2.000	0.131	71.650	-7.430	0.066	11.290	2.690
2.500	0.091	67.420	-9.370	0.054	12.370	1.640
3.000	0.057	62.290	-11.030	0.043	12.910	0.550
3.500	0.030	56.510	-12.000	0.033	12.960	-0.300
4.000	0.008	50.380	-12.420	0.025	12.640	-0.950
4.500	-0.009	44.160	-12.400	0.017	12.040	-1.420
5.000	-0.021	38.030	-12.050	0.011	11.240	-1.740
5.500	-0.030	32.180	-11.330	0.007	10.300	-1.990
6.000	-0.036	26.740	-10.410	0.003	9.270	-2.120
6.500	-0.039	21.790	-9.370	0.000	8.200	-2.150
7.000	-0.040	17.370	-8.280	-0.002	7.140	-2.110
7.500	-0.039	13.500	-7.200	-0.004	6.110	-2.020
8.000	-0.037	10.210	-5.960	-0.005	5.130	-1.870
8.500	-0.033	7.520	-4.820	-0.005	4.240	-1.710
9.000	-0.029	5.370	-3.790	-0.005	3.420	-1.550
9.500	-0.025	3.710	-2.910	-0.005	2.690	-1.390
10.000	-0.020	2.440	-2.170	-0.004	2.030	-1.250
10.500	-0.015	1.510	-1.600	-0.003	1.430	-1.130
11.000	-0.010	0.830	-1.140	-0.002	0.890	-1.040
11.500	-0.004	0.330	-0.880	-0.001	0.390	-0.980
11.900	0.000	0.000	-0.810	0.000	0.000	-0.970

Bending Moment Diagram

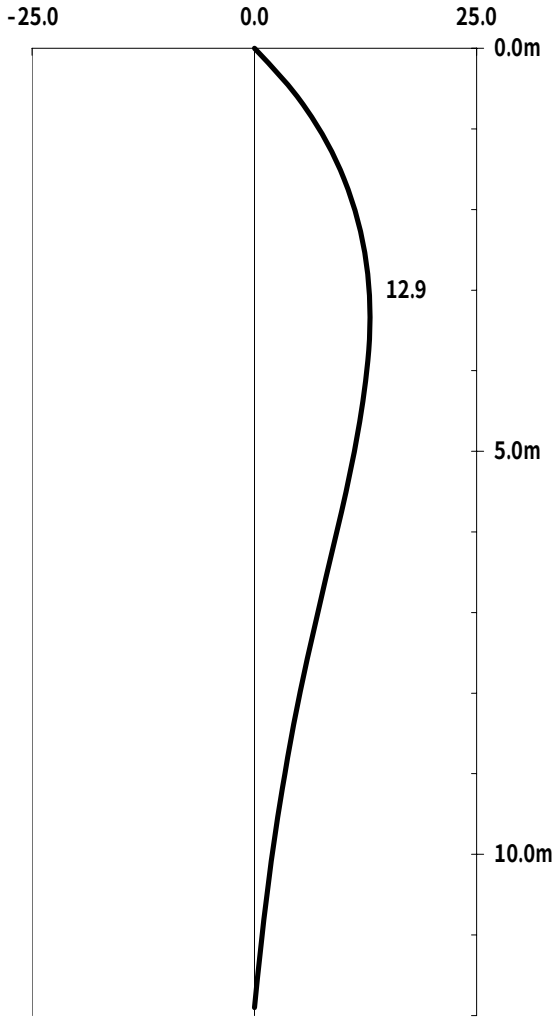
Pile head -Rigid connected

H= 9.290 kN
M= 72.530 kNm



Pile head -Hing connected

H= 9.290 kN
M= 0.000 kNm



iii) Transverse Direction Group-I

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	0.00	0.00
M (kN.m)	0.00	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	156745	75284
K2(kN/rad)	326833	0
K3(kN.m/m)	326833	0
K4(kN.m/rad)	1311300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	0.00	0.00
Mmax (kN.m)	0.00	0.00
Z (m)	0.000	0.000
1/2Mmax(kN.m)	0.00	0.00
S (kN)	0.00	0.00
Z (m)	0.000	0.000

(3) Seismic Design

1) Summary of Stability

Load Case		Longitudinal Direction	Transverse Direction
Actiing Force at Origin			
Vo	kN	29625.0	22909.0
Ho	kN	9248.8	5895.3
Mo	kN.m	46446.9	85413.8
Displacement at Origin			
δx	mm	5.63	3.40
δz	mm	5.61	4.34
α	rad	0.00174428	0.00100515
δf, δa	mm	5.63≦15.00	3.40≦15.00
Vertical Reaction Force			
PNmax	kN	3825.77≦3965.00	3909.94≦3965.00
PNmin	kN	406.37≧-1797.00	-637.23≧-1797.00
Horizontal Reaction Force			
PH	kN	660.63	421.09
Bending moment of Pile			
Pile head Mt	kN.m	142.47	11.02
In the ground Mm	kN.m	856.97	494.70

2) Calculation Result of Pile's Sectinal Force

i) Longitudinal Direction

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	660.63	660.63
M (kN.m)	142.47	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	257647	124706
K2(kN/rad)	453248	0
K3(kN.m/m)	453248	0
K4(kN.m/rad)	1545300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	142.47	0.00
Mmax (kN.m)	856.97	765.24
Z (m)	2.622	2.801
1/2Mmax(kN.m)	428.48	428.48
S (kN)	-164.52	-150.94
Z (m)	5.911	5.788

Mmax：Maximum bending moment of pile 1/2Mmax = 1/2・max(Mmax,Mt)

Mt ：Moment of pile top

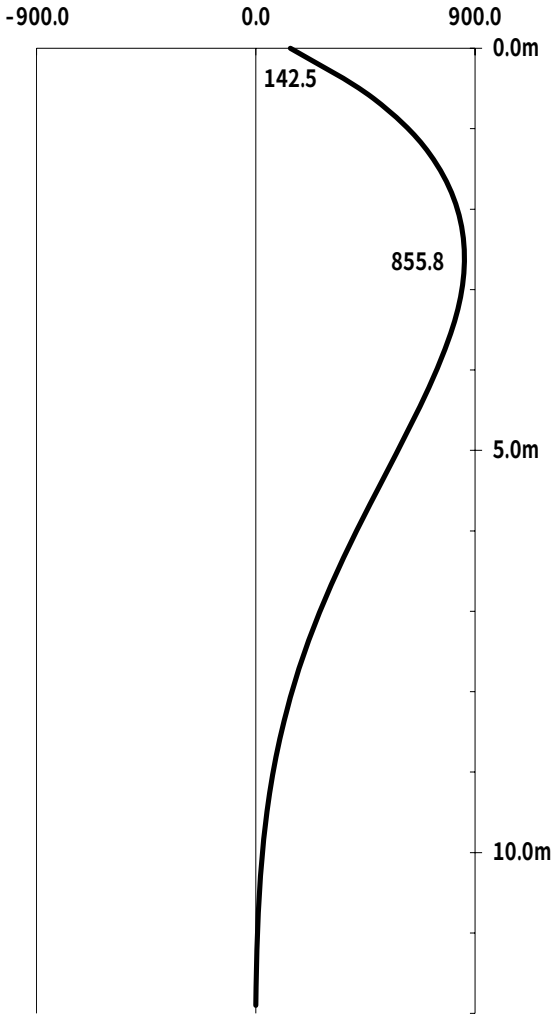
Sectional force of Pile

Z (m)	δx(mm)	M (kN.m)	S (kN)	δx(mm)	M (kN.m)	S (kN)
0.000	5.633	142.470	660.630	5.297	0.000	660.630
0.500	4.772	425.720	477.400	4.526	285.930	487.610
1.000	3.953	624.820	323.830	3.781	492.080	341.380
1.500	3.195	754.190	198.080	3.085	631.550	220.590
2.000	2.511	827.150	97.790	2.450	716.590	123.280
2.500	1.907	855.760	20.200	1.885	758.360	47.140
3.000	1.387	846.300	-54.110	1.394	762.510	-26.830
3.500	0.950	805.260	-106.740	0.978	734.950	-80.270
4.000	0.592	742.550	-141.390	0.634	685.110	-116.510
4.500	0.307	666.290	-161.500	0.357	620.790	-138.690
5.000	0.087	582.960	-170.190	0.141	548.270	-149.740
5.500	-0.075	497.460	-170.270	-0.021	472.260	-152.810
6.000	-0.189	413.950	-162.740	-0.137	396.740	-148.220
6.500	-0.262	335.580	-150.080	-0.214	324.920	-138.330
7.000	-0.302	264.390	-134.330	-0.259	258.960	-125.110
7.500	-0.316	201.490	-117.110	-0.278	200.100	-110.140
8.000	-0.310	148.100	-96.540	-0.278	149.600	-91.870
8.500	-0.289	104.800	-76.870	-0.262	108.150	-74.130
9.000	-0.258	70.940	-58.900	-0.236	75.250	-57.760
9.500	-0.220	45.520	-43.210	-0.203	50.060	-43.340
10.000	-0.178	27.290	-30.160	-0.165	31.510	-31.280
10.500	-0.132	14.880	-20.000	-0.123	18.340	-21.840
11.000	-0.086	7.080	-11.760	-0.080	9.480	-14.160
11.500	-0.038	2.520	-7.080	-0.036	3.630	-9.790
11.900	0.000	0.000	-5.920	0.000	0.000	-8.710

Bending Moment Diagram

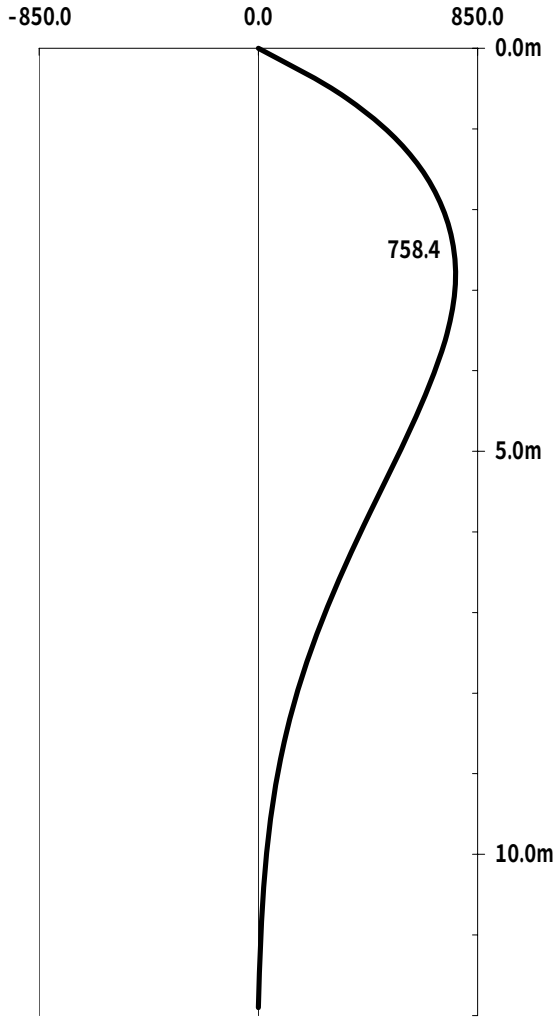
Pile head -Rigid connected

H= 660.630 kN
M= 142.470 kNm



Pile head -Hing connected

H= 660.630 kN
M= 0.000 kNm



ii) Transverse Direction

	Pile head -Rigid connected	Pile head -Hing connected
H (kN)	421.09	421.09
M (kN.m)	11.02	0.00
Spring constant of pile for transverse direction		
K1(kN/m)	257647	124706
K2(kN/rad)	453248	0
K3(kN.m/m)	453248	0
K4(kN.m/rad)	1545300	0
Mt, Mmax, 1/2Mmax		
Mt (kN.m)	11.02	0.00
Mmax (kN.m)	494.70	487.78
Z (m)	2.778	2.801
1/2Mmax(kN.m)	247.35	247.35
S (kN)	-94.83	-93.88
Z (m)	6.072	6.059

Mmax：Maximum bending moment of pile 1/2Mmax = 1/2・max(Mmax,Mt)
Mt ：Moment of pile top

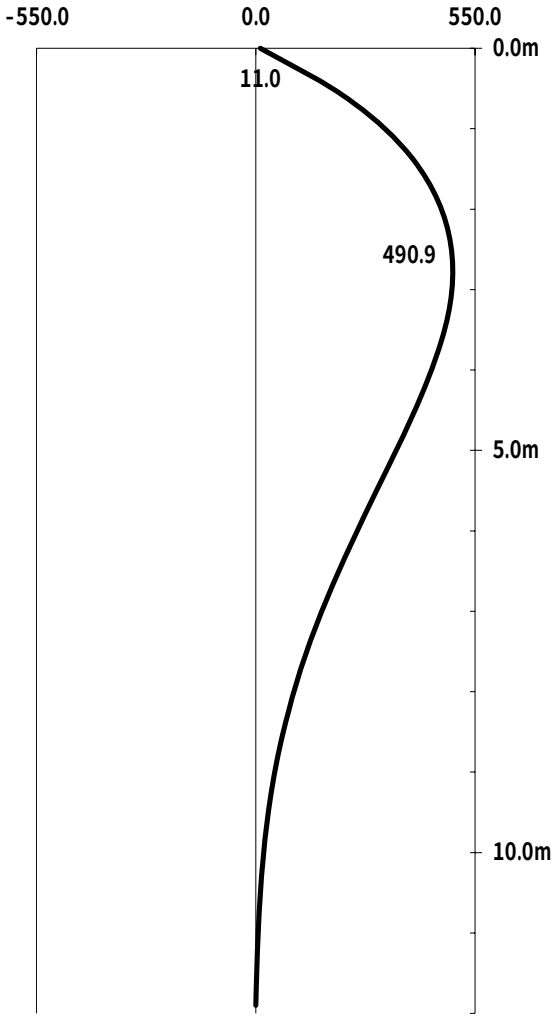
Sectional force of Pile

Z (m)	δx(mm)	M (kN.m)	S (kN)	δx(mm)	M (kN.m)	S (kN)
0.000	3.403	11.020	421.090	3.377	0.000	421.090
0.500	2.904	193.070	310.020	2.885	182.250	310.810
1.000	2.424	323.930	216.240	2.410	313.660	217.600
1.500	1.975	412.050	138.860	1.966	402.560	140.600
2.000	1.566	465.310	76.610	1.561	456.760	78.580
2.500	1.203	490.930	27.960	1.201	483.390	30.050
3.000	0.888	492.520	-19.210	0.888	486.040	-17.100
3.500	0.621	473.910	-53.210	0.623	468.470	-51.170
4.000	0.401	441.140	-76.190	0.404	436.700	-74.260
4.500	0.223	399.220	-90.170	0.227	395.700	-88.400
5.000	0.086	352.160	-97.030	0.090	349.470	-95.450
5.500	-0.018	302.970	-98.750	-0.014	301.020	-97.400
6.000	-0.092	254.220	-95.600	-0.087	252.880	-94.480
6.500	-0.140	207.930	-89.080	-0.136	207.110	-88.170
7.000	-0.168	165.480	-80.460	-0.165	165.060	-79.740
7.500	-0.180	127.660	-70.740	-0.177	127.550	-70.210
8.000	-0.179	95.240	-58.920	-0.177	95.360	-58.560
8.500	-0.169	68.670	-47.460	-0.167	68.930	-47.250
9.000	-0.152	47.630	-36.900	-0.151	47.960	-36.820
9.500	-0.131	31.560	-27.620	-0.129	31.910	-27.630
10.000	-0.106	19.760	-19.850	-0.105	20.080	-19.940
10.500	-0.079	11.420	-13.780	-0.079	11.690	-13.920
11.000	-0.051	5.860	-8.840	-0.051	6.040	-9.030
11.500	-0.023	2.230	-6.030	-0.023	2.310	-6.240
11.900	0.000	0.000	-5.340	0.000	0.000	-5.550

Bending Moment Diagram

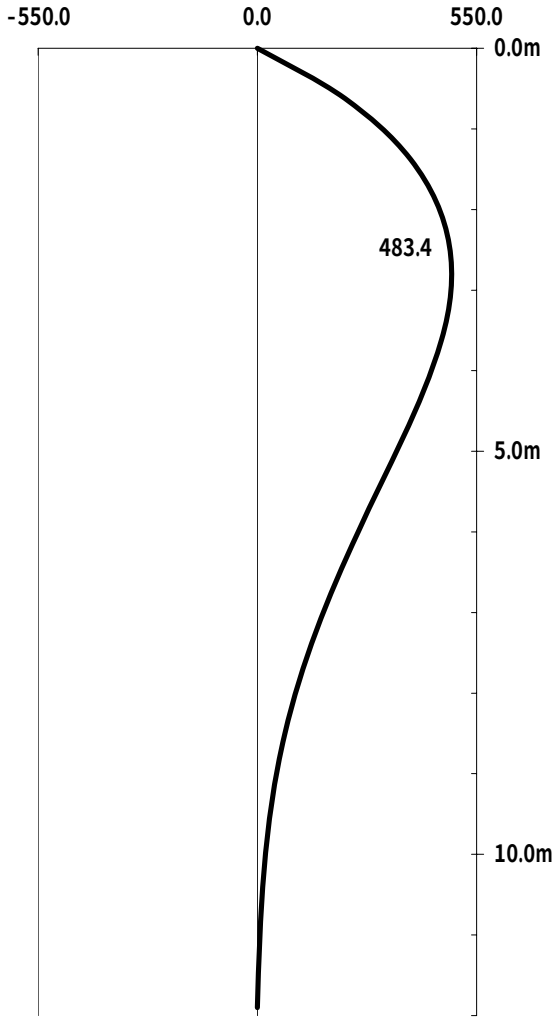
Pile head -Rigid connected

H= 421.090 kN
M= 11.020 kNm



Pile head -Hing connected

H= 421.090 kN
M= 0.000 kNm



2.4.4 Design of Pile

1) Summary of Sectional Force

		Longitudinal Direction			Transverse Direction		
		M(kNm)	N(kN)	S(kN)	M(kNm)	N(kN)	S(kN)
Service Load Design	Group-I	60.5	2312.3	9.8	-	-	-
	Group-III	80.3	2367.5	13.1	-	-	-
	Group-VI	78.3	2381.3	12.8	-	-	-
Load Factor Design	Group-I	93.3	3372.1	15.1	-	-	-
	Group-III	104.4	3078.4	17.0	-	-	-
	Group-VI	76.3	2680.2	12.5	-	-	-
Seismic Design		857.0	406.4	660.6	494.7	-637.2	421.1

*) Sectional Force of Seismic Design is Calculated by Dynamic Analysis.

2) Calculation of Stress for Service Load Design and Seismic Design

Stress Equation

$$\sigma_c = \frac{N}{\frac{b \cdot x}{2} - n \cdot As \cdot \frac{d-x}{x} + n \cdot As' \cdot \frac{x-d'}{x}}$$

$$\sigma_s = n \cdot \sigma_c \cdot \frac{d-x}{x}$$

$$x^3 - 3 \cdot \left(\frac{h}{2}-e\right) \cdot x^2 - \frac{6n}{b}\left\{As' \cdot \left(\frac{h}{2}-d'-e\right) + As \cdot \left(\frac{h}{2}-d-e\right)\right\} \cdot x + \frac{6n}{b}\left\{As' \cdot d' \cdot \left(\frac{h}{2}-d'-e\right) + As \cdot d \cdot \left(\frac{h}{2}-d-e\right)\right\} = 0.0$$

in which,

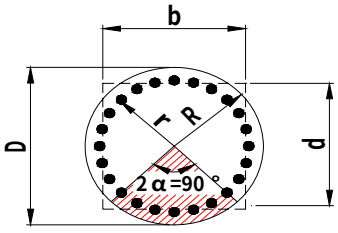
x : Distance from edge on compression side to neutral axis (mm)

h : Height of Member (mm)

b : Width in section (mm)

*)In case of circular section

$b=h=\sqrt{(\pi D^2 / 4)}$



d : Effective height (mm)

*)In case of circular section

$d=b/2+2/3 * (R^3-r^3) / (R^2-r^2) * \sin\alpha/\alpha$

in which, R : Radious of seciton

r : Radious of Re-Bar Arrangement

α: π/4(=45deg)

d' : Concrete Cover (mm)

As : Sectional area of reinforcing bar arranged on tension side (mm^2)

As': Sectional area of reinforcing bar arranged on compression side (mm^2)

n : Elastic Modulus Ratio of Reinforce and Concrete , n = 15.00

e : Axis force eccentric distance (mm)

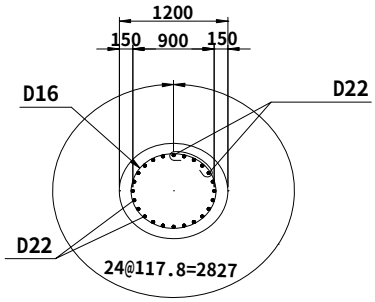
σc: Compressive Stress of Concrete (N/mm^2)

σs: Tensile Stress of Reinforcing (N/mm^2)

N: Axial Force (kN)

M: Bending Moment (kN.m)

Bar Arrangement



Calculation Result of Bending Stress

		Longitudinal Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	60.5	2312.3	2.13	-30.83	9.60	168.00	OK
	Group-III	80.3	2367.5	2.28	-32.63	12.00	210.00	OK
	Group-VI	78.3	2381.3	2.28	-32.68	13.44	235.20	OK
Sesmic Design		857.0	406.4	9.21	245.77	20.40	378.00	OK

	Transverse Direction						
	M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Sesmic Design	494.7	-637.2	5.46	255.19	20.40	378.00	OK

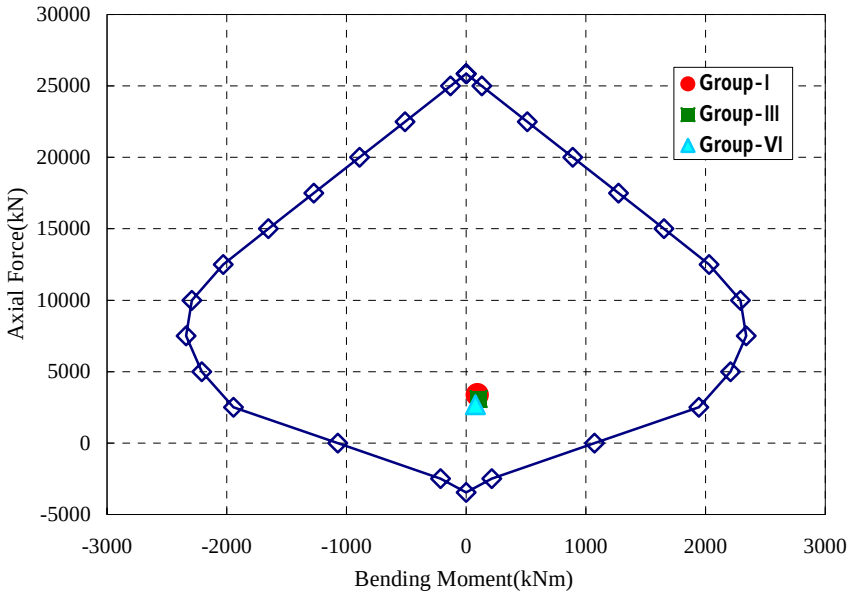
3) Calculation of Strength for Load Factor Design

*) Flexural Strength

Factored Sectional Force for Load Factor Design

		Bending Moment	Axial Force
Load Factor Design	Group-I	93.3 kNm	3372.08 kN
	Group-III	104.4 kNm	3078.39 kN
	Group-VI	76.3 kNm	2680.23 kN

Interaction of Longitudinal Direction



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

Vn= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=1/6x $\sqrt{}$ f'c)

= 1/6x8 $\sqrt{}$ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

		Longitudinal Direction
Load Factor Design	Group-I	15.1 kN
	Group-III	17.0 kN
	Group-VI	12.5 kN
Seismic Design		660.6 kN

Calculation of Shear Strength

vc = 1/6x $\sqrt{}$ f'c = 1/6x $\sqrt{}$ (24) = 0.816N/mm^2 -> 816kN/m^2

fy = 420 N/mm^2 -> 420000 kN/m^2

s = 1.000 m

Longitudinal Direction

		Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Load Factor Design	Group-I	15.1	1.063	0.937	691.06	0.00	0.0
	Group-III	17.0	1.063	0.937	691.06	0.00	0.0
	Group-VI	12.5	1.063	0.937	691.06	0.00	0.0
Seismic Design		660.6	1.063	0.937	691.06	0.00	0.0

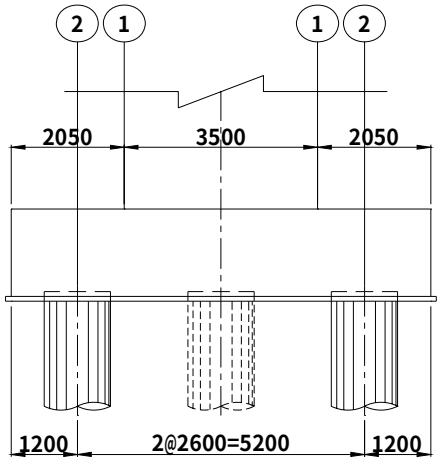
Arrangement of Stirr D16 -ctc.150 2680.8 mm^2/m > 0 mm^2/m

2.4.5 Design of Pilecap

1) Calculation of Sectional Force

(1) Longitudinal Direction

i) Self Weight of Pile Cap and Buoyancy



a) Section-①

Self Weight of Pile Cap = 24.5 x 1.800 x 2.050 x 14.400 = 1301.8 kN
Bending Moment = 1301.8 x 2.050 / 2 = 1334.4 kNm

Backfilling Soil = 19.0 x 1.5 x 2.050 x 14.400 = 841.3 kN
Bending Moment = 841.3 x 2.050 / 2 = 862.4 kNm

b) Section-② : L = 1.150(m)

Self Weight of Pile Cap = 24.5 x 1.800 x 1.200 x 14.400 = 762.0 kN
Bending Moment = 762.0 x (2.050 - 1.200 / 2) = 1105.0 kNm

Backfilling Soil = 19.0 x 1.5 x 1.200 x 14.400 = 492.5 kN
Bending Moment = 492.5 x (2.050 - 1.200 / 2) = 714.1 kNm

ii) Pile Reaction

$Sp = \Sigma(Vi)$

$Mp = \Sigma(Vi \cdot xi)$

Sp : Total Pile Reaction per each Section
Mp : Bending Moment per each Section(kN.m)
Vi : Each Pile Reaction(kN)
xi : Distance from center of Pile to Section(m)
Nos. of Pile: 5 Nos

a) Section-①

x = 0.850 m

		Sp(kN)	Mp(kN.m)
Service Load Design	Group-I	11561.6	9827.3
	Group-III	11837.3	10061.7
	Group-VI	11906.4	10120.4
Load Factor Design	Group-I	16860.4	14331.3
	Group-III	15392.0	13083.2
	Group-VI	13401.2	11391.0
Seismic Design		19128.9	16259.5

2） Section-②

x = 0.000 m

		Sp(kN)	Mp(kN.m)
Service Load Design	Group-I	11561.6	0.0
	Group-III	11837.3	0.0
	Group-VI	11906.4	0.0
Load Factor Design	Group-I	16860.4	0.0
	Group-III	15392.0	0.0
	Group-VI	13401.2	0.0
Seismic Design		19128.9	0.0

c)Summary of Sectional Force for Service Limit State

S＝Sp－ΣW

M＝Mp－Σ(W・x)

1） Section-①

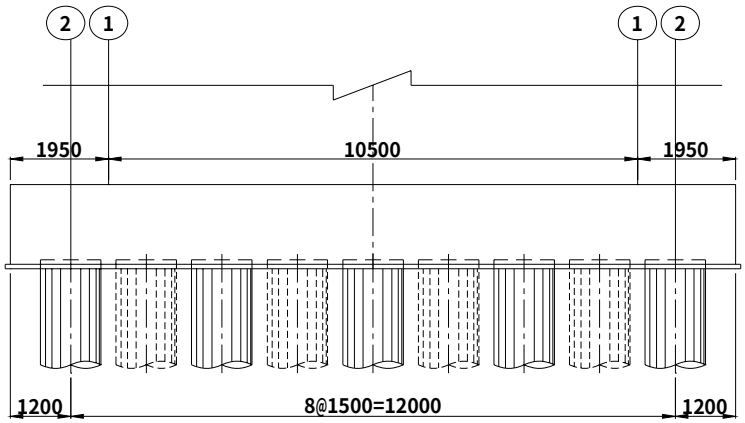
		Sp (kN)	Mp (kN.m)	ΣW (kN)	ΣWx (kN.m)	S (kN)	M (kN.m)
Service Load Design	Group-I	11561.6	9827.3	2143.2	2196.7	9418.4	7630.6
	Group-III	11837.3	10061.7	2143.2	2196.7	9694.1	7864.9
	Group-VI	11906.4	10120.4	2143.2	2196.7	9763.2	7923.7
Load Factor Design	Group-I	16860.4	14331.3	2143.2	2196.7	14717.2	12134.6
	Group-III	15392.0	13083.2	2143.2	2196.7	13248.8	10886.4
	Group-VI	13401.2	11391.0	2143.2	2196.7	11258.0	9194.2
Seismic Design		19128.9	16259.5	2143.2	2196.7	16985.7	14062.8

2） Section-②

		Sp (kN)	Mp (kN.m)	ΣW (kN)	ΣWx (kN.m)	S (kN)	M (kN.m)
Service Load Design	Group-I	11561.6	0.0	1254.5	1819.1	10307.0	-1819.1
	Group-III	11837.3	0.0	1254.5	1819.1	10582.7	-1819.1
	Group-VI	11906.4	0.0	1254.5	1819.1	10651.9	-1819.1
Load Factor Design	Group-I	16860.4	0.0	1254.5	1819.1	15605.9	-1819.1
	Group-III	15392.0	0.0	1254.5	1819.1	14137.4	-1819.1
	Group-VI	13401.2	0.0	1254.5	1819.1	12146.6	-1819.1
Seismic Design		19128.9	0.0	1254.5	1819.1	17874.3	-1819.1

(2)Transverse Direction

i) Self Weight of Pile Cap and Buoyancy



a) Section-①

Self Weight of Pile Cap = 24.5 x 1.800 x 1.950 x 7.600 = 653.6 kN
Bending Moment = 653.6 x 1.950 / 2 = 637.2 kNm

Backfilling Soil = 19.0 x 1.5 x 1.950 x 7.600 = 422.4 kN
Bending Moment = 422.4 x 1.950 / 2 = 411.8 kNm

b) Section-② : L = 1.150(m)

Self Weight of Pile Cap = 24.5 x 1.800 x 1.200 x 7.600 = 402.2 kN
Bending Moment = 402.2 x (1.950 - 1.200 / 2) = 543.0 kNm

Backfilling Soil = 19.0 x 1.5 x 1.200 x 7.600 = 259.9 kN
Bending Moment = 259.9 x (1.950 - 1.200 / 2) = 350.9 kNm

ii) Pile Reaction

Sp＝Σ(Vi)

Mp＝Σ(Vi・xi)

Sp : Total Pile Reaction per each Section
Mp : Bending Moment per each Section(kN.m)
Vi : Each Pile Reaction(kN)
xi : Distance from center of Pile to Section(m)
Nos. of Pile: 2 Nos

a) Section-①

x = 0.850 m

		Sp(kN)	Mp(kN.m)
Service Load Design	Group-I	4435.9	3770.5
Load Factor Design	Group-I	6453.7	5485.6
Seismic Design		7819.9	6646.9

2） Section-②

x = 0.000 m

		Sp(kN)	Mp(kN.m)
Service Load Design	Group-I	4435.9	0.0
Load Factor Design	Group-I	6453.7	0.0
Seismic Design		7819.9	0.0

c)Summary of Sectional Force for Service Limit State

S＝Sp－ΣW

M＝Mp－Σ(W・x)

1） Section-①

		Sp (kN)	Mp (kN.m)	ΣW (kN)	ΣWx (kN.m)	S (kN)	M (kN.m)
Service Load Design	Group-I	4435.9	3770.5	1075.9	1049.0	3360.0	2721.5
Load Factor Design	Group-I	6453.7	5485.6	1075.9	1049.0	5377.7	4436.6
Seismic Design		7819.9	6646.9	1075.9	1049.0	6743.9	5597.9

2） Section-②

		Sp (kN)	Mp (kN.m)	ΣW (kN)	ΣWx (kN.m)	S (kN)	M (kN.m)
Service Load Design	Group-I	4435.9	0.0	662.1	893.9	3773.8	-893.9
Load Factor Design	Group-I	6453.7	0.0	662.1	893.9	5791.6	-893.9
Seismic Design		7819.9	0.0	662.1	893.9	7157.8	-893.9

2) Summary of Sectional Force

Section-①

		Longitudinal Direction		Transverse Direction	
		M(kNm)	S(kN)	M(kNm)	S(kN)
Service Load Design	Group-I	7630.6	9418.4	2721.5	3360.0
	Group-III	7864.9	9694.1	-	-
	Group-VI	7923.7	9763.2	-	-
Load Factor Design	Group-I	12134.6	14717.2	4436.6	5377.7
	Group-III	10886.4	13248.8	-	-
	Group-VI	9194.2	11258.0	-	-
Seismic Design		14062.8	16985.7	5597.9	6743.9

Section-②

		Longitudinal Direction		Transverse Direction	
		M(kNm)	S(kN)	M(kNm)	S(kN)
Service Load Design	Group-I	-1819.1	10307.0	-893.9	3773.8
	Group-III	-1819.1	10582.7	-	-
	Group-VI	-1819.1	10651.9	-	-
Load Factor Design	Group-I	-1819.1	15605.9	-893.9	5791.6
	Group-III	-1819.1	14137.4	-	-
	Group-VI	-1819.1	12146.6	-	-
Seismic Design		-1819.1	17874.3	-893.9	7157.8

3) Calculation of Stress for Service Load Design and Seismic Design

Stress Equation

$$\sigma_c = \frac{M}{\frac{b \cdot x}{2} \cdot \left(\frac{h}{2} - \frac{x}{3}\right) + n \cdot As' \cdot \frac{(x-d') \cdot (h/2-d')}{x} + n \cdot As \cdot \frac{(x-d) \cdot (h/2-d)}{x}}$$

$$\sigma_s = n \cdot \sigma_c \cdot \frac{d-x}{x}$$

$$x^2 + \frac{2 \cdot n}{b} \left\{As' \cdot (x-d') + As \cdot (x-d)\right\} = 0.0$$

in which,

x : Distance from edge on compression side to neutral axis (mm)
h : Height of Member (mm)
b : Width in section (mm)
d : Effective height (mm)
d' : Concrete Cover (mm)
As : Sectional area of reinforcing bar arranged on tension side (mm^2)
As': Sectional area of reinforcing bar arranged on compression side (mm^2)
n : Elastic Modulus Ratio of Reinforce and Concrete , n = 15.00
σc: Compressive Stress of Concrete (N/mm^2)
σs: Tensile Stress of Reinforcing (N/mm^2)
M: Bending Moment (kN.m)

Bar Arrangement

		Longitudinal Direction	Transverse Direction
Dimension	b(mm)	1000	1000
	h(mm)	1800	1800
	d1(mm)	1550	1580
	d2(mm)	-	-
Bar Arrangement	As1(mm^2)	59-D32 47451	31-D28 19088
	As2(mm^2)	-	-

Calculation Result of Bending Stress

		Longitudinal Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	7630.6	0.0	1.91	101.75	9.60	168.00	OK
	Group-III	7864.9	0.0	1.99	105.48	12.00	210.00	OK
	Group-VI	7923.7	0.0	2.00	106.42	12.00	210.00	OK
Sesmic Design		14062.8	0.0	3.84	204.28	20.40	378.00	OK

		Transverse Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	2721.5	0.0	1.20	82.75	9.60	168.00	OK
Sesmic Design		5597.9	0.0	2.67	318.53	20.40	378.00	OK

4) Calculation of Strength for Load Factor Design

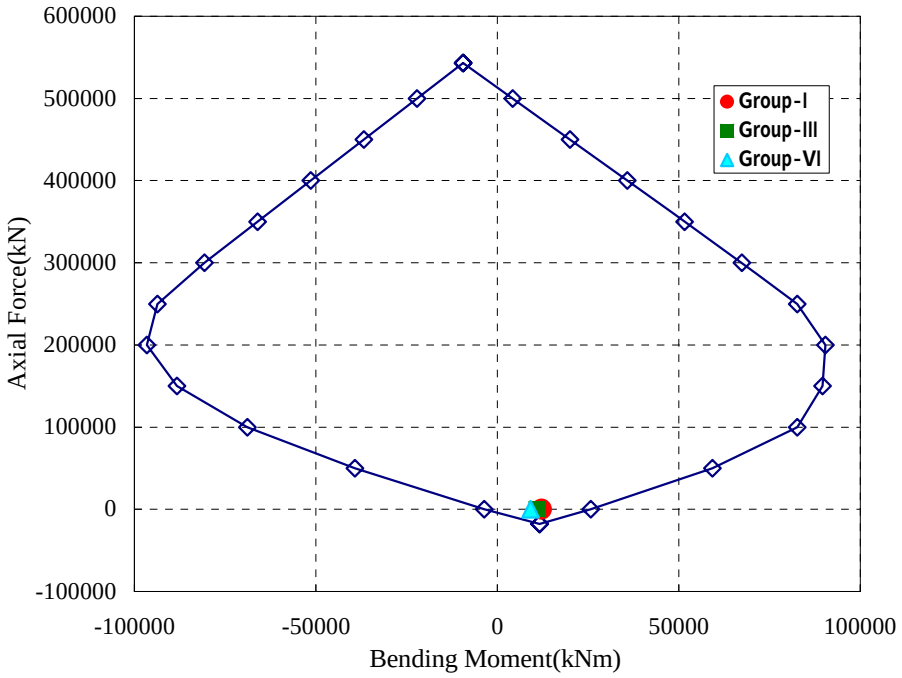
*) Flexural Strength

Longitudinal Direction

Factored Sectional Force for Load Factor Design

		Bending Moment	Axial Force
Load Factor Design	Group-I	12134.6 kNm	0.0 kN
	Group-III	10886.4 kNm	0.0 kN
	Group-VI	9194.2 kNm	0.0 kN

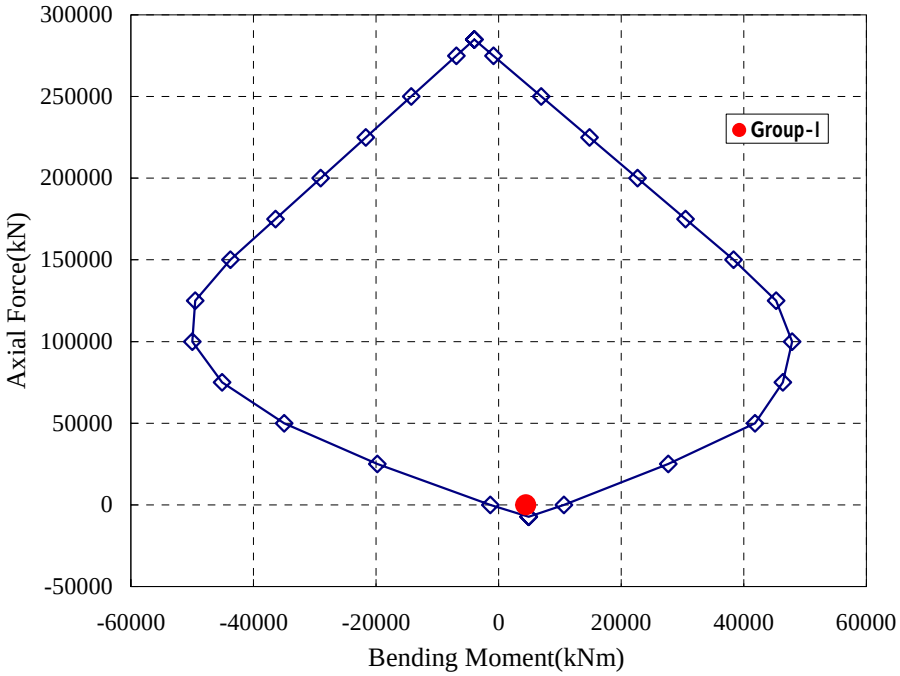
Interaction of Longitudinal Direction



Transverse Direction

Factored Sectional Force for Load Factor Design

		Bending Moment	Axial Force
Load Factor Design	Group-I	4436.6 kNm	0.0 kN



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

Vn= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=1/6x $\sqrt{}$ f'c)

= 1/6 x $\sqrt{}$ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

		Longitudinal Direction	Transverse Direction
Load Factor Design	Group-I	14717.2 kN	5791.6 kN
	Group-III	13248.8 kN	- kN
	Group-VI	11258.0 kN	- kN
Seismic Design		16985.7 kN	7157.8 kN

Calculation of Shear Strength

vc = $1/6 \times \sqrt{f'c} = 1/6 \times \sqrt{(24)} = 0.816 N/mm^2$ -> $816 kN/m^2$

fy = 420 N/mm^2 -> 420000 kN/m^2

s = 1.000 m

Longitudinal Direction

		Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Load Factor Design	Group-I	14717.2	14.400	1.650	16479.94	0.00	0.0
	Group-III	13248.8	14.400	1.650	16479.94	0.00	0.0
	Group-VI	11258.0	14.400	1.650	16479.94	0.00	0.0
Seismic Design		16985.7	14.400	1.650	16479.94	595.01	858.6

Arrangement of Stirrup D16 -ctc.500 11581.2 mm^2/m > 858.6 mm^2/m

Transverse Direction

		Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Load Factor Design	Group-I	5791.6	7.600	1.650	8697.74	0.00	0.0
Seismic Design		7157.8	7.600	1.650	8697.74	0.00	0.0

Arrangement of Stirrup D16 -ctc.500 6112.3 mm^2/m > 0 mm^2/m

2.5 Design of Wall

2.5.1 Summary of Sectional Force at Base of Wall

		Longitudinal Direction			Transverse Direction		
		N(kN)	S(kN)	M(kNm)	N(kN)	S(kN)	M(kNm)
Service Load Design	Group-I	21156.3	0.0	3302.1	21156.3	0.0	0.0
	Group-II	15646.3	0.0	2395.1	15646.3	0.0	0.0
	Group-III	21156.3	130.0	4726.9	21156.3	0.0	0.0
	Group-IV	21396.3	0.0	3186.1	21396.3	0.0	0.0
	Group-V	15886.3	0.0	2279.1	15886.3	0.0	0.0
	Group-VI	21396.3	130.0	4610.9	21396.3	0.0	0.0
Load Factor Design	Group-I	32302.5	0.0	5082.8	32302.5	0.0	0.0
	Group-II	20340.2	0.0	3113.7	20340.2	0.0	0.0
	Group-III	27503.2	169.0	6145.0	27503.2	0.0	0.0
	Group-IV	27815.2	0.0	4142.0	27815.2	0.0	0.0
	Group-V	19857.9	0.0	2848.9	19857.9	0.0	0.0
	Group-VI	22647.9	130.0	4499.5	22647.9	0.0	0.0
Seismic Design		19729.0	7263.0	31577.0	16207.0	3815.0	76670.0

*) Sectional Force of Seismic Design is Calculated by Dynamic Analysis.

2.5.2 Calculation of Stress for Service Load Design and Seismic Design

Stress Equation

$$\sigma_c = \frac{N}{\frac{b \cdot x}{2} - n \cdot As \cdot \frac{d-x}{x} + n \cdot As' \cdot \frac{x-d'}{x}}$$

$$\sigma_s = n \cdot \sigma_c \cdot \frac{d-x}{x}$$

$$x^3 - 3 \cdot \left(\frac{h}{2}-e\right) \cdot x^2 - \frac{6n}{b}\left\{As' \cdot \left(\frac{h}{2}-d'-e\right) + As \cdot \left(\frac{h}{2}-d-e\right)\right\} \cdot x + \frac{6n}{b}\left\{As' \cdot d' \cdot \left(\frac{h}{2}-d'-e\right) + As \cdot d \cdot \left(\frac{h}{2}-d-e\right)\right\} = 0.0$$

in which,

x : Distance from edge on compression side to neutral axis (mm)
h : Height of Member (mm)
b : Width in section (mm)
d : Effective height (mm)
d' : Concrete Cover (mm)
As : Sectional area of reinforcing bar arranged on tension side (mm^2)
As': Sectional area of reinforcing bar arranged on compression side (mm^2)
n : Elastic Modulus Ratio of Reinforce and Concrete , n = 15.00
e : Axis force eccentric distance (mm)
σc: Compressive Stress of Concrete (N/mm^2)
σs: Tensile Stress of Reinforcing (N/mm^2)
M: Bending Moment (kN.m)
N : Axial Force (kN)

Bar Arrangement

		Longitudinal Direction	Transverse Direction
Dimension	b(mm)	10500	3500
	h(mm)	3500	10500
	d1(mm)	3400	10400
Bar Arrangement	As1(mm^2)	43-D28 26477	15-D28 9908

Calculation Result of Bending Stress

		Longitudinal Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	3302.1	21156.3	0.50	-4.60	9.60	168.00	OK
	Group-II	2395.1	15646.3	0.40	-3.40	12.00	210.00	OK
	Group-III	4726.9	21156.3	0.60	-3.90	12.00	210.00	OK
	Group-IV	3186.1	21396.3	0.50	-4.70	12.00	210.00	OK
	Group-V	2279.1	15886.3	0.40	-3.50	13.44	235.20	OK
	Group-VI	4610.9	21396.3	0.60	-4.00	13.44	235.20	OK
Seismic Design		31577.0	19729.0	3.10	73.40	20.40	378.00	OK

		Transverse Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	0.0	21156.3	0.60	-8.50	9.60	168.00	OK
	Group-II	0.0	15646.3	0.40	-6.30	12.00	210.00	OK
	Group-III	0.0	21156.3	0.60	-8.50	12.00	210.00	OK
	Group-IV	0.0	21396.3	0.60	-8.50	12.00	210.00	OK
	Group-V	0.0	15886.3	0.40	-6.30	13.44	235.20	OK
	Group-VI	0.0	21396.3	0.60	-8.50	13.44	235.20	OK
Seismic Design		76670.0	16207.0	3.10	103.10	19.20	378.00	OK

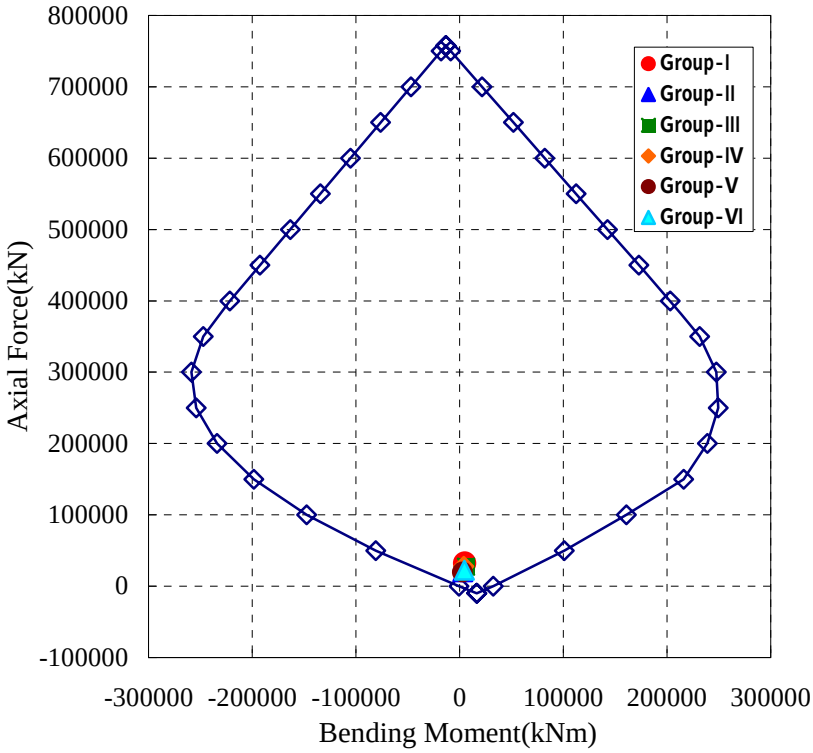
(6) Calculation of Strength for Load Factor Design

*) Flexural Strength

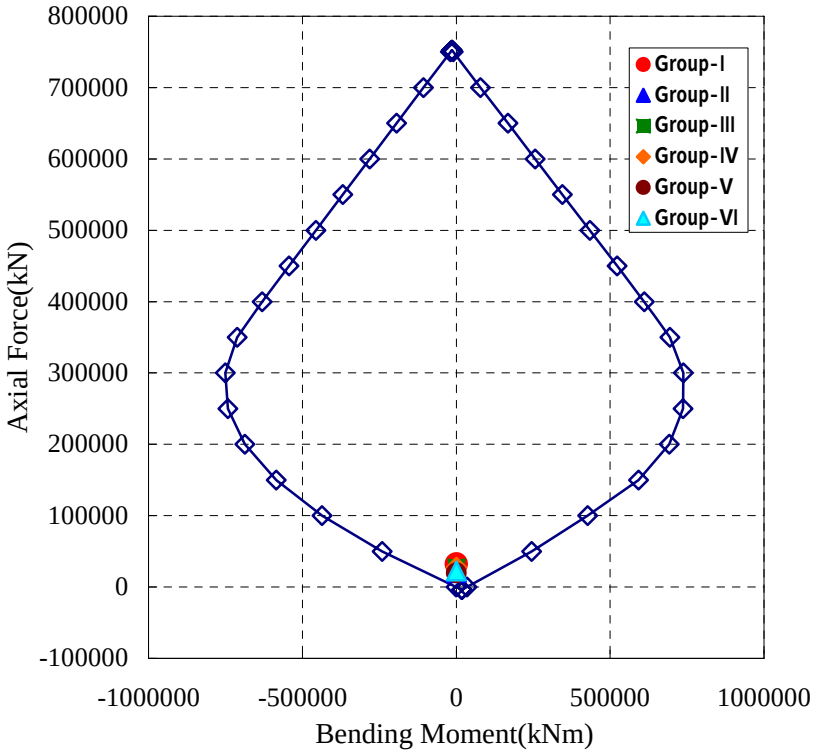
Factored Sectional Force for Load Factor Design

	Longitudinal Direction		Transverse Direction	
	M(kNm)	N(kN)	M(kNm)	N(kN)
Group-I	5082.8	32302.5	0.0	32302.5
Group-II	3113.7	20340.2	0.0	20340.2
Group-III	6145.0	27503.2	0.0	27503.2
Group-IV	4142.0	27815.2	0.0	27815.2
Group-V	2848.9	19857.9	0.0	19857.9
Group-VI	4499.5	22647.9	0.0	22647.9

Interaction of Longitudinal Direction



Interaction of Transverse Direction



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

Vn= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=0.08 $\sqrt{}$ f'c)

= 0.08 $\sqrt{}$ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

	Longitudinal Direction	Transverse Direction
Group-I	0.0 kN	0.00 kN
Group-II	0.0 kN	0.00 kN
Group-III	169.0 kN	0.00 kN
Group-IV	0.0 kN	0.00 kN
Group-V	0.0 kN	0.00 kN
Group-VI	130.0 kN	0.00 kN

Calculation of Shear Strength

vc = 1/6x $\sqrt{}$ f'c = 1/6x $\sqrt{}$ (24) = 0.816N/mm^2 -> 816kN/m^2

fy = 420 N/mm^2 -> 420000 kN/m^2

s = 1.000 m

Longitudinal Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	0.0	10.500	3.400	24761.5	0.0	0.0
Group-II	0.0	10.500	3.400	24761.5	0.0	0.0
Group-III	169.0	10.500	3.400	24761.5	0.0	0.0
Group-IV	0.0	10.500	3.400	24761.5	0.0	0.0
Group-V	0.0	10.500	3.400	24761.5	0.0	0.0
Group-VI	130.0	10.500	3.400	24761.5	0.0	0.0

Arrangement of Stirr D16 -ctc.150 16085 mm^2/m > 0 mm^2/m

Transverse Direction

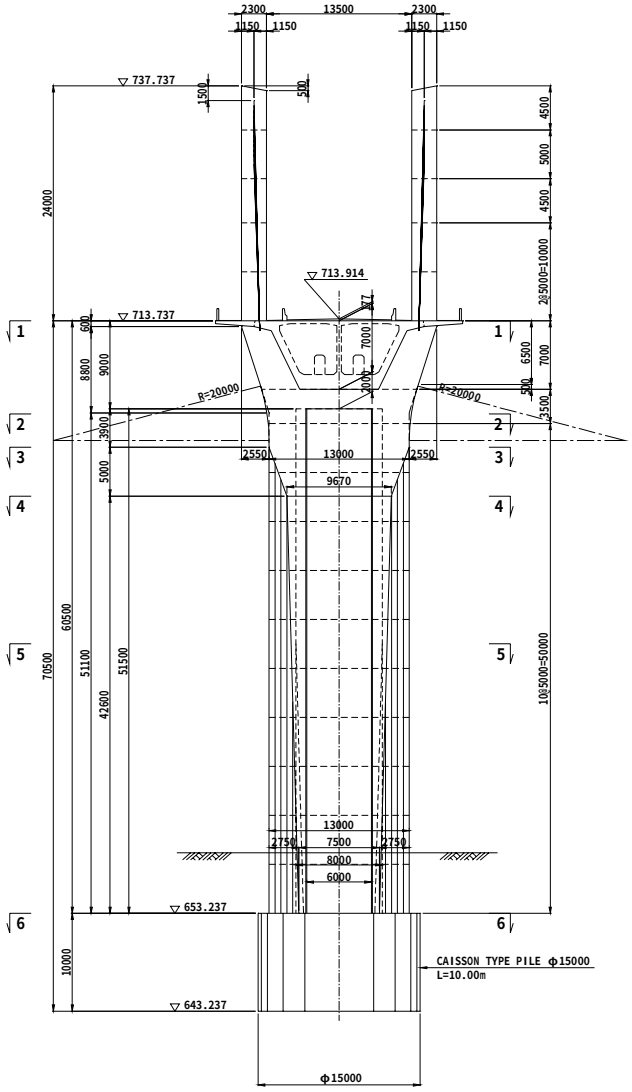
	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	0.0	3.500	10.400	25247.0	0.0	0.0
Group-II	0.0	3.500	10.400	25247.0	0.0	0.0
Group-III	0.0	3.500	10.400	25247.0	0.0	0.0
Group-IV	0.0	3.500	10.400	25247.0	0.0	0.0
Group-V	0.0	3.500	10.400	25247.0	0.0	0.0
Group-VI	0.0	3.500	10.400	25247.0	0.0	0.0

Arrangement of Stirr D16 -ctc.150 4021 mm^2/m > 0 mm^2/m

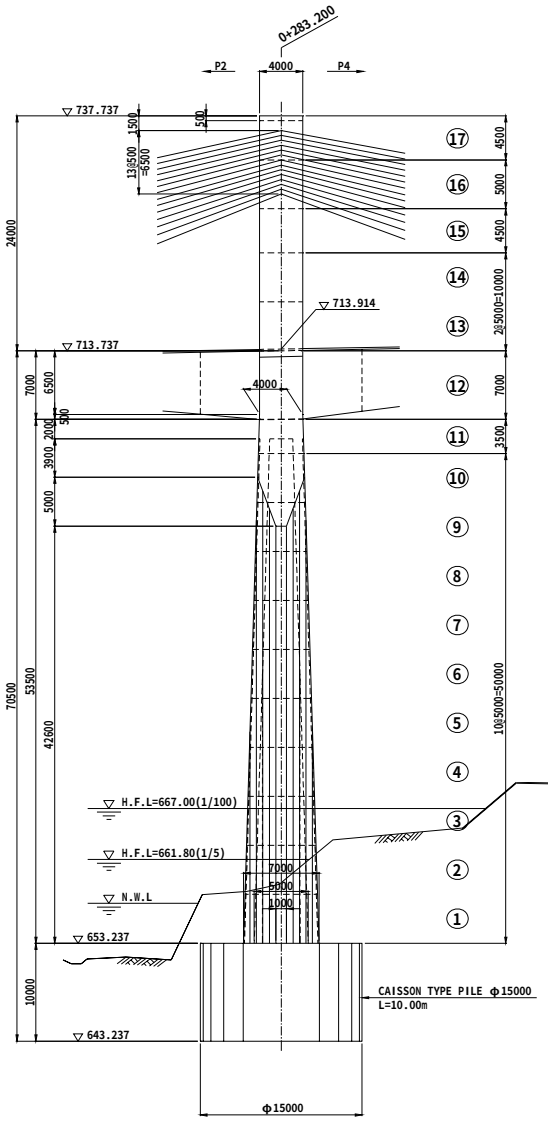
3. Design of P3 Pier

3.1 General Arrangement

Front Elevation

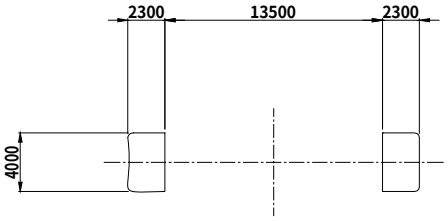


SIde Elevation

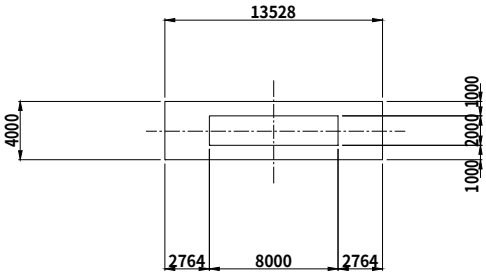


Plan

1 - 1



2 - 2



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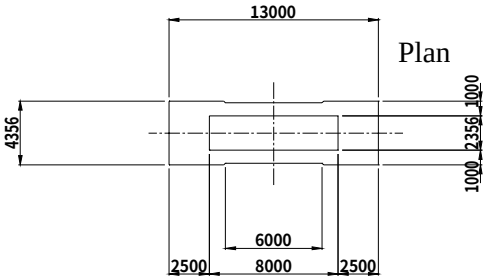

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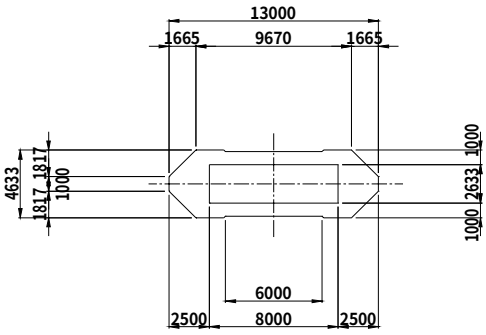

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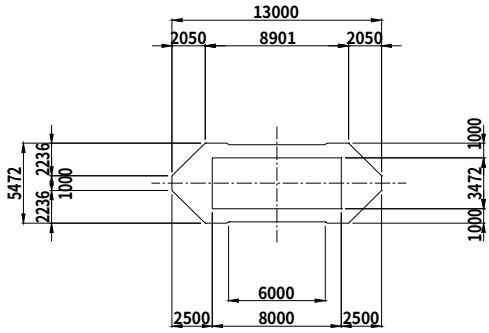
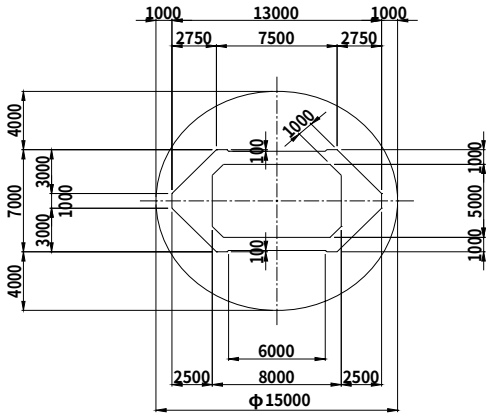
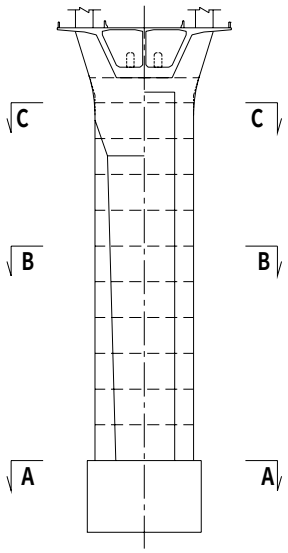


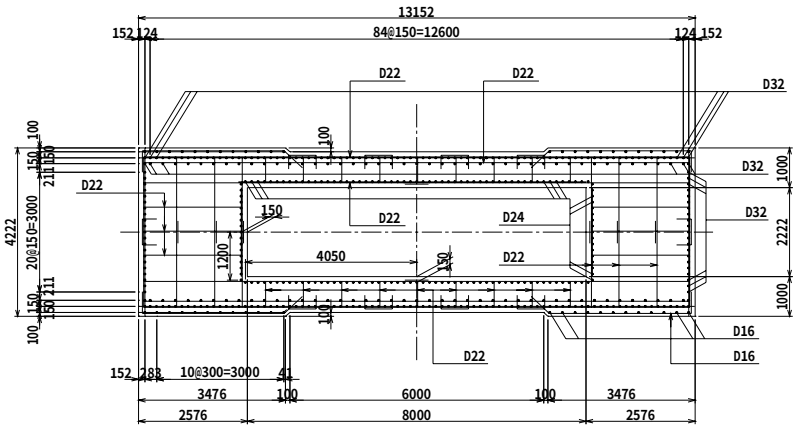
6 - 6



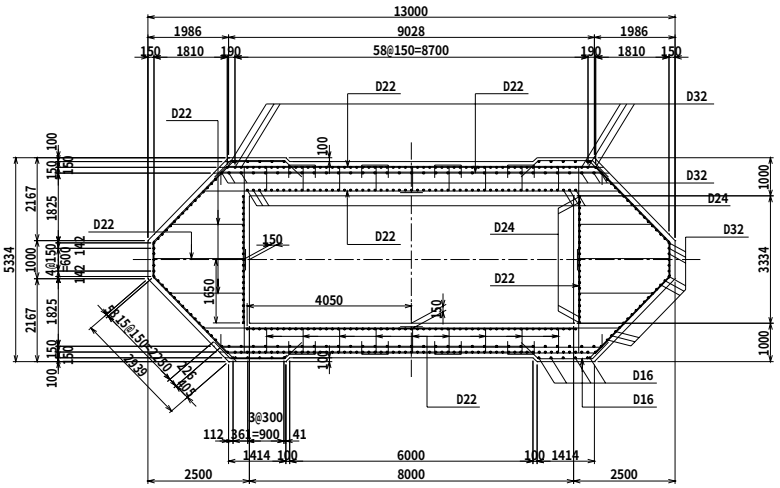
3.2 Bar Arrangement



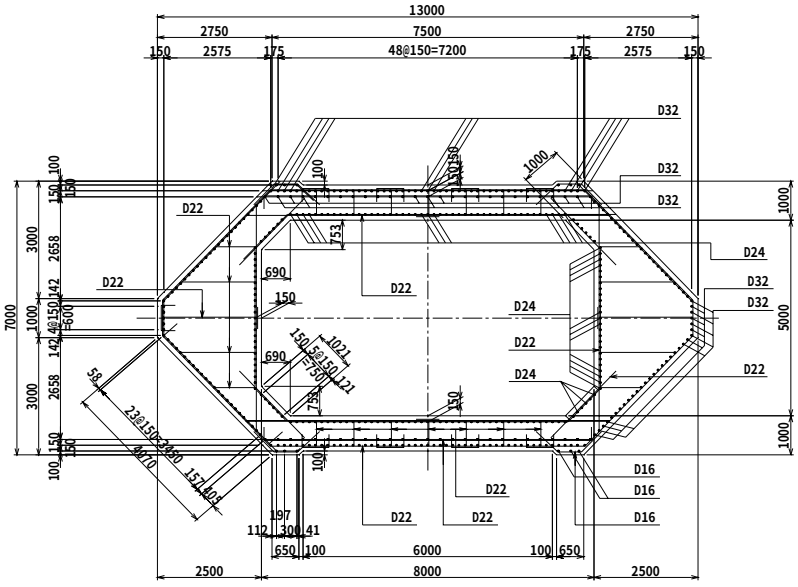
C - C



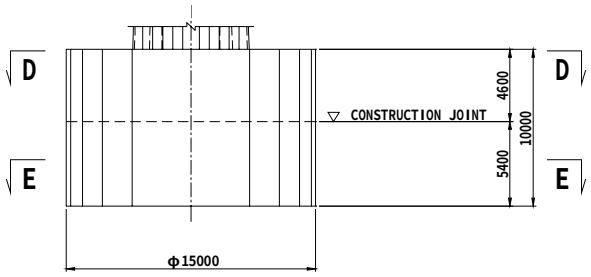
B - B

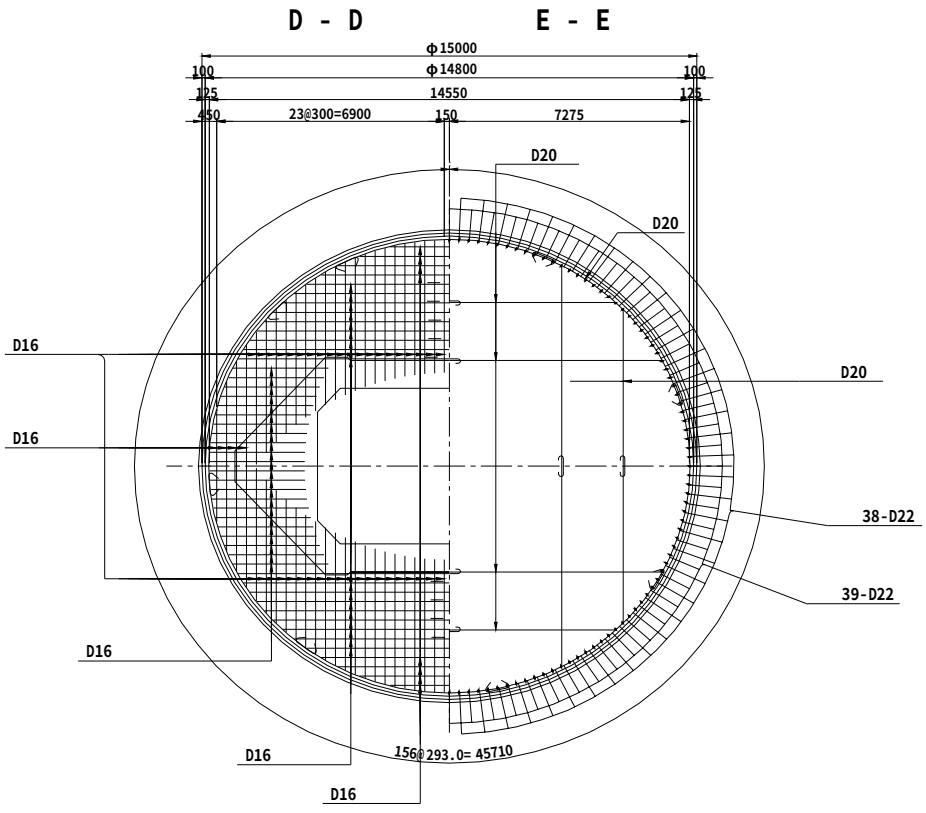


A - A



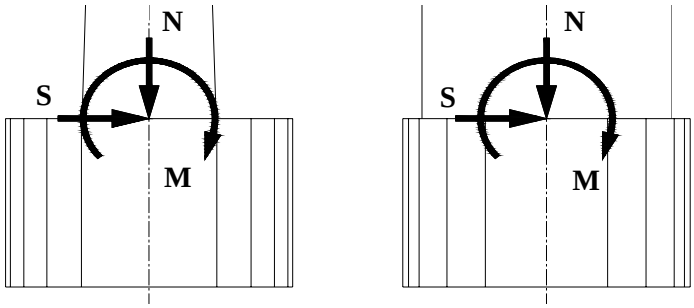
Shinso Foudation





3.3 Design of Wall

3.3.1 Sectional Force at Bottom of Wall from Static Analysis



Symbol	Description	Sectional Force					
		Longitudinal Direction			Transverse Direction		
		M(kNm)	S(kN)	N(kN)	M(kNm)	S(kN)	N(kN)
D	Self Weight	609	0	162122	0	0	162122
D	Surfacing	73	0	11435	0	0	11435
D	Prestress	-75	0	537	0	0	537
D	Creep Effect	-18	0	-161	0	0	-161
L	Live Load (Mmax)	36577	0	2840	0	0	2840
L	Live Load (Mmin)	-36552	0	2842	0	0	2842
L	Live Load (Nmax)	-16	0	5804	0	0	5804
L	Live Load (Nmin)	0	0	0	0	0	0
CF	Centrifugal Force	0	0	0	0	0	0
E	Earth Pressure	0	0	0	0	0	0
B	Buoyancy	0	0	0	0	0	0
SF	Stream Flow Pressure	0	0	0	9152	953	0
W	Wind Load	0	0	0	165674	2938	0
WL	Wind Load on Live Load	0	0	0	61126	1074	0
LF	Longitudinal Force	16541	265	0	0	0	0
S	Shrinkage	-309	0	-945	0	0	0
T	Temparature Rise	120	0	284	0	0	0
T	Temparature Down	-120	0	-284	0	0	0

3.3.2 Combination Load for Service Load Design

Group		Longitudinal Direction				Transverse Direction			
		M(kNm)	S(kN)	N(kN)	Calc.Stress	M(kNm)	S(kN)	N(kN)	Calc.Stress
I	Mmax	37166	0	176772	Calc.	9152	953	176772	-
	Mmin	-35963	0	176774	-	9152	953	176774	-
	Nmin	589	0	173932	-	9152	953	173932	-
II		589	0	173932	-	174827	3892	173932	Calc.
III	Mmax	53707	265	176772	Calc.	119981	2908	176772	-
	Mmin	-52504	-265	176774	-	119981	2908	176774	-
	Nmin	17114	265	179736	-	119981	2908	179736	-
IV	Mmax	36977	0	176111	-	9152	953	176772	-
	Mmin	-36392	0	175544	-	9152	953	176774	-
	Nmin	144	0	178506	-	9152	953	179736	-
V		401	0	173271	-	174827	3892	173932	-
VI	Mmax	53518	265	176111	-	119981	2908	176772	-
	Mmin	-52933	-265	175544	Calc.	119981	2908	176774	-
	Nmin	16926	265	179075	-	119981	2908	179736	-

3.3.3 Combination Load for Load Factor Design

Group		Longitudinal Direction				Transverse Direction			
		M(kNm)	S(kN)	N(kN)	Check	M(kNm)	S(kN)	N(kN)	Check
I	Mmax	80174	0	232277	Check	11898	1239	229804	-
	Mmin	-78588	0	232282	-	11898	1239	229806	-
	Nmin	732	0	238712	-	11898	1239	233657	-
II		766	0	226111	-	227274	5059	226111	Check
III	Mmax	69819	345	229804	Check	155975	3781	229804	-
	Mmin	-68255	-345	229806	-	155975	3781	229806	-
	Nmin	22249	345	233657	-	155975	3781	233657	-
IV	Mmax	48071	0	228945	-	11898	1239	229804	-
	Mmin	-46997	0	228947	-	11898	1239	229806	-
	Nmin	500	0	232798	-	11898	1239	233657	-
V		501	0	216589	-	218533	4865	217415	-
VI	Mmax	66898	331	220139	-	149976	3636	220965	-
	Mmin	-66166	-331	219430	Check	149976	3636	220967	-
	Nmin	21157	331	223844	-	149976	3636	224670	-

3.3.4 Sectional Force for Seismic Design from Dynamic Analysis

	Longitudinal Direction			Transverse Direction		
	M(kNm)	S(kN)	N(kN)	M(kNm)	S(kN)	N(kN)
Seismic Design	681228	19750	176460	704291	15386	172987

3.3.5 Calculation of Wind Effect

1) Design Wind Velocity

Ud= 30 m/s

2) Design Wind Pressure

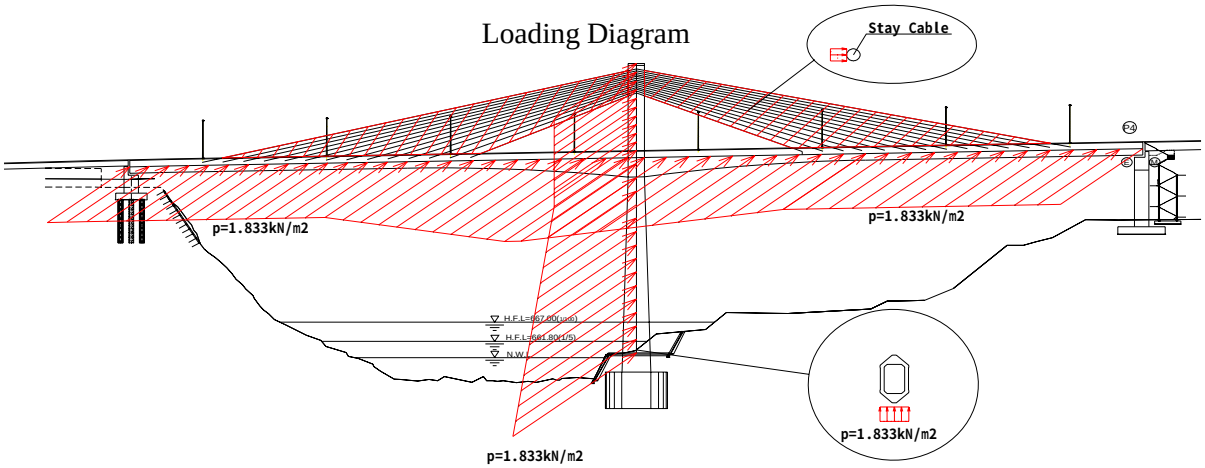
$p = 1/2 \times \rho U_d^2 \times Cd \times G$

in which

p:	Design Wind Pressure		kN/m^2
ρ:	Density of Air	= 1.23	kg/m^3
Cd:	Coefficient of Resistance		1.7
G:	Coefficient of Response		1.9

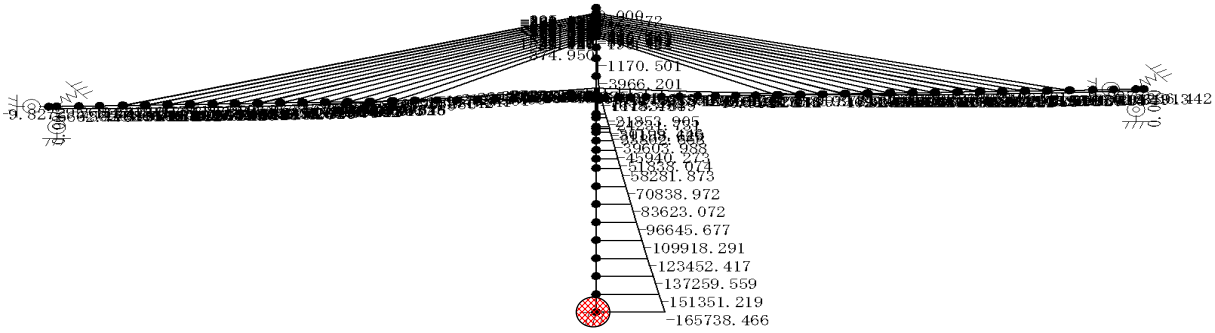
$p = 1/2 \times 1.23 \times 30^2 \times 1.7 \times 1.9 = 1833\ kN/m^2$

Loading Diagram



3) Calculation Result of Wind Effect

Bending Moment Diagram

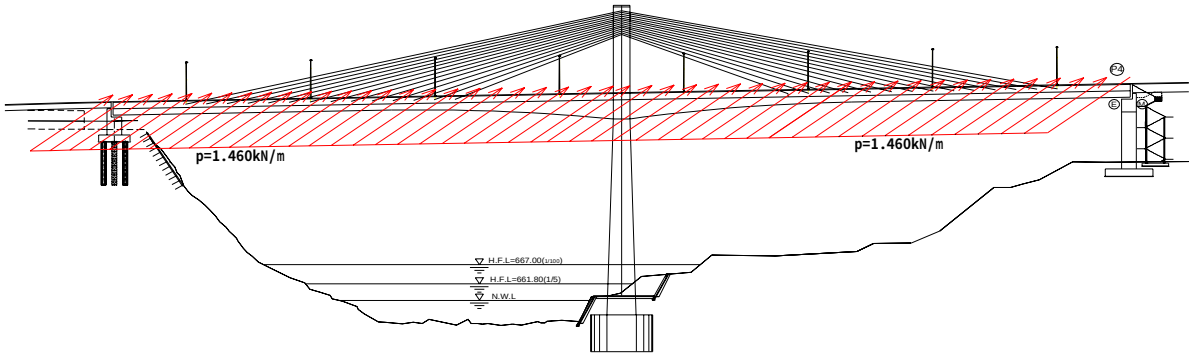


Sectional Force at Bottom of Wall M= 165674.4 kNm

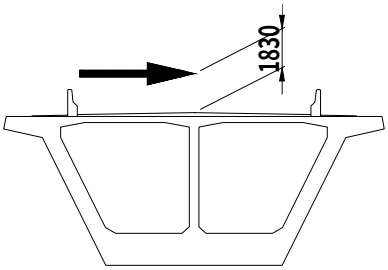
S= 2938.4 kN

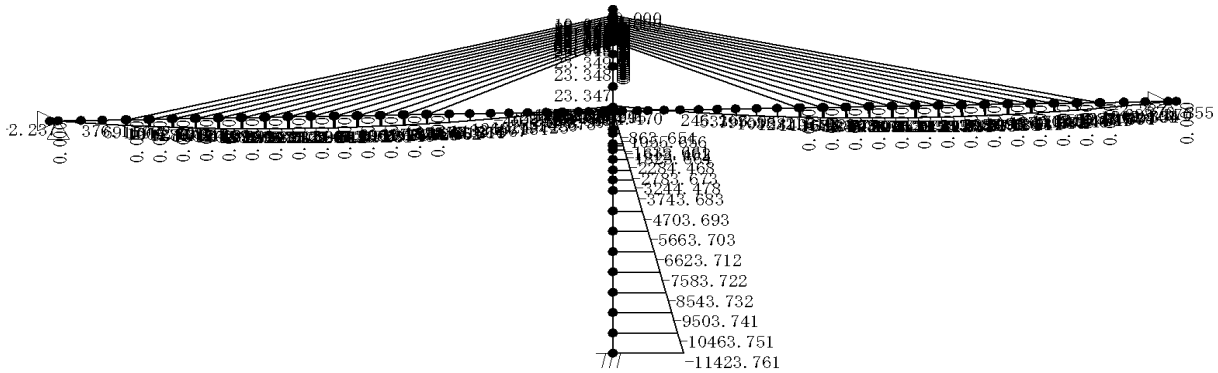
4) Calculation of Wind Load on Live Load

Wind Load on Live Load P= 1.460 kN/m



Wind Load on Live Load is above 1.830m from Surface of Girder





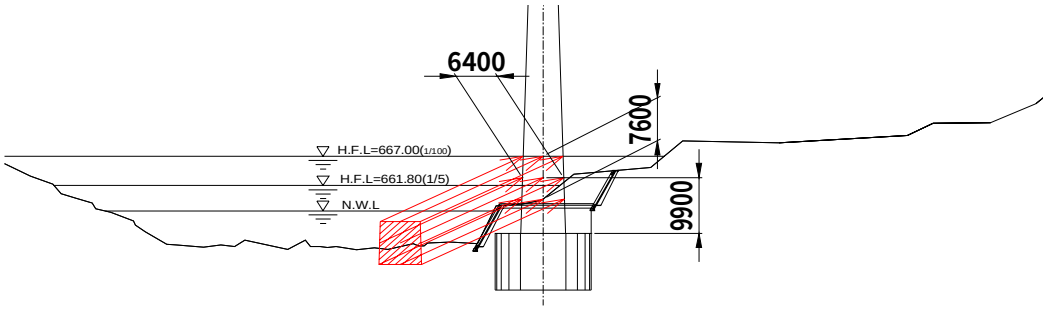
Sectional Force at Bottom of Wall M= 11423.8 kNm

S= 192.0 kN

3.3.6 Calculation of Stream Flow Effect

1) Design Stream Flow Pressure p= 19.6 kN/m2

2) Loading Area



3) Sectional Force of Stream Flow at Bottom of Wall

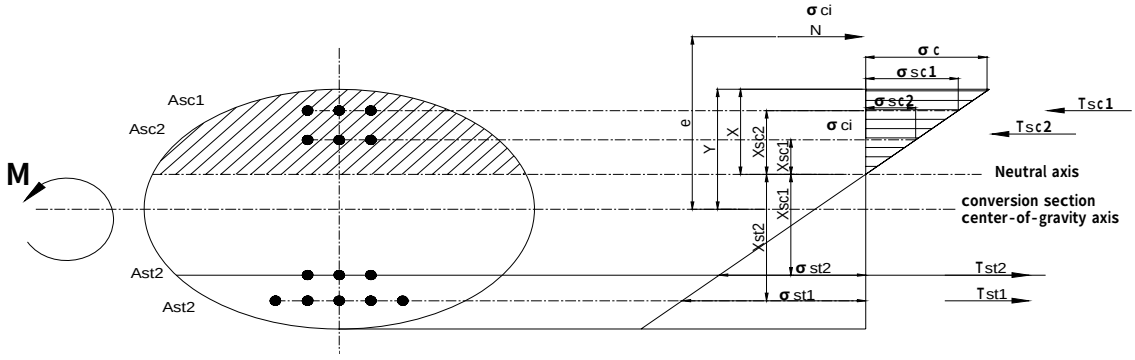
S= 19.6 x 6.4 x 7.6 = 953.3 kN
M= 953.3 x 9.9 = 9438.1 kNm

3.3.7 Summary of Sectional Force at Base of Wall

		Longitudinal Direction			Transverse Direction		
		N(kN)	S(kN)	M(kNm)	N(kN)	S(kN)	M(kNm)
Service Load Design	Group-I	176772	0	37166	-	-	-
	Group-II	-	-	-	173932	3892	174827
	Group-III	176772	265	53707	-	-	-
	Group-VI	175544	265	52933	-	-	-
Load Factor Design	Group-I	232277	0	80174	-	-	-
	Group-II	-	-	-	226111	5059	227274
	Group-III	229804	345	69819	-	-	-
	Group-VI	219430	331	66166	-	-	-
Seismic Design		176460	19750	681228	172987	15386	704291

*) Sectional Force of Seismic Design is Calculated by Dynamic Analysis.

