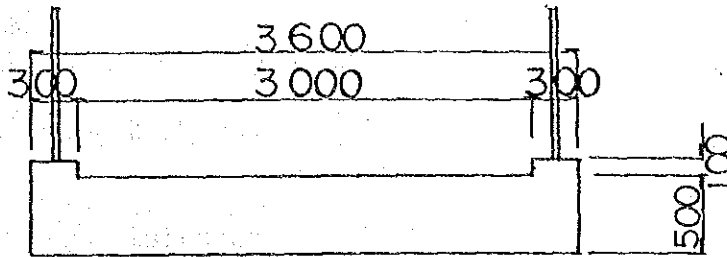


# PEDESTRIAN OVER BRIDGE(2)

## No. ② PEDESTRIAN BRIDGE OF MAIN

1) Shape and factors for calculation of stress

a) Superstructure

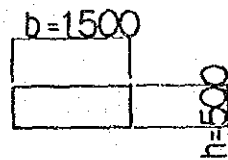


$$A = 3.60 \times 0.50 = 1.800 \text{ m}^2$$

$$I = \frac{1}{12} \times 3.60 \times 0.50^3 = 0.03750 \text{ m}^4$$

$$E_{c_1} = 27 \text{ KN/mm}^2 = 2.7 \times 10^7 \text{ KN/m}^2 \quad (f_{cu} = 30 \text{ KN/mm}^2)$$

b) Substructure

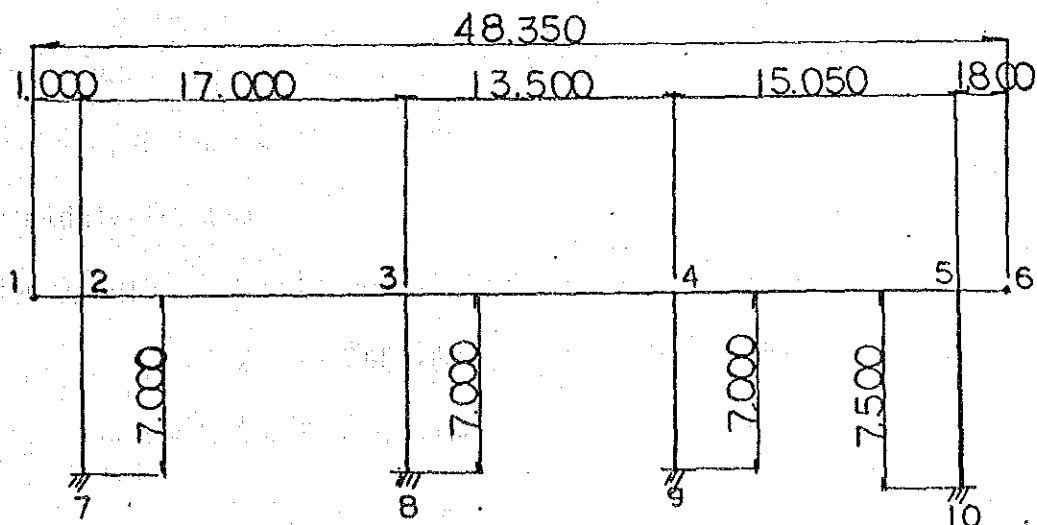


$$A = 1.50 \times 0.50 = 0.750 \text{ m}^2$$

$$I = \frac{1.50 \times 0.50^3}{12} = 0.01562 \text{ m}^4$$

$$E_{c_2} = 25 \text{ KN/mm}^2 = 2.5 \times 10^7 \text{ KN/m}^2$$

c) Frame



2) Load

(1) Dead load

$$\text{parapet} = 23.6 (2 \times 0.30 \times 0.10) + 0.29 \times 2 = 2.004 \text{ KN/m}$$

$$\text{slab} = 23.6 \times 1.80 = 42.480 \text{ KN/m}$$

$$\omega d_1 = 44.484 \text{ KN/m}$$

$$\text{Pillar : } \omega d_2 = 23.6 \times 0.750 = 17.700 \text{ KN/m}$$

(2) Dead load from staircase

$$R_d = 127.597 \text{ KN}$$

$$\omega R = 81.628 / 3.60 = 22.675 \text{ KN/m}$$

(3) Live load : width = 3.000m

a) Intensity of load

$$\text{small than } 2.0^m \text{ width : } \omega \ell_1 = 5.00 \text{ KN/m}^2 \times 2.0 \times 1.000 = 10.000 \text{ KN/m}$$

$$\text{large than } 2.0^m \text{ width : } \omega \ell_2 = 5.00 \text{ KN/m}^2 \times 1.0 \times 0.850 = 4.250 \text{ KN/m}$$

$$\omega \ell_0 = 14.250 \text{ KN/m}$$

b) For first span and second span

$$\text{loaded length (1) } \ell = 17.000^m + 15.050^m = 32.050^m > 30.000^m$$

$$\therefore \text{ reduced factor } K = 151 \left( \frac{1}{\ell} \right)^{0.475} / 30.00$$

$$= 151 \left( \frac{1}{32.050} \right)^{0.475} / 30.00 = 0.970 \approx 1.000$$

$$\text{loaded length (2) } \ell = 13.500^m < 30.00^m \quad \therefore K = 1.00$$

$$\therefore \omega \ell = \omega \ell_0 \cdot K = 14.250 \text{ KN/m}$$

c) For middle fulcrum

$$\text{loaded length } \ell = 17.00 + 13.50^m = 30.500^m \approx 30.00^m \quad \therefore K = 1.00$$

$$\ell = 13.500 + 15.050 = 28.550^m < 30.00^m \quad \therefore K = 1.00$$

$$\therefore \omega \ell = \omega \ell_0 \cdot K = 14.250 \text{ KN/m}$$

(4) Otheres load

a) Temperature

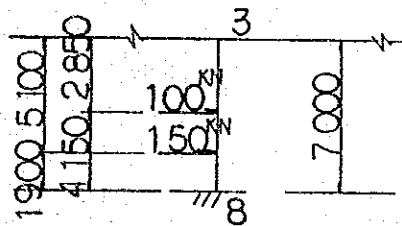
point ②~③  $T = \pm 12.5^{\circ}\text{C}$

Coefficient of thermal expansion.  $\alpha = 12 \times 10^{-6} / ^{\circ}\text{C}$

b) Seismic

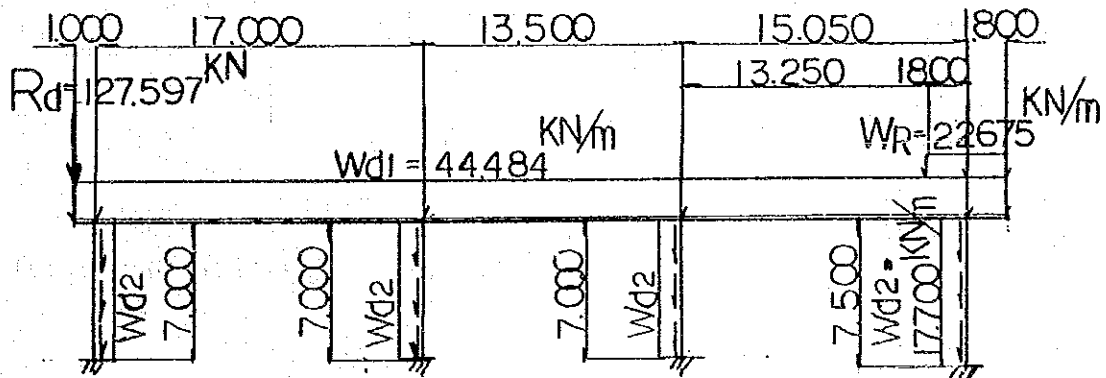
Coefficient of seismic.  $k_H = 0.10$

c) Collision for pillar



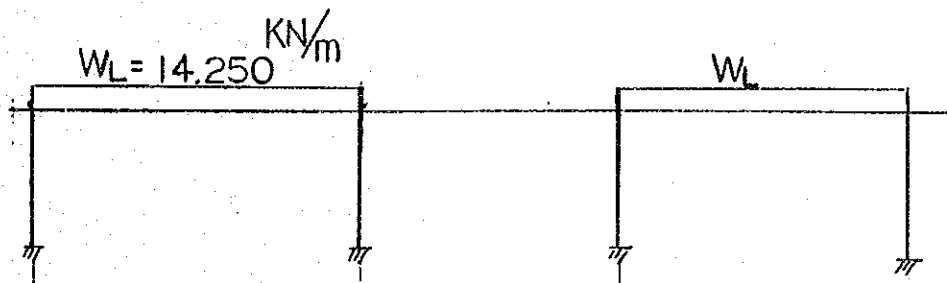
3. Loaded figure

(1) Dead load ... case-1

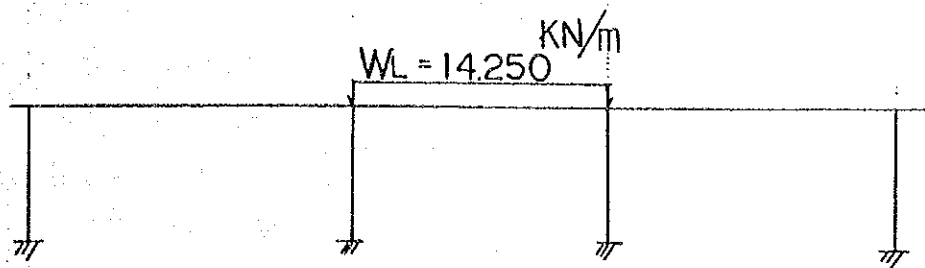


(2) Live load

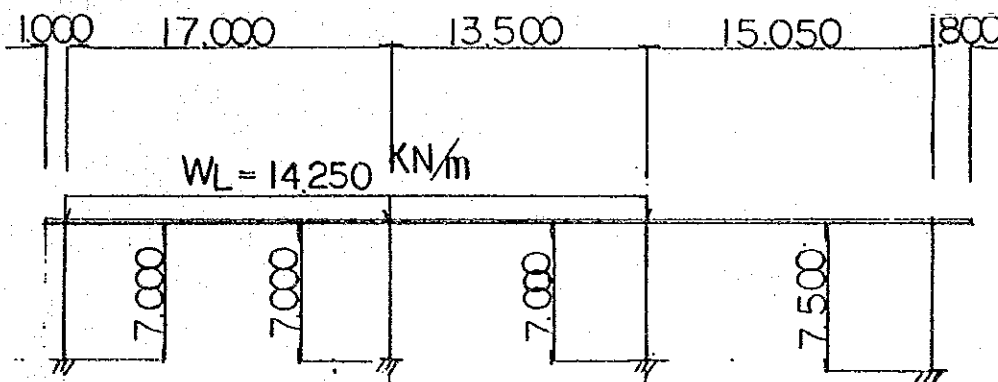
a) for first span ... case-2



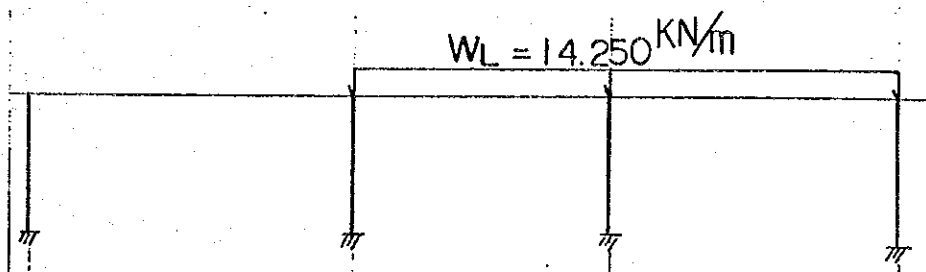
b) for second span ... case-3



c) for first fulcrum ... case-4



d) for second fulcrum ... case-5

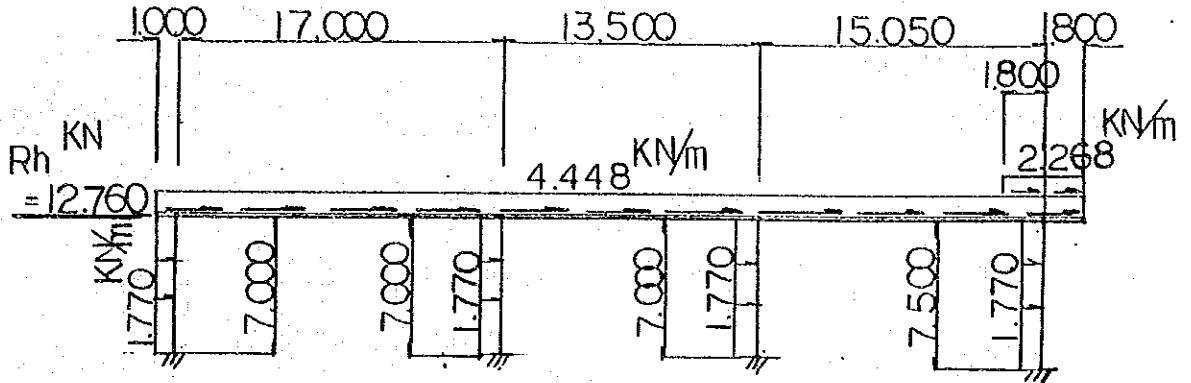


3) Others load

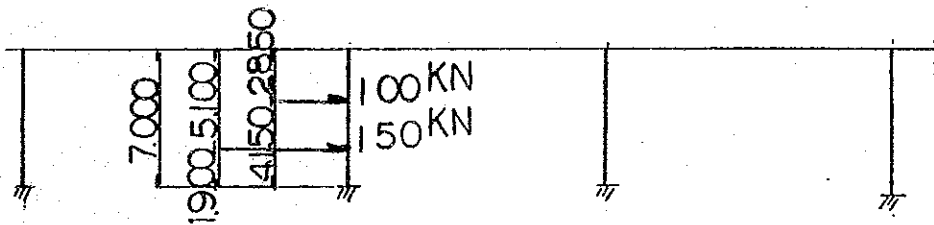
a) Temperature ... case-6

$$T = \pm 12.5^{\circ}\text{C} \quad \alpha = 12 \times 10^{-6} / ^{\circ}\text{C}$$

b) Seismic ( $k_H = 0.10$ ) ... case-7



c) Collision for pillar ... case-8



PEDE-Br NO-2 SUPERSTRUCTURE (MAIN BRIDGE)