3.3.8 Calculation of Stress for Service Load Design and Seismic Design



Stress Equation

$$\sigma c = \frac{0.001 \times n \times N \times X}{n \times Gst - Gc - n \times Gsc}$$

$$\sigma sci = n \times \sigma c \times Xsci / X$$

$$\sigma sti = n \times \sigma c \times Xsti / X$$

in which,

e : Axis force eccentric distance (mm) (e=M/N)

Tsc : Tsc = 1000 × n × σc × Gsc / X

Tst : Tst = 1000 × n × σc × Gst / X

X : Distance from edge on compression side to neutral axis (mm)

Xsc: Distance from gravity of re-bar on compressive side to neutral axis (mm)

Xst: Distance from gravity of re-bar on tensile side to neutral axis (mm)

Ast : Sectional area of reinforcing bar arranged on tension side (mm^2)

Asc: Sectional area of reinforcing bar arranged on compression side (mm^2)

n : Elastic Modulus Ratio of Reinforce and Concrete , n = 15.00

σc: Compressive Stress of Concrete (N/mm^2)

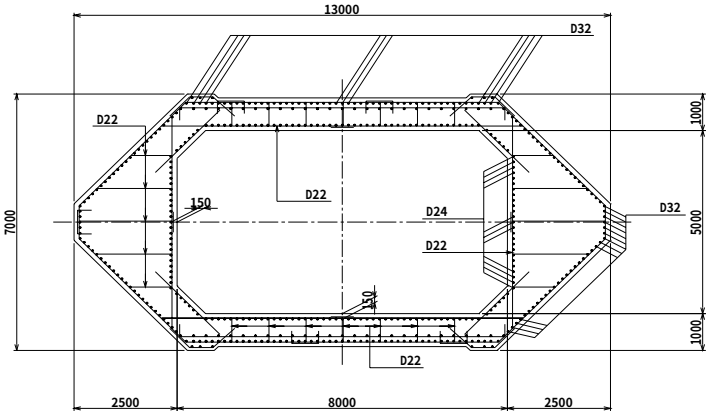
σst: Tensile Stress of Reinforcing (N/mm^2)

σsc: Compressive Stress of Reinforcing (N/mm^2)

N :Axial Force (kN)

M: Bending Moment (kN.m)

Bar Arrangement of Pylon



Calculation Result of Bending Stress

		Longitudinal Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	37166	176772	1.60	-13.50	9.60	168.00	OK
	Group-III	53707	176772	1.80	-10.70	12.00	210.00	OK
	Group-VI	52933	175544	1.80	-10.60	13.44	235.20	OK
Seismic Design		681228	176460	11.80	362.20	20.40	378.00	OK

		Transverse Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load	Group-II	174827	173932	1.00	-14.60	12.00	210.00	OK
Seismic Design		704291	172987	7.80	213.70	19.20	378.00	OK

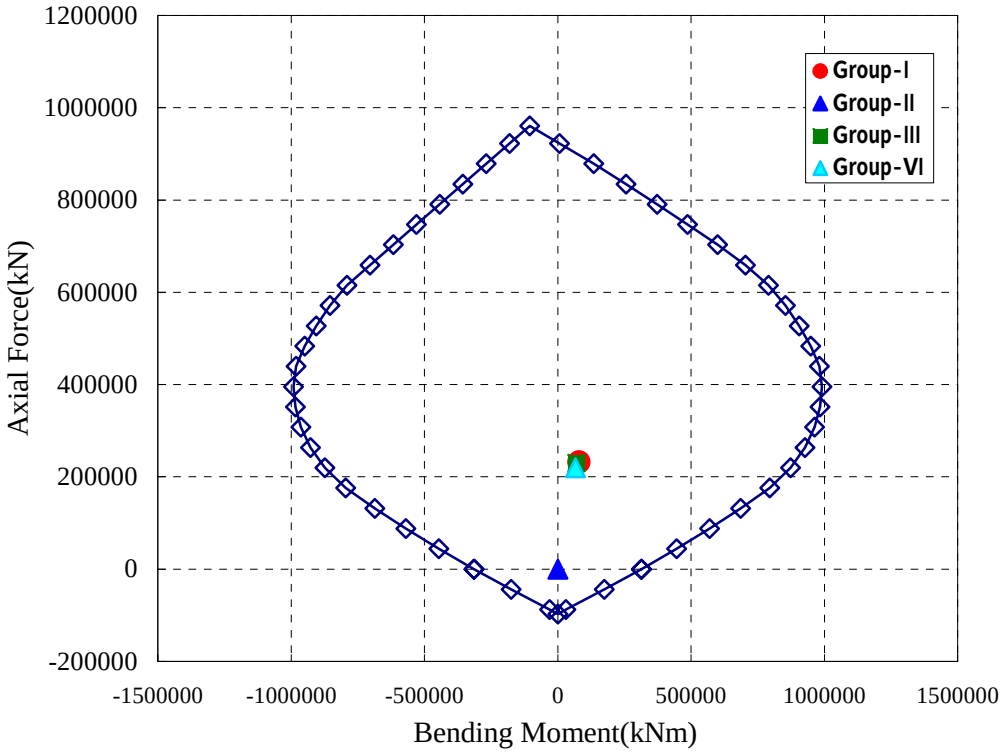
3.3.9 Calculation of Strength for Load Factor Design

*) Flexural Strength

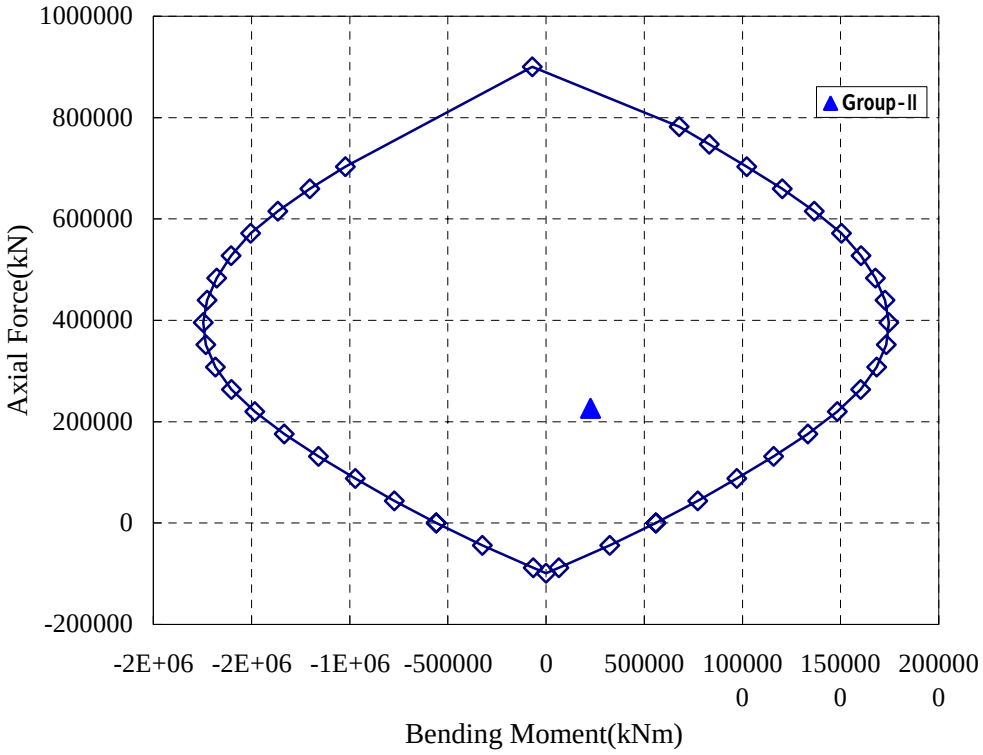
Factored Sectional Force for Load Factor Design

	Longitudinal Direction		Transverse Direction	
	M(kNm)	N(kN)	M(kNm)	N(kN)
Group-I	80174	232277	-	-
Group-II	-	-	227274	226111
Group-III	69819	229804	-	-
Group-VI	66166	219430	-	-

Interaction of Longitudinal Direction



Interaction of Transverse Direction



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

Vn= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=0.08 √ f'c)

= 0.08 √ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

	Longitudinal Direction	Transverse Direction
Group-I	0 kN	-
Group-II	-	5059 kN
Group-III	345 kN	-
Group-VI	331 kN	-
Seismic Design	19750 kN	15386 kN

Calculation of Shear Strength

vc = 1/6x √ f'c = 1/6x √ (24) = 0.816N/mm^2 -> 816kN/m^2

fy = 420 N/mm^2 -> 420000 kN/m^2

s = 1.000 m

Longitudinal Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	0.0	2.776	6.900	13285	0	0
Group-III	344.5	2.776	6.900	13285	0	0
Group-VI	331.3	2.776	6.900	13285	0	0
Seismic Design	19750.0	2.776	6.900	13285	7605	2624

Arrangement of Stirr D22 -ctc.150 10137 mm^2/m > 2624.3 mm^2/m

Transverse Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-II	5059.3	2.000	10.500	14566	0	0
Seismic Design	15386.0	2.000	10.500	14566	965	219

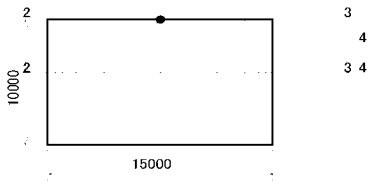
Arrangement of Stirr D22 -ctc.150 10137 mm^2/m > 218.9 mm^2/m

3.4 Design of Shinso Foundation

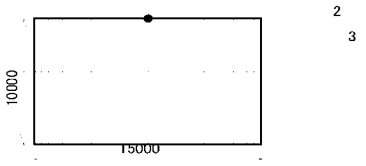
3.4.1 Design Criteria of Shinso Foundation

(1) Configuration of Shinso Foundation

Longitudinal Direction



Transverse Direction



(2) Material

【Concrete】 σck = 24 N/mm^2

【Reinforcement】 σsy = 420 N/mm^2

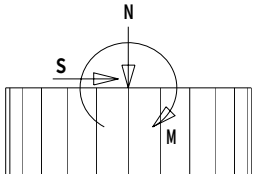
(3) Temporary Works

Liner Plate

(4) Soil Condition

Stratum	C (kN/m^2)	φ (deg)	γ (kN/m^3)	N value	E (kN/m^2)	Type of Soil	Class
1	30	0.0	14.0	5	14000	clay	
2	500	35.0	21.0	300	1200000	rock	weatherd
bottom	500	35.0	21.0		1200000		

(5) Acting Force



1) Resalt of Static Analysis

ⅰ) Service Load Design

Group	Longitudinal Direction			Transversal Direction		
	V (kN)	H (kN)	M (kN·m)	V (kN)	H (kN)	M (kN·m)
Ⅰ	176780	0	37170	176780	960	4350
Ⅱ	173940	0	590	173940	3900	170030
Ⅲ	176780	270	53710	176780	2910	115180
Ⅳ	176120	0	36980	176780	960	4350
Ⅴ	173280	0	410	173940	3900	170030
Ⅵ	176120	270	53520	176780	2910	115180

ⅱ) Load Factor Design

Group	Longitudinal Direction			Transversal Direction		
	V (kN)	H (kN)	M (kN·m)	V (kN)	H (kN)	M (kN·m)
Ⅰ	232280	0	80180	233660	1240	5660
Ⅱ	226120	0	770	226120	5060	221030
Ⅲ	229810	345	69820	233660	3790	149730
Ⅳ	228950	0	48080	233660	1240	5660
Ⅴ	216590	0	510	217420	4870	212530
Ⅵ	220140	331	66900	224670	3640	143970

2) Resalt of Dynamic Analysis

	Longitudinal Direction			Transversal Direction		
	V (kN)	H (kN)	M (kN·m)	V (kN)	H (kN)	M (kN·m)
Seismic	176460	19750	681230	172990	15390	704300

3.4.2 Calculation Result of Shinso's Sectional Force

(1) Longitudinal Direction

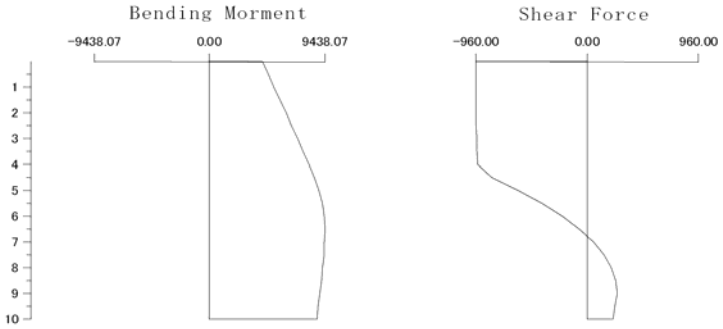
1) Service Load Design

i) Group-I

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.43	-6.30	37170.00	0.00	176780.00
0.50	0.40	-6.28	37170.00	0.00	178945.00
0.50	0.40	-6.28	37170.00	0.00	178945.00
1.00	0.37	-6.26	37170.00	0.00	181110.00
1.00	0.37	-6.26	37170.00	0.00	181110.00
1.50	0.35	-6.24	37170.00	0.00	183274.00
1.50	0.35	-6.24	37170.00	0.00	183274.00
2.00	0.32	-6.22	37170.00	0.00	185439.00
2.00	0.32	-6.22	37170.00	-11.90	185439.00
2.50	0.29	-6.20	37164.10	-11.90	187604.00
2.50	0.29	-6.20	37164.10	-22.73	187604.00
3.00	0.26	-6.18	37152.70	-22.73	189769.00
3.00	0.26	-6.18	37152.70	-32.52	189769.00
3.50	0.23	-6.16	37136.40	-32.52	191933.00
3.50	0.23	-6.16	37136.40	-41.25	191933.00
4.00	0.20	-6.14	37115.80	-41.25	194098.00
4.00	0.20	-6.14	37115.80	-48.93	194098.00
4.50	0.18	-6.11	37091.30	-48.93	196263.00
4.50	0.18	-6.11	37091.30	-618.75	196263.00
5.00	0.15	-6.09	36782.00	-618.75	198428.00
5.00	0.15	-6.09	36782.00	-1100.02	198428.00
5.50	0.12	-6.07	36232.00	-1100.02	200592.00
5.50	0.12	-6.07	36232.00	-1493.20	200592.00
6.00	0.09	-6.05	35485.40	-1493.20	202757.00
6.00	0.09	-6.05	35485.40	-1798.77	202757.00
6.50	0.07	-6.02	34586.00	-1798.77	204922.00
6.50	0.07	-6.02	34586.00	-2017.19	204922.00
7.00	0.04	-6.00	33577.40	-2017.19	207087.00
7.00	0.04	-6.00	33577.40	-2148.90	207087.00
7.50	0.01	-5.98	32502.90	-2148.90	209251.00
7.50	0.01	-5.98	32502.90	-2194.33	209251.00
8.00	-0.01	-5.95	31405.80	-2194.33	211416.00
8.00	-0.01	-5.95	31405.80	-2153.92	211416.00
8.50	-0.04	-5.93	30328.80	-2153.92	213581.00
8.50	-0.04	-5.93	30328.80	-2028.07	213581.00
9.00	-0.07	-5.90	29314.80	-2028.07	215746.00
9.00	-0.07	-5.90	29314.80	-1817.16	215746.00
9.50	-0.09	-5.88	28406.20	-1817.16	217910.00
9.50	-0.09	-5.88	28406.20	-1521.58	217910.00
10.00	-0.12	-5.85	27645.40	-1521.58	220075.00

Mmax = 37170.0 kN･m (Z= 0.00m)

Smax = -2194.33 kN (Z= 7.50m)



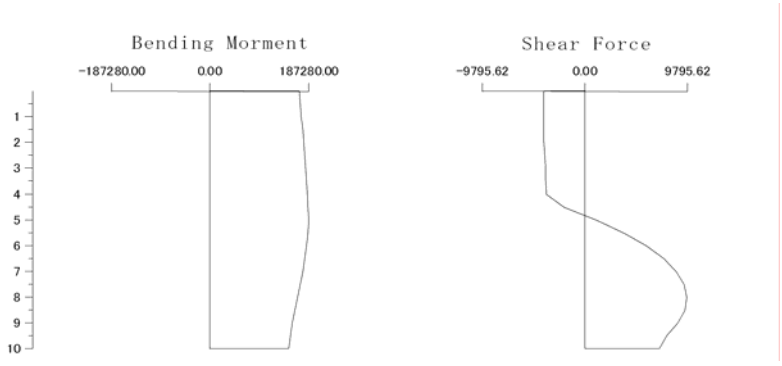
Longitudinal Direction

ii) Group-Ⅱ

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.01	-6.22	590.00	0.00	173940.00
0.50	0.01	-6.20	590.00	0.00	176105.00
0.50	0.01	-6.20	590.00	0.00	176105.00
1.00	0.01	-6.18	590.00	0.00	178270.00
1.00	0.01	-6.18	590.00	0.00	178270.00
1.50	0.01	-6.16	590.00	0.00	180434.00
1.50	0.01	-6.16	590.00	0.00	180434.00
2.00	0.01	-6.14	590.00	0.00	182599.00
2.00	0.01	-6.14	590.00	-0.19	182599.00
2.50	0.00	-6.12	589.91	-0.19	184764.00
2.50	0.00	-6.12	589.91	-0.36	184764.00
3.00	0.00	-6.10	589.73	-0.36	186929.00
3.00	0.00	-6.10	589.73	-0.52	186929.00
3.50	0.00	-6.08	589.47	-0.52	189093.00
3.50	0.00	-6.08	589.47	-0.65	189093.00
4.00	0.00	-6.06	589.14	-0.65	191258.00
4.00	0.00	-6.06	589.14	-0.78	191258.00
4.50	0.00	-6.03	588.75	-0.78	193423.00
4.50	0.00	-6.03	588.75	-9.82	193423.00
5.00	0.00	-6.01	583.84	-9.82	195588.00
5.00	0.00	-6.01	583.84	-17.46	195588.00
5.50	0.00	-5.99	575.11	-17.46	197752.00
5.50	0.00	-5.99	575.11	-23.70	197752.00
6.00	0.00	-5.97	563.26	-23.70	199917.00
6.00	0.00	-5.97	563.26	-28.55	199917.00
6.50	0.00	-5.94	548.98	-28.55	202082.00
6.50	0.00	-5.94	548.98	-32.02	202082.00
7.00	0.00	-5.92	532.97	-32.02	204247.00
7.00	0.00	-5.92	532.97	-34.11	204247.00
7.50	0.00	-5.90	515.92	-34.11	206411.00
7.50	0.00	-5.90	515.92	-34.83	206411.00
8.00	0.00	-5.88	498.50	-34.83	208576.00
8.00	0.00	-5.88	498.50	-34.19	208576.00
8.50	0.00	-5.85	481.41	-34.19	210741.00
8.50	0.00	-5.85	481.41	-32.19	210741.00
9.00	0.00	-5.83	465.31	-32.19	212906.00
9.00	0.00	-5.83	465.31	-28.84	212906.00
9.50	0.00	-5.80	450.89	-28.84	215070.00
9.50	0.00	-5.80	450.89	-24.15	215070.00
10.00	0.00	-5.78	438.82	-24.15	217235.00

Mmax = 590.0 kN·m (Z= 0.00m)

Smax = -34.83 kN (Z= 7.50m)



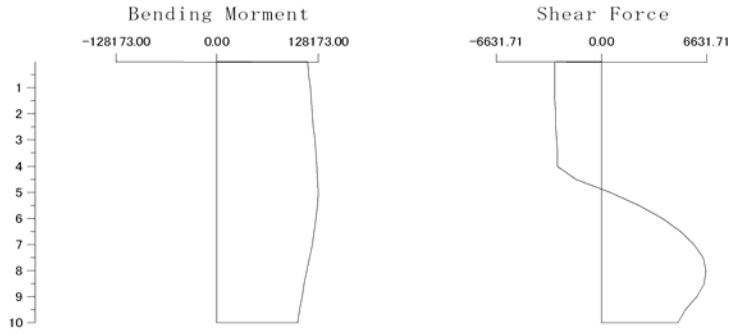
Longitudinal Direction

iii) Group-III

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.65	-6.30	53710.00	270.00	176780.00
0.50	0.61	-6.28	53845.00	270.00	178945.00
0.50	0.61	-6.28	53845.00	270.00	178945.00
1.00	0.57	-6.26	53980.00	270.00	181110.00
1.00	0.57	-6.26	53980.00	270.00	181110.00
1.50	0.52	-6.24	54115.00	270.00	183274.00
1.50	0.52	-6.24	54115.00	270.00	183274.00
2.00	0.48	-6.22	54250.00	270.00	185439.00
2.00	0.48	-6.22	54250.00	251.93	185439.00
2.50	0.44	-6.20	54376.00	251.93	187604.00
2.50	0.44	-6.20	54376.00	235.46	187604.00
3.00	0.40	-6.18	54493.70	235.46	189769.00
3.00	0.40	-6.18	54493.70	220.57	189769.00
3.50	0.35	-6.16	54604.00	220.57	191933.00
3.50	0.35	-6.16	54604.00	207.25	191933.00
4.00	0.31	-6.14	54707.60	207.25	194098.00
4.00	0.31	-6.14	54707.60	195.50	194098.00
4.50	0.27	-6.11	54805.40	195.50	196263.00
4.50	0.27	-6.11	54805.40	-677.91	196263.00
5.00	0.23	-6.09	54466.40	-677.91	198428.00
5.00	0.23	-6.09	54466.40	-1418.39	198428.00
5.50	0.19	-6.07	53757.20	-1418.39	200592.00
5.50	0.19	-6.07	53757.20	-2026.65	200592.00
6.00	0.15	-6.05	52743.90	-2026.65	202757.00
6.00	0.15	-6.05	52743.90	-2503.38	202757.00
6.50	0.11	-6.02	51492.20	-2503.38	204922.00
6.50	0.11	-6.02	51492.20	-2849.26	204922.00
7.00	0.07	-6.00	50067.60	-2849.26	207087.00
7.00	0.07	-6.00	50067.60	-3064.97	207087.00
7.50	0.03	-5.98	48535.10	-3064.97	209251.00
7.50	0.03	-5.98	48535.10	-3151.14	209251.00
8.00	-0.01	-5.95	46959.50	-3151.14	211416.00
8.00	-0.01	-5.95	46959.50	-3108.42	211416.00
8.50	-0.05	-5.93	45405.30	-3108.42	213581.00
8.50	-0.05	-5.93	45405.30	-2937.39	213581.00
9.00	-0.09	-5.90	43936.60	-2937.39	215746.00
9.00	-0.09	-5.90	43936.60	-2638.66	215746.00
9.50	-0.13	-5.88	42617.30	-2638.66	217910.00
9.50	-0.13	-5.88	42617.30	-2212.80	217910.00
10.00	-0.17	-5.85	41510.90	-2212.80	220075.00

Mmax = 54805.4 kN·m (Z= 4.50m)

Smax = -3151.14 kN (Z= 7.50m)



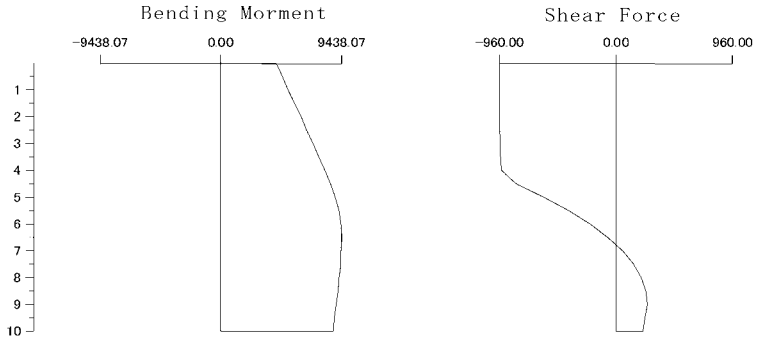
Longitudinal Direction

iv) Group-Ⅳ

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.43	-6.28	36980.00	0.00	176120.00
0.50	0.40	-6.26	36980.00	0.00	178285.00
0.50	0.40	-6.26	36980.00	0.00	178285.00
1.00	0.37	-6.24	36980.00	0.00	180450.00
1.00	0.37	-6.24	36980.00	0.00	180450.00
1.50	0.34	-6.22	36980.00	0.00	182614.00
1.50	0.34	-6.22	36980.00	0.00	182614.00
2.00	0.32	-6.20	36980.00	0.00	184779.00
2.00	0.32	-6.20	36980.00	-11.84	184779.00
2.50	0.29	-6.18	36974.10	-11.84	186944.00
2.50	0.29	-6.18	36974.10	-22.62	186944.00
3.00	0.26	-6.16	36962.80	-22.62	189109.00
3.00	0.26	-6.16	36962.80	-32.35	189109.00
3.50	0.23	-6.14	36946.60	-32.35	191273.00
3.50	0.23	-6.14	36946.60	-41.04	191273.00
4.00	0.20	-6.12	36926.10	-41.04	193438.00
4.00	0.20	-6.12	36926.10	-48.68	193438.00
4.50	0.18	-6.09	36901.70	-48.68	195603.00
4.50	0.18	-6.09	36901.70	-615.59	195603.00
5.00	0.15	-6.07	36593.90	-615.59	197768.00
5.00	0.15	-6.07	36593.90	-1094.39	197768.00
5.50	0.12	-6.05	36046.70	-1094.39	199932.00
5.50	0.12	-6.05	36046.70	-1485.57	199932.00
6.00	0.09	-6.03	35304.00	-1485.57	202097.00
6.00	0.09	-6.03	35304.00	-1789.57	202097.00
6.50	0.07	-6.00	34409.20	-1789.57	204262.00
6.50	0.07	-6.00	34409.20	-2006.87	204262.00
7.00	0.04	-5.98	33405.70	-2006.87	206427.00
7.00	0.04	-5.98	33405.70	-2137.91	206427.00
7.50	0.01	-5.96	32336.80	-2137.91	208591.00
7.50	0.01	-5.96	32336.80	-2183.12	208591.00
8.00	-0.01	-5.93	31245.20	-2183.12	210756.00
8.00	-0.01	-5.93	31245.20	-2142.91	210756.00
8.50	-0.04	-5.91	30173.80	-2142.91	212921.00
8.50	-0.04	-5.91	30173.80	-2017.70	212921.00
9.00	-0.07	-5.89	29164.90	-2017.70	215086.00
9.00	-0.07	-5.89	29164.90	-1807.87	215086.00
9.50	-0.09	-5.86	28261.00	-1807.87	217250.00
9.50	-0.09	-5.86	28261.00	-1513.80	217250.00
10.00	-0.12	-5.84	27504.10	-1513.80	219415.00

Mmax = 36980.0 kN·m (Z= 0.00m)

Smax = -2183.12 kN (Z= 7.50m)



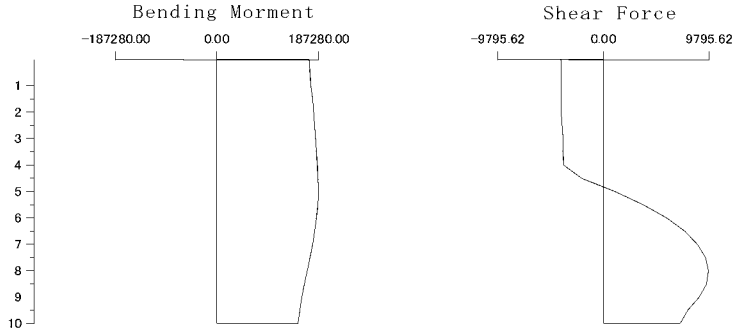
Longitudinal Direction

v) Group-Ⅴ

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.00	-6.20	410.00	0.00	173280.00
0.50	0.00	-6.18	410.00	0.00	175445.00
0.50	0.00	-6.18	410.00	0.00	175445.00
1.00	0.00	-6.16	410.00	0.00	177610.00
1.00	0.00	-6.16	410.00	0.00	177610.00
1.50	0.00	-6.14	410.00	0.00	179774.00
1.50	0.00	-6.14	410.00	0.00	179774.00
2.00	0.00	-6.12	410.00	0.00	181939.00
2.00	0.00	-6.12	410.00	-0.13	181939.00
2.50	0.00	-6.10	409.93	-0.13	184104.00
2.50	0.00	-6.10	409.93	-0.25	184104.00
3.00	0.00	-6.08	409.81	-0.25	186269.00
3.00	0.00	-6.08	409.81	-0.36	186269.00
3.50	0.00	-6.06	409.63	-0.36	188433.00
3.50	0.00	-6.06	409.63	-0.45	188433.00
4.00	0.00	-6.04	409.40	-0.45	190598.00
4.00	0.00	-6.04	409.40	-0.54	190598.00
4.50	0.00	-6.02	409.13	-0.54	192763.00
4.50	0.00	-6.02	409.13	-6.83	192763.00
5.00	0.00	-5.99	405.72	-6.83	194928.00
5.00	0.00	-5.99	405.72	-12.13	194928.00
5.50	0.00	-5.97	399.65	-12.13	197092.00
5.50	0.00	-5.97	399.65	-16.47	197092.00
6.00	0.00	-5.95	391.42	-16.47	199257.00
6.00	0.00	-5.95	391.42	-19.84	199257.00
6.50	0.00	-5.93	381.50	-19.84	201422.00
6.50	0.00	-5.93	381.50	-22.25	201422.00
7.00	0.00	-5.90	370.37	-22.25	203587.00
7.00	0.00	-5.90	370.37	-23.70	203587.00
7.50	0.00	-5.88	358.52	-23.70	205751.00
7.50	0.00	-5.88	358.52	-24.20	205751.00
8.00	0.00	-5.86	346.42	-24.20	207916.00
8.00	0.00	-5.86	346.42	-23.76	207916.00
8.50	0.00	-5.83	334.54	-23.76	210081.00
8.50	0.00	-5.83	334.54	-22.37	210081.00
9.00	0.00	-5.81	323.35	-22.37	212246.00
9.00	0.00	-5.81	323.35	-20.04	212246.00
9.50	0.00	-5.79	313.33	-20.04	214410.00
9.50	0.00	-5.79	313.33	-16.78	214410.00
10.00	0.00	-5.76	304.94	-16.78	216575.00

Mmax = 410.0 kN･m (Z= 0.00m)

Smax = -24.2 kN (Z= 7.50m)



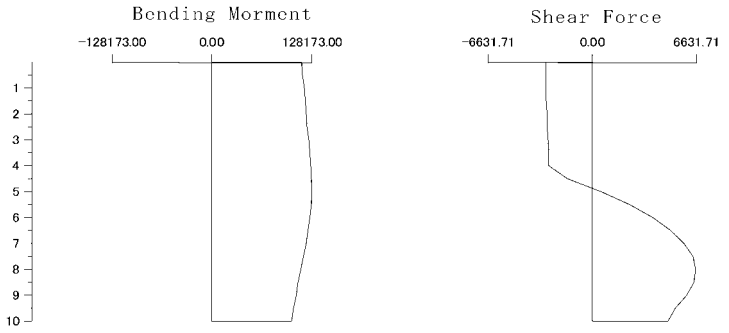
Longitudinal Direction

vi) Group-VI

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.65	-6.28	53520.00	270.00	176120.00
0.50	0.61	-6.26	53655.00	270.00	178285.00
0.50	0.61	-6.26	53655.00	270.00	178285.00
1.00	0.56	-6.24	53790.00	270.00	180450.00
1.00	0.56	-6.24	53790.00	270.00	180450.00
1.50	0.52	-6.22	53925.00	270.00	182614.00
1.50	0.52	-6.22	53925.00	270.00	182614.00
2.00	0.48	-6.20	54060.00	270.00	184779.00
2.00	0.48	-6.20	54060.00	251.99	184779.00
2.50	0.44	-6.18	54186.00	251.99	186944.00
2.50	0.44	-6.18	54186.00	235.57	186944.00
3.00	0.40	-6.16	54303.80	235.57	189109.00
3.00	0.40	-6.16	54303.80	220.73	189109.00
3.50	0.35	-6.14	54414.10	220.73	191273.00
3.50	0.35	-6.14	54414.10	207.46	191273.00
4.00	0.31	-6.12	54517.90	207.46	193438.00
4.00	0.31	-6.12	54517.90	195.75	193438.00
4.50	0.27	-6.09	54615.80	195.75	195603.00
4.50	0.27	-6.09	54615.80	-674.75	195603.00
5.00	0.23	-6.07	54278.40	-674.75	197768.00
5.00	0.23	-6.07	54278.40	-1412.77	197768.00
5.50	0.19	-6.05	53572.00	-1412.77	199932.00
5.50	0.19	-6.05	53572.00	-2019.02	199932.00
6.00	0.15	-6.03	52562.50	-2019.02	202097.00
6.00	0.15	-6.03	52562.50	-2494.18	202097.00
6.50	0.11	-6.00	51315.40	-2494.18	204262.00
6.50	0.11	-6.00	51315.40	-2838.95	204262.00
7.00	0.07	-5.98	49895.90	-2838.95	206427.00
7.00	0.07	-5.98	49895.90	-3053.99	206427.00
7.50	0.03	-5.96	48368.90	-3053.99	208591.00
7.50	0.03	-5.96	48368.90	-3139.93	208591.00
8.00	-0.01	-5.93	46799.00	-3139.93	210756.00
8.00	-0.01	-5.93	46799.00	-3097.41	210756.00
8.50	-0.05	-5.91	45250.30	-3097.41	212921.00
8.50	-0.05	-5.91	45250.30	-2927.03	212921.00
9.00	-0.09	-5.89	43786.70	-2927.03	215086.00
9.00	-0.09	-5.89	43786.70	-2629.37	215086.00
9.50	-0.13	-5.86	42472.10	-2629.37	217250.00
9.50	-0.13	-5.86	42472.10	-2205.02	217250.00
10.00	-0.17	-5.84	41369.60	-2205.02	219415.00

Mmax = 54615.8 kN·m (Z= 4.50m)

Smax = -3139.93 kN (Z= 7.50m)



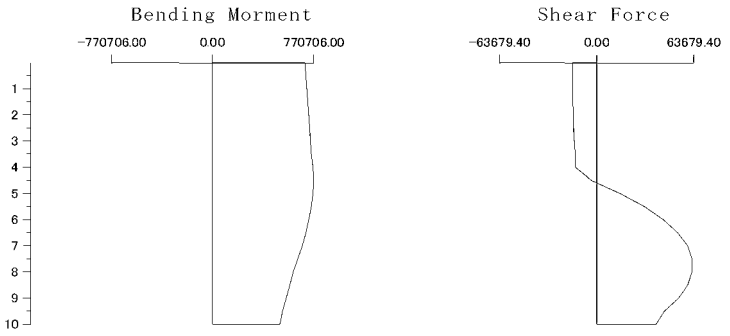
Longitudinal Direction

7) Seismic Load (Dynamic Analysis)

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	5.56	-3.26	681230.00	19750.00	176459.00
0.50	5.19	-3.24	691105.00	19750.00	178624.00
0.50	5.19	-3.24	691105.00	19750.00	178624.00
1.00	4.83	-3.22	700980.00	19750.00	180789.00
1.00	4.83	-3.22	700980.00	19750.00	180789.00
1.50	4.46	-3.20	710855.00	19750.00	182953.00
1.50	4.46	-3.20	710855.00	19750.00	182953.00
2.00	4.10	-3.18	720730.00	19750.00	185118.00
2.00	4.10	-3.18	720730.00	19442.20	185118.00
2.50	3.74	-3.16	730451.00	19442.20	187283.00
2.50	3.74	-3.16	730451.00	19161.30	187283.00
3.00	3.39	-3.14	740032.00	19161.30	189448.00
3.00	3.39	-3.14	740032.00	18907.00	189448.00
3.50	3.03	-3.11	749485.00	18907.00	191612.00
3.50	3.03	-3.11	749485.00	18679.30	191612.00
4.00	2.68	-3.09	758825.00	18679.30	193777.00
4.00	2.68	-3.09	758825.00	18477.70	193777.00
4.50	2.34	-3.07	768064.00	18477.70	195942.00
4.50	2.34	-3.07	768064.00	3431.16	195942.00
5.00	2.00	-3.05	769779.00	3431.16	198107.00
5.00	2.00	-3.05	769779.00	-9406.62	198107.00
5.50	1.65	-3.03	765076.00	-9406.62	200271.00
5.50	1.65	-3.03	765076.00	-20055.50	200271.00
6.00	1.32	-3.00	755048.00	-20055.50	202436.00
6.00	1.32	-3.00	755048.00	-28535.30	202436.00
6.50	0.98	-2.98	740781.00	-28535.30	204601.00
6.50	0.98	-2.98	740781.00	-34865.60	204601.00
7.00	0.65	-2.96	723348.00	-34865.60	206766.00
7.00	0.65	-2.96	723348.00	-39065.40	206766.00
7.50	0.32	-2.93	703815.00	-39065.40	208930.00
7.50	0.32	-2.93	703815.00	-41153.60	208930.00
8.00	0.00	-2.91	683238.00	-41153.60	211095.00
8.00	0.00	-2.91	683238.00	-41148.30	211095.00
8.50	-0.32	-2.89	662664.00	-41148.30	213260.00
8.50	-0.32	-2.89	662664.00	-39067.30	213260.00
9.00	-0.64	-2.86	643131.00	-39067.30	215425.00
9.00	-0.64	-2.86	643131.00	-34927.60	215425.00
9.50	-0.96	-2.84	625667.00	-34927.60	217589.00
9.50	-0.96	-2.84	625667.00	-28746.00	217589.00
10.00	-1.28	-2.81	611294.00	-28746.00	219754.00

Mmax = 769779.0 kN·m (Z= 5.00m)

Smax = -41153.6 kN (Z= 7.50m)



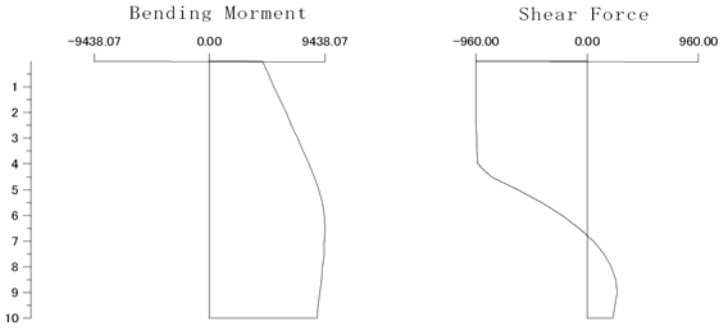
2) Load Factor Design

ⅰ) Group-I

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.93	-8.27	80180.00	0.00	232280.00
0.50	0.87	-8.24	80180.00	0.00	235094.00
0.50	0.87	-8.24	80180.00	0.00	235094.00
1.00	0.81	-8.21	80180.00	0.00	237908.00
1.00	0.81	-8.21	80180.00	0.00	237908.00
1.50	0.75	-8.19	80180.00	0.00	240723.00
1.50	0.75	-8.19	80180.00	0.00	240723.00
2.00	0.68	-8.16	80180.00	0.00	243537.00
2.00	0.68	-8.16	80180.00	-25.66	243537.00
2.50	0.62	-8.13	80167.20	-25.66	246351.00
2.50	0.62	-8.13	80167.20	-49.04	246351.00
3.00	0.56	-8.10	80142.60	-49.04	249165.00
3.00	0.56	-8.10	80142.60	-70.14	249165.00
3.50	0.50	-8.07	80107.60	-70.14	251979.00
3.50	0.50	-8.07	80107.60	-88.97	251979.00
4.00	0.44	-8.05	80063.10	-88.97	254793.00
4.00	0.44	-8.05	80063.10	-105.55	254793.00
4.50	0.38	-8.02	80010.30	-105.55	257608.00
4.50	0.38	-8.02	80010.30	-1334.72	257608.00
5.00	0.32	-7.99	79343.00	-1334.72	260422.00
5.00	0.32	-7.99	79343.00	-2372.87	260422.00
5.50	0.26	-7.96	78156.50	-2372.87	263236.00
5.50	0.26	-7.96	78156.50	-3221.01	263236.00
6.00	0.20	-7.93	76546.00	-3221.01	266050.00
6.00	0.20	-7.93	76546.00	-3880.15	266050.00
6.50	0.15	-7.90	74605.90	-3880.15	268864.00
6.50	0.15	-7.90	74605.90	-4351.30	268864.00
7.00	0.09	-7.87	72430.30	-4351.30	271679.00
7.00	0.09	-7.87	72430.30	-4635.42	271679.00
7.50	0.03	-7.84	70112.60	-4635.42	274493.00
7.50	0.03	-7.84	70112.60	-4733.43	274493.00
8.00	-0.03	-7.80	67745.90	-4733.43	277307.00
8.00	-0.03	-7.80	67745.90	-4646.26	277307.00
8.50	-0.08	-7.77	65422.70	-4646.26	280121.00
8.50	-0.08	-7.77	65422.70	-4374.77	280121.00
9.00	-0.14	-7.74	63235.30	-4374.77	282935.00
9.00	-0.14	-7.74	63235.30	-3919.82	282935.00
9.50	-0.20	-7.71	61275.40	-3919.82	285749.00
9.50	-0.20	-7.71	61275.40	-3282.23	285749.00
10.00	-0.25	-7.68	59634.30	-3282.23	288564.00

Mmax = 80180.0 kN·m (Z= 0.00m)

Smax = -4733.43 kN (Z= 7.50m)



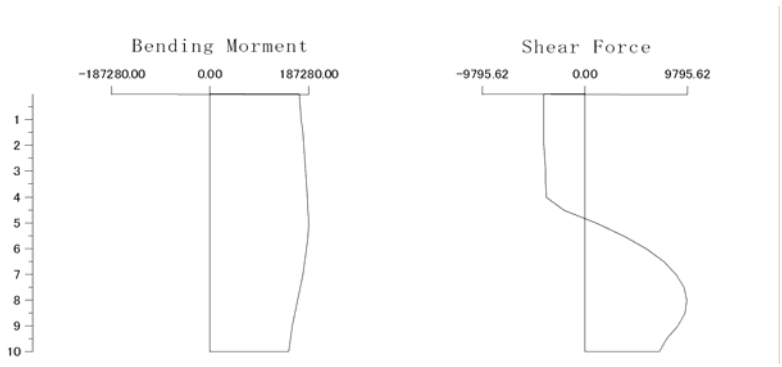
Longitudinal Direction

ii) Group-II

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.01	-8.09	770.00	0.00	226120.00
0.50	0.01	-8.06	770.00	0.00	228934.00
0.50	0.01	-8.06	770.00	0.00	228934.00
1.00	0.01	-8.04	770.00	0.00	231748.00
1.00	0.01	-8.04	770.00	0.00	231748.00
1.50	0.01	-8.01	770.00	0.00	234563.00
1.50	0.01	-8.01	770.00	0.00	234563.00
2.00	0.01	-7.98	770.00	0.00	237377.00
2.00	0.01	-7.98	770.00	-0.25	237377.00
2.50	0.01	-7.96	769.88	-0.25	240191.00
2.50	0.01	-7.96	769.88	-0.47	240191.00
3.00	0.01	-7.93	769.64	-0.47	243005.00
3.00	0.01	-7.93	769.64	-0.67	243005.00
3.50	0.00	-7.90	769.30	-0.67	245819.00
3.50	0.00	-7.90	769.30	-0.85	245819.00
4.00	0.00	-7.87	768.88	-0.85	248633.00
4.00	0.00	-7.87	768.88	-1.01	248633.00
4.50	0.00	-7.84	768.37	-1.01	251448.00
4.50	0.00	-7.84	768.37	-12.82	251448.00
5.00	0.00	-7.82	761.96	-12.82	254262.00
5.00	0.00	-7.82	761.96	-22.79	254262.00
5.50	0.00	-7.79	750.57	-22.79	257076.00
5.50	0.00	-7.79	750.57	-30.93	257076.00
6.00	0.00	-7.76	735.10	-30.93	259890.00
6.00	0.00	-7.76	735.10	-37.26	259890.00
6.50	0.00	-7.73	716.47	-37.26	262704.00
6.50	0.00	-7.73	716.47	-41.79	262704.00
7.00	0.00	-7.70	695.58	-41.79	265519.00
7.00	0.00	-7.70	695.58	-44.52	265519.00
7.50	0.00	-7.67	673.32	-44.52	268333.00
7.50	0.00	-7.67	673.32	-45.46	268333.00
8.00	0.00	-7.64	650.59	-45.46	271147.00
8.00	0.00	-7.64	650.59	-44.62	271147.00
8.50	0.00	-7.61	628.28	-44.62	273961.00
8.50	0.00	-7.61	628.28	-42.01	273961.00
9.00	0.00	-7.58	607.27	-42.01	276775.00
9.00	0.00	-7.58	607.27	-37.64	276775.00
9.50	0.00	-7.54	588.45	-37.64	279589.00
9.50	0.00	-7.54	588.45	-31.52	279589.00
10.00	0.00	-7.51	572.69	-31.52	282404.00

Mmax = 770.0 kN·m (Z= 0.00m)

Smax = -45.46 kN (Z= 7.50m)



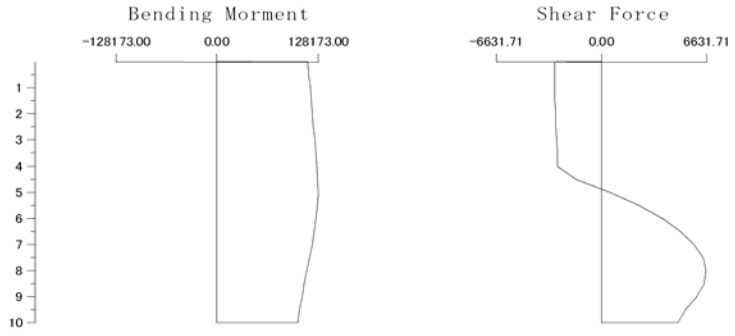
Longitudinal Direction

iii) Group-III

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.85	-8.19	69820.00	345.00	229810.00
0.50	0.79	-8.17	69992.50	345.00	232624.00
0.50	0.79	-8.17	69992.50	345.00	232624.00
1.00	0.74	-8.14	70165.00	345.00	235438.00
1.00	0.74	-8.14	70165.00	345.00	235438.00
1.50	0.68	-8.11	70337.50	345.00	238253.00
1.50	0.68	-8.11	70337.50	345.00	238253.00
2.00	0.63	-8.09	70510.00	345.00	241067.00
2.00	0.63	-8.09	70510.00	321.53	241067.00
2.50	0.57	-8.06	70670.80	321.53	243881.00
2.50	0.57	-8.06	70670.80	300.13	243881.00
3.00	0.52	-8.03	70820.80	300.13	246695.00
3.00	0.52	-8.03	70820.80	280.79	246695.00
3.50	0.46	-8.00	70961.20	280.79	249509.00
3.50	0.46	-8.00	70961.20	263.50	249509.00
4.00	0.41	-7.98	71093.00	263.50	252323.00
4.00	0.41	-7.98	71093.00	248.24	252323.00
4.50	0.35	-7.95	71217.10	248.24	255138.00
4.50	0.35	-7.95	71217.10	-886.04	255138.00
5.00	0.30	-7.92	70774.10	-886.04	257952.00
5.00	0.30	-7.92	70774.10	-1847.62	257952.00
5.50	0.25	-7.89	69850.30	-1847.62	260766.00
5.50	0.25	-7.89	69850.30	-2637.43	260766.00
6.00	0.19	-7.86	68531.60	-2637.43	263580.00
6.00	0.19	-7.86	68531.60	-3256.38	263580.00
6.50	0.14	-7.83	66903.40	-3256.38	266394.00
6.50	0.14	-7.83	66903.40	-3705.34	266394.00
7.00	0.09	-7.80	65050.70	-3705.34	269209.00
7.00	0.09	-7.80	65050.70	-3985.18	269209.00
7.50	0.03	-7.77	63058.10	-3985.18	272023.00
7.50	0.03	-7.77	63058.10	-4096.75	272023.00
8.00	-0.02	-7.74	61009.70	-4096.75	274837.00
8.00	-0.02	-7.74	61009.70	-4040.86	274837.00
8.50	-0.07	-7.71	58989.30	-4040.86	277651.00
8.50	-0.07	-7.71	58989.30	-3818.30	277651.00
9.00	-0.12	-7.67	57080.20	-3818.30	280465.00
9.00	-0.12	-7.67	57080.20	-3429.83	280465.00
9.50	-0.17	-7.64	55365.20	-3429.83	283279.00
9.50	-0.17	-7.64	55365.20	-2876.20	283279.00
10.00	-0.22	-7.61	53927.10	-2876.20	286094.00

Mmax = 71217.1 kN·m (Z= 4.50m)

Smax = -4096.75 kN (Z= 7.50m)



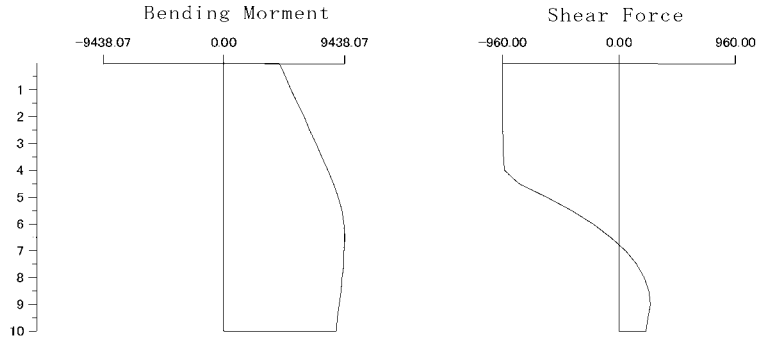
Longitudinal Direction

iv) Group-Ⅳ

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.56	-8.17	48080.00	0.00	228950.00
0.50	0.52	-8.14	48080.00	0.00	231764.00
0.50	0.52	-8.14	48080.00	0.00	231764.00
1.00	0.48	-8.12	48080.00	0.00	234578.00
1.00	0.48	-8.12	48080.00	0.00	234578.00
1.50	0.45	-8.09	48080.00	0.00	237393.00
1.50	0.45	-8.09	48080.00	0.00	237393.00
2.00	0.41	-8.06	48080.00	0.00	240207.00
2.00	0.41	-8.06	48080.00	-15.39	240207.00
2.50	0.37	-8.04	48072.30	-15.39	243021.00
2.50	0.37	-8.04	48072.30	-29.41	243021.00
3.00	0.34	-8.01	48057.60	-29.41	245835.00
3.00	0.34	-8.01	48057.60	-42.06	245835.00
3.50	0.30	-7.98	48036.60	-42.06	248649.00
3.50	0.30	-7.98	48036.60	-53.35	248649.00
4.00	0.26	-7.95	48009.90	-53.35	251463.00
4.00	0.26	-7.95	48009.90	-63.30	251463.00
4.50	0.23	-7.92	47978.20	-63.30	254278.00
4.50	0.23	-7.92	47978.20	-800.37	254278.00
5.00	0.19	-7.89	47578.10	-800.37	257092.00
5.00	0.19	-7.89	47578.10	-1422.89	257092.00
5.50	0.16	-7.87	46866.60	-1422.89	259906.00
5.50	0.16	-7.87	46866.60	-1931.48	259906.00
6.00	0.12	-7.84	45900.90	-1931.48	262720.00
6.00	0.12	-7.84	45900.90	-2326.74	262720.00
6.50	0.09	-7.81	44737.50	-2326.74	265534.00
6.50	0.09	-7.81	44737.50	-2609.26	265534.00
7.00	0.05	-7.78	43432.90	-2609.26	268349.00
7.00	0.05	-7.78	43432.90	-2779.63	268349.00
7.50	0.02	-7.74	42043.10	-2779.63	271163.00
7.50	0.02	-7.74	42043.10	-2838.41	271163.00
8.00	-0.02	-7.71	40623.90	-2838.41	273977.00
8.00	-0.02	-7.71	40623.90	-2786.13	273977.00
8.50	-0.05	-7.68	39230.80	-2786.13	276791.00
8.50	-0.05	-7.68	39230.80	-2623.34	276791.00
9.00	-0.08	-7.65	37919.10	-2623.34	279605.00
9.00	-0.08	-7.65	37919.10	-2350.53	279605.00
9.50	-0.12	-7.62	36743.90	-2350.53	282419.00
9.50	-0.12	-7.62	36743.90	-1968.19	282419.00
10.00	-0.15	-7.59	35759.80	-1968.19	285234.00

Mmax = 48080.0 kN·m (Z= 0.00m)

Smax = -2838.41 kN (Z= 7.50m)



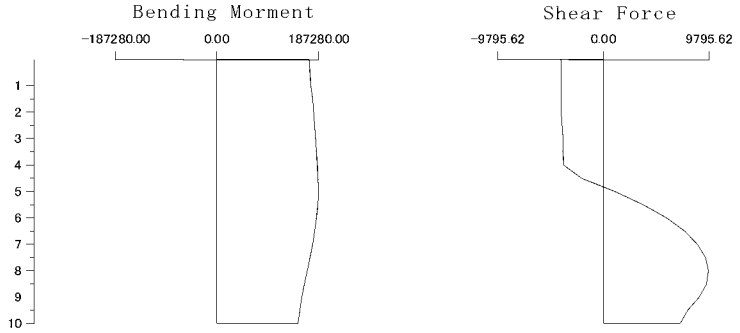
Longitudinal Direction

v) Group-Ⅴ

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.01	-7.81	510.00	0.00	216590.00
0.50	0.01	-7.79	510.00	0.00	219404.00
0.50	0.01	-7.79	510.00	0.00	219404.00
1.00	0.01	-7.76	510.00	0.00	222218.00
1.00	0.01	-7.76	510.00	0.00	222218.00
1.50	0.00	-7.74	510.00	0.00	225033.00
1.50	0.00	-7.74	510.00	0.00	225033.00
2.00	0.00	-7.71	510.00	0.00	227847.00
2.00	0.00	-7.71	510.00	-0.16	227847.00
2.50	0.00	-7.69	509.92	-0.16	230661.00
2.50	0.00	-7.69	509.92	-0.31	230661.00
3.00	0.00	-7.66	509.76	-0.31	233475.00
3.00	0.00	-7.66	509.76	-0.45	233475.00
3.50	0.00	-7.63	509.54	-0.45	236289.00
3.50	0.00	-7.63	509.54	-0.57	236289.00
4.00	0.00	-7.61	509.26	-0.57	239103.00
4.00	0.00	-7.61	509.26	-0.67	239103.00
4.50	0.00	-7.58	508.92	-0.67	241918.00
4.50	0.00	-7.58	508.92	-8.49	241918.00
5.00	0.00	-7.55	504.68	-8.49	244732.00
5.00	0.00	-7.55	504.68	-15.09	244732.00
5.50	0.00	-7.52	497.13	-15.09	247546.00
5.50	0.00	-7.52	497.13	-20.49	247546.00
6.00	0.00	-7.50	486.89	-20.49	250360.00
6.00	0.00	-7.50	486.89	-24.68	250360.00
6.50	0.00	-7.47	474.55	-24.68	253174.00
6.50	0.00	-7.47	474.55	-27.68	253174.00
7.00	0.00	-7.44	460.71	-27.68	255989.00
7.00	0.00	-7.44	460.71	-29.48	255989.00
7.50	0.00	-7.41	445.96	-29.48	258803.00
7.50	0.00	-7.41	445.96	-30.11	258803.00
8.00	0.00	-7.38	430.91	-30.11	261617.00
8.00	0.00	-7.38	430.91	-29.55	261617.00
8.50	0.00	-7.35	416.13	-29.55	264431.00
8.50	0.00	-7.35	416.13	-27.83	264431.00
9.00	0.00	-7.32	402.22	-27.83	267245.00
9.00	0.00	-7.32	402.22	-24.93	267245.00
9.50	0.00	-7.29	389.75	-24.93	270059.00
9.50	0.00	-7.29	389.75	-20.88	270059.00
10.00	0.00	-7.26	379.32	-20.88	272874.00

Mmax = 501.0 kN·m (Z= 0.00m)

Smax = -30.11 kN (Z= 7.50m)



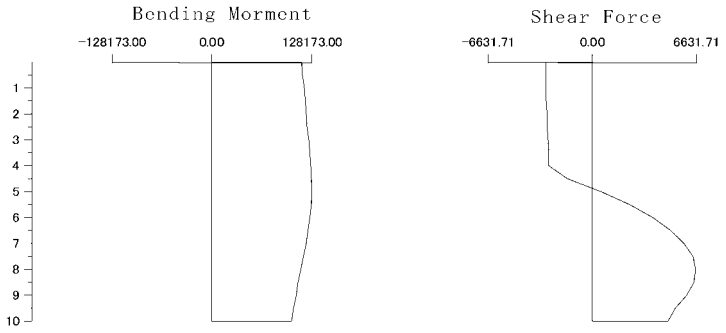
Longitudinal Direction

vi) Group-VI

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.81	-7.92	66900.00	331.00	220140.00
0.50	0.76	-7.89	67065.50	331.00	222954.00
0.50	0.76	-7.89	67065.50	331.00	222954.00
1.00	0.71	-7.86	67231.00	331.00	225768.00
1.00	0.71	-7.86	67231.00	331.00	225768.00
1.50	0.65	-7.84	67396.50	331.00	228583.00
1.50	0.65	-7.84	67396.50	331.00	228583.00
2.00	0.60	-7.81	67562.00	331.00	231397.00
2.00	0.60	-7.81	67562.00	308.51	231397.00
2.50	0.55	-7.79	67716.30	308.51	234211.00
2.50	0.55	-7.79	67716.30	288.01	234211.00
3.00	0.49	-7.76	67860.30	288.01	237025.00
3.00	0.49	-7.76	67860.30	269.47	237025.00
3.50	0.44	-7.73	67995.00	269.47	239839.00
3.50	0.44	-7.73	67995.00	252.90	239839.00
4.00	0.39	-7.71	68121.40	252.90	242653.00
4.00	0.39	-7.71	68121.40	238.28	242653.00
4.50	0.34	-7.68	68240.60	238.28	245468.00
4.50	0.34	-7.68	68240.60	-848.64	245468.00
5.00	0.29	-7.65	67816.30	-848.64	248282.00
5.00	0.29	-7.65	67816.30	-1770.08	248282.00
5.50	0.24	-7.62	66931.20	-1770.08	251096.00
5.50	0.24	-7.62	66931.20	-2526.92	251096.00
6.00	0.18	-7.59	65667.80	-2526.92	253910.00
6.00	0.18	-7.59	65667.80	-3120.04	253910.00
6.50	0.13	-7.56	64107.70	-3120.04	256724.00
6.50	0.13	-7.56	64107.70	-3550.27	256724.00
7.00	0.08	-7.54	62332.60	-3550.27	259539.00
7.00	0.08	-7.54	62332.60	-3818.45	259539.00
7.50	0.03	-7.51	60423.40	-3818.45	262353.00
7.50	0.03	-7.51	60423.40	-3925.38	262353.00
8.00	-0.02	-7.48	58460.70	-3925.38	265167.00
8.00	-0.02	-7.48	58460.70	-3871.85	265167.00
8.50	-0.07	-7.45	56524.80	-3871.85	267981.00
8.50	-0.07	-7.45	56524.80	-3658.62	267981.00
9.00	-0.12	-7.42	54695.50	-3658.62	270795.00
9.00	-0.12	-7.42	54695.50	-3286.41	270795.00
9.50	-0.16	-7.38	53052.30	-3286.41	273609.00
9.50	-0.16	-7.38	53052.30	-2755.93	273609.00
10.00	-0.21	-7.35	51674.30	-2755.93	276424.00

Mmax = 68240.6 kN·m (Z= 4.50m)

Smax = -3925.38 kN (Z= 7.50m)



Calculation Result of Shinso's Sectional Force

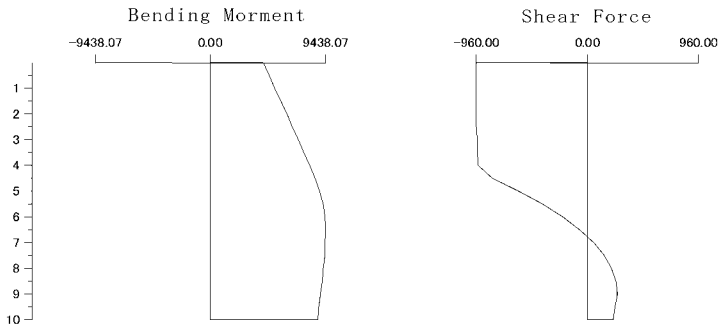
(2) Transverse Direction

1) Service Load Design

ⅰ) Group-I

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.16	0.02	4350.00	-960.00	176780
0.50	0.15	0.02	4830.00	-960.00	178945
0.50	0.15	0.02	4830.00	-960.00	178945
1.00	0.14	0.02	5310.00	-960.00	181110
1.00	0.14	0.02	5310.00	-960.00	181110
1.50	0.13	0.02	5790.00	-960.00	183275
1.50	0.13	0.02	5790.00	-960.00	183275
2.00	0.12	0.02	6270.00	-960.00	185440
2.00	0.12	0.02	6270.00	-955.49	185440
2.50	0.11	0.02	6747.75	-955.49	187605
2.50	0.11	0.02	6747.75	-951.32	187605
3.00	0.10	0.02	7223.41	-951.32	189770
3.00	0.10	0.02	7223.41	-947.48	189770
3.50	0.09	0.02	7697.15	-947.48	191935
3.50	0.09	0.02	7697.15	-943.97	191935
4.00	0.08	0.02	8169.13	-943.97	194100
4.00	0.08	0.02	8169.13	-940.79	194100
4.50	0.08	0.02	8639.53	-940.79	196265
4.50	0.08	0.02	8639.53	-696.23	196265
5.00	0.07	0.02	8987.64	-696.23	198430
5.00	0.07	0.02	8987.64	-479.68	198430
5.50	0.06	0.02	9227.48	-479.68	200595
5.50	0.06	0.02	9227.48	-291.03	200595
6.00	0.05	0.02	9372.99	-291.03	202760
6.00	0.05	0.02	9372.99	-130.15	202760
6.50	0.04	0.02	9438.07	-130.15	204925
6.50	0.04	0.02	9438.07	3.06	204925
7.00	0.03	0.02	9436.54	3.06	207090
7.00	0.03	0.02	9436.54	108.74	207090
7.50	0.02	0.02	9382.17	108.74	209255
7.50	0.02	0.02	9382.17	187.01	209255
8.00	0.02	0.02	9288.66	187.01	211420
8.00	0.02	0.02	9288.66	237.98	211420
8.50	0.01	0.02	9169.68	237.98	213585
8.50	0.01	0.02	9169.68	261.78	213585
9.00	0.00	0.02	9038.78	261.78	215750
9.00	0.00	0.02	9038.78	258.53	215750
9.50	-0.01	0.02	8909.52	258.53	217915
9.50	-0.01	0.02	8909.52	228.34	217915
10.00	-0.02	0.02	8795.35	228.34	220080

Mmax = 9438.07 kN･m (Z= 6.50m)
Smax = -960.0 kN (Z= 0.00m)



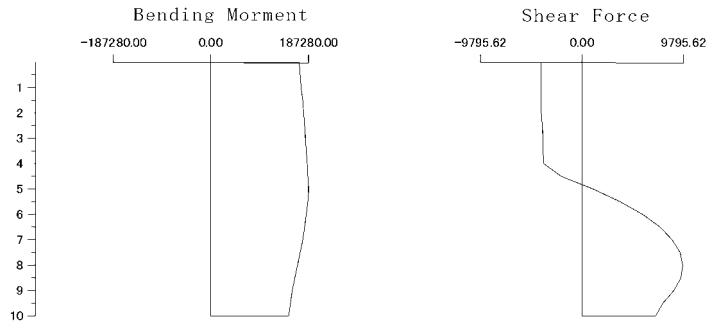
Transverse Direction

ii) Group-II

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	2.40	0.31	170030.00	-3900.00	173940
0.50	2.25	0.31	171980.00	-3900.00	176105
0.50	2.25	0.31	171980.00	-3900.00	176105
1.00	2.09	0.31	173930.00	-3900.00	178270
1.00	2.09	0.31	173930.00	-3900.00	178270
1.50	1.94	0.31	175880.00	-3900.00	180435
1.50	1.94	0.31	175880.00	-3900.00	180435
2.00	1.79	0.30	177830.00	-3900.00	182600
2.00	1.79	0.30	177830.00	-3832.93	182600
2.50	1.64	0.30	179746.00	-3832.93	184765
2.50	1.64	0.30	179746.00	-3771.56	184765
3.00	1.48	0.30	181632.00	-3771.56	186930
3.00	1.48	0.30	181632.00	-3715.86	186930
3.50	1.33	0.30	183490.00	-3715.86	189095
3.50	1.33	0.30	183490.00	-3665.81	189095
4.00	1.18	0.30	185323.00	-3665.81	191260
4.00	1.18	0.30	185323.00	-3621.38	191260
4.50	1.03	0.30	187134.00	-3621.38	193425
4.50	1.03	0.30	187134.00	-292.17	193425
5.00	0.89	0.30	187280.00	-292.17	195590
5.00	0.89	0.30	187280.00	2560.24	195590
5.50	0.74	0.29	186000.00	2560.24	197755
5.50	0.74	0.29	186000.00	4938.27	197755
6.00	0.59	0.29	183531.00	4938.27	199920
6.00	0.59	0.29	183531.00	6844.32	199920
6.50	0.45	0.29	180108.00	6844.32	202085
6.50	0.45	0.29	180108.00	8280.79	202085
7.00	0.30	0.29	175968.00	8280.79	204250
7.00	0.30	0.29	175968.00	9249.98	204250
7.50	0.16	0.29	171343.00	9249.98	206415
7.50	0.16	0.29	171343.00	9754.19	206415
8.00	0.01	0.29	166466.00	9754.19	208580
8.00	0.01	0.29	166466.00	9795.62	208580
8.50	-0.13	0.29	161568.00	9795.62	210745
8.50	-0.13	0.29	161568.00	9376.44	210745
9.00	-0.27	0.28	156880.00	9376.44	212910
9.00	-0.27	0.28	156880.00	8498.73	212910
9.50	-0.41	0.28	152631.00	8498.73	215075
9.50	-0.41	0.28	152631.00	7164.53	215075
10.00	-0.56	0.28	149048.00	7164.53	217240

Mmax = 187280.0 kN·m (Z= 5.00m)

Smax = 9795.62 kN (Z= 8.00m)



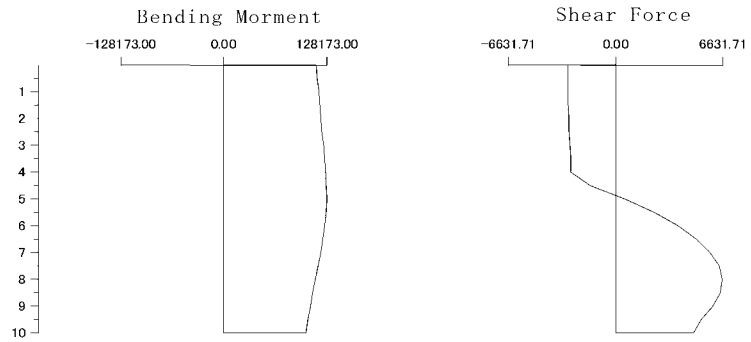
Transverse Direction

iii) Group-III

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	1.66	0.21	115180.00	-2910.00	176780
0.50	1.55	0.21	116635.00	-2910.00	178945
0.50	1.55	0.21	116635.00	-2910.00	178945
1.00	1.44	0.21	118090.00	-2910.00	181110
1.00	1.44	0.21	118090.00	-2910.00	181110
1.50	1.34	0.21	119545.00	-2910.00	183275
1.50	1.34	0.21	119545.00	-2910.00	183275
2.00	1.23	0.21	121000.00	-2910.00	185440
2.00	1.23	0.21	121000.00	-2863.70	185440
2.50	1.13	0.21	122432.00	-2863.70	187605
2.50	1.13	0.21	122432.00	-2821.31	187605
3.00	1.03	0.21	123843.00	-2821.31	189770
3.00	1.03	0.21	123843.00	-2782.83	189770
3.50	0.92	0.21	125234.00	-2782.83	191935
3.50	0.92	0.21	125234.00	-2748.23	191935
4.00	0.82	0.21	126608.00	-2748.23	194100
4.00	0.82	0.21	126608.00	-2717.49	194100
4.50	0.72	0.20	127967.00	-2717.49	196265
4.50	0.72	0.20	127967.00	-412.58	196265
5.00	0.61	0.20	128173.00	-412.58	198430
5.00	0.61	0.20	128173.00	1564.42	198430
5.50	0.51	0.20	127391.00	1564.42	200595
5.50	0.51	0.20	127391.00	3215.15	200595
6.00	0.41	0.20	125783.00	3215.15	202760
6.00	0.41	0.20	125783.00	4541.28	202760
6.50	0.31	0.20	123513.00	4541.28	204925
6.50	0.31	0.20	123513.00	5544.41	204925
7.00	0.21	0.20	120740.00	5544.41	207090
7.00	0.21	0.20	120740.00	6226.16	207090
7.50	0.11	0.20	117627.00	6226.16	209255
7.50	0.11	0.20	117627.00	6588.09	209255
8.00	0.01	0.20	114333.00	6588.09	211420
8.00	0.01	0.20	114333.00	6631.71	211420
8.50	-0.08	0.20	111017.00	6631.71	213585
8.50	-0.08	0.20	111017.00	6358.51	213585
9.00	-0.18	0.20	107838.00	6358.51	215750
9.00	-0.18	0.20	107838.00	5769.93	215750
9.50	-0.28	0.19	104953.00	5769.93	217915
9.50	-0.28	0.19	104953.00	4867.36	217915
10.00	-0.38	0.19	102520.00	4867.36	220080

Mmax = 128173.0 kN·m (Z= 5.00m)

Smax = 6631.71 kN (Z= 8.00m)



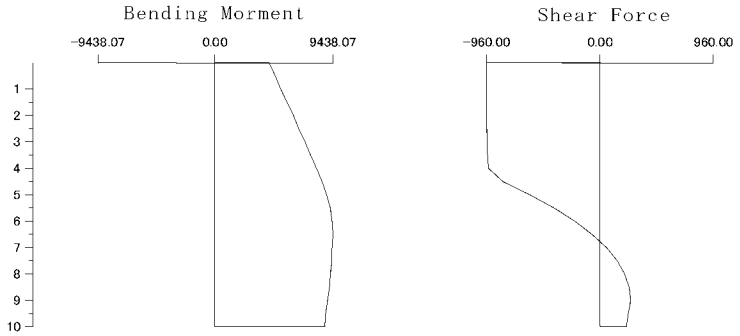
Transverse Direction

ⅳ) Group-Ⅳ

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.16	0.02	4350.00	-960.00	176780
0.50	0.15	0.02	4830.00	-960.00	178945
0.50	0.15	0.02	4830.00	-960.00	178945
1.00	0.14	0.02	5310.00	-960.00	181110
1.00	0.14	0.02	5310.00	-960.00	181110
1.50	0.13	0.02	5790.00	-960.00	183275
1.50	0.13	0.02	5790.00	-960.00	183275
2.00	0.12	0.02	6270.00	-960.00	185440
2.00	0.12	0.02	6270.00	-955.49	185440
2.50	0.11	0.02	6747.75	-955.49	187605
2.50	0.11	0.02	6747.75	-951.32	187605
3.00	0.10	0.02	7223.41	-951.32	189770
3.00	0.10	0.02	7223.41	-947.48	189770
3.50	0.09	0.02	7697.15	-947.48	191935
3.50	0.09	0.02	7697.15	-943.97	191935
4.00	0.08	0.02	8169.13	-943.97	194100
4.00	0.08	0.02	8169.13	-940.79	194100
4.50	0.08	0.02	8639.53	-940.79	196265
4.50	0.08	0.02	8639.53	-696.23	196265
5.00	0.07	0.02	8987.64	-696.23	198430
5.00	0.07	0.02	8987.64	-479.68	198430
5.50	0.06	0.02	9227.48	-479.68	200595
5.50	0.06	0.02	9227.48	-291.03	200595
6.00	0.05	0.02	9372.99	-291.03	202760
6.00	0.05	0.02	9372.99	-130.15	202760
6.50	0.04	0.02	9438.07	-130.15	204925
6.50	0.04	0.02	9438.07	3.06	204925
7.00	0.03	0.02	9436.54	3.06	207090
7.00	0.03	0.02	9436.54	108.74	207090
7.50	0.02	0.02	9382.17	108.74	209255
7.50	0.02	0.02	9382.17	187.01	209255
8.00	0.02	0.02	9288.66	187.01	211420
8.00	0.02	0.02	9288.66	237.98	211420
8.50	0.01	0.02	9169.68	237.98	213585
8.50	0.01	0.02	9169.68	261.78	213585
9.00	0.00	0.02	9038.78	261.78	215750
9.00	0.00	0.02	9038.78	258.53	215750
9.50	-0.01	0.02	8909.52	258.53	217915
9.50	-0.01	0.02	8909.52	228.34	217915
10.00	-0.02	0.02	8795.35	228.34	220080

Mmax = 9438.07 kN·m (Z= 6.50m)

Smax = -960.0 kN (Z= 0.00m)



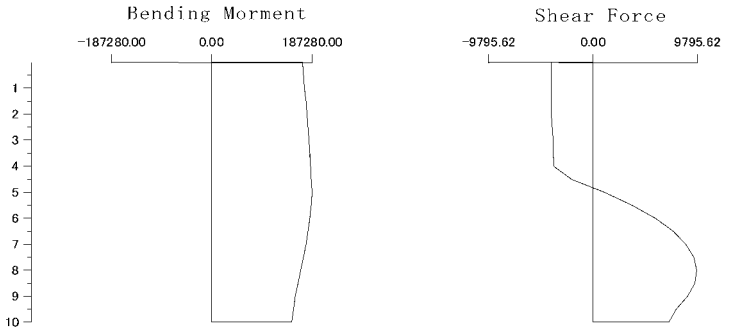
Transverse Direction

v) Group- Ⅴ

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	2.40	0.31	170030.00	-3900.00	173940
0.50	2.25	0.31	171980.00	-3900.00	176105
0.50	2.25	0.31	171980.00	-3900.00	176105
1.00	2.09	0.31	173930.00	-3900.00	178270
1.00	2.09	0.31	173930.00	-3900.00	178270
1.50	1.94	0.31	175880.00	-3900.00	180435
1.50	1.94	0.31	175880.00	-3900.00	180435
2.00	1.79	0.30	177830.00	-3900.00	182600
2.00	1.79	0.30	177830.00	-3832.93	182600
2.50	1.64	0.30	179746.00	-3832.93	184765
2.50	1.64	0.30	179746.00	-3771.56	184765
3.00	1.48	0.30	181632.00	-3771.56	186930
3.00	1.48	0.30	181632.00	-3715.86	186930
3.50	1.33	0.30	183490.00	-3715.86	189095
3.50	1.33	0.30	183490.00	-3665.81	189095
4.00	1.18	0.30	185323.00	-3665.81	191260
4.00	1.18	0.30	185323.00	-3621.38	191260
4.50	1.03	0.30	187134.00	-3621.38	193425
4.50	1.03	0.30	187134.00	-292.17	193425
5.00	0.89	0.30	187280.00	-292.17	195590
5.00	0.89	0.30	187280.00	2560.24	195590
5.50	0.74	0.29	186000.00	2560.24	197755
5.50	0.74	0.29	186000.00	4938.27	197755
6.00	0.59	0.29	183531.00	4938.27	199920
6.00	0.59	0.29	183531.00	6844.32	199920
6.50	0.45	0.29	180108.00	6844.32	202085
6.50	0.45	0.29	180108.00	8280.79	202085
7.00	0.30	0.29	175968.00	8280.79	204250
7.00	0.30	0.29	175968.00	9249.98	204250
7.50	0.16	0.29	171343.00	9249.98	206415
7.50	0.16	0.29	171343.00	9754.19	206415
8.00	0.01	0.29	166466.00	9754.19	208580
8.00	0.01	0.29	166466.00	9795.62	208580
8.50	-0.13	0.29	161568.00	9795.62	210745
8.50	-0.13	0.29	161568.00	9376.44	210745
9.00	-0.27	0.28	156880.00	9376.44	212910
9.00	-0.27	0.28	156880.00	8498.73	212910
9.50	-0.41	0.28	152631.00	8498.73	215075
9.50	-0.41	0.28	152631.00	7164.53	215075
10.00	-0.56	0.28	149048.00	7164.53	217240

Mmax = 187280.0 kN･m (Z= 5.00m)

Smax = 9795.62 kN (Z= 8.00m)



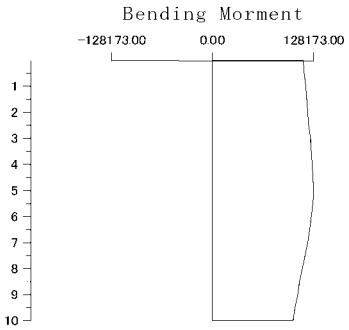
Transverse Direction

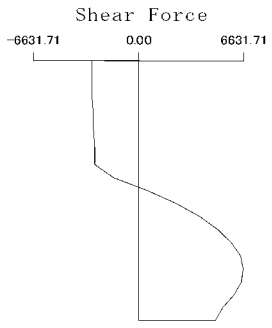
vi) Group-VI

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	1.66	0.21	115180.00	-2910.00	176780
0.50	1.55	0.21	116635.00	-2910.00	178945
0.50	1.55	0.21	116635.00	-2910.00	178945
1.00	1.44	0.21	118090.00	-2910.00	181110
1.00	1.44	0.21	118090.00	-2910.00	181110
1.50	1.34	0.21	119545.00	-2910.00	183275
1.50	1.34	0.21	119545.00	-2910.00	183275
2.00	1.23	0.21	121000.00	-2910.00	185440
2.00	1.23	0.21	121000.00	-2863.70	185440
2.50	1.13	0.21	122432.00	-2863.70	187605
2.50	1.13	0.21	122432.00	-2821.31	187605
3.00	1.03	0.21	123843.00	-2821.31	189770
3.00	1.03	0.21	123843.00	-2782.83	189770
3.50	0.92	0.21	125234.00	-2782.83	191935
3.50	0.92	0.21	125234.00	-2748.23	191935
4.00	0.82	0.21	126608.00	-2748.23	194100
4.00	0.82	0.21	126608.00	-2717.49	194100
4.50	0.72	0.20	127967.00	-2717.49	196265
4.50	0.72	0.20	127967.00	-412.58	196265
5.00	0.61	0.20	128173.00	-412.58	198430
5.00	0.61	0.20	128173.00	1564.42	198430
5.50	0.51	0.20	127391.00	1564.42	200595
5.50	0.51	0.20	127391.00	3215.15	200595
6.00	0.41	0.20	125783.00	3215.15	202760
6.00	0.41	0.20	125783.00	4541.28	202760
6.50	0.31	0.20	123513.00	4541.28	204925
6.50	0.31	0.20	123513.00	5544.41	204925
7.00	0.21	0.20	120740.00	5544.41	207090
7.00	0.21	0.20	120740.00	6226.16	207090
7.50	0.11	0.20	117627.00	6226.16	209255
7.50	0.11	0.20	117627.00	6588.09	209255
8.00	0.01	0.20	114333.00	6588.09	211420
8.00	0.01	0.20	114333.00	6631.71	211420
8.50	-0.08	0.20	111017.00	6631.71	213585
8.50	-0.08	0.20	111017.00	6358.51	213585
9.00	-0.18	0.20	107838.00	6358.51	215750
9.00	-0.18	0.20	107838.00	5769.93	215750
9.50	-0.28	0.19	104953.00	5769.93	217915
9.50	-0.28	0.19	104953.00	4867.36	217915
10.00	-0.38	0.19	102520.00	4867.36	220080

Mmax = 128173.0 kN·m (Z= 5.00m)

Smax = 6631.71 kN (Z= 8.00m)





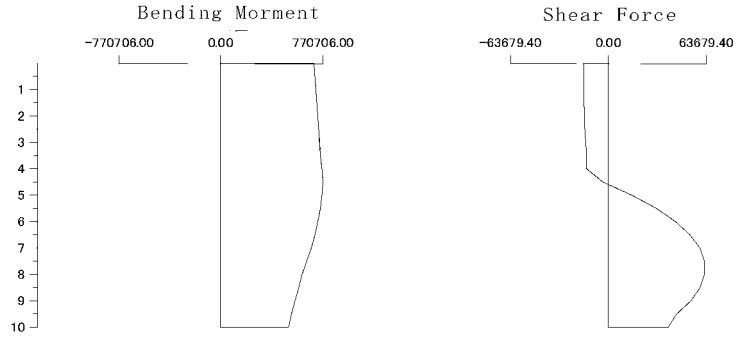
Transverse Direction

vii) Seismic Load (Dynamic Analysis)

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	7.83	1.06	704300.00	-15390.00	0
0.50	7.30	1.05	711995.00	-15390.00	2165
0.50	7.30	1.05	711995.00	-15390.00	2165
1.00	6.78	1.04	719690.00	-15390.00	4330
1.00	6.78	1.04	719690.00	-15390.00	4330
1.50	6.26	1.04	727385.00	-15390.00	6495
1.50	6.26	1.04	727385.00	-15390.00	6495
2.00	5.74	1.03	735080.00	-15390.00	8660
2.00	5.74	1.03	735080.00	-14958.90	8660
2.50	5.23	1.03	742559.00	-14958.90	10825
2.50	5.23	1.03	742559.00	-14566.40	10825
3.00	4.72	1.02	749843.00	-14566.40	12990
3.00	4.72	1.02	749843.00	-14212.40	12990
3.50	4.21	1.01	756949.00	-14212.40	15155
3.50	4.21	1.01	756949.00	-13896.50	15155
4.00	3.70	1.01	763897.00	-13896.50	17320
4.00	3.70	1.01	763897.00	-13618.60	17320
4.50	3.20	1.00	770706.00	-13618.60	19485
4.50	3.20	1.00	770706.00	6968.04	19485
5.00	2.70	1.00	767222.00	6968.04	21650
5.00	2.70	1.00	767222.00	24341.00	21650
5.50	2.20	0.99	755052.00	24341.00	23815
5.50	2.20	0.99	755052.00	38520.00	23815
6.00	1.71	0.98	735792.00	38520.00	25980
6.00	1.71	0.98	735792.00	49524.70	25980
6.50	1.22	0.98	711030.00	49524.70	28145
6.50	1.22	0.98	711030.00	57374.00	28145
7.00	0.73	0.97	682343.00	57374.00	30310
7.00	0.73	0.97	682343.00	62086.30	30310
7.50	0.25	0.97	651299.00	62086.30	32475
7.50	0.25	0.97	651299.00	63679.40	32475
8.00	-0.23	0.96	619460.00	63679.40	34640
8.00	-0.23	0.96	619460.00	62170.00	34640
8.50	-0.71	0.96	588375.00	62170.00	36805
8.50	-0.71	0.96	588375.00	57574.10	36805
9.00	-1.19	0.95	559588.00	57574.10	38970
9.00	-1.19	0.95	559588.00	49907.20	38970
9.50	-1.67	0.95	534634.00	49907.20	41135
9.50	-1.67	0.95	534634.00	39183.60	41135
10.00	-2.14	0.94	515042.00	39183.60	43300

Mmax = 770706.0 kN·m (Z= 4.50m)

Smax = 63679.4 kN (Z= 7.50m)

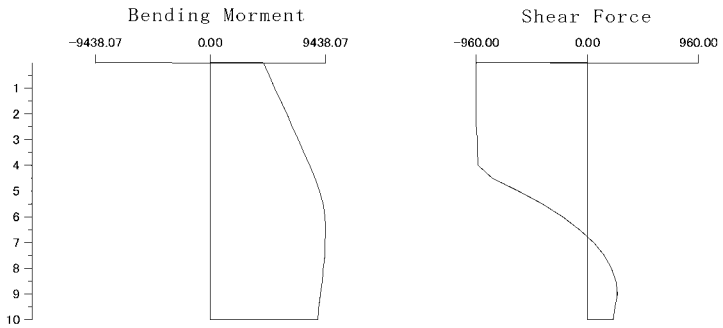


2) Load Factor Design

ⅰ) Group-I

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.20	0.02	5660.00	-1240.00	233660
0.50	0.19	0.02	6280.00	-1240.00	235825
0.50	0.19	0.02	6280.00	-1240.00	235825
1.00	0.18	0.02	6900.00	-1240.00	237990
1.00	0.18	0.02	6900.00	-1240.00	237990
1.50	0.17	0.02	7520.00	-1240.00	240155
1.50	0.17	0.02	7520.00	-1240.00	240155
2.00	0.16	0.02	8140.00	-1240.00	242320
2.00	0.16	0.02	8140.00	-1234.17	242320
2.50	0.14	0.02	8757.08	-1234.17	244485
2.50	0.14	0.02	8757.08	-1228.77	244485
3.00	0.13	0.02	9371.47	-1228.77	246650
3.00	0.13	0.02	9371.47	-1223.79	246650
3.50	0.12	0.02	9983.36	-1223.79	248815
3.50	0.12	0.02	9983.36	-1219.25	248815
4.00	0.11	0.02	10593.00	-1219.25	250980
4.00	0.11	0.02	10593.00	-1215.13	250980
4.50	0.10	0.02	11200.60	-1215.13	253145
4.50	0.10	0.02	11200.60	-898.60	253145
5.00	0.09	0.02	11649.90	-898.60	255310
5.00	0.09	0.02	11649.90	-618.36	255310
5.50	0.08	0.02	11959.00	-618.36	257475
5.50	0.08	0.02	11959.00	-374.25	257475
6.00	0.06	0.02	12146.20	-374.25	259640
6.00	0.06	0.02	12146.20	-166.12	259640
6.50	0.05	0.02	12229.20	-166.12	261805
6.50	0.05	0.02	12229.20	6.19	261805
7.00	0.04	0.02	12226.10	6.19	263970
7.00	0.04	0.02	12226.10	142.84	263970
7.50	0.03	0.02	12154.70	142.84	266135
7.50	0.03	0.02	12154.70	243.98	266135
8.00	0.02	0.02	12032.70	243.98	268300
8.00	0.02	0.02	12032.70	309.78	268300
8.50	0.01	0.02	11877.80	309.78	270465
8.50	0.01	0.02	11877.80	340.38	270465
9.00	0.00	0.02	11707.60	340.38	272630
9.00	0.00	0.02	11707.60	335.95	272630
9.50	-0.01	0.02	11539.70	335.95	274795
9.50	-0.01	0.02	11539.70	296.63	274795
10.00	-0.02	0.02	11391.30	296.63	276960

Mmax = 12229.20 kN･m (Z= 6.50m)
Smax = -1240.0 kN (Z= 0.00m)



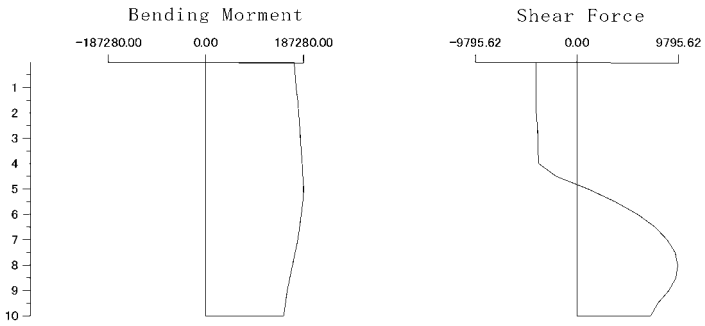
Transverse Direction

ii) Group-II

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	3.12	0.40	221030.00	-5060.00	226120
0.50	2.92	0.40	223560.00	-5060.00	228285
0.50	2.92	0.40	223560.00	-5060.00	228285
1.00	2.72	0.40	226090.00	-5060.00	230450
1.00	2.72	0.40	226090.00	-5060.00	230450
1.50	2.52	0.40	228620.00	-5060.00	232615
1.50	2.52	0.40	228620.00	-5060.00	232615
2.00	2.32	0.40	231150.00	-5060.00	234780
2.00	2.32	0.40	231150.00	-4972.84	234780
2.50	2.12	0.39	233636.00	-4972.84	236945
2.50	2.12	0.39	233636.00	-4893.09	236945
3.00	1.93	0.39	236083.00	-4893.09	239110
3.00	1.93	0.39	236083.00	-4820.72	239110
3.50	1.73	0.39	238493.00	-4820.72	241275
3.50	1.73	0.39	238493.00	-4755.68	241275
4.00	1.54	0.39	240871.00	-4755.68	243440
4.00	1.54	0.39	240871.00	-4697.94	243440
4.50	1.34	0.39	243220.00	-4697.94	245605
4.50	1.34	0.39	243220.00	-371.97	245605
5.00	1.15	0.38	243406.00	-371.97	247770
5.00	1.15	0.38	243406.00	3334.38	247770
5.50	0.96	0.38	241739.00	3334.38	249935
5.50	0.96	0.38	241739.00	6424.24	249935
6.00	0.77	0.38	238527.00	6424.24	252100
6.00	0.77	0.38	238527.00	8900.74	252100
6.50	0.58	0.38	234076.00	8900.74	254265
6.50	0.58	0.38	234076.00	10767.00	254265
7.00	0.39	0.38	228693.00	10767.00	256430
7.00	0.39	0.38	228693.00	12025.90	256430
7.50	0.20	0.37	222680.00	12025.90	258595
7.50	0.20	0.37	222680.00	12680.60	258595
8.00	0.02	0.37	216340.00	12680.60	260760
8.00	0.02	0.37	216340.00	12733.90	260760
8.50	-0.17	0.37	209973.00	12733.90	262925
8.50	-0.17	0.37	209973.00	12188.60	262925
9.00	-0.35	0.37	203878.00	12188.60	265090
9.00	-0.35	0.37	203878.00	11047.40	265090
9.50	-0.54	0.37	198355.00	11047.40	267255
9.50	-0.54	0.37	198355.00	9312.99	267255
10.00	-0.72	0.37	193698.00	9312.99	269420

Mmax = 243406.0 kN·m (Z= 5.00m)

Smax = 12733.90 kN (Z= 8.00m)



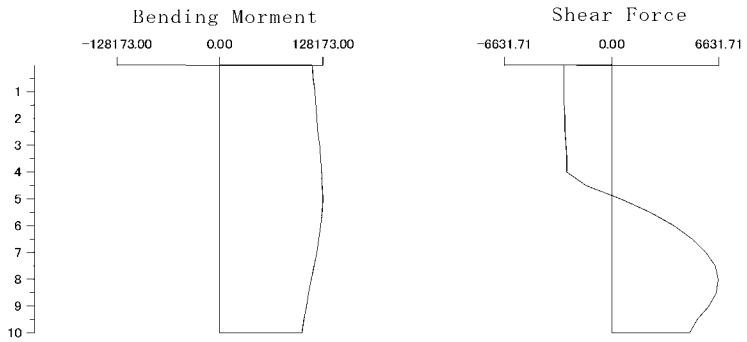
Transverse Direction

iii) Group-III

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	2.15	0.28	149730.00	-3790.00	233660
0.50	2.02	0.28	151625.00	-3790.00	235825
0.50	2.02	0.28	151625.00	-3790.00	235825
1.00	1.88	0.27	153520.00	-3790.00	237990
1.00	1.88	0.27	153520.00	-3790.00	237990
1.50	1.74	0.27	155415.00	-3790.00	240155
1.50	1.74	0.27	155415.00	-3790.00	240155
2.00	1.60	0.27	157310.00	-3790.00	242320
2.00	1.60	0.27	157310.00	-3729.78	242320
2.50	1.47	0.27	159175.00	-3729.78	244485
2.50	1.47	0.27	159175.00	-3674.66	244485
3.00	1.33	0.27	161012.00	-3674.66	246650
3.00	1.33	0.27	161012.00	-3624.62	246650
3.50	1.20	0.27	162825.00	-3624.62	248815
3.50	1.20	0.27	162825.00	-3579.62	248815
4.00	1.06	0.27	164614.00	-3579.62	250980
4.00	1.06	0.27	164614.00	-3539.65	250980
4.50	0.93	0.27	166384.00	-3539.65	253145
4.50	0.93	0.27	166384.00	-542.03	253145
5.00	0.80	0.26	166655.00	-542.03	255310
5.00	0.80	0.26	166655.00	2029.19	255310
5.50	0.67	0.26	165641.00	2029.19	257475
5.50	0.67	0.26	165641.00	4176.14	257475
6.00	0.54	0.26	163553.00	4176.14	259640
6.00	0.54	0.26	163553.00	5900.98	259640
6.50	0.41	0.26	160602.00	5900.98	261805
6.50	0.41	0.26	160602.00	7205.82	261805
7.00	0.28	0.26	156999.00	7205.82	263970
7.00	0.28	0.26	156999.00	8092.74	263970
7.50	0.15	0.26	152953.00	8092.74	266135
7.50	0.15	0.26	152953.00	8563.77	266135
8.00	0.02	0.26	148671.00	8563.77	268300
8.00	0.02	0.26	148671.00	8620.89	268300
8.50	-0.11	0.26	144360.00	8620.89	270465
8.50	-0.11	0.26	144360.00	8266.03	270465
9.00	-0.24	0.25	140227.00	8266.03	272630
9.00	-0.24	0.25	140227.00	7501.05	272630
9.50	-0.36	0.25	136477.00	7501.05	274795
9.50	-0.36	0.25	136477.00	6327.77	274795
10.00	-0.49	0.25	133313.00	6327.77	276960

Mmax = 166655.0 kN·m (Z= 5.00m)

Smax = 8620.89 kN (Z= 8.00m)



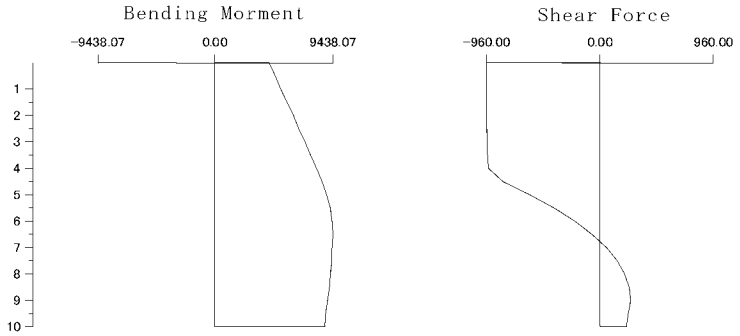
Transverse Direction

iv) Group-IV

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	0.20	0.02	5660.00	-1240.00	233660
0.50	0.19	0.02	6280.00	-1240.00	235825
0.50	0.19	0.02	6280.00	-1240.00	235825
1.00	0.18	0.02	6900.00	-1240.00	237990
1.00	0.18	0.02	6900.00	-1240.00	237990
1.50	0.17	0.02	7520.00	-1240.00	240155
1.50	0.17	0.02	7520.00	-1240.00	240155
2.00	0.16	0.02	8140.00	-1240.00	242320
2.00	0.16	0.02	8140.00	-1234.17	242320
2.50	0.14	0.02	8757.08	-1234.17	244485
2.50	0.14	0.02	8757.08	-1228.77	244485
3.00	0.13	0.02	9371.47	-1228.77	246650
3.00	0.13	0.02	9371.47	-1223.79	246650
3.50	0.12	0.02	9983.36	-1223.79	248815
3.50	0.12	0.02	9983.36	-1219.25	248815
4.00	0.11	0.02	10593.00	-1219.25	250980
4.00	0.11	0.02	10593.00	-1215.13	250980
4.50	0.10	0.02	11200.60	-1215.13	253145
4.50	0.10	0.02	11200.60	-898.60	253145
5.00	0.09	0.02	11649.90	-898.60	255310
5.00	0.09	0.02	11649.90	-618.36	255310
5.50	0.08	0.02	11959.00	-618.36	257475
5.50	0.08	0.02	11959.00	-374.25	257475
6.00	0.06	0.02	12146.20	-374.25	259640
6.00	0.06	0.02	12146.20	-166.12	259640
6.50	0.05	0.02	12229.20	-166.12	261805
6.50	0.05	0.02	12229.20	6.19	261805
7.00	0.04	0.02	12226.10	6.19	263970
7.00	0.04	0.02	12226.10	142.84	263970
7.50	0.03	0.02	12154.70	142.84	266135
7.50	0.03	0.02	12154.70	243.98	266135
8.00	0.02	0.02	12032.70	243.98	268300
8.00	0.02	0.02	12032.70	309.78	268300
8.50	0.01	0.02	11877.80	309.78	270465
8.50	0.01	0.02	11877.80	340.38	270465
9.00	0.00	0.02	11707.60	340.38	272630
9.00	0.00	0.02	11707.60	335.95	272630
9.50	-0.01	0.02	11539.70	335.95	274795
9.50	-0.01	0.02	11539.70	296.63	274795
10.00	-0.02	0.02	11391.30	296.63	276960

Mmax = 12229.20 kN·m (Z= 6.50m)

Smax = -1240.0 kN (Z= 0.00m)



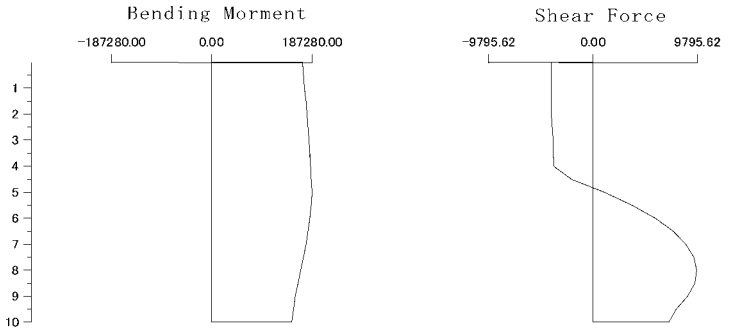
Transverse Direction

v) Group- Ⅴ

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	3.00	0.39	212530.00	-4870.00	217420
0.50	2.81	0.39	214965.00	-4870.00	219585
0.50	2.81	0.39	214965.00	-4870.00	219585
1.00	2.62	0.38	217400.00	-4870.00	221750
1.00	2.62	0.38	217400.00	-4870.00	221750
1.50	2.42	0.38	219835.00	-4870.00	223915
1.50	2.42	0.38	219835.00	-4870.00	223915
2.00	2.23	0.38	222270.00	-4870.00	226080
2.00	2.23	0.38	222270.00	-4786.18	226080
2.50	2.04	0.38	224663.00	-4786.18	228245
2.50	2.04	0.38	224663.00	-4709.48	228245
3.00	1.85	0.38	227018.00	-4709.48	230410
3.00	1.85	0.38	227018.00	-4639.88	230410
3.50	1.67	0.38	229338.00	-4639.88	232575
3.50	1.67	0.38	229338.00	-4577.33	232575
4.00	1.48	0.37	231626.00	-4577.33	234740
4.00	1.48	0.37	231626.00	-4521.80	234740
4.50	1.29	0.37	233887.00	-4521.80	236905
4.50	1.29	0.37	233887.00	-361.34	236905
5.00	1.11	0.37	234068.00	-361.34	239070
5.00	1.11	0.37	234068.00	3203.24	239070
5.50	0.92	0.37	232466.00	3203.24	241235
5.50	0.92	0.37	232466.00	6174.96	241235
6.00	0.74	0.37	229379.00	6174.96	243400
6.00	0.74	0.37	229379.00	8556.82	243400
6.50	0.56	0.36	225100.00	8556.82	245565
6.50	0.56	0.36	225100.00	10351.80	245565
7.00	0.38	0.36	219925.00	10351.80	247730
7.00	0.38	0.36	219925.00	11562.80	247730
7.50	0.20	0.36	214143.00	11562.80	249895
7.50	0.20	0.36	214143.00	12192.70	249895
8.00	0.02	0.36	208047.00	12192.70	252060
8.00	0.02	0.36	208047.00	12244.20	252060
8.50	-0.16	0.36	201925.00	12244.20	254225
8.50	-0.16	0.36	201925.00	11720.00	254225
9.00	-0.34	0.36	196065.00	11720.00	256390
9.00	-0.34	0.36	196065.00	10622.80	256390
9.50	-0.52	0.35	190753.00	10622.80	258555
9.50	-0.52	0.35	190753.00	8955.09	258555
10.00	-0.69	0.35	186276.00	8955.09	260720

Mmax = 234068.0 kN･m (Z= 5.00m)

Smax = 12244.00 kN (Z= 8.00m)



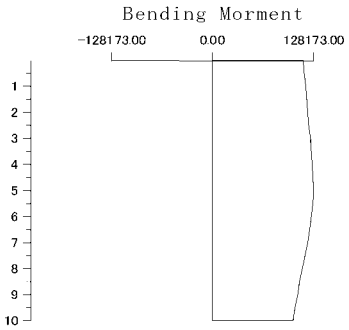
Transverse Direction

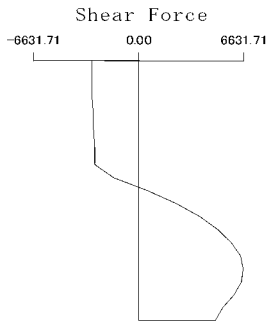
vi) Group-VI

Z (m)	δx (mm)	δz (mm)	M (kN.m)	S (kN)	N (kN)
0.00	2.07	0.27	143970.00	-3640.00	224670
0.50	1.94	0.27	145790.00	-3640.00	226835
0.50	1.94	0.27	145790.00	-3640.00	226835
1.00	1.81	0.26	147610.00	-3640.00	229000
1.00	1.81	0.26	147610.00	-3640.00	229000
1.50	1.67	0.26	149430.00	-3640.00	231165
1.50	1.67	0.26	149430.00	-3640.00	231165
2.00	1.54	0.26	151250.00	-3640.00	233330
2.00	1.54	0.26	151250.00	-3582.11	233330
2.50	1.41	0.26	153041.00	-3582.11	235495
2.50	1.41	0.26	153041.00	-3529.13	235495
3.00	1.28	0.26	154806.00	-3529.13	237660
3.00	1.28	0.26	154806.00	-3481.02	237660
3.50	1.15	0.26	156546.00	-3481.02	239825
3.50	1.15	0.26	156546.00	-3437.76	239825
4.00	1.02	0.26	158265.00	-3437.76	241990
4.00	1.02	0.26	158265.00	-3399.34	241990
4.50	0.90	0.26	159965.00	-3399.34	244155
4.50	0.90	0.26	159965.00	-517.81	244155
5.00	0.77	0.25	160224.00	-517.81	246320
5.00	0.77	0.25	160224.00	1953.79	246320
5.50	0.64	0.25	159247.00	1953.79	248485
5.50	0.64	0.25	159247.00	4017.53	248485
6.00	0.52	0.25	157238.00	4017.53	250650
6.00	0.52	0.25	157238.00	5675.46	250650
6.50	0.39	0.25	154400.00	5675.46	252815
6.50	0.39	0.25	154400.00	6929.64	252815
7.00	0.26	0.25	150935.00	6929.64	254980
7.00	0.26	0.25	150935.00	7782.04	254980
7.50	0.14	0.25	147044.00	7782.04	257145
7.50	0.14	0.25	147044.00	8234.64	257145
8.00	0.02	0.25	142927.00	8234.64	259310
8.00	0.02	0.25	142927.00	8289.32	259310
8.50	-0.11	0.25	138782.00	8289.32	261475
8.50	-0.11	0.25	138782.00	7947.93	261475
9.00	-0.23	0.24	134808.00	7947.93	263640
9.00	-0.23	0.24	134808.00	7212.29	263640
9.50	-0.35	0.24	131202.00	7212.29	265805
9.50	-0.35	0.24	131202.00	6084.13	265805
10.00	-0.47	0.24	128160.00	6084.13	267970

Mmax = 160224.0 kN·m (Z= 5.00m)

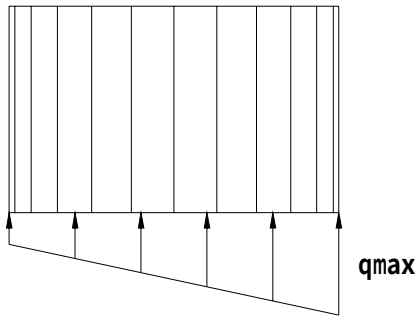
Smax = 8289.32 kN (Z= 8.00m)





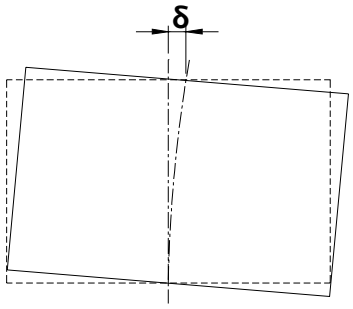
3.4.3 Calculation Resalt of Stability

1) Lomgitudinal Direction



Ground Reaction

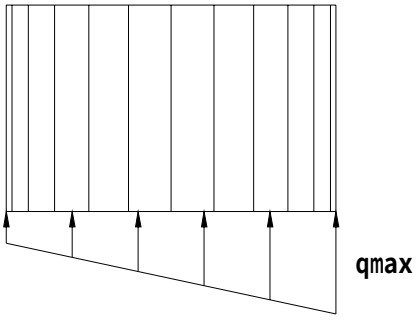
	qmax (kN/m^2)		qa (kN/m^2)	Remarks	
Group-I	1328.8	<	6500	OK	
Group-II	1230.6	<	6500	OK	
Group-III	1370.7	<	6500	OK	
Group-IV	1324.6	<	6500	OK	
Group-V	1226.5	<	6500	OK	
Group-VI	1226.5	<	6500	OK	
seismic	4245.1	<	9750	OK	Dynamic Load



Displacement for top of foundation

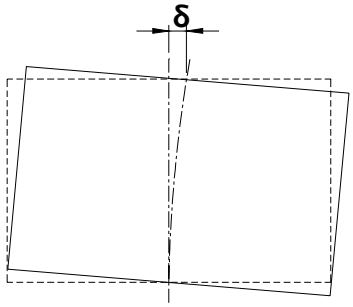
	δ (mm)		δa (mm)	Remarks	
Group-I	0.43	<	50.0	OK	
Group-II	0.01	<	50.0	OK	
Group-III	0.65	<	50.0	OK	
Group-IV	0.43	<	50.0	OK	
Group-V	0.00	<	50.0	OK	
Group-VI	0.65	<	50.0	OK	
seismic	5.56	<	50.0	OK	Dynamic Load

2) Transverse Direction



Ground Reaction

	qmax (kN/m^2)		qa (kN/m^2)	Remarks	
Group-I	1271.9	<	6500	OK	
Group-II	1679.1	<	6500	OK	
Group-III	1554.8	<	6500	OK	
Group-IV	1271.9	<	6500	OK	
Group-V	1679.1	<	6500	OK	
Group-VI	1554.8	<	6500	OK	
seismic	4839.8	<	9750	OK	Dynamic Load



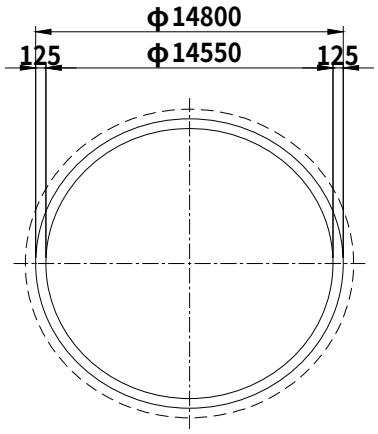
Displacement for top of foundation

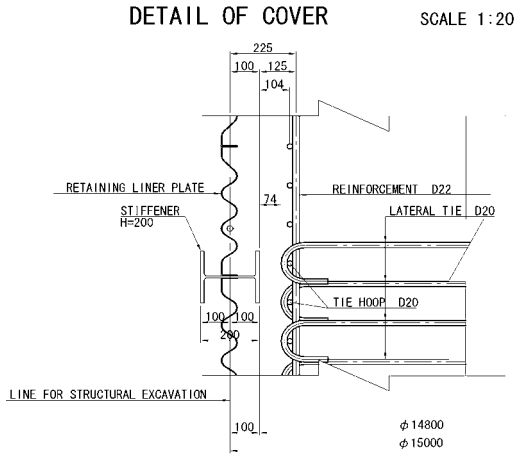
	δ (mm)		δa (mm)	Remarks	
Group-I	0.16	<	50.0	OK	
Group-II	2.40	<	50.0	OK	
Group-III	1.66	<	50.0	OK	
Group-IV	0.16	<	50.0	OK	
Group-V	2.40	<	50.0	OK	
Group-VI	1.66	<	50.0	OK	
seismic	7.83	<	50.0	OK	Dynamic Load

3.4.4 Calculation of Stress for Service Load Design

Bar Arrangement

		Longitudinal Direction
Dimension	Dia.(mm)	14800
Bar Arrangement	As1(mm^2)	156 - D22 ctc 293





(1) Calculation Result of Bending Stress

Longitudinal Direction

	Longitudinal Direction					
	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks	
Group-I	1.13	-13.5	9.60	168.0	OK	
Group-II	1.00	-15.0	12.00	210.0	OK	
Group-III	1.30	-14.4	12.00	210.0	OK	
Group-IV	1.13	-13.5	12.00	210.0	OK	
Group-V	1.00	-14.9	13.44	235.2	OK	
Group-VI	1.29	-14.4	13.44	235.2	OK	
seismic	4.26	42.7	20.40	378.0	OK	Dynamic

Transverse Direction

	Transverse Direction					
	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks	
Group-I	1.21	-17.2	9.60	168.0	OK	
Group-II	1.70	-8.4	12.00	210.0	OK	
Group-III	1.53	-11.3	12.00	210.0	OK	
Group-IV	1.21	-17.2	12.00	210.0	OK	
Group-V	1.70	-8.4	13.44	235.2	OK	
Group-VI	1.53	-11.3	13.44	235.2	OK	
seismic	4.34	47.1	20.40	378.0	OK	Dynamic

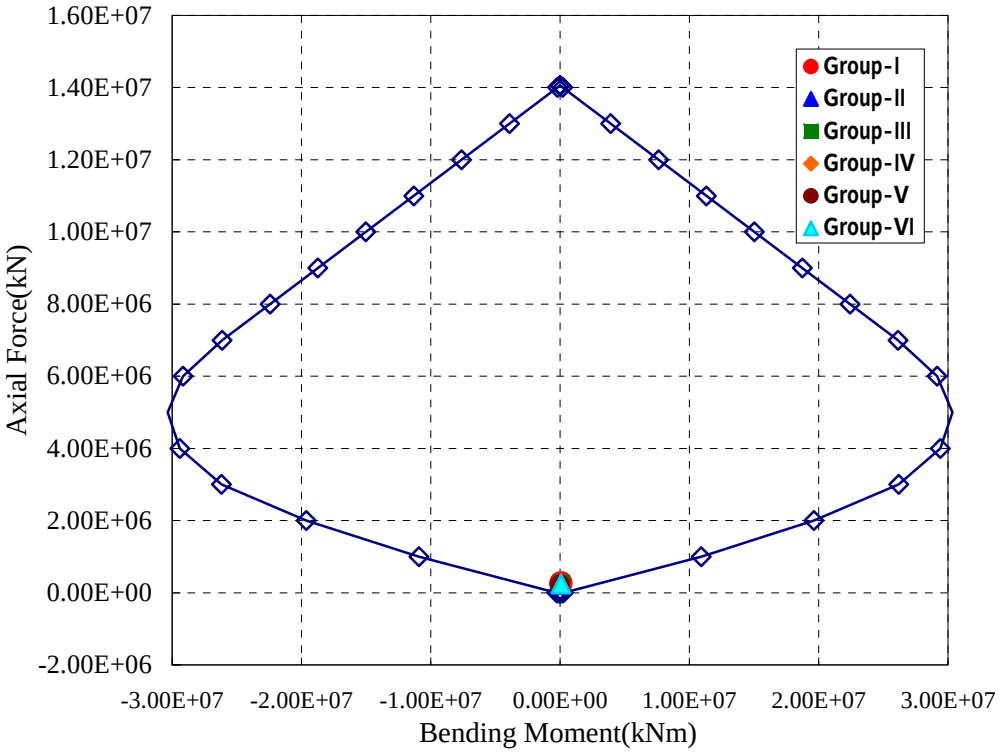
(2) Calculation of Strength for Load Factor Design

*) Flexural Strength

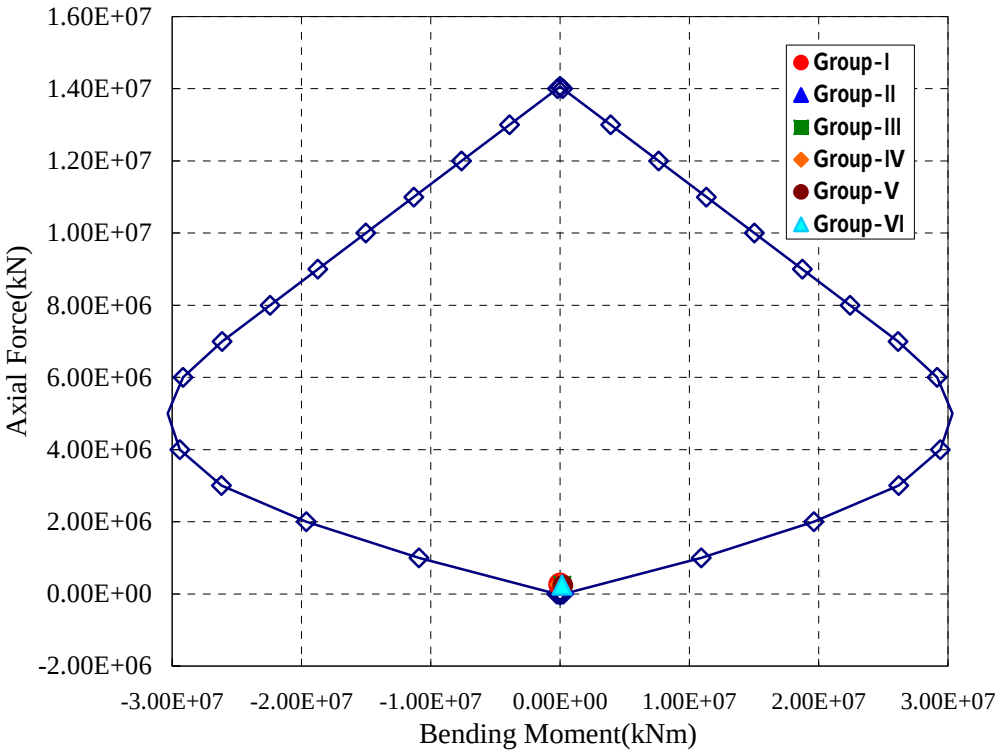
Factored Bending Moment for Load Factor Design

	Longitudinal Direction		Transverse Direction	
	M(kNm)	N(kN)	M(kNm)	N(kN)
Group-I	70112.6	274493	12229.2	261805
Group-II	770.0	226120	243406.0	247770
Group-III	71217.1	255138	166655.0	255310
Group-IV	48080.0	228950	12229.2	261805
Group-V	510.0	216590	234068.0	239070
Group-VI	68240.6	245468	160224.0	246320

Interaction of Longitudinal Direction



Interaction of Transverse Direction



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

Vn= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=1/6x $\sqrt{}$ f'c)

= 1/6x $\sqrt{}$ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

	Longitudinal Direction	Transverse Direction
Group-I	4733.4 kN	1240.0 kN
Group-II	45.5 kN	12733.9 kN
Group-III	4096.8 kN	8620.9 kN
Group-IV	2838.4 kN	1240.0 kN
Group-V	30.1 kN	12244.0 kN
Group-VI	3925.4 kN	8289.3 kN

Calculation of Shear Strength

vc = $1/6x\sqrt{f'c} = 1/6x\sqrt{(24)} = 0.816 N/mm^2$ -> $816 kN/m^2$

fy = 420 N/mm^2 -> 420000 kN/m^2

s = 2.960 m

Longitudinal Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	4733.4	1.000	14.675	10178.58	0.00	0.0
Group-II	45.5	1.000	14.675	10178.58	0.00	0.0
Group-III	4096.8	1.000	14.675	10178.58	0.00	0.0
Group-IV	2838.4	1.000	14.675	10178.58	0.00	0.0
Group-V	30.1	1.000	14.675	10178.58	0.00	0.0
Group-VI	3925.4	1.000	14.675	10178.58	0.00	0.0

Arrangement of Stirrup D20 -ctc.150 13962.63 mm^2/m > 0 mm^2/m

Transverse Direction

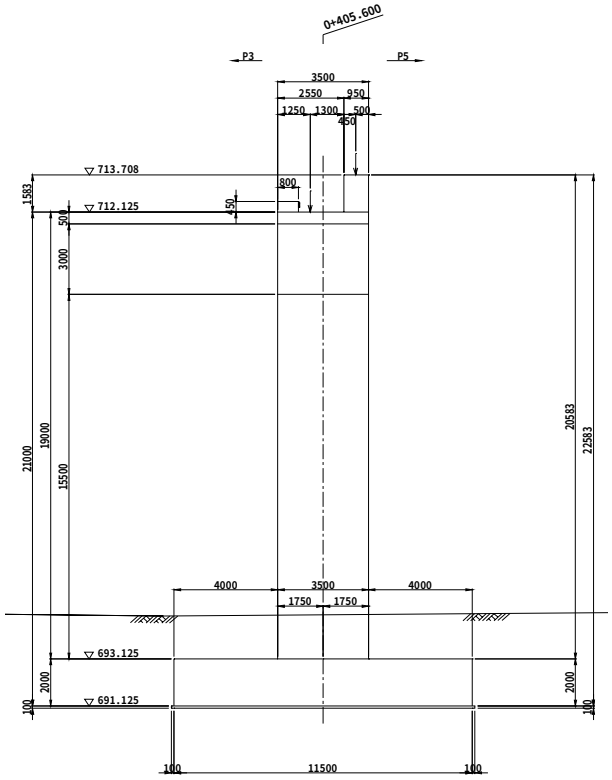
	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	1240.0	1.000	14.675	10178.58	0.00	0.0
Group-II	12733.9	1.000	14.675	10178.58	3006.26	487.8
Group-III	8620.9	1.000	14.675	10178.58	0.00	0.0
Group-IV	1240.0	1.000	14.675	10178.58	0.00	0.0
Group-V	12244.0	1.000	14.675	10178.58	2429.91	394.2
Group-VI	8289.3	1.000	14.675	10178.58	0.00	0.0

Arrangement of Stirrup D20 -ctc.150 13962.63 mm^2/m > 487.8 mm^2/m

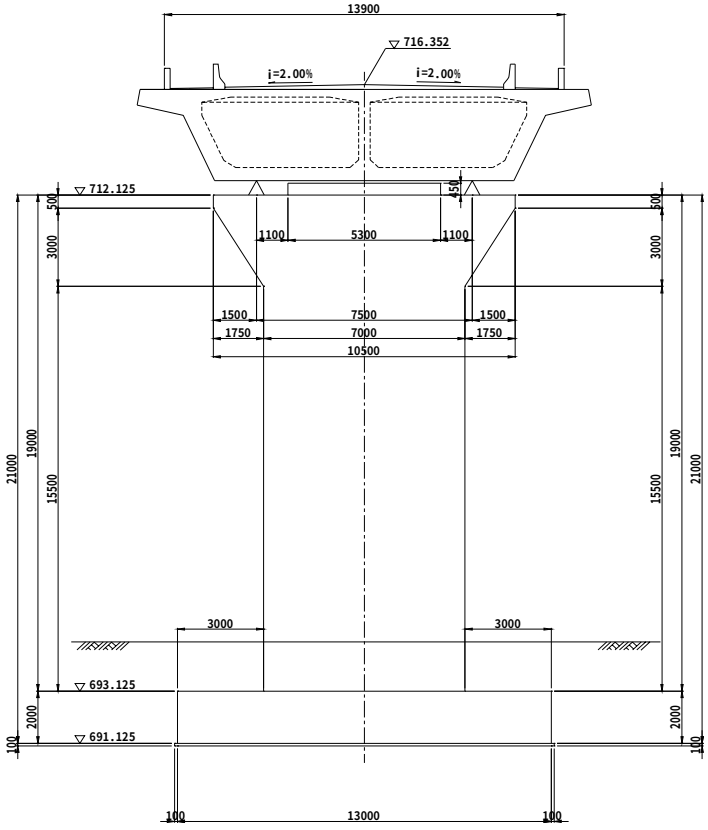
4. Design of P4 Pier

4.1 General Arrangement

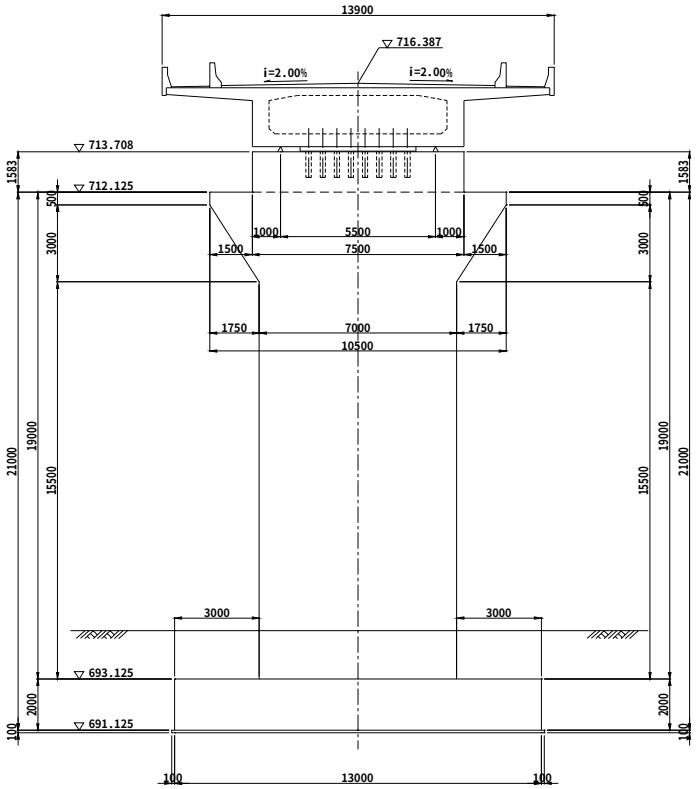
Side Elevation



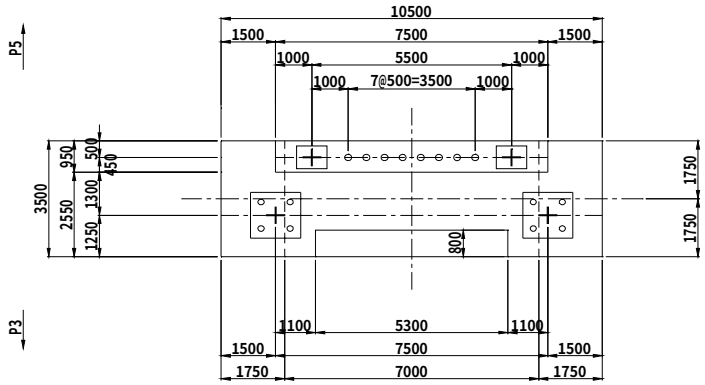
Front Elevation - 1

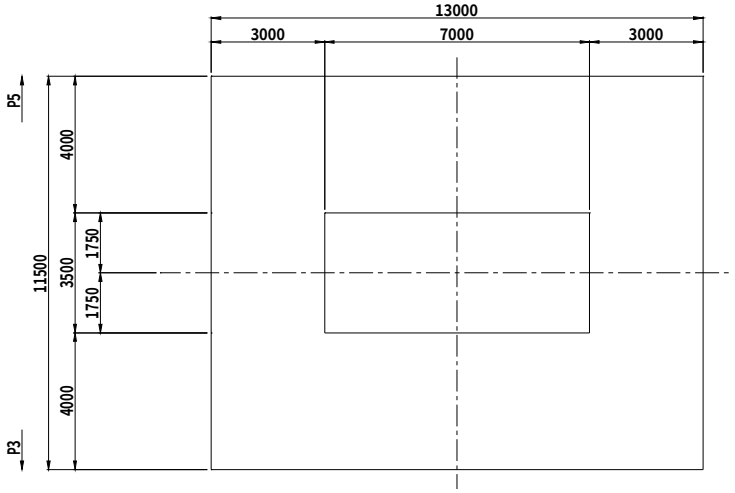


Front Elevation - 2

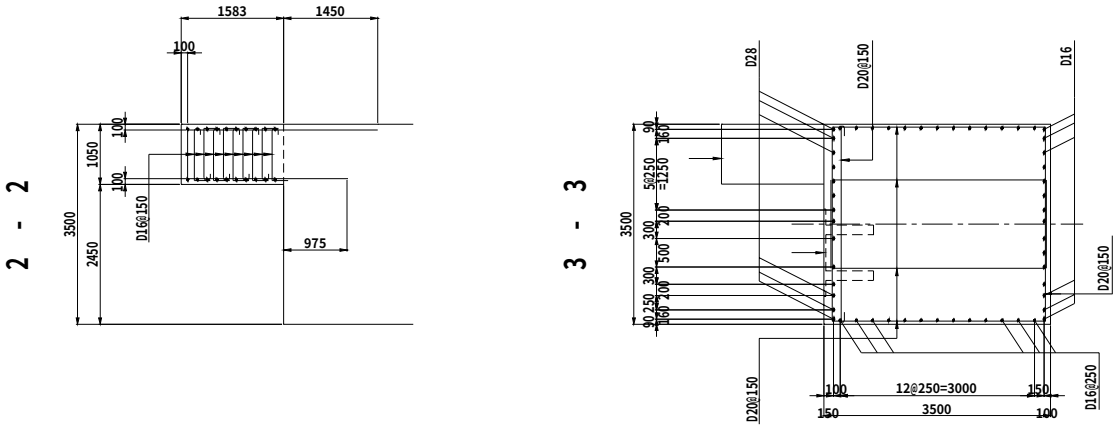


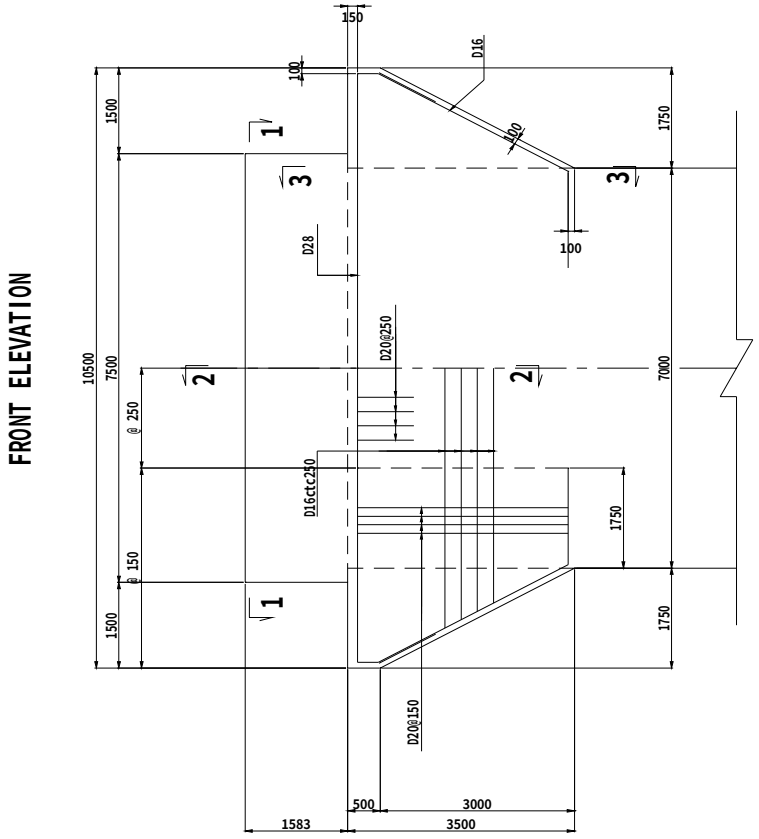
Plan

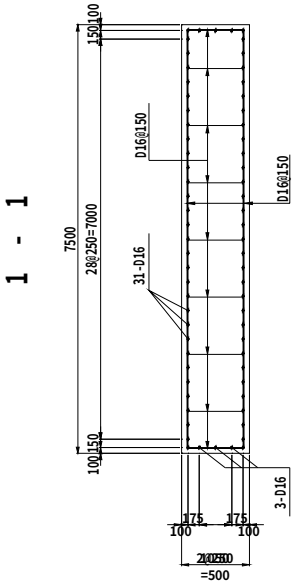




4.2 Bar Arrangement



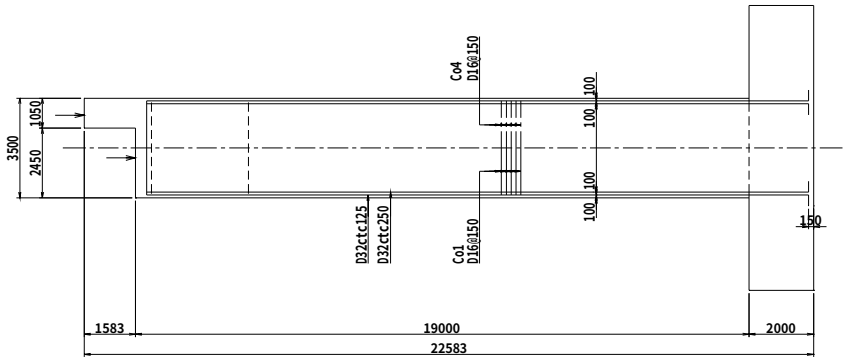




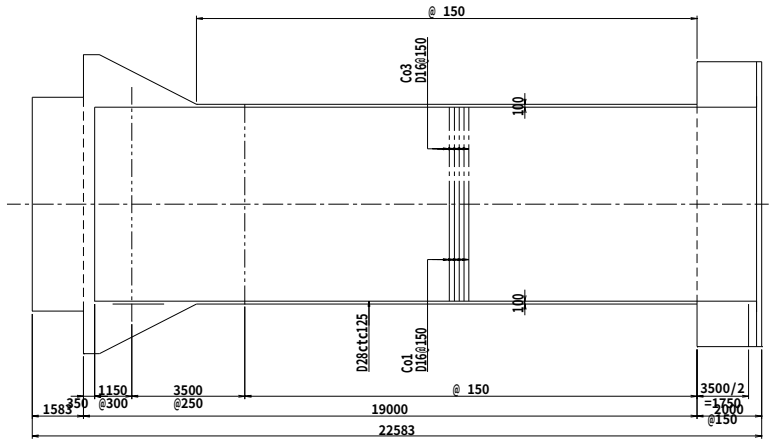
BEAM

WALL

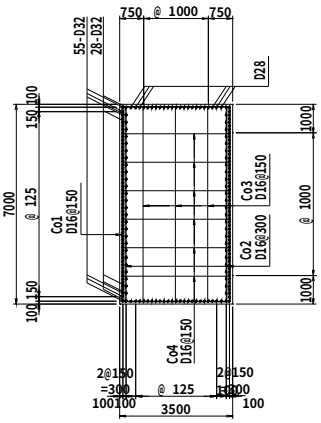
SIDE ELEVATION



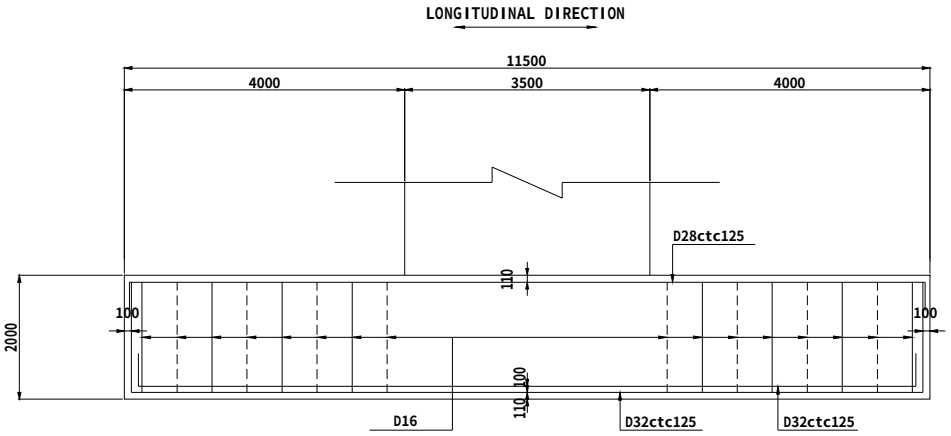
FRONT ELEVATION



PLAN



FOOTING


LONGITUDINAL DIRECTION
11500
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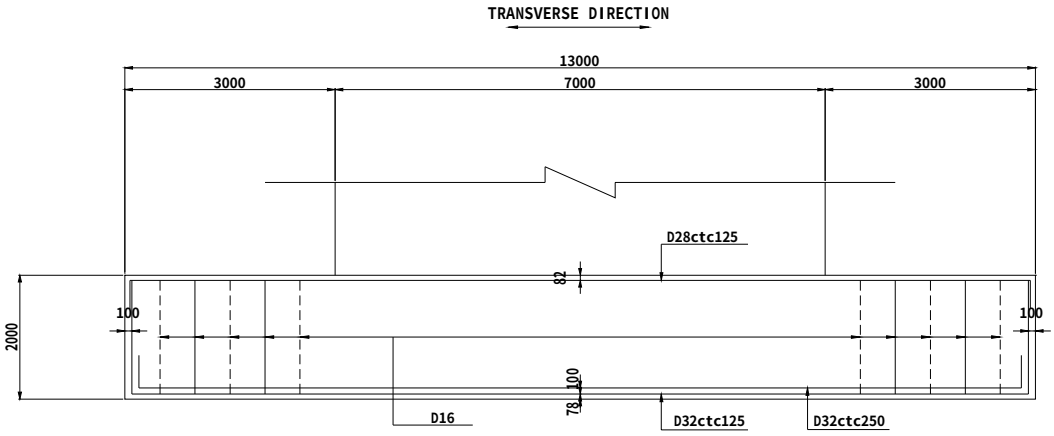
3500
4000
D28ctc125
110
100
100
2000
100
110
D16
D32ctc125
D32ctc125


TRANSVERSE DIRECTION
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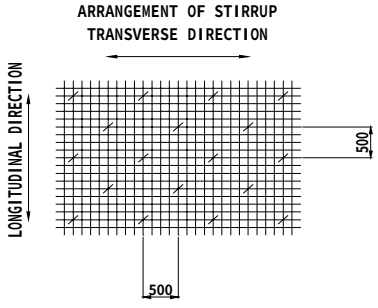
3000
7000
3000
D28ctc125
82
100
100
2000
100
78
D16
D32ctc125
D32ctc250


ARRANGEMENT OF STIRRUP
TRANSVERSE DIRECTION
LONGITUDINAL DIRECTION
500
500

4.3 Loading Data

4.3.1 Reaction from Superstructure

(1)Vertical Force

Loadings		Naluchi side	West side	Total	Gravity of Longitudinal(m)	
Mark	Type of Loading	(kN)	(kN)	(kN)	Eest side	Naluchi side
D	Self Weight of Girder	5360	3700	9060	0.500	1.250
	Prestress	-270	590	320	0.500	1.250
	Creep Effect	90	-60	30	0.500	1.250
	Total	5180	4230	9410	0.500	1.250
	Eccentric Distance for Longitudinal Direction					0.287
SD	Surfacing	2070	960	3030	0.500	1.250
	Eccentric Distance for Longitudinal Direction					0.054
L	CLASS-A Loading Maximum	1550	820	2370	0.500	1.250
	Impuct Factor	100	160	260	0.500	1.250
	Footway Load	240	120	360	0.500	1.250
	Total	3960	2060	6020	0.500	1.250
	Eccentric Distance for Longitudinal Direction					0.071
S	Shrinkage	470	-110	360	0.500	1.250
	Eccentric Distance for Longitudinal Direction					-1.035
T	Temparature Change(Rise)	0	0	0	0.500	1.250
T	Temparature Difference	80	240	320	0.500	1.250
	Eccentric Distance for Longitudinal Direction					0.813

(2)Horizontal Force

1)Longitudinal Direction

Loadings		Naluchi side	West side	Total
Mark	Type of Loading	(kN)	(kN)	(kN)
S	Shrinkage	0	0	0
T	Temparature Change (Rise)	0	0	0
T	Temparature Difference	0	0	0
LF	Longitudanl Force	90	50	140

2)Transverse Direction

Loadings		Naluchi side	West side	Total
Mark	Type of Loading	(kN)	(kN)	(kN)
CF	Centrifugal Force	0	0	0

4.3.2 Force at Bottom of Wall

(1)Concrete Volume and Self Weight of Substructure

Division	Calculation formula Width × Height × Depth	Volume Vi(m^3)	Gravity x(m)	Gravity y(m)	Vi x x	Vi x y
1	7.500 x 1.583 x 0.950	11.279	1.275	19.692	14.381	222.098
2	7.000 x 18.900 x 3.500	463.050	0.000	9.450	0.000	4375.823
3	0.500 x 3.500 x 3.500	6.125	0.000	18.650	0.000	114.231
4	1.750 x 3.000 x 3.500	18.375	0.000	17.400	0.000	319.725
Σ		498.829	0.029	10.087	14.381	5031.877

Self Weight of Substructure 24.5 x ΣV = 12221.307 kN

(2) Buoyancy

Division	Calculation formula Width × Height × Depth	Volume Vi(m^3)
1		-
2		-
3		-
4		-
Σ		0.000

Buoyancy -10 x ΣV = 0.000 kN

(3) Superstructure Reaction

Load		V (kN)	H (kN)	xi (m)	yi (m)
Self Weight of Girder	D	9410.0	0.0	0.287	18.900
Surfacing	SD	3030.0	0.0	0.054	18.900
Shrinkage	S	360.0	0.0	-1.035	18.900
Live Load (CLASS-A)	L	6020.0	0.0	0.071	18.900
Longitidinal Force	LF	0.0	140.0	0.000	25.090
Centrifugal Force	CF	0.0	0.0	0.000	25.090
Temparature Change	T	0.0	0.0	0.000	18.900
Temparature Difference	T	320.0	0.0	0.813	18.900

(4) Summary of Force For Service Load Design

1) Longitudinal Direction

Group-I	D+SD+L+CF+E+B					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.029	10.087	352.3
Self Weight of Girder	D(Super)	9410.0	0.0	0.287	18.900	2697.5
Surfacing	SD	3030.0	0.0	0.054	18.900	165.0
Live Load CLASS-A	L	6020.0	0.0	0.071	18.900	430.0
Centrifugal Force	CF	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Total		30681.3	0.0	-	-	3644.8

Group-II	D+SD+E+B+W					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.029	10.087	352.3
Self Weight of Girder	D(Super)	9410.0	0.0	0.287	18.900	2697.5
Surfacing	SD	3030.0	0.0	0.054	18.900	165.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Total		24661.3	0.0	-	-	3214.8