	(m)	(m)
1	0.0000	7.5000
2	1.0000	7.5000
3	18.0000	7.5000
4	31.5000	7.5000
5	46.5500	7.5000
6	48.3500	7.5000
7	1.0000	0.5000
8	18.0000	0.5000
9	31.5000	0.5000
10	46.5500	0.0000

NOTE: THE DIMENSION(I) BE EXCHANG TO  
DIMENSION(KN) INTO THIS CALCULATION

PEDE-Br NO-2

No	I	J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1	2	1.80000	0.037500	Fix - Fix	1.000	2.70E+07	1.20E-05
2	2	3	1.80000	0.037500	Fix - Fix	17.000	2.70E+07	1.20E-05
3	3	4	1.80000	0.037500	Fix - Fix	13.500	2.70E+07	1.20E-05
4	4	5	1.80000	0.037500	Fix - Fix	15.050	2.70E+07	1.20E-05
5	5	6	1.80000	0.037500	Fix - Fix	1.800	2.70E+07	1.20E-05
6	2	7	0.75000	0.015620	Fix - Fix	7.000	2.50E+07	1.20E-05
7	3	8	0.75000	0.015620	Fix - Fix	7.000	2.50E+07	1.20E-05
8	4	9	0.75000	0.015620	Fix - Fix	7.000	2.50E+07	1.20E-05
9	5	10	0.75000	0.015620	Fix - Fix	7.500	2.50E+07	1.20E-05

PEDE-Br NO-2

No. 1

No	X (t/m)	Y (t/m)	M (tm/Rad)
7	Fix	Fix	Fix
8	Fix	Fix	Fix
9	Fix	Fix	Fix
10	Fix	Fix	Fix

PEDE-Br NO-2

No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No
	1	2	3	4	5	6	7	8	9	10
	11	12	13	14	15	16	17	18	19	20
1	0									
2	9	1.700	3.400	5.100	6.800	8.500	10.200	11.900	13.600	15.300
3	9	1.350	2.700	4.050	5.400	6.750	8.100	9.450	10.800	12.150
4	9	1.505	3.010	4.515	6.020	7.525	9.030	10.535	12.040	13.545
5	0									
6	4	1.400	2.800	4.200	5.600					
7	4	1.400	2.800	4.200	5.600					
8	4	1.400	2.800	4.200	5.600					
9	4	1.500	3.000	4.500	6.000					

PEDE-Br NO-2

: DEAD LOAD  
 No. : 1  
 No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1	2	-Y	0.001		-127.597	
1	1	2	-Y	0.000	1.000	-44.484	-44.484
2	2	3	-Y	0.000	17.000	-44.484	-44.484
3	3	4	-Y	0.000	13.500	-44.484	-44.484
4	4	5	-Y	0.000	15.050	-44.484	-44.484
5	5	6	-Y	0.000	1.800	-44.484	-44.484
4	4	5	-Y	13.250	1.800	-22.675	-22.675
5	5	6	-Y	0.000	1.800	-22.675	-22.675
6	2	7	-Y	0.000	7.000	-17.700	-17.700
7	3	8	-Y	0.000	7.000	-17.700	-17.700
8	4	9	-Y	0.000	7.000	-17.700	-17.700
9	5	10	-Y	0.000	7.500	-17.700	-17.700

$\Sigma V = -2864.478 (t)$   
 $\Sigma H = 0.000 (t)$

PEDE-Br NO-2

\*

: LIVE LOAD  
 No. : 2  
 No. : 1

	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2	3	-Y	0.000	17.000	-14.250	-14.250
4	4	5	-Y	0.000	15.050	-14.250	-14.250

$\Sigma V = -456.713 (t)$   
 $\Sigma H = 0.000 (t)$

PEDE-Br NO-2

: LIVE LOAD  
 No. : 3  
 No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
3	3	4	-Y	0.000	13.500	-14.250	-14.250

$\Sigma V = -192.375 (t)$   
 $\Sigma H = 0.000 (t)$

: LIVE LOAD  
 No. : 4  
 No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	0.000	17.000	-14.250	-14.250
3	3-	4	-Y	0.000	13.500	-14.250	-14.250

$\Sigma V = -434.625 (t)$   
 $\Sigma H = 0.000 (t)$

PEDE-Br NO-2

: LIVE LOAD  
 No. : 5  
 No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
3	3-	4	-Y	0.000	13.500	-14.250	-14.250
4	4-	5	-Y	0.000	15.050	-14.250	-14.250

$\Sigma V = -406.838 (t)$   
 $\Sigma H = 0.000 (t)$

PEDE-Br NO-2

: TEMPERATURE  
 No. : 6  
 No. : 1

No	TO	No	T (°C)
2	—	4	12.50

$\Sigma V = 0.000 (t)$   
 $\Sigma H = 0.000 (t)$

PEDE-Br NO-2

: SEISMIC  
 No. : 7  
 No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.001		12.760	
1	1-	2	-X	0.000	1.000	4.448	4.448
2	2-	3	-X	0.000	17.000	4.448	4.448
3	3-	4	-X	0.000	13.500	4.448	4.448
4	4-	5	-X	0.000	15.050	4.448	4.448
5	5-	6	-X	0.000	1.800	4.448	4.448
4	4-	5	-X	13.250	1.800	2.268	2.268
5	5-	6	-X	0.000	1.800	2.268	2.268
6	2-	7	-X	0.000	7.000	1.770	1.770
7	3-	8	-X	0.000	7.000	1.770	1.770
8	4-	9	-X	0.000	7.000	1.770	1.770
9	5-	10	-X	0.000	7.500	1.770	1.770

$\Sigma V = 0.000 (t)$   
 $\Sigma H = 286.431 (t)$



PEDE-Br NO-2

: COLLISION FOR PILLAR  
 No. : 8  
 No. : 1

No	i	-j	Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
7	3-	8	-X	2.850	100.000	
7	3-	8	-X	5.100	150.000	

$\Sigma V = 0.000 (t)$   
 $\Sigma H = 250.000 (t)$

PEDE-Br NO-2

No	C-No 1	C-No 2	C-No 3	C-No 4	C-No 5	C-No 6	C-No 7	C-No 8
No	No 9	No10	No11	No12	No13	No14	No15	No16
$\alpha$	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
No 1	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.0000
No 2	1.6500	0.0000	0.0000	0.0000	1.3800	0.0000	1.3800	1.0000
No 3	0.0000	1.6500	0.0000	0.0000	1.3800	0.0000	1.3800	0.0000
No 4	0.0000	0.0000	1.6500	0.0000	0.0000	0.0000	0.0000	0.0000
No 5	0.0000	0.0000	0.0000	1.6500	0.0000	0.0000	0.0000	0.0000
No 6	0.0000	0.0000	0.0000	0.0000	-1.4300	0.0000	0.0000	0.0000
No 7	0.0000	0.0000	0.0000	0.0000	0.0000	1.3200	0.0000	0.0000
No 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3800	0.0000

No	C-No 9	C-No10	C-No11	C-No12	C-No13	C-No14
No	No17	No18	No19	No20	No21	No22
$\alpha$	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
No 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
No 2	0.0000	0.0000	0.0000	1.0000	0.0000	1.0000
No 3	1.0000	0.0000	0.0000	1.0000	0.0000	1.0000
No 4	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000
No 5	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
No 6	0.0000	0.0000	0.0000	-1.0000	0.0000	0.0000
No 7	0.0000	0.0000	0.0000	0.0000	0.8000	0.0000
No 8	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000

PEDE-Br NO-2

No 1 : 9 10 11 12 13 14 15  
 No 2 : 16 17 18 19 20 21 22

No.	Case. 1		Case. 2		Case. 3	
	RX (t)	RY (t)	RX (tm)	RY (t)	RX (tm)	RY (t)
7.	103.506	646.622	233.824	116.028	55.360	-3.741
8.	-23.796	838.667	-132.871	129.483	-68.630	101.604
9.	28.448	778.338	59.253	106.938	57.979	103.390
10.	-78.237	600.852	-201.513	104.263	-82.802	-6.879
						10.304
No.	Case. 4		Case. 5		Case. 6	
	RX (t)	RY (t)	RX (tm)	RY (t)	RX (tm)	RY (t)
7.	34.517	108.140	73.238	-1.155	0.903	7.393
8.	-17.045	245.094	-46.862	87.597	40.746	-8.036
9.	-15.737	84.601	-46.061	239.118	23.211	-53.673
10.	-0.745	-3.210	-7.987	93.716	-54.208	8.416
						-112.072
No.	Case. 7		Case. 8		Case. 9	
	RX (t)	RY (t)	RX (tm)	RY (t)	RX (tm)	RY (t)
7.	-65.507	-17.488	-247.595	-3.371	-71.548	1083.780
8.	-81.566	0.802	-284.535	2.746	-235.507	1371.010
9.	-81.488	-2.564	-284.638	-7.664	-85.225	1250.560
10.	-57.970	19.250	-235.263	7.280	-71.233	1001.210
						-414.712
No.	Case. 10		Case. 11		Case. 12	
	RX (t)	RY (t)	RX (tm)	RY (t)	RX (tm)	RY (t)
7.	135.506	882.865	305.107	1070.770	443.520	886.409
8.	-45.023	1325.010	-115.312	1561.770	-260.717	1301.900
9.	10.690	1244.706	15.085	1213.700	5.769	1452.150
10.	-101.174	817.326	-261.087	823.879	-291.266	963.806
						-367.531
No.	Case. 13		Case. 14		Case. 15	
	RX (t)	RY (t)	RX (tm)	RY (t)	RX (tm)	RY (t)
7.	153.101	1033.960	264.347	869.354	-4.149	1041.260
8.	-116.527	1487.750	-305.811	1158.420	-558.710	1480.050
9.	73.013	1375.480	182.764	1070.720	-293.953	1353.780
10.	-109.587	951.530	-217.872	854.585	-575.435	973.625
						-476.438
No.	Case. 16		Case. 17		Case. 18	
	RX (t)	RY (t)	RX (tm)	RY (t)	RX (tm)	RY (t)
7.	145.983	762.650	329.190	640.881	223.212	754.762
8.	-90.372	968.150	-221.491	940.272	-91.629	1083.700
9.	54.690	885.276	117.232	881.726	20.770	863.985
10.	-110.300	705.114	-284.316	-74.123	-191.209	597.042
						-209.500
No.	Case. 19		Case. 20		Case. 21	
	RX (t)	RY (t)	RX (tm)	RY (t)	RX (tm)	RY (t)
7.	102.411	643.028	234.737	749.510	195.597	632.631
8.	-37.513	926.265	-92.125	1077.790	-220.156	839.309
9.	36.789	1007.460	82.465	996.441	130.453	770.287
10.	-101.286	694.567	-235.721	689.819	-161.939	616.251
						-351.723
No.	Case. 22					
	RX (t)	RY (t)	RX (tm)			
7.	125.029	754.538	247.030			
8.	-266.938	1072.500	-515.756			
9.	15.951	981.003	-8.411			

No.	Case. 1		Case. 2		Case. 3		ROTA. (mmRad)
	X-DIS. (mm)	Y-DIS. (mm)	X-DIS. (mm)	Y-DIS. (mm)	X-DIS. (mm)	Y-DIS. (mm)	
1.	0.49710	2.04306	0.22043	0.90591	0.00306	-0.09166	0.9538
2.	0.49710	-0.21828	0.22043	-0.04332	0.00306	0.00214	0.9538
3.	0.46086	-0.28997	0.20361	-0.04834	0.00464	-0.03753	-0.3716
4.	0.44703	-0.26745	0.20400	-0.03992	0.00098	-0.03860	0.3618
5.	0.42279	-0.21375	0.15408	-0.04171	0.00226	0.00375	-0.0559
6.	0.37805	1.70156	0.19408	1.24984	0.00326	-0.17699	-0.0999
7.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
8.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
9.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
10.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000

No.	Case. 4		Case. 5		Case. 6		ROTA. (mmRad)
	X-DIS. (mm)	Y-DIS. (mm)	X-DIS. (mm)	Y-DIS. (mm)	X-DIS. (mm)	Y-DIS. (mm)	
1.	0.45814	0.81240	-0.23159	-0.08982	-3.38007	-0.35269	0.3499
2.	0.45814	-0.04037	-0.23159	0.00134	-3.38007	-0.00276	0.3499
3.	0.44606	-0.09150	0.23118	-0.03270	-0.84037	0.00300	0.0025
4.	0.44121	-0.03158	-0.23226	-0.08554	1.17325	0.00290	-0.0218
5.	0.44098	-0.00128	-0.24235	-0.03745	3.42280	-0.00337	-0.2929
6.	0.44098	-0.17817	-0.24239	1.07404	3.42280	-0.53055	-0.2929
7.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
8.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
9.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
10.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000