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.029	10.087	352.3
Self Weight of Girder	D(Super)	9410.0	0.0	0.287	18.900	2697.5
Surfacing	SD	3030.0	0.0	0.054	18.900	165.0
Live Load CLASS-A	L	6020.0	0.0	0.071	18.900	430.0
Centrifugal Force	CF	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	0.0	140.0	0.000	25.090	3512.6
Total		30681.3	140.0	-	-	7157.4

Group-IV	D+SD+L+CF+E+B+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.029	10.087	352.3
Self Weight of Girder	D(Super)	9410.0	0.0	0.287	18.900	2697.5
Surfacing	SD	3030.0	0.0	0.054	18.900	165.0
Live Load CLASS-A	L	6020.0	0.0	0.071	18.900	430.0
Centrifugal Force	CF	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	320.0	0.0	0.813	18.900	260.0
Total		31001.3	0.0	-	-	3904.8

Group-V	D+SD+E+B+W+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.029	10.087	352.3
Self Weight of Girder	D(Super)	9410.0	0.0	0.287	18.900	2697.5
Surfacing	SD	3030.0	0.0	0.054	18.900	165.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	320.0	0.0	0.813	18.900	260.0
Total		24981.3	0.0	-	-	3474.8

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.029	10.087	352.3
Self Weight of Girder	D(Super)	9410.0	0.0	0.287	18.900	2697.5
Surfacing	SD	3030.0	0.0	0.054	18.900	165.0
Live Load CLASS-A	L	6020.0	0.0	0.071	18.900	430.0
Centrifugal Force	CF	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	0.0	140.0	0.000	25.090	3512.6
Shrinkage	S	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	320.0	0.0	0.813	18.900	260.0
Total		31001.3	140.0	-	-	7417.4

2) Transvers Direction

Group-I	D+SD+L+CF+E+B					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	9410.0	0.0	0.000	18.900	0.0
Surfacing	SD	3030.0	0.0	0.000	18.900	0.0
Live Load CLASS-A	L	6020.0	0.0	0.000	18.900	0.0
Centrifugal Force	CF	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Total		30681.3	0.0	-	-	0.0

Group-II	D+SD+E+B+W					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	9410.0	0.0	0.000	18.900	0.0
Surfacing	SD	3030.0	0.0	0.000	18.900	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Total		24661.3	0.0	-	-	0.0

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	9410.0	0.0	0.000	18.900	0.0
Surfacing	SD	3030.0	0.0	0.000	18.900	0.0
Live Load CLASS-A	L	6020.0	0.0	0.000	18.900	0.0
Centrifugal Force	CF	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	0.0	0.0	0.000	25.090	0.0
Total		30681.3	0.0	-	-	0.0

Group-IV	D+SD+L+CF+E+B+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	9410.0	0.0	0.000	18.900	0.0
Surfacing	SD	3030.0	0.0	0.000	18.900	0.0
Live Load CLASS-A	L	6020.0	0.0	0.000	18.900	0.0
Centrifugal Force	CF	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	320.0	0.0	0.000	18.900	0.0
Total		31001.3	0.0	-	-	0.0

Group-V	D+SD+E+B+W+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	9410.0	0.0	0.000	18.900	0.0
Surfacing	SD	3030.0	0.0	0.000	18.900	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	320.0	0.0	0.000	18.900	0.0
Total		24981.3	0.0	-	-	0.0

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T					
Loadings		V_i (kN)	H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	12221.3	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	9410.0	0.0	0.000	18.900	0.0
Surfacing	SD	3030.0	0.0	0.000	18.900	0.0
Live Load CLASS-A	L	6020.0	0.0	0.000	18.900	0.0
Centrifugal Force	CF	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	0.0	0.0	0.000	25.090	0.0
Shrinkage	S	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	320.0	0.0	0.000	18.900	0.0
Total		31001.3	0.0	-	-	0.0

(5) Summary of Force For Load Factor Design

1) Longitudinal Direction

Group-I	γ(D+SD+1.67L+CF+E+B)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	15887.7	0.0	0.029	10.087	458.0
Self Weight of Girder	D(Super)	1.300	12233.0	0.0	0.287	18.900	3506.8
Surfacing	SD	1.300	3939.0	0.0	0.054	18.900	214.5
Live Load CLASS-A	L	2.171	13069.4	0.0	0.071	18.900	933.5
Centrifugal Force	CF	1.300	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Total			45129.1	0.0	-	-	5112.8

Group-II	γ(D+SD+E+B+W)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	15887.7	0.0	0.029	10.087	458.0
Self Weight of Girder	D(Super)	1.300	12233.0	0.0	0.287	18.900	3506.8
Surfacing	SD	1.300	3939.0	0.0	0.054	18.900	214.5
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.300	0.0	0.0	0.000	0.000	0.0
Total			32059.7	0.0	-	-	4179.3

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	15887.7	0.0	0.029	10.087	458.0
Self Weight of Girder	D(Super)	1.300	12233.0	0.0	0.287	18.900	3506.8
Surfacing	SD	1.300	3939.0	0.0	0.054	18.900	214.5
Live Load CLASS-A	L	1.300	7826.0	0.0	0.071	18.900	559.0
Centrifugal Force	CF	1.300	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.390	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	1.300	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	1.300	0.0	182.0	0.000	25.090	4566.4
Total			39885.7	182.0	-	-	9304.7

Group-IV	γ(D+SD+L+CF+E+B+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	15887.7	0.0	0.029	10.087	458.0
Self Weight of Girder	D(Super)	1.300	12233.0	0.0	0.287	18.900	3506.8
Surfacing	SD	1.300	3939.0	0.0	0.054	18.900	214.5
Live Load CLASS-A	L	1.300	7826.0	0.0	0.071	18.900	559.0
Centrifugal Force	CF	1.300	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	1.300	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	1.300	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	1.300	416.0	0.0	0.813	18.900	338.0
Total			40301.7	0.0	-	-	5076.3

Group-V	γ(D+SD+E+B+W+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.250	15276.6	0.0	0.029	10.087	440.4
Self Weight of Girder	D(Super)	1.250	11762.5	0.0	0.287	18.900	3371.9
Surfacing	SD	1.250	3787.5	0.0	0.054	18.900	206.3
Earth Pressure	E	1.250	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.250	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	1.250	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	1.250	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	1.250	400.0	0.0	0.813	18.900	325.0
Total			31226.6	0.0	-	-	4343.5

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.250	15276.6	0.0	0.029	10.087	440.4
Self Weight of Girder	D(Super)	1.250	9410.0	0.0	0.287	18.900	2697.5
Surfacing	SD	1.250	3030.0	0.0	0.054	18.900	165.0
Live Load CLASS-A	L	1.250	6020.0	0.0	0.071	18.900	430.0
Centrifugal Force	CF	1.250	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	1.250	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	1.250	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	1.250	0.0	140.0	0.000	25.090	3512.6
Shrinkage	S	1.250	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	1.250	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	1.250	320.0	0.0	0.813	18.900	260.0
Total			34056.6	140.0	-	-	7505.5

2) Transvers Direction

Group-I	γ(D+SD+1.67L+CF+E+B)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	15887.7	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	1.300	12233.0	0.0	0.000	18.900	0.0
Surfacing	SD	1.300	3939.0	0.0	0.000	18.900	0.0
Live Load CLASS-A	L	2.171	13069.4	0.0	0.000	18.900	0.0
Centrifugal Force	CF	1.300	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Total			45129.1	0.0	-	-	0.0

Group-II	γ(D+SD+E+B+W)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	15887.7	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	1.300	12233.0	0.0	0.000	18.900	0.0
Surfacing	SD	1.300	3939.0	0.0	0.000	18.900	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.300	0.0	0.0	0.000	0.000	0.0
Total			32059.7	0.0	-	-	0.0

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	15887.7	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	1.300	12233.0	0.0	0.000	18.900	0.0
Surfacing	SD	1.300	3939.0	0.0	0.000	18.900	0.0
Live Load CLASS-A	L	1.300	7826.0	0.0	0.000	18.900	0.0
Centrifugal Force	CF	1.300	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Wind Load	W	0.390	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	1.300	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	1.300	0.0	0.0	0.000	25.090	0.0
Total			39885.7	0.0	-	-	0.0

Group-IV	γ(D+SD+L+CF+E+B+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.300	15887.7	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	1.300	12233.0	0.0	0.000	18.900	0.0
Surfacing	SD	1.300	3939.0	0.0	0.000	18.900	0.0
Live Load CLASS-A	L	1.300	7826.0	0.0	0.000	18.900	0.0
Centrifugal Force	CF	1.300	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	1.300	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.300	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	1.300	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	1.300	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	1.300	416.0	0.0	0.000	18.900	0.0
Total			40301.7	0.0	-	-	0.0

Group-V	γ(D+SD+E+B+W+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.250	15276.6	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	1.250	11762.5	0.0	0.000	18.900	0.0
Surfacing	SD	1.250	3787.5	0.0	0.000	18.900	0.0
Earth Pressure	E	1.250	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.250	0.0	0.0	0.000	0.000	0.0
Shrinkage	S	1.250	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	1.250	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	1.250	400.0	0.0	0.000	18.900	0.0
Total			31226.6	0.0	-	-	0.0

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)						
Loadings		γ x β	γ·β·V_i (kN)	γ·β·H_i (kN)	Xi(m)	Yi(m)	M=Hi·Yi+Vi·Xi
Self Weight of Substructure	D(Sub)	1.250	15276.6	0.0	0.000	10.087	0.0
Self Weight of Girder	D(Super)	1.250	9410.0	0.0	0.000	18.900	0.0
Surfacing	SD	1.250	3030.0	0.0	0.000	18.900	0.0
Live Load CLASS-A	L	1.250	6020.0	0.0	0.000	18.900	0.0
Centrifugal Force	CF	1.250	0.0	0.0	0.000	25.090	0.0
Earth Pressure	E	1.250	0.0	0.0	0.000	0.000	0.0
Buoyancy	B	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load	W	1.250	0.0	0.0	0.000	0.000	0.0
Wind Load on Live Load	WL	1.250	0.0	0.0	0.000	0.000	0.0
Longitidinal Force	LF	1.250	0.0	0.0	0.000	25.090	0.0
Shrinkage	S	1.250	0.0	0.0	0.000	18.900	0.0
Temparature Change	T	1.250	0.0	0.0	0.000	18.900	0.0
Temparature Difference	T	1.250	320.0	0.0	0.000	18.900	0.0
Total			34056.6	0.0	-	-	0.0

(5) Summary of Force at Bottom of Wall

		Longitudinal Direction			Transverse Direction		
		V(kN)	H(kN)	M(kNm)	V(kN)	H(kN)	M(kNm)
Service Load Design	Group-I	30681.3	0.0	3644.8	30681.3	0.0	0.0
	Group-II	24661.3	0.0	3214.8	24661.3	0.0	0.0
	Group-III	30681.3	140.0	7157.4	30681.3	0.0	0.0
	Group-IV	31001.3	0.0	3904.8	31001.3	0.0	0.0
	Group-V	24981.3	0.0	3474.8	24981.3	0.0	0.0
	Group-VI	31001.3	140.0	7417.4	31001.3	0.0	0.0
Load Factor Design	Group-I	45129.1	0.0	5112.8	45129.1	0.0	0.0
	Group-II	32059.7	0.0	4179.3	32059.7	0.0	0.0
	Group-III	39885.7	182.0	9304.7	39885.7	0.0	0.0
	Group-IV	40301.7	0.0	5076.3	40301.7	0.0	0.0
	Group-V	31226.6	0.0	4343.5	31226.6	0.0	0.0
	Group-VI	34056.6	140.0	7505.5	34056.6	0.0	0.0
Seismic Design		28918.0	7812.0	127514.0	25310.0	8914.0	130314.0

*) Sectional Force of Seismic Design is Calculated by Dynamic Analysis.

4.4 Design of Foundation

4.4.1 Summary of Force at Center of Pile Group

(1)Concrete Volume and Self Weight of Spread Footing

Division	Calculation formula Width × Height × Depth	Volume $Vi(m^3)$	Gravity y(m)	Vi x y
1	13.000 x 11.500 x 2.000	299.00	1.000	299.000
Σ		299.00	1.000	299.000

Self Weight of Substructure 24.5 x ΣV = 7325.50 kN

(2) Backfill Soil Covering on Footing

Division	Calculation formula Width × Height × Depth	Volume $Vi(m^3)$
1	(13.000 x 11.500 - 7.000 x 3.500)x 1.88	235.00
Σ		235.00

Weight of Soil on Spread Footing 19 x ΣV = 4465.00 kN

(3) Buoyancy

Division	Calculation formula Width × Height × Depth	Volume $Vi(m^3)$
1	13.000 x 11.500 x 0.000	0.00
Σ		0.00

Buoyancy -10 x ΣV = 0.000 kN

(4) Summary of Force at Bottom of Footing for Service Load Design

1) Longitudinal Direction

Group-I	D+SD+L+CF+E+B					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		30681.3	0.0	3644.8	2.000	3644.8
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		42471.8	0.0	-	-	3644.8

Group-II	D+SD+E+B+W					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		24661.3	0.0	3214.8	2.000	3214.8
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		36451.8	0.0	-	-	3214.8

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		30681.3	140.0	7157.4	2.000	7437.4
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		42471.8	140.0	-	-	7437.4

Group-IV	D+SD+L+CF+E+B+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		31001.3	0.0	3904.8	2.000	3904.8
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		42791.8	0.0	-	-	3904.8

Group-V	D+SD+E+B+W+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		24981.3	0.0	3474.8	2.000	3474.8
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		36771.8	0.0	-	-	3474.8

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		31001.3	140.0	7417.4	2.000	7697.4
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		42791.8	140.0	-	-	7697.4

2) Transvers Direction

Group-I	D+SD+L+CF+E+B					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		30681.3	0.0	0.0	2.000	0.0
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		42471.8	0.0	-	-	0.0

Group-II	D+SD+E+B+W					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		24661.3	0.0	0.0	2.000	0.0
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		36451.8	0.0	-	-	0.0

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		30681.3	0.0	0.0	2.000	0.0
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		42471.8	0.0	-	-	0.0

Group-IV	D+SD+L+CF+E+B+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		31001.3	0.0	0.0	2.000	0.0
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		42791.8	0.0	-	-	0.0

Group-V	D+SD+E+B+W+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		24981.3	0.0	0.0	2.000	0.0
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		36771.8	0.0	-	-	0.0

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T					
Loadings		V_i (kN)	H_i (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		31001.3	0.0	0.0	2.000	0.0
Self Weight of Footing	D	7325.5	0.0	0.0	1.000	0.0
Backfill Soil Covering on Footing	D	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	0.0	0.0	0.0	1.000	0.0
Total		42791.8	0.0	-	-	0.0

(5) Summary of Force at Bottom of Footing for Load Factor Design

1) Longitudinal Direction

Group-I	γ(D+SD+1.67L+CF+E+B)					
Loadings		γ x β	$\gamma \cdot \beta \cdot V_i$ (kN)	$\gamma \cdot \beta \cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i \cdot Y_i$
Force at Bottom of Wall		-	45129.1	0.0	5112.8	2.000	5112.8
Self Weight of Footing	D	1.300	9523.2	0.0	0.0	1.000	0.0
Backfill Soil	D	1.300	5804.5	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	1.000	0.0
Total			60456.8	0.0	-	-	5112.8

Group-II	γ(D+SD+E+B+W)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	32059.7	0.0	4179.3	2.000	4179.3
Self Weight of Footing	D	1.300	7325.5	0.0	0.0	1.000	0.0
Backfill Soil	D	1.300	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	1.000	0.0
Total			43850.2	0.0	-	-	4179.3

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	39885.7	182.0	9304.7	2.000	9668.7
Self Weight of Footing	D	1.300	9523.2	0.0	0.0	1.000	0.0
Backfill Soil	D	1.300	5804.5	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	1.000	0.0
Total			55213.3	182.0	-	-	9668.7

Group-IV	γ(D+SD+L+CF+E+B+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	40301.7	0.0	5076.3	2.000	5076.3
Self Weight of Footing	D	1.300	7325.5	0.0	0.0	1.000	0.0
Backfill Soil	D	1.300	4465.0	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	1.000	0.0
Total			52092.2	0.0	-	-	5076.3

Group-V	γ(D+SD+E+B+W+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	31226.6	0.0	4343.5	2.000	4343.5
Self Weight of Footing	D	1.250	9156.9	0.0	0.0	1.000	0.0
Backfill Soil	D	1.250	5581.3	0.0	0.0	3.635	0.0
Buoyancy	B	1.250	0.0	0.0	0.0	1.000	0.0
Total			45964.8	0.0	-	-	4343.5

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=Mi+H_i\cdot Y_i$
Force at Bottom of Wall		-	34056.6	140.0	7505.5	2.000	7785.5
Self Weight of Footing	D	1.250	9156.9	0.0	0.0	1.000	0.0
Backfill Soil	D	1.250	5581.3	0.0	0.0	3.635	0.0
Buoyancy	B	1.250	0.0	0.0	0.0	1.000	0.0
Total			48794.8	140.0	-	-	7785.5

2) Transvers Direction

Group-I	γ(D+SD+1.67L+CF+E+B)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	45129.1	0.0	0.0	2.000	0.0
Self Weight of Footing	D	1.300	9523.2	0.0	0.0	1.000	0.0
Backfill Soil	D	1.300	5804.5	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	1.000	0.0
Total			60456.8	0.0	-	-	0.0

Group-II	γ(D+SD+E+B+W)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	32059.7	0.0	0.0	2.000	0.0
Self Weight of Footing	D	1.300	9523.2	0.0	0.0	1.000	0.0
Backfill Soil	D	1.300	5804.5	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	1.000	0.0
Total			47387.3	0.0	-	-	0.0

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	39885.7	0.0	0.0	2.000	0.0
Self Weight of Footing	D	1.300	9523.2	0.0	0.0	1.000	0.0
Backfill Soil	D	1.300	5804.5	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	1.000	0.0
Total			55213.3	0.0	-	-	0.0

Group-IV	γ(D+SD+L+CF+E+B+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	40301.7	0.0	0.0	2.000	0.0
Self Weight of Footing	D	1.300	9523.2	0.0	0.0	1.000	0.0
Backfill Soil	D	1.300	5804.5	0.0	0.0	3.635	0.0
Buoyancy	B	1.300	0.0	0.0	0.0	1.000	0.0
Total			55629.3	0.0	-	-	0.0

Group-V	γ(D+SD+E+B+W+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	31226.6	0.0	0.0	2.000	0.0
Self Weight of Footing	D	1.250	9156.9	0.0	0.0	1.000	0.0
Backfill Soil	D	1.250	5581.3	0.0	0.0	3.635	0.0
Buoyancy	B	1.250	0.0	0.0	0.0	1.000	0.0
Total			45964.8	0.0	-	-	0.0

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)						
Loadings		γ x β	$\gamma\cdot\beta\cdot V_i$ (kN)	$\gamma\cdot\beta\cdot H_i$ (kN)	Mi(m)	Yi(m)	$M_{yi}=M_i+H_i\cdot Y_i$
Force at Bottom of Wall		-	34056.6	0.0	0.0	2.000	0.0
Self Weight of Footing	D	1.250	9156.9	0.0	0.0	1.000	0.0
Backfill Soil	D	1.250	5581.3	0.0	0.0	3.635	0.0
Buoyancy	B	1.250	0.0	0.0	0.0	1.000	0.0
Total			48794.8	0.0	-	-	0.0

(5) Summary of Force at Bottom of Footing

		Longitudinal Direction			Transverse Direction		
		V(kN)	H(kN)	M(kNm)	V(kN)	H(kN)	M(kNm)
Service Load Design	Group-I	42471.8	0.0	3644.8	42471.8	0.0	0.0
	Group-II	36451.8	0.0	3214.8	36451.8	0.0	0.0
	Group-III	42471.8	140.0	7437.4	42471.8	0.0	0.0
	Group-IV	42791.8	0.0	3904.8	42791.8	0.0	0.0
	Group-V	36771.8	0.0	3474.8	36771.8	0.0	0.0
	Group-VI	42791.8	140.0	7697.4	42791.8	0.0	0.0
Load Factor Design	Group-I	60456.8	0.0	5112.8	60456.8	0.0	0.0
	Group-II	43850.2	0.0	4179.3	47387.3	0.0	0.0
	Group-III	55213.3	182.0	9668.7	55213.3	0.0	0.0
	Group-IV	52092.2	0.0	5076.3	55629.3	0.0	0.0
	Group-V	45964.8	0.0	4343.5	45964.8	0.0	0.0
	Group-VI	48794.8	140.0	7785.5	48794.8	0.0	0.0
Seismic Design		41870.5	11116.5	146456.5	38260.5	12070.0	151310.0

*) Sectional Force of Seismic Design is Calculated by Dynamic Analysis.

(6) Calculation of Stability on Service Load Design and Seismic Design

Stability of Footing is checked as follows.

*1) Eccentric Distance from Center of Footing to Vertical Force

$e = M / V - B/2$

e : Eccentric Distance
M : Moment at Bottom of Footing
V : Vertical Force at Bottom of Footing
B : Width of Footing on Checking Direction

*2) Safety Factor for Horizontal Force

$S.F = V*\tan\theta / H$

S.F : Safety Factor
V : Vertical Force at Bottom of Footing
$\tan\theta$: 0.6
H : Horizontal Force at Bottom of Footing

*3) Ground Reaction

$q = V/DB \pm 6M/DB^2$ $(e < B/6)$
$q = 2V / Dx$ $(e \geqq B/6)$

q : Ground Reaction
V : Vertical Force at Bottom of Footing
M : Moment at Bottom of Footing
D : Length of Footing
B : Width of Footing on Checking Direction
x : 3(B/2 - e)

Calculation Result of Stability

1) Longitudinal Direction

Dimension of Footing B= 11.500 m
D= 13.000 m

Eccentric Distance from Center of Footing to Vertical Force

	V (kN)	H (kN)	M (kN)	e (m)
Group-I	42471.8	0.0	3644.8	0.086
Group-II	36451.8	0.0	3214.8	0.088
Group-III	42471.8	140.0	7437.4	0.175
Group-IV	42791.8	0.0	3904.8	0.091
Group-V	36771.8	0.0	3474.8	0.094
Group-VI	42791.8	140.0	7697.4	0.180
Seismic Design	41870.5	11116.5	146456.5	3.498

Eccentric Distance for Load Factor Design

	V (kN)	H (kN)	M (kN)	e (m)
Group-I	60456.8	0.0	5112.8	0.085
Group-II	43850.2	0.0	4179.3	0.095
Group-III	55213.3	182.0	9668.7	0.175
Group-IV	52092.2	0.0	5076.3	0.097
Group-V	45964.8	0.0	4343.5	0.094
Group-VI	48794.8	140.0	7785.5	0.160

Safety Factor for Horizontal Force

	V (kN)	H (kN)	M (kN)	S.F	Limit of S.F	
Group-I	42471.8	0.0	3644.8	-	1.500	OK
Group-II	36451.8	0.0	3214.8	-	1.500	OK
Group-III	42471.8	140.0	7437.4	182.022	1.500	OK
Group-IV	42791.8	0.0	3904.8	-	1.500	OK
Group-V	36771.8	0.0	3474.8	-	1.500	OK
Group-VI	42791.8	140.0	7697.4	183.393	1.500	OK
Seismic Design	41870.5	11116.5	146456.5	2.260	1.200	OK

Ground Reaction

	V (kN)	H (kN)	M (kN)	x (m)	qmax (kN/m^2)	qmin (kN/m^2)	qa (kN/m^2)	
Group-I	42471.8	0.0	3644.8	11.500	296.81	271.37	700	OK
Group-II	36451.8	0.0	3214.8	11.500	255.04	232.61	700	OK
Group-III	42471.8	140.0	7437.4	11.500	310.05	258.14	700	OK
Group-IV	42791.8	0.0	3904.8	11.500	299.86	272.61	700	OK
Group-V	36771.8	0.0	3474.8	11.500	258.09	233.84	700	OK
Group-VI	42791.8	140.0	7697.4	11.500	313.10	259.37	700	OK
Seismic Design	41870.5	11116.5	146456.5	6.756	953.40	0.00	1050	OK

Ground Reaction for Load Factor Design

	V (kN)	H (kN)	M (kN)	x (m)	qmax (kN/m^2)	qmin (kN/m^2)
Group-I	60456.8	0.0	5112.8	11.500	422.24	386.55
Group-II	43850.2	0.0	4179.3	11.500	307.90	278.73
Group-III	55213.3	182.0	9668.7	11.500	403.06	335.58
Group-IV	52092.2	0.0	5076.3	11.500	366.16	330.73
Group-V	45964.8	0.0	4343.5	11.500	322.62	292.30
Group-VI	48794.8	140.0	7785.5	11.500	353.56	299.22

2) Transverse Direction

Dimension of Footing B= 13.000 m

D= 11.500 m

Eccentric Distance from Center of Footing to Vertical Force

	V (kN)	H (kN)	M (kN)	e (m)
Group-I	42471.8	0.0	0.0	0.000
Group-II	36451.8	0.0	0.0	0.000
Group-III	42471.8	0.0	0.0	0.000
Group-IV	42791.8	0.0	0.0	0.000
Group-V	36771.8	0.0	0.0	0.000
Group-VI	42791.8	0.0	0.0	0.000
Seismic Design	38260.5	12070.0	151310.0	3.955

Eccentric Distance for Load Factor Design

	V (kN)	H (kN)	M (kN)	e (m)
Group-I	60456.8	0.0	0.0	0.000
Group-II	47387.3	0.0	0.0	0.000
Group-III	55213.3	0.0	0.0	0.000
Group-IV	55629.3	0.0	0.0	0.000
Group-V	45964.8	0.0	0.0	0.000
Group-VI	48794.8	0.0	0.0	0.000

Safety Factor for Horizontal Force

	V (kN)	H (kN)	M (kN)	S.F	Limit of S.F	
Group-I	42471.8	0.0	0.0	-	1.500	OK
Group-II	36451.8	0.0	0.0	-	1.500	OK
Group-III	42471.8	0.0	0.0	-	1.500	OK
Group-IV	42791.8	0.0	0.0	-	1.500	OK
Group-V	36771.8	0.0	0.0	-	1.500	OK
Group-VI	42791.8	0.0	0.0	-	1.500	OK
Seismic Design	38260.5	12070.0	151310.0	1.902	1.200	OK

Ground Reaction

	V (kN)	H (kN)	M (kN)	x (m)	qmax (kN/m^2)	qmin (kN/m^2)	qa (kN/m^2)	
Group-I	42471.8	0.0	0.0	13.000	284.09	284.09	700	OK
Group-II	36451.8	0.0	0.0	13.000	243.82	243.82	700	OK
Group-III	42471.8	0.0	0.0	13.000	284.09	284.09	700	OK
Group-IV	42791.8	0.0	0.0	13.000	286.23	286.23	700	OK
Group-V	36771.8	0.0	0.0	13.000	245.97	245.97	700	OK
Group-VI	42791.8	0.0	0.0	13.000	286.23	286.23	700	OK
Seismic Design	38260.5	12070.0	151310.0	7.636	871.42	0.00	1050	OK

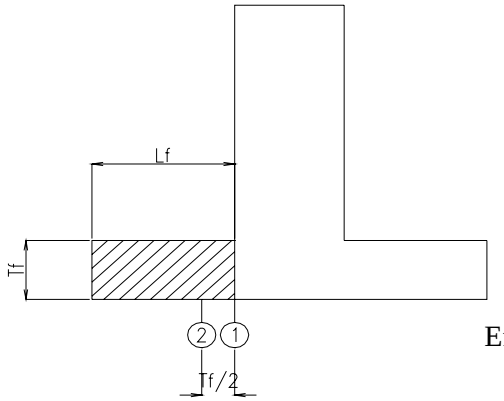
Ground Reaction for Load Factor Design

	V (kN)	H (kN)	M (kN)	x (m)	qmax (kN/m^2)	qmin (kN/m^2)
Group-I	60456.8	0.0	0.0	13.000	404.39	404.39
Group-II	47387.3	0.0	0.0	13.000	316.97	316.97
Group-III	55213.3	0.0	0.0	13.000	369.32	369.32
Group-IV	55629.3	0.0	0.0	13.000	372.10	372.10
Group-V	45964.8	0.0	0.0	13.000	307.46	307.46
Group-VI	48794.8	0.0	0.0	13.000	326.39	326.39

4.5.1 Design of Spread Footing

(1) Block data that doesn't consider water level for Longitudinal Direction

1) Self Weight for Section-①



Lf= 4.000 m

Tf= 2.000 m

Pile Cap Length

L= 13.000 m

Effective Width= 10.680 m

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Position Xi(m)	Vi・Xi
1	4 x 2 x 13	104.0	2.000	208.000
Σ		104.0	---	208.000

Self Weight

Vertical Force W = γ x V = 24.5 x 104= 2548.00 kN

2) Backfill soil and buoyancy for Section-①

*) Buoyancy

Water level Hw= 0.00 m (equally Top of Footing)

Buoyancy

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Position Xi(m)	Vi・Xi
1	4 x 0 x 13	0.0	2.000	0.000
Σ		0.0	---	0.000

Buoyancy

Vertical Force W = γw x V = -10x 0= 0.00 kN

*) Backfill Soil

Backfill Soil Covering on Footing H= 2.200 m

Buoyancy

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Position Xi(m)	Vi・Xi
1	4 x 2.2 x 13	114.4	2.000	228.800
Σ		114.4	---	228.800

Backfill Soil

Vertical Force W = γs x V = 19x 114.4= 2173.60 kN

1) Self Weight for Section-②

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Position Xi(m)	Vi・Xi
1	3 x 2 x 13	78.0	1.500	117.000
Σ		78.0	---	117.000

Self Weight
Vertical Force W = γ x V = 24.5 x 78= 1911.00 kN

2) Backfill soil and buoyancy for Section-②

*) Buoyancy

Water level Hw= 0.00 m (equally Top of Footing)
Buoyancy

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Position Xi(m)	Vi・Xi
1	3 x 0 x 13	0.0	1.500	0.000
Σ		0.0	---	0.000

Buoyancy
Vertical Force W = γw x V = -10x 0= 0.00 kN

*) Backfill Soil

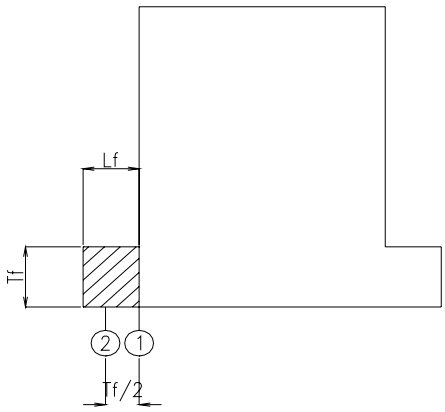
Backfill Soil Covering on Footing H= 2.200 m
Buoyancy

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Position Xi(m)	Vi・Xi
1	3 x 2.2 x 13	85.8	1.500	128.700
Σ		85.8	---	128.700

Backfill Soil
Vertical Force W = γs x V = 19x 85.8= 1630.20 kN

(2) Block data that doesn't consider water level for Transverse Direction

1) Self Weight for Section-①



Lf= 3.000 m
Tf= 2.000 m
Pile Cap Length
L= 11.500 m

Effective Width= 7.244 m

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Xi(m)	Vi・Xi
1	3 x 2 x 11.5	69.0	1.500	103.500
Σ		69.0	---	103.500

Self Weight
Vertical Force W = γ x V = 24.5 x 69= 1690.50 kN

2) Backfill soil and buoyancy for Section-①

*) Buoyancy

Water level Hw= 0.00 m (equally Top of Footing)

Buoyancy

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Xi(m)	Vi・Xi
1	3 x 0 x 11.5	0.0	1.500	0.000
Σ		0.0	---	0.000

Buoyancy
Vertical Force W = γw x V = -10x 0= 0.00 kN

*) Backfill Soil

Backfill Soil Covering on Footing H= 2.200 m

Buoyancy

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Xi(m)	Vi・Xi
1	3 x 2.2 x 11.5	75.9	1.500	113.850
Σ		75.9	---	113.850

Backfill Soil
Vertical Force W = γs x V = 19x 75.9= 1442.10 kN

1) Self Weight for Section-②

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Xi(m)	Vi・Xi
1	2 x 2 x 11.5	46.0	1.000	46.000
Σ		46.0	---	46.000

Self Weight
Vertical Force W = γ x V = 24.5 x 46= 1127.00 kN

2) Backfill soil and buoyancy for Section-②

*) Buoyancy

Water level Hw= 0.00 m (equally Top of Footing)

Buoyancy

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Xi(m)	Vi・Xi
1	2 x 0 x 11.5	0.0	1.000	0.000
Σ		0.0	---	0.000

Buoyancy

Vertical Force W = γw x V = -10x 0= 0.00 kN

*) Backfill Soil

Backfill Soil Covering on Footing H= 2.200 m

Buoyancy

Division	Calculation formula Width × Height × Length	Volume V1 Vi(m^3)	Barycentric Xi(m)	Vi・Xi
1	2 x 2.2 x 11.5	50.6	1.000	50.600
Σ		50.6	---	50.600

Backfill Soil

Vertical Force W = γs x V = 19x 50.6= 961.40 kN

(3) Summary of Sectional Force for Service Load Design

Longitudinal Direction at Section-①

Group-I	D+SD+L+CF+E+B			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	2548.00	2.000	5096.0
Backfill Soil Covering on Footing	D	2173.60	2.000	4347.2
Buoyancy	B	0.00	2.000	0.0
Ground Reaction	-	-15204.18	2.01008788	-30561.7
Total		-10482.58		-21118.5
Per 1 meter		-806.35		-1977.4

Group-II	D+SD+E+B+W			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	2548.00	2.000	5096.0
Backfill Soil Covering on Footing	D	2173.60	2.000	4347.2
Buoyancy	B	0.00	2.000	0.0
Ground Reaction	-	-13059.37	2.01035908	-26254.0
Total		-8337.77		-16810.8
Per 1 meter		-641.37		-1574.0

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	2548.00	2.000	5096.0
Backfill Soil Covering on Footing	D	2173.60	2.000	4347.2
Buoyancy	B	0.00	2.000	0.0
Ground Reaction	-	-15653.04	2.020	-31619.1
Total		-10931.44		-22175.9
Per 1 meter		-840.88		-2076.4

Group-IV	D+SD+L+CF+E+B+S+T			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	2548.00	2.000	5096.0
Backfill Soil Covering on Footing	D	2173.60	2.000	4347.2
Buoyancy	B	0.00	2.000	0.0
Ground Reaction	-	-15346.25	2.011	-30856.8
Total		-10624.65		-21413.6
Per 1 meter		-817.28		-2005.0

Group-V	D+SD+E+B+W+S+T			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	2548.00	2.000	5096.0
Backfill Soil Covering on Footing	D	2173.60	2.000	4347.2
Buoyancy	B	0.00	2.000	0.0
Ground Reaction	-	-13201.45	2.011	-26549.1
Total		-8479.85		-17105.9
Per 1 meter		-652.30		-1601.7

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	2548.00	2.000	5096.0
Backfill Soil Covering on Footing	D	2173.60	2.000	4347.2
Buoyancy	B	0.00	2.000	0.0
Ground Reaction	-	-15795.12	2.021	-31914.2
Total		-11073.52		-22471.0
Per 1 meter		-851.81		-2104.0

Transverse Direction at Section-①

Group-I	D+SD+L+CF+E+B			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1690.50	1.500	2535.8
Backfill Soil Covering on Footing	D	1442.10	1.500	2163.2
Buoyancy	B	0.00	1.500	0.0
Ground Reaction	-	-9801.19	1.5	-14701.8
Total		-6668.59		-10002.8
Per 1 meter		-579.88		-1380.8

Group-II	D+SD+E+B+W			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1690.50	1.500	2535.8
Backfill Soil Covering on Footing	D	1442.10	1.500	2163.2
Buoyancy	B	0.00	1.500	0.0
Ground Reaction	-	-8411.96	1.5	-12617.9
Total		-5279.36		-7918.9
Per 1 meter		-459.07		-1093.2

Group-III	D+SD+L+CF+E+B+0.3W+WL+LF			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1690.50	1.500	2535.8
Backfill Soil Covering on Footing	D	1442.10	1.500	2163.2
Buoyancy	B	0.00	1.500	0.0
Ground Reaction	-	-9801.19	1.500	-14701.8
Total		-6668.59		-10002.8
Per 1 meter		-579.88		-1380.8

Group-IV	D+SD+L+CF+E+B+S+T			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1690.50	1.500	2535.8
Backfill Soil Covering on Footing	D	1442.10	1.500	2163.2
Buoyancy	B	0.00	1.500	0.0
Ground Reaction	-	-9875.03	1.500	-14812.5
Total		-6742.43		-10113.5
Per 1 meter		-586.30		-1396.1

Group-V	D+SD+E+B+W+S+T			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1690.50	1.500	2535.8
Backfill Soil Covering on Footing	D	1442.10	1.500	2163.2
Buoyancy	B	0.00	1.500	0.0
Ground Reaction	-	-8485.80	1.500	-12728.7
Total		-5353.20		-8029.7
Per 1 meter		-465.50		-1108.5

Group-VI	D+SD+L+CF+E+B+0.3W+WL+LF+S+T			
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1690.50	1.500	2535.8
Backfill Soil Covering on Footing	D	1442.10	1.500	2163.2
Buoyancy	B	0.00	1.500	0.0
Ground Reaction	-	-9875.03	1.500	-14812.5
Total		-6742.43		-10113.5
Per 1 meter		-586.30		-1396.1

(4) Summary of Sectional Force for Load Factor Design

Longitudinal Direction at Section-①

Group-I	γ(D+SD+1.67L+CF+E+B)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.300	3312.40	2.000	6624.8
Backfill Soil Covering on Footing	D	1.300	2825.68	2.000	5651.4
Buoyancy	B	1.300	0.00	2.000	0.0
Ground Reaction	-	-	-21633.56	2.00994529	-43482.3
Total			-15495.48		-31206.1
Per 1 meter			-1191.96		-2921.9

Group-II	γ(D+SD+E+B+W)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.300	3312.40	2.000	6624.8
Backfill Soil Covering on Footing	D	1.300	2825.68	2.000	5651.4
Buoyancy	B	1.300	0.00	2.000	0.0
Ground Reaction	-	-	-15746.87	2.01116844	-31669.6
Total			-9608.79		-19393.4
Per 1 meter			-739.14		-1815.9

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.300	3312.40	2.000	6624.8
Backfill Soil Covering on Footing	D	1.300	2825.68	2.000	5651.4
Buoyancy	B	1.300	0.00	2.000	0.0
Ground Reaction	-	-	-20348.96	2.020	-41104.8
Total			-14210.88		-28828.6
Per 1 meter			-1093.14		-2699.3

Group-IV	γ(D+SD+L+CF+E+B+S+T)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.300	3312.40	2.000	6624.8
Backfill Soil Covering on Footing	D	1.300	2825.68	2.000	5651.4
Buoyancy	B	1.300	0.00	2.000	0.0
Ground Reaction	-	-	-18719.82	2.011	-37653.3
Total			-12581.74		-25377.1
Per 1 meter			-967.83		-2376.1

Group-V	γ(D+SD+E+B+W+S+T)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.250	3185.00	2.000	6370.0
Backfill Soil Covering on Footing	D	1.250	2717.00	2.000	5434.0
Buoyancy	B	1.250	0.00	2.000	0.0
Ground Reaction	-	-	-16501.81	2.011	-33186.4
Total			-10599.81		-21382.4
Per 1 meter			-815.37		-2002.1

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.250	3185.00	2.000	6370.0
Backfill Soil Covering on Footing	D	1.250	2717.00	2.000	5434.0
Buoyancy	B	1.250	0.00	2.000	0.0
Ground Reaction	-	-	-17893.53	2.018	-36114.7
Total			-11991.53		-24310.7
Per 1 meter			-922.43		-2276.3

Longitudinal Direction at Section-②

Group-I	γ(D+SD+1.67L+CF+E+B)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.300	2484.30
Backfill Soil Covering on Footing	D	1.300	2119.26
Buoyancy	B	1.300	0.00
Ground Reaction	-	-	-16285.68
Total			-11682.12
Per 1 meter			-898.62

Group-II	γ(D+SD+E+B+W)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.300	2484.30
Backfill Soil Covering on Footing	D	1.300	2119.26
Buoyancy	B	1.300	0.00
Ground Reaction	-	-	-11859.62
Total			-7256.06
Per 1 meter			-558.16

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.300	2484.30
Backfill Soil Covering on Footing	D	1.300	2119.26
Buoyancy	B	1.300	0.00
Ground Reaction	-	-	-15376.15
Total			-10772.59
Per 1 meter			-828.66

Group-IV	γ(D+SD+L+CF+E+B+S+T)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.300	2484.30
Backfill Soil Covering on Footing	D	1.300	2119.26
Buoyancy	B	1.300	0.00
Ground Reaction	-	-	-14099.94
Total			-9496.38
Per 1 meter			-730.49

Group-V	γ(D+SD+E+B+W+S+T)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.250	2388.75
Backfill Soil Covering on Footing	D	1.250	2037.75
Buoyancy	B	1.250	0.00
Ground Reaction	-	-	-12427.77
Total			-8001.27
Per 1 meter			-615.48

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.250	2388.75
Backfill Soil Covering on Footing	D	1.250	2037.75
Buoyancy	B	1.250	0.00
Ground Reaction	-	-	-13512.29
Total			-9085.79
Per 1 meter			-698.91

Transverse Direction at Section-①

Group-I	γ(D+SD+1.67L+CF+E+B)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.300	2197.65	1.500	3296.5
Backfill Soil Covering on Footing	D	1.300	1874.73	1.500	2812.1
Buoyancy	B	1.300	0.00	1.500	0.0
Ground Reaction	-	-	-13951.56	1.5	-20927.3
Total			-9879.18		-14818.7
Per 1 meter			-859.06		-2045.7

Group-II	γ(D+SD+E+B+W)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.300	2197.65	1.500	3296.5
Backfill Soil Covering on Footing	D	1.300	1874.73	1.500	2812.1
Buoyancy	B	1.300	0.00	1.500	0.0
Ground Reaction	-	-	-10935.54	1.5	-16403.3
Total			-6863.16		-10294.7
Per 1 meter			-596.80		-1421.1

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.300	2197.65	1.500	3296.5
Backfill Soil Covering on Footing	D	1.300	1874.73	1.500	2812.1
Buoyancy	B	1.300	0.00	1.500	0.0
Ground Reaction	-	-	-12741.54	1.500	-19112.3
Total			-8669.16		-13003.7
Per 1 meter			-753.84		-1795.1

Group-IV	γ(D+SD+L+CF+E+B+S+T)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.300	2197.65	1.500	3296.5
Backfill Soil Covering on Footing	D	1.300	1874.73	1.500	2812.1
Buoyancy	B	1.300	0.00	1.500	0.0
Ground Reaction	-	-	-12837.54	1.500	-19256.3
Total			-8765.16		-13147.7
Per 1 meter			-762.19		-1815.0

Group-V	γ(D+SD+E+B+W+S+T)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.250	2113.13	1.500	3169.7
Backfill Soil Covering on Footing	D	1.250	1802.63	1.500	2703.9
Buoyancy	B	1.250	0.00	1.500	0.0
Ground Reaction	-	-	-10607.25	1.500	-15910.9
Total			-6691.50		-10037.3
Per 1 meter			-581.87		-1385.6

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)				
		γ x β	Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1.250	2113.13	1.500	3169.7
Backfill Soil Covering on Footing	D	1.250	1802.63	1.500	2703.9
Buoyancy	B	1.250	0.00	1.500	0.0
Ground Reaction	-	-	-11260.33	1.500	-16890.5
Total			-7344.58		-11016.9
Per 1 meter			-638.66		-1520.8

Transverse Direction at Section-②

Group-I	γ(D+SD+1.67L+CF+E+B)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.300	1465.10
Backfill Soil Covering on Footing	D	1.300	1249.82
Buoyancy	B	1.300	0.00
Ground Reaction	-	-	-9301.04
Total			-6586.12
Per 1 meter			-572.71

Group-II	γ(D+SD+E+B+W)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.300	1465.10
Backfill Soil Covering on Footing	D	1.300	1249.82
Buoyancy	B	1.300	0.00
Ground Reaction	-	-	-7290.36
Total			-4575.44
Per 1 meter			-397.86

Group-III	γ(D+SD+L+CF+E+B+0.3W+WL+LF)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.300	1465.10
Backfill Soil Covering on Footing	D	1.300	1249.82
Buoyancy	B	1.300	0.00
Ground Reaction	-	-	-8494.36
Total			-5779.44
Per 1 meter			-502.56

Group-IV	γ(D+SD+L+CF+E+B+S+T)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.300	1465.10
Backfill Soil Covering on Footing	D	1.300	1249.82
Buoyancy	B	1.300	0.00
Ground Reaction	-	-	-8558.36
Total			-5843.44
Per 1 meter			-508.13

Group-V	γ(D+SD+E+B+W+S+T)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.250	1408.75
Backfill Soil Covering on Footing	D	1.250	1201.75
Buoyancy	B	1.250	0.00
Ground Reaction	-	-	-7071.50
Total			-4461.00
Per 1 meter			-387.91

Group-VI	γ(D+SD+L+CF+E+B+0.3W+WL+LF+S+T)		
		γ x β	Vi(kN)
Self Weight of Footing	D	1.250	1408.75
Backfill Soil Covering on Footing	D	1.250	1201.75
Buoyancy	B	1.250	0.00
Ground Reaction	-	-	-7506.89
Total			-4896.39
Per 1 meter			-425.77

(5) Summary of Sectional Force for Seismic Design

Section-① Longitudinal Direction				
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	2548.00	2.000	5096.0
Backfill Soil Covering on Footing	D	2173.60	2.000	4347.2
Buoyancy	B	0.00	2.000	0.0
Ground Reaction	-	-34901.43	2.280	-79586.4
Total		-30179.83		-70143.2
Per 1 meter		-2321.53		-6567.7

Section-① Transverse Direction				
		Vi(kN)	Xi(m)	Mi(kNm)
Self Weight of Footing	D	1690.50	1.500	2535.8
Backfill Soil Covering on Footing	D	1442.10	1.500	2163.2
Buoyancy	B	0.00	1.500	0.0
Ground Reaction	-	-24158.15	1.622	-39190.2
Total		-21025.55		-34491.2
Per 1 meter		-1828.31		-4761.3

Section-② Longitudinal Direction		
		Vi(kN)
Self Weight of Footing	D	1911.00
Backfill Soil Covering on Footing	D	1630.20
Buoyancy	B	0.00
Ground Reaction	-	-28927.70
Total		-25386.50
Per 1 meter		-1952.81

Section-② Transverse Direction		
		Vi(kN)
Self Weight of Footing	D	1690.50
Backfill Soil Covering on Footing	D	1442.10
Buoyancy	B	0.00
Ground Reaction	-	-17417.85
Total		-14285.25
Per 1 meter		-1242.20

(6) Calculation of Stress for Service Load Design and Seismic Design

Stress Equation

$$\sigma_c = \frac{M}{\frac{b \cdot x}{2} \cdot \left(\frac{h}{2} - \frac{x}{3}\right) + n \cdot As' \cdot \frac{(x-d') \cdot (h/2-d')}{x} + n \cdot As \cdot \frac{(x-d) \cdot (h/2-d)}{x}}$$

$$\sigma_s = n \cdot \sigma_c \cdot \frac{d-x}{x}$$

$$x^2 + \frac{2 \cdot n}{b} \left\{As' \cdot (x-d') + As \cdot (x-d)\right\} = 0.0$$

in which,

x : Distance from edge on compression side to neutral axis (mm)

h : Height of Member (mm), h = 2000mm

b : Width in section (mm), b = 1000mm

d : Effective height (mm)

d' : Concrete Cover (mm)

As : Sectional area of reinforcing bar arranged on tension side (mm^2)

As': Sectional area of reinforcing bar arranged on compression side (mm^2)

n : Elastic Modulus Ratio of Reinforce and Concrete , n = 15.00

σc: Compressive Stress of Concrete (N/mm^2)

σs: Tensile Stress of Reinforcing (N/mm^2)

M: Bending Moment (kN.m)

Bar Arrangement

		Longitudinal Direction	Transverse Direction
Dimension	b(mm)	1000	1000
	h(mm)	2000	2000
	d1(mm)	1890	1922
	d2(mm)	1790	1822
Bar Arrangement	As1(mm^2)	8-D32 6434	8-D32 6434
	As2(mm^2)	8-D32 6434	4-D32 3217

Calculation Result of Bending Stress

	Longitudinal Direction					
	M (kNm)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Group-I	1977.4	3.03	93.00	9.60	168.00	OK
Group-II	1574.0	2.41	74.03	12.00	210.00	OK
Group-III	2076.4	3.18	97.66	12.00	210.00	OK
Group-IV	2005.0	3.07	94.30	12.00	210.00	OK
Group-V	1601.7	2.45	75.33	13.44	235.20	OK
Group-VI	2104.0	3.22	98.96	13.44	235.20	OK
Seismic Design	6567.7	10.06	308.89	20.40	378.00	OK

	Transverse Direction					
	M (kNm)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Group-I	1380.8	2.05	64.30	9.60	168.00	OK
Group-II	1093.2	1.62	50.90	12.00	210.00	OK
Group-III	1380.8	2.05	64.30	12.00	210.00	OK
Group-IV	1396.1	2.07	65.01	12.00	210.00	OK
Group-V	1108.5	1.65	51.62	13.44	235.20	OK
Group-VI	1396.1	2.07	65.01	13.44	235.20	OK
Seismic Design	4761.3	7.07	221.72	20.40	378.00	OK

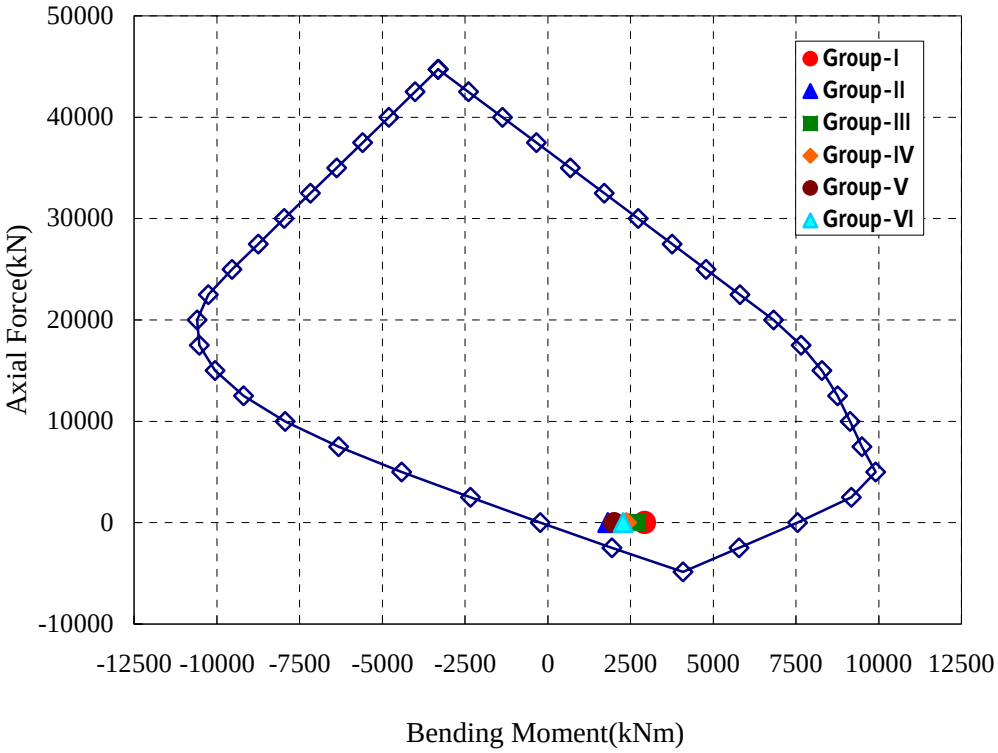
(6) Calculation of Strength for Load Factor Design

*) Flexural Strength

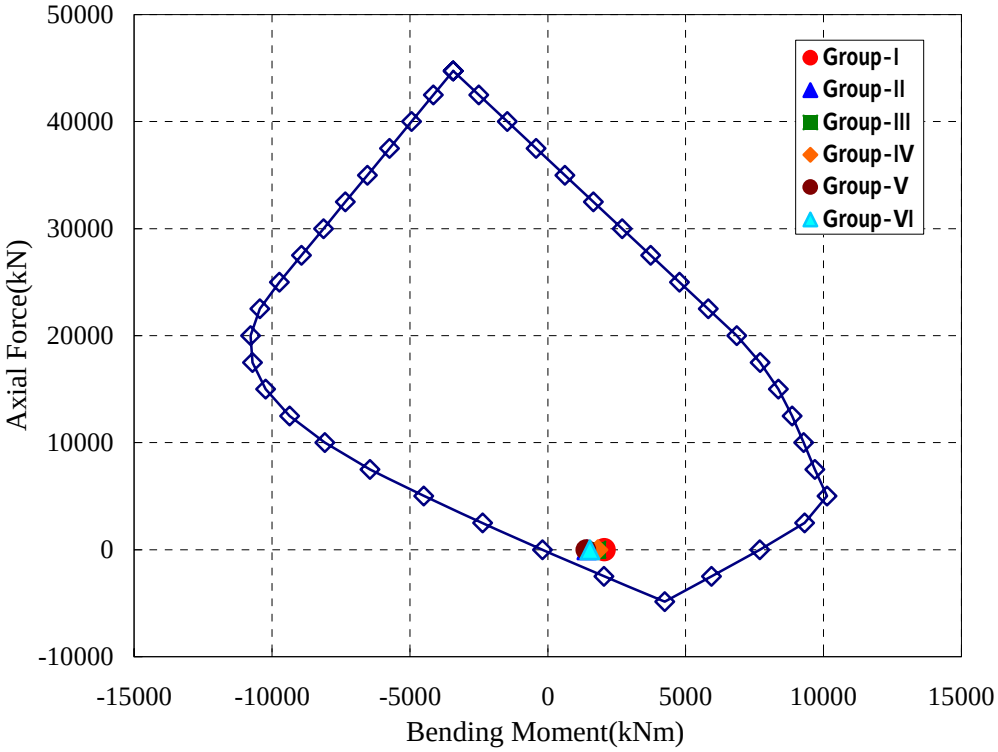
Factored Bending Moment for Load Factor Design

	Longitudinal Direction	Transverse Direction
Group-I	2921.9 kNm	2045.65 kNm
Group-II	1815.9 kNm	1421.13 kNm
Group-III	2699.3 kNm	1795.10 kNm
Group-IV	2376.1 kNm	1814.98 kNm
Group-V	2002.1 kNm	1385.60 kNm
Group-VI	2276.3 kNm	1520.83 kNm

Interaction of Longitudinal Direction



Interaction of Transverse Direction



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

Vn= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=1/6x $\sqrt{}$ f'c)

= 1/6x $\sqrt{}$ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

	Longitudinal Direction	Transverse Direction
Group-I	898.6 kN	572.71 kN
Group-II	558.2 kN	397.86 kN
Group-III	828.7 kN	502.56 kN
Group-IV	730.5 kN	508.13 kN
Group-V	615.5 kN	387.91 kN
Group-VI	698.9 kN	425.77 kN
Seismic Design	1952.8 kN	1242.20 kN

Calculation of Shear Strength

$vc = 1/6x \sqrt{f'c} = 1/6x \sqrt{(24)} = 0.816 N/mm^2 \rightarrow 816 kN/m^2$

$fy = 420\ N/mm^2 \rightarrow 420000\ kN/m^2$

$s = 1.000\ m$

Longitudinal Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	898.6	1.000	1.890	1310.90	0.00	0.0
Group-II	558.2	1.000	1.890	1310.90	0.00	0.0
Group-III	828.7	1.000	1.890	1310.90	0.00	0.0
Group-IV	730.5	1.000	1.890	1310.90	0.00	0.0
Group-V	615.5	1.000	1.890	1310.90	0.00	0.0
Group-VI	698.9	1.000	1.890	1310.90	0.00	0.0
Seismic Design	1952.8	1.000	1.890	1310.90	641.90	799.1

Arrangement of Stirrup D16 -ctc.500 804.25 mm^2/m > 799.1 mm^2/m

Transverse Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	572.7	1.000	1.922	1333.10	0.00	0.0
Group-II	397.9	1.000	1.922	1333.10	0.00	0.0
Group-III	502.6	1.000	1.922	1333.10	0.00	0.0
Group-IV	508.1	1.000	1.922	1333.10	0.00	0.0
Group-V	387.9	1.000	1.922	1333.10	0.00	0.0
Group-VI	425.8	1.000	1.922	1333.10	0.00	0.0
Seismic Design	1242.2	1.000	1.922	1333.10	0.00	0.0

Arrangement of Stirrup D16 -ctc.500 804.25 mm^2/m > 0 mm^2/m

4.6 Design of Wall

4.6.1 Summary of Sectional Force at Base of Wall

		Longitudinal Direction			Transverse Direction		
		N(kN)	S(kN)	M(kNm)	N(kN)	S(kN)	M(kNm)
Service Load Design	Group-I	30681.3	0.0	3644.8	30681.3	0.0	0.0
	Group-II	24661.3	0.0	3214.8	24661.3	0.0	0.0
	Group-III	30681.3	140.0	7157.4	30681.3	0.0	0.0
	Group-IV	31001.3	0.0	3904.8	31001.3	0.0	0.0
	Group-V	24981.3	0.0	3474.8	24981.3	0.0	0.0
	Group-VI	31001.3	140.0	7417.4	31001.3	0.0	0.0
Load Factor Design	Group-I	45129.1	0.0	5112.8	45129.1	0.0	0.0
	Group-II	32059.7	0.0	4179.3	32059.7	0.0	0.0
	Group-III	39885.7	182.0	9304.7	39885.7	0.0	0.0
	Group-IV	40301.7	0.0	5076.3	40301.7	0.0	0.0
	Group-V	31226.6	0.0	4343.5	31226.6	0.0	0.0
	Group-VI	34056.6	140.0	7505.5	34056.6	0.0	0.0
Seismic Design		28918.0	7812.0	127514.0	25310.0	8914.0	130314.0

*) Sectional Force of Seismic Design is Calculated by Dynamic Analysis.

4.6.2 Calculation of Stress for Service Load Design and Seismic Design

Stress Equation

$$\sigma_c = \frac{N}{\frac{b \cdot x}{2} - n \cdot As \cdot \frac{d-x}{x} + n \cdot As' \cdot \frac{x-d'}{x}}$$

$$\sigma_s = n \cdot \sigma_c \cdot \frac{d-x}{x}$$

$$x^3 - 3 \cdot \left(\frac{h}{2}-e\right) \cdot x^2 - \frac{6n}{b}\left\{As' \cdot \left(\frac{h}{2}-d'-e\right) + As \cdot \left(\frac{h}{2}-d-e\right)\right\} \cdot x + \frac{6n}{b}\left\{As' \cdot d' \cdot \left(\frac{h}{2}-d'-e\right) + As \cdot d \cdot \left(\frac{h}{2}-d-e\right)\right\} = 0.0$$

in which,

x : Distance from edge on compression side to neutral axis (mm)

h : Height of Member (mm)

b : Width in section (mm)

d : Effective height (mm)

d' : Concrete Cover (mm)

As : Sectional area of reinforcing bar arranged on tension side (mm^2)

As': Sectional area of reinforcing bar arranged on compression side (mm^2)

n : Elastic Modulus Ratio of Reinforce and Concrete , n = 15.00

e : Axis force eccentric distance (mm)

σc: Compressive Stress of Concrete (N/mm^2)

σs: Tensile Stress of Reinforcing (N/mm^2)

N : Axial Force (kN)

M: Bending Moment (kN.m)

Bar Arrangement

		Longitudinal Direction	Transverse Direction
Dimension	b(mm)	7000	3500
	h(mm)	3500	7000
	d1(mm)	3400	6900
	d2(mm)	3300	-
Bar Arrangement	As1(mm^2)	55-D32 44234	23-D28 14162
	As2(mm^2)	28-D32 22519	-

Calculation Result of Bending Stress

		Longitudinal Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	3644.8	30681.3	1.60	-13.50	9.60	168.00	OK
	Group-II	3214.8	24661.3	1.30	-10.60	12.00	210.00	OK
	Group-III	7157.4	30681.3	1.80	-10.70	12.00	210.00	OK
	Group-IV	3904.8	31001.3	1.60	-13.50	12.00	210.00	OK
	Group-V	3474.8	24981.3	1.30	-10.60	13.44	235.20	OK
	Group-VI	7417.4	31001.3	1.80	-10.60	13.44	235.20	OK
Seismic Design		127514.0	28918.0	11.80	362.20	20.40	378.00	OK

		Transverse Direction						
		M (kNm)	N (kN)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Service Load Design	Group-I	0.0	30681.3	1.30	-18.20	9.60	168.00	OK
	Group-II	0.0	24661.3	1.00	-14.60	12.00	210.00	OK
	Group-III	0.0	30681.3	1.30	-18.20	12.00	210.00	OK
	Group-IV	0.0	31001.3	1.30	-18.40	12.00	210.00	OK
	Group-V	0.0	24981.3	1.00	-14.80	13.44	235.20	OK
	Group-VI	0.0	31001.3	1.30	-18.40	13.44	235.20	OK
Seismic Design		130314.0	25310.0	7.80	213.70	19.20	378.00	OK

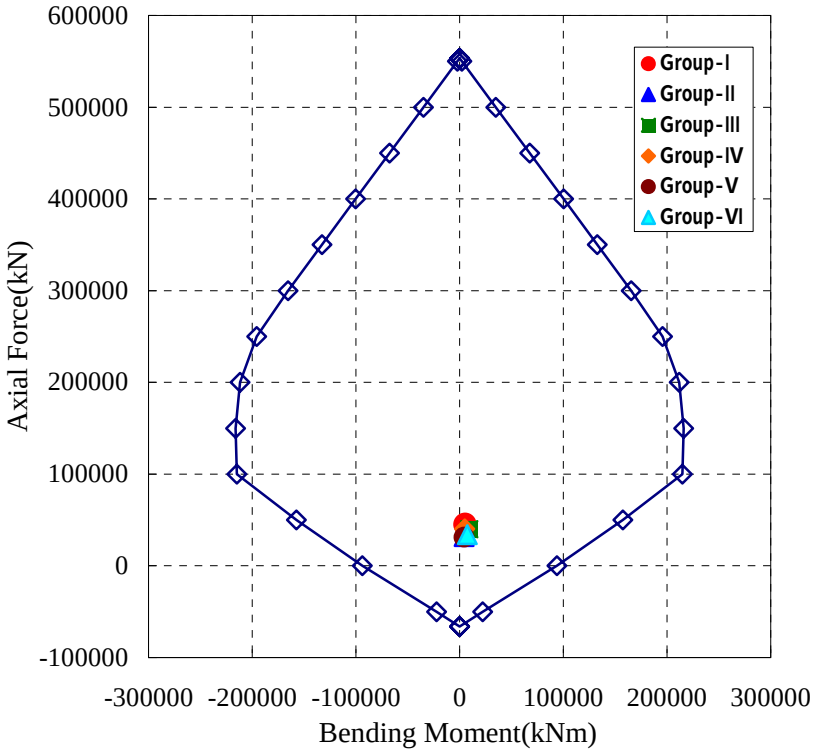
(6) Calculation of Strength for Load Factor Design

*) Flexural Strength

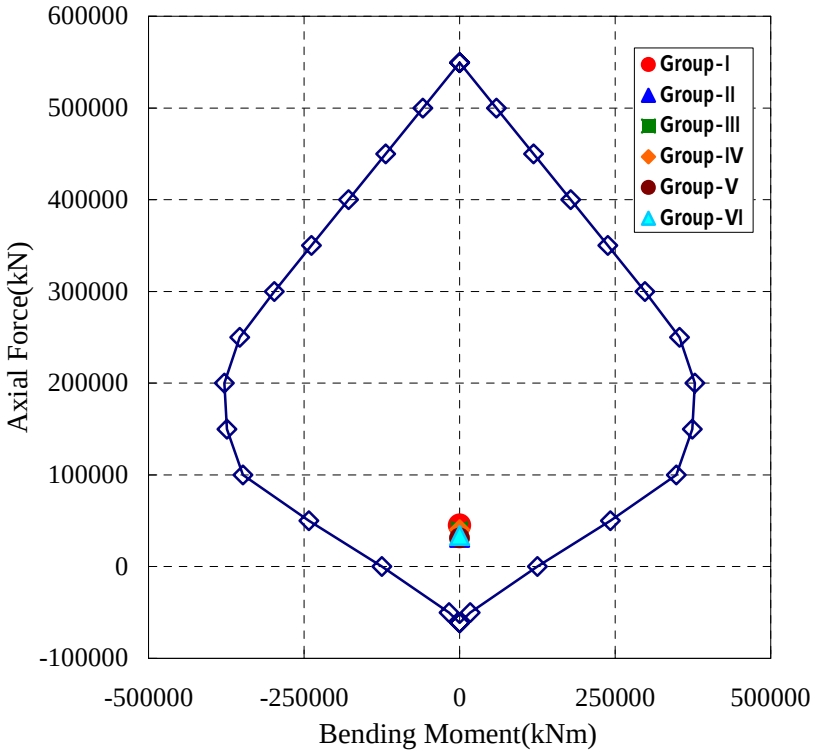
Factored Sectional Force for Load Factor Design

	Longitudinal Direction		Transverse Direction	
	M(kNm)	N(kN)	M(kNm)	N(kN)
Group-I	5112.8	45129.1	0.0	45129.1
Group-II	4179.3	32059.7	0.0	32059.7
Group-III	9304.7	39885.7	0.0	39885.7
Group-IV	5076.3	40301.7	0.0	40301.7
Group-V	4343.5	31226.6	0.0	31226.6
Group-VI	7505.5	34056.6	0.0	34056.6

Interaction of Longitudinal Direction



Interaction of Transverse Direction



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

Vn= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=0.08 $\sqrt{}$ f'c)

= 0.08 $\sqrt{}$ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

	Longitudinal Direction	Transverse Direction
Group-I	0.0 kN	0.00 kN
Group-II	0.0 kN	0.00 kN
Group-III	182.0 kN	0.00 kN
Group-IV	0.0 kN	0.00 kN
Group-V	0.0 kN	0.00 kN
Group-VI	140.0 kN	0.00 kN

Calculation of Shear Strength

vc = 1/6x $\sqrt{}$ f'c = 1/6x $\sqrt{}$ (24) = 0.816N/mm^2 -> 816kN/m^2

fy = 420 N/mm^2 -> 420000 kN/m^2

s = 1.000 m

Longitudinal Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	0.0	7.000	3.400	16507.7	0.0	0.0
Group-II	0.0	7.000	3.400	16507.7	0.0	0.0
Group-III	182.0	7.000	3.400	16507.7	0.0	0.0
Group-IV	0.0	7.000	3.400	16507.7	0.0	0.0
Group-V	0.0	7.000	3.400	16507.7	0.0	0.0
Group-VI	140.0	7.000	3.400	16507.7	0.0	0.0

Arrangement of Stirr D16 -ctc.150 14745 mm^2/m > 0 mm^2/m

Transverse Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	0.0	3.500	6.900	16750.4	0.0	0.0
Group-II	0.0	3.500	6.900	16750.4	0.0	0.0
Group-III	0.0	3.500	6.900	16750.4	0.0	0.0
Group-IV	0.0	3.500	6.900	16750.4	0.0	0.0
Group-V	0.0	3.500	6.900	16750.4	0.0	0.0
Group-VI	0.0	3.500	6.900	16750.4	0.0	0.0

Arrangement of Stirr D16 -ctc.150 6702 mm^2/m > 0 mm^2/m

4.7 Design of Beam

4.7.1 Reaction from Superstructure per Each Bearing

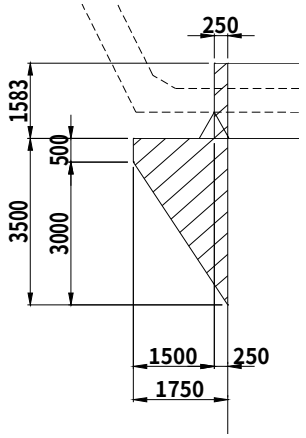
(1)Vertical Reaction

Loadings		G1	G2	Total
Mark	Type of Loading	Ry(kN)	Ry(kN)	ΣRz(kN)
D	Self Weight of Girder	2680.0	2680.0	5360.0
	Prestress	-135.0	-135.0	-270.0
	Creep Effect	45.0	45.0	90.0
	Total	2590.0	2590.0	5180.0
SD	Surfacing	1035.0	1035.0	2070.0
L	CLASS-A Loading Maximum	775.0	775.0	1550.0
	Impuct Factor	50.0	50.0	100.0
	Footway Load	120.0	120.0	240.0
	Total	1980.0	1980.0	3960.0
S	Shrinkage	235.0	235.0	470.0
T	Temparature Change (Rise)	0.0	0.0	0.0
T	Temparature Difference	40.0	40.0	80.0

(2)Horizontal Force for Longitudinal Direction

Loadings		G1	G2	Total
Mark	Type of Loading	Ry(kN)	Ry(kN)	ΣRz(kN)
S	Shrinkage	0.0	0.0	0.0
T	Temparature Change (Rise)	0.0	0.0	0.0
T	Temparature Difference	0.0	0.0	0.0
LF	Longitudanl Force	45.0	45.0	90.0
EQ	Seismic Force	1280.0	1280.0	2560.0

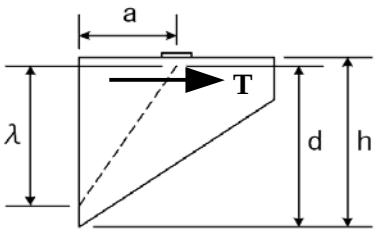
4.7.2 Design of Cantilever Beam as Corbel (Service Load Seign Method)



(1) Self Weight of Cantilever Beam

Equation		W (kN)	x (m)	M (kNm)
Self Weight	24.5 x 0.250 x 1.583 x 0.950	9.2	0.125	1.2
	24.5 x 0.500 x 1.750 x 3.500	75.0	0.875	65.7
	24.5 x 1.750 x 3.000 / 2 x 3.500	225.1	0.583	131.3
	Total	309.3	0.640	198.1

(2) Summary of Tensile Force at Bese of Cantilever Beam



Tensile Force calculated by Truss Theory

Ti= Vi x ai / λ

Height at the Base of Cantilever Beam

h= 3500 mm

Effective Height of Cantilever Beam

d= 3350 mm

a: Arm Length of Each Loadings

λ: 0.85 x d = 0.85 x 3350 = 2848 mm

List of Tensile Force

Loadings		Vi (kN)	ai (m)	Ti (kN)
Self Weight of Cantilever Beam	D	309.3	0.640	69.6
Reaction of Dead Load from Superstructure	D	2590.0	0.250	227.4
Reaction of Surfacing from Superstructure	SD	1035.0	0.250	90.9
Reaction of Live Load from Superstructure	L	1980.0	0.250	173.8
Reaction of Shrinkage from Superstructure	S	235.0	0.250	20.6
Reaction of Temparature Difference from Superstructure	T	40.0	0.250	3.5

Summary of Tensile Force for Service Load Design

Group-I	D+SD+L		
Loadings		Vi (kN)	Ti (kN)
Self Weight of Cantilever Beam	D	309.3	69.6
Reaction of Dead Load from Superstructure	D	2590.0	227.4
Reaction of Surfacing from Superstructure	SD	1035.0	90.9
Reaction of Live Load from Superstructure	L	1980.0	173.8
Total		5914.3	561.7

Group-II	D+SD		
Loadings		Vi (kN)	Ti (kN)
Self Weight of Cantilever Beam	D	309.3	69.6
Reaction of Dead Load from Superstructure	D	2590.0	227.4
Reaction of Surfacing from Superstructure	SD	1035.0	90.9
Total		3934.3	387.8

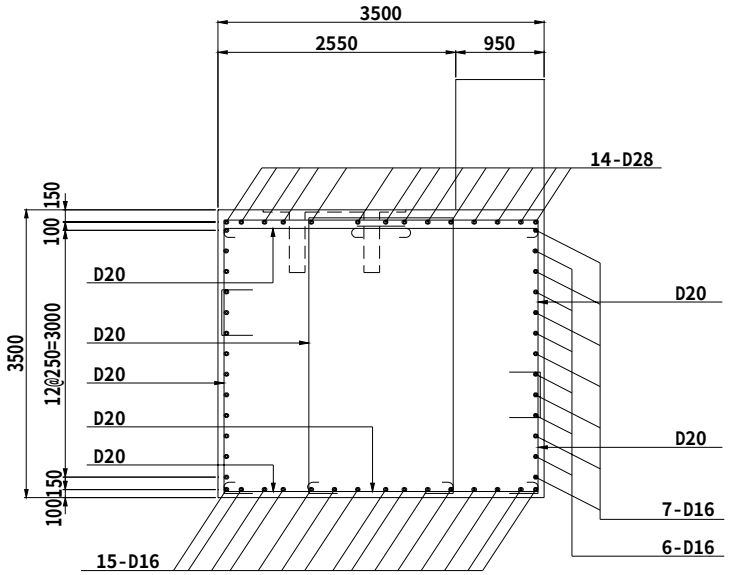
Group-IV	D+SD+L+S+T		
Loadings		Vi (kN)	Ti (kN)
Self Weight of Cantilever Beam	D	309.3	69.6
Reaction of Dead Load from Superstructure	D	2590.0	227.4
Reaction of Surfacing from Superstructure	SD	1035.0	90.9
Reaction of Live Load from Superstructure	L	1980.0	173.8
Reaction of Shrinkage from Superstructure	S	235.0	20.6
Reaction of Temparature Difference from Superstructure	T	40.0	3.5
Total		6189.3	585.8