No.	Case. 7		Case. 8		Case. 9		ROTA. (mmRad)
	X-DIS. (mm)	Y-DIS. (mm)	X-DIS. (mm)	Y-DIS. (mm)	X-DIS. (mm)	Y-DIS. (mm)	
1.	6.38345	0.58778	2.08419	0.25384	1.04972	4.31417	-4.6534
2.	6.38314	0.00653	2.08419	0.00089	1.04972	-0.37370	-4.7523
3.	6.38352	-0.00030	2.08594	-0.00103	0.97325	-0.47993	2.3361
4.	6.38233	0.00096	2.07902	0.00286	0.97325	-0.43496	-1.9990
5.	6.38379	-0.00770	-0.46998	-0.00392	0.90368	-0.36384	3.6210
6.	6.38401	-0.85366	2.07376	-0.26472	0.90368	6.03391	3.5321
7.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
8.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
9.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
10.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000

No.	Case. 10		Case. 11		Case. 12		ROTA. (mmRad)
	X-DIS. (mm)	Y-DIS. (mm)	X-DIS. (mm)	Y-DIS. (mm)	X-DIS. (mm)	Y-DIS. (mm)	
1.	0.69104	2.66818	1.44193	4.15968	0.30387	2.67123	-2.9388
2.	0.69104	-0.29769	1.44193	-0.36784	0.30387	-0.29901	-3.0357
3.	0.64364	-0.46375	1.37200	-0.53114	0.25453	-0.43412	0.9318
4.	0.61851	-0.48277	1.34490	-0.42120	0.22872	-0.51022	-1.1742
5.	0.58718	-0.29045	1.31107	-0.29291	0.18351	-0.35688	3.4560
6.	0.58718	3.67965	1.31107	3.67769	0.18351	5.73584	3.5671
7.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
8.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
9.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
10.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000

No.	Case. 13			Case. 14			Case. 15		
	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)
1.	5.82752	4.4743	-4.77010	9.11216	3.59529	-3.85047	3.87060	4.29200	-4.6174
2.	5.82792	-0.35410	-4.86598	9.11175	-0.29260	-3.95336	3.87060	-0.35062	-4.7143
3.	2.12787	-0.52351	1.82590	9.06091	-0.40056	1.03889	3.81025	-0.52084	2.0242
4.	-0.77804	-0.48159	-1.30364	9.04158	-0.36782	-1.32580	3.76881	-0.47350	-1.5112
5.	-4.04020	-0.34397	3.70932	9.01006	-0.30519	1.81675	3.71619	-0.35283	3.0888
6.	-4.04020	6.21090	3.61935	9.01035	2.84484	1.72778	3.71619	5.08691	2.9988
7.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
8.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
9.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
10.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000

No.	Case. 16			Case. 17			Case. 18		
	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)
1.	0.71754	2.94897	-3.18779	0.50016	1.95140	-2.14470	0.95524	2.85546	-3.0913
2.	0.71754	-0.26159	-3.25800	0.50016	-0.21613	-2.21497	0.95524	-0.25605	-3.1010
3.	0.66647	-0.33831	1.69956	0.48530	-0.32751	0.62175	0.90693	-0.38148	1.2224
4.	0.65103	-0.30738	-1.32975	0.44800	-0.30605	-0.36065	0.88824	-0.29904	-0.45889
5.	0.61687	-0.25550	2.48356	0.42505	-0.21104	1.66018	0.86377	-0.21251	1.6668
6.	0.61687	4.12787	2.41908	0.42505	2.70104	1.60170	0.86377	2.09983	1.6019
7.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
8.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
9.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
10.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000

No.	Case. 19			Case. 20			Case. 21		
	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)
1.	0.26551	1.95325	-2.14741	4.10067	3.20999	-3.44361	5.60367	2.31328	-2.7036
2.	0.26551	-0.21694	-2.21762	4.10067	-0.25069	-3.51412	5.60367	-0.21303	-2.7738
3.	0.22959	-0.32268	0.72726	1.51149	-0.37925	1.32545	5.56686	-0.29021	0.7922
4.	0.21177	-0.35299	-0.82988	-0.52129	-0.34888	-0.94618	5.53289	-0.20059	-0.9218
5.	0.18041	-0.25128	2.38355	-2.80367	-0.24938	2.67658	5.52982	-0.21992	1.3901
6.	0.18041	3.95207	2.31507	-2.80367	4.48143	2.61211	5.53000	2.19510	1.3250
7.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
8.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
9.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
10.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000

No.	Case. 22		
	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)
1.	2.80478	3.11014	-3.34594
2.	2.80478	-0.25857	-3.41615
3.	2.76105	-0.37727	1.46684
4.	2.73102	-0.34511	-1.09505
5.	2.69289	-0.25566	2.23826
6.	2.69289	3.68616	2.17378
7.	0.00000	0.00000	0.00000
8.	0.00000	0.00000	0.00000
9.	0.00000	0.00000	0.00000
10.	0.00000	0.00000	0.00000

No	L(m)	Case 1 DEAD LOAD		Case 2 LIVE LOAD		Case 3 LIVE LOAD		N (t)	S (t)
		N (tm)	S (t)	N (tm)	S (t)	N (tm)	S (t)		
1- 2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2- 1	1.000	-1.9.711	-172.081	0.000	0.000	0.000	0.000	0.000	0.000
3- 3	0.000	-541.128	330.641	-103.606	116.028	21.078	-3.741	4.527	0.000
* 1	1.700	-109.518	225.018	-103.606	91.805	11.516	-3.741	4.527	0.000
* 2	3.400	-253.933	189.395	-103.606	67.378	1.558	-3.741	4.527	0.000
* 3	5.100	-368.626	123.772	-103.606	43.352	-8.201	-3.741	4.527	0.000
* 4	6.800	-474.759	48.150	-103.606	19.128	-17.961	-3.741	4.527	0.000
* 5	8.500	-572.334	-27.473	-103.606	5.897	-27.721	-3.741	4.527	0.000
* 6	10.200	-621.351	-103.096	-103.606	2.453	-37.481	-3.741	4.527	0.000
* 7	11.900	-681.808	-178.719	-103.606	1.000	-47.241	-3.741	4.527	0.000
* 8	13.600	-743.707	-254.342	-103.606	58.873	-57.001	-3.741	4.527	0.000
* 9	15.300	-829.963	-329.964	-103.606	-93.931	-66.760	-3.741	4.527	0.000
3- 2	17.000	-1108.172	-405.587	-103.606	-126.222	-76.520	-3.741	4.527	0.000
3- 4	0.000	-654.167	300.180	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 1	1.350	-487.610	249.127	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 2	2.700	-191.825	189.073	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 3	4.050	22.887	129.020	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 4	5.400	136.536	68.966	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 5	6.750	208.097	8.913	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 6	8.100	180.593	-31.140	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 7	9.450	71.018	-111.194	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 8	10.800	-119.620	-171.247	-49.809	3.261	-159.256	55.863	-13.180	0.000
* 9	12.150	-391.330	-231.301	-49.809	3.261	-159.256	55.863	-13.180	0.000
4- 3	13.500	-744.142	-291.554	-49.809	3.261	-159.256	55.863	-13.180	0.000
4- 5	0.000	-884.033	369.084	-78.337	110.200	-32.043	6.879	4.134	0.000
* 1	1.505	-387.961	296.135	-78.337	85.755	-32.043	6.879	4.134	0.000
* 2	3.010	7.344	229.187	-78.337	67.307	-32.043	6.879	4.134	0.000
* 3	4.515	301.892	162.239	-78.337	45.861	-32.043	6.879	4.134	0.000
* 4	6.020	435.682	95.290	-78.337	24.415	-32.043	6.879	4.134	0.000
* 5	7.525	388.715	28.342	-78.337	2.908	-32.043	6.879	4.134	0.000
* 6	9.030	580.991	-38.607	-78.337	21.529	-32.043	6.879	4.134	0.000
* 7	10.535	472.509	-105.555	-78.337	18.478	-32.043	6.879	4.134	0.000
* 8	12.040	263.370	-172.504	-78.337	5.924	-32.043	6.879	4.134	0.000
* 9	13.545	-47.713	-245.141	-78.337	31.728	-32.043	6.879	4.134	0.000
5- 4	15.050	-434.314	-347.215	-78.337	-16.743	-32.043	6.879	4.134	0.000
5- 5	0.000	-108.758	120.886	0.000	0.000	-104.263	20.702	6.879	0.000
6- 5	1.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7- 2	0.000	391.417	-103.606	-322.722	201.372	-43.377	-21.078	4.527	0.000
* 1	1.400	346.369	-103.606	-347.502	141.944	-43.377	-21.078	4.527	0.000
* 2	2.800	201.321	-103.606	-372.282	82.617	-43.377	-21.078	4.527	0.000
* 3	4.200	36.373	-103.606	-397.062	23.386	-43.377	-21.078	4.527	0.000
* 4	5.600	-88.776	-103.606	-421.842	-36.028	-43.377	-21.078	4.527	0.000
7- 2	7.000	-233.824	-103.606	-446.622	-53.366	-43.377	-21.078	4.527	0.000
8- 3	0.000	-243.704	53.756	-714.787	-167.409	36.376	82.706	-17.707	0.000
* 1	1.400	-168.389	53.756	-739.547	-116.203	30.576	57.916	-17.707	0.000
* 2	2.800	-93.074	53.756	-764.327	-64.997	36.576	6.337	-17.707	0.000
* 3	4.200	-17.739	53.756	-789.107	-13.791	36.576	6.337	-17.707	0.000
* 4	5.600	57.356	53.756	-813.887	37.414	36.576	6.337	-17.707	0.000
8- 3	7.000	152.871	53.756	-838.667	86.020	36.576	6.337	-17.707	0.000
9- 9	0.000	133.832	-28.448	-654.438	125.713	-26.242	-41.242	4.527	0.000
* 1	1.400	100.035	-28.448	-679.218	88.974	-26.242	-41.242	4.527	0.000
* 2	2.800	60.228	-28.448	-703.998	52.236	-26.242	-41.242	4.527	0.000
* 3	4.200	20.401	-28.448	-728.778	15.498	-26.242	-41.242	4.527	0.000
* 4	5.600	-19.426	-28.448	-753.558	-21.211	-26.242	-41.242	4.527	0.000
9- 7	7.000	-59.333	-28.448	-778.338	-57.979	-26.242	-41.242	4.527	0.000
10- 5	0.000	-385.416	78.257	-488.102	-157.520	32.043	104.363	6.879	0.000
* 1	1.500	-268.050	78.257	-474.152	-109.456	32.043	104.363	6.879	0.000
* 2	3.000	-140.544	78.257	-511.202	-61.311	32.043	104.363	6.879	0.000
* 3	4.500	-33.358	78.257	-547.552	-13.527	32.043	104.363	6.879	0.000
* 4	6.000	84.127	78.257	-584.002	34.738	32.043	104.363	6.879	0.000
10- 5	7.500	291.313	78.257	-600.852	82.802	32.043	104.363	6.879	0.000

No	L (m)	Case 4 LIVE LOAD		Case 5 LIVE LOAD		Case 6 TEMPERATURE		N (t)	S (t)	N (t)	S (t)
		M (tm)	S (t)	M (tm)	S (t)	M (tm)	S (t)				
1-1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2-1	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3-1	0.000	-168.383	108.140	-34.517	5.367	-3.557	1.155	-83.535	7.393	0.000	7.393
4-1	1.700	55.137	83.915	34.517	3.158	-6.594	1.195	0.970	7.393	-28.446	7.393
5-1	3.100	116.927	58.650	-34.517	-2.951	-3.557	1.195	58.401	7.393	-29.446	7.393
6-1	5.100	197.809	35.463	-34.517	-9.061	-3.557	1.195	-73.832	7.393	-29.446	7.393
7-1	8.500	237.508	13.240	-34.517	-15.170	-3.557	1.195	-33.263	7.393	-29.446	7.393
8-1	6.800	236.024	-12.983	-34.517	-21.479	-3.557	1.195	-20.694	7.393	-29.446	7.393
9-1	10.200	193.358	-37.210	-34.517	-27.389	-3.557	1.195	-8.125	7.393	-29.446	7.393
10-1	11.500	109.510	-61.435	-34.517	-33.436	-3.557	1.195	4.474	7.393	-29.446	7.393
11-1	15.000	-15.521	-85.660	-34.517	-39.507	-3.557	1.195	17.013	7.393	-29.446	7.393
12-1	19.300	-81.734	-109.888	-34.517	-45.717	-3.557	1.195	29.582	7.393	-29.446	7.393
13-1	17.000	-389.130	-134.110	-34.517	-51.825	-3.557	1.153	42.151	7.393	-29.446	7.393
14-1	0.000	-916.695	110.984	-17.472	-122.263	64.004	-14.688	2.519	-0.542	-40.808	-0.542
15-1	1.350	-175.852	91.717	-17.472	-21.844	64.766	-14.688	1.652	-0.542	-40.808	-0.542
16-1	2.700	-68.979	72.509	-17.472	52.605	45.528	-14.688	0.784	-0.542	-40.808	-0.542
17-1	4.050	15.923	53.274	-17.472	101.084	26.231	-14.688	-0.063	-0.542	-40.808	-0.542
18-1	5.400	74.854	34.034	-17.472	123.592	7.054	-14.688	-0.950	-0.542	-40.808	-0.542
19-1	6.750	107.815	14.737	-17.472	120.129	-12.114	-14.688	-1.817	-0.542	-40.808	-0.542
20-1	8.100	114.805	-4.441	-17.472	90.696	-31.421	-14.688	-2.684	-0.542	-40.808	-0.542
21-1	9.450	95.825	-23.678	-17.472	35.291	-50.659	-14.688	-3.552	-0.542	-40.808	-0.542
22-1	10.800	50.874	-42.916	-17.472	-45.083	-59.896	-14.688	-4.419	-0.542	-40.808	-0.542
23-1	12.150	-20.048	-62.153	-17.472	-53.428	-69.334	-14.688	-5.286	-0.542	-40.808	-0.542
24-1	13.500	-116.940	-81.391	-17.472	-286.744	-108.371	-14.688	-6.153	-0.542	-40.808	-0.542
25-1	0.000	-45.515	3.210	-0.745	-321.518	120.747	-25.029	45.054	-8.416	-23.820	-8.416
26-1	1.500	-41.084	3.210	-0.745	-156.323	99.300	-25.029	32.427	-8.416	-23.820	-8.416
27-1	3.010	-36.253	3.210	-0.745	-23.024	77.854	-23.029	15.761	-8.416	-23.820	-8.416
28-1	4.515	-31.422	3.210	-0.745	78.008	56.408	-23.029	7.094	-8.416	-23.820	-8.416
29-1	6.020	-26.591	3.210	-0.745	146.764	34.562	-23.029	-5.573	-8.416	-23.820	-8.416
30-1	7.525	-21.760	3.210	-0.745	183.245	13.515	-23.029	-18.240	-8.416	-23.820	-8.416
31-1	9.030	-16.929	3.210	-0.745	187.445	-7.531	-23.029	-30.907	-8.416	-23.820	-8.416
32-1	10.535	-12.098	3.210	-0.745	159.371	-29.377	-23.029	-43.574	-8.416	-23.820	-8.416
33-1	12.040	-7.267	3.210	-0.745	99.020	-50.823	-23.029	-56.240	-8.416	-23.820	-8.416
34-1	13.545	-2.436	3.210	-0.745	-72.370	-62.370	-23.029	-68.907	-8.416	-23.820	-8.416
35-1	15.050	2.395	3.210	-0.745	-118.512	-53.716	-23.029	-81.574	-8.416	-23.820	-8.416
36-1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37-1	1.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38-1	0.000	168.383	-34.517	108.140	-8.267	1.195	3.594	83.539	-29.446	-7.393	-29.446
39-1	1.400	120.059	-34.517	108.140	-1.355	1.195	3.594	42.812	-29.446	-7.393	-29.446
40-1	2.800	71.735	-34.517	108.140	-5.922	1.195	3.594	1.031	-29.446	-7.393	-29.446
41-1	4.200	28.410	-34.517	108.140	-11.249	1.195	3.594	-40.133	-29.446	-7.393	-29.446
42-1	5.600	-24.914	-34.517	108.140	-16.576	1.195	3.594	-81.657	-29.446	-7.393	-29.446
43-1	7.000	-73.238	-34.517	108.140	-20.903	1.195	3.594	-122.687	-29.446	-7.393	-29.446
44-1	0.000	73.435	17.045	-25.094	70.488	-15.683	-87.497	39.632	-11.363	8.026	-11.363
45-1	1.500	-48.522	17.045	-25.094	-48.201	-15.683	-87.497	23.774	-11.363	8.026	-11.363
46-1	3.000	-24.708	17.045	-25.094	25.994	-15.683	-87.497	1.858	-11.363	8.026	-11.363
47-1	4.500	-0.845	17.045	-25.094	3.778	-15.683	-87.497	-6.092	-11.363	8.026	-11.363
48-1	6.000	33.019	17.045	-25.094	-8.558	-15.683	-87.497	-7.000	-11.363	8.026	-11.363
49-1	7.500	66.862	17.045	-25.094	-10.745	-15.683	-87.497	-68.906	-11.363	8.026	-11.363
50-1	0.000	-11.023	16.727	-84.601	27.114	-8.341	-235.118	0.000	11.363	8.026	11.363
51-1	1.500	-17.608	16.727	-84.601	23.477	-8.341	-235.118	-60.355	11.363	8.026	11.363
52-1	3.000	-34.491	16.727	-84.601	11.820	-8.341	-235.118	-5.218	11.363	8.026	11.363
53-1	4.500	-51.373	16.727	-84.601	0.143	-8.341	-235.118	-11.706	11.363	8.026	11.363
54-1	6.000	-68.256	16.727	-84.601	-11.537	-8.341	-235.118	-20.650	11.363	8.026	11.363
55-1	7.500	-85.139	16.727	-84.601	-23.411	-8.341	-235.118	-33.575	11.363	8.026	11.363
56-1	0.000	2.395	0.745	3.210	-18.532	23.029	-93.516	-81.574	23.820	-8.416	23.820
57-1	1.500	3.514	0.745	3.210	-33.668	23.029	-93.516	-73.873	23.820	-8.416	23.820
58-1	3.000	-1.632	0.745	3.210	-59.724	23.029	-93.516	-47.115	23.820	-8.416	23.820
59-1	4.500	5.750	0.745	3.210	-85.800	23.029	-93.516	-20.357	23.820	-8.416	23.820
60-1	6.000	0.868	0.745	3.210	-111.876	23.029	-93.516	13.473	23.820	-8.416	23.820
61-1	7.500	7.987	0.745	3.210	-137.952	23.029	-93.516	-12.072	23.820	-8.416	23.820

No	Case 7 SEISMIC		Case 8 COLLISION FOR PILLAR		Case 9	
	L(m)	M (tm)	S (t)	N (t)	M (tm)	N (t)
1- 2	0.000	0.000	0.000	0.000	0.000	0.000
2- 1	1.000	0.000	0.000	0.000	0.000	0.000
2- 3	0.000	168.289	-17.488	36.009	-43.437	16.426
* 1	1.700	138.558	-17.488	28.418	39.405	16.426
* 2	3.400	108.829	-17.488	20.886	35.374	16.426
* 3	5.100	79.099	-17.488	13.324	27.311	16.426
* 4	6.800	48.369	-17.488	5.763	16.426	16.426
* 5	8.500	19.659	-17.488	-1.799	23.280	16.426
* 6	10.200	-10.051	-17.488	-8.248	19.218	16.426
* 7	11.900	-39.821	-17.488	-16.922	15.117	16.426
* 8	13.600	-69.551	-17.488	-24.484	11.185	16.426
* 9	15.300	-99.281	-17.488	-32.045	7.154	16.426
3- 2	17.000	-129.011	-17.488	-39.607	3.123	16.426
3- 4	0.000	112.827	-16.686	29.359	-22.478	-39.301
* 1	1.300	90.301	-16.686	23.369	-21.973	-39.301
* 2	2.700	67.775	-16.686	17.359	-21.468	-39.301
* 3	4.050	45.249	-16.686	11.354	-20.963	-39.301
* 4	5.400	22.723	-16.686	5.349	-20.457	-39.301
* 5	6.750	0.197	-16.686	-0.655	-19.952	-39.301
* 6	8.100	-22.320	-16.686	-6.660	-19.447	-39.301
* 7	9.450	-44.856	-16.686	-12.665	-18.942	-39.301
* 8	10.800	-67.382	-16.686	-18.670	-18.436	-39.301
* 9	12.150	-89.908	-16.686	-24.675	-17.931	-39.301
4- 3	13.500	-112.434	-16.686	-30.679	-17.426	-39.301
4- 5	0.000	129.980	-19.250	38.419	53.621	-16.976
* 1	1.505	101.010	-19.250	32.423	42.650	-16.976
* 2	3.010	73.039	-19.250	26.430	31.679	-16.976
* 3	4.515	45.066	-19.250	20.436	20.708	-16.976
* 4	6.020	14.097	-19.250	14.442	9.738	-16.976
* 5	7.525	-14.874	-19.250	8.448	-1.233	-16.976
* 6	9.030	-48.843	-19.250	-7.546	-12.204	-16.976
* 7	10.535	-73.816	-19.250	-16.441	-25.175	-16.976
* 8	12.040	-101.787	-19.250	-25.336	-38.146	-16.976
* 9	13.545	-130.758	-19.250	-34.227	-51.117	-16.976
5- 4	15.050	-159.728	-19.250	-43.118	-64.086	-16.976
5- 5	0.000	0.000	0.000	0.000	0.000	0.000
5- 6	1.800	0.000	0.000	0.000	0.000	0.000
2- 7	0.000	-168.289	53.217	17.488	-43.437	16.426
* 1	1.400	-92.051	55.695	17.488	-20.440	16.426
* 2	2.800	-12.345	58.173	17.488	2.557	16.426
* 3	4.200	76.834	60.651	17.488	2.557	16.426
* 4	5.600	157.480	63.129	17.488	48.531	16.426
7- 2	7.000	247.595	65.607	17.488	71.536	16.426
3- 8	0.000	-241.839	68.076	-0.802	23.601	-55.728
* 1	1.400	-142.538	71.454	-0.802	12.418	-55.728
* 2	2.800	-41.739	73.932	-0.802	1.232	-55.728
* 3	4.200	62.470	76.410	-0.802	0.046	-55.728
* 4	5.600	173.118	78.888	-0.802	63.526	-55.728
8- 3	7.000	284.335	81.366	-0.802	86.507	-55.728
4- 9	0.000	-242.413	69.098	2.354	-71.017	22.325
* 1	1.400	-143.913	71.576	2.354	-59.732	22.325
* 2	2.800	-42.001	74.054	2.354	-48.449	22.325
* 3	4.200	63.410	76.532	2.354	-37.166	22.325
* 4	5.600	172.289	79.010	2.354	-25.883	22.325
9- 4	7.000	284.658	81.486	2.354	-14.599	22.325
5- 10	0.000	-139.728	44.655	-19.250	56.088	16.976
* 1	1.500	-80.659	47.550	-19.250	45.802	16.976
* 2	3.000	-17.660	50.005	-19.250	35.516	16.976
* 3	4.500	59.319	52.660	-19.250	25.230	16.976
* 4	6.000	140.899	55.315	-19.250	14.944	16.976
10- 5	7.500	225.563	57.970	-19.250	4.658	16.976