Group-V	D+SD+S+T		
Loadings		Vi (kN)	Ti (kN)
Self Weight of Cantilever Beam	D	309.3	69.6
Reaction of Dead Load from Superstructure	D	2590.0	227.4
Reaction of Surfacing from Superstructure	SD	1035.0	90.9
Reaction of Shrinkage from Superstructure	S	235.0	20.6
Reaction of Temparature Difference from Superstructure	T	40.0	3.5
Total		4209.3	412.0

(3) Calculation for Required Area of Reinforcement

	Tensile Force (kN)	Allowable Sterss of Reinforcement(N/mm^2)	Required Area of Reinforcement(N/mm^2)
Group-I	561.7	168.0	3343.3
Group-II	387.8	210.0	1846.8
Group-IV	585.8	210.0	2789.6
Group-V	412.0	235.2	1751.6

Bar Arrangement of Cantilever Beam



Checking of Area of Reinforcement

Arrangement 14-D28= 8621 mm^2 > (Required= 3343 mm^2)

4.7.3 Design of Cantilever Beam for Bending Moment and Shear Force

1) Seismic Force for Longitudinal Direction

Seismic Coefficient = 0.35 (Longitudinal)

Loadings	H (kN)	x (m)	M (kNm)
Self Weight of Cantilever Beam	108.3	0.640	69.3

(2) Summary of Sectional Force at Base of Cantilever Beam for Vertical Direction

1) Service Load Design

Group-I D+SD+L		V (kN)	x (m)	M (kNm)
Loading				
Self Weight of Cantilever Beam	D	309.3	0.640	198.1
Reaction of Dead Load from Superstructure	D	2590.0	0.250	647.5
Reaction of Surfacing from Superstructure	SD	1035.0	0.250	258.8
Reaction of Live Load from Superstructure	L	1980.0	0.250	495.0
Total		5914.3		1599.4

Group-II D+SD+W		V (kN)	x (m)	M (kNm)
Loading				
Self Weight of Cantilever Beam	D	309.3	0.640	198.1
Reaction of Dead Load from Superstructure	D	2590.0	0.250	647.5
Reaction of Surfacing from Superstructure	SD	1035.0	0.250	258.8
Wind Load	W	0.0	0.250	0.0
Total		3934.3		1104.4

Group-III D+SD+L+0.3W+WL		V (kN)	x (m)	M (kNm)
Loading				
Self Weight of Cantilever Beam	D	309.3	0.640	198.1
Reaction of Dead Load from Superstructure	D	2590.0	0.250	647.5
Reaction of Surfacing from Superstructure	SD	1035.0	0.250	258.8
Reaction of Live Load from Superstructure	L	1980.0	0.250	495.0
Wind Load on Live Load	WL	0.0	0.250	0.0
Wind Load	0.3W	0.0	0.250	0.0
Total		5914.3		1599.4

Group-IV D+SD+L+T		V (kN)	x (m)	M (kNm)
Loading				
Self Weight of Cantilever Beam	D	309.3	0.640	198.1
Reaction of Dead Load from Superstructure	D	2590.0	0.250	647.5
Reaction of Surfacing from Superstructure	SD	1035.0	0.250	258.8
Reaction of Live Load from Superstructure	L	1980.0	0.250	495.0
Reaction of Temp. Diff. from Superstructure	T	40.0	0.250	10.0
Total		5954.3		1609.4

Group-V	D+SD+W+T		V	x	M
Loading			(kN)	(m)	(kNm)
Self Weight of Cantilever Beam		D	309.3	0.640	198.1
Reaction of Dead Load from Superstructure		D	2590.0	0.250	647.5
Reaction of Surfacing from Superstructure		SD	1035.0	0.250	258.8
Reaction of Live Load from Superstructure		L	1980.0	0.250	495.0
Wind Load		W	0.0	0.250	0.0
Reaction of Temp. Diff. from Superstructure		T	40.0	0.250	10.0
Total			5954.3		1609.4

Group-VI	D+SD+L+0.3W+WL+T		V	x	M
Loading			(kN)	(m)	(kNm)
Self Weight of Cantilever Beam		D	309.3	0.640	198.1
Reaction of Dead Load from Superstructure		D	2590.0	0.250	647.5
Reaction of Surfacing from Superstructure		SD	1035.0	0.250	258.8
Reaction of Live Load from Superstructure		L	1980.0	0.250	495.0
Wind Load on Live Load		WL	0.0	0.250	0.0
Wind Load		0.3W	0.0	0.250	0.0
Reaction of Temp. Diff. from Superstructure		T	40.0	0.250	10.0
Total			5954.3		1609.4

2) Load Factor Design

Group-I	γ(D+SD+L)		V	x	M
Loading		γ x β	(kN)	(m)	(kNm)
Self Weight of Cantilever Beam	D	1.300	402.1	0.640	257.5
Reaction of Dead Load from Superstructure	D	1.300	3367.0	0.250	841.8
Reaction of Surfacing from Superstructure	SD	1.300	1345.5	0.250	336.4
Reaction of Live Load from Superstructure	L	1.300	2574.0	0.250	643.5
Total			7688.6		2079.2

Group-II	γ(D+SD+W)		V	x	M
Loading		γ x β	(kN)	(m)	(kNm)
Self Weight of Cantilever Beam	D	1.300	402.1	0.640	257.5
Reaction of Dead Load from Superstructure	D	1.300	3367.0	0.250	841.8
Reaction of Surfacing from Superstructure	SD	1.300	1345.5	0.250	336.4
Wind Load	W	1.300	0.0	0.250	0.0
Total			5114.6		1435.7

Group-III	γ(D+SD+L+0.3W+WL)		V	x	M
Loading		γ x β	(kN)	(m)	(kNm)
Self Weight of Cantilever Beam	D	1.300	402.1	0.640	257.5
Reaction of Dead Load from Superstructure	D	1.300	3367.0	0.250	841.8
Reaction of Surfacing from Superstructure	SD	1.300	1345.5	0.250	336.4
Reaction of Live Load from Superstructure	L	1.300	2574.0	0.250	643.5
Wind Load	0.3W	1.300	0.0	0.250	0.0
Wind Load on Live Load	WL	1.300	0.0	0.250	0.0
Total			7688.6		2079.2

Group-IV	γ(D+SD+L+T)		V	x	M
Loading		γ x β	(kN)	(m)	(kNm)
Self Weight of Cantilever Beam	D	1.300	402.1	0.640	257.5
Reaction of Dead Load from Superstructure	D	1.300	3367.0	0.250	841.8
Reaction of Surfacing from Superstructure	SD	1.300	1345.5	0.250	336.4
Reaction of Live Load from Superstructure	L	1.300	2574.0	0.250	643.5
Reaction of Temp. Diff. from Superstructure	T	1.300	52.0	0.250	13.0
Total			7740.6		2092.2

Group-V	γ(D+SD+W+T)		V	x	M
Loading		γ x β	(kN)	(m)	(kNm)
Self Weight of Cantilever Beam	D	1.250	386.7	0.640	247.6
Reaction of Dead Load from Superstructure	D	1.250	3237.5	0.250	809.4
Reaction of Surfacing from Superstructure	SD	1.250	1293.8	0.250	323.4
Reaction of Live Load from Superstructure	L	1.250	2475.0	0.250	618.8
Wind Load	W	1.250	0.0	0.250	0.0
Reaction of Temp. Diff. from Superstructure	T	1.250	50.0	0.250	12.5
Total			7442.9		2011.7

Group-VI	γ(D+SD+L+0.3W+WL+T)		V	x	M
Loading		γ x β	(kN)	(m)	(kNm)
Self Weight of Cantilever Beam	D	1.250	386.7	0.640	247.6
Reaction of Dead Load from Superstructure	D	1.250	3237.5	0.250	809.4
Reaction of Surfacing from Superstructure	SD	1.250	1293.8	0.250	323.4
Reaction of Live Load from Superstructure	L	1.250	2475.0	0.250	618.8
Wind Load	0.3W	1.250	0.0	0.250	0.0
Wind Load on Live Load	WL	1.250	0.0	0.250	0.0
Reaction of Temp. Diff. from Superstructure	T	1.250	50.0	0.250	12.5
Total			7442.9		2011.7

(3) Summary of Sectional Force at Base of Cantilever Beam for Longitudinal Direction

1) Service Load Design

Group-III	LF		H	x	M
Loading			(kN)	(m)	(kNm)
Reaction of Longitudinal Force from Superstructure		LF	45.0	0.250	11.3
Total			45.0		11.3

Group-VI	LF		H	x	M
Loading			(kN)	(m)	(kNm)
Reaction of Longitudinal Force from Superstructure		LF	45.0	0.250	11.3
Total			45.0		11.3

Group-VII	EQ		H	x	M
Loading			(kN)	(m)	(kNm)
Seismic Force from Superstructure		EQ	1280.0	0.250	320.0
Seismic Force by Self Weight of Cantilever Beam		EQ	108.3	0.640	69.3
Total			1388.3		389.3

2) Load Factor Design

Group-III	γ(LF)			H	x	M
Loading			γ x β	(kN)	(m)	(kNm)
Reaction of Longitudinal Force from Superstructure		LF	1.300	58.5	0.250	14.6
Total				58.5		14.6

Group-VI	γ(LF)			H	x	M
Loading			γ x β	(kN)	(m)	(kNm)
Reaction of Longitudinal Force from Superstructure		LF	1.250	56.3	0.250	14.1
Total				56.3		14.1

Group-VII	γ(EQ)			H	x	M
Loading			γ x β	(kN)	(m)	(kNm)
Seismic Force from Superstructure		EQ	1.300	1664.0	0.250	416.0
Seismic Force by Self Weight of Cantilever Beam		EQ	1.300	140.7	0.640	90.1
Total				1804.7		506.1

4.7.4 Summary of Sectional Force

Summary of Force at Bottom of Footing

		Vertical Direction		Longitudinal Direction	
		M(kNm)	S(kN)	M(kNm)	S(kN)
Service Load Design	Group-I	1599.4	5914.3	-	-
	Group-II	1104.4	3934.3	-	-
	Group-III	1599.4	5914.3	11.3	45.0
	Group-IV	1609.4	5954.3	-	-
	Group-V	1609.4	5954.3	-	-
	Group-VI	1609.4	5954.3	11.3	45.0
	Group-VII	-	-	389.3	1388.3
Load Factor Design	Group-I	2079.2	7688.6	-	-
	Group-II	1435.7	5114.6	-	-
	Group-III	2079.2	7688.6	14.6	58.5
	Group-IV	2092.2	7740.6	-	-
	Group-V	2011.7	7442.9	-	-
	Group-VI	2011.7	7442.9	14.1	56.3
	Group-VII	-	-	506.1	1804.7

4.7.5 Calculation of Stress for Service Load Design

Stress Equation

$$\sigma_c = \frac{M}{\frac{b \cdot x}{2} \cdot \left(\frac{h}{2} - \frac{x}{3}\right) + n \cdot As' \cdot \frac{(x-d') \cdot (h/2-d')}{x} + n \cdot As \cdot \frac{(x-d) \cdot (h/2-d)}{x}}$$

$$\sigma_s = n \cdot \sigma_c \cdot \frac{d-x}{x}$$

$$x^2 + \frac{2 \cdot n}{b} \left\{As' \cdot (x-d') + As \cdot (x-d)\right\} = 0.0$$

in which,

x : Distance from edge on compression side to neutral axis (mm)
h : Height of Member (mm)
b : Width in section (mm)
d : Effective height (mm)
d' : Concrete Cover (mm)
As : Sectional area of reinforcing bar arranged on tension side (mm^2)
As': Sectional area of reinforcing bar arranged on compression side (mm^2)
n : Elastic Modulus Ratio of Reinforce and Concrete , n = 15.00
σc: Compressive Stress of Concrete (N/mm^2)
σs: Tensile Stress of Reinforcing (N/mm^2)
M: Bending Moment (kN.m)

Bar Arrangement

		Vertical Direction	Longitudinal Direction
Dimension	b(mm)	3500	3500
	h(mm)	3500	3500
	d1(mm)	3350	2400
	d2(mm)	-	-
Bar Arrangement	As1(mm^2)	14-D28 8621	11-D16 2212
	As2(mm^2)	-	-

Calculation Result of Bending Stress

	Vertical Direction					
	M (kNm)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Group-I	1599.4	0.64	66.41	9.60	168.00	OK
Group-II	1104.4	0.44	45.86	12.00	210.00	OK
Group-III	1599.4	0.64	66.41	12.00	210.00	OK
Group-IV	1609.4	0.64	66.83	12.00	210.00	OK
Group-V	1609.4	0.64	66.83	13.44	235.20	OK
Group-VI	1609.4	0.64	66.83	13.44	235.20	OK

	Lonigitudinal Direction					
	M (kNm)	σc (N/mm^2)	σs (N/mm^2)	σca (N/mm^2)	σsa (N/mm^2)	Remarks
Group-III	11.3	0.01	1.60	12.00	210.00	OK
Group-VI	11.3	0.01	1.60	13.44	235.20	OK
Group-VII	389.3	0.27	55.23	12.77	223.44	OK

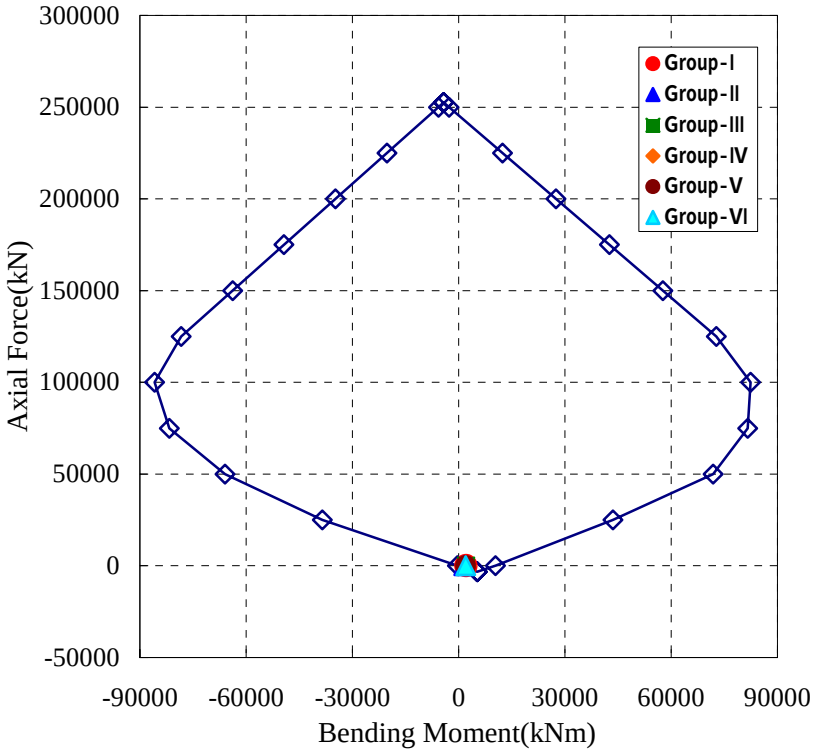
(6) Calculation of Strength for Load Factor Design

*) Flexural Strength

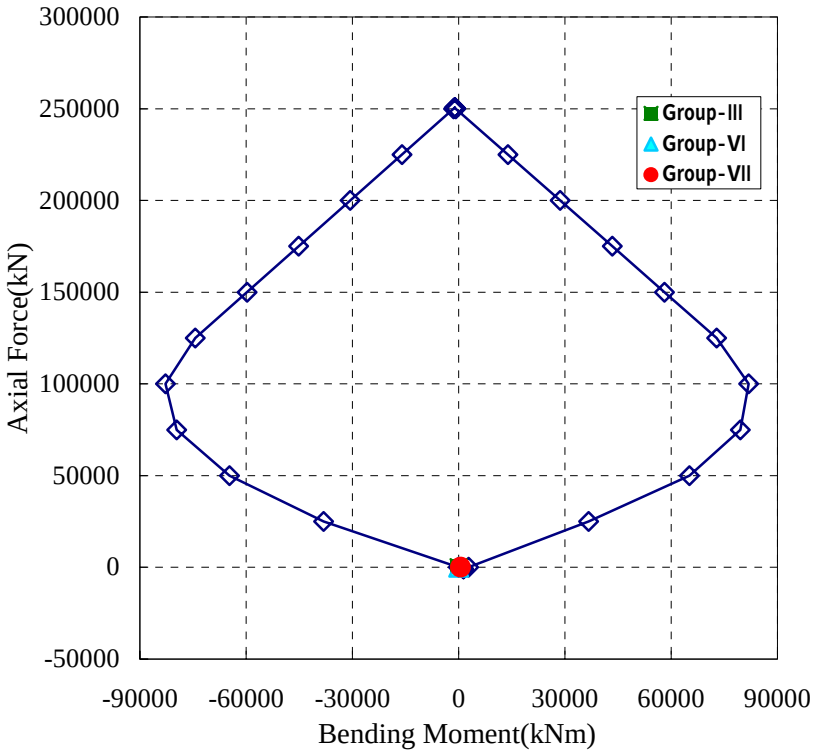
Factored Bending Moment for Load Factor Design

	Vertical Direction	Longitudinal Direction
Group-I	2079.2 kNm	- kNm
Group-II	1435.7 kNm	- kNm
Group-III	2079.2 kNm	14.6 kNm
Group-IV	2092.2 kNm	- kNm
Group-V	2011.7 kNm	- kNm
Group-VI	2011.7 kNm	14.1 kNm
Group-VII	- kNm	506.1 kNm

Interaction of Vertical Direction



Interaction of Longitudinal Direction



*) Shear Strength

Shear Strength "Vn" is Calculated as follows.

Vn= Vc + Vs

In Which

Vc : Normal Shear Strength provided by the Concrete

Vc = vc x bw x d (vc=1/6x $\sqrt{}$ f'c)

= 1/6x $\sqrt{}$ f'c x bw x d)

f'c : 28days Cylinder Strength

bw : Width of Section

d : Effective Height of Section

Vs : Normal Shear Strength provided by the Shear Reinforcement

Vs = Av x fy x d / s

Av : Area of Shear Reinforcement within a distancees.

fy : Yeild Strength of Shear Reinforcement

d : Effective Height of Section

s : Calculated Distance.

Factored Shear Force for Load Factor Design

	Vertical Direction	Longitudinal Direction
Group-I	7688.6 kN	- kN
Group-II	5114.6 kN	- kN
Group-III	7688.6 kN	58.5 kN
Group-IV	7740.6 kN	- kN
Group-V	7442.9 kN	- kN
Group-VI	7442.9 kN	56.3 kN
Group-VI	- kN	1804.7 kN

Calculation of Shear Strength

vc = $1/6 \times \sqrt{f'c} = 1/6 \sqrt{(24)} = 0.816 N/mm^2$ -> $816 kN/m^2$

fy = 420 N/mm^2 -> 420000 kN/m^2

s = 1.000 m

Vertical Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-I	7688.6	3.500	3.350	8132.46	0.0	0.0
Group-II	5114.6	3.500	3.350	8132.46	0.0	0.0
Group-III	7688.6	3.500	3.350	8132.46	0.0	0.0
Group-IV	7740.6	3.500	3.350	8132.46	0.0	0.0
Group-V	7442.9	3.500	3.350	8132.46	0.0	0.0
Group-VI	7442.9	3.500	3.350	8132.46	0.0	0.0

Arrangement of Stirr D20 -ctc.150 8378 mm^2/m > 0 mm^2/m

Longitudinal Direction

	Su(kN)	bw(m)	d(m)	Vc(kN)	Vsreq(kN)	Asreq(mm^2/m)
Group-III	58.5	3.500	3.430	8326.67	0.0	0.0
Group-VI	56.3	3.500	3.430	8326.67	0.0	0.0
Group-VII	1804.7	3.500	3.430	8326.67	0.0	0.0

Arrangement of Stirr D20 -ctc.150 4189 mm^2/m > 0 mm^2/m

Seismic Analysis

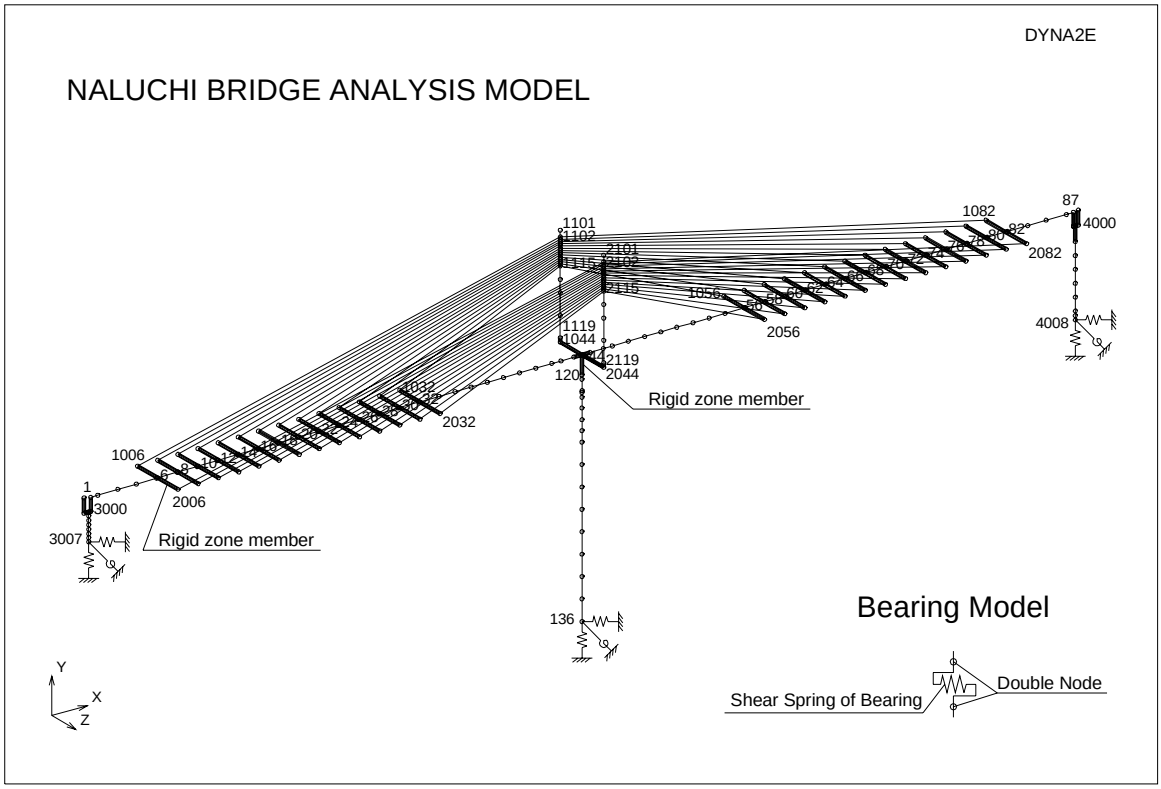
1. SEISMIC ANALYSIS

1.1 Summary of Analysis

1.1.1 Analysis Model

Analysis model for dynamic analysis is shown following.

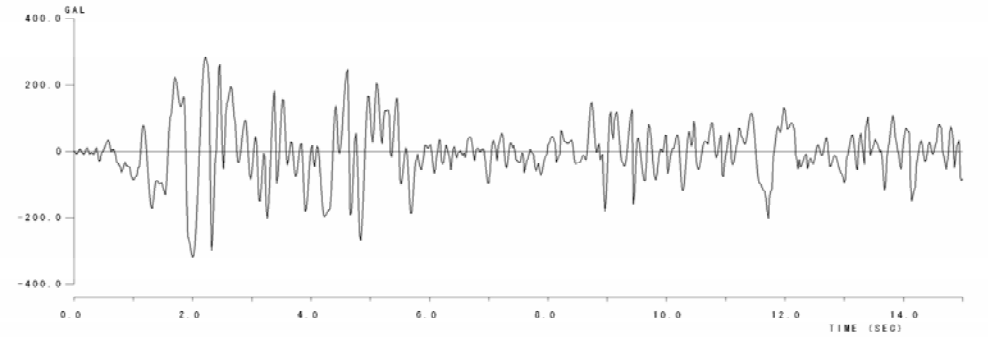
The menber of main girder and column of pier, which modeling as beam element on centoroidal axis. Meanwhile, pylon and stay cable is modeling for real position of anchorage and saddle. The connection member between stay cable to maingirder is modeling as rigid zone member. Also, connection between pulon to main girder or column, which modeling as rigid zone member.



Member	Modeling	Remarks
Girder	Beam element	A,Iz,Iy,J
Cross Beam for Stay Cable	Rigid zone element	A=Iz=Iy=J=infinity
Stay Cable	Beam element	
Substructure	Beam element (consider as yield stiffenness)	Connection of Girder to P3 Column and Pylon , Beam at top of P4 : Rigid zone element
Foundation	6-Digit Spring coefficient	

1.1.2 Input Waveforme

In the time-history response analysis, the El Centro seismic waveform are utilized as an input earthquake ground motion. Although it is desirable to use observed seismic record at an actual bridge construction point for seismic wave input, it is normally difficult to obtain survey data. Therefore, the EL Centro seismic wave in accordance with AASHTO which has almost equal maximum acceleration to the earthquake arisen on 8th Oct, 2005.



1.1.3 Eigenvalue Analysis

(1) Purpos of Eigenvalue Analysis

From the Eigenvalue analysis outputs, it is calculated selected vibration mode and viscosity dumping characteristics for further dynamic analysis. The dynamic analysis take bridge damping effect calculated by viscosity damping matrix into consideration.

(2) Determination of Parameter for Viscosity Damping Matrix

Determination of parameter for viscosity damping matrix, which clculate from two predominant mode, the parameter should calculate as following formula.

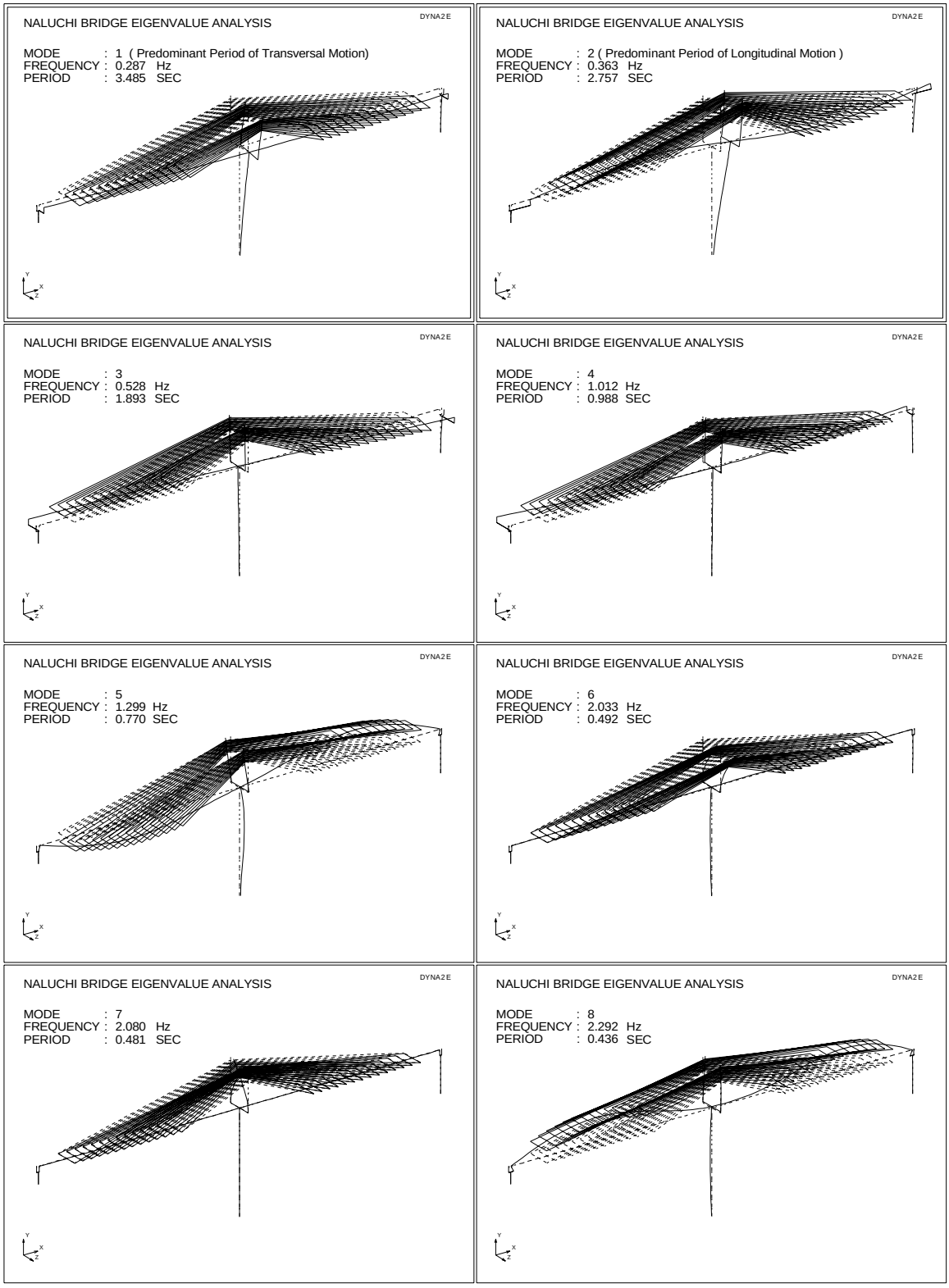
$$[C] = \alpha \cdot [Ko] + \beta \cdot [M]$$

$$\alpha = (fi \cdot hi - fj \cdot hj) / \{\pi \cdot (fi^{\wedge}2 - fj^2)\}$$
$$\beta = 4\pi \cdot fi \cdot (hi - a \cdot \pi \cdot fi)$$

[C] : Damping Matrix
[Ko] : Elasticity Stiffeness Matrix
[M] : Mass Matrx
a : Coefficient of Stiffeness Matrix for Structural Syste
b : Coefficient of Mass Matrix for Structural System
fi : Freqency at "i"th Mode
fj : Freqency at "j"th Mode
hi : Damping Coefficient at "i"th Mode
hj : Damping Coefficient at "j"th Mode

1.2 Result of Eigenvalue Analysis

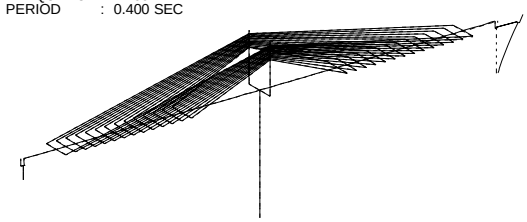
1.2.1 Mode Shape



NALUCHI BRIDGE EIGENVALUE ANALYSIS

DYNA2E

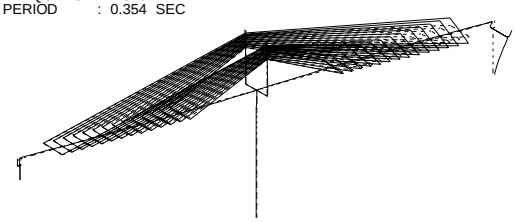
MODE : 9
FREQUENCY : 2.499 Hz
PERIOD : 0.400 SEC



NALUCHI BRIDGE EIGENVALUE ANALYSIS

DYNA2E

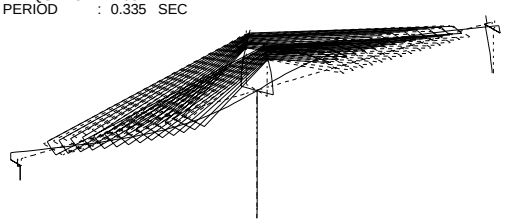
MODE : 10
FREQUENCY : 2.826 Hz
PERIOD : 0.354 SEC



NALUCHI BRIDGE EIGENVALUE ANALYSIS

DYNA2E

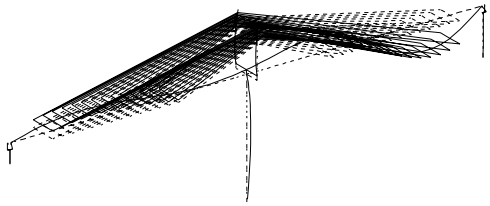
MODE : 11
FREQUENCY : 2.987 Hz
PERIOD : 0.335 SEC



NALUCHI BRIDGE EIGENVALUE ANALYSIS

DYNA2E

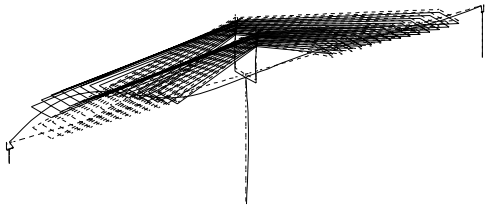
MODE : 12
FREQUENCY : 3.348 Hz
PERIOD : 0.299 SEC



NALUCHI BRIDGE EIGENVALUE ANALYSIS

DYNA2E

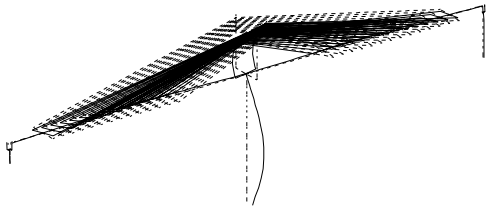
MODE : 13
FREQUENCY : 3.849 Hz
PERIOD : 0.260 SEC



NALUCHI BRIDGE EIGENVALUE ANALYSIS

DYNA2E

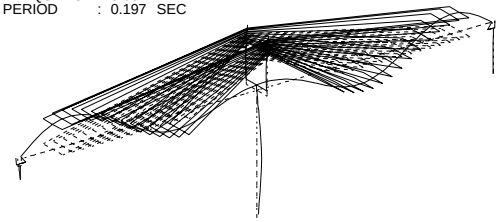
MODE : 14
FREQUENCY : 4.679 Hz
PERIOD : 0.214 SEC



NALUCHI BRIDGE EIGENVALUE ANALYSIS

DYNA2E

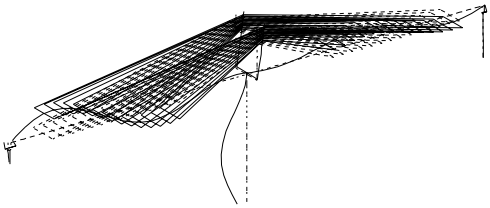
MODE : 15
FREQUENCY : 5.087 Hz
PERIOD : 0.197 SEC



NALUCHI BRIDGE EIGENVALUE ANALYSIS

DYNA2E

MODE : 16
FREQUENCY : 5.782 Hz
PERIOD : 0.173 SEC



1.2.2 Natural Frequency

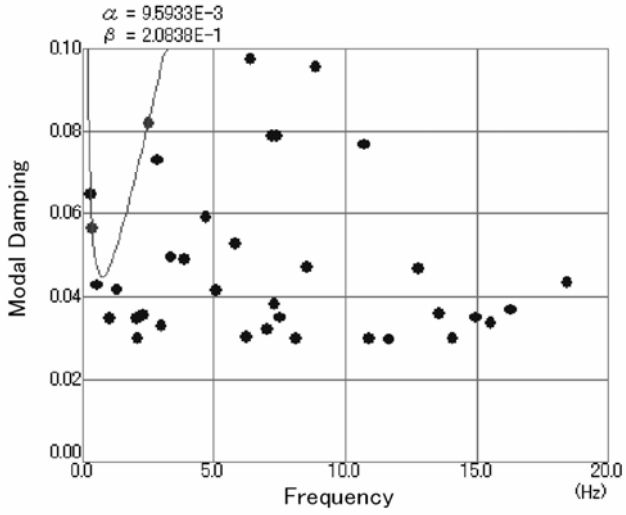
MODE	CIRC. FRQ (RAD/SEC)	FREQUENCY (1/SEC)	PERIOD (SEC)		Longitudinal X	Virtical Y	Transverse Z
1	1.80296	0.28695	3.484935	P.F	0.000	0.000	127.490
				PF*S	0.000	0.000	1.556
				E.M	0	0	16,253
				EMR	0.000	0.000	0.798
2	2.27913	0.36274	2.756832	P.F	127.370	-0.787	0.000
				PF*S	1.162	-0.007	0.000
				E.M	16,222	1	0
				EMR	0.797	0.000	0.000
3	3.31842	0.52814	1.893427	P.F	0.000	0.000	-1.821
				PF*S	0.000	0.000	-0.037
				E.M	0	0	3
				EMR	0.000	0.000	0.000
4	6.35799	1.01191	0.988235	P.F	0.000	0.000	-15.799
				PF*S	0.000	0.000	0.495
				E.M	0	0	250
				EMR	0.000	0.000	0.012
5	8.1638	1.29931	0.76964	P.F	24.667	11.110	0.000
				PF*S	0.685	0.309	0.000
				E.M	608	123	0
				EMR	0.030	0.006	0.000
6	12.77269	2.03284	0.491923	P.F	0.000	0.000	-12.876
				PF*S	0.000	0.000	-0.714
				E.M	0	0	166
				EMR	0.000	0.000	0.008
7	13.06889	2.07998	0.480774	P.F	0.261	-3.573	0.000
				PF*S	0.015	-0.210	0.000
				E.M	0	13	0
				EMR	0.000	0.001	0.000
8	14.3996	2.29177	0.436344	P.F	-4.675	77.999	0.000
				PF*S	-0.153	2.545	0.000
				E.M	22	6,084	0
				EMR	0.001	0.299	0.000
9	15.70037	2.49879	0.400193	P.F	32.613	1.996	0.000
				PF*S	1.733	0.106	0.000
				E.M	1,064	4	0
				EMR	0.052	0.000	0.000
10	17.75932	2.82648	0.353796	P.F	0.000	0.000	31.781
				PF*S	0.000	0.000	1.588
				E.M	0	0	1,010
				EMR	0.000	0.000	0.050
11	18.7692	2.98721	0.33476	P.F	0.000	0.000	-7.456
				PF*S	0.000	0.000	0.159
				E.M	0	0	56
				EMR	0.000	0.000	0.003
12	21.0341	3.34768	0.298714	P.F	6.231	64.739	0.000
				PF*S	-0.182	-1.892	0.000
				E.M	39	4,191	0
				EMR	0.002	0.206	0.000
13	24.18439	3.84906	0.259803	P.F	5.325	-51.585	0.000
				PF*S	0.254	-2.462	0.000
				E.M	28	2,661	0
				EMR	0.001	0.131	0.000
14	29.39772	4.67879	0.21373	P.F	0.000	0.000	25.975
				PF*S	0.000	0.000	0.647
				E.M	0	0	675
				EMR	0.000	0.000	0.033
15	31.96417	5.08726	0.19657	P.F	2.972	51.485	0.000
				PF*S	0.082	1.429	0.000
				E.M	9	2,651	0
				EMR	0.000	0.130	0.000
16	36.32937	5.782	0.172951	P.F	-19.207	9.847	0.000
				PF*S	0.466	-0.239	0.000
				E.M	369	97	0
				EMR	0.018	0.005	0.000

1.2.3 Determination of Parameter for Viscosity Damping Matrix

Calculation result of Reyliegh type viscosity damping coefficient is mentioned below.

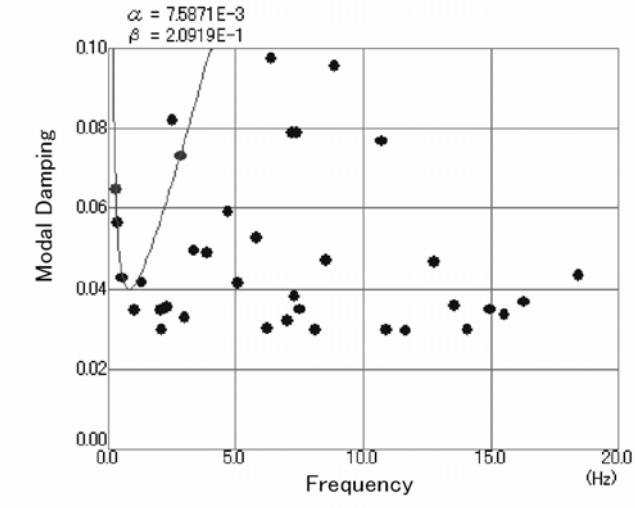
Longitudinal

Mode	Frequency fi (Hz)	Modal Damping hi	a	b
2	0.363	0.05665	9.5933E-03	2.0838E-01
9	2.499	0.08195		



Transverse

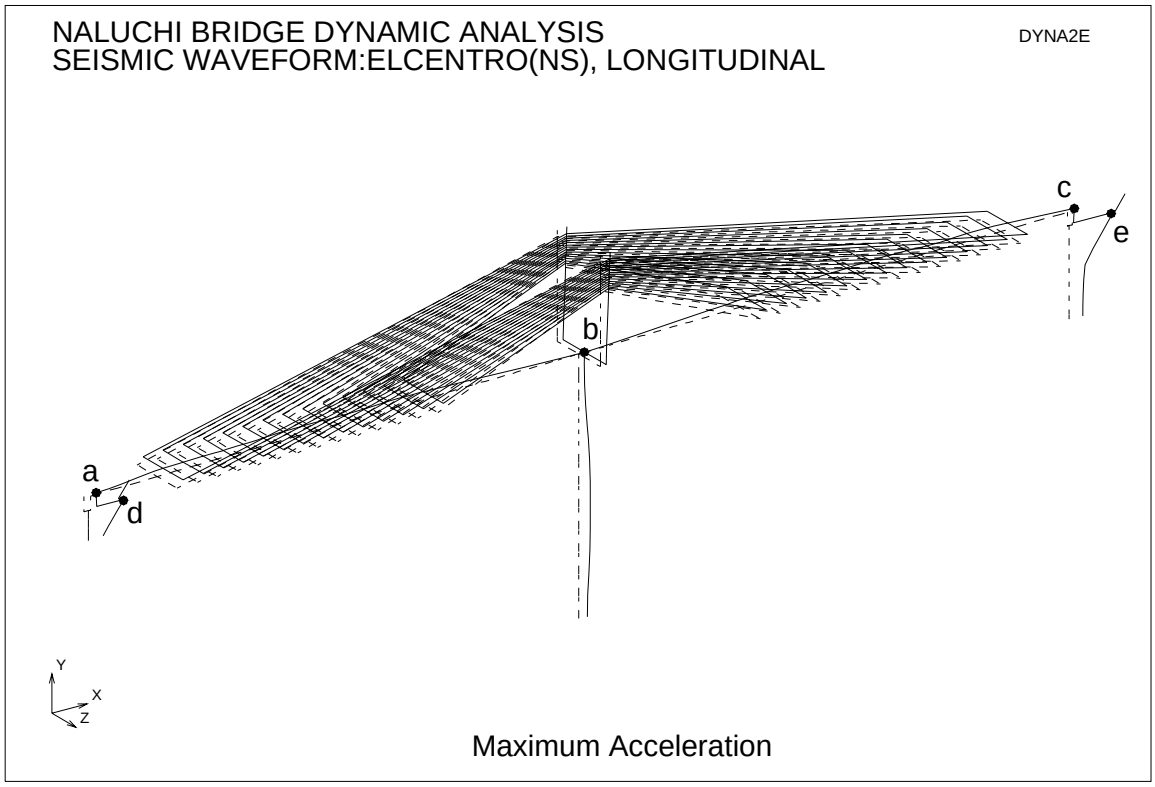
Mode	Frequency fi (Hz)	Modal Damping hi	a	b
1	0.287	0.06485	7.5871E-03	2.0919E-01
10	2.826	0.07326		



1.3 Calculation Result of Dynamic Analysis

1.3.1 Longitudinal Seismic Motion

(1) Response Acceleration



		Acceleration (gal)	Remarks
a	Girder at P2 support	196.8	
b	Top of P3 column	195.6	
c	Girder at P4 support	204.0	
d	Top of P2 column	695.3	
e	Top of P4 column	1279.3	

Longitudinal Direction MAXIMUM ABS.ACCELERATION

Node No	X (m/s^2)	Time (sec)	Y (m/s^2)	Time (sec)	Z (m/s^2)	Time (sec)	θx (rad/s^2)	Time (sec)	θy (rad/s^2)	Time (sec)	θz (rad/s^2)	Time (sec)	Remarks
1	1.968	5.740	-0.355	4.800	0.000	7.416	0.000	12.036	0.000	6.292	-0.163	2.648	Girder End
2	1.965	5.738	-0.538	2.642	0.000	7.412	0.000	12.036	0.000	6.292	-0.163	2.648	
3	1.956	5.738	-1.327	2.644	0.000	7.394	0.000	5.474	0.000	6.292	-0.152	2.646	
4	1.948	5.738	-1.978	2.644	0.000	7.366	0.000	5.474	0.000	6.292	-0.130	2.646	
5	1.940	5.736	-2.557	2.646	0.000	7.326	0.000	5.474	0.000	6.292	-0.102	2.646	
6	1.940	5.736	-2.588	2.646	0.000	7.326	0.000	5.474	0.000	6.292	-0.100	2.644	
7	1.934	5.736	-2.991	2.644	0.000	7.326	0.000	5.588	0.000	6.290	0.086	5.826	
8	1.933	5.736	-3.013	2.644	0.000	7.326	0.000	5.588	0.000	6.290	0.086	5.826	
9	1.929	5.736	-3.280	2.644	0.000	6.292	0.000	5.474	0.000	6.290	0.086	5.824	
10	1.928	5.736	-3.293	2.644	0.000	6.292	0.000	5.474	0.000	6.290	0.086	5.824	
11	1.925	5.736	-3.434	2.644	0.000	6.290	0.000	5.634	0.000	5.454	0.083	5.824	
12	1.925	5.736	-3.439	2.644	0.000	6.290	0.000	5.634	0.000	5.454	0.082	5.824	
13	1.922	5.736	-3.469	2.644	0.000	6.290	0.000	5.634	0.000	5.454	0.077	5.822	
14	1.922	5.736	-3.468	2.644	0.000	6.290	0.000	5.634	0.000	5.454	0.076	5.822	
15	1.920	5.734	-3.404	2.642	0.000	6.290	0.000	5.634	0.000	5.454	0.068	5.822	
16	1.920	5.734	-3.398	2.642	0.000	6.290	0.000	5.634	0.000	5.454	0.067	5.820	
17	1.920	5.734	3.436	5.830	0.000	6.290	0.000	5.634	0.000	6.112	-0.061	2.556	
18	1.920	5.734	3.452	5.830	0.000	6.290	0.000	5.634	0.000	6.112	-0.061	2.556	
19	1.919	5.734	3.671	5.826	0.000	6.288	0.000	5.548	0.000	6.544	-0.064	2.546	
20	1.919	5.734	3.683	5.826	0.000	6.288	0.000	5.548	0.000	6.544	-0.065	2.546	
21	1.920	5.734	3.827	5.824	0.000	6.288	0.000	5.632	0.000	6.696	-0.068	2.538	
22	1.920	5.734	3.834	5.824	0.000	6.288	0.000	5.632	0.000	5.284	-0.068	2.538	
23	1.921	5.734	3.894	5.822	0.000	6.284	0.000	5.632	0.000	6.824	-0.069	2.534	
24	1.921	5.734	3.895	5.822	0.000	6.284	0.000	5.632	0.000	6.824	-0.069	2.532	
25	1.922	5.732	3.865	5.820	0.000	6.282	0.000	5.632	0.000	6.292	-0.066	2.528	
26	1.922	5.732	3.860	5.820	0.000	6.282	0.000	5.632	0.000	6.292	-0.066	2.528	
27	1.923	5.732	3.738	5.820	0.000	6.280	0.000	5.632	0.000	6.290	0.071	2.402	
28	1.923	5.732	3.728	5.820	0.000	6.280	0.000	5.632	0.000	6.290	0.071	2.402	
29	1.925	5.730	3.518	5.818	0.000	6.280	0.000	5.592	0.000	6.290	0.070	2.398	
30	1.925	5.730	3.502	5.816	0.000	6.280	0.000	5.592	0.000	6.290	0.070	2.398	
31	1.927	5.730	3.214	5.814	0.000	6.278	0.000	6.718	0.000	6.288	-0.071	5.828	
32	1.927	5.730	3.194	5.814	0.000	6.278	0.000	6.718	0.000	6.288	-0.071	5.828	
33	1.929	5.728	2.846	5.812	0.000	6.278	0.000	6.718	0.000	6.288	-0.081	5.824	
34	1.931	5.728	2.520	5.808	0.000	6.276	0.000	6.718	0.000	6.288	-0.087	5.822	
35	1.933	5.728	2.179	5.804	0.000	6.272	0.000	6.718	0.000	6.278	-0.090	5.820	
36	1.935	5.726	1.838	5.796	0.000	6.270	0.000	6.718	0.000	6.286	-0.090	5.816	
37	1.938	5.726	1.511	5.786	0.000	6.270	0.000	6.718	0.000	6.286	-0.087	5.814	
38	1.941	5.726	1.204	5.776	0.000	6.268	0.000	6.718	0.000	6.276	-0.084	5.806	
39	1.944	5.726	0.907	5.766	0.000	6.252	0.000	6.718	0.000	6.254	-0.080	5.796	
40	1.948	5.726	0.608	5.758	0.000	6.252	0.000	8.356	0.000	6.254	-0.078	5.776	
41	1.950	5.726	0.436	5.756	0.000	6.252	0.000	8.356	0.000	6.252	-0.078	5.766	
42	1.954	5.726	-0.213	2.720	0.000	8.356	0.000	8.356	0.000	6.252	-0.081	5.758	
43	1.955	5.726	-0.164	2.732	0.000	8.460	0.000	8.356	0.000	6.252	-0.082	5.754	
44	1.956	5.726	-0.154	2.734	0.000	7.244	0.000	8.356	0.000	6.578	-0.083	5.754	
45	1.957	5.726	-0.145	2.736	0.000	8.462	0.000	8.356	0.000	6.252	-0.082	5.754	
46	1.960	5.728	0.212	2.534	0.000	8.330	0.000	8.356	0.000	6.252	-0.081	5.756	
47	1.967	5.728	0.412	2.524	0.000	6.812	0.000	8.356	0.000	6.252	-0.079	5.766	
48	1.971	5.730	-0.586	5.764	0.000	6.812	0.000	8.356	0.000	6.254	-0.078	5.772	
49	1.978	5.730	-0.892	5.770	0.000	6.252	0.000	6.252	0.000	6.254	0.079	2.542	
50	1.986	5.732	-1.193	5.776	0.000	6.268	0.000	6.712	0.000	6.276	0.088	2.548	
51	1.992	5.732	1.520	2.538	0.000	6.270	0.000	5.480	0.000	6.286	0.096	2.554	
52	1.999	5.734	1.891	2.544	0.000	6.270	0.000	5.480	0.000	6.286	0.101	2.558	
53	2.005	5.734	2.272	2.546	0.000	6.272	0.000	5.570	0.000	6.278	0.101	2.562	
54	2.011	5.736	2.643	2.550	0.000	6.276	0.000	5.570	0.000	6.288	0.096	2.566	
55	2.016	5.736	2.983	2.552	0.000	6.278	0.000	5.570	0.000	6.288	0.087	2.572	
56	2.022	5.736	3.318	2.556	0.000	6.278	0.000	5.570	0.000	6.288	-0.084	2.240	
57	2.023	5.736	3.337	2.556	0.000	6.278	0.000	5.570	0.000	6.288	-0.084	2.240	
58	2.029	5.736	3.572	2.558	0.000	6.280	0.000	5.570	0.000	6.290	-0.087	2.242	
59	2.029	5.736	3.584	2.558	0.000	6.280	0.000	5.570	0.000	6.290	-0.087	2.242	
60	2.036	5.736	3.703	2.562	0.000	6.280	0.000	6.760	0.000	6.290	-0.085	2.244	
61	2.036	5.736	3.707	2.562	0.000	6.280	0.000	6.760	0.000	6.290	-0.085	2.244	
62	2.042	5.736	-3.731	5.830	0.000	6.284	0.000	6.760	0.000	6.292	0.081	2.426	
63	2.042	5.736	-3.738	5.830	0.000	6.284	0.000	6.760	0.000	6.292	0.082	2.426	
64	2.047	5.736	-3.813	5.834	0.000	6.288	0.000	5.500	0.000	6.304	0.082	2.430	
65	2.048	5.736	-3.815	5.834	0.000	6.288	0.000	5.500	0.000	6.304	0.082	2.430	
66	2.053	5.736	-3.893	2.240	0.000	6.288	0.000	6.760	0.000	6.174	0.076	2.434	
67	2.053	5.736	-3.907	2.240	0.000	6.288	0.000	6.760	0.000	6.174	0.075	2.436	
68	2.058	5.736	-4.087	2.242	0.000	6.290	0.000	5.506	0.000	6.176	-0.079	2.558	
69	2.058	5.736	-4.096	2.242	0.000	6.290	0.000	5.506	0.000	6.176	-0.079	2.558	
70	2.062	5.736	-4.178	2.242	0.000	6.290	0.000	5.564	0.000	6.176	-0.088	2.560	
71	2.062	5.736	-4.180	2.242	0.000	6.290	0.000	5.564	0.000	6.176	-0.088	2.562	
72	2.065	5.738	-4.160	2.244	0.000	6.292	0.000	5.638	0.000	6.386	-0.091	2.564	
73	2.065	5.738	-4.155	2.244	0.000	6.292	0.000	5.638	0.000	6.386	-0.091	2.564	
74	2.067	5.738	-4.027	2.244	0.000	6.292	0.000	5.638	0.000	6.390	-0.090	2.568	
75	2.068	5.738	-4.016	2.246	0.000	6.292	0.000	5.638	0.000	6.390	-0.090	2.568	
76	2.069	5.738	-3.780	2.246	0.000	6.294	0.000	5.554	0.000	5.456	-0.084	2.574	
77	2.069	5.738	-3.762	2.246	0.000	6.294	0.000	5.554	0.000	5.456	-0.084	2.576	
78	2.068	5.738	-3.417	2.248	0.000	6.296	0.000	6.554	0.000	5.458	0.085	5.842	
79	2.068	5.738	-3.392	2.248	0.000	6.296	0.000	6.554	0.000	5.458	0.086	2.242	

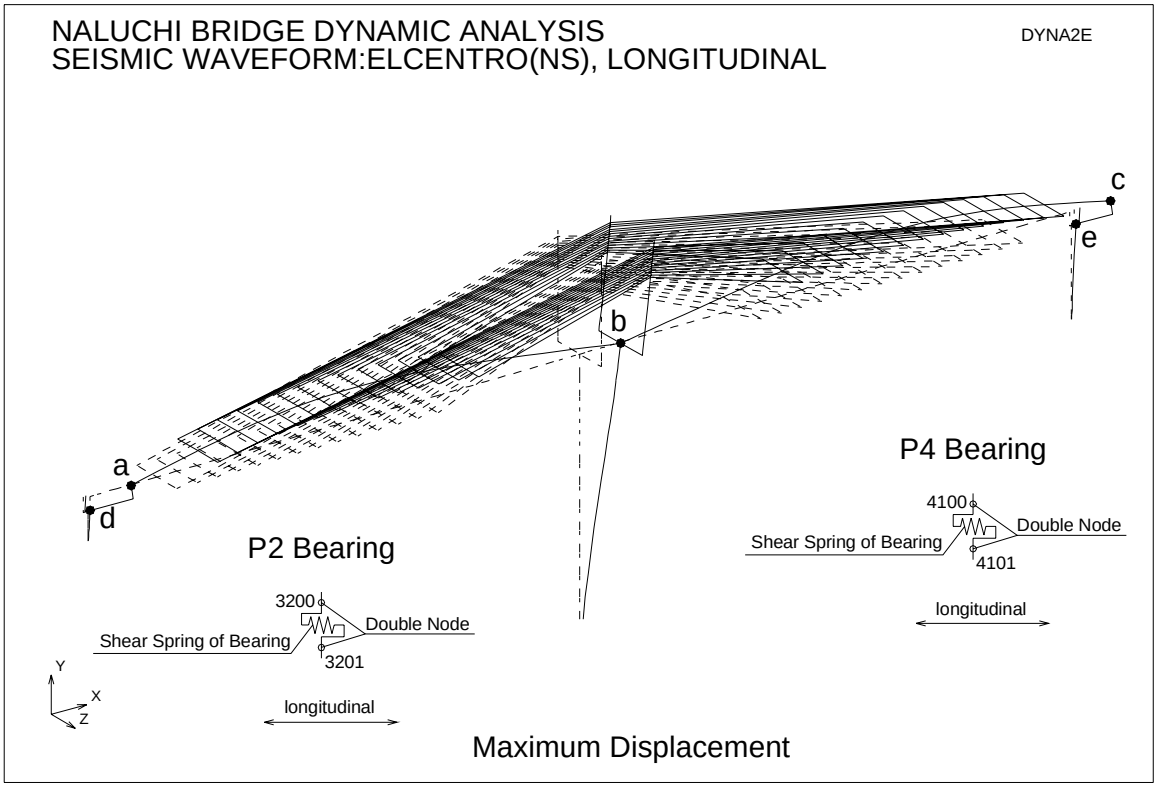
Longitudinal Direction MAXIMUM ABS.ACCELERATION

Node No	X (m/s^2)	Time (sec)	Y (m/s^2)	Time (sec)	Z (m/s^2)	Time (sec)	θx (rad/s^2)	Time (sec)	θy (rad/s^2)	Time (sec)	θz (rad/s^2)	Time (sec)	Remarks
86	2.043	5.738	0.426	2.668	0.000	7.378	0.000	5.896	0.000	5.462	0.165	2.258	
87	2.040	5.738	-0.415	2.454	0.000	7.426	0.000	5.896	0.000	5.464	0.167	2.258	Girder End
1006	1.940	5.736	-2.588	2.646	0.000	7.364	0.000	2.652	0.000	5.772	-0.100	2.644	
1008	1.933	5.736	-3.013	2.644	0.000	7.364	0.000	2.652	0.000	5.770	0.086	5.826	
1010	1.928	5.736	-3.293	2.644	0.000	6.290	0.000	2.652	0.000	2.518	0.086	5.824	
1012	1.925	5.736	-3.439	2.644	0.000	6.290	0.000	2.652	0.000	2.514	0.082	5.824	
1014	1.922	5.736	-3.468	2.644	0.000	6.290	0.000	5.746	0.000	2.510	0.076	5.822	
1016	1.920	5.734	-3.398	2.642	0.000	6.290	0.000	2.494	0.000	2.506	0.067	5.820	
1018	1.920	5.734	3.452	5.830	0.000	6.288	0.000	2.496	0.000	2.502	-0.061	2.556	
1020	1.919	5.734	3.683	5.826	0.000	6.286	0.000	2.494	0.000	2.496	-0.065	2.546	
1022	1.920	5.734	3.834	5.824	0.000	6.284	0.000	2.492	0.000	2.490	-0.068	2.538	
1024	1.921	5.734	3.895	5.822	0.000	6.284	0.000	2.488	0.000	2.484	-0.069	2.532	
1026	1.922	5.732	3.860	5.820	0.000	4.546	0.000	2.484	0.000	2.480	-0.066	2.528	
1028	1.923	5.732	3.728	5.820	0.000	5.672	0.000	2.478	0.000	2.476	0.071	2.402	
1030	1.925	5.730	3.502	5.816	0.000	5.666	0.000	2.472	0.000	2.474	0.070	2.398	
1032	1.927	5.730	3.194	5.814	0.000	5.662	0.000	5.824	0.000	5.822	-0.071	5.828	
1082	2.063	5.738	-2.358	2.248	0.000	6.296	0.000	5.776	0.000	5.776	0.127	2.250	
1080	2.066	5.738	-2.941	2.248	0.000	6.296	0.000	2.660	0.000	5.772	0.106	2.246	
1078	2.068	5.738	-3.417	2.248	0.000	6.296	0.000	5.756	0.000	5.770	0.085	5.842	
1076	2.069	5.738	-3.780	2.246	0.000	6.294	0.000	5.756	0.000	5.768	-0.084	2.574	
1074	2.067	5.738	-4.027	2.244	0.000	6.292	0.000	5.754	0.000	5.764	-0.090	2.568	
1072	2.065	5.738	-4.160	2.244	0.000	6.292	0.000	5.752	0.000	2.420	-0.091	2.564	
1070	2.062	5.736	-4.178	2.242	0.000	6.290	0.000	2.330	0.000	3.354	-0.088	2.560	
1068	2.058	5.736	-4.087	2.242	0.000	6.290	0.000	2.328	0.000	4.902	-0.079	2.558	
1066	2.053	5.736	-3.893	2.240	0.000	2.580	0.000	2.324	0.000	4.900	0.076	2.434	
1064	2.047	5.736	-3.813	5.834	0.000	2.566	0.000	2.558	0.000	2.572	0.082	2.430	
1062	2.042	5.736	-3.731	5.830	0.000	2.564	0.000	2.558	0.000	2.568	0.081	2.426	
1060	2.036	5.736	3.703	2.562	0.000	2.564	0.000	2.558	0.000	2.564	-0.085	2.244	
1058	2.029	5.736	3.572	2.558	0.000	2.560	0.000	2.558	0.000	2.562	-0.087	2.242	
1056	2.022	5.736	3.318	2.556	0.000	2.560	0.000	2.558	0.000	2.560	-0.084	2.240	
2006	1.940	5.736	-2.588	2.646	0.000	4.822	0.000	2.652	0.000	5.772	-0.100	2.644	
2008	1.933	5.736	-3.013	2.644	0.000	4.822	0.000	2.652	0.000	5.770	0.086	5.826	
2010	1.928	5.736	-3.293	2.644	0.000	4.822	0.000	2.652	0.000	2.518	0.086	5.824	
2012	1.925	5.736	-3.439	2.644	0.000	4.822	0.000	2.650	0.000	2.514	0.082	5.824	
2014	1.922	5.736	-3.468	2.644	0.000	4.820	0.000	5.746	0.000	2.510	0.076	5.822	
2016	1.920	5.734	-3.398	2.642	0.000	4.820	0.000	2.494	0.000	2.506	0.067	5.820	
2018	1.920	5.734	3.452	5.830	0.000	4.820	0.000	2.496	0.000	2.502	-0.061	2.556	
2020	1.919	5.734	3.683	5.826	0.000	6.288	0.000	2.494	0.000	2.496	-0.065	2.546	
2022	1.920	5.734	3.834	5.824	0.000	6.288	0.000	2.492	0.000	2.490	-0.068	2.538	
2024	1.921	5.734	3.895	5.822	0.000	6.288	0.000	2.488	0.000	2.484	-0.069	2.532	
2026	1.922	5.732	3.860	5.820	0.000	4.814	0.000	2.482	0.000	2.480	-0.066	2.528	
2028	1.923	5.732	3.728	5.820	0.000	4.812	0.000	2.478	0.000	2.476	0.071	2.402	
2030	1.925	5.730	3.502	5.816	0.000	4.812	0.000	2.472	0.000	2.474	0.070	2.398	
2032	1.927	5.730	3.194	5.814	0.000	4.810	0.000	5.824	0.000	5.822	-0.071	5.828	
2082	2.063	5.738	-2.358	2.248	0.000	4.702	0.000	5.778	0.000	5.776	0.127	2.250	
2080	2.066	5.738	-2.941	2.248	0.000	6.298	0.000	2.660	0.000	5.772	0.106	2.246	
2078	2.068	5.738	-3.417	2.248	0.000	6.298	0.000	5.756	0.000	5.770	0.085	5.842	
2076	2.069	5.738	-3.780	2.246	0.000	6.296	0.000	5.754	0.000	5.768	-0.084	2.574	
2074	2.067	5.738	-4.027	2.244	0.000	6.292	0.000	5.752	0.000	5.764	-0.090	2.568	
2072	2.065	5.738	-4.160	2.244	0.000	6.292	0.000	5.752	0.000	2.420	-0.091	2.564	
2070	2.062	5.736	-4.178	2.242	0.000	6.290	0.000	2.330	0.000	3.354	-0.088	2.560	
2068	2.058	5.736	-4.087	2.242	0.000	6.290	0.000	2.328	0.000	4.902	-0.079	2.558	
2066	2.053	5.736	-3.893	2.240	0.000	6.288	0.000	2.324	0.000	4.900	0.076	2.434	
2064	2.047	5.736	-3.813	5.834	0.000	6.288	0.000	2.558	0.000	2.572	0.082	2.430	
2062	2.042	5.736	-3.731	5.830	0.000	6.284	0.000	2.558	0.000	2.568	0.081	2.426	
2060	2.036	5.736	3.703	2.562	0.000	6.280	0.000	2.560	0.000	2.564	-0.085	2.244	
2058	2.029	5.736	3.572	2.558	0.000	6.280	0.000	2.558	0.000	2.562	-0.087	2.242	
2056	2.022	5.736	3.318	2.556	0.000	2.558	0.000	2.558	0.000	2.560	-0.084	2.240	
1101	3.152	5.758	-0.156	2.734	-0.091	2.626	-0.005	2.626	0.000	2.344	0.045	2.656	
1102	3.109	5.758	-0.156	2.734	-0.083	2.626	-0.005	2.626	0.000	2.344	0.045	2.656	
1103	3.094	5.758	-0.156	2.734	-0.080	2.626	-0.005	2.626	0.000	2.344	0.045	2.656	
1104	3.080	5.758	-0.156	2.734	-0.077	2.626	-0.005	2.626	0.000	2.344	0.044	2.656	
1105	3.065	5.756	-0.156	2.734	-0.075	2.626	-0.005	2.626	0.000	2.344	0.044	2.656	
1106	3.051	5.756	-0.156	2.734	-0.072	2.626	-0.005	2.626	0.000	2.344	0.044	2.656	
1107	3.037	5.756	-0.156	2.734	-0.070	2.626	-0.005	2.626	0.000	2.344	0.044	2.656	
1108	3.022	5.756	-0.156	2.734	-0.067	2.626	-0.005	2.626	0.000	2.344	0.044	2.656	
1109	3.008	5.756	-0.156	2.734	-0.064	2.626	-0.005	2.626	0.000	2.344	-0.044	2.226	
1110	2.993	5.756	-0.156	2.734	-0.062	2.626	-0.005	2.626	0.000	2.344	-0.044	2.226	
1111	2.978	5.756	-0.156	2.734	-0.059	2.626	-0.005	2.626	0.000	2.344	-0.044	2.226	
1112	2.963	5.756	-0.156	2.734	-0.056	2.626	-0.005	2.626	0.000	2.344	-0.045	2.226	
1113	2.948	5.756	-0.156	2.734	-0.054	2.626	-0.005	2.626	0.000	2.344	-0.045	2.226	
1114	2.933	5.756	-0.156	2.734	-0.051	2.626	-0.005	2.626	0.000	2.344	-0.045	2.226	
1115	2.917	5.756	-0.156	2.734	-0.049	2.626	-0.005	2.626	0.000	2.344	-0.045	2.224	
1116	2.815	5.754	-0.156	2.734	-0.034	2.626	-0.005	2.626	0.000	2.344	0.045	2.654	
1117	2.685	5.752	-0.155	2.734	-0.021	2.626	-0.004	2.626	0.000	2.344	-0.050	5.764	
1118	2.397	5.748	-0.155	2.734	-0.006	2.626	-0.002	2.626	0.000	2.344	-0.068	5.758	
1119	2.032	5.734	-0.154	2.734	0.000	2.888	0.000	2.890	0.000	2.344	-0.082	5.754	
1044	1.956	5.726	-0.154	2.734	0.000	2.624	0.000	2.890	0.000	2.344	-0.082	5.754	

Longitudinal Direction MAXIMUM ABS.ACCELERATION

Node No	X (m/s^2)	Time (sec)	Y (m/s^2)	Time (sec)	Z (m/s^2)	Time (sec)	θx (rad/s^2)	Time (sec)	θy (rad/s^2)	Time (sec)	θz (rad/s^2)	Time (sec)	Remarks
2103	3.094	5.758	-0.156	2.734	0.080	2.626	0.005	2.626	0.000	2.344	0.045	2.656	
2104	3.080	5.758	-0.156	2.734	0.077	2.626	0.005	2.626	0.000	2.344	0.044	2.656	
2105	3.065	5.756	-0.156	2.734	0.075	2.626	0.005	2.626	0.000	2.344	0.044	2.656	
2106	3.051	5.756	-0.156	2.734	0.072	2.626	0.005	2.626	0.000	2.344	0.044	2.656	
2107	3.037	5.756	-0.156	2.734	0.070	2.626	0.005	2.626	0.000	2.344	0.044	2.656	
2108	3.022	5.756	-0.156	2.734	0.067	2.626	0.005	2.626	0.000	2.344	0.044	2.656	
2109	3.008	5.756	-0.156	2.734	0.064	2.626	0.005	2.626	0.000	2.344	-0.044	2.226	
2110	2.993	5.756	-0.156	2.734	0.062	2.626	0.005	2.626	0.000	2.344	-0.044	2.226	
2111	2.978	5.756	-0.156	2.734	0.059	2.626	0.005	2.626	0.000	2.344	-0.044	2.226	
2112	2.963	5.756	-0.156	2.734	0.056	2.626	0.005	2.626	0.000	2.344	-0.045	2.226	
2113	2.948	5.756	-0.156	2.734	0.054	2.626	0.005	2.626	0.000	2.344	-0.045	2.226	
2114	2.933	5.756	-0.156	2.734	0.051	2.626	0.005	2.626	0.000	2.344	-0.045	2.226	
2115	2.917	5.756	-0.156	2.734	0.049	2.626	0.005	2.626	0.000	2.344	-0.045	2.224	
2116	2.815	5.754	-0.156	2.734	0.034	2.626	0.005	2.626	0.000	2.344	0.045	2.654	
2117	2.685	5.752	-0.155	2.734	0.021	2.626	0.004	2.626	0.000	2.344	-0.050	5.764	
2118	2.397	5.748	-0.155	2.734	0.006	2.626	0.002	2.626	0.000	2.344	-0.068	5.758	
2119	2.032	5.734	-0.154	2.734	0.000	2.888	0.000	2.890	0.000	2.344	-0.082	5.754	
2044	1.956	5.726	-0.154	2.734	0.000	2.624	0.000	2.890	0.000	2.344	-0.082	5.754	
120	-1.845	4.560	-0.154	2.734	0.000	7.252	0.000	8.384	0.000	6.578	-0.084	5.752	P3 Column Top
121	-1.833	4.558	-0.153	2.734	0.000	7.258	0.000	8.384	0.000	6.578	-0.088	5.746	
122	-1.807	7.348	-0.151	2.734	0.000	7.262	0.000	8.362	0.000	6.578	-0.099	5.740	
123	-1.810	7.348	-0.151	2.734	0.000	7.262	0.000	8.362	0.000	6.578	-0.100	5.740	
124	-1.818	7.348	-0.150	2.734	0.000	7.262	0.000	8.392	0.000	6.578	-0.103	5.738	
125	-1.832	7.348	-0.148	2.734	0.000	7.262	0.000	8.392	0.000	6.578	-0.109	5.736	
126	-1.891	4.888	-0.145	2.734	0.000	7.264	0.000	8.392	0.000	6.578	-0.114	2.366	
127	-2.082	4.886	-0.143	2.734	0.000	7.264	0.000	8.394	0.000	6.578	-0.116	2.364	
128	-2.293	4.884	-0.140	2.734	0.000	7.264	0.000	8.394	0.000	6.578	-0.113	2.362	
129	-2.667	4.882	-0.135	2.734	0.000	7.266	0.000	8.394	0.000	6.578	0.104	4.630	
130	-2.954	4.880	-0.130	2.734	0.000	7.268	0.000	7.220	0.000	6.578	0.097	4.628	
131	-3.121	4.878	-0.124	2.734	0.000	7.268	0.000	7.222	0.000	6.578	0.087	4.610	
132	-3.160	4.874	-0.119	2.734	0.000	7.268	0.000	7.274	0.000	6.578	-0.081	3.264	
133	-3.088	4.872	-0.114	2.734	0.000	7.268	0.000	7.268	0.000	6.578	-0.090	3.424	
134	2.965	2.464	-0.109	2.734	0.000	7.268	0.000	7.270	0.000	6.578	-0.104	3.422	
135	-2.978	1.984	-0.104	2.734	0.000	7.266	0.000	7.270	0.000	6.578	-0.111	3.420	
136	-3.052	1.988	-0.099	2.734	0.000	7.264	0.000	7.268			-0.109	3.420	
88	-8.746	4.868	-0.702	2.364	0.000	6.136	0.000	12.036	0.000	7.418	0.566	2.366	
3100	-6.953	4.866	-0.702	2.364	0.000	6.136	0.000	12.036	0.000	7.418	0.566	2.366	
3200	2.294	5.746	-0.355	4.800	0.000	7.416	0.000	12.036	0.000	6.292	-0.163	2.648	
3201	-6.953	4.866	-0.355	4.800	0.000	6.136	0.000	12.036	0.000	7.418	0.566	2.366	
3000	-6.953	4.866	-0.138	2.648	0.000	6.136	0.000	12.036	0.000	7.418	0.566	2.366	P2 Column Top
3001	-6.490	4.866	-0.138	2.648	0.000	6.136	0.000	12.036	0.000	7.418	0.566	2.366	
3002	-5.975	4.866	-0.137	2.648	0.000	6.136	0.000	12.036	0.000	7.418	0.565	2.366	
3003	-5.469	4.864	-0.137	2.648	0.000	6.136	0.000	12.036	0.000	7.418	0.563	2.366	
3004	-4.969	4.864	-0.136	2.648	0.000	6.136	0.000	12.036	0.000	7.418	0.559	2.366	
3005	-4.483	4.862	-0.135	2.648	0.000	6.140	0.000	12.036	0.000	7.418	0.552	2.366	
3006	-4.055	1.968	-0.135	2.648	0.000	6.140	0.000	12.036	0.000	7.418	0.552	2.366	
3007	-3.796	1.970	-0.135	2.648	0.000	12.072	0.000	12.036			0.552	2.366	
89	-15.613	2.456	0.589	2.456	0.000	5.896	0.000	5.896	0.000	7.356	0.837	2.454	
4200	-12.793	2.456	0.589	2.456	0.000	5.896	0.000	5.896	0.000	7.356	0.837	2.454	
4100	2.371	5.904	-0.415	2.454	0.000	7.380	0.000	5.896	0.000	5.464	0.167	2.258	
4101	-12.793	2.456	-0.415	2.454	0.000	5.896	0.000	5.896	0.000	7.356	0.837	2.454	
4000	-12.793	2.456	0.013	2.670	0.000	5.896	0.000	5.896	0.000	7.356	0.837	2.454	P4 Column Top
4001	-9.864	2.456	0.013	2.670	0.000	5.886	0.000	5.896	0.000	7.356	0.837	2.454	
4002	8.208	2.288	0.010	2.670	0.000	5.888	0.000	5.900	0.000	7.356	0.820	2.454	
4003	6.842	2.284	0.008	2.670	0.000	5.888	0.000	5.904	0.000	7.356	0.779	2.454	
4004	5.585	2.276	0.005	2.670	0.000	5.888	0.000	5.888	0.000	7.356	0.709	2.454	
4005	4.502	2.268	0.003	2.670	0.000	5.890	0.000	5.890	0.000	7.356	0.606	2.454	
4006	-4.421	4.850	0.000	2.670	0.000	5.884	0.000	5.890	0.000	7.356	0.470	2.454	
4007	-4.438	4.850	0.000	2.670	0.000	5.882	0.000	5.890	0.000	7.356	0.470	2.454	
4008	-4.456	4.850			0.000	5.880	0.000	5.890			0.470	2.454	