No	Case 13			Case 14			Case 15			N (t)
	L(m)	M (tm)	S (t)	N (t)	M (tm)	S (t)	N (t)	M (tm)	S (t)	
1- 2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2- 1	1.000	-206.602	-237.472	-237.472	-206.602	-237.472	-22.715	-206.602	-237.472	0.000
2- 3	0.000	-1019.965	633.508	-153.101	-662.615	460.800	-55.442	-1073.482	632.808	-173.540
* 1	1.700	-67.722	487.718	-153.101	52.039	356.440	-109.428	-114.850	495.018	-173.540
* 2	3.400	644.277	349.826	-153.101	343.282	322.061	-115.407	609.1580	337.328	-173.540
* 3	5.100	1122.033	212.438	-153.101	889.114	147.721	-123.388	1099.746	319.358	-173.540
* 4	6.800	1365.547	74.348	-153.101	1051.335	43.362	-135.369	1355.670	81.648	-173.540
* 5	8.500	1374.817	-63.442	-153.101	1086.545	-40.997	-143.351	1377.351	-56.142	-173.540
* 6	10.200	1149.845	-201.332	-153.101	844.144	-85.537	-153.382	1164.789	-93.532	-173.540
* 7	11.900	690.650	-339.032	-153.101	474.332	-209.716	-163.313	717.983	-331.722	-173.540
* 8	13.600	-0.823	-476.812	-153.101	-72.892	-374.076	-173.295	36.935	-169.511	-173.540
* 9	15.300	-930.530	-614.602	-153.101	-797.526	-478.435	-185.276	-878.355	-607.801	-173.540
3- 2	17.000	-3092.474	-783.392	-153.101	-1695.572	-582.795	-195.237	-3027.890	-743.051	-172.540
3- 4	0.000	-1582.598	564.379	-36.575	-1044.033	404.645	-29.970	-1610.017	563.977	-149.166
* 1	1.350	-894.546	451.057	-36.575	361.703	321.765	-37.897	-322.507	454.565	-149.166
* 2	2.700	-358.213	345.556	-36.575	-176.256	238.895	-45.823	-382.717	345.134	-149.166
* 3	4.050	38.401	326.115	-36.575	91.313	156.022	-53.749	6.352	235.742	-149.166
* 4	5.400	283.286	126.693	-36.575	246.003	73.128	-61.626	253.706	126.251	-149.166
* 5	6.750	380.472	17.272	-36.575	288.813	-9.726	-68.602	330.390	16.870	-149.166
* 6	8.100	329.929	-92.150	-36.575	213.743	-92.559	-77.528	299.254	-92.552	-149.166
* 7	9.450	131.668	-301.571	-36.575	38.795	-175.473	-85.445	100.445	-301.573	-149.166
* 8	10.800	-214.333	-310.993	-36.575	-254.034	-358.347	-93.581	-246.074	-311.565	-149.166
* 9	12.150	-708.013	-420.414	-36.575	-668.742	-441.220	-101.907	-740.316	-420.816	-149.166
4- 3	13.500	-1349.431	-329.836	-36.575	-1175.339	-424.094	-109.234	-1382.278	-530.238	-149.166
4- 5	0.000	-1677.756	674.059	-109.537	-1048.378	473.646	-77.882	-1538.274	652.1564	-169.536
* 1	1.505	-754.188	552.674	-109.537	-402.083	383.237	-60.118	-648.959	530.579	-169.536
* 2	3.010	-13.206	430.650	-109.537	103.226	290.868	-74.935	-7.765	408.555	-169.536
* 3	4.515	542.189	308.705	-109.537	473.460	198.480	-83.791	500.910	286.610	-169.536
* 4	6.020	914.997	186.721	-109.537	702.650	106.051	-92.628	500.495	164.623	-169.536
* 5	7.525	1104.218	64.736	-109.537	792.784	13.702	-101.464	1076.432	42.641	-169.536
* 6	9.030	1109.532	-57.249	-109.537	743.882	-78.687	-110.300	1048.813	-79.344	-169.536
* 7	10.535	921.889	-179.253	-109.537	555.946	-171.076	-119.137	837.507	-201.323	-169.536
* 8	12.040	570.339	-301.218	-109.537	228.535	-263.483	-137.973	442.814	-323.313	-169.536
* 9	13.545	23.871	-432.434	-109.537	-268.444	-365.064	-137.933	-156.928	-434.339	-169.536
5- 4	15.050	-754.173	-601.512	-109.537	-892.856	-504.567	-151.035	-548.423	-823.607	-169.536
5- 6	0.000	-150.141	166.823	0.000	-150.141	166.823	15.957	-150.141	166.823	0.000
6- 3	1.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2- 7	0.000	807.363	-153.101	-862.980	456.013	-72.729	-692.272	865.881	-172.540	-870.280
* 1	1.400	593.031	-153.101	-897.176	356.482	-69.458	-732.468	825.324	-172.540	-904.476
* 2	2.800	378.679	-153.101	-951.373	241.690	-66.168	-766.664	583.768	-172.540	-938.675
* 3	4.200	164.337	-153.101	-985.568	111.137	-62.917	-800.861	142.211	-172.540	-972.865
* 4	5.600	-80.005	-153.101	-999.765	63.883	-59.648	-835.057	-99.345	-172.540	-1007.066
7- 2	7.000	-264.347	-153.101	-1033.552	4.149	-50.375	-869.254	-340.501	-172.540	-1041.262
3- 8	0.000	-509.876	116.527	-1316.770	-655.339	165.287	-937.438	-417.873	23.374	-1309.068
* 1	1.400	-346.738	116.527	-1350.967	-421.848	168.538	-1021.834	-583.140	23.374	-1343.365
* 2	2.800	-183.601	116.527	-1385.163	-183.578	171.825	-1055.830	-352.456	23.374	-1377.861
* 3	4.200	-20.464	116.527	-1419.360	59.272	175.100	-1090.027	-133.403	161.574	-1411.857
* 4	5.600	142.674	116.527	-1453.556	308.701	178.371	-1124.223	198.020	368.374	-1443.834
8- 3	7.000	503.811	116.527	-1487.752	538.710	181.642	-1168.420	711.743	358.374	-1480.050
4- 9	0.000	328.325	-73.013	-1201.495	-126.931	51.952	-899.740	146.936	-20.770	-1182.802
* 1	1.400	226.107	-73.013	-1238.691	-51.929	55.223	-923.937	17.919	-20.770	-1216.998
* 2	2.800	123.888	-73.013	-1272.887	27.073	58.494	-958.133	66.813	-20.770	-1251.154
* 3	4.200	21.672	-73.013	-1307.084	111.854	61.765	-1002.329	59.783	-20.770	-1285.351
* 4	5.600	-80.546	-73.013	-1341.280	200.644	65.036	-1056.526	40.683	-20.770	-1319.547
9- 4	7.000	-182.764	-73.013	-1375.477	293.933	68.307	-1070.722	11.607	-20.770	-1353.744
5- 10	0.000	-604.033	109.587	-768.035	-742.716	166.592	-671.390	-798.062	168.536	-750.430
* 1	1.500	-459.632	109.587	-804.974	-463.599	170.497	-708.029	-543.180	169.536	-827.069
* 2	3.000	-275.271	109.587	-841.013	-231.226	174.001	-744.683	-288.273	165.536	-883.708
* 3	4.500	-110.860	109.587	-878.552	-84.504	177.506	-781.307	-128.277	169.536	-900.347
* 4	6.000	59.451	109.587	-916.091	301.231	181.010	-817.946	231.534	165.536	-936.886
10- 5	7.500	217.672	109.587	-953.630	573.445	184.515	-854.585	476.438	169.536	-973.025

No	Case 16			Case 17			Case 18		
	L(m)	N (t)	S (t)	N (t)	S (t)	N (t)	S (t)	N (t)	
1- 2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
2- 1	1.000	-149.711	-172.081	-149.711	-172.081	-149.711	-172.081	-149.711	
2- 3	0.000	-842.400	466.669	-830.050	344.900	-809.512	458.781	-138.123	
1- 1	1.700	-133.934	266.821	-98.000	269.217	-95.079	269.217	-138.123	
* 2	3.400	104.782	266.974	-45.983	295.451	-55.079	328.933	-138.123	
* 3	5.100	773.777	167.126	-145.983	560.424	-99.079	410.860	-138.123	
* 4	6.800	973.020	67.278	-145.983	896.758	-99.079	750.434	-138.123	
* 5	8.500	1002.522	-32.570	-145.983	704.614	-99.079	55.350	-138.123	
* 6	10.200	862.882	-132.448	-45.983	583.870	-99.079	968.559	-138.123	
* 7	11.900	552.302	-232.268	-145.983	374.568	-99.079	874.709	-138.123	
* 8	13.600	72.580	-332.113	-43.993	184.460	-99.079	240.154	-138.123	
* 9	15.300	-576.883	-431.961	-145.983	-59.713	-99.079	-340.092	-138.123	
3- 2	17.000	-1396.088	-531.809	-145.983	-111.338	-99.079	-338.849	-138.123	
3- 4	0.000	-884.975	313.741	-55.611	-1023.693	405.043	-1181.163	-67.281	
* 1	1.350	-603.715	253.388	-55.611	-530.406	323.752	-667.462	-67.281	
* 2	2.700	-303.528	192.534	-55.611	-144.161	246.462	-360.805	-67.281	
* 3	4.050	-84.412	132.281	-55.611	135.041	167.117	-38.810	-67.281	
* 4	5.400	53.631	72.228	-55.611	307.200	87.800	182.281	-67.281	
* 5	6.750	110.602	12.174	-55.611	372.316	8.589	103.001	-67.281	
* 6	8.100	86.501	-47.879	-55.611	330.389	-70.702	295.398	-67.281	
* 7	9.450	-18.672	-107.933	-55.611	181.420	-149.993	166.842	-67.281	
* 8	10.800	-204.917	-167.985	-55.611	-74.592	-239.284	-68.756	-67.281	
* 9	12.150	-472.234	-228.039	-55.611	-437.646	-308.575	-411.358	-67.281	
4- 3	13.500	-820.623	-388.093	-55.611	-507.743	-387.866	-861.082	-67.281	
4- 5	0.000	-1086.218	473.283	-110.300	-950.843	369.962	-928.539	-79.003	
* 1	1.505	-440.443	384.889	-110.300	-600.428	365.014	-528.045	-79.003	
* 2	3.010	72.258	296.484	-110.300	-54.771	336.086	-28.508	-79.003	
* 3	4.515	452.004	208.089	-110.300	250.129	169.117	270.470	-79.003	
* 4	6.020	958.077	119.703	-110.300	454.272	102.169	468.091	-79.003	
* 5	7.525	812.316	31.310	-110.300	557.657	55.230	58.500	-79.003	
* 6	9.030	792.920	-57.036	-110.300	560.285	-21.728	566.955	-79.003	
* 7	10.535	640.491	-148.479	-110.300	462.155	-88.077	304.062	-79.003	
* 8	12.040	353.874	-233.874	-110.300	263.268	-163.625	400.411	-79.003	
* 9	13.545	-64.456	-328.958	-110.300	-37.363	-239.363	256.003	-79.003	
5- 4	15.050	-851.734	-451.478	-110.300	-173.511	-340.337	-50.149	-79.003	
5- 5	0.000	-108.798	120.886	0.000	-108.798	120.886	-108.798	0.000	
6- 5	1.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
2- 7	0.000	692.589	-145.983	-638.750	470.339	-99.079	-138.123	-630.802	
* 1	1.400	488.313	-145.983	-663.530	331.629	-99.079	659.800	-630.802	
* 2	2.800	383.938	-145.983	-688.310	192.919	-99.079	465.428	-630.802	
* 3	4.200	79.562	-145.983	-713.090	54.205	-99.079	279.055	-630.802	
* 4	5.600	-124.814	-145.983	-737.870	-84.502	-99.079	79.683	-630.802	
7- 2	7.000	-329.190	-145.983	-762.650	-223.212	-99.079	-113.690	-630.802	
3- 8	0.000	-411.113	90.372	-844.250	-160.999	35.090	-307.062	-75.762	
* 1	1.400	-248.592	90.372	-869.030	-110.473	35.090	-316.139	-75.762	
* 2	2.800	-158.072	90.372	-893.810	-58.648	35.090	-310.961	-75.762	
* 3	4.200	-61.551	90.372	-918.590	-9.422	35.090	-217.783	-75.762	
* 4	5.600	54.870	90.372	-943.370	41.103	35.090	-16.604	-75.762	
8- 3	7.000	231.491	90.372	-968.150	91.629	35.090	80.574	-75.762	
4- 9	0.000	293.594	-54.650	-761.370	59.100	-11.134	179.753	70.842	
* 1	1.400	183.029	-54.650	-786.156	43.512	-11.134	68.837	70.842	
* 2	2.800	112.484	-54.650	-810.936	27.924	-11.134	52.447	70.842	
* 3	4.200	33.698	-54.650	-835.716	12.337	-11.134	36.037	70.842	
* 4	5.600	-40.667	-54.650	-860.496	-3.251	-11.134	19.627	70.842	
9- 4	7.000	-117.232	-54.650	-885.276	-18.839	-11.134	3.218	70.842	
5- 10	0.000	-542.936	110.300	-572.364	-364.714	74.133	-383.021	-79.003	
* 1	1.500	-377.486	110.300	-598.914	-163.529	74.133	-64.517	-79.003	
* 2	3.000	-212.036	110.300	-625.464	-42.345	74.133	209.500	-79.003	
* 3	4.500	-46.585	110.300	-652.014	-31.600	74.133	-46.012	-79.003	
* 4	6.000	118.865	110.300	-678.564	80.025	74.133	-27.508	-79.003	
10- 5	7.500	264.316	110.300	-705.114	191.209	74.133	50.586	-79.003	



Case 22				
No	L(m)	M (tm)	S (t)	N (t)
1- 2	0.000	0.000	0.000	0.000
2- 1	1.000	-149.711	-172.081	0.000
2- 3	0.000	-777.886	458.557	-125.029
* 1	1.700	-83.210	358.709	-125.029
* 2	3.400	441.724	258.861	-125.029
* 3	5.100	796.918	159.013	-125.029
* 4	6.800	982.370	59.165	-125.029
* 5	8.500	998.080	-40.682	-125.029
* 6	10.200	844.050	-140.530	-125.029
* 7	11.900	520.278	-240.378	-125.029
* 8	13.600	26.765	-340.226	-125.029
* 9	15.300	-636.490	-440.074	-125.029
3- 2	17.000	-1469.485	-539.921	-125.029
3- 4	0.000	-1166.679	408.679	-108.092
* 1	1.350	-668.484	329.388	-108.092
* 2	2.700	-277.331	250.097	-108.092
* 3	4.050	6.778	170.806	-108.092
* 4	5.400	183.845	91.515	-108.092
* 5	6.750	253.869	12.224	-108.092
* 6	8.100	216.851	-67.067	-108.092
* 7	9.450	72.789	-146.358	-108.092
* 8	10.800	-178.315	-225.648	-108.092
* 9	12.150	-536.461	-304.939	-108.092
4- 3	13.500	-1001.651	-384.230	-108.092
4- 5	0.000	-1115.416	472.872	-123.142
* 1	1.505	-470.260	384.478	-123.142
* 2	3.010	41.862	296.083	-123.142
* 3	4.515	420.950	207.688	-123.142
* 4	6.020	667.004	119.294	-123.142
* 5	7.525	780.024	30.899	-123.142
* 6	9.030	760.010	-57.496	-123.142
* 7	10.535	606.962	-145.890	-123.142
* 8	12.040	320.880	-234.285	-123.142
* 9	13.545	-99.223	-329.369	-123.142
5- 4	15.050	-687.120	-451.889	-123.142
5- 6	0.000	-108.798	120.886	0.000
6- 5	1.800	0.000	0.000	0.000
2- 7	0.000	628.174	-125.029	-630.638
* 1	1.400	453.133	-125.029	-655.418
* 2	2.800	278.093	-125.029	-680.198
* 3	4.200	103.052	-125.029	-704.978
* 4	5.600	-71.989	-125.029	-729.758
7- 2	7.000	-247.030	-125.029	-754.538

Case 22				
部材No	L(m)	M (tm)	S (t)	N (t)
3- 8	0.000	-302.807	16.938	-948.600
* 1	1.400	-279.094	16.938	-973.380
* 2	2.800	-255.381	16.938	-998.160
* 3	4.200	-96.669	116.938	-1022.940
* 4	5.600	142.044	266.938	-1047.720
8- 3	7.000	515.756	266.938	-1072.500
4- 9	0.000	113.765	-15.051	-857.103
* 1	1.400	92.695	-15.051	-881.883
* 2	2.800	71.624	-15.051	-906.663
* 3	4.200	50.553	-15.051	-931.443
* 4	5.600	29.482	-15.051	-956.223
9- 4	7.000	8.411	-15.051	-981.003
5- 10	0.000	-578.322	123.142	-572.776
* 1	1.500	-393.609	123.142	-599.326
* 2	3.000	-208.895	123.142	-625.876
* 3	4.500	-24.182	123.142	-652.426
* 4	6.000	160.532	123.142	-678.976
10- 5	7.500	345.245	123.142	-705.526

PICK-UP NO 1 ULS

M. MAXIMUM

M. MAXIMUM

No.	L (m)	Case	M (km)	S (t)	X (t)	Case	M (km)	S (t)	X (t)
1	2	0.000	C-9	0.000	0.000	C-10	0.000	0.000	0.000
2	1	1.000	C-13	-206.602	-237.472	C-12	-206.602	-237.472	0.000
3	2	0.000	C-14	-662.616	460.800	C-9	-1216.816	673.931	-212.886
4	1	3.700	C-14	32.039	356.440	C-9	-191.474	581.000	-312.888
5	2	3.400	C-13	644.277	249.928	C-12	400.758	289.236	-141.003
6	3	5.100	C-9	1132.502	242.339	C-12	789.783	164.476	-141.003
7	4	6.800	C-9	1412.497	58.008	C-10	956.732	50.974	-138.506
8	5	8.500	C-9	1456.430	-46.322	C-10	964.382	-47.386	-138.506
9	6	10.200	C-9	1235.001	-130.653	C-10	795.631	-151.745	-133.506
10	7	11.900	C-9	808.309	-334.984	C-10	448.249	-256.103	-133.506
11	8	13.600	C-9	116.656	-779.275	C-10	-73.133	-380.484	-133.506
12	9	15.300	C-9	-741.807	-661.280	C-11	-986.337	-636.661	-139.830
13	10	17.000	C-12	-1614.789	-365.640	C-11	-1717.342	-780.952	-189.830
14	1	0.000	C-14	-1044.033	404.643	C-11	-1715.512	609.792	-97.566
15	2	1.350	C-14	-533.705	321.769	C-11	-966.638	463.177	-97.566
16	3	2.700	C-14	-175.256	238.895	C-9	-49.078	260.302	-78.309
17	4	4.050	C-10	216.637	240.866	C-8	-145.460	183.428	-78.309
18	5	5.400	C-10	464.617	126.381	C-9	-46.228	100.555	-78.309
19	6	6.750	C-10	537.863	11.765	C-9	126.037	17.667	-78.309
20	7	8.100	C-10	496.282	-102.850	C-9	95.947	-65.193	-78.309
21	8	9.450	C-10	240.189	-317.466	C-5	-45.983	-148.066	-78.309
22	9	10.800	C-11	-81.148	-307.132	C-9	-305.812	-230.940	-78.309
23	10	12.150	C-11	-573.142	-21.748	C-2	-753.200	-268.266	-52.873
24	11	13.500	C-9	-1153.110	-395.688	C-12	-1500.044	-580.881	-52.873
25	1	0.000	C-14	-1048.378	475.646	C-12	-1731.117	700.288	-143.933
26	2	1.505	C-14	-402.053	383.257	C-12	-793.335	572.513	-143.933
27	3	3.010	C-9	17.308	227.333	C-10	-82.353	327.613	-101.174
28	4	4.515	C-9	664.296	299.560	C-10	331.202	235.239	-101.174
29	5	6.020	C-9	1018.983	171.785	C-10	615.714	122.830	-101.174
30	6	7.525	C-9	1211.368	44.009	C-10	761.160	50.401	-101.174
31	7	9.030	C-9	1121.431	-83.766	C-14	743.882	-178.687	-110.300
32	8	10.535	C-13	941.689	-179.233	C-14	555.946	-171.076	-110.300
33	9	12.040	C-13	570.359	-301.218	C-14	228.943	-263.465	-117.973
34	10	13.545	C-13	-23.871	-322.434	C-14	-238.444	-335.084	-137.633
35	11	15.050	C-10	-647.856	-467.808	C-13	-648.235	-533.607	-159.533
36	1	0.000	C-11	-150.141	166.823	C-9	-150.141	166.823	0.000
37	2	1.800	C-14	0.000	0.000	C-13	0.000	0.000	0.000
38	3	0.000	C-9	1010.354	-312.898	C-14	450.013	-72.729	-696.272
39	4	1.400	C-9	712.197	-112.898	C-14	350.483	-65.438	-732.468
40	5	2.800	C-9	474.141	-312.898	C-14	261.530	-60.188	-760.664
41	6	4.200	C-14	171.557	-62.817	C-9	70.645	-11.603	-818.016
42	7	5.600	C-14	85.563	-59.646	C-9	-18.973	-24.898	-1045.887
43	8	7.000	C-14	4.145	-56.373	C-9	-180.050	-212.888	-1083.783
44	9	0.000	C-10	-199.848	45.023	C-14	-632.335	162.287	-887.438
45	10	1.400	C-10	-156.816	45.023	C-9	-234.112	134.559	-1324.292
46	11	2.800	C-10	-73.763	45.023	C-15	-352.426	23.374	-1377.463
47	12	4.200	C-14	59.272	175.100	C-15	-333.403	161.374	-1411.687
48	13	5.600	C-14	306.701	178.371	C-12	48.687	48.032	-1267.700
49	14	7.000	C-15	711.743	368.374	C-10	115.512	-45.023	-1325.006
50	1	0.000	C-9	-50.453	-82.537	C-14	-126.931	51.932	-895.740
51	2	1.400	C-9	165.304	-82.537	C-14	-71.929	51.233	-933.937
52	3	2.800	C-9	111.854	61.765	C-14	27.673	38.492	-888.233
53	4	4.200	C-14	200.614	63.036	C-10	12.546	-10.690	-1176.507
54	5	5.600	C-14	256.953	68.307	C-13	-182.754	-73.013	-1341.280
55	6	7.000	C-14	-457.716	101.174	C-13	-798.081	165.526	-1375.477
56	7	8.400	C-10	-345.952	101.174	C-9	-150.784	160.806	-790.430
57	8	9.800	C-10	-194.193	101.174	C-9	-108.185	160.886	-854.635
58	9	11.200	C-14	32.404	171.306	C-13	-10.830	109.587	-876.252
59	10	12.600	C-14	301.251	181.010	C-13	53.491	109.587	-914.651
60	11	14.000	C-14	575.433	184.515	C-13	217.372	109.587	-931.530

# PICK-UP NO1 ULS

## S - M I N I M U M

## S - M A X I M U M

No.	L (m)	Case	N (km)	S (t)	N (t)	Case	M (km)	S (t)	N (t)
1	0.000	C-13	0.000	0.000	0.000	C-9	0.000	0.000	0.000
2	1.000	C-13	-206.602	-237.472	0.000	C-9	-206.602	-237.472	0.000
3	0.000	C-9	-216.856	675.331	-112.898	C-14	-562.615	460.800	-93.422
4	1.700	C-9	-391.474	531.000	-312.898	C-14	32.039	335.440	-10.425
5	3.400	C-9	338.345	386.070	-212.898	C-14	348.232	232.281	-13.507
6	5.100	C-9	123.202	242.539	-112.858	C-14	68.114	147.721	-13.388
7	6.800	C-9	112.497	98.008	-212.898	C-14	103.333	43.362	-13.365
8	8.500	C-9	675.511	-33.843	-142.005	C-14	137.817	-63.442	-13.101
9	10.200	C-12	312.773	-148.202	-141.005	C-14	117.506	-203.889	-19.530
10	11.900	C-12	471.624	-322.561	-141.005	C-11	707.537	-348.000	-19.930
11	13.600	C-12	46.436	-350.521	-141.005	C-11	5.564	-348.000	-19.930
12	15.300	C-12	471.907	-451.389	-141.005	C-11	-906.337	-656.001	-199.330
13	17.000	C-12	-1614.789	-363.640	-141.005	C-11	-2171.342	-780.992	-159.330
14	0.000	C-11	1715.512	609.792	-97.566	C-14	-1048.033	404.543	-29.970
15	1.300	C-11	-389.658	495.177	-97.566	C-14	533.703	321.765	-37.857
16	2.700	C-11	-378.535	380.561	-97.566	C-14	-175.256	238.595	-35.825
17	4.050	C-11	37.857	265.946	-97.566	C-14	67.313	156.922	-33.745
18	5.400	C-11	339.518	151.330	-97.566	C-14	246.003	73.448	-31.670
19	6.750	C-11	466.448	35.714	-97.566	C-14	286.813	-9.726	-29.602
20	8.100	C-9	93.067	-65.195	-78.309	C-12	398.866	-122.419	-92.973
21	9.450	C-9	-49.583	-148.066	-78.309	C-12	146.335	-237.034	-92.573
22	10.800	C-9	-305.812	-230.940	-78.309	C-12	-241.127	-351.650	-92.973
23	12.150	C-9	-673.521	-313.814	-78.309	C-12	-793.320	-466.566	-92.573
24	13.500	C-9	-1153.110	-396.688	-78.309	C-12	-1300.044	-580.881	-92.973
25	0.000	C-12	1751.117	700.285	-145.993	C-14	-1048.378	73.646	-37.282
26	1.505	C-12	-291.535	572.513	-145.993	C-14	402.053	363.257	-30.116
27	3.010	C-12	-27.834	444.737	-145.993	C-14	103.236	390.868	-24.513
28	4.515	C-12	316.325	316.962	-145.993	C-14	473.400	198.480	-23.731
29	6.020	C-12	926.202	189.187	-145.993	C-14	702.630	106.081	-22.528
30	7.525	C-12	1104.218	64.736	-109.587	C-14	733.794	13.702	-21.464
31	9.030	C-10	767.602	-41.928	-101.174	C-9	1131.451	-83.766	-160.866
32	10.535	C-10	634.975	-134.315	-101.174	C-9	939.333	-211.541	-160.866
33	12.040	C-10	363.309	-326.705	-101.174	C-9	514.713	-328.316	-160.866
34	13.545	C-10	-48.786	-328.525	-101.174	C-9	-93.470	-470.322	-160.866
35	15.050	C-10	-647.836	-467.808	-101.174	C-9	-541.923	-631.151	-160.866
36	0.000	C-9	-150.141	166.823	0.000	C-13	-150.141	166.823	0.000
37	1.800	C-14	0.000	0.000	0.000	C-13	0.000	0.000	0.000
38	0.000	C-14	356.013	-72.729	-698.232	C-9	1010.254	-212.898	-912.603
39	1.400	C-14	356.482	-69.438	-733.488	C-9	712.197	-212.898	-912.603
40	2.800	C-14	261.530	-66.188	-766.664	C-9	714.141	-212.898	-912.603
41	4.200	C-14	171.157	-62.917	-800.861	C-9	116.084	-212.898	-912.603
42	5.600	C-14	85.365	-59.646	-835.037	C-9	181.973	-212.898	-912.603
43	7.000	C-14	4.149	-56.373	-869.234	C-9	-80.030	-212.898	-912.603
44	0.000	C-14	-653.539	168.287	-987.488	C-13	-417.873	23.574	-1305.068
45	1.400	C-14	-421.848	168.558	-1021.634	C-13	-385.150	23.574	-1305.068
46	2.800	C-14	-183.578	171.839	-1053.800	C-13	-352.426	23.574	-1305.068
47	4.200	C-14	59.272	178.100	-1090.070	C-10	-10.752	43.023	-1256.616
48	5.600	C-15	196.020	368.374	-1443.834	C-10	52.280	43.023	-1256.616
49	7.000	C-15	711.743	568.374	-1480.000	C-10	115.512	43.023	-1256.616
50	0.000	C-14	-120.951	51.522	-899.740	C-9	400.463	-82.557	-1078.373
51	1.400	C-14	-51.929	52.232	-933.937	C-9	284.633	-82.557	-1078.373
52	2.800	C-14	27.673	53.434	-968.133	C-9	169.504	-82.557	-1078.373
53	4.200	C-14	111.854	61.783	-1002.329	C-9	53.724	-82.557	-1078.373
54	5.600	C-14	200.614	65.036	-1036.596	C-9	-61.833	-82.557	-1078.373
55	7.000	C-14	295.933	68.337	-1070.722	C-9	-177.435	-82.557	-1078.373
56	0.000	C-15	-798.056	169.936	-760.430	C-10	-487.716	101.174	-634.631
57	1.500	C-14	-189.599	170.437	-708.029	C-10	-445.935	101.174	-634.631
58	3.000	C-14	-231.226	174.001	-744.868	C-10	-394.133	101.174	-634.631
59	4.500	C-14	32.404	177.596	-781.307	C-10	-42.434	101.174	-634.631
60	6.000	C-14	301.231	181.010	-817.246	C-10	-42.434	101.174	-634.631
61	7.500	C-14	575.445	184.515	-853.685	C-10	261.067	101.174	-634.631