(2) Response Displacement



		Displacement (m)	Remarks
a	Girder at P2 support	0.389	
b	Top of P3 column	0.389	
c	Girder at P4 support	0.389	
d	Top of P2 column	0.013	
e	Top of P4 column	0.069	

	Node	Displacement (m)	Relative Displacement (m)
P2	3200	0.405	
	3201	0.014	0.391
P4	4100	0.407	
	4101	0.069	0.338

Longitudinal Direction MAXIMUM ABS.DISPLACEMENT

Node No	X (m)	Time (sec)	Y (m)	Time (sec)	Z (m)	Time (sec)	θx (rad)	Time (sec)	θy (rad)	Time (sec)	θz (rad)	Time (sec)	Remarks
1	-0.389	5.886	0.000	2.648	0.000	7.318	0.000	7.300	0.000	7.396	-0.005	5.844	Girder End
2	-0.388	5.888	-0.009	5.866	0.000	7.318	0.000	7.296	0.000	7.396	-0.005	5.844	
3	-0.388	5.888	-0.036	5.850	0.000	7.316	0.000	7.284	0.000	7.396	-0.005	5.844	
4	-0.388	5.888	-0.061	5.848	0.000	7.314	0.000	7.274	0.000	7.394	-0.005	5.842	
5	-0.387	5.888	-0.087	5.846	0.000	7.312	0.000	7.262	0.000	7.392	-0.005	5.842	
6	-0.387	5.888	-0.089	5.846	0.000	7.312	0.000	7.260	0.000	7.392	-0.005	5.842	
7	-0.387	5.888	-0.112	5.844	0.000	7.310	0.000	7.250	0.000	7.390	-0.005	5.840	
8	-0.387	5.888	-0.114	5.844	0.000	7.310	0.000	7.250	0.000	7.390	-0.005	5.840	
9	-0.386	5.888	-0.136	5.844	0.000	7.308	0.000	7.242	0.000	7.386	-0.005	5.840	
10	-0.386	5.888	-0.137	5.844	0.000	7.308	0.000	7.240	0.000	7.386	-0.004	5.840	
11	-0.386	5.888	-0.157	5.842	0.000	7.306	0.000	7.232	0.000	7.384	-0.004	5.838	
12	-0.386	5.888	-0.159	5.842	0.000	7.306	0.000	7.232	0.000	7.384	-0.004	5.838	
13	-0.385	5.888	-0.176	5.842	0.000	7.306	0.000	7.226	0.000	7.378	-0.004	5.838	
14	-0.385	5.888	-0.177	5.842	0.000	7.306	0.000	7.226	0.000	7.378	-0.003	5.838	
15	-0.385	5.888	-0.193	5.842	0.000	7.304	0.000	7.218	0.000	7.374	-0.003	5.836	
16	-0.385	5.888	-0.194	5.842	0.000	7.304	0.000	7.218	0.000	7.374	-0.003	5.836	
17	-0.385	5.888	-0.206	5.842	0.000	7.302	0.000	7.212	0.000	7.368	-0.002	5.834	
18	-0.385	5.888	-0.206	5.842	0.000	7.302	0.000	7.212	0.000	7.368	-0.002	5.834	
19	-0.385	5.888	-0.216	5.840	0.000	7.300	0.000	7.204	0.000	7.362	-0.002	5.832	
20	-0.385	5.888	-0.216	5.840	0.000	7.300	0.000	7.204	0.000	7.362	-0.002	5.832	
21	-0.384	5.888	-0.222	5.840	0.000	7.298	0.000	7.202	0.000	7.356	-0.001	5.828	
22	-0.384	5.888	-0.222	5.840	0.000	7.298	0.000	7.202	0.000	7.356	-0.001	5.978	
23	-0.384	5.888	-0.224	5.840	0.000	7.296	0.000	7.200	0.000	7.350	0.000	6.162	
24	-0.384	5.888	-0.224	5.840	0.000	7.296	0.000	7.200	0.000	7.348	0.000	2.658	
25	-0.384	5.888	-0.223	5.840	0.000	7.294	0.000	7.200	0.000	7.342	0.001	5.844	
26	-0.384	5.888	-0.222	5.840	0.000	7.294	0.000	7.200	0.000	7.342	0.001	5.844	
27	-0.384	5.888	-0.217	5.840	0.000	7.292	0.000	7.198	0.000	7.336	0.002	5.840	
28	-0.384	5.888	-0.216	5.840	0.000	7.292	0.000	7.198	0.000	7.336	0.002	5.840	
29	-0.385	5.888	-0.207	5.840	0.000	7.288	0.000	7.198	0.000	7.332	0.002	5.838	
30	-0.385	5.888	-0.206	5.840	0.000	7.288	0.000	7.198	0.000	7.332	0.002	5.838	
31	-0.385	5.888	-0.193	5.840	0.000	7.286	0.000	7.196	0.000	7.328	0.003	5.838	
32	-0.385	5.888	-0.192	5.840	0.000	7.286	0.000	7.196	0.000	7.328	0.003	5.838	
33	-0.385	5.888	-0.176	5.840	0.000	7.282	0.000	7.196	0.000	7.324	0.004	5.838	
34	-0.386	5.888	-0.161	5.840	0.000	7.280	0.000	7.196	0.000	7.322	0.004	5.838	
35	-0.386	5.888	-0.143	5.842	0.000	7.276	0.000	7.196	0.000	7.320	0.005	5.838	
36	-0.386	5.888	-0.125	5.842	0.000	7.272	0.000	7.196	0.000	7.318	0.005	5.838	
37	-0.387	5.888	-0.105	5.844	0.000	7.268	0.000	7.196	0.000	7.316	0.005	5.838	
38	-0.387	5.888	-0.085	5.844	0.000	7.262	0.000	7.196	0.000	7.314	0.005	5.840	
39	-0.387	5.888	-0.063	5.846	0.000	7.254	0.000	7.196	0.000	7.314	0.005	5.842	
40	-0.388	5.886	-0.042	5.848	0.000	7.242	0.000	7.196	0.000	7.312	0.005	5.846	
41	-0.388	5.886	-0.029	5.848	0.000	7.234	0.000	7.194	0.000	7.312	0.006	5.846	
42	-0.388	5.886	-0.011	5.846	0.000	7.218	0.000	7.194	0.000	7.310	0.006	5.850	
43	-0.389	5.886	-0.002	5.818	0.000	7.206	0.000	7.194	0.000	7.310	0.006	5.852	
44	-0.389	5.886	-0.001	2.558	0.000	7.204	0.000	7.194	0.000	7.310	0.006	5.852	
45	-0.389	5.886	0.002	5.874	0.000	7.202	0.000	7.194	0.000	7.310	0.006	5.852	
46	-0.389	5.886	0.011	5.856	0.000	8.524	0.000	7.194	0.000	7.310	0.006	5.850	
47	-0.389	5.886	0.030	5.852	0.000	8.518	0.000	7.192	0.000	7.312	0.006	5.850	
48	-0.389	5.886	0.042	5.850	0.000	8.514	0.000	7.190	0.000	7.312	0.006	5.848	
49	-0.390	5.886	0.064	5.850	0.000	8.498	0.000	7.186	0.000	7.312	0.005	5.846	
50	-0.390	5.886	0.085	5.848	0.000	8.474	0.000	8.526	0.000	7.314	0.005	5.846	
51	-0.391	5.886	0.106	5.848	0.000	5.004	0.000	8.522	0.000	7.314	0.005	5.846	
52	-0.391	5.886	0.126	5.848	0.000	4.880	0.000	8.520	0.000	7.316	0.005	5.844	
53	-0.392	5.886	0.145	5.846	0.000	4.836	0.000	8.516	0.000	7.316	0.005	5.846	
54	-0.392	5.886	0.162	5.846	0.000	4.810	0.000	8.510	0.000	7.318	0.004	5.846	
55	-0.392	5.886	0.179	5.846	0.000	4.798	0.000	8.500	0.000	7.320	0.004	5.848	
56	-0.393	5.886	0.196	5.846	0.000	4.786	0.000	8.490	0.000	7.320	0.003	5.850	
57	-0.393	5.886	0.197	5.846	0.000	4.786	0.000	8.488	0.000	7.320	0.003	5.850	
58	-0.393	5.886	0.210	5.848	0.000	6.088	0.000	8.452	0.000	7.322	0.003	5.852	
59	-0.393	5.886	0.211	5.848	0.000	6.088	0.000	8.452	0.000	7.322	0.003	5.854	
60	-0.393	5.886	0.221	5.848	0.000	6.078	0.000	5.266	0.000	7.324	0.002	5.858	
61	-0.393	5.886	0.222	5.848	0.000	6.078	0.000	4.902	0.000	7.324	0.002	5.858	
62	-0.393	5.886	0.228	5.848	0.000	7.366	0.000	4.844	0.000	7.326	0.001	5.866	
63	-0.393	5.886	0.229	5.848	0.000	7.364	0.000	4.840	0.000	7.328	0.001	5.866	
64	-0.394	5.886	0.231	5.850	0.000	7.362	0.000	4.816	0.000	7.330	0.000	2.250	
65	-0.394	5.886	0.231	5.850	0.000	7.360	0.000	4.814	0.000	7.330	0.000	2.250	
66	-0.394	5.886	0.230	5.850	0.000	7.358	0.000	4.788	0.000	7.332	0.001	4.516	
67	-0.394	5.886	0.230	5.850	0.000	7.358	0.000	4.788	0.000	7.332	0.001	4.516	
68	-0.394	5.886	0.224	5.852	0.000	7.356	0.000	4.782	0.000	7.334	-0.001	5.826	
69	-0.394	5.886	0.224	5.852	0.000	7.356	0.000	4.782	0.000	7.334	-0.002	5.826	
70	-0.393	5.886	0.215	5.852	0.000	7.354	0.000	4.776	0.000	7.336	-0.002	5.836	
71	-0.393	5.886	0.215	5.852	0.000	7.354	0.000	4.776	0.000	7.336	-0.002	5.836	
72	-0.393	5.886	0.202	5.854	0.000	7.354	0.000	4.770	0.000	7.338	-0.003	5.840	
73	-0.393	5.886	0.202	5.854	0.000	7.354	0.000	4.770	0.000	7.338	-0.003	5.842	
74	-0.393	5.886	0.186	5.854	0.000	7.352	0.000	4.766	0.000	7.340	-0.004	5.844	
75	-0.393	5.886	0.185	5.854	0.000	7.352	0.000	4.766	0.000	7.340	-0.004	5.844	
76	-0.393	5.886	0.167	5.856	0.000	7.352	0.000	4.760	0.000	7.342	-0.004	5.848	
77	-0.393	5.886	0.166	5.856	0.000	7.352	0.000	4.760	0.000	7.342	-0.004	5.848	
78	-0.392	5.886	0.145	5.858	0.000	7.352	0.000	7.402	0.000	7.344	-0.005	5.852	
79	-0.392	5.886	0.143	5.858	0.000	7.352	0.000	7.402	0.000	7.344	-0.005	5.852	

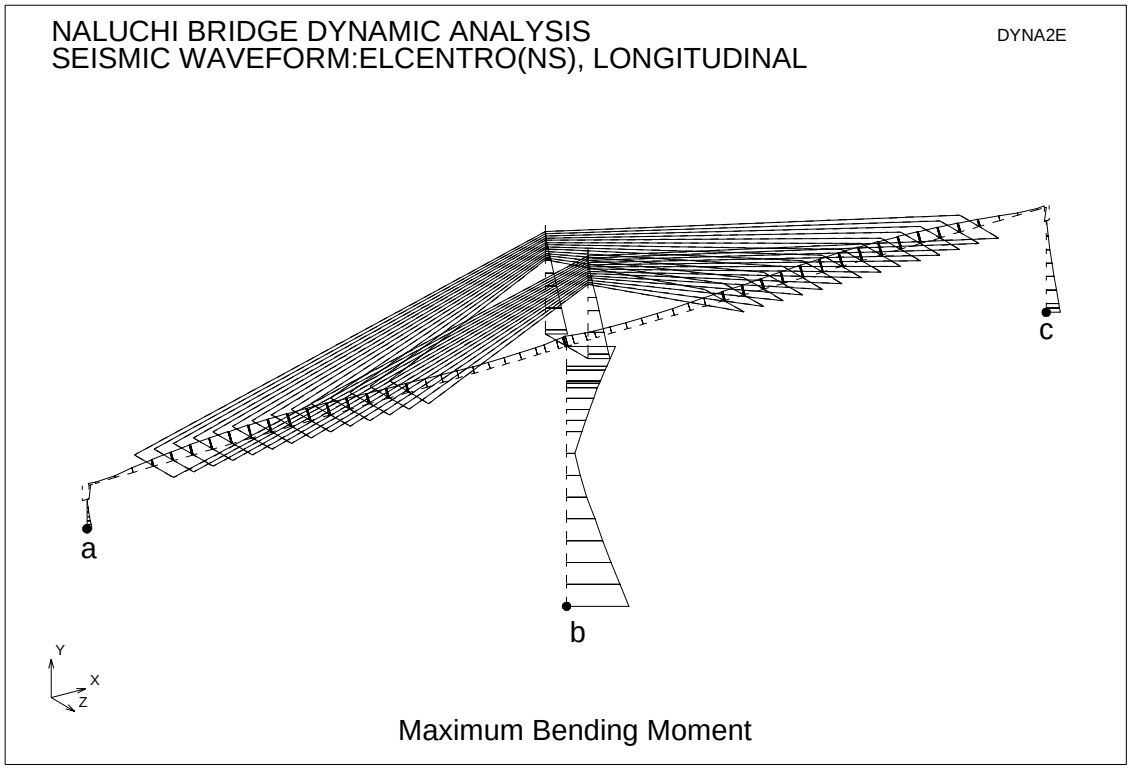
Longitudinal Direction MAXIMUM ABS.DISPLACEMENT

Node No	X (m)	Time (sec)	Y (m)	Time (sec)	Z (m)	Time (sec)	θx (rad)	Time (sec)	θy (rad)	Time (sec)	θz (rad)	Time (sec)	Remarks
86	-0.389	5.888	0.009	5.814	0.000	7.350	0.000	7.370	0.000	7.348	-0.006	5.864	
87	-0.389	5.888	-0.002	5.920	0.000	7.350	0.000	7.368	0.000	7.348	-0.006	5.864	Girder End
1006	-0.387	5.888	-0.089	5.846	0.000	7.320	0.000	5.860	0.000	5.850	-0.005	5.842	
1008	-0.387	5.888	-0.114	5.844	0.000	7.318	0.000	5.862	0.000	5.852	-0.005	5.840	
1010	-0.386	5.888	-0.137	5.844	0.000	7.316	0.000	5.864	0.000	5.856	-0.004	5.840	
1012	-0.386	5.888	-0.159	5.842	0.000	7.314	0.000	5.866	0.000	5.862	-0.004	5.838	
1014	-0.385	5.888	-0.177	5.842	0.000	7.312	0.000	5.870	0.000	5.876	-0.003	5.838	
1016	-0.385	5.888	-0.194	5.842	0.000	7.310	0.000	5.878	0.000	5.894	-0.003	5.836	
1018	-0.385	5.888	-0.206	5.842	0.000	7.308	0.000	5.894	0.000	5.914	-0.002	5.834	
1020	-0.385	5.888	-0.216	5.840	0.000	7.304	0.000	5.914	0.000	5.934	-0.002	5.832	
1022	-0.384	5.888	-0.222	5.840	0.000	7.300	0.000	5.948	0.000	6.054	-0.001	5.978	
1024	-0.384	5.888	-0.224	5.840	0.000	7.296	0.000	5.820	0.000	5.824	0.000	2.658	
1026	-0.384	5.888	-0.222	5.840	0.000	7.292	0.000	5.826	0.000	5.826	0.001	5.844	
1028	-0.384	5.888	-0.216	5.840	0.000	7.286	0.000	5.828	0.000	5.828	0.002	5.840	
1030	-0.385	5.888	-0.206	5.840	0.000	7.278	0.000	5.828	0.000	5.828	0.002	5.838	
1032	-0.385	5.888	-0.192	5.840	0.000	7.270	0.000	5.830	0.000	5.828	0.003	5.838	
1082	-0.391	5.886	0.094	5.858	0.000	7.362	0.000	5.842	0.000	5.842	-0.005	5.858	
1080	-0.392	5.886	0.120	5.858	0.000	7.362	0.000	5.848	0.000	5.840	-0.005	5.854	
1078	-0.392	5.886	0.145	5.858	0.000	7.364	0.000	5.846	0.000	5.836	-0.005	5.852	
1076	-0.393	5.886	0.167	5.856	0.000	7.366	0.000	5.842	0.000	5.828	-0.004	5.848	
1074	-0.393	5.886	0.186	5.854	0.000	7.368	0.000	5.834	0.000	5.816	-0.004	5.844	
1072	-0.393	5.886	0.202	5.854	0.000	7.370	0.000	5.818	0.000	5.796	-0.003	5.840	
1070	-0.393	5.886	0.215	5.852	0.000	7.372	0.000	5.786	0.000	4.546	-0.002	5.836	
1068	-0.394	5.886	0.224	5.852	0.000	7.370	0.000	7.290	0.000	6.162	-0.001	5.826	
1066	-0.394	5.886	0.230	5.850	0.000	7.372	0.000	2.270	0.000	2.264	0.001	4.516	
1064	-0.394	5.886	0.231	5.850	0.000	6.014	0.000	5.858	0.000	5.852	0.000	2.250	
1062	-0.393	5.886	0.228	5.848	0.000	5.998	0.000	5.852	0.000	5.850	0.001	5.866	
1060	-0.393	5.886	0.221	5.848	0.000	5.984	0.000	5.850	0.000	5.846	0.002	5.858	
1058	-0.393	5.886	0.210	5.848	0.000	5.970	0.000	5.848	0.000	5.846	0.003	5.852	
1056	-0.393	5.886	0.196	5.846	0.000	5.956	0.000	5.846	0.000	5.844	0.003	5.850	
2006	-0.387	5.888	-0.089	5.846	0.000	7.304	0.000	5.860	0.000	5.850	-0.005	5.842	
2008	-0.387	5.888	-0.114	5.844	0.000	7.302	0.000	5.862	0.000	5.852	-0.005	5.840	
2010	-0.386	5.888	-0.137	5.844	0.000	7.300	0.000	5.864	0.000	5.856	-0.004	5.840	
2012	-0.386	5.888	-0.159	5.842	0.000	7.298	0.000	5.866	0.000	5.862	-0.004	5.838	
2014	-0.385	5.888	-0.177	5.842	0.000	7.298	0.000	5.870	0.000	5.876	-0.003	5.838	
2016	-0.385	5.888	-0.194	5.842	0.000	7.296	0.000	5.878	0.000	5.894	-0.003	5.836	
2018	-0.385	5.888	-0.206	5.842	0.000	7.296	0.000	5.894	0.000	5.914	-0.002	5.834	
2020	-0.385	5.888	-0.216	5.840	0.000	7.296	0.000	5.916	0.000	5.934	-0.002	5.832	
2022	-0.384	5.888	-0.222	5.840	0.000	7.296	0.000	5.950	0.000	6.054	-0.001	5.978	
2024	-0.384	5.888	-0.224	5.840	0.000	7.294	0.000	5.820	0.000	5.824	0.000	2.658	
2026	-0.384	5.888	-0.222	5.840	0.000	7.294	0.000	5.826	0.000	5.826	0.001	5.844	
2028	-0.384	5.888	-0.216	5.840	0.000	7.294	0.000	5.828	0.000	5.828	0.002	5.840	
2030	-0.385	5.888	-0.206	5.840	0.000	7.296	0.000	5.828	0.000	5.828	0.002	5.838	
2032	-0.385	5.888	-0.192	5.840	0.000	7.296	0.000	5.830	0.000	5.828	0.003	5.838	
2082	-0.391	5.886	0.094	5.858	0.000	7.340	0.000	5.842	0.000	5.842	-0.005	5.858	
2080	-0.392	5.886	0.120	5.858	0.000	7.340	0.000	5.846	0.000	5.840	-0.005	5.854	
2078	-0.392	5.886	0.145	5.858	0.000	7.340	0.000	5.844	0.000	5.836	-0.005	5.852	
2076	-0.393	5.886	0.167	5.856	0.000	7.338	0.000	5.840	0.000	5.830	-0.004	5.848	
2074	-0.393	5.886	0.186	5.854	0.000	7.338	0.000	5.834	0.000	5.818	-0.004	5.844	
2072	-0.393	5.886	0.202	5.854	0.000	7.338	0.000	5.816	0.000	5.798	-0.003	5.840	
2070	-0.393	5.886	0.215	5.852	0.000	7.338	0.000	5.786	0.000	4.546	-0.002	5.836	
2068	-0.394	5.886	0.224	5.852	0.000	7.344	0.000	7.290	0.000	7.296	-0.001	5.826	
2066	-0.394	5.886	0.230	5.850	0.000	7.346	0.000	2.270	0.000	2.264	0.001	4.516	
2064	-0.394	5.886	0.231	5.850	0.000	7.348	0.000	5.858	0.000	5.852	0.000	2.250	
2062	-0.393	5.886	0.228	5.848	0.000	6.168	0.000	5.852	0.000	5.848	0.001	5.866	
2060	-0.393	5.886	0.221	5.848	0.000	6.206	0.000	5.850	0.000	5.846	0.002	5.858	
2058	-0.393	5.886	0.210	5.848	0.000	6.248	0.000	5.848	0.000	5.844	0.003	5.852	
2056	-0.393	5.886	0.196	5.846	0.000	6.272	0.000	5.846	0.000	5.844	0.003	5.850	
1101	-0.464	5.876	-0.001	2.556	0.001	2.622	0.000	2.622	0.000	5.866	0.001	5.848	
1102	-0.462	5.876	-0.001	2.556	0.001	2.622	0.000	2.622	0.000	5.866	0.001	5.848	
1103	-0.461	5.876	-0.001	2.556	0.001	2.622	0.000	2.622	0.000	5.866	0.001	5.848	
1104	-0.460	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.001	5.848	
1105	-0.460	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.001	5.848	
1106	-0.459	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.001	5.848	
1107	-0.458	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.001	5.848	
1108	-0.457	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.848	
1109	-0.457	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.848	
1110	-0.456	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
1111	-0.455	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
1112	-0.454	5.878	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
1113	-0.453	5.878	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
1114	-0.453	5.878	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
1115	-0.452	5.878	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
1116	-0.446	5.878	-0.001	2.558	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.848	
1117	-0.438	5.880	-0.001	2.558	0.000	2.622	0.000	2.622	0.000	5.866	0.003	5.848	
1118	-0.419	5.882	-0.001	2.558	0.000	2.622	0.000	2.622	0.000	5.866	0.004	5.850	
1119	-0.394	5.886	-0.001	2.558	0.000	3.112	0.000	3.118	0.000	5.866	0.006	5.852	
1044	-0.389	5.886	-0.001	2.558	0.000	2.620	0.000	3.120	0.000	5.866	0.006	5.852	
2101	-0.464	5.876	-0.001	2.556	-0.001	2.622	0.000	2.622	0.000	5.866	0.001	5.848	

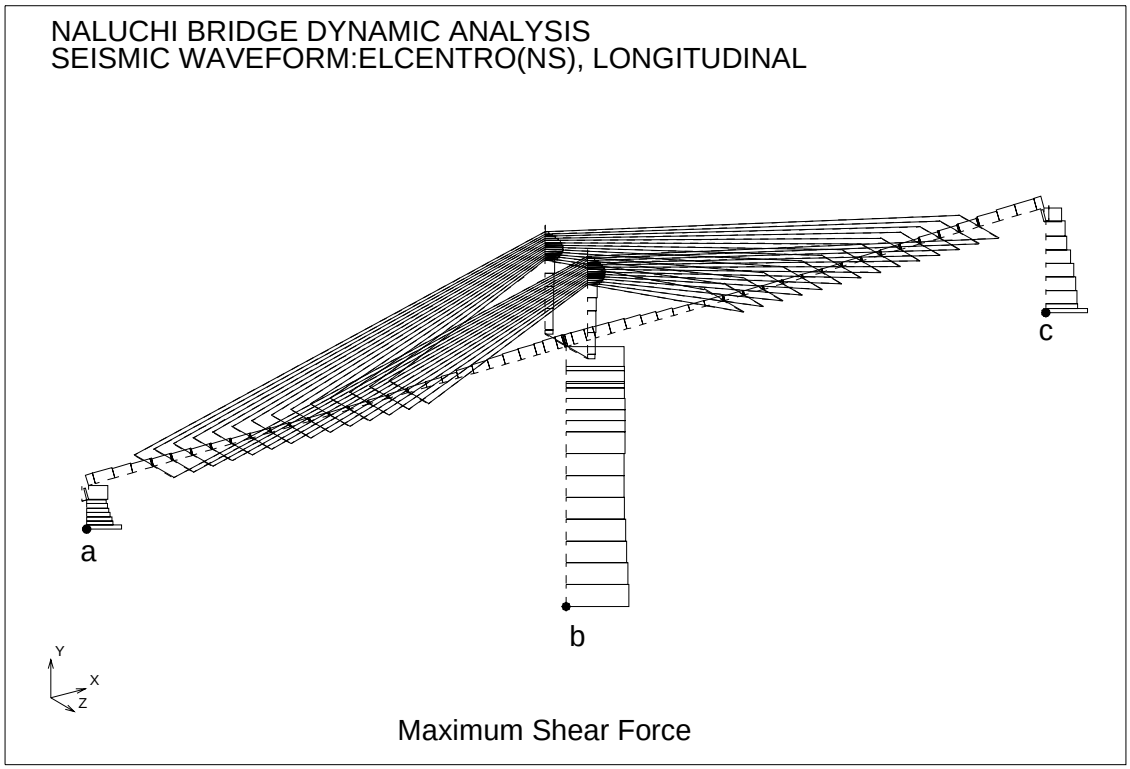
Longitudinal Direction MAXIMUM ABS.DISPLACEMENT

Node No	X (m)	Time (sec)	Y (m)	Time (sec)	Z (m)	Time (sec)	θx (rad)	Time (sec)	θy (rad)	Time (sec)	θz (rad)	Time (sec)	Remarks
2107	-0.458	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.001	5.848	
2108	-0.457	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.848	
2109	-0.457	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.848	
2110	-0.456	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
2111	-0.455	5.876	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
2112	-0.454	5.878	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
2113	-0.453	5.878	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
2114	-0.453	5.878	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
2115	-0.452	5.878	-0.001	2.556	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.846	
2116	-0.446	5.878	-0.001	2.558	0.000	2.622	0.000	2.622	0.000	5.866	0.002	5.848	
2117	-0.438	5.880	-0.001	2.558	0.000	2.622	0.000	2.622	0.000	5.866	0.003	5.848	
2118	-0.419	5.882	-0.001	2.558	0.000	2.622	0.000	2.622	0.000	5.866	0.004	5.850	
2119	-0.394	5.886	-0.001	2.558	0.000	3.112	0.000	3.118	0.000	5.866	0.006	5.852	
2044	-0.389	5.886	-0.001	2.558	0.000	2.622	0.000	3.120	0.000	5.866	0.006	5.852	
120	-0.363	5.892	-0.001	2.558	0.000	7.206	0.000	7.196	0.000	7.310	0.006	5.854	P3 Column Top
121	-0.357	5.892	-0.001	2.558	0.000	7.206	0.000	7.196	0.000	7.310	0.006	5.856	
122	-0.343	5.896	-0.001	2.558	0.000	7.206	0.000	7.196	0.000	7.310	0.006	5.866	
123	-0.340	5.896	-0.001	2.558	0.000	7.206	0.000	7.196	0.000	7.310	0.006	5.868	
124	-0.333	5.898	-0.001	2.558	0.000	7.206	0.000	7.196	0.000	7.310	0.006	5.872	
125	-0.318	5.900	-0.001	2.558	0.000	7.206	0.000	7.198	0.000	7.310	0.007	5.878	
126	-0.301	5.904	0.000	2.558	0.000	7.208	0.000	7.198	0.000	7.310	0.007	5.884	
127	-0.284	5.906	0.000	2.558	0.000	7.208	0.000	7.200	0.000	7.310	0.007	5.888	
128	-0.266	5.912	0.000	2.558	0.000	7.208	0.000	7.200	0.000	7.310	0.007	5.892	
129	-0.231	5.934	0.000	2.558	0.000	7.210	0.000	7.202	0.000	7.310	0.007	5.896	
130	-0.197	5.950	0.000	2.558	0.000	7.210	0.000	7.204	0.000	7.310	0.007	5.900	
131	-0.164	5.962	0.000	2.558	0.000	7.212	0.000	7.206	0.000	7.310	0.007	5.906	
132	-0.132	5.968	0.000	2.558	0.000	7.214	0.000	7.208	0.000	7.310	0.006	5.916	
133	-0.103	5.972	0.000	2.558	0.000	7.214	0.000	7.210	0.000	7.310	0.006	5.950	
134	-0.075	5.976	0.000	2.558	0.000	7.216	0.000	7.212	0.000	7.310	0.005	5.964	
135	-0.051	5.980	0.000	2.558	0.000	7.216	0.000	7.214	0.000	7.310	0.005	5.972	
136	-0.030	5.982	0.000	2.558	0.000	7.218	0.000	7.216			0.004	5.978	
88	0.020	4.712	-0.002	5.814	0.000	7.302	0.000	7.300	0.000	7.318	-0.002	4.712	
3100	0.015	4.712	-0.002	5.814	0.000	7.304	0.000	7.300	0.000	7.318	-0.002	4.712	
3200	-0.405	5.882	0.000	2.648	0.000	7.318	0.000	7.300	0.000	7.396	-0.005	5.844	
3201	0.015	4.712	0.000	2.648	0.000	7.304	0.000	7.300	0.000	7.318	-0.002	4.712	
3000	0.015	4.712	-0.001	5.896	0.000	7.304	0.000	7.300	0.000	7.318	-0.002	4.712	P2 Column Top
3001	0.013	4.712	-0.001	5.896	0.000	7.304	0.000	7.300	0.000	7.318	-0.002	4.712	
3002	0.012	4.712	-0.001	5.896	0.000	7.304	0.000	7.300	0.000	7.318	-0.002	4.712	
3003	0.010	4.712	-0.001	5.896	0.000	7.304	0.000	7.300	0.000	7.318	-0.002	4.712	
3004	0.008	4.712	-0.001	5.896	0.000	7.306	0.000	7.300	0.000	7.318	-0.002	4.712	
3005	0.007	4.712	-0.001	5.896	0.000	7.306	0.000	7.300	0.000	7.318	-0.002	4.712	
3006	0.005	4.712	-0.001	5.896	0.000	7.308	0.000	7.300	0.000	7.318	-0.002	4.712	
3007	0.004	4.712	-0.001	5.896	0.000	7.310	0.000	7.300			-0.002	4.712	
89	-0.082	5.928	0.003	5.920	0.000	7.366	0.000	7.368	0.000	7.348	0.004	5.920	
4200	-0.069	5.928	0.003	5.920	0.000	7.366	0.000	7.368	0.000	7.348	0.004	5.920	
4100	-0.407	5.884	-0.002	5.920	0.000	7.350	0.000	7.368	0.000	7.348	-0.006	5.864	
4101	-0.069	5.928	-0.002	5.920	0.000	7.366	0.000	7.368	0.000	7.348	0.004	5.920	
4000	-0.069	5.928	0.000	5.790	0.000	7.366	0.000	7.368	0.000	7.348	0.004	5.920	P4 Column Top
4001	-0.056	5.930	0.000	5.790	0.000	7.364	0.000	7.368	0.000	7.348	0.004	5.920	
4002	-0.044	5.932	0.000	5.790	0.000	7.364	0.000	7.366	0.000	7.348	0.004	5.920	
4003	-0.033	5.934	0.000	5.790	0.000	7.364	0.000	7.366	0.000	7.348	0.003	5.922	
4004	0.024	4.840	0.000	5.790	0.000	7.362	0.000	7.364	0.000	7.348	0.003	5.924	
4005	0.016	4.850	0.000	5.790	0.000	7.362	0.000	7.364	0.000	7.348	0.003	5.926	
4006	0.009	4.856	0.000	5.790	0.000	7.360	0.000	7.364	0.000	7.348	0.002	5.928	
4007	0.007	4.856	0.000	5.790	0.000	7.358	0.000	7.364	0.000	7.348	0.002	5.928	
4008	0.006	4.858			0.000	7.356	0.000	7.364			0.002	5.928	

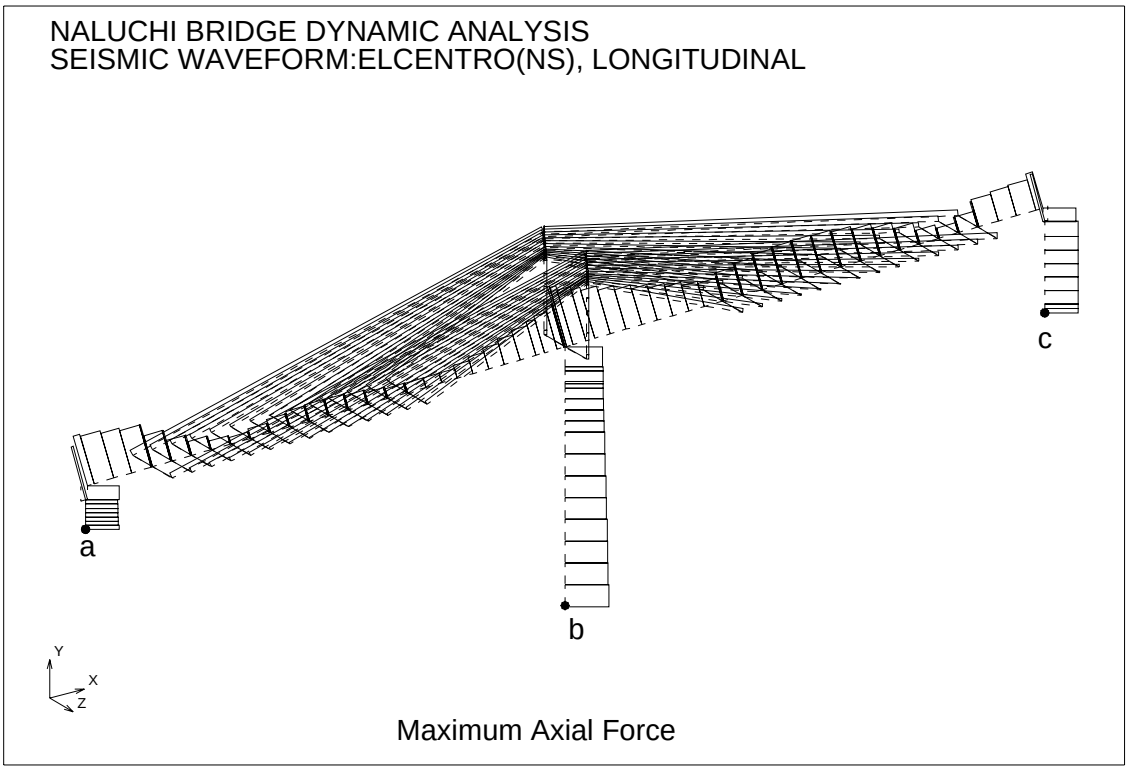
(3) Response Section Force



Maximum Bending Moment



Maximum Shear Force



a:P2 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
LG	Initial Force	16207	0	0	0	0	0
	Seismic Force	3522	7263	0	0	0	31577
	Total	19729	7263	0	0	0	31577

b:P3 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
LG	Initial Force	173030	0	0	0	0	280
	Seismic Force	3430	19750	0	0	0	680948
	Total	176460	19750	0	0	0	681228

c:P4 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
LG	Initial Force	25310	0	0	0	0	0
	Seismic Force	3608	7812	0	0	0	127514
	Total	28918	7812	0	0	0	127514

Longitudinal Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
1	1	6101	5.882	3357	5.888	0	7.306	0	10.160	0	10.160	20443	5.886	Girder End
1	2	-6101	5.882	-3357	5.888	0	7.306	0	10.160	0	7.308	-15124	6.000	
2	2	5824	5.880	3325	5.886	0	7.304	0	10.160	0	7.308	15124	6.000	
2	3	-5824	5.880	-3325	5.886	0	7.304	0	10.160	0	7.304	-7917	2.656	
3	3	5450	5.874	3198	5.872	0	7.298	0	10.160	0	7.304	7917	2.656	
3	4	-5450	5.874	-3198	5.872	0	7.298	0	10.160	0	7.302	16749	5.882	
4	4	5139	5.872	3058	5.844	0	7.294	0	10.160	0	7.302	-16749	5.882	
4	5	-5139	5.872	-3058	5.844	0	7.294	0	10.160	0	7.300	31885	5.874	
5	5	5119	5.870	3046	5.842	0	7.292	0	10.160	0	7.300	-31885	5.874	
5	6	-5119	5.870	-3046	5.842	0	7.292	0	10.160	0	7.300	32791	5.874	
6	6	3686	5.876	2716	5.840	0	7.292	0	7.044	0	7.300	-32790	5.874	
6	7	-3686	5.876	-2716	5.840	0	7.292	0	7.044	0	7.298	45436	5.866	
7	7	3682	5.876	2713	5.840	0	7.292	0	7.044	0	7.298	-45436	5.866	
7	8	-3682	5.876	-2713	5.840	0	7.292	0	7.044	0	7.298	46245	5.866	
8	8	2363	6.028	2344	5.836	0	7.290	0	7.048	0	7.296	-46244	5.866	
8	9	-2363	6.028	-2344	5.836	0	7.290	0	7.048	0	7.296	57143	5.858	
9	9	2362	6.028	2344	5.836	0	7.290	0	7.048	0	7.296	-57143	5.858	
9	10	-2362	6.028	-2344	5.836	0	7.290	0	7.048	0	7.296	57841	5.858	
10	10	-1486	7.338	2061	5.834	0	7.290	0	7.052	0	7.296	-57840	5.858	
10	11	1486	7.338	-2061	5.834	0	7.290	0	7.052	0	7.294	67458	5.850	
11	11	-1486	7.338	2061	5.834	0	7.290	0	7.052	0	7.294	-67458	5.850	
11	12	1486	7.338	-2061	5.834	0	7.290	0	7.052	0	7.294	68073	5.850	
12	12	869	6.202	1814	5.834	0	7.288	0	7.060	0	7.294	-68072	5.850	
12	13	-869	6.202	-1814	5.834	0	7.288	0	7.060	0	7.292	76562	5.846	
13	13	869	6.202	1814	5.834	0	7.288	0	7.060	0	7.292	-76562	5.846	
13	14	-869	6.202	-1814	5.834	0	7.288	0	7.060	0	7.292	77104	5.846	
14	14	-716	5.794	1602	5.832	0	7.288	0	7.062	0	7.292	-77103	5.846	
14	15	716	5.794	-1602	5.832	0	7.288	0	7.062	0	7.292	84609	5.842	
15	15	-716	5.794	1602	5.832	0	7.288	0	7.062	0	7.292	-84609	5.842	
15	16	716	5.794	-1602	5.832	0	7.288	0	7.062	0	7.292	85088	5.842	
16	16	-1348	5.798	1428	5.832	0	7.288	0	7.082	0	7.292	-85087	5.842	
16	17	1348	5.798	-1428	5.832	0	7.288	0	7.082	0	7.290	91781	5.840	
17	17	-1348	5.798	1427	5.832	0	7.288	0	7.082	0	7.290	-91781	5.840	
17	18	1348	5.798	-1427	5.832	0	7.288	0	7.082	0	7.290	92209	5.840	
18	18	-1794	5.800	1298	5.830	0	7.288	0	7.092	0	7.290	-92207	5.840	
18	19	1794	5.800	-1298	5.830	0	7.288	0	7.092	0	7.290	98293	5.838	
19	19	-1829	5.800	1230	5.830	0	7.286	0	7.092	0	7.290	-98293	5.838	
19	20	1829	5.800	-1230	5.830	0	7.286	0	7.092	0	7.290	98661	5.838	
20	20	-2054	5.800	1082	5.826	0	7.284	0	8.556	0	7.290	-98660	5.838	
20	21	2054	5.800	-1082	5.826	0	7.284	0	8.556	0	7.290	103730	5.838	
21	21	-2083	5.800	1025	5.824	0	7.284	0	8.556	0	7.290	-103730	5.838	
21	22	2083	5.800	-1025	5.824	0	7.284	0	8.556	0	7.290	104036	5.838	
22	22	-2157	5.796	969	5.994	0	7.282	0	8.424	0	7.290	-104035	5.838	
22	23	2157	5.796	-969	5.994	0	7.282	0	8.424	0	7.290	108371	5.836	
23	23	-2179	5.796	953	6.000	0	7.280	0	8.424	0	7.290	-108371	5.836	
23	24	2179	5.796	-953	6.000	0	7.280	0	8.424	0	7.288	108634	5.836	
24	24	-2118	5.904	952	6.014	0	7.278	0	8.402	0	7.288	-108633	5.836	
24	25	2118	5.904	-952	6.014	0	7.278	0	8.402	0	7.288	112578	5.836	
25	25	-2134	5.904	944	6.028	0	7.278	0	8.402	0	7.288	-112578	5.836	
25	26	2134	5.904	-944	6.028	0	7.278	0	8.402	0	7.288	112821	5.836	
26	26	-1920	5.910	998	6.044	0	7.276	0	8.436	0	7.288	-112820	5.836	
26	27	1920	5.910	-998	6.044	0	7.276	0	8.436	0	7.288	116768	5.836	
27	27	-1939	5.910	995	6.056	0	7.276	0	8.436	0	7.288	-116768	5.836	
27	28	1939	5.910	-995	6.056	0	7.276	0	8.436	0	7.288	117010	5.836	
28	28	-1582	5.916	1100	6.060	0	7.274	0	8.444	0	7.288	-117009	5.836	
28	29	1582	5.916	-1100	6.060	0	7.274	0	8.444	0	7.286	121208	5.834	
29	29	-1584	5.916	1100	6.062	0	7.274	0	8.444	0	7.286	-121208	5.834	
29	30	1584	5.916	-1100	6.062	0	7.274	0	8.444	0	7.286	121474	5.834	
30	30	-1135	5.922	1262	6.076	0	7.272	0	8.428	0	7.286	-121473	5.834	
30	31	1135	5.922	-1262	6.076	0	7.272	0	8.428	0	7.286	125991	5.834	
31	31	-1135	5.922	1262	6.076	0	7.272	0	8.428	0	7.286	-125991	5.834	
31	32	1135	5.922	-1262	6.076	0	7.272	0	8.428	0	7.286	126279	5.834	
32	32	945	2.512	1485	6.064	0	7.270	0	8.424	0	7.286	-126278	5.834	
32	33	-945	2.512	-1485	6.064	0	7.270	0	8.424	0	7.284	132057	5.834	
33	33	932	2.510	1528	6.114	0	7.258	0	8.424	0	7.284	-132057	5.834	
33	34	-932	2.510	-1528	6.114	0	7.258	0	8.424	0	7.284	134654	5.838	
34	34	-1314	5.926	1586	6.120	0	7.140	0	8.424	0	7.284	-134654	5.838	
34	35	1314	5.926	-1586	6.120	0	7.140	0	8.424	0	7.282	135634	5.886	
35	35	-1755	5.926	1883	2.730	0	7.136	0	8.424	0	7.282	-135634	5.886	
35	36	1755	5.926	-1883	2.730	0	7.136	0	8.424	0	7.280	136904	5.914	
36	36	-2222	5.926	2214	2.730	0	7.118	0	8.424	0	7.280	-136904	5.914	
36	37	2222	5.926	-2214	2.730	0	7.118	0	8.424	0	7.278	137636	5.928	
37	37	-2716	5.926	2497	2.730	0	5.818	0	8.424	0	7.278	-137636	5.928	
37	38	2716	5.926	-2497	2.730	0	5.818	0	8.424	0	7.276	137708	5.938	
38	38	-3233	5.924	2731	2.728	0	5.816	0	8.424	0	7.276	-137708	5.938	
38	39	3233	5.924	-2731	2.728	0	5.816	0	8.424	0	7.272	141024	6.062	
39	39	-3779	5.924	2915	2.728	0	5.814	0	8.424	0	7.272	-141024	6.062	
39	40	3779	5.924	-2915	2.728	0	5.814	0	8.424	0	7.270	146583	6.078	

Longitudinal Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
43	44	5339	5.922	-3171	2.728	0	5.810	0	8.424	0	7.266	158356	6.094	
44	44	-7415	7.282	3711	2.558	0	5.444	0	7.276	0	3.062	162445	6.144	
44	45	7415	7.282	-3711	2.558	0	5.444	0	7.276	0	3.062	-161717	6.144	
45	45	-7276	7.282	3702	2.558	0	5.444	0	7.276	0	3.062	161717	6.144	
45	46	7276	7.282	-3702	2.558	0	5.444	0	7.276	0	3.062	-158568	6.142	
46	46	-6719	7.282	3642	2.558	0	11.302	0	7.276	0	3.062	158568	6.142	
46	47	6719	7.282	-3642	2.558	0	11.302	0	7.276	0	3.064	-152295	6.138	
47	47	-6345	7.282	3569	2.560	0	11.302	0	7.276	0	3.064	152295	6.138	
47	48	6345	7.282	-3569	2.560	0	11.302	0	7.276	0	3.112	-147989	6.134	
48	48	-5938	7.284	3462	2.560	0	11.302	0	7.276	0	3.112	147989	6.134	
48	49	5938	7.284	-3462	2.560	0	11.302	0	7.276	0	3.112	140938	7.288	
49	49	-5440	7.284	3257	2.562	0	11.304	0	7.276	0	3.112	-140938	7.288	
49	50	5440	7.284	-3257	2.562	0	11.304	0	7.276	0	3.114	134507	7.286	
50	50	-4964	7.284	2981	2.564	0	11.304	0	7.276	0	3.114	-134507	7.286	
50	51	4964	7.284	-2981	2.564	0	11.304	0	7.276	0	3.116	127986	7.284	
51	51	-4514	7.286	2635	2.566	0	11.306	0	7.276	0	3.116	-127986	7.284	
51	52	4514	7.286	-2635	2.566	0	11.306	0	7.276	0	3.118	-126110	5.782	
52	52	-4090	7.286	2226	2.568	0	11.308	0	7.276	0	3.118	126110	5.782	
52	53	4090	7.286	-2226	2.568	0	11.308	0	7.276	0	5.932	-127634	5.798	
53	53	-3690	7.286	-1849	2.242	0	11.310	0	7.276	0	5.932	127634	5.798	
53	54	3690	7.286	1849	2.242	0	11.310	0	7.276	0	5.936	-127828	5.810	
54	54	-3317	7.288	1753	6.166	0	11.316	0	7.276	0	5.936	127828	5.810	
54	55	3317	7.288	-1753	6.166	0	11.316	0	7.276	0	5.940	-126315	5.820	
55	55	-2942	7.288	1638	6.160	0	3.068	0	7.276	0	5.940	126315	5.820	
55	56	2942	7.288	-1638	6.160	0	3.068	0	7.276	0	5.944	-122109	5.826	
56	56	3445	5.916	1448	6.168	0	3.068	0	7.278	0	5.944	122110	5.826	
56	57	-3445	5.916	-1448	6.168	0	3.068	0	7.278	0	5.944	-121936	5.828	
57	57	3441	5.916	1446	6.168	0	3.068	0	7.278	0	5.944	121936	5.828	
57	58	-3441	5.916	-1446	6.168	0	3.068	0	7.278	0	5.946	-119217	5.834	
58	58	3970	5.914	1274	6.174	0	3.070	0	7.286	0	5.946	119218	5.834	
58	59	-3970	5.914	-1274	6.174	0	3.070	0	7.286	0	5.946	-119070	5.834	
59	59	3958	5.914	1269	6.172	0	3.072	0	7.286	0	5.946	119070	5.834	
59	60	-3958	5.914	-1269	6.172	0	3.072	0	7.286	0	5.948	-116674	5.838	
60	60	4410	5.912	1172	6.176	0	3.072	0	7.280	0	5.948	116675	5.838	
60	61	-4410	5.912	-1172	6.176	0	3.072	0	7.280	0	5.948	-116557	5.838	
61	61	4388	5.910	1160	6.176	0	3.072	0	7.280	0	5.948	116557	5.838	
61	62	-4388	5.910	-1160	6.176	0	3.072	0	7.280	0	5.950	-114550	5.842	
62	62	4673	5.910	1091	6.178	0	3.076	0	7.278	0	5.950	114551	5.842	
62	63	-4673	5.910	-1091	6.178	0	3.076	0	7.278	0	5.950	-114429	5.842	
63	63	4636	5.910	1067	6.176	0	3.080	0	7.278	0	5.950	114429	5.842	
63	64	-4636	5.910	-1067	6.176	0	3.080	0	7.278	0	5.952	-112205	5.846	
64	64	4760	5.908	1021	6.176	0	3.082	0	7.288	0	5.952	112206	5.846	
64	65	-4760	5.908	-1021	6.176	0	3.082	0	7.288	0	5.952	-112048	5.846	
65	65	4716	5.908	989	6.174	0	3.084	0	7.288	0	5.952	112048	5.846	
65	66	-4716	5.908	-989	6.174	0	3.084	0	7.288	0	5.952	-109171	5.848	
66	66	4681	5.908	-1001	4.514	0	3.088	0	7.314	0	5.954	109172	5.848	
66	67	-4681	5.908	1001	4.514	0	3.088	0	7.314	0	5.954	-108952	5.848	
67	67	4630	5.908	-1000	4.518	0	3.092	0	7.314	0	5.954	108952	5.848	
67	68	-4630	5.908	1000	4.518	0	3.092	0	7.314	0	5.954	-105056	5.852	
68	68	4443	5.906	-1039	4.522	0	3.098	0	7.316	0	5.954	105057	5.852	
68	69	-4443	5.906	1039	4.522	0	3.098	0	7.316	0	5.954	-104757	5.852	
69	69	4385	5.906	1131	5.830	0	3.100	0	7.316	0	5.954	104757	5.852	
69	70	-4385	5.906	-1131	5.830	0	3.100	0	7.316	0	5.956	-99551	5.856	
70	70	4002	5.906	1276	5.830	0	3.102	0	7.310	0	5.954	99552	5.856	
70	71	-4002	5.906	-1276	5.830	0	3.102	0	7.310	0	5.954	-99178	5.856	
71	71	3993	5.906	1289	5.832	0	3.102	0	7.310	0	5.954	99178	5.856	
71	72	-3993	5.906	-1289	5.832	0	3.102	0	7.310	0	5.956	-93255	5.860	
72	72	3414	5.908	1486	5.832	0	3.104	0	7.308	0	5.956	93256	5.860	
72	73	-3414	5.908	-1486	5.832	0	3.104	0	7.308	0	5.956	-92819	5.860	
73	73	3401	5.908	1507	5.834	0	3.104	0	7.308	0	5.956	92819	5.860	
73	74	-3401	5.908	-1507	5.834	0	3.104	0	7.308	0	5.956	-85911	5.866	
74	74	2635	5.910	1748	5.836	0	3.106	0	7.320	0	5.956	85912	5.866	
74	75	-2635	5.910	-1748	5.836	0	3.106	0	7.320	0	5.956	-85399	5.866	
75	75	2617	5.910	1772	5.836	0	3.106	0	7.320	0	5.956	85399	5.866	
75	76	-2617	5.910	-1772	5.836	0	3.106	0	7.320	0	5.958	-77284	5.874	
76	76	1673	5.912	2053	5.838	0	5.948	0	7.322	0	5.958	77285	5.874	
76	77	-1673	5.912	-2053	5.838	0	5.948	0	7.322	0	5.958	-76684	5.874	
77	77	1648	5.912	2083	5.840	0	5.950	0	7.322	0	5.958	76684	5.874	
77	78	-1648	5.912	-2083	5.840	0	5.950	0	7.322	0	5.960	-67145	5.880	
78	78	-990	2.474	2393	5.842	0	5.952	0	7.316	0	5.962	67146	5.880	
78	79	990	2.474	-2393	5.842	0	5.952	0	7.316	0	5.962	-66445	5.880	
79	79	-988	2.474	2424	5.844	0	5.952	0	7.316	0	5.962	66445	5.880	
79	80	988	2.474	-2424	5.844	0	5.952	0	7.316	0	5.964	-55327	5.888	
80	80	-1297	5.818	2823	5.850	0	5.956	0	7.316	0	5.966	55328	5.888	
80	81	1297	5.818	-2823	5.850	0	5.956	0	7.316	0	5.966	-54495	5.888	
81	81	-1333	5.818	2858	5.854	0	5.956	0	7.316	0	5.966	54495	5.888	
81	82	1333	5.818	-2858	5.854	0	5.956	0	7.316	0	5.968	-41259	5.892	
82	82	-2769	5.820	3206	5.856	0	5.956	0	7.318	0	5.968	41260	5.892	

Longitudinal Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
85	86	3488	5.818	-3648	5.894	0	5.970	0	7.318	0	7.312	-13084	4.558	
86	86	-4317	5.816	3716	5.900	0	7.314	0	7.318	0	7.312	13084	4.558	
86	87	4317	5.816	-3716	5.900	0	7.314	0	7.318	0	7.316	18184	5.796	Girder End
1101	1101	-3	2.744	-52	5.770	2	2.636			0	5.428	0	7.244	
1101	1102	3	2.744	52	5.770	-2	2.636			-2	2.636	-78	5.770	
1102	1102	-29	5.854	1281	5.844	4	2.636	0	5.872	2	2.636	78	5.770	
1102	1103	29	5.854	-1281	5.844	-4	2.636	0	5.872	-4	2.636	569	5.842	
1103	1103	-56	5.870	2504	5.844	5	2.636	0	5.872	4	2.636	-569	5.842	
1103	1104	56	5.870	-2504	5.844	-5	2.636	0	5.872	-7	2.636	1820	5.844	
1104	1104	-83	5.888	3579	5.844	6	2.634	0	5.870	7	2.636	-1820	5.844	
1104	1105	83	5.888	-3579	5.844	-6	2.634	0	5.870	-10	2.636	3609	5.844	
1105	1105	-109	5.900	4494	5.844	7	2.634	0	5.870	10	2.636	-3609	5.844	
1105	1106	109	5.900	-4494	5.844	-7	2.634	0	5.870	-13	2.636	5856	5.844	
1106	1106	-133	5.908	5238	5.844	8	2.632	0	5.870	13	2.636	-5855	5.844	
1106	1107	133	5.908	-5238	5.844	-8	2.632	0	5.870	-17	2.634	8474	5.844	
1107	1107	-157	5.912	5800	5.844	9	2.632	0	5.868	17	2.634	-8473	5.844	
1107	1108	157	5.912	-5800	5.844	-9	2.632	0	5.868	-22	2.634	11373	5.844	
1108	1108	-179	5.916	6169	5.844	10	2.630	0	5.868	22	2.634	-11372	5.844	
1108	1109	179	5.916	-6169	5.844	-10	2.630	0	5.868	-27	2.634	14457	5.844	
1109	1109	-193	5.918	6277	5.844	11	2.628	0	5.868	27	2.634	-14456	5.844	
1109	1110	193	5.918	-6277	5.844	-11	2.628	0	5.868	-32	2.632	17594	5.844	
1110	1110	-206	5.920	6236	5.844	12	2.626	0	5.868	32	2.632	-17594	5.844	
1110	1111	206	5.920	-6236	5.844	-12	2.626	0	5.868	-38	2.632	20712	5.844	
1111	1111	-218	5.922	6042	5.846	13	2.626	0	5.868	38	2.632	-20711	5.844	
1111	1112	218	5.922	-6042	5.846	-13	2.626	0	5.868	-45	2.630	23732	5.844	
1112	1112	-229	5.924	5692	5.850	14	2.624	0	5.868	45	2.630	-23731	5.844	
1112	1113	229	5.924	-5692	5.850	-14	2.624	0	5.868	-52	2.630	26577	5.844	
1113	1113	-239	5.926	5187	5.856	15	2.620	0	5.870	52	2.630	-26575	5.844	
1113	1114	239	5.926	-5187	5.856	-15	2.620	0	5.870	-59	2.628	29168	5.844	
1114	1114	-248	5.928	4534	5.874	16	2.618	0	5.870	59	2.628	-29166	5.844	
1114	1115	248	5.928	-4534	5.874	-16	2.618	0	5.870	-67	2.628	31430	5.846	
1115	1115	262	2.526	3697	5.894	18	2.616	0	5.872	67	2.628	-31428	5.846	
1115	1116	-262	2.526	-3697	5.894	-18	2.616	0	5.872	-119	2.622	42454	5.852	
1116	1116	266	2.528	3561	5.890	19	2.618	0	5.872	119	2.622	-42454	5.852	
1116	1117	-266	2.528	-3561	5.890	-19	2.618	0	5.872	-177	2.622	53100	5.856	
1117	1117	272	2.530	3374	5.882	21	2.620	0	5.872	177	2.622	-53100	5.856	
1117	1118	-272	2.530	-3374	5.882	-21	2.620	0	5.872	-280	2.622	69948	5.862	
1118	1118	281	2.534	3149	5.870	21	2.620	0	5.872	280	2.622	-69948	5.862	
1118	1119	-281	2.534	-3149	5.870	-21	2.620	0	5.872	-387	2.622	85688	5.862	
1119	1119	286	2.534	3046	5.866	21	2.620	0	5.872	387	2.622	-85688	5.862	
1119	1044	-286	2.534	-3046	5.866	-21	2.620	0	5.872	-408	2.622	88734	5.862	
1044	1044	21	2.620	-286	2.534	-3046	5.866	-88734	5.862	0	5.872	-408	2.622	
1044	44	-21	2.620	286	2.534	3046	5.866	88734	5.862	24063	5.866	2189	3.132	
2101	2101	-3	2.744	-52	5.770	-2	2.636			0	5.438	0	10.216	
2101	2102	3	2.744	52	5.770	2	2.636			2	2.636	-78	5.770	
2102	2102	-29	5.854	1281	5.844	-4	2.636	0	5.872	-2	2.636	78	5.770	
2102	2103	29	5.854	-1281	5.844	4	2.636	0	5.872	4	2.636	569	5.842	
2103	2103	-56	5.870	2504	5.844	-5	2.636	0	5.872	-4	2.636	-569	5.842	
2103	2104	56	5.870	-2504	5.844	5	2.636	0	5.872	7	2.636	1820	5.844	
2104	2104	-83	5.888	3579	5.844	-6	2.634	0	5.870	-7	2.636	-1820	5.844	
2104	2105	83	5.888	-3579	5.844	6	2.634	0	5.870	10	2.636	3609	5.844	
2105	2105	-109	5.900	4494	5.844	-7	2.634	0	5.870	-10	2.636	-3609	5.844	
2105	2106	109	5.900	-4494	5.844	7	2.634	0	5.870	13	2.636	5856	5.844	
2106	2106	-133	5.908	5238	5.844	-8	2.632	0	5.870	-13	2.636	-5855	5.844	
2106	2107	133	5.908	-5238	5.844	8	2.632	0	5.870	17	2.634	8474	5.844	
2107	2107	-157	5.912	5800	5.844	-9	2.632	0	5.868	-17	2.634	-8473	5.844	
2107	2108	157	5.912	-5800	5.844	9	2.632	0	5.868	22	2.634	11373	5.844	
2108	2108	-179	5.916	6169	5.844	-10	2.630	0	5.868	-22	2.634	-11372	5.844	
2108	2109	179	5.916	-6169	5.844	10	2.630	0	5.868	27	2.634	14457	5.844	
2109	2109	-193	5.918	6277	5.844	-11	2.628	0	5.868	-27	2.634	-14456	5.844	
2109	2110	193	5.918	-6277	5.844	11	2.628	0	5.868	32	2.632	17594	5.844	
2110	2110	-206	5.920	6236	5.844	-12	2.626	0	5.868	-32	2.632	-17594	5.844	
2110	2111	206	5.920	-6236	5.844	12	2.626	0	5.868	38	2.632	20712	5.844	
2111	2111	-218	5.922	6042	5.846	-13	2.626	0	5.868	-38	2.632	-20711	5.844	
2111	2112	218	5.922	-6042	5.846	13	2.626	0	5.868	45	2.630	23732	5.844	
2112	2112	-229	5.924	5692	5.850	-14	2.624	0	5.868	-45	2.630	-23731	5.844	
2112	2113	229	5.924	-5692	5.850	14	2.624	0	5.868	52	2.630	26577	5.844	
2113	2113	-239	5.926	5187	5.856	-15	2.620	0	5.870	-52	2.630	-26575	5.844	
2113	2114	239	5.926	-5187	5.856	15	2.620	0	5.870	59	2.628	29168	5.844	
2114	2114	-248	5.928	4534	5.874	-16	2.618	0	5.870	-59	2.628	-29166	5.844	
2114	2115	248	5.928	-4534	5.874	16	2.618	0	5.870	67	2.628	31430	5.846	
2115	2115	262	2.526	3697	5.894	-18	2.616	0	5.872	-67	2.628	-31428	5.846	
2115	2116	-262	2.526	-3697	5.894	18	2.616	0	5.872	119	2.622	42454	5.852	
2116	2116	266	2.528	3561	5.890	-19	2.618	0	5.872	-119	2.622	-42454	5.852	
2116	2117	-266	2.528	-3561	5.890	19	2.618	0	5.872	177	2.622	53100	5.856	
2117	2117	272	2.530	3374	5.882	-21	2.620	0	5.872	-177	2.622	-53100	5.856	
2117	2118	-272	2.530	-3374	5.882	21	2.620	0	5.872	280	2.622	69948	5.862	
2118	2118	281	2.534	3149	5.870	-21	2.620	0	5.872	-280	2.622	-69948	5.862	

Longitudinal Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
1006	1006	-3	5.850	-173	5.860	-704	5.850	0	5.842	0	5.736	0	5.850	
1008	8	3	5.852	162	5.862	639	5.852	0	5.840	-4713	5.852	1192	5.862	
1008	1008	-3	5.852	-162	5.862	-639	5.852	0	5.840	0	5.738	0	5.848	
1010	10	3	5.856	148	5.864	568	5.856	0	5.840	-4188	5.856	1094	5.864	
1010	1010	-3	5.856	-148	5.864	-568	5.856	0	5.840	0	5.740	0	5.848	
1012	12	3	5.862	133	5.866	491	5.862	1	5.840	-3621	5.862	979	5.866	
1012	1012	-3	5.862	-133	5.866	-491	5.862	-1	5.840	0	5.740	0	5.846	
1014	14	3	5.874	115	5.870	409	5.876	1	5.838	-3016	5.876	847	5.870	
1014	1014	-3	5.874	-115	5.870	-409	5.876	-1	5.838	0	5.742	0	5.846	
1016	16	2	5.894	94	5.878	322	5.894	1	5.838	-2378	5.894	695	5.878	
1016	1016	-2	5.894	-94	5.878	-322	5.894	-1	5.838	0	5.742	0	5.844	
1018	18	2	5.914	71	5.894	232	5.914	1	5.838	-1714	5.914	522	5.894	
1018	1018	-2	5.914	-71	5.894	-232	5.914	-1	5.838	0	5.742	0	5.844	
1020	20	1	5.934	31	5.914	98	5.934	1	5.838	-726	5.934	232	5.914	
1020	1020	-1	5.934	-31	5.914	-98	5.934	-1	5.838	0	5.740	0	5.844	
1022	22	0	6.054	11	5.950	33	6.054	1	5.838	-242	6.054	80	5.950	
1022	1022	0	6.054	-11	5.950	-33	6.054	-1	5.838	0	5.738	0	5.846	
1024	24	-1	5.824	-18	5.820	-61	5.824	1	5.838	449	5.824	-132	5.820	
1024	1024	1	5.824	18	5.820	61	5.824	-1	5.838	0	5.734	0	5.846	
1026	26	-1	5.826	-47	5.826	-139	5.826	1	5.838	1022	5.826	-346	5.826	
1026	1026	1	5.826	47	5.826	139	5.826	-1	5.838	0	5.730	0	5.848	
1028	28	-2	5.828	-80	5.828	-216	5.828	1	5.840	1596	5.828	-589	5.828	
1028	1028	2	5.828	80	5.828	216	5.828	-1	5.840	0	5.728	0	5.852	
1030	30	-3	5.828	-117	5.828	-292	5.828	1	5.842	2153	5.828	-865	5.828	
1030	1030	3	5.828	117	5.828	292	5.828	-1	5.842	0	5.722	0	5.856	
1032	32	-5	5.828	-160	5.830	-363	5.828	1	5.850	2678	5.828	-1177	5.830	
1032	1032	5	5.828	160	5.830	363	5.828	-1	5.850	0	5.716	0	5.866	
1080	82	-3	5.842	-142	5.842	699	5.842	0	5.858	-5152	5.842	-1048	5.842	
1080	1082	3	5.842	142	5.842	-699	5.842	0	5.858	0	5.892	0	5.852	
1078	80	-3	5.840	-134	5.848	629	5.840	0	5.856	-4641	5.840	-985	5.848	
1078	1080	3	5.840	134	5.848	-629	5.840	0	5.856	0	5.890	0	5.850	
1076	78	-3	5.836	-121	5.844	551	5.836	1	5.854	-4067	5.836	-895	5.844	
1076	1078	3	5.836	121	5.844	-551	5.836	-1	5.854	0	5.890	0	5.846	
1074	76	-3	5.828	-107	5.842	468	5.828	1	5.852	-3451	5.828	-790	5.842	
1074	1076	3	5.828	107	5.842	-468	5.828	-1	5.852	0	5.890	0	5.844	
1072	74	-2	5.818	-91	5.834	379	5.816	1	5.850	-2798	5.816	-669	5.834	
1072	1074	2	5.818	91	5.834	-379	5.816	-1	5.850	0	5.890	0	5.842	
1070	72	-2	5.798	-72	5.818	286	5.798	1	5.848	-2113	5.798	-529	5.818	
1070	1072	2	5.798	72	5.818	-286	5.798	-1	5.848	0	5.890	0	5.840	
1068	70	1	4.546	-50	5.786	-191	4.546	1	5.846	1407	4.546	-370	5.786	
1068	1070	-1	4.546	50	5.786	191	4.546	-1	5.846	0	5.890	0	5.838	
1066	68	-1	6.162	22	7.290	87	6.162	1	5.844	-639	6.162	160	7.290	
1066	1068	1	6.162	-22	7.290	-87	6.162	-1	5.844	0	5.890	0	5.836	
1064	66	0	2.264	13	2.270	-63	2.264	1	5.842	462	2.264	93	2.270	
1064	1066	0	2.264	-13	2.270	63	2.264	-1	5.842	0	5.892	0	5.832	
1062	64	1	5.852	25	5.858	-98	5.852	1	5.840	720	5.852	186	5.858	
1062	1064	-1	5.852	-25	5.858	98	5.852	-1	5.840	0	5.894	0	5.828	
1060	62	2	5.850	53	5.852	-177	5.848	1	5.838	1308	5.848	388	5.852	
1060	1062	-2	5.850	-53	5.852	177	5.848	-1	5.838	0	5.898	0	5.824	
1058	60	3	5.846	84	5.850	-257	5.846	1	5.836	1895	5.846	621	5.850	
1058	1060	-3	5.846	-84	5.850	257	5.846	-1	5.836	0	5.902	0	5.818	
1056	58	4	5.846	120	5.848	-334	5.844	1	5.834	2462	5.844	887	5.848	
1056	1058	-4	5.846	-120	5.848	334	5.844	-1	5.834	0	4.662	0	5.812	
1054	56	5	5.844	162	5.846	-406	5.844	1	5.834	2995	5.844	1194	5.846	
1054	1056	-5	5.844	-162	5.846	406	5.844	-1	5.834	0	4.658	0	5.804	
2006	6	3	5.850	173	5.860	-704	5.850	0	5.842	5194	5.850	1275	5.860	
2006	2006	-3	5.850	-173	5.860	704	5.850	0	5.842	0	5.738	0	5.850	
2008	8	3	5.852	162	5.862	-639	5.852	0	5.840	4713	5.852	1192	5.862	
2008	2008	-3	5.852	-162	5.862	639	5.852	0	5.840	0	5.738	0	5.848	
2010	10	3	5.856	148	5.864	-568	5.856	0	5.840	4188	5.856	1094	5.864	
2010	2010	-3	5.856	-148	5.864	568	5.856	0	5.840	0	5.740	0	5.848	
2012	12	3	5.862	133	5.866	-491	5.862	-1	5.840	3621	5.862	979	5.866	
2012	2012	-3	5.862	-133	5.866	491	5.862	1	5.840	0	5.742	0	5.846	
2014	14	3	5.874	115	5.870	-409	5.876	-1	5.838	3016	5.876	847	5.870	
2014	2014	-3	5.874	-115	5.870	409	5.876	1	5.838	0	5.742	0	5.846	
2016	16	2	5.894	94	5.878	-322	5.894	-1	5.838	2378	5.894	695	5.878	
2016	2016	-2	5.894	-94	5.878	322	5.894	1	5.838	0	5.742	0	5.844	
2018	18	2	5.914	71	5.894	-232	5.914	-1	5.838	1714	5.914	522	5.894	
2018	2018	-2	5.914	-71	5.894	232	5.914	1	5.838	0	5.744	0	5.844	
2020	20	1	5.934	31	5.914	-98	5.934	-1	5.838	726	5.934	232	5.914	
2020	2020	-1	5.934	-31	5.914	98	5.934	1	5.838	0	5.740	0	5.844	
2022	22	0	6.054	11	5.950	-33	6.054	-1	5.838	242	6.054	80	5.950	
2022	2022	0	6.054	-11	5.950	33	6.054	1	5.838	0	5.738	0	5.846	
2024	24	-1	5.824	-18	5.820	61	5.824	-1	5.838	-449	5.824	-132	5.820	
2024	2024	1	5.824	18	5.820	-61	5.824	1	5.838	0	5.734	0	5.846	
2026	26	-1	5.826	-47	5.826	139	5.826	-1	5.838	-1022	5.826	-346	5.826	
2026	2026	1	5.826	47	5.826	-139	5.826	1	5.838	0	5.730	0	5.848	
2028	28	-2	5.828	-80	5.828	216	5.828	-1	5.840	-1596	5.828	-589	5.828	