# PICK-UP NO 1-ULS

## N. MINIMUM

## N. MAXIMUM

No.	L (m)	Case	M (km)	S (t)	N (t)	Case	N (km)	S (t)	N (t)
1 - 1	0.000	C-9	0.000	0.000	0.000	C-14	0.000	0.000	0.000
1 - 2	1.000	C-9	-206.602	-237.472	0.000	C-14	-206.002	-237.472	-22.715
2 - 1	0.000	C-14	-662.613	460.800	-65.444	C-9	-1216.826	675.333	-212.898
2 - 2	1.700	C-14	32.039	356.440	-105.175	C-9	-191.774	521.000	-112.898
2 - 3	3.400	C-14	549.282	252.081	-118.407	C-9	388.373	386.670	-112.898
2 - 4	5.100	C-14	889.114	147.721	-128.368	C-9	1412.202	242.359	-112.898
2 - 5	6.800	C-14	1051.335	43.362	-136.369	C-9	1412.497	98.008	-112.898
2 - 6	8.500	C-14	964.882	-47.386	-146.430	C-9	-46.222	-46.222	-112.898
2 - 7	10.200	C-10	785.621	-131.743	-153.506	C-9	1253.001	-150.633	-112.898
2 - 8	11.900	C-10	448.949	-256.103	-158.506	C-9	808.209	-324.664	-112.898
2 - 9	13.600	C-10	-75.133	-360.404	-159.506	C-9	16.058	-479.115	-112.898
2 - 10	15.300	C-10	-176.629	-464.824	-164.506	C-9	-821.500	-633.642	-112.898
3 - 1	17.000	C-10	-1655.133	-369.189	-165.506	C-9	-2004.335	-767.976	-212.898
3 - 2	0.000	C-14	-1044.033	404.645	-29.970	C-15	-1610.017	563.977	-149.166
3 - 3	1.350	C-13	-864.546	454.575	-36.573	C-15	-922.507	454.575	-149.166
3 - 4	2.700	C-13	-354.219	345.536	-38.573	C-15	-392.717	355.234	-149.166
3 - 5	4.050	C-13	38.401	236.116	-38.573	C-15	5.354	235.712	-149.166
3 - 6	5.400	C-13	285.296	126.693	-36.573	C-15	283.706	126.693	-149.166
3 - 7	6.750	C-13	380.472	17.272	-30.573	C-15	350.340	16.870	-149.166
3 - 8	8.100	C-13	329.929	-92.150	-36.573	C-15	289.334	-92.150	-149.166
3 - 9	9.450	C-13	131.668	-201.571	-36.573	C-15	100.449	-201.573	-149.166
3 - 10	10.800	C-13	-114.513	-310.993	-36.573	C-15	-246.074	-311.665	-149.166
3 - 11	12.150	C-13	-708.013	-420.434	-30.573	C-15	-740.215	-420.434	-149.166
3 - 12	13.500	C-13	-1349.431	-329.836	-36.573	C-15	-1392.278	-330.538	-149.166
4 - 1	0.000	C-14	-1048.378	475.646	-57.282	C-15	-1595.274	522.864	-165.936
4 - 2	1.500	C-14	-102.053	383.257	-66.118	C-15	-648.956	520.375	-165.936
4 - 3	3.010	C-14	105.220	290.868	-74.955	C-15	57.769	408.353	-165.936
4 - 4	4.525	C-14	472.560	198.480	-82.791	C-15	580.910	280.010	-165.936
4 - 5	6.040	C-14	702.630	106.091	-92.628	C-15	520.463	124.635	-165.936
4 - 6	7.555	C-10	761.180	50.461	-101.174	C-15	1076.232	-24.474	-165.936
4 - 7	9.070	C-10	767.602	-41.328	-101.174	C-15	1048.833	-45.344	-165.936
4 - 8	10.585	C-10	634.978	-134.316	-101.174	C-15	887.007	-201.329	-165.936
4 - 9	12.100	C-10	363.205	-226.706	-101.174	C-15	442.814	-343.313	-165.936
4 - 10	13.545	C-10	-48.765	-328.325	-101.174	C-15	-156.928	-447.529	-165.936
4 - 11	15.030	C-10	-647.856	-467.808	-101.174	C-15	-548.323	-623.607	-165.936
5 - 1	0.000	C-14	-150.141	166.823	15.957	C-9	-150.141	166.823	0.000
5 - 2	1.800	C-14	0.000	0.000	0.000	C-9	0.000	0.000	0.000
6 - 1	0.000	C-14	456.013	-72.129	-698.272	C-9	1010.254	-212.898	-912.803
6 - 2	1.400	C-14	356.482	-69.458	-732.158	C-9	712.197	-212.898	-912.803
6 - 3	2.800	C-14	261.530	-66.188	-766.664	C-9	414.141	-212.898	-912.803
6 - 4	4.200	C-14	171.137	-62.617	-800.861	C-9	116.084	-212.898	-912.803
6 - 5	5.600	C-14	85.353	-59.646	-835.057	C-9	-181.973	-212.898	-912.803
6 - 6	7.000	C-14	4.149	-56.375	-869.254	C-9	-380.000	-212.898	-912.803
7 - 1	0.000	C-14	-655.535	166.287	-987.438	C-11	-453.830	102.364	-1390.784
7 - 2	1.400	C-14	-421.848	166.558	-1021.634	C-11	-332.320	102.364	-1390.784
7 - 3	2.800	C-14	-183.578	171.829	-1055.830	C-11	-155.211	102.364	-1390.784
7 - 4	4.200	C-14	59.272	175.300	-1090.027	C-11	-5.932	102.364	-1390.784
7 - 5	5.600	C-14	306.701	178.371	-1124.223	C-11	177.558	102.364	-1390.784
7 - 6	7.000	C-14	558.710	181.642	-1158.420	C-11	260.717	102.364	-1390.784
8 - 1	0.000	C-14	-126.951	51.952	-895.1740	C-12	231.073	-53.020	-1381.165
8 - 2	1.400	C-14	-11.929	51.223	-933.937	C-12	176.845	-53.020	-1381.165
8 - 3	2.800	C-14	27.673	58.154	-968.132	C-12	102.617	-53.020	-1381.165
8 - 4	4.200	C-14	111.554	61.765	-1002.329	C-12	28.688	-53.020	-1381.165
8 - 5	5.600	C-14	200.514	65.036	-1036.525	C-12	-49.840	-53.020	-1381.165
8 - 6	7.000	C-14	295.953	68.307	-1070.722	C-12	-120.068	-53.020	-1381.165
9 - 1	0.000	C-10	-497.716	101.174	-624.631	C-9	-731.783	160.866	-918.014
9 - 2	1.500	C-10	-835.955	101.174	-671.270	C-9	-550.484	160.866	-918.014
9 - 3	3.000	C-10	-594.195	101.174	-707.909	C-9	-396.183	160.866	-918.014
9 - 4	4.500	C-10	-42.434	101.174	-744.548	C-9	-27.680	160.866	-918.014
9 - 5	6.000	C-10	109.326	101.174	-781.187	C-9	173.413	160.866	-918.014
9 - 6	7.500	C-10	261.087	101.174	-817.826	C-9	414.712	160.866	-918.014

PICK-UP NO 2 - SLS

M. MINIMUM

M. MAXIMUM

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	X (t)
1	2	0.000	0.000	0.000	0.000	C-17	0.000	0.000	0.000	C-17	0.000	0.000	0.000
2	1	1.000	-149.711	-172.081	0.000	C-19	-149.711	-172.081	0.000	C-19	-149.711	-172.081	0.000
3	0.000	C-21	-506.497	336.650	-74.799	C-16	-842.400	466.669	-145.983	C-16	-842.400	466.669	-145.983
4	1.700	C-11	1.539	261.027	-80.848	C-16	-333.934	366.821	-145.983	C-16	-333.934	366.821	-145.983
5	3.400	C-20	461.751	253.889	-12.010	C-19	290.582	150.179	-102.411	C-19	290.582	150.179	-102.411
6	5.100	C-20	811.407	153.991	-12.010	C-19	559.565	52.505	-59.079	C-19	559.565	52.505	-59.079
7	6.800	C-20	988.322	54.143	-142.913	C-17	704.614	-98.079	-98.079	C-17	704.614	-98.079	-98.079
8	8.500	C-16	1002.522	-32.670	-145.983	C-17	383.870	-184.460	-99.079	C-17	383.870	-184.460	-99.079
9	10.200	C-16	862.283	-132.418	-145.983	C-17	534.568	-360.082	-99.079	C-17	534.568	-360.082	-99.079
10	11.900	C-16	652.302	-232.265	-145.983	C-17	432.293	-445.096	-112.010	C-17	432.293	-445.096	-112.010
11	13.600	C-16	472.580	-332.113	-102.411	C-20	-873.225	-344.543	-112.010	C-20	-873.225	-344.543	-112.010
12	15.300	C-19	-526.689	-332.558	-102.411	C-20	-1314.738			C-20	-1314.738		
13	17.000	C-19	-1139.597	-409.181	-102.411	C-20				C-20			
14	0.000	C-21	-774.205	295.821	-36.315	C-18	-1161.163	420.164	-67.261	C-18	-1161.163	420.164	-67.261
15	1.350	C-21	-315.369	235.778	-31.118	C-22	-668.484	325.386	-106.062	C-22	-668.484	325.386	-106.062
16	2.700	C-21	-137.605	175.724	-85.932	C-16	-303.528	192.334	-55.611	C-16	-303.528	192.334	-55.611
17	4.050	C-17	135.041	167.171	-82.985	C-16	-84.412	132.281	-55.611	C-16	-84.412	132.281	-55.611
18	5.400	C-17	307.200	87.880	-82.985	C-16	53.681	72.228	-55.611	C-16	53.681	72.228	-55.611
19	6.750	C-17	372.316	8.359	-82.985	C-16	110.602	12.174	-55.611	C-16	110.602	12.174	-55.611
20	8.100	C-17	330.389	-70.702	-82.985	C-16	80.501	-47.879	-55.611	C-16	80.501	-47.879	-55.611
21	9.450	C-17	181.420	-149.993	-62.985	C-16	-18.572	-107.930	-55.611	C-16	-18.572	-107.930	-55.611
22	10.800	C-18	-68.756	-214.163	-67.261	C-16	-204.917	-107.986	-55.611	C-16	-204.917	-107.986	-55.611
23	12.150	C-18	-411.398	-253.434	-67.261	C-19	-344.778	-320.434	-64.498	C-19	-344.778	-320.434	-64.498
24	13.500	C-16	-820.623	-288.093	-55.611	C-19	-1030.686	-359.725	-64.498	C-19	-1030.686	-359.725	-64.498
25	0.000	C-21	-780.039	347.684	-47.852	C-20	-1144.131	488.573	-80.347	C-20	-1144.131	488.573	-80.347
26	1.500	C-21	-307.153	280.736	-47.852	C-17	-345.336	400.184	-80.347	C-17	-345.336	400.184	-80.347
27	3.010	C-16	72.238	296.494	-110.300	C-17	-54.771	236.066	-74.123	C-17	-54.771	236.066	-74.123
28	4.515	C-16	452.004	208.099	-110.300	C-17	250.129	169.117	-74.123	C-17	250.129	169.117	-74.123
29	6.020	C-16	698.677	115.705	-110.300	C-17	454.272	102.165	-74.123	C-17	454.272	102.165	-74.123
30	7.525	C-16	812.316	31.310	-110.300	C-17	557.657	35.220	-74.123	C-17	557.657	35.220	-74.123
31	9.030	C-20	803.120	-41.790	-80.347	C-21	545.915	-54.005	-78.654	C-21	545.915	-54.005	-78.654
32	10.535	C-20	673.710	-130.184	-80.347	C-21	414.257	-120.955	-80.010	C-21	414.257	-120.955	-80.010
33	12.040	C-20	411.266	-218.579	-80.347	C-21	161.841	-187.503	-80.363	C-21	161.841	-187.503	-80.363
34	13.545	C-20	14.801	-313.663	-80.347	C-21	-132.319	-301.541	-96.256	C-21	-132.319	-301.541	-96.256
35	15.050	C-17	-473.511	-340.337	-74.123	C-22	-687.120	-451.889	-123.142	C-22	-687.120	-451.889	-123.142
36	0.000	C-18	-108.798	120.886	0.000	C-16	-108.798	120.886	0.000	C-16	-108.798	120.886	0.000
37	1.800	C-21	0.000	0.000	0.000	C-20	0.000	0.000	0.000	C-20	0.000	0.000	0.000
38	0.000	C-16	692.689	-145.983	-638.750	C-21	355.785	-61.052	-508.731	C-21	355.785	-61.052	-508.731
39	1.400	C-16	488.313	-148.383	-663.530	C-21	272.728	-59.050	-533.511	C-21	272.728	-59.050	-533.511
40	2.800	C-16	263.938	-145.983	-688.310	C-21	191.446	-57.067	-558.291	C-21	191.446	-57.067	-558.291
41	4.200	C-20	117.631	-113.010	-693.936	C-19	52.024	-102.411	-593.468	C-19	52.024	-102.411	-593.468
42	5.600	C-21	37.205	-83.103	-607.831	C-16	-124.614	-145.963	-737.870	C-16	-124.614	-145.963	-737.870
43	7.000	C-21	-35.747	-51.120	-632.631	C-16	-329.190	-123.583	-762.650	C-16	-329.190	-123.583	-762.650
44	0.000	C-17	-160.595	36.090	-816.372	C-21	-37.173	108.977	-715.405	C-21	-37.173	108.977	-715.405
45	1.400	C-17	-110.473	36.090	-841.132	C-16	-284.592	90.372	-869.030	C-16	-284.592	90.372	-869.030
46	2.800	C-17	-58.648	36.090	-853.932	C-16	-235.381	16.938	-898.160	C-16	-235.381	16.938	-898.160
47	4.200	C-21	35.016	114.924	-789.719	C-22	-98.669	116.938	-1023.940	C-22	-98.669	116.938	-1023.940
48	5.600	C-21	195.298	116.936	-814.535	C-19	39.046	37.913	-901.485	C-19	39.046	37.913	-901.485
49	7.000	C-22	515.756	268.938	-1072.500	C-17	91.029	36.090	-940.273	C-17	91.029	36.090	-940.273
50	0.000	C-16	265.594	-54.690	-761.376	C-21	-34.050	26.831	-652.387	C-21	-34.050	26.831	-652.387
51	1.400	C-16	189.029	-54.690	-785.156	C-21	-15.099	28.615	-677.107	C-21	-15.099	28.615	-677.107
52	2.800	C-16	112.464	-54.690	-810.936	C-21	26.627	30.796	-701.547	C-21	26.627	30.796	-701.547
53	4.200	C-21	74.128	32.778	-728.737	C-17	12.327	-11.334	-822.104	C-17	12.327	-11.334	-822.104
54	5.600	C-21	118.405	34.760	-751.507	C-20	-57.182	-52.365	-871.661	C-20	-57.182	-52.365	-871.661
55	7.000	C-21	168.458	36.743	-776.287	C-20	-30.423	-52.365	-936.441	C-20	-30.423	-52.365	-936.441
56	0.000	C-17	-264.714	74.123	-461.223	C-22	-578.322	123.142	-572.776	C-22	-578.322	123.142	-572.776
57	1.500	C-17	-353.529	47.773	-487.773	C-22	-953.009	123.142	-599.326	C-22	-953.009	123.142	-599.326
58	3.000	C-17	-142.242	74.123	-514.333	C-16	-412.030	110.300	-625.464	C-16	-412.030	110.300	-625.464
59	4.500	C-21	14.197	120.383	-565.131	C-20	-79.101	80.347	-636.719	C-20	-79.101	80.347	-636.719
60	6.000	C-21	156.307	122.505	-588.704	C-20	41.419	80.347	-663.235	C-20	41.419	80.347	-663.235
61	7.500	C-21	321.723	124.633	-616.231	C-20	101.939	80.347	-689.819	C-20	101.939	80.347	-689.819