Longitudinal Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
2080	2082	3	5.842	142	5.842	699	5.842	0	5.858	0	5.892	0	5.852	
2078	80	-3	5.840	-134	5.848	-629	5.840	0	5.856	4641	5.840	-985	5.848	
2078	2080	3	5.840	134	5.848	629	5.840	0	5.856	0	5.890	0	5.850	
2076	78	-3	5.836	-121	5.844	-551	5.836	-1	5.854	4067	5.836	-895	5.844	
2076	2078	3	5.836	121	5.844	551	5.836	1	5.854	0	5.890	0	5.846	
2074	76	-3	5.828	-107	5.842	-468	5.828	-1	5.852	3451	5.828	-790	5.842	
2074	2076	3	5.828	107	5.842	468	5.828	1	5.852	0	5.890	0	5.844	
2072	74	-2	5.818	-91	5.834	-379	5.816	-1	5.850	2798	5.816	-669	5.834	
2072	2074	2	5.818	91	5.834	379	5.816	1	5.850	0	5.890	0	5.842	
2070	72	-2	5.798	-72	5.818	-286	5.798	-1	5.848	2113	5.798	-529	5.818	
2070	2072	2	5.798	72	5.818	286	5.798	1	5.848	0	5.890	0	5.840	
2068	70	1	4.546	-50	5.786	191	4.546	-1	5.846	-1407	4.546	-370	5.786	
2068	2070	-1	4.546	50	5.786	-191	4.546	1	5.846	0	5.890	0	5.838	
2066	68	-1	6.162	22	7.290	-87	6.162	-1	5.844	639	6.162	160	7.290	
2066	2068	1	6.162	-22	7.290	87	6.162	1	5.844	0	5.890	0	5.836	
2064	66	0	2.264	13	2.270	63	2.264	-1	5.842	-462	2.264	93	2.270	
2064	2066	0	2.264	-13	2.270	-63	2.264	1	5.842	0	5.892	0	5.832	
2062	64	1	5.852	25	5.858	98	5.852	-1	5.840	-720	5.852	186	5.858	
2062	2064	-1	5.852	-25	5.858	-98	5.852	1	5.840	0	5.894	0	5.828	
2060	62	2	5.850	53	5.852	177	5.848	-1	5.838	-1308	5.848	388	5.852	
2060	2062	-2	5.850	-53	5.852	-177	5.848	1	5.838	0	5.898	0	5.824	
2058	60	3	5.846	84	5.850	257	5.846	-1	5.836	-1895	5.846	621	5.850	
2058	2060	-3	5.846	-84	5.850	-257	5.846	1	5.836	0	5.902	0	5.818	
2056	58	4	5.846	120	5.848	334	5.844	-1	5.834	-2462	5.844	887	5.848	
2056	2058	-4	5.846	-120	5.848	-334	5.844	1	5.834	0	4.662	0	5.812	
2054	56	5	5.844	162	5.846	406	5.844	-1	5.834	-2995	5.844	1194	5.846	
2054	2056	-5	5.844	-162	5.846	-406	5.844	1	5.834	0	4.658	0	5.804	
1201	1006	721	5.850	0	5.842	0	5.774			0	5.736	0	5.842	
1201	1102	-721	5.850	0	5.842	0	5.774			0	5.872	0	5.840	
1202	1008	655	5.852	0	5.840	0	5.780			0	5.738	0	5.840	
1202	1103	-655	5.852	0	5.840	0	5.780			0	5.872	0	5.840	
1203	1010	583	5.856	0	5.840	0	5.786			0	5.740	0	5.840	
1203	1104	-583	5.856	0	5.840	0	5.786			0	5.872	0	5.838	
1204	1012	505	5.862	0	5.838	0	5.790			0	5.740	-1	5.840	
1204	1105	-505	5.862	0	5.838	0	5.790			0	5.874	0	5.838	
1205	1014	421	5.874	0	5.838	0	5.794			0	5.740	-1	5.838	
1205	1106	-421	5.874	0	5.838	0	5.794			0	5.874	0	5.838	
1206	1016	332	5.894	0	5.838	0	5.798			0	5.740	-1	5.838	
1206	1107	-332	5.894	0	5.838	0	5.798			0	5.876	0	5.838	
1207	1018	239	5.914	0	5.838	0	5.800			0	5.740	-1	5.838	
1207	1108	-239	5.914	0	5.838	0	5.800			0	5.878	0	5.838	
1208	1020	101	5.934	0	5.838	0	5.800			0	5.740	-1	5.838	
1208	1109	-101	5.934	0	5.838	0	5.800			0	5.880	0	5.838	
1209	1022	33	6.054	0	5.838	0	5.800			0	5.738	-1	5.838	
1209	1110	-33	6.054	0	5.838	0	5.800			0	5.882	0	5.838	
1210	1024	-66	5.824	0	5.838	0	5.800			0	5.736	-1	5.838	
1210	1111	66	5.824	0	5.838	0	5.800			0	5.886	-1	5.838	
1211	1026	-148	5.826	0	5.838	0	5.796			0	5.732	-1	5.838	
1211	1112	148	5.826	0	5.838	0	5.796			0	5.890	-1	5.838	
1212	1028	-233	5.828	0	5.838	0	5.792			0	5.726	-1	5.840	
1212	1113	233	5.828	0	5.838	0	5.792			0	5.894	-1	5.838	
1213	1030	-316	5.828	0	5.840	0	5.782			0	5.720	-1	5.842	
1213	1114	316	5.828	0	5.840	0	5.782			0	5.898	-1	5.838	
1214	1032	-398	5.828	0	5.842	0	5.772			0	5.714	-1	5.850	
1214	1115	398	5.828	0	5.842	0	5.772			0	5.900	-1	5.840	
1301	1082	-713	5.842	0	5.860	0	5.888			0	5.892	0	5.858	
1301	1102	713	5.842	0	5.860	0	5.888			0	5.874	0	5.864	
1302	1080	-640	5.840	0	5.858	0	5.886			0	5.890	0	5.856	
1302	1103	640	5.840	0	5.858	0	5.886			0	5.870	0	5.860	
1303	1078	-562	5.836	0	5.854	0	5.886			0	5.890	1	5.854	
1303	1104	562	5.836	0	5.854	0	5.886			0	5.866	0	5.856	
1304	1076	-477	5.828	0	5.852	0	5.884			0	5.890	1	5.852	
1304	1105	477	5.828	0	5.852	0	5.884			0	5.860	0	5.854	
1305	1074	-387	5.818	0	5.850	0	5.884			0	5.890	1	5.850	
1305	1106	387	5.818	0	5.850	0	5.884			0	5.856	0	5.852	
1306	1072	-293	5.798	0	5.848	0	5.882			0	5.890	1	5.848	
1306	1107	293	5.798	0	5.848	0	5.882			0	5.850	0	5.850	
1307	1070	195	4.546	0	5.846	0	5.882			0	5.890	1	5.846	
1307	1108	-195	4.546	0	5.846	0	5.882			0	5.844	0	5.848	
1308	1068	-88	6.162	0	5.844	0	5.882			0	5.890	1	5.844	
1308	1109	88	6.162	0	5.844	0	5.882			0	5.834	0	5.848	
1309	1066	64	2.264	0	5.844	0	5.884			0	5.892	1	5.842	
1309	1110	-64	2.264	0	5.844	0	5.884			0	5.824	0	5.846	
1310	1064	104	5.852	0	5.842	0	5.886			0	5.894	1	5.840	
1310	1111	-104	5.852	0	5.842	0	5.886			0	5.810	1	5.844	
1311	1062	188	5.850	0	5.840	0	5.888			0	5.898	1	5.838	
1311	1112	-188	5.850	0	5.840	0	5.888			0	5.794	1	5.844	
1312	1060	273	5.846	0	5.840	0	5.894			0	5.902	1	5.836	

Longitudinal Direction SECTIONAL FORCE

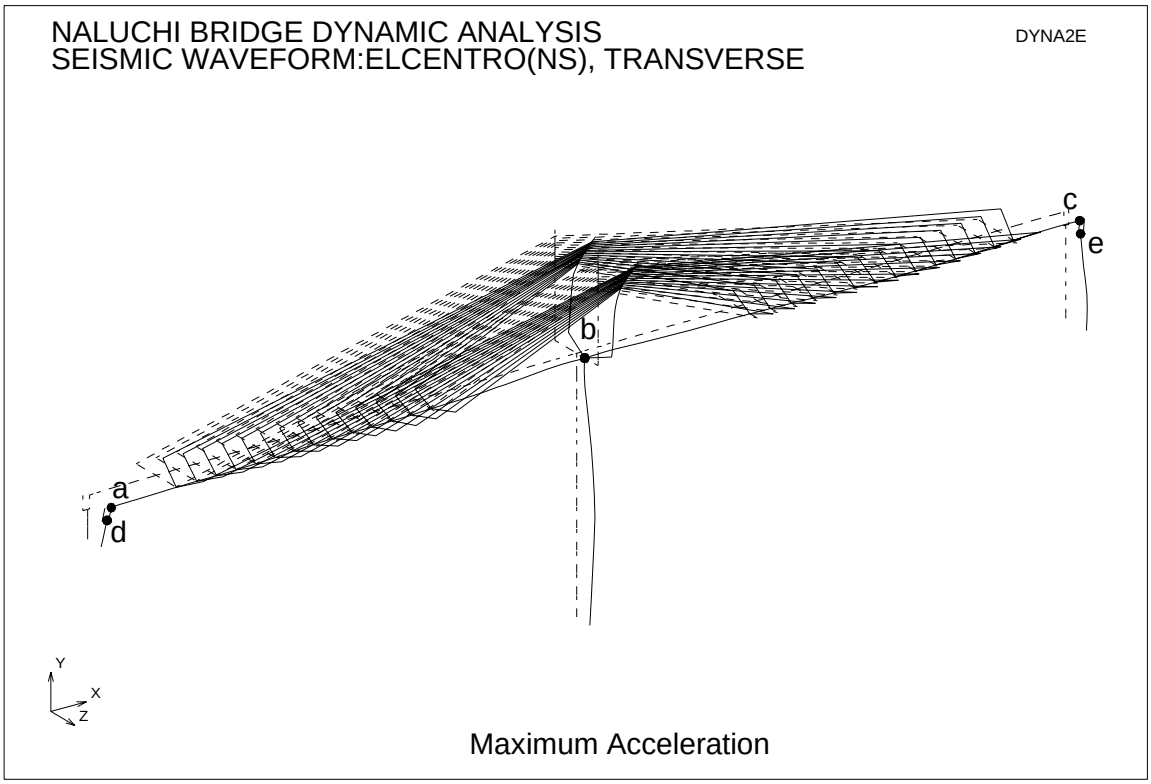
Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
2201	2102	-721	5.850	0	5.842	0	5.774			0	5.872	0	5.840	
2202	2008	655	5.852	0	5.840	0	5.780			0	5.738	0	5.840	
2202	2103	-655	5.852	0	5.840	0	5.780			0	5.872	0	5.840	
2203	2010	583	5.856	0	5.840	0	5.786			0	5.740	0	5.840	
2203	2104	-583	5.856	0	5.840	0	5.786			0	5.872	0	5.838	
2204	2012	505	5.862	0	5.838	0	5.790			0	5.740	-1	5.840	
2204	2105	-505	5.862	0	5.838	0	5.790			0	5.874	0	5.838	
2205	2014	421	5.874	0	5.838	0	5.794			0	5.740	-1	5.838	
2205	2106	-421	5.874	0	5.838	0	5.794			0	5.874	0	5.838	
2206	2016	332	5.894	0	5.838	0	5.798			0	5.740	-1	5.838	
2206	2107	-332	5.894	0	5.838	0	5.798			0	5.876	0	5.838	
2207	2018	239	5.914	0	5.838	0	5.800			0	5.740	-1	5.838	
2207	2108	-239	5.914	0	5.838	0	5.800			0	5.878	0	5.838	
2208	2020	101	5.934	0	5.838	0	5.800			0	5.740	-1	5.838	
2208	2109	-101	5.934	0	5.838	0	5.800			0	5.880	0	5.838	
2209	2022	33	6.054	0	5.838	0	5.800			0	5.738	-1	5.838	
2209	2110	-33	6.054	0	5.838	0	5.800			0	5.882	0	5.838	
2210	2024	-66	5.824	0	5.838	0	5.800			0	5.736	-1	5.838	
2210	2111	66	5.824	0	5.838	0	5.800			0	5.886	-1	5.838	
2211	2026	-148	5.826	0	5.838	0	5.796			0	5.732	-1	5.838	
2211	2112	148	5.826	0	5.838	0	5.796			0	5.890	-1	5.838	
2212	2028	-233	5.828	0	5.838	0	5.792			0	5.726	-1	5.840	
2212	2113	233	5.828	0	5.838	0	5.792			0	5.894	-1	5.838	
2213	2030	-316	5.828	0	5.840	0	5.782			0	5.720	-1	5.842	
2213	2114	316	5.828	0	5.840	0	5.782			0	5.898	-1	5.838	
2214	2032	-398	5.828	0	5.842	0	5.772			0	5.714	-1	5.850	
2214	2115	398	5.828	0	5.842	0	5.772			0	5.900	-1	5.840	
2301	2082	-713	5.842	0	5.860	0	5.888			0	5.892	0	5.858	
2301	2102	713	5.842	0	5.860	0	5.888			0	5.874	0	5.864	
2302	2080	-640	5.840	0	5.858	0	5.886			0	5.890	0	5.856	
2302	2103	640	5.840	0	5.858	0	5.886			0	5.870	0	5.860	
2303	2078	-562	5.836	0	5.854	0	5.886			0	5.890	1	5.854	
2303	2104	562	5.836	0	5.854	0	5.886			0	5.866	0	5.856	
2304	2076	-477	5.828	0	5.852	0	5.884			0	5.890	1	5.852	
2304	2105	477	5.828	0	5.852	0	5.884			0	5.860	0	5.854	
2305	2074	-387	5.818	0	5.850	0	5.884			0	5.890	1	5.850	
2305	2106	387	5.818	0	5.850	0	5.884			0	5.856	0	5.852	
2306	2072	-293	5.798	0	5.848	0	5.882			0	5.890	1	5.848	
2306	2107	293	5.798	0	5.848	0	5.882			0	5.850	0	5.850	
2307	2070	195	4.546	0	5.846	0	5.882			0	5.890	1	5.846	
2307	2108	-195	4.546	0	5.846	0	5.882			0	5.844	0	5.848	
2308	2068	-88	6.162	0	5.844	0	5.882			0	5.890	1	5.844	
2308	2109	88	6.162	0	5.844	0	5.882			0	5.834	0	5.848	
2309	2066	64	2.264	0	5.844	0	5.884			0	5.892	1	5.842	
2309	2110	-64	2.264	0	5.844	0	5.884			0	5.824	0	5.846	
2310	2064	104	5.852	0	5.842	0	5.886			0	5.894	1	5.840	
2310	2111	-104	5.852	0	5.842	0	5.886			0	5.810	1	5.844	
2311	2062	188	5.850	0	5.840	0	5.888			0	5.898	1	5.838	
2311	2112	-188	5.850	0	5.840	0	5.888			0	5.794	1	5.844	
2312	2060	273	5.846	0	5.840	0	5.894			0	5.902	1	5.836	
2312	2113	-273	5.846	0	5.840	0	5.894			0	5.780	1	5.844	
2313	2058	357	5.846	0	5.840	0	5.900			0	4.662	1	5.834	
2313	2114	-357	5.846	0	5.840	0	5.900			0	5.768	1	5.844	
2314	2056	440	5.844	0	5.842	0	5.906			0	4.658	1	5.834	
2314	2115	-440	5.844	0	5.842	0	5.906			0	5.758	1	5.844	
5001	88			0	7.060							0	11.414	
5001	3100			0	7.060							0	7.060	
3101	3100	0	7.338	0	14.296							0	4.728	
3101	3000	0	7.338	0	14.296							0	5.980	
5002	1	3505	5.892	-6496	5.886	0	7.318	0	6.204	0	10.160	-20443	5.886	
5002	3200	-3505	5.892	6496	5.886	0	7.318	0	6.204	0	7.252	0	5.906	
3201	3201	6496	5.886	-3505	5.892	0	7.318	0	7.252			0	4.722	
3201	3000	-6496	5.886	3505	5.892	0	7.318	0	7.252	0	7.318	-1577	5.892	
3000	3000	3506	5.892	-6473	5.836	0	7.318	0	7.318	0	7.252	-1577	5.892	P2 Column Top
3000	3001	-3506	5.892	6473	5.836	0	7.318	0	7.318	0	7.266	-4459	5.986	
3001	3001	3510	5.892	-6615	5.820	0	7.318	0	7.318	0	7.266	4459	5.986	
3001	3002	-3510	5.892	6615	5.820	0	7.318	0	7.318	0	7.278	-10951	5.824	
3002	3002	3514	5.892	-6760	5.818	0	7.318	0	7.318	0	7.278	10951	5.824	
3002	3003	-3514	5.892	6760	5.818	0	7.318	0	7.318	0	7.284	-17706	5.820	
3003	3003	3518	5.894	6913	4.714	0	7.318	0	7.318	0	7.284	17706	5.820	
3003	3004	-3518	5.894	-6913	4.714	0	7.318	0	7.318	0	7.290	-24588	5.818	
3004	3004	3522	5.894	7263	4.712	0	7.318	0	7.318	0	7.290	24588	5.818	
3004	3005	-3522	5.894	-7263	4.712	0	7.318	0	7.318	0	7.292	-31577	5.818	
3005	3005	3523	5.894	7417	4.712	0	7.318	0	7.318	0	7.292	31577	5.818	
3005	3006	-3523	5.894	-7417	4.712	0	7.318	0	7.318	0	7.296	-37905	5.818	
3006	3006	3545	5.896	8879	4.872	0	7.318	0	7.318	0	7.296	37905	5.818	
3006	3007	-3545	5.896	-8879	4.872	0	7.318	0	7.318	0	7.298	45450	4.712	
5004	89			0	9.340							0	14.440	

Longitudinal Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
4101	4000	5778	5.796	-3603	5.790	0	7.348	0	7.262	0	7.348	1802	5.790	P4 Column Top
4000	4000	-3604	5.790	-5995	5.894	0	7.350	0	7.348	0	7.262	-1802	5.790	
4000	4001	3604	5.790	5995	5.894	0	7.350	0	7.348	0	4.768	-19204	5.892	
4001	4001	-3606	5.790	-6509	5.904	0	7.350	0	7.348	0	4.768	19204	5.892	
4001	4002	3606	5.790	6509	5.904	0	7.350	0	7.348	0	7.382	-39359	5.900	
4002	4002	-3607	5.790	6913	4.788	0	7.352	0	7.348	0	7.382	39359	5.900	
4002	4003	3607	5.790	-6913	4.788	0	7.352	0	7.348	0	7.372	-60514	5.904	
4003	4003	-3607	5.790	7328	4.790	0	7.354	0	7.348	0	7.372	60514	5.904	
4003	4004	3607	5.790	-7328	4.790	0	7.354	0	7.348	0	7.368	-82393	5.910	
4004	4004	-3608	5.790	7535	4.796	0	7.354	0	7.348	0	7.368	82393	5.910	
4004	4005	3608	5.790	-7535	4.796	0	7.354	0	7.348	0	7.366	-104774	5.914	
4005	4005	-3608	5.790	7812	4.838	0	7.354	0	7.348	0	7.366	104774	5.914	
4005	4006	3608	5.790	-7812	4.838	0	7.354	0	7.348	0	7.364	-127514	5.920	
4006	4006	-3608	5.790	8168	4.848	0	7.354	0	7.348	0	7.364	127514	5.920	
4006	4007	3608	5.790	-8168	4.848	0	7.354	0	7.348	0	7.364	-134900	5.922	
4007	4007	-3608	5.790	11989	4.858	0	7.356	0	7.348	0	7.364	134900	5.922	
4007	4008	3608	5.790	-11989	4.858	0	7.356	0	7.348	0	7.364	-142576	5.928	
120	44	3226	2.556	-17865	5.918	0	7.196	0	7.310	0	7.308	-465763	6.104	P3 Column Top
120	120	-3226	2.556	17865	5.918	0	7.196	0	7.310	0	11.998	387128	6.108	
121	120	3236	2.556	-17997	5.918	0	7.200	0	7.310	0	11.998	-387128	6.108	
121	121	-3236	2.556	17997	5.918	0	7.200	0	7.310	0	10.220	369529	6.108	
122	121	3236	2.556	-17997	5.918	0	7.200	0	7.310	0	10.220	-369529	6.108	
122	122	-3236	2.556	17997	5.918	0	7.200	0	7.310	0	10.212	325596	6.112	
123	122	3236	2.556	-17997	5.918	0	7.200	0	7.310	0	10.212	-325596	6.112	
123	123	-3236	2.556	17997	5.918	0	7.200	0	7.310	0	10.210	318575	6.112	
124	123	3238	2.556	-18023	5.918	0	7.200	0	7.310	0	10.210	-318575	6.112	
124	124	-3238	2.556	18023	5.918	0	7.200	0	7.310	0	7.104	299249	6.114	
125	124	3244	2.556	-18092	5.918	0	7.202	0	7.310	0	7.104	-299249	6.114	
125	125	-3244	2.556	18092	5.918	0	7.202	0	7.310	0	7.116	256975	6.120	
126	125	3256	2.556	-18214	5.920	0	7.206	0	7.310	0	7.116	-256975	6.120	
126	126	-3256	2.556	18214	5.920	0	7.206	0	7.310	0	7.132	211025	6.128	
127	126	3268	2.556	-18313	5.920	0	7.208	0	7.310	0	7.132	-211025	6.128	
127	127	-3268	2.556	18313	5.920	0	7.208	0	7.310	0	7.142	168971	6.148	
128	127	3279	2.556	-18389	5.920	0	7.210	0	7.310	0	7.142	-168971	6.148	
128	128	-3279	2.556	18389	5.920	0	7.210	0	7.310	0	7.152	125021	6.178	
129	128	3291	2.556	-18507	6.078	0	7.214	0	7.310	0	7.152	-125021	6.178	
129	129	-3291	2.556	18507	6.078	0	7.214	0	7.310	0	7.164	65335	2.654	
130	129	3313	2.556	-18758	6.074	0	7.220	0	7.310	0	7.164	-65335	2.654	
130	130	-3313	2.556	18758	6.074	0	7.220	0	7.310	0	7.172	-136158	5.762	
131	130	3334	2.556	-18970	6.068	0	7.226	0	7.310	0	7.172	136158	5.762	
131	131	-3334	2.556	18970	6.068	0	7.226	0	7.310	0	7.180	-224780	5.892	
132	131	3354	2.558	-19150	6.060	0	7.232	0	7.310	0	7.180	224780	5.892	
132	132	-3354	2.558	19150	6.060	0	7.232	0	7.310	0	7.186	-316538	5.894	
133	132	3374	2.558	-19315	6.042	0	7.240	0	7.310	0	7.186	316538	5.894	
133	133	-3374	2.558	19315	6.042	0	7.240	0	7.310	0	7.192	-408132	5.898	
134	133	3394	2.558	-19481	6.024	0	7.246	0	7.310	0	7.192	408132	5.898	
134	134	-3394	2.558	19481	6.024	0	7.246	0	7.310	0	7.198	-499399	5.898	
135	134	3412	2.558	-19631	6.018	0	7.250	0	7.310	0	7.198	499399	5.898	
135	135	-3412	2.558	19631	6.018	0	7.250	0	7.310	0	7.204	-590290	5.902	
136	135	3430	2.558	-19750	6.016	0	7.252	0	7.310	0	7.204	590290	5.902	
136	136	-3430	2.558	19750	6.016	0	7.252	0	7.310	0	7.208	-680948	5.914	
1900	3200	-6496	5.886											
1900	3201	6496	5.886											
2900	4100	-5778	5.796											
2900	4101	5778	5.796											
1950	3200					0	7.318							
1950	3201					0	7.318							
2950	4100					0	7.348							
2950	4101					0	7.348							
6101	3007	8879	4.872	-3545	5.896							-45450	4.712	
6201	3007					0	7.318	0	7.298					
6301	136	-19837	6.016	-3447	2.558							680948	5.914	
6401	136					0	7.254	0	7.208					
6501	4008	11989	4.858									142576	5.928	
6601	4008					0	7.356	0	7.364					

1.3.2 Transverse Seismic Motion

(1) Response Acceleration



		Acceleration (gal)	Remarks
a	Girder at P2 support	266.5	
b	Top of P3 column	168.9	
c	Girder at P4 support	185.1	
d	Top of P2 column	590.4	
e	Top of P4 column	1427.9	

Transverse Direction MAXIMUM ABS.ACCELERATION

Node No	X (m/s^2)	Time (sec)	Y (m/s^2)	Time (sec)	Z (m/s^2)	Time (sec)	θx (rad/s^2)	Time (sec)	θy (rad/s^2)	Time (sec)	θz (rad/s^2)	Time (sec)	Remarks
1	0.000	7.054	0.000	2.698	-2.665	4.354	-0.310	2.350	0.051	4.848	0.000	3.140	Girder End
2	0.000	7.054	0.000	3.142	-2.616	4.356	-0.306	2.350	0.051	4.848	0.000	3.138	
3	0.000	7.054	0.000	3.140	-2.478	4.362	-0.293	2.350	0.051	4.848	0.000	3.138	
4	0.000	7.054	0.000	3.138	-2.354	4.368	-0.280	2.350	0.051	4.848	0.000	3.136	
5	0.000	7.054	0.000	3.136	-2.225	4.376	-0.266	2.350	0.050	4.848	0.000	2.996	
6	0.000	7.054	0.000	3.136	-2.217	4.376	-0.265	2.350	0.050	4.848	0.000	2.996	
7	0.000	7.054	0.000	3.134	-2.102	4.384	-0.251	2.350	0.050	4.848	0.000	2.996	
8	0.000	7.054	0.000	3.134	-2.094	4.384	-0.250	2.350	0.050	4.848	0.000	2.996	
9	0.000	7.054	0.000	2.996	-2.011	5.220	-0.235	2.348	0.049	4.846	0.000	5.734	
10	0.000	7.054	0.000	2.996	-2.009	5.220	-0.234	2.348	0.048	4.846	0.000	5.734	
11	0.000	7.054	0.000	2.996	-1.974	5.220	-0.219	2.348	0.047	4.846	0.000	2.972	
12	0.000	7.054	0.000	2.996	-1.972	5.220	-0.218	2.348	0.047	4.846	0.000	2.972	
13	0.000	7.052	0.000	2.996	-1.935	5.218	-0.205	4.692	0.045	4.846	0.000	5.712	
14	0.000	7.052	0.000	2.996	-1.932	5.218	-0.205	4.692	0.045	4.846	0.000	5.712	
15	0.000	7.052	0.000	2.996	-1.892	5.218	-0.195	4.690	0.043	4.844	0.000	5.700	
16	0.000	7.052	0.000	2.996	-1.890	5.218	-0.194	4.690	0.043	4.844	0.000	5.700	
17	0.000	7.052	0.000	2.978	1.852	3.718	-0.185	4.690	0.041	4.842	0.000	5.696	
18	0.000	7.052	0.000	2.978	1.851	3.718	-0.184	4.690	0.040	4.842	0.000	5.696	
19	0.000	7.052	0.000	2.978	1.834	3.718	0.178	2.596	0.038	4.830	0.000	5.696	
20	0.000	7.052	0.000	2.978	1.832	3.718	0.178	2.596	0.038	4.830	0.000	5.696	
21	0.000	7.052	0.000	2.974	1.807	3.716	0.177	2.596	0.036	4.824	0.000	3.134	
22	0.000	7.052	0.000	2.974	1.805	3.716	0.177	2.596	0.035	4.822	0.000	3.134	
23	0.000	7.052	0.000	2.974	1.772	3.714	0.177	2.596	0.034	4.804	0.000	3.128	
24	0.000	7.052	0.000	2.974	1.770	3.714	0.177	2.596	0.034	4.802	0.000	3.128	
25	0.000	7.052	0.000	2.974	1.727	3.714	0.176	2.594	0.033	4.790	0.000	3.126	
26	0.000	7.052	0.000	5.752	1.724	3.714	0.176	2.594	0.033	4.790	0.000	3.126	
27	0.000	7.046	0.000	5.724	-1.720	5.036	0.176	2.594	0.033	4.780	0.000	3.126	
28	0.000	7.046	0.000	5.724	-1.720	5.036	0.176	2.594	0.033	4.780	0.000	3.126	
29	0.000	7.046	0.000	5.730	-1.727	5.034	0.176	2.594	0.033	4.776	0.000	3.130	
30	0.000	7.046	0.000	5.726	-1.727	5.034	0.176	2.594	0.033	4.776	0.000	3.130	
31	0.000	7.046	0.000	5.726	-1.722	5.032	0.176	2.592	0.032	4.772	0.000	3.004	
32	0.000	7.046	0.000	5.726	-1.722	5.032	0.176	2.592	0.032	4.772	0.000	3.004	
33	0.000	7.048	0.000	5.732	-1.707	5.030	0.176	2.592	0.032	4.768	0.000	2.972	
34	0.000	7.048	0.000	5.734	-1.689	5.028	0.177	2.590	0.032	4.768	0.000	5.726	
35	0.000	7.048	0.000	5.734	-1.667	5.026	0.177	2.590	0.031	4.766	0.000	5.732	
36	0.000	7.048	0.000	5.740	-1.644	5.022	-0.178	2.498	0.030	4.764	0.000	5.734	
37	0.000	7.048	0.000	5.746	-1.624	5.018	-0.183	2.498	0.028	4.764	0.000	5.736	
38	0.000	7.046	0.000	5.746	-1.611	5.010	-0.188	2.496	0.026	4.934	0.000	5.734	
39	0.000	7.046	0.000	2.922	-1.611	5.002	-0.192	2.496	-0.025	2.508	0.000	5.702	
40	0.000	7.046	0.000	2.928	-1.627	4.992	-0.196	2.496	-0.023	2.508	0.000	5.700	
41	0.000	7.046	0.000	2.930	-1.643	4.986	-0.198	2.496	-0.022	2.506	0.000	5.684	
42	0.000	7.044	0.000	2.790	-1.671	4.978	-0.201	2.496	0.021	3.028	0.000	5.684	
43	0.000	7.044	0.000	2.790	-1.686	4.976	-0.202	2.496	0.020	3.026	0.000	5.674	
44	0.000	7.044	0.000	2.790	-1.689	4.974	-0.202	2.496	0.020	3.026	0.000	5.674	
45	0.000	7.044	0.000	2.786	-1.693	4.974	-0.202	2.496	0.020	3.026	0.000	5.674	
46	0.000	7.044	0.000	2.796	-1.707	4.972	-0.202	2.496	0.019	3.024	0.000	5.666	
47	0.000	7.046	0.000	2.798	-1.732	4.970	-0.203	2.494	0.018	3.022	0.000	5.654	
48	0.000	7.046	0.000	2.798	-1.746	4.970	-0.204	2.494	0.017	3.020	0.000	5.656	
49	0.000	7.046	0.000	9.886	-1.764	4.970	-0.206	2.494	0.017	2.688	0.000	5.656	
50	0.000	7.046	0.000	7.038	-1.775	4.974	-0.208	2.492	0.017	2.690	0.000	5.658	
51	0.000	7.046	0.000	7.038	-1.783	4.982	-0.210	2.490	0.017	2.692	0.000	3.128	
52	0.000	7.048	0.000	7.036	-1.790	4.988	-0.214	2.488	0.017	2.694	0.000	3.130	
53	0.000	7.048	0.000	3.142	-1.815	4.858	-0.218	2.488	-0.016	2.826	0.000	3.132	
54	0.000	7.048	0.000	3.140	-1.845	4.860	-0.224	2.484	-0.016	2.824	0.000	3.138	
55	0.000	7.046	0.000	3.138	-1.870	4.860	-0.232	2.482	-0.015	2.824	0.000	3.154	
56	0.000	7.046	0.000	3.154	-1.890	4.860	-0.244	2.478	-0.016	4.778	0.000	3.154	
57	0.000	7.046	0.000	3.154	-1.891	4.860	-0.245	2.478	-0.016	4.778	0.000	3.154	
58	0.000	7.046	0.000	3.154	-1.899	4.860	-0.263	2.474	-0.018	4.780	0.000	2.526	
59	0.000	7.046	0.000	3.154	-1.900	4.860	-0.264	2.472	-0.018	4.780	0.000	2.526	
60	0.000	7.046	0.000	3.154	-1.894	4.860	-0.289	2.466	-0.019	4.782	0.000	2.520	
61	0.000	7.046	0.000	3.154	-1.894	4.860	-0.291	2.466	-0.019	4.782	0.000	2.520	
62	0.000	7.042	0.000	3.154	-1.902	5.022	-0.320	2.460	-0.019	4.784	0.000	2.508	
63	0.000	7.042	0.000	3.154	-1.903	5.022	-0.322	2.458	-0.019	4.784	0.000	2.508	
64	0.000	7.040	0.000	3.152	-1.906	5.024	-0.357	2.452	-0.019	4.786	0.000	2.510	
65	0.000	7.040	0.000	3.152	-1.906	5.024	-0.359	2.452	-0.019	4.786	0.000	2.510	
66	0.000	7.040	0.000	3.154	-1.902	5.026	-0.396	2.446	-0.019	4.790	0.000	2.506	
67	0.000	7.040	0.000	3.154	-1.901	5.026	-0.399	2.446	-0.019	4.790	0.000	2.506	
68	0.000	7.042	0.000	3.154	-1.888	5.028	-0.438	2.444	-0.019	4.796	0.000	2.532	
69	0.000	7.042	0.000	3.154	-1.887	5.028	-0.440	2.444	-0.019	4.796	0.000	2.532	
70	0.000	7.042	0.000	3.156	-1.865	5.030	-0.479	2.442	0.020	3.284	0.000	2.540	
71	0.000	7.042	0.000	3.156	-1.863	5.030	-0.482	2.442	0.020	3.282	0.000	2.540	
72	0.000	7.040	0.000	2.564	-1.832	5.032	-0.522	2.440	0.022	3.270	0.000	4.628	
73	0.000	7.040	0.000	2.564	-1.830	5.032	-0.524	2.440	0.022	3.270	0.000	4.628	
74	0.000	7.042	0.000	2.564	-1.791	5.034	-0.564	2.438	-0.024	2.706	0.000	4.604	
75	0.000	7.042	0.000	2.564	-1.788	5.034	-0.567	2.438	-0.025	2.706	0.000	4.604	
76	0.000	7.042	0.000	2.564	-1.742	5.038	-0.607	2.438	-0.027	2.706	0.000	3.166	
77	0.000	7.042	0.000	2.564	-1.739	5.038	-0.610	2.438	-0.028	2.706	0.000	3.166	
78	0.000	7.042	0.000	2.564	-1.688	5.042	-0.650	2.436	-0.030	2.706	0.000	3.168	
79	0.000	7.042	0.000	2.564	-1.685	5.042	-0.652	2.436	-0.030	2.706	0.000	3.168	

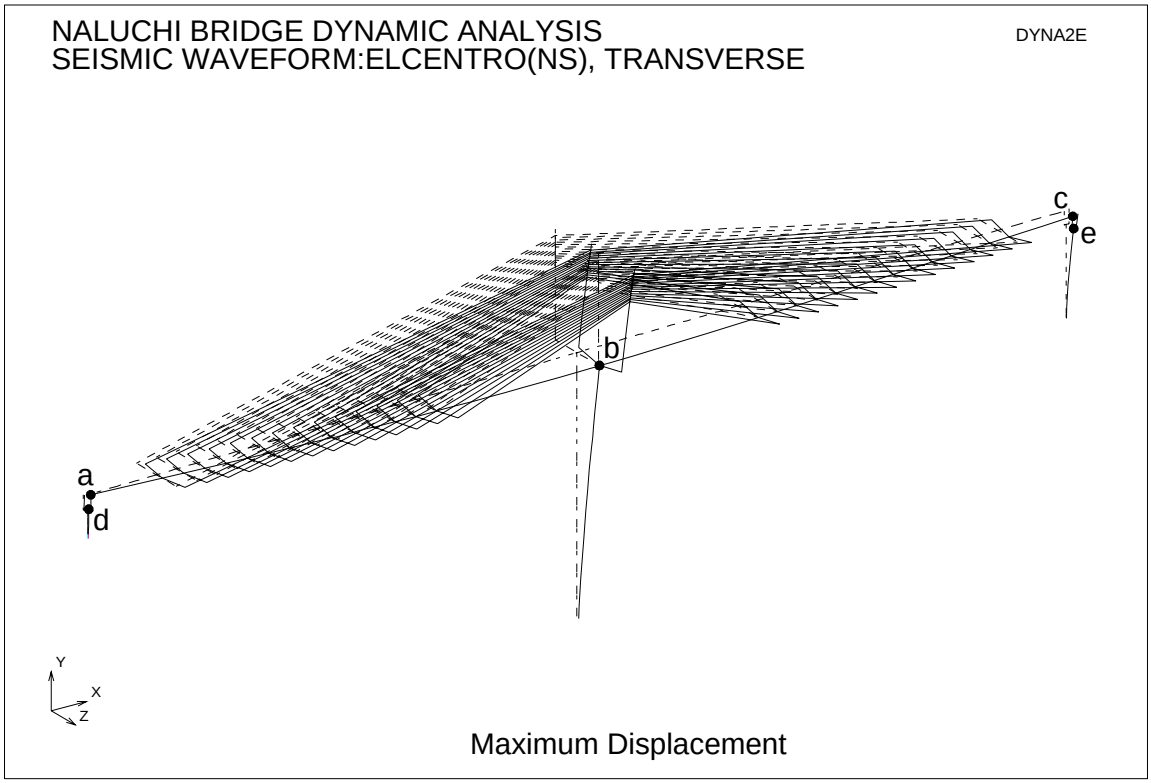
Transverse Direction MAXIMUM ABS.ACCELERATION

Node No	X (m/s^2)	Time (sec)	Y (m/s^2)	Time (sec)	Z (m/s^2)	Time (sec)	θx (rad/s^2)	Time (sec)	θy (rad/s^2)	Time (sec)	θz (rad/s^2)	Time (sec)	Remarks
86	0.000	7.052	0.000	2.570	-1.807	5.140	-0.858	2.434	-0.036	2.706	0.000	2.570	
87	0.000	7.052	0.000	7.130	-1.851	5.138	-0.871	2.434	-0.036	2.706	0.000	2.570	Girder End
1006	-0.372	4.848	-1.955	2.350	-2.217	4.376	-0.265	2.350	0.050	4.848	0.000	4.656	
1008	-0.366	4.848	-1.844	2.350	-2.094	4.384	-0.250	2.350	0.050	4.848	0.000	4.656	
1010	-0.357	4.846	-1.727	2.348	-2.009	5.220	-0.234	2.348	0.048	4.846	0.000	2.350	
1012	-0.346	4.846	-1.609	2.348	-1.972	5.220	-0.218	2.348	0.047	4.846	0.000	2.350	
1014	-0.333	4.846	-1.509	4.692	-1.932	5.218	-0.205	4.692	0.045	4.846	0.000	2.350	
1016	-0.317	4.844	-1.434	4.690	-1.890	5.218	-0.194	4.690	0.043	4.844	0.000	2.352	
1018	-0.299	4.842	-1.359	4.690	1.851	3.718	-0.184	4.690	0.040	4.842	0.000	2.352	
1020	-0.280	4.830	1.312	2.596	1.832	3.718	0.178	2.596	0.038	4.830	0.000	2.352	
1022	-0.262	4.822	1.309	2.596	1.805	3.716	0.177	2.596	0.035	4.822	0.000	2.444	
1024	-0.250	4.802	1.305	2.596	1.770	3.714	0.177	2.596	0.034	4.802	0.000	2.444	
1026	-0.244	4.790	1.301	2.594	1.724	3.714	0.176	2.594	0.033	4.790	0.000	2.444	
1028	-0.242	4.780	1.300	2.594	-1.720	5.036	0.176	2.594	0.033	4.780	0.000	2.444	
1030	-0.240	4.776	1.298	2.594	-1.727	5.034	0.176	2.594	0.033	4.776	0.000	2.444	
1032	-0.239	4.772	1.299	2.592	-1.722	5.032	0.176	2.592	0.032	4.772	0.000	2.444	
1082	0.250	2.706	-5.421	2.436	-1.625	5.206	-0.735	2.436	-0.034	2.706	0.000	2.412	
1080	0.237	2.706	-5.108	2.436	-1.632	5.046	-0.693	2.436	-0.032	2.706	0.000	2.410	
1078	0.221	2.706	-4.792	2.436	-1.688	5.042	-0.650	2.436	-0.030	2.706	0.000	2.412	
1076	0.202	2.706	-4.478	2.438	-1.742	5.038	-0.607	2.438	-0.027	2.706	0.000	2.408	
1074	0.181	2.706	-4.162	2.438	-1.791	5.034	-0.564	2.438	-0.024	2.706	0.000	2.414	
1072	-0.160	3.270	-3.848	2.440	-1.832	5.032	-0.522	2.440	0.022	3.270	0.000	2.408	
1070	-0.147	3.284	-3.536	2.442	-1.865	5.030	-0.479	2.442	0.020	3.284	0.000	2.408	
1068	0.143	4.796	-3.227	2.444	-1.888	5.028	-0.438	2.444	-0.019	4.796	0.000	2.410	
1066	0.143	4.790	-2.924	2.446	-1.902	5.026	-0.396	2.446	-0.019	4.790	0.000	2.410	
1064	0.143	4.786	-2.632	2.452	-1.906	5.024	-0.357	2.452	-0.019	4.786	0.000	2.408	
1062	0.141	4.784	-2.363	2.460	-1.902	5.022	-0.320	2.460	-0.019	4.784	0.000	2.406	
1060	0.137	4.782	-2.130	2.466	-1.894	4.860	-0.289	2.466	-0.019	4.782	0.000	2.406	
1058	0.130	4.780	-1.938	2.474	-1.899	4.860	-0.263	2.474	-0.018	4.780	0.000	2.406	
1056	0.121	4.778	-1.800	2.478	-1.890	4.860	-0.244	2.478	-0.016	4.778	0.000	2.404	
2006	0.372	4.848	1.955	2.350	-2.217	4.376	-0.265	2.350	0.050	4.848	0.000	2.444	
2008	0.366	4.848	1.844	2.350	-2.094	4.384	-0.250	2.350	0.050	4.848	0.000	2.444	
2010	0.357	4.846	1.727	2.348	-2.009	5.220	-0.234	2.348	0.048	4.846	0.000	2.504	
2012	0.346	4.846	1.609	2.348	-1.972	5.220	-0.218	2.348	0.047	4.846	0.000	2.504	
2014	0.333	4.846	1.509	4.692	-1.932	5.218	-0.205	4.692	0.045	4.846	0.000	2.504	
2016	0.317	4.844	1.434	4.690	-1.890	5.218	-0.194	4.690	0.043	4.844	0.000	2.504	
2018	0.299	4.842	1.359	4.690	1.851	3.718	-0.184	4.690	0.040	4.842	0.000	2.502	
2020	0.280	4.830	-1.312	2.596	1.832	3.718	0.178	2.596	0.038	4.830	0.000	2.502	
2022	0.262	4.822	-1.309	2.596	1.805	3.716	0.177	2.596	0.035	4.822	0.000	2.504	
2024	0.250	4.802	-1.305	2.596	1.770	3.714	0.177	2.596	0.034	4.802	0.000	2.506	
2026	0.244	4.790	-1.301	2.594	1.724	3.714	0.176	2.594	0.033	4.790	0.000	2.506	
2028	0.242	4.780	-1.300	2.594	-1.720	5.036	0.176	2.594	0.033	4.780	0.000	2.504	
2030	0.240	4.776	-1.298	2.594	-1.727	5.034	0.176	2.594	0.033	4.776	0.000	2.504	
2032	0.239	4.772	-1.299	2.592	-1.722	5.032	0.176	2.592	0.032	4.772	0.000	2.506	
2082	-0.250	2.706	5.421	2.436	-1.625	5.206	-0.735	2.436	-0.034	2.706	0.000	2.408	
2080	-0.237	2.706	5.108	2.436	-1.632	5.046	-0.693	2.436	-0.032	2.706	0.000	2.408	
2078	-0.221	2.706	4.792	2.436	-1.688	5.042	-0.650	2.436	-0.030	2.706	0.000	2.406	
2076	-0.202	2.706	4.478	2.438	-1.742	5.038	-0.607	2.438	-0.027	2.706	0.000	2.412	
2074	-0.181	2.706	4.162	2.438	-1.791	5.034	-0.564	2.438	-0.024	2.706	0.000	2.412	
2072	0.160	3.270	3.848	2.440	-1.832	5.032	-0.522	2.440	0.022	3.270	0.000	2.410	
2070	0.147	3.284	3.536	2.442	-1.865	5.030	-0.479	2.442	0.020	3.284	0.000	2.410	
2068	-0.143	4.796	3.227	2.444	-1.888	5.028	-0.438	2.444	-0.019	4.796	0.000	2.408	
2066	-0.143	4.790	2.924	2.446	-1.902	5.026	-0.396	2.446	-0.019	4.790	0.000	2.408	
2064	-0.143	4.786	2.632	2.452	-1.906	5.024	-0.357	2.452	-0.019	4.786	0.000	2.408	
2062	-0.141	4.784	2.363	2.460	-1.902	5.022	-0.320	2.460	-0.019	4.784	0.000	2.410	
2060	-0.137	4.782	2.130	2.466	-1.894	4.860	-0.289	2.466	-0.019	4.782	0.000	2.408	
2058	-0.130	4.780	1.938	2.474	-1.899	4.860	-0.263	2.474	-0.018	4.780	0.000	2.404	
2056	-0.121	4.778	1.800	2.478	-1.890	4.860	-0.244	2.478	-0.016	4.778	0.000	2.402	
1101	1.087	2.450	-1.631	2.496	-8.578	2.354	-0.567	2.370	0.020	3.026	-0.062	2.448	
1102	0.995	2.450	-1.631	2.496	-7.799	2.350	-0.567	2.370	0.020	3.026	-0.062	2.448	
1103	0.964	2.450	-1.631	2.496	-7.545	2.350	-0.567	2.370	0.020	3.026	-0.062	2.448	
1104	0.933	2.450	-1.631	2.496	-7.295	2.348	-0.566	2.370	0.020	3.026	-0.062	2.448	
1105	0.903	2.450	-1.631	2.496	-7.048	2.346	-0.565	2.370	0.020	3.026	-0.062	2.448	
1106	0.872	2.450	-1.631	2.496	-6.805	2.344	-0.564	2.370	0.020	3.026	-0.061	2.448	
1107	0.841	2.450	-1.630	2.496	-6.564	2.342	-0.562	2.370	0.020	3.026	-0.061	2.448	
1108	0.811	2.450	-1.630	2.496	-6.327	2.340	-0.560	2.370	0.020	3.026	-0.061	2.448	
1109	0.780	2.450	-1.630	2.496	-6.092	2.340	-0.557	2.370	0.020	3.026	-0.061	2.448	
1110	0.750	2.450	-1.629	2.496	-5.860	2.338	-0.554	2.370	0.020	3.026	-0.060	2.448	
1111	0.720	2.450	-1.629	2.496	-5.630	2.336	-0.550	2.370	0.020	3.026	-0.060	2.448	
1112	0.690	2.450	-1.629	2.496	-5.403	2.336	-0.545	2.370	0.020	3.026	-0.060	2.448	
1113	0.661	2.450	-1.628	2.496	-5.177	2.334	-0.540	2.370	0.020	3.026	-0.059	2.448	
1114	0.632	2.452	-1.628	2.496	-4.954	2.334	-0.534	2.368	0.020	3.026	-0.059	2.448	
1115	0.603	2.452	-1.627	2.496	-4.733	2.332	-0.528	2.368	0.020	3.026	-0.058	2.448	
1116	0.438	2.454	-1.623	2.496	-3.462	2.328	-0.469	2.362	0.020	3.026	-0.053	2.448	
1117	0.299	2.456	-1.618	2.496	-2.743	5.182	-0.388	2.350	0.020	3.026	-0.042	2.448	
1118	-0.167	3.020	-1.608	2.496	-2.226	5.020	-0.242	2.332	0.020	3.026	-0.022	2.448	
1119	-0.157	3.026	-1.596	2.496	-1.785	4.998	-0.202	2.496	0.020	3.026	0.000	2.448	
1044	-0.157	3.026	-1.596	2.496	-1.689	4.974	-0.202	2.496	0.020	3.026	0.000	2.448	
2101	-1.087	2.450	1.631	2.496	-8.578	2.354	-0.567	2.370	0.020	3.026	0.062	2.448	

Transverse Direction MAXIMUM ABS.ACCELERATION

Node No	X (m/s^2)	Time (sec)	Y (m/s^2)	Time (sec)	Z (m/s^2)	Time (sec)	θx (rad/s^2)	Time (sec)	θy (rad/s^2)	Time (sec)	θz (rad/s^2)	Time (sec)	Remarks
2107	-0.841	2.450	1.630	2.496	-6.564	2.342	-0.562	2.370	0.020	3.026	0.061	2.448	
2108	-0.811	2.450	1.630	2.496	-6.327	2.340	-0.560	2.370	0.020	3.026	0.061	2.448	
2109	-0.780	2.450	1.630	2.496	-6.092	2.340	-0.557	2.370	0.020	3.026	0.061	2.448	
2110	-0.750	2.450	1.629	2.496	-5.860	2.338	-0.554	2.370	0.020	3.026	0.060	2.448	
2111	-0.720	2.450	1.629	2.496	-5.630	2.336	-0.550	2.370	0.020	3.026	0.060	2.448	
2112	-0.690	2.450	1.629	2.496	-5.403	2.336	-0.545	2.370	0.020	3.026	0.060	2.448	
2113	-0.661	2.450	1.628	2.496	-5.177	2.334	-0.540	2.370	0.020	3.026	0.059	2.448	
2114	-0.632	2.452	1.628	2.496	-4.954	2.334	-0.534	2.368	0.020	3.026	0.059	2.448	
2115	-0.603	2.452	1.627	2.496	-4.733	2.332	-0.528	2.368	0.020	3.026	0.058	2.448	
2116	-0.438	2.454	1.623	2.496	-3.462	2.328	-0.469	2.362	0.020	3.026	0.053	2.448	
2117	-0.299	2.456	1.618	2.496	-2.743	5.182	-0.388	2.350	0.020	3.026	0.042	2.448	
2118	0.167	3.020	1.608	2.496	-2.226	5.020	-0.242	2.332	0.020	3.026	0.022	2.448	
2119	0.157	3.026	1.596	2.496	-1.785	4.998	-0.202	2.496	0.020	3.026	0.000	2.448	
2044	0.157	3.026	1.596	2.496	-1.689	4.974	-0.202	2.496	0.020	3.026	0.000	2.448	
120	0.000	7.078	0.000	2.790	-2.067	4.922	-0.202	2.496	0.020	3.026	0.000	5.682	P3 Column Top
121	0.000	7.078	0.000	2.786	-2.171	4.920	-0.201	2.496	0.020	3.026	0.000	5.684	
122	0.000	7.100	0.000	2.786	-2.425	4.920	-0.197	2.494	0.019	3.026	0.000	5.684	
123	0.000	7.100	0.000	2.786	-2.464	4.920	-0.196	2.494	0.019	3.026	0.000	5.684	
124	0.000	7.108	0.000	2.786	-2.570	4.920	-0.193	2.494	0.019	3.026	0.000	7.232	
125	0.000	7.108	0.000	2.786	-2.788	4.918	-0.185	2.494	0.018	3.026	0.000	7.232	
126	0.000	7.110	0.000	2.786	-3.001	4.918	-0.172	2.492	0.017	3.026	0.000	7.232	
127	0.000	7.118	0.000	2.786	-3.169	4.918	-0.157	2.490	0.016	3.026	0.000	7.242	
128	0.000	7.128	0.000	2.786	-3.315	4.918	-0.140	2.486	0.015	3.026	0.000	7.244	
129	0.000	7.130	0.000	2.788	3.540	2.492	-0.106	2.478	0.013	3.026	0.000	7.008	
130	0.000	7.136	0.000	2.788	3.914	2.490	-0.077	2.468	0.011	3.026	0.000	7.110	
131	0.000	8.406	0.000	2.788	4.073	2.488	0.092	2.330	0.009	3.026	0.000	7.114	
132	0.000	8.408	0.000	2.788	-4.153	2.008	0.105	2.326	0.007	3.026	0.000	7.122	
133	0.000	8.408	0.000	2.788	-4.147	2.008	-0.135	2.588	0.005	3.026	0.000	7.136	
134	0.000	8.408	0.000	2.790	-4.043	2.008	-0.156	2.590	0.004	3.026	0.000	8.408	
135	0.000	8.400	0.000	2.790	-3.863	2.006	-0.164	2.590	0.002	3.026	0.000	8.408	
136	0.000	8.400	0.000	2.790	-3.637	2.006	-0.159	2.592			0.000	8.400	
88	0.000	5.892	0.000	4.850	-6.936	2.346	-0.310	2.350	0.000	4.838	0.000	5.892	
3100	0.000	5.892	0.000	4.850	-5.904	2.346	-0.310	2.350	0.000	4.838	0.000	5.892	
3200	0.000	6.986	0.000	2.698	2.739	4.836	-0.310	2.350	0.051	4.848	0.000	3.140	
3201	0.000	5.892	0.000	2.698	-5.904	2.346	-0.310	2.350	0.000	4.838	0.000	5.892	
3000	0.000	5.892	0.000	2.696	-5.904	2.346	-0.310	2.350	0.000	4.838	0.000	5.892	P2 Column Top
3001	0.000	5.894	0.000	2.696	-5.634	2.346	-0.311	2.350	0.000	4.838	0.000	5.892	
3002	0.000	5.894	0.000	2.696	-5.336	2.344	-0.311	2.350	0.000	4.838	0.000	5.892	
3003	0.000	5.894	0.000	2.698	-5.048	2.344	-0.311	2.350	0.000	4.838	0.000	5.894	
3004	0.000	5.894	0.000	2.698	-4.759	2.344	-0.310	2.350	0.000	4.838	0.000	5.894	
3005	0.000	5.894	0.000	2.698	-4.473	2.342	-0.310	2.350	0.000	4.838	0.000	5.894	
3006	0.000	5.894	0.000	2.698	-4.227	2.342	-0.309	2.350	0.000	4.838	0.000	5.894	
3007	0.000	5.892	0.000	2.698	-3.981	2.342	-0.309	2.350			0.000	5.894	
89	0.000	7.138	0.000	7.034	-17.212	2.432	-0.871	2.434	0.003	2.432	0.000	7.136	
4200	0.000	7.140	0.000	7.034	-14.281	2.432	-0.871	2.434	0.003	2.432	0.000	7.136	
4100	0.000	7.026	0.000	7.130	-2.586	4.502	-0.871	2.434	-0.036	2.706	0.000	2.570	
4101	0.000	7.140	0.000	7.130	-14.277	2.432	-0.871	2.434	0.003	2.432	0.000	7.136	
4000	0.000	7.140	0.000	2.534	-14.279	2.432	-0.871	2.434	0.003	2.432	0.000	7.136	P4 Column Top
4001	0.000	7.144	0.000	2.534	-11.236	2.430	-0.871	2.434	0.003	2.432	0.000	7.136	
4002	0.000	7.148	0.000	2.534	-8.522	2.430	-0.881	2.434	0.002	2.432	0.000	7.140	
4003	0.000	7.154	0.000	2.534	6.455	2.260	-0.850	2.434	0.002	2.432	0.000	7.146	
4004	0.000	7.156	0.000	2.534	5.620	2.610	-0.769	2.436	0.001	2.432	0.000	7.152	
4005	0.000	7.112	0.000	2.534	4.847	2.612	-0.635	2.438	0.001	2.432	0.000	7.156	
4006	0.000	7.210	0.000	2.534	4.181	2.614	-0.446	2.440	0.000	2.432	0.000	7.156	
4007	0.000	7.216	0.000	2.534	-4.173	1.960	-0.445	2.440	0.000	2.432	0.000	7.156	
4008	0.000	7.222			-4.232	1.960	-0.445	2.440			0.000	7.156	

(2) Response Displacement



		Displacement (m)	Remarks
a	Girder at P2 support	0.229	
b	Top of P3 column	0.416	
c	Girder at P4 support	0.380	
d	Top of P2 column	0.006	
e	Top of P4 column	0.055	

	Node	Displacement (m)	Relative Displacement (m)
P2	3200	0.226	
	3201	0.008	0.218
P4	4100	0.367	
	4101	0.067	0.300

Transverse Direction MAXIMUM ABS.DISPLACEMENT

Node No	X (m)	Time (sec)	Y (m)	Time (sec)	Z (m)	Time (sec)	θx (rad)	Time (sec)	θy (rad)	Time (sec)	θz (rad)	Time (sec)	Remarks
1	0.000	8.562	0.000	11.702	0.229	5.182	0.001	5.202	-0.003	4.868	0.000	8.564	Girder End
2	0.000	8.562	0.000	8.566	0.233	5.180	0.001	5.200	-0.003	4.868	0.000	8.564	
3	0.000	8.562	0.000	8.564	0.242	5.174	0.001	5.198	-0.003	4.868	0.000	8.564	
4	0.000	8.562	0.000	8.564	0.251	5.170	0.002	5.196	-0.003	4.868	0.000	8.564	
5	0.000	8.562	0.000	8.564	0.261	5.164	0.002	5.062	-0.003	4.868	0.000	8.562	
6	0.000	8.562	0.000	8.564	0.261	5.164	0.002	5.062	-0.003	4.868	0.000	8.562	
7	0.000	8.562	0.000	8.564	0.270	5.158	0.002	5.062	-0.003	4.866	0.000	8.564	
8	0.000	8.562	0.000	8.564	0.271	5.158	0.002	5.062	-0.003	4.866	0.000	8.564	
9	0.000	8.562	0.000	8.564	0.280	5.152	0.003	5.060	-0.003	4.866	0.000	8.564	
10	0.000	8.562	0.000	8.564	0.280	5.152	0.003	5.060	-0.003	4.866	0.000	8.564	
11	0.000	8.562	0.000	8.564	0.289	5.146	0.003	5.060	-0.003	4.866	0.000	8.566	
12	0.000	8.562	0.000	8.564	0.290	5.146	0.003	5.060	-0.003	4.866	0.000	8.566	
13	0.000	8.562	0.000	8.564	0.299	5.140	0.003	5.060	-0.003	4.866	0.000	8.568	
14	0.000	8.562	0.000	8.564	0.299	5.140	0.003	5.060	-0.003	4.866	0.000	8.570	
15	0.000	8.562	0.000	8.564	0.308	5.134	0.004	5.058	-0.003	4.866	0.000	8.574	
16	0.000	8.562	0.000	8.564	0.309	5.134	0.004	5.058	-0.003	4.866	0.000	8.574	
17	0.000	8.562	0.000	8.566	0.317	5.128	0.004	5.058	-0.002	4.866	0.000	8.582	
18	0.000	8.562	0.000	8.566	0.318	5.128	0.004	5.058	-0.002	4.866	0.000	8.582	
19	0.000	8.562	0.000	8.566	0.326	5.122	0.004	5.056	-0.002	4.866	0.000	8.596	
20	0.000	8.562	0.000	8.566	0.327	5.122	0.004	5.056	-0.002	4.866	0.000	8.596	
21	0.000	8.562	0.000	8.568	0.335	5.116	0.005	5.054	-0.002	4.868	0.000	5.856	
22	0.000	8.562	0.000	8.568	0.335	5.116	0.005	5.054	-0.002	4.868	0.000	5.860	
23	0.000	8.562	0.000	8.568	0.343	5.110	0.005	5.054	-0.002	4.868	0.000	4.726	
24	0.000	8.562	0.000	8.568	0.344	5.110	0.005	5.054	-0.002	4.868	0.000	5.104	
25	0.000	8.562	0.000	8.570	0.352	5.106	0.006	5.052	-0.002	4.868	0.000	8.436	
26	0.000	8.562	0.000	8.570	0.352	5.106	0.006	5.052	-0.002	4.868	0.000	8.442	
27	0.000	8.562	0.000	8.572	0.360	5.100	0.006	5.052	-0.002	4.870	0.000	8.520	
28	0.000	8.562	0.000	8.572	0.360	5.100	0.006	5.052	-0.002	4.870	0.000	8.522	
29	0.000	8.562	0.000	8.574	0.367	5.096	0.006	5.050	-0.002	4.872	0.000	8.546	
30	0.000	8.562	0.000	8.574	0.367	5.096	0.006	5.050	-0.002	4.872	0.000	8.548	
31	0.000	8.562	0.000	8.574	0.374	5.092	0.007	5.048	-0.002	4.874	0.000	8.560	
32	0.000	8.562	0.000	8.574	0.375	5.092	0.007	5.048	-0.002	4.874	0.000	8.562	
33	0.000	8.562	0.000	8.576	0.381	5.088	0.007	5.048	-0.002	4.878	0.000	8.568	
34	0.000	8.562	0.000	8.576	0.386	5.084	0.007	5.048	-0.001	4.880	0.000	8.572	
35	0.000	8.562	0.000	8.576	0.391	5.082	0.007	5.046	-0.001	4.884	0.000	8.574	
36	0.000	8.562	0.000	8.576	0.395	5.078	0.007	5.046	-0.001	4.888	0.000	8.576	
37	0.000	8.562	0.000	8.576	0.399	5.076	0.007	5.046	-0.001	4.890	0.000	8.578	
38	0.000	8.562	0.000	8.576	0.403	5.074	0.008	5.046	-0.001	4.892	0.000	8.578	
39	0.000	8.562	0.000	8.576	0.407	5.072	0.008	5.046	-0.001	4.894	0.000	8.580	
40	0.000	8.562	0.000	8.572	0.410	5.070	0.008	5.044	-0.001	4.894	0.000	8.580	
41	0.000	8.562	0.000	8.570	0.412	5.068	0.008	5.044	-0.001	4.894	0.000	8.580	
42	0.000	8.562	0.000	8.556	0.414	5.066	0.008	5.044	-0.001	4.894	0.000	8.580	
43	0.000	8.562	0.000	8.518	0.415	5.066	0.008	5.044	-0.001	4.894	0.000	8.580	
44	0.000	8.562	0.000	3.352	0.416	5.066	0.008	5.044	-0.001	4.894	0.000	8.580	
45	0.000	8.562	0.000	8.626	0.416	5.066	0.008	5.044	-0.001	4.894	0.000	8.580	
46	0.000	8.562	0.000	8.602	0.417	5.064	0.008	5.044	-0.001	4.894	0.000	8.582	
47	0.000	8.562	0.000	8.592	0.419	5.064	0.008	5.044	-0.001	4.894	0.000	8.586	
48	0.000	8.562	0.000	8.590	0.420	5.062	0.008	5.044	-0.001	4.892	0.000	8.588	
49	0.000	8.562	0.000	8.590	0.422	5.060	0.008	5.044	0.000	4.892	0.000	8.592	
50	0.000	8.562	0.000	8.590	0.424	5.058	0.008	5.044	0.000	4.894	0.000	8.596	
51	0.000	8.562	0.000	8.592	0.426	5.058	0.008	5.044	0.000	4.894	0.000	8.600	
52	0.000	8.562	0.000	8.594	0.427	5.058	0.008	5.044	0.000	5.024	0.000	8.604	
53	0.000	8.562	0.000	8.594	0.428	5.056	0.007	5.044	0.000	3.872	0.000	8.608	
54	0.000	8.562	0.000	8.596	0.429	5.056	0.007	5.042	0.000	4.780	0.000	8.612	
55	0.000	8.562	0.000	8.598	0.429	5.058	0.007	5.042	0.000	4.790	0.000	8.618	
56	0.000	8.562	0.000	8.600	0.429	5.058	0.007	5.042	0.000	4.802	0.000	5.852	
57	0.000	8.562	0.000	8.600	0.429	5.058	0.007	5.042	0.000	4.802	0.000	5.854	
58	0.000	8.562	0.000	8.602	0.429	5.060	0.007	5.040	0.000	4.812	0.000	5.888	
59	0.000	8.562	0.000	8.602	0.429	5.060	0.007	5.040	0.000	4.814	0.000	5.890	
60	0.000	8.562	0.000	8.604	0.428	5.062	0.007	5.038	0.001	4.826	0.000	5.930	
61	0.000	8.562	0.000	8.604	0.428	5.062	0.007	5.038	0.001	4.826	0.000	5.934	
62	0.000	8.562	0.000	8.606	0.426	5.064	0.006	5.034	0.001	4.838	0.000	4.782	
63	0.000	8.562	0.000	8.606	0.426	5.066	0.006	5.034	0.001	4.840	0.000	4.786	
64	0.000	8.562	0.000	8.608	0.425	5.068	0.006	5.142	0.001	4.850	0.000	5.130	
65	0.000	8.562	0.000	8.608	0.424	5.068	0.006	5.142	0.001	4.850	0.000	5.168	
66	0.000	8.562	0.000	8.610	0.422	5.072	0.006	5.144	0.001	4.856	0.000	8.452	
67	0.000	8.562	0.000	8.610	0.422	5.072	0.006	5.144	0.001	4.856	0.000	8.456	
68	0.000	8.562	0.000	8.612	0.420	5.076	0.006	5.146	0.001	4.860	0.000	8.544	
69	0.000	8.562	0.000	8.612	0.419	5.076	0.006	5.146	0.001	4.860	0.000	8.550	
70	0.000	8.562	0.000	8.614	0.417	5.078	0.006	5.146	0.001	4.864	0.000	8.584	
71	0.000	8.562	0.000	8.614	0.416	5.080	0.006	5.146	0.001	4.864	0.000	8.586	
72	0.000	8.562	0.000	8.614	0.413	5.082	0.006	5.148	0.001	4.864	0.000	8.600	
73	0.000	8.562	0.000	8.614	0.413	5.084	0.005	5.148	0.001	4.866	0.000	8.600	
74	0.000	8.562	0.000	8.614	0.410	5.088	0.005	5.148	0.001	4.866	0.000	8.608	
75	0.000	8.562	0.000	8.614	0.410	5.088	0.005	5.148	0.001	4.866	0.000	8.608	
76	0.000	8.562	0.000	8.616	0.406	5.092	0.005	5.148	0.001	4.868	0.000	8.612	
77	0.000	8.562	0.000	8.616	0.406	5.092	0.005	5.148	0.001	4.868	0.000	8.612	
78	0.000	8.562	0.000	8.616	0.402	5.096	0.005	5.150	0.001	4.868	0.000	8.614	
79	0.000	8.562	0.000	8.616	0.402	5.096	0.005	5.150	0.001	4.868	0.000	8.614	

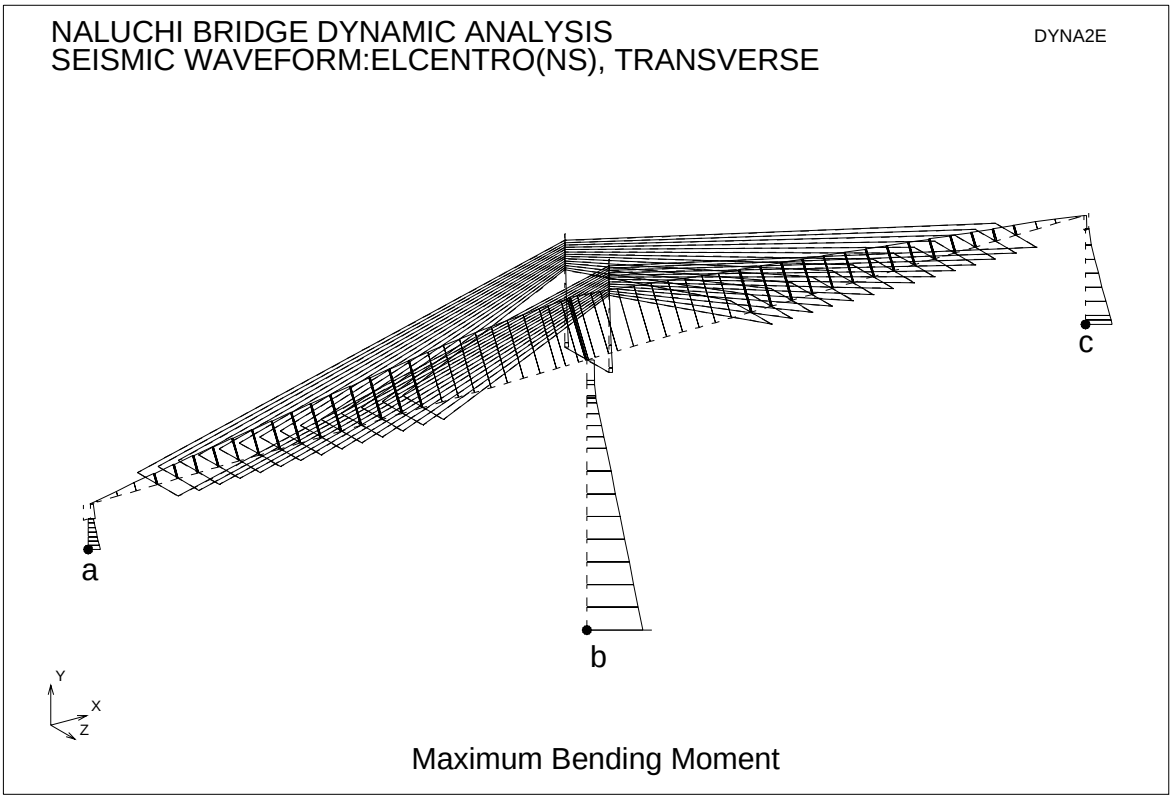
Transverse Direction MAXIMUM ABS.DISPLACEMENT

Node No	X (m)	Time (sec)	Y (m)	Time (sec)	Z (m)	Time (sec)	θx (rad)	Time (sec)	θy (rad)	Time (sec)	θz (rad)	Time (sec)	Remarks
86	0.000	8.562	0.000	5.862	0.381	5.114	0.004	4.956	0.001	4.870	0.000	5.836	
87	0.000	8.562	0.000	8.556	0.380	5.116	0.004	4.956	0.001	4.870	0.000	5.838	Girder End
1006	0.020	4.868	0.015	5.062	0.261	5.164	0.002	5.062	-0.003	4.868	0.000	5.804	
1008	0.020	4.866	0.017	5.062	0.271	5.158	0.002	5.062	-0.003	4.866	0.000	5.812	
1010	0.020	4.866	0.020	5.060	0.280	5.152	0.003	5.060	-0.003	4.866	0.000	5.824	
1012	0.019	4.866	0.023	5.060	0.290	5.146	0.003	5.060	-0.003	4.866	0.000	5.946	
1014	0.019	4.866	0.025	5.060	0.299	5.140	0.003	5.060	-0.003	4.866	0.000	5.968	
1016	0.019	4.866	0.028	5.058	0.309	5.134	0.004	5.058	-0.003	4.866	0.000	5.992	
1018	0.018	4.866	0.030	5.058	0.318	5.128	0.004	5.058	-0.002	4.866	0.000	4.854	
1020	0.017	4.866	0.033	5.056	0.327	5.122	0.004	5.056	-0.002	4.866	0.000	4.868	
1022	0.017	4.868	0.036	5.054	0.335	5.116	0.005	5.054	-0.002	4.868	0.000	5.018	
1024	0.016	4.868	0.038	5.054	0.344	5.110	0.005	5.054	-0.002	4.868	0.000	5.028	
1026	0.015	4.868	0.041	5.052	0.352	5.106	0.006	5.052	-0.002	4.868	0.000	5.040	
1028	0.014	4.870	0.044	5.052	0.360	5.100	0.006	5.052	-0.002	4.870	0.000	5.052	
1030	0.013	4.872	0.046	5.050	0.367	5.096	0.006	5.050	-0.002	4.872	0.000	8.474	
1032	0.012	4.874	0.048	5.048	0.375	5.092	0.007	5.048	-0.002	4.874	0.000	8.488	
1082	-0.010	4.870	0.034	4.966	0.394	5.104	0.005	4.966	0.001	4.870	0.000	8.554	
1080	-0.010	4.868	0.035	4.970	0.398	5.100	0.005	4.970	0.001	4.868	0.000	8.540	
1078	-0.010	4.868	0.037	5.150	0.402	5.096	0.005	5.150	0.001	4.868	0.000	8.524	
1076	-0.009	4.868	0.038	5.148	0.406	5.092	0.005	5.148	0.001	4.868	0.000	8.510	
1074	-0.009	4.866	0.039	5.148	0.410	5.088	0.005	5.148	0.001	4.866	0.000	8.498	
1072	-0.008	4.864	0.041	5.148	0.413	5.082	0.006	5.148	0.001	4.864	0.000	8.488	
1070	-0.008	4.864	0.042	5.146	0.417	5.078	0.006	5.146	0.001	4.864	0.000	8.478	
1068	-0.007	4.860	0.043	5.146	0.420	5.076	0.006	5.146	0.001	4.860	0.000	8.470	
1066	-0.006	4.856	0.045	5.144	0.422	5.072	0.006	5.144	0.001	4.856	0.000	5.048	
1064	-0.006	4.850	0.046	5.142	0.425	5.068	0.006	5.142	0.001	4.850	0.000	5.030	
1062	-0.005	4.838	0.048	5.034	0.426	5.064	0.006	5.034	0.001	4.838	0.000	5.002	
1060	-0.004	4.826	0.049	5.038	0.428	5.062	0.007	5.038	0.001	4.826	0.000	4.840	
1058	-0.003	4.812	0.051	5.040	0.429	5.060	0.007	5.040	0.000	4.812	0.000	4.832	
1056	-0.002	4.802	0.052	5.042	0.429	5.058	0.007	5.042	0.000	4.802	0.000	4.828	
2006	-0.020	4.868	-0.015	5.062	0.261	5.164	0.002	5.062	-0.003	4.868	0.000	8.506	
2008	-0.020	4.866	-0.017	5.062	0.271	5.158	0.002	5.062	-0.003	4.866	0.000	8.504	
2010	-0.020	4.866	-0.020	5.060	0.280	5.152	0.003	5.060	-0.003	4.866	0.000	8.502	
2012	-0.019	4.866	-0.023	5.060	0.290	5.146	0.003	5.060	-0.003	4.866	0.000	8.500	
2014	-0.019	4.866	-0.025	5.060	0.299	5.140	0.003	5.060	-0.003	4.866	0.000	8.496	
2016	-0.019	4.866	-0.028	5.058	0.309	5.134	0.004	5.058	-0.003	4.866	0.000	8.492	
2018	-0.018	4.866	-0.030	5.058	0.318	5.128	0.004	5.058	-0.002	4.866	0.000	8.484	
2020	-0.017	4.866	-0.033	5.056	0.327	5.122	0.004	5.056	-0.002	4.866	0.000	8.476	
2022	-0.017	4.868	-0.036	5.054	0.335	5.116	0.005	5.054	-0.002	4.868	0.000	5.038	
2024	-0.016	4.868	-0.038	5.054	0.344	5.110	0.005	5.054	-0.002	4.868	0.000	5.026	
2026	-0.015	4.868	-0.041	5.052	0.352	5.106	0.006	5.052	-0.002	4.868	0.000	5.014	
2028	-0.014	4.870	-0.044	5.052	0.360	5.100	0.006	5.052	-0.002	4.870	0.000	4.862	
2030	-0.013	4.872	-0.046	5.050	0.367	5.096	0.006	5.050	-0.002	4.872	0.000	4.852	
2032	-0.012	4.874	-0.048	5.048	0.375	5.092	0.007	5.048	-0.002	4.874	0.000	6.104	
2082	0.010	4.870	-0.034	4.966	0.394	5.104	0.005	4.966	0.001	4.870	0.000	5.942	
2080	0.010	4.868	-0.035	4.970	0.398	5.100	0.005	4.970	0.001	4.868	0.000	5.950	
2078	0.010	4.868	-0.037	5.150	0.402	5.096	0.005	5.150	0.001	4.868	0.000	5.962	
2076	0.009	4.868	-0.038	5.148	0.406	5.092	0.005	5.148	0.001	4.868	0.000	5.982	
2074	0.009	4.866	-0.039	5.148	0.410	5.088	0.005	5.148	0.001	4.866	0.000	6.014	
2072	0.008	4.864	-0.041	5.148	0.413	5.082	0.006	5.148	0.001	4.864	0.000	6.036	
2070	0.008	4.864	-0.042	5.146	0.417	5.078	0.006	5.146	0.001	4.864	0.000	6.064	
2068	0.007	4.860	-0.043	5.146	0.420	5.076	0.006	5.146	0.001	4.860	0.000	4.838	
2066	0.006	4.856	-0.045	5.144	0.422	5.072	0.006	5.144	0.001	4.856	0.000	4.842	
2064	0.006	4.850	-0.046	5.142	0.425	5.068	0.006	5.142	0.001	4.850	0.000	5.006	
2062	0.005	4.838	-0.048	5.034	0.426	5.064	0.006	5.034	0.001	4.838	0.000	8.484	
2060	0.004	4.826	-0.049	5.038	0.428	5.062	0.007	5.038	0.001	4.826	0.000	8.494	
2058	0.003	4.812	-0.051	5.040	0.429	5.060	0.007	5.040	0.000	4.812	0.000	8.502	
2056	0.002	4.802	-0.052	5.042	0.429	5.058	0.007	5.042	0.000	4.802	0.000	8.514	
1101	0.004	4.870	0.062	5.044	0.646	5.120	0.010	5.144	-0.001	4.894	0.000	4.952	
1102	0.004	4.870	0.062	5.044	0.631	5.118	0.010	5.144	-0.001	4.894	0.000	4.952	
1103	0.004	4.870	0.062	5.044	0.626	5.116	0.010	5.144	-0.001	4.894	0.000	4.952	
1104	0.004	4.870	0.062	5.044	0.621	5.116	0.010	5.144	-0.001	4.894	0.000	4.952	
1105	0.004	4.870	0.062	5.044	0.616	5.116	0.010	5.144	-0.001	4.894	0.000	4.952	
1106	0.004	4.870	0.062	5.044	0.611	5.114	0.010	5.144	-0.001	4.894	0.000	4.952	
1107	0.004	4.872	0.062	5.044	0.606	5.114	0.010	5.144	-0.001	4.894	0.000	4.952	
1108	0.004	4.872	0.062	5.044	0.601	5.114	0.010	5.144	-0.001	4.894	0.000	4.952	
1109	0.004	4.872	0.062	5.044	0.596	5.112	0.010	5.144	-0.001	4.894	0.000	4.952	
1110	0.004	4.872	0.062	5.044	0.591	5.112	0.010	5.144	-0.001	4.894	0.000	4.952	
1111	0.004	4.872	0.062	5.044	0.586	5.110	0.010	5.144	-0.001	4.894	0.000	4.952	
1112	0.004	4.872	0.062	5.044	0.581	5.110	0.010	5.144	-0.001	4.894	0.000	4.952	
1113	0.004	4.872	0.062	5.044	0.576	5.108	0.010	5.144	-0.001	4.894	0.000	4.952	
1114	0.004	4.872	0.062	5.044	0.571	5.108	0.010	5.144	-0.001	4.894	0.000	4.952	
1115	0.005	4.872	0.062	5.044	0.566	5.106	0.010	5.144	-0.001	4.894	0.000	4.952	
1116	0.005	4.874	0.062	5.044	0.536	5.098	0.010	5.144	-0.001	4.894	0.000	4.952	
1117	0.005	4.878	0.062	5.044	0.508	5.088	0.010	5.144	-0.001	4.894	0.000	4.952	
1118	0.005	4.886	0.062	5.044	0.464	5.072	0.009	5.142	-0.001	4.894	0.000	4.954	
1119	0.005	4.894	0.062	5.044	0.423	5.064	0.008	5.044	-0.001	4.894	0.000	4.954	
1044	0.005	4.894	0.062	5.044	0.416	5.066	0.008	5.044	-0.001	4.894	0.000	4.954	
2101	-0.004	4.870	-0.062	5.044	0.646	5.120	0.010	5.144	-0.001	4.894	0.000	4.952	

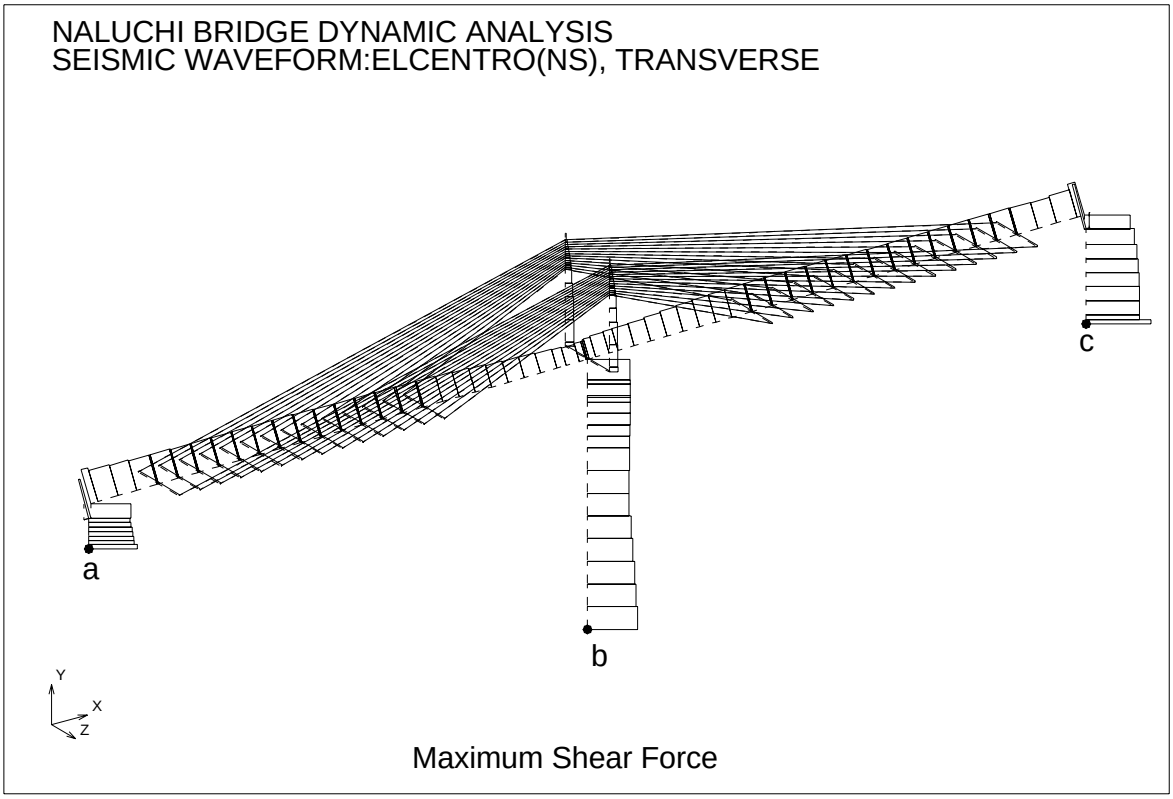
Transverse Direction MAXIMUM ABS.DISPLACEMENT

Node No	X (m)	Time (sec)	Y (m)	Time (sec)	Z (m)	Time (sec)	θx (rad)	Time (sec)	θy (rad)	Time (sec)	θz (rad)	Time (sec)	Remarks
2107	-0.004	4.872	-0.062	5.044	0.606	5.114	0.010	5.144	-0.001	4.894	0.000	4.952	
2108	-0.004	4.872	-0.062	5.044	0.601	5.114	0.010	5.144	-0.001	4.894	0.000	4.952	
2109	-0.004	4.872	-0.062	5.044	0.596	5.112	0.010	5.144	-0.001	4.894	0.000	4.952	
2110	-0.004	4.872	-0.062	5.044	0.591	5.112	0.010	5.144	-0.001	4.894	0.000	4.952	
2111	-0.004	4.872	-0.062	5.044	0.586	5.110	0.010	5.144	-0.001	4.894	0.000	4.952	
2112	-0.004	4.872	-0.062	5.044	0.581	5.110	0.010	5.144	-0.001	4.894	0.000	4.952	
2113	-0.004	4.872	-0.062	5.044	0.576	5.108	0.010	5.144	-0.001	4.894	0.000	4.952	
2114	-0.004	4.872	-0.062	5.044	0.571	5.108	0.010	5.144	-0.001	4.894	0.000	4.952	
2115	-0.005	4.872	-0.062	5.044	0.566	5.106	0.010	5.144	-0.001	4.894	0.000	4.952	
2116	-0.005	4.874	-0.062	5.044	0.536	5.098	0.010	5.144	-0.001	4.894	0.000	4.952	
2117	-0.005	4.878	-0.062	5.044	0.508	5.088	0.010	5.144	-0.001	4.894	0.000	4.952	
2118	-0.005	4.886	-0.062	5.044	0.464	5.072	0.009	5.142	-0.001	4.894	0.000	4.954	
2119	-0.005	4.894	-0.062	5.044	0.423	5.064	0.008	5.044	-0.001	4.894	0.000	4.954	
2044	-0.005	4.894	-0.062	5.044	0.416	5.066	0.008	5.044	-0.001	4.894	0.000	4.954	
120	0.000	8.560	0.000	3.352	0.380	5.070	0.008	5.044	-0.001	4.894	0.000	8.580	P3 Column Top
121	0.000	8.560	0.000	3.352	0.373	5.072	0.008	5.044	-0.001	4.894	0.000	8.578	
122	0.000	8.560	0.000	3.352	0.353	5.074	0.008	5.044	-0.001	4.894	0.000	8.574	
123	0.000	8.560	0.000	3.352	0.350	5.076	0.008	5.044	-0.001	4.894	0.000	8.574	
124	0.000	8.560	0.000	3.352	0.341	5.076	0.008	5.042	-0.001	4.894	0.000	8.572	
125	0.000	8.560	0.000	3.352	0.323	5.080	0.008	5.042	-0.001	4.894	0.000	8.570	
126	0.000	8.558	0.000	3.352	0.303	5.082	0.008	5.042	-0.001	4.894	0.000	8.566	
127	0.000	8.558	0.000	3.352	0.285	5.084	0.008	5.042	-0.001	4.894	0.000	8.564	
128	0.000	8.558	0.000	3.352	0.265	5.086	0.008	5.042	0.000	4.894	0.000	8.564	
129	0.000	8.558	0.000	3.352	0.228	5.090	0.007	5.044	0.000	4.894	0.000	8.562	
130	0.000	8.556	0.000	3.352	0.193	5.092	0.007	5.050	0.000	4.894	0.000	8.560	
131	0.000	8.556	0.000	3.352	0.160	5.096	0.007	5.072	0.000	4.894	0.000	8.558	
132	0.000	8.556	0.000	3.352	0.128	5.096	0.006	5.086	0.000	4.894	0.000	8.558	
133	0.000	8.556	0.000	3.352	0.099	5.098	0.006	5.092	0.000	4.894	0.000	8.556	
134	0.000	8.556	0.000	3.352	0.073	4.948	0.005	5.096	0.000	4.894	0.000	8.556	
135	0.000	8.556	0.000	3.352	0.049	4.944	0.004	5.098	0.000	4.894	0.000	8.556	
136	0.000	8.556	0.000	3.352	0.029	4.942	0.004	4.946			0.000	8.556	
88	0.000	8.560	0.000	8.566	0.012	5.202	0.001	5.202	0.000	5.168	0.000	8.560	
3100	0.000	8.560	0.000	8.566	0.008	5.202	0.001	5.202	0.000	5.168	0.000	8.560	
3200	0.000	8.562	0.000	11.702	0.226	5.180	0.001	5.202	-0.003	4.868	0.000	8.564	
3201	0.000	8.560	0.000	11.702	0.008	5.202	0.001	5.202	0.000	5.168	0.000	8.560	
3000	0.000	8.560	0.000	8.574	0.008	5.202	0.001	5.202	0.000	5.168	0.000	8.560	P2 Column Top
3001	0.000	8.560	0.000	8.574	0.007	5.204	0.001	5.202	0.000	5.168	0.000	8.560	
3002	0.000	8.560	0.000	8.574	0.007	5.204	0.001	5.202	0.000	5.168	0.000	8.560	
3003	0.000	8.560	0.000	8.574	0.006	5.204	0.001	5.202	0.000	5.168	0.000	8.560	
3004	0.000	8.560	0.000	8.574	0.005	5.204	0.001	5.202	0.000	5.168	0.000	8.560	
3005	0.000	8.560	0.000	8.574	0.004	5.204	0.001	5.202	0.000	5.168	0.000	8.560	
3006	0.000	8.560	0.000	8.574	0.003	5.204	0.001	5.202	0.000	5.168	0.000	8.560	
3007	0.000	8.560	0.000	8.574	0.002	5.204	0.001	5.202			0.000	8.560	
89	0.000	8.562	0.000	8.566	0.081	4.950	0.004	4.956	0.000	5.096	0.000	8.562	
4200	0.000	8.562	0.000	8.566	0.067	4.948	0.004	4.956	0.000	5.096	0.000	8.562	
4100	0.000	8.564	0.000	8.556	0.367	5.112	0.004	4.956	0.001	4.870	0.000	5.838	
4101	0.000	8.562	0.000	8.556	0.067	4.948	0.004	4.956	0.000	5.096	0.000	8.562	
4000	0.000	8.562	0.000	5.864	0.067	4.948	0.004	4.956	0.000	5.096	0.000	8.562	P4 Column Top
4001	0.000	8.562	0.000	5.864	0.052	4.946	0.004	4.956	0.000	5.096	0.000	8.562	
4002	0.000	8.562	0.000	5.864	0.040	4.944	0.004	4.954	0.000	5.096	0.000	8.562	
4003	0.000	8.562	0.000	5.864	0.029	2.434	0.003	4.952	0.000	5.096	0.000	8.562	
4004	0.000	8.562	0.000	5.864	0.020	2.432	0.003	4.950	0.000	5.096	0.000	8.562	
4005	0.000	8.562	0.000	5.864	0.013	2.430	0.002	4.948	0.000	5.096	0.000	8.562	
4006	0.000	8.564	0.000	5.864	0.007	2.062	0.002	2.436	0.000	5.096	0.000	8.562	
4007	0.000	8.564	0.000	5.864	0.006	2.062	0.002	2.436	0.000	5.096	0.000	8.562	
4008	0.000	8.564			0.005	2.062	0.002	2.436			0.000	8.562	

(3) Response Section Force



Maximum Bending Moment



Maximum Shear Force

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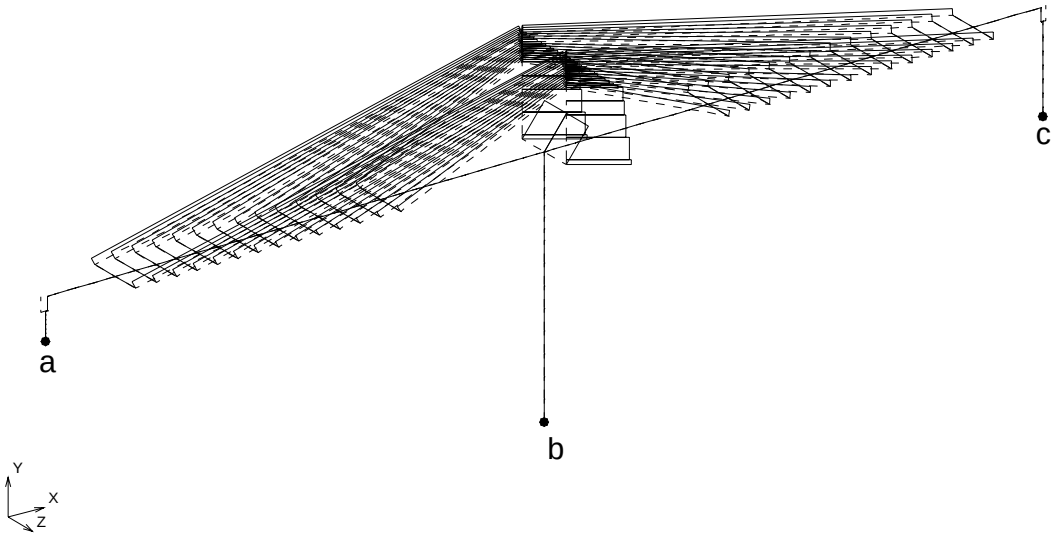
SEISMIC WAVEFORM:ELCENTRO(NS), TRANSVERSE



Maximum Axial Force

a:P2 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
TR	Initial Force	16207	0	0	0	0	0
	Seismic Force	0	0	3815	1621	76670	0
	Total	16207	0	3815	1621	76670	0

b:P3 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
TR	Initial Force	172987	0	0	0	0	0
	Seismic Force	0	0	15386	17503	704291	0
	Total	172987	0	15386	17503	704291	0

c:P4 Column

		Fx (kN)	Fy (kN)	Fz (kN)	Mx (kN.m)	My (kN.m)	Mz (kN.m)
TR	Initial Force	25310	0	0	0	0	0
	Seismic Force	0	0	8914	2541	130314	0
	Total	25310	0	8914	2541	130314	0

Transverse Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
1	1	0	8.562	0	8.568	-3098	5.138	-49130	5.038	983	5.038	0	8.562	Girder End
1	2	0	8.562	0	8.568	3098	5.138	49130	5.038	4451	5.154	0	8.560	
2	2	0	8.560	0	8.566	-2941	5.046	-49130	5.038	-4451	5.154	0	8.560	
2	3	0	8.560	0	8.566	2941	5.046	49130	5.038	19017	5.058	0	11.700	
3	3	0	8.560	0	8.562	-2898	4.872	-49130	5.038	-19017	5.058	0	11.700	
3	4	0	8.560	0	8.562	2898	4.872	49130	5.038	32045	5.036	0	8.568	
4	4	0	8.558	0	8.556	-3157	4.856	-49130	5.038	-32045	5.036	0	8.568	
4	5	0	8.558	0	8.556	3157	4.856	49130	5.038	46023	5.018	0	8.564	
5	5	0	8.558	0	8.554	-3172	4.856	-49130	5.038	-46023	5.018	0	8.564	
5	6	0	8.558	0	8.554	3172	4.856	49130	5.038	46868	5.018	0	8.564	
6	6	0	8.548	0	8.530	-3192	4.856	-49336	5.036	-45813	5.022	0	8.564	
6	7	0	8.548	0	8.530	3192	4.856	49336	5.036	59291	4.874	0	8.556	
7	7	0	8.548	0	8.530	-3194	4.856	-49336	5.036	-59291	4.874	0	8.556	
7	8	0	8.548	0	8.530	3194	4.856	49336	5.036	60244	4.874	0	8.556	
8	8	0	8.536	0	8.530	-3250	4.852	-49561	5.034	-58723	5.016	0	8.556	
8	9	0	8.536	0	8.530	3250	4.852	49561	5.034	73768	4.870	0	8.550	
9	9	0	8.536	0	8.530	-3250	4.852	-49561	5.034	-73768	4.870	0	8.550	
9	10	0	8.536	0	8.530	3250	4.852	49561	5.034	74739	4.868	0	8.550	
10	10	0	8.524	0	8.532	-3257	4.852	-49806	5.032	-73013	4.870	0	8.550	
10	11	0	8.524	0	8.532	3257	4.852	49806	5.032	88252	4.866	0	8.546	
11	11	0	8.524	0	8.532	-3257	4.852	-49806	5.032	-88252	4.866	0	8.546	
11	12	0	8.524	0	8.532	3257	4.852	49806	5.032	89226	4.866	0	8.546	
12	12	0	4.950	0	8.514	-3258	4.852	-50071	5.032	-87435	4.866	0	8.546	
12	13	0	4.950	0	8.514	3258	4.852	50071	5.032	102696	4.864	0	8.540	
13	13	0	4.950	0	8.514	-3258	4.852	-50071	5.032	-102696	4.864	0	8.540	
13	14	0	4.950	0	8.514	3258	4.852	50071	5.032	103671	4.864	0	8.540	
14	14	0	4.940	0	8.562	-3257	4.850	-50358	5.030	-101823	4.866	0	8.540	
14	15	0	4.940	0	8.562	3257	4.850	50358	5.030	117092	4.864	0	8.544	
15	15	0	4.940	0	8.562	-3257	4.850	-50358	5.030	-117092	4.864	0	8.544	
15	16	0	4.940	0	8.562	3257	4.850	50358	5.030	118067	4.864	0	8.544	
16	16	0	4.924	0	8.562	-3256	4.850	-50665	5.028	-116173	4.864	0	8.544	
16	17	0	4.924	0	8.562	3256	4.850	50665	5.028	131442	4.862	0	8.544	
17	17	0	4.924	0	8.562	-3256	4.850	-50665	5.028	-131442	4.862	0	8.544	
17	18	0	4.924	0	8.562	3256	4.850	50665	5.028	132417	4.862	0	8.544	
18	18	0	4.910	0	5.866	-3254	4.850	-50995	5.026	-130480	4.862	0	8.544	
18	19	0	4.910	0	5.866	3254	4.850	50995	5.026	145745	4.862	0	8.552	
19	19	0	4.906	0	5.876	-3250	4.850	-50995	5.026	-145745	4.862	0	8.552	
19	20	0	4.906	0	5.876	3250	4.850	50995	5.026	146718	4.862	0	8.552	
20	20	0	4.908	0	8.564	-3242	4.846	-51244	5.024	-145326	4.862	0	8.552	
20	21	0	4.908	0	8.564	3242	4.846	51244	5.024	160521	4.860	0	8.552	
21	21	0	4.908	0	8.566	-3236	4.846	-51244	5.024	-160521	4.860	0	8.552	
21	22	0	4.908	0	8.566	3236	4.846	51244	5.024	161489	4.860	0	8.552	
22	22	0	4.904	0	5.872	-3225	4.842	-51512	5.024	-160078	4.862	0	8.552	
22	23	0	4.904	0	5.872	3225	4.842	51512	5.024	175183	4.860	0	8.558	
23	23	0	4.902	0	5.872	-3219	4.840	-51512	5.024	-175183	4.860	0	8.558	
23	24	0	4.902	0	5.872	3219	4.840	51512	5.024	176145	4.860	0	8.558	
24	24	0	4.902	0	4.710	-3206	4.838	-51798	5.022	-174724	4.860	0	8.558	
24	25	0	4.902	0	4.710	3206	4.838	51798	5.022	189722	4.860	0	8.568	
25	25	0	4.900	0	4.710	-3201	4.836	-51798	5.022	-189722	4.860	0	8.568	
25	26	0	4.900	0	4.710	3201	4.836	51798	5.022	190677	4.860	0	8.568	
26	26	0	4.904	0	4.714	-3189	4.834	-52106	5.020	-189251	4.860	0	8.568	
26	27	0	4.904	0	4.714	3189	4.834	52106	5.020	204151	4.858	0	8.582	
27	27	0	4.902	0	4.714	-3182	4.832	-52106	5.020	-204151	4.858	0	8.582	
27	28	0	4.902	0	4.714	3182	4.832	52106	5.020	205100	4.858	0	8.582	
28	28	0	4.912	0	5.040	-3167	4.828	-52440	5.020	-203672	4.858	0	8.582	
28	29	0	4.912	0	5.040	3167	4.828	52440	5.020	218444	4.858	0	8.600	
29	29	0	4.912	0	5.040	-3166	4.828	-52440	5.020	-218444	4.858	0	8.600	
29	30	0	4.912	0	5.040	3166	4.828	52440	5.020	219386	4.858	0	8.600	
30	30	0	4.912	0	5.918	-3130	4.818	-52804	5.018	-217970	4.858	0	8.600	
30	31	0	4.912	0	5.918	3130	4.818	52804	5.018	232497	4.858	0	8.604	
31	31	0	4.912	0	5.918	-3130	4.818	-52804	5.018	-232497	4.858	0	8.604	
31	32	0	4.912	0	5.918	3130	4.818	52804	5.018	233424	4.858	0	8.604	
32	32	0	4.924	0	8.564	-3117	4.816	-53197	5.016	-232045	4.858	0	8.604	
32	33	0	4.924	0	8.564	3117	4.816	53197	5.016	246495	4.856	0	8.602	
33	33	0	4.916	0	8.570	-2969	4.792	-53197	5.016	-246495	4.856	0	8.602	
33	34	0	4.916	0	8.570	2969	4.792	53197	5.016	257747	4.856	0	8.598	
34	34	0	4.908	0	8.576	-2842	4.782	-53197	5.016	-257747	4.856	0	8.598	
34	35	0	4.908	0	8.576	2842	4.782	53197	5.016	267898	4.854	0	8.596	
35	35	0	4.898	0	8.578	-2699	4.774	-53197	5.016	-267898	4.854	0	8.596	
35	36	0	4.898	0	8.578	2699	4.774	53197	5.016	276848	4.852	0	8.594	
36	36	0	4.890	0	8.578	-2531	4.770	-53197	5.016	-276848	4.852	0	8.594	
36	37	0	4.890	0	8.578	2531	4.770	53197	5.016	284505	4.850	0	8.592	
37	37	0	4.878	0	8.580	-2334	4.766	-53197	5.016	-284505	4.850	0	8.592	
37	38	0	4.878	0	8.580	2334	4.766	53197	5.016	290816	4.842	0	8.590	
38	38	0	4.866	0	8.580	-2107	4.764	-53197	5.016	-290816	4.842	0	8.590	
38	39	0	4.866	0	8.580	2107	4.764	53197	5.016	295971	4.828	0	8.590	
39	39	0	4.842	0	8.580	-1848	4.760	-53197	5.016	-295971	4.828	0	8.590	
39	40	0	4.842	0	8.580	1848	4.760	53197	5.016	300429	4.812	0	8.588	

Transverse Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
43	44	0	4.794	0	8.590	-2069	2.508	53197	5.016	306621	4.792	0	8.588	
44	44	0	8.400	0	5.174	2065	2.826	31462	5.052	-288818	4.792	0	8.490	
44	45	0	8.400	0	5.174	-2065	2.826	-31462	5.052	288953	4.792	0	8.490	
45	45	0	8.400	0	5.174	2033	2.826	31462	5.052	-288953	4.792	0	8.490	
45	46	0	8.400	0	5.174	-2033	2.826	-31462	5.052	289412	4.794	0	8.490	
46	46	0	8.400	0	5.174	1903	2.826	31462	5.052	-289412	4.794	0	8.490	
46	47	0	8.400	0	5.174	-1903	2.826	-31462	5.052	289302	4.802	0	8.490	
47	47	0	8.398	0	5.174	1810	2.826	31462	5.052	-289302	4.802	0	8.490	
47	48	0	8.398	0	5.174	-1810	2.826	-31462	5.052	288830	4.808	0	8.492	
48	48	0	8.392	0	5.176	1705	2.824	31462	5.052	-288830	4.808	0	8.492	
48	49	0	8.392	0	5.176	-1705	2.824	-31462	5.052	287718	4.890	0	8.494	
49	49	0	8.390	0	5.180	1563	2.824	31462	5.052	-287718	4.890	0	8.494	
49	50	0	8.390	0	5.180	-1563	2.824	-31462	5.052	285991	4.884	0	8.496	
50	50	0	8.388	0	5.186	1581	4.762	31462	5.052	-285991	4.884	0	8.496	
50	51	0	8.388	0	5.186	-1581	4.762	-31462	5.052	282691	4.880	0	8.500	
51	51	0	8.388	0	5.192	1854	4.766	31462	5.052	-282691	4.880	0	8.500	
51	52	0	8.388	0	5.192	-1854	4.766	-31462	5.052	277841	4.876	0	8.508	
52	52	0	8.386	0	5.200	2110	4.770	31462	5.052	-277841	4.876	0	8.508	
52	53	0	8.386	0	5.200	-2110	4.770	-31462	5.052	271471	4.874	0	8.524	
53	53	0	8.386	0	8.450	2349	4.776	31462	5.052	-271471	4.874	0	8.524	
53	54	0	8.386	0	8.450	-2349	4.776	-31462	5.052	263632	4.872	0	8.548	
54	54	0	8.384	0	8.442	2570	4.782	31462	5.052	-263632	4.872	0	8.548	
54	55	0	8.384	0	8.442	-2570	4.782	-31462	5.052	254401	4.872	0	8.566	
55	55	0	8.384	0	8.434	2796	4.792	31462	5.052	-254401	4.872	0	8.566	
55	56	0	8.384	0	8.434	-2796	4.792	-31462	5.052	241879	4.872	0	8.578	
56	56	0	8.388	0	10.018	2813	4.792	31137	5.052	-243243	4.872	0	8.578	
56	57	0	8.388	0	10.018	-2813	4.792	-31137	5.052	242436	4.872	0	8.578	
57	57	0	8.388	0	8.438	2816	4.794	31137	5.052	-242436	4.872	0	8.578	
57	58	0	8.388	0	8.438	-2816	4.794	-31137	5.052	229775	4.872	0	8.584	
58	58	0	8.392	0	8.406	2877	4.798	30818	5.052	-231225	4.872	0	8.584	
58	59	0	8.392	0	8.406	-2877	4.798	-30818	5.052	230386	4.872	0	8.586	
59	59	0	8.392	0	5.244	2884	4.798	30818	5.052	-230386	4.872	0	8.586	
59	60	0	8.392	0	5.244	-2884	4.798	-30818	5.052	217197	4.872	0	8.596	
60	60	0	8.394	0	5.206	2908	4.802	30508	5.052	-218707	4.872	0	8.596	
60	61	0	8.394	0	5.206	-2908	4.802	-30508	5.052	217853	4.872	0	8.598	
61	61	0	8.394	0	5.204	2920	4.804	30508	5.052	-217853	4.872	0	8.598	
61	62	0	8.394	0	5.204	-2920	4.804	-30508	5.052	204390	4.872	0	8.612	
62	62	0	8.486	0	8.432	2951	4.808	30209	5.052	-205942	4.872	0	8.612	
62	63	0	8.486	0	8.432	-2951	4.808	-30209	5.052	205067	4.872	0	8.614	
63	63	0	8.486	0	8.432	2972	4.812	30209	5.052	-205067	4.872	0	8.614	
63	64	0	8.486	0	8.432	-2972	4.812	-30209	5.052	191209	4.872	0	8.618	
64	64	0	8.492	0	8.410	3012	4.824	29920	5.054	-192788	4.872	0	8.618	
64	65	0	8.492	0	8.410	-3012	4.824	-29920	5.054	191886	4.872	0	8.618	
65	65	0	8.492	0	8.410	3045	4.846	29920	5.054	-191886	4.872	0	8.618	
65	66	0	8.492	0	8.410	-3045	4.846	-29920	5.054	177575	4.872	0	5.854	
66	66	0	8.494	0	8.422	3106	4.868	29641	5.054	-179171	4.872	0	5.854	
66	67	0	8.494	0	8.422	-3106	4.868	-29641	5.054	178239	4.872	0	5.854	
67	67	0	8.494	0	8.420	3150	4.870	29641	5.054	-178239	4.872	0	5.854	
67	68	0	8.494	0	8.420	-3150	4.870	-29641	5.054	163431	4.872	0	5.872	
68	68	0	8.502	0	8.416	3214	4.870	29371	5.054	-165032	4.872	0	5.872	
68	69	0	8.502	0	8.416	-3214	4.870	-29371	5.054	164068	4.872	0	5.874	
69	69	0	8.502	0	9.958	3261	4.870	29371	5.054	-164068	4.872	0	5.874	
69	70	0	8.502	0	9.958	-3261	4.870	-29371	5.054	148737	4.872	0	5.890	
70	70	0	7.070	0	8.626	3284	4.870	29004	5.054	-150997	4.872	0	5.890	
70	71	0	7.070	0	8.626	-3284	4.870	-29004	5.054	150012	4.872	0	5.890	
71	71	0	7.068	0	8.616	3290	4.870	29004	5.054	-150012	4.872	0	5.890	
71	72	0	7.068	0	8.616	-3290	4.870	-29004	5.054	134546	4.872	0	5.894	
72	72	0	7.078	0	5.918	3315	4.870	28653	5.056	-136789	4.874	0	5.894	
72	73	0	7.078	0	5.918	-3315	4.870	-28653	5.056	135794	4.874	0	5.894	
73	73	0	7.078	0	5.924	3324	4.870	28653	5.056	-135794	4.874	0	5.894	
73	74	0	7.078	0	5.924	-3324	4.870	-28653	5.056	120172	4.874	0	5.888	
74	74	0	7.342	0	5.914	3350	4.870	28318	5.056	-122386	4.874	0	5.888	
74	75	0	7.342	0	5.914	-3350	4.870	-28318	5.056	121381	4.874	0	5.886	
75	75	0	7.342	0	5.918	3361	4.870	28318	5.056	-121381	4.874	0	5.886	
75	76	0	7.342	0	5.918	-3361	4.870	-28318	5.056	105584	4.874	0	5.880	
76	76	0	4.742	0	5.910	3389	4.870	27996	5.056	-107761	4.874	0	5.880	
76	77	0	4.742	0	5.910	-3389	4.870	-27996	5.056	106744	4.874	0	5.878	
77	77	0	4.742	0	5.912	3403	4.870	27996	5.056	-106744	4.874	0	5.878	
77	78	0	4.742	0	5.912	-3403	4.870	-27996	5.056	90750	4.874	0	5.870	
78	78	0	4.872	0	8.618	3430	4.870	27689	5.056	-92880	4.874	0	5.870	
78	79	0	4.872	0	8.618	-3430	4.870	-27689	5.056	91851	4.874	0	5.870	
79	79	0	4.876	0	8.614	3445	4.872	27689	5.056	-91851	4.874	0	5.870	
79	80	0	4.876	0	8.614	-3445	4.872	-27689	5.056	75663	4.876	0	5.880	
80	80	0	8.566	0	5.872	3503	4.872	27396	5.058	-77740	4.876	0	5.880	
80	81	0	8.566	0	5.872	-3503	4.872	-27396	5.058	76690	4.876	0	5.880	
81	81	0	8.566	0	5.882	3520	4.872	27396	5.058	-76690	4.876	0	5.880	
81	82	0	8.566	0	5.882	-3520	4.872	-27396	5.058	60146	4.876	0	5.880	
82	82	0	8.566	0	8.622	3541	4.872	27137	5.058	-62167	4.876	0	5.880	

Transverse Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
85	86	0	8.566	0	8.606	-3756	4.878	-27137	5.058	7620	5.036	0	8.518	
86	86	0	8.566	0	8.606	4050	5.032	27137	5.058	-7620	5.036	0	8.518	
86	87	0	8.566	0	8.606	-4050	5.032	-27137	5.058	543	5.058	0	8.564	Girder End
1101	1101	-27	2.504	-18	2.458	146	2.362			0	5.134	0	5.750	
1101	1102	27	2.504	18	2.458	-146	2.362			-219	2.362	-27	2.458	
1102	1102	-94	4.834	-40	4.956	348	2.360	0	4.960	219	2.362	27	2.458	
1102	1103	94	4.834	40	4.956	-348	2.360	0	4.960	-394	2.360	-46	2.456	
1103	1103	-166	4.834	-62	4.956	457	2.358	0	4.960	394	2.360	46	2.456	
1103	1104	166	4.834	62	4.956	-457	2.358	0	4.960	-622	2.360	-71	2.454	
1104	1104	-240	4.834	-84	4.954	559	2.358	0	4.960	622	2.360	71	2.454	
1104	1105	240	4.834	84	4.954	-559	2.358	0	4.960	-902	2.360	-108	4.956	
1105	1105	-319	4.834	-104	4.954	657	2.358	0	4.960	902	2.360	108	4.956	
1105	1106	319	4.834	104	4.954	-657	2.358	0	4.960	-1230	2.358	-160	4.956	
1106	1106	-401	4.834	-123	4.952	750	2.356	0	4.958	1230	2.358	160	4.956	
1106	1107	401	4.834	123	4.952	-750	2.356	0	4.958	-1605	2.358	-222	4.954	
1107	1107	-487	4.834	-141	4.952	838	2.356	0	4.958	1605	2.358	222	4.954	
1107	1108	487	4.834	141	4.952	-838	2.356	0	4.958	-2024	2.358	-292	4.954	
1108	1108	-577	4.834	-157	4.950	922	2.354	0	4.958	2024	2.358	292	4.954	
1108	1109	577	4.834	157	4.950	-922	2.354	0	4.958	-2485	2.358	-371	4.954	
1109	1109	-647	4.834	-169	4.950	1001	2.354	0	4.958	2485	2.358	371	4.954	
1109	1110	647	4.834	169	4.950	-1001	2.354	0	4.958	-2985	2.356	-455	4.954	
1110	1110	-720	4.834	-178	4.950	1076	2.354	0	4.958	2985	2.356	455	4.954	
1110	1111	720	4.834	178	4.950	-1076	2.354	0	4.958	-3523	2.356	-544	4.952	
1111	1111	-796	4.834	-185	4.948	1147	2.352	0	4.958	3523	2.356	544	4.952	
1111	1112	796	4.834	185	4.948	-1147	2.352	0	4.958	-4097	2.356	-637	4.952	
1112	1112	-875	4.834	-189	4.948	1214	2.352	0	4.956	4097	2.356	637	4.952	
1112	1113	875	4.834	189	4.948	-1214	2.352	0	4.956	-4703	2.356	-731	4.952	
1113	1113	-958	4.834	-189	4.948	1277	2.352	0	4.956	4703	2.356	731	4.952	
1113	1114	958	4.834	189	4.948	-1277	2.352	0	4.956	-5341	2.354	-825	4.952	
1114	1114	-1045	4.834	-185	4.946	1336	2.350	0	4.956	5341	2.354	825	4.952	
1114	1115	1045	4.834	185	4.946	-1336	2.350	0	4.956	-6008	2.354	-917	4.952	
1115	1115	-1154	4.834	-180	4.948	1486	2.348	0	4.956	6008	2.354	917	4.952	
1115	1116	1154	4.834	180	4.948	-1486	2.348	0	4.956	-10460	2.352	-1458	4.950	
1116	1116	-1202	4.834	-188	4.952	1662	2.346	0	4.956	10460	2.352	1458	4.950	
1116	1117	1202	4.834	188	4.952	-1662	2.346	0	4.956	-15434	2.350	-2020	4.952	
1117	1117	-1271	4.834	-191	4.954	1830	2.342	0	4.956	15434	2.350	2020	4.952	
1117	1118	1271	4.834	191	4.954	-1830	2.342	0	4.956	-24550	2.346	-2975	4.952	
1118	1118	-1362	4.834	-185	4.956	1905	2.338	0	4.956	24550	2.346	2975	4.952	
1118	1119	1362	4.834	185	4.956	-1905	2.338	0	4.956	-34022	2.342	-3896	4.954	
1119	1119	-1409	4.834	-179	4.958	1906	2.336	0	4.956	34022	2.342	3896	4.954	
1119	1044	1409	4.834	179	4.958	-1906	2.336	0	4.956	-35921	2.342	-4075	4.954	
1044	1044	1906	2.336	1409	4.834	179	4.958	4075	4.954	0	4.956	-35921	2.342	
1044	44	-1906	2.336	-1409	4.834	-179	4.958	-4075	4.954	-1415	4.958	37776	2.334	
2101	2101	27	2.504	18	2.458	146	2.362			0	5.130	0	8.480	
2101	2102	-27	2.504	-18	2.458	-146	2.362			-219	2.362	27	2.458	
2102	2102	94	4.834	40	4.956	348	2.360	0	4.960	219	2.362	-27	2.458	
2102	2103	-94	4.834	-40	4.956	-348	2.360	0	4.960	-394	2.360	46	2.456	
2103	2103	166	4.834	62	4.956	457	2.358	0	4.960	394	2.360	-46	2.456	
2103	2104	-166	4.834	-62	4.956	-457	2.358	0	4.960	-622	2.360	71	2.454	
2104	2104	240	4.834	84	4.954	559	2.358	0	4.960	622	2.360	-71	2.454	
2104	2105	-240	4.834	-84	4.954	-559	2.358	0	4.960	-902	2.360	108	4.956	
2105	2105	319	4.834	104	4.954	657	2.358	0	4.960	902	2.360	-108	4.956	
2105	2106	-319	4.834	-104	4.954	-657	2.358	0	4.960	-1230	2.358	160	4.956	
2106	2106	401	4.834	123	4.952	750	2.356	0	4.958	1230	2.358	-160	4.956	
2106	2107	-401	4.834	-123	4.952	-750	2.356	0	4.958	-1605	2.358	222	4.954	
2107	2107	487	4.834	141	4.952	838	2.356	0	4.958	1605	2.358	-222	4.954	
2107	2108	-487	4.834	-141	4.952	-838	2.356	0	4.958	-2024	2.358	292	4.954	
2108	2108	577	4.834	157	4.950	922	2.354	0	4.958	2024	2.358	-292	4.954	
2108	2109	-577	4.834	-157	4.950	-922	2.354	0	4.958	-2485	2.358	371	4.954	
2109	2109	647	4.834	169	4.950	1001	2.354	0	4.958	2485	2.358	-371	4.954	
2109	2110	-647	4.834	-169	4.950	-1001	2.354	0	4.958	-2985	2.356	455	4.954	
2110	2110	720	4.834	178	4.950	1076	2.354	0	4.958	2985	2.356	-455	4.954	
2110	2111	-720	4.834	-178	4.950	-1076	2.354	0	4.958	-3523	2.356	544	4.952	
2111	2111	796	4.834	185	4.948	1147	2.352	0	4.958	3523	2.356	-544	4.952	
2111	2112	-796	4.834	-185	4.948	-1147	2.352	0	4.958	-4097	2.356	637	4.952	
2112	2112	875	4.834	189	4.948	1214	2.352	0	4.956	4097	2.356	-637	4.952	
2112	2113	-875	4.834	-189	4.948	-1214	2.352	0	4.956	-4703	2.356	731	4.952	
2113	2113	958	4.834	189	4.948	1277	2.352	0	4.956	4703	2.356	-731	4.952	
2113	2114	-958	4.834	-189	4.948	-1277	2.352	0	4.956	-5341	2.354	825	4.952	
2114	2114	1045	4.834	185	4.946	1336	2.350	0	4.956	5341	2.354	-825	4.952	
2114	2115	-1045	4.834	-185	4.946	-1336	2.350	0	4.956	-6008	2.354	917	4.952	
2115	2115	1154	4.834	180	4.948	1486	2.348	0	4.956	6008	2.354	-917	4.952	
2115	2116	-1154	4.834	-180	4.948	-1486	2.348	0	4.956	-10460	2.352	1458	4.950	
2116	2116	1202	4.834	188	4.952	1662	2.346	0	4.956	10460	2.352	-1458	4.950	
2116	2117	-1202	4.834	-188	4.952	-1662	2.346	0	4.956	-15434	2.350	2020	4.952	
2117	2117	1271	4.834	191	4.954	1830	2.342	0	4.956	15434	2.350	-2020	4.952	
2117	2118	-1271	4.834	-191	4.954	-1830	2.342	0	4.956	-24550	2.346	2975	4.952	
2118	2118	1362	4.834	185	4.956	1905	2.338	0	4.956	24550	2.346	-2975	4.952	

Transverse Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
1006	1006	-4	5.236	-30	4.782	-116	4.808	0	5.034	0	5.140	0	5.140	
1008	8	4	5.232	31	4.784	121	4.808	0	5.034	-891	4.808	232	4.784	
1008	1008	-4	5.232	-31	4.784	-121	4.808	0	5.034	0	5.140	0	5.140	
1010	10	4	5.230	33	4.786	125	4.808	0	5.032	-923	4.808	245	4.786	
1010	1010	-4	5.230	-33	4.786	-125	4.808	0	5.032	0	5.142	0	5.142	
1012	12	3	5.228	35	4.788	129	4.808	0	5.032	-953	4.808	259	4.788	
1012	1012	-3	5.228	-35	4.788	-129	4.808	0	5.032	0	5.142	0	5.142	
1014	14	3	5.226	37	4.788	133	4.808	0	5.032	-980	4.808	273	4.788	
1014	1014	-3	5.226	-37	4.788	-133	4.808	0	5.032	0	5.142	0	5.142	
1016	16	3	5.226	39	4.790	136	4.808	0	5.030	-1005	4.808	288	4.790	
1016	1016	-3	5.226	-39	4.790	-136	4.808	0	5.030	0	5.144	0	5.144	
1018	18	3	5.224	41	4.792	139	4.806	0	5.030	-1026	4.806	304	4.792	
1018	1018	-3	5.224	-41	4.792	-139	4.806	0	5.030	0	5.144	0	5.144	
1020	20	2	5.224	31	4.792	100	4.806	0	5.028	-738	4.806	228	4.792	
1020	1020	-2	5.224	-31	4.792	-100	4.806	0	5.028	0	5.146	0	5.146	
1022	22	2	5.046	33	4.792	102	4.804	0	5.028	-749	4.804	241	4.792	
1022	1022	-2	5.046	-33	4.792	-102	4.804	0	5.028	0	5.146	0	5.146	
1024	24	2	5.042	35	4.794	103	4.804	0	5.026	-757	4.804	256	4.794	
1024	1024	-2	5.042	-35	4.794	-103	4.804	0	5.026	0	5.146	0	5.146	
1026	26	2	5.040	37	4.794	104	4.802	0	5.026	-763	4.802	273	4.794	
1026	1026	-2	5.040	-37	4.794	-104	4.802	0	5.026	0	5.148	0	5.148	
1028	28	2	5.036	40	4.792	104	4.800	0	5.024	-767	4.800	292	4.792	
1028	1028	-2	5.036	-40	4.792	-104	4.800	0	5.024	0	5.148	0	5.148	
1030	30	2	4.854	43	4.792	104	4.798	0	5.022	-767	4.798	314	4.792	
1030	1030	-2	4.854	-43	4.792	-104	4.798	0	5.022	0	5.150	0	5.150	
1032	32	2	4.850	46	4.790	103	4.796	0	5.020	-757	4.796	336	4.790	
1032	1032	-2	4.850	-46	4.790	-103	4.796	0	5.020	0	5.150	0	5.150	
1080	82	1	4.878	28	4.878	-138	4.878	0	5.040	1015	4.878	207	4.878	
1080	1082	-1	4.878	-28	4.878	138	4.878	0	5.040	0	5.146	0	5.146	
1078	80	3	5.050	32	4.868	-142	4.878	0	5.040	1044	4.878	239	4.868	
1078	1080	-3	5.050	-32	4.868	142	4.878	0	5.040	0	5.146	0	5.146	
1076	78	3	5.046	34	4.868	-145	4.878	0	5.038	1071	4.878	250	4.868	
1076	1078	-3	5.046	-34	4.868	145	4.878	0	5.038	0	5.148	0	5.148	
1074	76	3	5.042	35	4.870	-148	4.878	0	5.036	1095	4.878	261	4.870	
1074	1076	-3	5.042	-35	4.870	148	4.878	0	5.036	0	5.150	0	5.148	
1072	74	3	5.038	37	4.870	-151	4.878	0	5.036	1114	4.878	273	4.870	
1072	1074	-3	5.038	-37	4.870	151	4.878	0	5.036	0	2.306	0	5.150	
1070	72	3	5.036	39	4.872	-153	4.878	0	5.034	1128	4.878	285	4.872	
1070	1072	-3	5.036	-39	4.872	153	4.878	0	5.034	0	2.306	0	2.306	
1068	70	3	4.872	40	4.874	-154	4.878	0	5.030	1138	4.878	298	4.874	
1068	1070	-3	4.872	-40	4.874	154	4.878	0	5.030	0	2.308	0	2.308	
1066	68	2	4.870	30	4.874	-109	4.878	0	5.028	806	4.878	222	4.874	
1066	1068	-2	4.870	-30	4.874	109	4.878	0	5.028	0	2.310	0	2.308	
1064	66	3	4.870	32	4.874	-109	4.878	0	5.024	804	4.878	234	4.874	
1064	1066	-3	4.870	-32	4.874	109	4.878	0	5.024	0	2.310	0	2.310	
1062	64	3	4.870	33	4.876	-108	4.878	0	5.020	796	4.878	243	4.876	
1062	1064	-3	4.870	-33	4.876	108	4.878	0	5.020	0	2.312	0	2.312	
1060	62	3	4.870	34	4.878	-106	4.878	0	5.012	782	4.878	253	4.878	
1060	1062	-3	4.870	-34	4.878	106	4.878	0	5.012	0	2.316	0	2.314	
1058	60	3	4.870	36	4.880	-103	4.878	0	5.002	761	4.878	263	4.880	
1058	1060	-3	4.870	-36	4.880	103	4.878	0	5.002	0	2.318	0	2.318	
1056	58	3	4.870	37	4.880	-99	4.878	0	4.990	731	4.878	272	4.880	
1056	1058	-3	4.870	-37	4.880	99	4.878	0	4.990	0	2.320	0	2.320	
1054	56	3	4.870	38	4.880	-93	4.762	0	4.978	689	4.762	280	4.880	
1054	1056	-3	4.870	-38	4.880	93	4.762	0	4.978	0	2.324	0	2.324	
2006	6	-4	5.236	-30	4.782	116	4.808	0	5.034	-857	4.808	-219	4.782	
2006	2006	4	5.236	30	4.782	-116	4.808	0	5.034	0	5.140	0	5.140	
2008	8	-4	5.232	-31	4.784	121	4.808	0	5.034	-891	4.808	-232	4.784	
2008	2008	4	5.232	31	4.784	-121	4.808	0	5.034	0	5.140	0	5.140	
2010	10	-4	5.230	-33	4.786	125	4.808	0	5.032	-923	4.808	-245	4.786	
2010	2010	4	5.230	33	4.786	-125	4.808	0	5.032	0	5.142	0	5.142	
2012	12	-3	5.228	-35	4.788	129	4.808	0	5.032	-953	4.808	-259	4.788	
2012	2012	3	5.228	35	4.788	-129	4.808	0	5.032	0	5.142	0	5.142	
2014	14	-3	5.226	-37	4.788	133	4.808	0	5.032	-980	4.808	-273	4.788	
2014	2014	3	5.226	37	4.788	-133	4.808	0	5.032	0	5.142	0	5.142	
2016	16	-3	5.226	-39	4.790	136	4.808	0	5.030	-1005	4.808	-288	4.790	
2016	2016	3	5.226	39	4.790	-136	4.808	0	5.030	0	5.144	0	5.144	
2018	18	-3	5.224	-41	4.792	139	4.806	0	5.030	-1026	4.806	-304	4.792	
2018	2018	3	5.224	41	4.792	-139	4.806	0	5.030	0	5.144	0	5.144	
2020	20	-2	5.224	-31	4.792	100	4.806	0	5.028	-738	4.806	-228	4.792	
2020	2020	2	5.224	31	4.792	-100	4.806	0	5.028	0	5.146	0	5.146	
2022	22	-2	5.046	-33	4.792	102	4.804	0	5.028	-749	4.804	-241	4.792	
2022	2022	2	5.046	33	4.792	-102	4.804	0	5.028	0	5.146	0	5.146	
2024	24	-2	5.042	-35	4.794	103	4.804	0	5.026	-757	4.804	-256	4.794	
2024	2024	2	5.042	35	4.794	-103	4.804	0	5.026	0	5.146	0	5.146	
2026	26	-2	5.040	-37	4.794	104	4.802	0	5.026	-763	4.802	-273	4.794	
2026	2026	2	5.040	37	4.794	-104	4.802	0	5.026	0	5.148	0	5.148	
2028	28	-2	5.036	-40	4.792	104	4.800	0	5.024	-767	4.800	-292	4.792	

Transverse Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
2080	82	-1	4.878	-28	4.878	-138	4.878	0	5.040	1015	4.878	-207	4.878	
2080	2082	1	4.878	28	4.878	138	4.878	0	5.040	0	5.146	0	5.146	
2078	80	-3	5.050	-32	4.868	-142	4.878	0	5.040	1044	4.878	-239	4.868	
2078	2080	3	5.050	32	4.868	142	4.878	0	5.040	0	5.146	0	5.146	
2076	78	-3	5.046	-34	4.868	-145	4.878	0	5.038	1071	4.878	-250	4.868	
2076	2078	3	5.046	34	4.868	145	4.878	0	5.038	0	5.148	0	5.148	
2074	76	-3	5.042	-35	4.870	-148	4.878	0	5.036	1095	4.878	-261	4.870	
2074	2076	3	5.042	35	4.870	148	4.878	0	5.036	0	5.150	0	5.148	
2072	74	-3	5.038	-37	4.870	-151	4.878	0	5.036	1114	4.878	-273	4.870	
2072	2074	3	5.038	37	4.870	151	4.878	0	5.036	0	2.306	0	5.150	
2070	72	-3	5.036	-39	4.872	-153	4.878	0	5.034	1128	4.878	-285	4.872	
2070	2072	3	5.036	39	4.872	153	4.878	0	5.034	0	2.306	0	2.306	
2068	70	-3	4.872	-40	4.874	-154	4.878	0	5.030	1138	4.878	-298	4.874	
2068	2070	3	4.872	40	4.874	154	4.878	0	5.030	0	2.308	0	2.308	
2066	68	-2	4.870	-30	4.874	-109	4.878	0	5.028	806	4.878	-222	4.874	
2066	2068	2	4.870	30	4.874	109	4.878	0	5.028	0	2.310	0	2.308	
2064	66	-3	4.870	-32	4.874	-109	4.878	0	5.024	804	4.878	-234	4.874	
2064	2066	3	4.870	32	4.874	109	4.878	0	5.024	0	2.310	0	2.310	
2062	64	-3	4.870	-33	4.876	-108	4.878	0	5.020	796	4.878	-243	4.876	
2062	2064	3	4.870	33	4.876	108	4.878	0	5.020	0	2.312	0	2.312	
2060	62	-3	4.870	-34	4.878	-106	4.878	0	5.012	782	4.878	-253	4.878	
2060	2062	3	4.870	34	4.878	106	4.878	0	5.012	0	2.316	0	2.314	
2058	60	-3	4.870	-36	4.880	-103	4.878	0	5.002	761	4.878	-263	4.880	
2058	2060	3	4.870	36	4.880	103	4.878	0	5.002	0	2.318	0	2.318	
2056	58	-3	4.870	-37	4.880	-99	4.878	0	4.990	731	4.878	-272	4.880	
2056	2058	3	4.870	37	4.880	99	4.878	0	4.990	0	2.320	0	2.320	
2054	56	-3	4.870	-38	4.880	-93	4.762	0	4.978	689	4.762	-280	4.880	
2054	2056	3	4.870	38	4.880	93	4.762	0	4.978	0	2.324	0	2.324	
1201	1006	120	4.808	0	5.038	0	5.118			0	5.140	0	5.034	
1201	1102	-120	4.808	0	5.038	0	5.118			0	4.944	0	5.040	
1202	1008	125	4.808	0	5.038	0	5.120			0	5.140	0	5.034	
1202	1103	-125	4.808	0	5.038	0	5.120			0	4.946	0	5.040	
1203	1010	130	4.808	0	5.038	0	5.120			0	5.142	0	5.032	
1203	1104	-130	4.808	0	5.038	0	5.120			0	4.946	0	5.040	
1204	1012	134	4.808	0	5.036	0	5.122			0	5.142	0	5.032	
1204	1105	-134	4.808	0	5.036	0	5.122			0	4.948	0	5.040	
1205	1014	138	4.808	0	5.036	0	5.124			0	5.142	0	5.032	
1205	1106	-138	4.808	0	5.036	0	5.124			0	4.948	0	5.038	
1206	1016	142	4.808	0	5.036	0	5.126			0	5.144	0	5.030	
1206	1107	-142	4.808	0	5.036	0	5.126			0	4.950	0	5.038	
1207	1018	145	4.808	0	5.034	0	5.126			0	5.144	0	5.030	
1207	1108	-145	4.808	0	5.034	0	5.126			0	4.950	0	5.038	
1208	1020	105	4.806	0	5.034	0	5.128			0	5.146	0	5.030	
1208	1109	-105	4.806	0	5.034	0	5.128			0	4.952	0	5.036	
1209	1022	107	4.804	0	5.032	0	5.130			0	5.146	0	5.028	
1209	1110	-107	4.804	0	5.032	0	5.130			0	4.952	0	5.036	
1210	1024	109	4.804	0	5.032	0	5.130			0	5.146	0	5.028	
1210	1111	-109	4.804	0	5.032	0	5.130			0	4.954	0	5.036	
1211	1026	110	4.802	0	5.032	0	5.132			0	5.148	0	5.026	
1211	1112	-110	4.802	0	5.032	0	5.132			0	4.954	0	5.034	
1212	1028	111	4.800	0	5.030	0	5.134			0	5.148	0	5.024	
1212	1113	-111	4.800	0	5.030	0	5.134			0	4.954	0	5.034	
1213	1030	113	4.798	0	5.030	0	5.136			0	5.150	0	5.024	
1213	1114	-113	4.798	0	5.030	0	5.136			0	4.956	0	5.032	
1214	1032	112	4.796	0	5.028	0	5.138			0	5.150	0	5.022	
1214	1115	-112	4.796	0	5.028	0	5.138			0	4.956	0	5.032	
1301	1082	141	4.878	0	5.030	0	5.106			0	5.146	0	5.042	
1301	1102	-141	4.878	0	5.030	0	5.106			0	4.856	0	4.992	
1302	1080	145	4.878	0	5.026	0	5.110			0	5.146	0	5.040	
1302	1103	-145	4.878	0	5.026	0	5.110			0	4.854	0	4.990	
1303	1078	149	4.878	0	5.024	0	5.112			0	5.148	0	5.038	
1303	1104	-149	4.878	0	5.024	0	5.112			0	4.854	0	4.986	
1304	1076	152	4.878	0	5.020	0	5.116			0	5.150	0	5.038	
1304	1105	-152	4.878	0	5.020	0	5.116			0	4.854	0	4.984	
1305	1074	155	4.878	0	5.014	0	5.118			0	2.306	0	5.036	
1305	1106	-155	4.878	0	5.014	0	5.118			0	4.854	0	4.982	
1306	1072	158	4.878	0	5.008	0	5.122			0	2.306	0	5.034	
1306	1107	-158	4.878	0	5.008	0	5.122			0	4.856	0	4.978	
1307	1070	159	4.878	0	5.002	0	5.124			0	2.308	0	5.032	
1307	1108	-159	4.878	0	5.002	0	5.124			0	4.856	0	4.976	
1308	1068	113	4.878	0	4.996	0	5.126			0	2.310	0	5.028	
1308	1109	-113	4.878	0	4.996	0	5.126			0	4.856	0	4.974	
1309	1066	113	4.878	0	4.990	0	5.128			0	2.310	0	5.026	
1309	1110	-113	4.878	0	4.990	0	5.128			0	4.856	0	4.972	
1310	1064	113	4.878	0	4.984	0	5.132			0	2.312	0	5.020	
1310	1111	-113	4.878	0	4.984	0	5.132			0	4.856	0	4.968	
1311	1062	111	4.878	0	4.978	0	5.134			0	2.316	0	5.014	
1311	1112	-111	4.878	0	4.978	0	5.134			0	4.858	0	4.966	

Transverse Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
2201	2006	-120	4.808	0	5.038	0	5.118			0	5.140	0	5.034	
2201	2102	120	4.808	0	5.038	0	5.118			0	4.944	0	5.040	
2202	2008	-125	4.808	0	5.038	0	5.120			0	5.140	0	5.034	
2202	2103	125	4.808	0	5.038	0	5.120			0	4.946	0	5.040	
2203	2010	-130	4.808	0	5.038	0	5.120			0	5.142	0	5.032	
2203	2104	130	4.808	0	5.038	0	5.120			0	4.946	0	5.040	
2204	2012	-134	4.808	0	5.036	0	5.122			0	5.142	0	5.032	
2204	2105	134	4.808	0	5.036	0	5.122			0	4.948	0	5.040	
2205	2014	-138	4.808	0	5.036	0	5.124			0	5.142	0	5.032	
2205	2106	138	4.808	0	5.036	0	5.124			0	4.948	0	5.038	
2206	2016	-142	4.808	0	5.036	0	5.126			0	5.144	0	5.030	
2206	2107	142	4.808	0	5.036	0	5.126			0	4.950	0	5.038	
2207	2018	-145	4.808	0	5.034	0	5.126			0	5.144	0	5.030	
2207	2108	145	4.808	0	5.034	0	5.126			0	4.950	0	5.038	
2208	2020	-105	4.806	0	5.034	0	5.128			0	5.146	0	5.030	
2208	2109	105	4.806	0	5.034	0	5.128			0	4.952	0	5.036	
2209	2022	-107	4.804	0	5.032	0	5.130			0	5.146	0	5.028	
2209	2110	107	4.804	0	5.032	0	5.130			0	4.952	0	5.036	
2210	2024	-109	4.804	0	5.032	0	5.130			0	5.146	0	5.028	
2210	2111	109	4.804	0	5.032	0	5.130			0	4.954	0	5.036	
2211	2026	-110	4.802	0	5.032	0	5.132			0	5.148	0	5.026	
2211	2112	110	4.802	0	5.032	0	5.132			0	4.954	0	5.034	
2212	2028	-111	4.800	0	5.030	0	5.134			0	5.148	0	5.024	
2212	2113	111	4.800	0	5.030	0	5.134			0	4.954	0	5.034	
2213	2030	-113	4.798	0	5.030	0	5.136			0	5.150	0	5.024	
2213	2114	113	4.798	0	5.030	0	5.136			0	4.956	0	5.032	
2214	2032	-112	4.796	0	5.028	0	5.138			0	5.150	0	5.022	
2214	2115	112	4.796	0	5.028	0	5.138			0	4.956	0	5.032	
2301	2082	-141	4.878	0	5.030	0	5.106			0	5.146	0	5.042	
2301	2102	141	4.878	0	5.030	0	5.106			0	4.856	0	4.992	
2302	2080	-145	4.878	0	5.026	0	5.110			0	5.146	0	5.040	
2302	2103	145	4.878	0	5.026	0	5.110			0	4.854	0	4.990	
2303	2078	-149	4.878	0	5.024	0	5.112			0	5.148	0	5.038	
2303	2104	149	4.878	0	5.024	0	5.112			0	4.854	0	4.986	
2304	2076	-152	4.878	0	5.020	0	5.116			0	5.150	0	5.038	
2304	2105	152	4.878	0	5.020	0	5.116			0	4.854	0	4.984	
2305	2074	-155	4.878	0	5.014	0	5.118			0	2.306	0	5.036	
2305	2106	155	4.878	0	5.014	0	5.118			0	4.854	0	4.982	
2306	2072	-158	4.878	0	5.008	0	5.122			0	2.306	0	5.034	
2306	2107	158	4.878	0	5.008	0	5.122			0	4.856	0	4.978	
2307	2070	-159	4.878	0	5.002	0	5.124			0	2.308	0	5.032	
2307	2108	159	4.878	0	5.002	0	5.124			0	4.856	0	4.976	
2308	2068	-113	4.878	0	4.996	0	5.126			0	2.310	0	5.028	
2308	2109	113	4.878	0	4.996	0	5.126			0	4.856	0	4.974	
2309	2066	-113	4.878	0	4.990	0	5.128			0	2.310	0	5.026	
2309	2110	113	4.878	0	4.990	0	5.128			0	4.856	0	4.972	
2310	2064	-113	4.878	0	4.984	0	5.132			0	2.312	0	5.020	
2310	2111	113	4.878	0	4.984	0	5.132			0	4.856	0	4.968	
2311	2062	-111	4.878	0	4.978	0	5.134			0	2.316	0	5.014	
2311	2112	111	4.878	0	4.978	0	5.134			0	4.858	0	4.966	
2312	2060	-109	4.878	0	4.972	0	5.136			0	2.318	0	5.004	
2312	2113	109	4.878	0	4.972	0	5.136			0	4.858	0	4.964	
2313	2058	-106	4.878	0	4.968	0	5.140			0	2.320	0	4.992	
2313	2114	106	4.878	0	4.968	0	5.140			0	4.860	0	4.960	
2314	2056	-101	4.762	0	4.964	0	5.142			0	2.324	0	4.980	
2314	2115	101	4.762	0	4.964	0	5.142			0	4.860	0	4.958	
5001	88					0	4.160			0	9.920			
5001	3100					0	4.160			0	3.828			
3101	3100					0	5.208	0	9.752	0	8.188			
3101	3000					0	5.208	0	9.752	0	5.208			
5002	1	0	8.570	0	8.562	3603	5.168	0	5.130	49140	5.038	0	8.562	
5002	3200	0	8.570	0	8.562	-3603	5.168	0	5.130	-59902	5.132	0	4.924	
3201	3201	0	8.562	0	8.570	-3603	5.168	-59902	5.132	0	5.210			
3201	3000	0	8.562	0	8.570	3603	5.168	59902	5.132	1621	5.168	0	8.570	
3000	3000	0	8.570	0	8.562	3618	5.200	1621	5.168	59902	5.132	0	8.570	P2 Column Top
3000	3001	0	8.570	0	8.562	-3618	5.200	-1621	5.168	-62994	5.136	0	8.558	
3001	3001	0	8.570	0	8.562	3675	5.204	1621	5.168	62994	5.136	0	8.558	
3001	3002	0	8.570	0	8.562	-3675	5.204	-1621	5.168	-66199	5.148	0	8.560	
3002	3002	0	8.570	0	8.562	3730	5.206	1621	5.168	66199	5.148	0	8.560	
3002	3003	0	8.570	0	8.562	-3730	5.206	-1621	5.168	-69458	5.174	0	8.560	
3003	3003	0	8.572	0	8.562	3777	5.206	1621	5.168	69458	5.174	0	8.560	
3003	3004	0	8.572	0	8.562	-3777	5.206	-1621	5.168	-72987	5.186	0	8.560	
3004	3004	0	8.572	0	8.560	3815	5.206	1621	5.168	72987	5.186	0	8.560	
3004	3005	0	8.572	0	8.560	-3815	5.206	-1621	5.168	-76670	5.192	0	8.560	
3005	3005	0	8.572	0	8.560	3830	5.206	1621	5.168	76670	5.192	0	8.560	
3005	3006	0	8.572	0	8.560	-3830	5.206	-1621	5.168	-80048	5.196	0	8.560	
3006	3006	0	8.574	0	8.560	5626	2.350	1621	5.168	80048	5.196	0	8.560	
3006	3007	0	8.574	0	8.560	-5626	2.350	-1621	5.168	-83528	5.198	0	8.560	

Transverse Direction SECTIONAL FORCE

Elem No	Node No	Axial Force		Shear Force				Torsion		Bending Moment				Remarks
		Fx (kN)	Time (sec)	Fy (kN)	Time (sec)	Fz (kN)	Time (sec)	Mx (kN·m)	Time (sec)	My (kN·m)	Time (sec)	Mz (kN·m)	Time (sec)	
4101	4101	0	8.564	0	5.862	5083	5.096	42970	5.062	0	3.440			
4101	4000	0	8.564	0	5.862	-5083	5.096	-42970	5.062	-2541	5.096	0	5.862	P4 Column Top
4000	4000	0	5.862	0	8.564	4920	5.140	-2541	5.096	42970	5.062	0	5.862	
4000	4001	0	5.862	0	8.564	-4920	5.140	2541	5.096	-58907	5.068	0	8.554	
4001	4001	0	5.864	0	8.564	5354	2.438	-2541	5.096	58907	5.068	0	8.554	
4001	4002	0	5.864	0	8.564	-5354	2.438	2541	5.096	-72266	5.136	0	8.560	
4002	4002	0	5.864	0	8.564	6950	2.438	-2541	5.096	72266	5.136	0	8.560	
4002	4003	0	5.864	0	8.564	-6950	2.438	2541	5.096	-85623	5.142	0	8.560	
4003	4003	0	5.864	0	8.564	8047	2.438	-2541	5.096	85623	5.142	0	8.560	
4003	4004	0	5.864	0	8.564	-8047	2.438	2541	5.096	-98503	4.960	0	8.562	
4004	4004	0	5.864	0	8.564	8680	2.436	-2541	5.096	98503	4.960	0	8.562	
4004	4005	0	5.864	0	8.564	-8680	2.436	2541	5.096	-114631	4.954	0	8.562	
4005	4005	0	5.864	0	8.564	8914	2.434	-2541	5.096	114631	4.954	0	8.562	
4005	4006	0	5.864	0	8.564	-8914	2.434	2541	5.096	-130314	4.950	0	8.562	
4006	4006	0	5.864	0	8.564	8883	2.434	-2541	5.096	130314	4.950	0	8.562	
4006	4007	0	5.864	0	8.564	-8883	2.434	2541	5.096	-135265	4.948	0	8.562	
4007	4007	0	5.864	0	8.564	10574	2.062	-2541	5.096	135265	4.948	0	8.562	
4007	4008	0	5.864	0	8.564	-10574	2.062	2541	5.096	-140228	2.436	0	8.562	
120	44	0	3.352	0	8.546	13871	5.024	17503	4.894	-72408	4.942	0	8.536	P3 Column Top
120	120	0	3.352	0	8.546	-13871	5.024	-17503	4.894	-58804	2.334	0	8.534	
121	120	0	3.352	0	8.546	13938	5.024	17503	4.894	58804	2.334	0	8.534	
121	121	0	3.352	0	8.546	-13938	5.024	-17503	4.894	-62267	2.332	0	8.534	
122	121	0	3.352	0	8.546	13938	5.024	17503	4.894	62267	2.332	0	8.534	
122	122	0	3.352	0	8.546	-13938	5.024	-17503	4.894	-91712	5.192	0	8.532	
123	122	0	3.352	0	8.546	13938	5.024	17503	4.894	91712	5.192	0	8.532	
123	123	0	3.352	0	8.546	-13938	5.024	-17503	4.894	-96494	5.192	0	8.532	
124	123	0	3.352	0	8.546	13942	5.024	17503	4.894	96494	5.192	0	8.532	
124	124	0	3.352	0	8.546	-13942	5.024	-17503	4.894	-109647	5.192	0	8.530	
125	124	0	3.352	0	8.546	13944	5.024	17503	4.894	109647	5.192	0	8.530	
125	125	0	3.352	0	8.546	-13944	5.024	-17503	4.894	-138346	5.192	0	8.528	
126	125	0	3.352	0	8.546	13910	5.022	17503	4.894	138346	5.192	0	8.528	
126	126	0	3.352	0	8.546	-13910	5.022	-17503	4.894	-169395	5.194	0	8.524	
127	126	0	3.352	0	8.546	13841	5.022	17503	4.894	169395	5.194	0	8.524	
127	127	0	3.352	0	8.546	-13841	5.022	-17503	4.894	-197938	5.194	0	8.518	
128	127	0	3.352	0	8.546	13748	5.020	17503	4.894	197938	5.194	0	8.518	
128	128	0	3.352	0	8.546	-13748	5.020	-17503	4.894	-228692	5.194	0	8.508	
129	128	0	3.352	0	8.548	13617	5.018	17503	4.894	228692	5.194	0	8.508	
129	129	0	3.352	0	8.548	-13617	5.018	-17503	4.894	-289413	5.036	0	5.132	
130	129	0	3.352	0	8.548	13303	5.006	17503	4.894	289413	5.036	0	5.132	
130	130	0	3.352	0	8.548	-13303	5.006	-17503	4.894	-354872	5.034	0	8.636	
131	130	0	3.352	0	8.548	13222	4.966	17503	4.894	354872	5.034	0	8.636	
131	131	0	3.352	0	8.548	-13222	4.966	-17503	4.894	-418174	5.034	0	8.588	
132	131	0	3.352	0	8.548	13669	4.942	17503	4.894	418174	5.034	0	8.588	
132	132	0	3.352	0	8.548	-13669	4.942	-17503	4.894	-479078	5.032	0	8.570	
133	132	0	3.352	0	8.548	14209	4.934	17503	4.894	479078	5.032	0	8.570	
133	133	0	3.352	0	8.548	-14209	4.934	-17503	4.894	-537519	5.032	0	8.564	
134	133	0	3.352	0	8.550	14697	4.930	17503	4.894	537519	5.032	0	8.564	
134	134	0	3.352	0	8.550	-14697	4.930	-17503	4.894	-593617	5.032	0	8.560	
135	134	0	3.352	0	8.550	15097	4.926	17503	4.894	593617	5.032	0	8.560	
135	135	0	3.352	0	8.550	-15097	4.926	-17503	4.894	-647637	5.032	0	8.558	
136	135	0	3.352	0	8.550	15386	4.922	17503	4.894	647637	5.032	0	8.558	
136	136	0	3.352	0	8.550	-15386	4.922	-17503	4.894	-704291	5.088	0	8.558	
1900	3200	0	8.562											
1900	3201	0	8.562											
2900	4100	0	8.564											
2900	4101	0	8.564											
1950	3200					3603	5.168							
1950	3201					-3603	5.168							
2950	4100					5083	5.096							
2950	4101					-5083	5.096							
6101	3007	0	8.560	0	8.574							0	8.560	
6201	3007					5626	2.350	83528	5.198					
6301	136	0	8.550	0	3.352							0	8.558	
6401	136					15572	4.920	704291	5.088					
6501	4008	0	8.564									0	8.562	
6601	4008					10574	2.062	140228	2.436					