PICK-UP NO 2 - SLS

S. MAXIMUM

S. MINIMUM

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-17	0.000	0.000	0.000	C-16	0.000	0.000	0.000
2 - 1	1.000	C-17	-149.711	-172.081	0.000	C-16	-149.711	-172.081	0.000
2 - 1	0.000	C-16	-842.400	456.569	-145.983	C-21	-506.487	388.670	-77.756
* 1	1.700	C-16	-133.934	366.821	-145.983	C-21	1.529	251.027	-80.828
* 2	3.400	C-16	404.792	260.974	-145.983	C-21	380.956	183.403	-86.987
* 3	5.100	C-16	773.777	167.126	-145.983	C-21	631.905	109.782	-92.840
* 4	6.800	C-16	973.020	67.278	-145.983	C-21	754.235	34.535	-98.556
* 5	8.500	C-19	711.055	-31.067	-102.411	C-20	995.435	-43.704	-112.010
* 6	10.200	C-19	593.982	-106.690	-102.411	C-20	832.517	-143.932	-112.010
* 7	11.900	C-19	348.310	-182.312	-102.411	C-20	500.617	-245.400	-112.010
* 8	13.600	C-19	-25.900	-337.935	-102.411	C-20	-1.433	-343.248	-112.010
* 9	15.300	C-19	-138.669	-433.558	-102.411	C-20	-673.225	-445.980	-112.010
3 - 2	17.000	C-19	-1159.997	-409.181	-102.411	C-20	-1511.778	-544.943	-112.010
3 - 1	0.000	C-18	-1181.165	420.164	-67.281	C-21	-774.205	285.831	-26.315
* 1	1.300	C-18	-867.462	340.873	-67.281	C-21	-413.369	233.778	-31.118
* 2	2.700	C-18	-460.805	261.582	-67.281	C-21	-137.605	175.724	-35.922
* 3	4.050	C-18	38.810	182.291	-67.281	C-21	59.086	113.871	-40.726
* 4	5.400	C-18	231.382	103.001	-67.281	C-21	174.706	55.548	-45.530
* 5	6.750	C-18	316.912	23.710	-67.281	C-21	208.234	-4.436	-50.334
* 6	8.100	C-16	86.501	-47.879	-55.611	C-19	271.289	-82.562	-64.498
* 7	9.450	C-16	-18.672	-107.933	-55.611	C-19	106.309	-161.833	-64.498
* 8	10.800	C-16	-204.917	-167.986	-55.611	C-19	-145.713	-241.143	-64.498
* 9	12.150	C-10	-472.234	-228.039	-54.778	C-9	-330.434	-330.434	-64.498
4 - 3	13.500	C-16	-820.623	-288.093	-55.611	C-19	-1030.856	-559.725	-64.498
4 - 2	0.000	C-20	-1315.131	488.578	-80.347	C-21	-780.039	347.884	-17.322
* 1	1.500	C-20	-945.338	400.184	-80.347	C-21	-307.153	280.736	-22.677
* 2	3.000	C-20	-515.378	311.789	-80.347	C-21	64.975	213.787	-28.233
* 3	4.515	C-20	393.147	233.394	-80.347	C-21	330.346	140.639	-33.568
* 4	6.030	C-20	682.839	135.000	-80.347	C-21	506.560	79.850	-38.914
* 5	7.545	C-20	799.497	40.605	-80.347	C-21	573.816	12.947	-44.269
* 6	9.030	C-17	550.285	-31.728	-74.123	C-22	780.010	-37.856	-49.624
* 7	10.535	C-17	462.155	-98.677	-74.123	C-22	508.362	-125.890	-55.078
* 8	12.040	C-17	263.268	-165.625	-74.123	C-22	320.880	-234.285	-60.432
* 9	13.545	C-17	-37.363	-239.263	-74.123	C-22	-89.223	-326.369	-65.786
5 - 4	15.050	C-17	-473.511	-340.337	-74.123	C-22	-687.120	-451.885	-71.142
5 - 3	0.000	C-16	-108.798	120.886	0.000	C-20	-106.798	120.886	0.000
5 - 2	1.800	C-21	0.000	0.000	0.000	C-20	0.000	0.000	0.000
2 - 7	0.000	C-21	356.785	-61.032	-508.721	C-16	692.669	-145.983	-632.750
* 1	1.400	C-21	272.728	-56.050	-533.511	C-16	488.313	-145.983	-663.330
* 2	2.800	C-21	191.446	-57.067	-558.291	C-16	282.938	-145.983	-686.310
* 3	4.200	C-21	112.940	-35.085	-583.071	C-16	79.562	-145.983	-713.050
* 4	5.600	C-21	37.208	-33.103	-607.851	C-16	-124.814	-145.983	-737.870
* 5	7.000	C-21	-35.747	-31.120	-632.631	C-16	-323.150	-145.983	-762.630
3 - 8	0.000	C-21	-337.175	108.977	-715.409	C-22	-302.807	16.538	-948.600
* 1	1.400	C-21	-283.220	110.959	-740.189	C-22	-279.094	10.938	-973.380
* 2	2.800	C-21	-126.490	112.542	-764.965	C-22	-235.381	16.538	-998.160
* 3	4.200	C-22	-96.669	116.938	-1022.910	C-17	-9.822	36.090	-890.712
* 4	5.600	C-22	142.044	266.938	-1047.720	C-17	41.103	36.090	-815.492
8 - 3	7.000	C-22	513.756	256.938	-1072.500	C-17	91.629	36.090	-940.272
4 - 9	0.000	C-21	-54.050	26.831	-652.387	C-10	263.554	-34.680	-761.376
* 1	1.400	C-21	-15.099	28.813	-677.187	C-16	189.029	-34.680	-786.156
* 2	2.800	C-21	26.627	30.795	-701.947	C-16	132.484	-34.680	-810.936
* 3	4.200	C-21	71.128	32.778	-726.727	C-16	35.898	-34.680	-835.716
* 4	5.600	C-21	118.405	34.760	-751.507	C-16	-40.667	-34.680	-860.456
9 - 4	7.000	C-21	168.458	36.743	-776.287	C-16	-117.332	-34.680	-885.276
5 - 10	0.000	C-22	-378.322	123.142	-572.776	C-17	-364.714	74.123	-461.223
* 1	1.500	C-22	-283.609	123.142	-589.336	C-17	-233.529	74.123	-487.773
* 2	3.000	C-22	-108.895	123.142	-623.876	C-17	-142.343	74.123	-514.323
* 3	4.500	C-22	-24.182	123.142	-658.426	C-17	-51.160	74.123	-540.873
* 4	6.000	C-22	160.332	123.142	-678.976	C-17	80.025	74.123	-567.423
10 - 5	7.500	C-21	381.723	124.633	-616.251	C-17	191.209	74.123	-593.973

# PICK-UP NO 2 - SLS

## N. MINIMUM

## N. MAXIMUM

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-16	0.000	0.000	0.000	C-21	0.000	0.000	0.000
2 - 1	1.000	C-16	-149.711	-172.081	0.000	C-21	-149.711	-172.081	-143.766
2 - 3	0.000	C-21	-306.597	336.650	-74.799	C-16	-842.400	565.569	-143.983
3 - 1	1.700	C-21	1.529	261.027	-80.845	C-16	-133.934	366.821	-143.983
3 - 2	3.400	C-21	380.996	183.405	-86.897	C-16	404.782	266.974	-143.983
3 - 3	5.100	C-21	531.905	109.782	-92.946	C-16	773.777	107.126	-143.983
4 - 1	6.800	C-21	754.255	34.159	-98.990	C-16	973.020	67.378	-143.983
5 - 1	8.500	C-17	1044.614	-33.214	-99.079	C-16	1003.532	-32.570	-143.983
6 - 1	10.200	C-17	1383.870	-108.837	-99.079	C-16	862.282	-132.418	-143.983
7 - 1	11.900	C-17	1744.568	-184.460	-99.079	C-16	552.302	-232.365	-143.983
8 - 1	13.600	C-17	2105.266	-260.083	-99.079	C-16	72.360	-332.113	-143.983
9 - 1	15.300	C-17	2465.964	-335.705	-99.079	C-16	-576.883	-431.861	-143.983
10 - 1	17.000	C-17	2826.662	-411.328	-99.079	C-16	-1355.068	-531.609	-143.983
3 - 4	0.000	C-21	-774.205	295.831	-25.315	C-22	-1156.079	408.679	-108.092
4 - 1	1.350	C-20	-548.162	329.656	-27.982	C-22	-665.487	298.868	-108.092
5 - 1	2.700	C-20	-356.648	250.365	-27.982	C-22	-277.351	250.397	-108.092
6 - 1	4.050	C-20	-171.824	171.074	-27.982	C-22	6.778	170.606	-108.092
7 - 1	5.400	C-20	205.252	91.785	-27.982	C-22	183.845	91.515	-108.092
8 - 1	6.750	C-20	275.639	12.452	-27.982	C-22	253.869	12.324	-108.092
9 - 1	8.100	C-20	338.982	-66.798	-27.982	C-22	215.851	-67.067	-108.092
10 - 1	9.450	C-20	402.325	-146.088	-27.982	C-22	77.789	-146.958	-108.092
11 - 1	10.800	C-20	465.668	-225.380	-27.982	C-22	-178.335	-225.348	-108.092
12 - 1	12.150	C-20	529.011	-304.671	-27.982	C-22	-506.461	-304.525	-108.092
13 - 1	13.500	C-20	592.354	-383.962	-27.982	C-22	-1001.651	-384.230	-108.092
4 - 5	0.000	C-21	-780.039	347.684	-47.522	C-22	-1115.416	472.372	-123.142
5 - 1	1.500	C-21	-307.153	280.736	-52.677	C-22	-470.260	384.478	-123.142
6 - 1	3.000	C-21	64.975	213.787	-41.862	C-22	41.862	256.083	-123.142
7 - 1	4.500	C-21	236.546	146.839	-63.588	C-22	50.850	207.688	-123.142
8 - 1	6.000	C-21	506.960	79.880	-68.944	C-22	687.004	115.254	-123.142
9 - 1	7.500	C-21	777.374	35.220	-74.125	C-22	780.024	30.899	-123.142
10 - 1	9.000	C-17	1048.285	-31.728	-74.125	C-22	760.010	-37.456	-123.142
11 - 1	10.500	C-17	1319.200	-98.677	-74.125	C-22	605.962	-145.890	-123.142
12 - 1	12.000	C-17	1590.115	-177.626	-74.125	C-22	320.880	-234.285	-123.142
13 - 1	13.500	C-17	1861.030	-256.575	-74.125	C-22	-99.233	-323.679	-123.142
14 - 1	15.000	C-17	2131.945	-335.524	-74.125	C-22	-657.120	-413.069	-123.142
5 - 6	0.000	C-21	-108.798	120.886	9.671	C-16	-108.798	120.886	0.000
6 - 1	1.800	C-21	0.000	0.000	0.000	C-16	0.000	0.000	0.000
2 - 7	0.000	C-21	356.785	-61.032	-508.731	C-16	593.689	-145.983	-638.750
3 - 1	1.400	C-21	272.728	-35.050	-533.511	C-16	488.313	-145.983	-638.750
4 - 1	2.800	C-21	191.446	-37.067	-558.291	C-16	283.938	-145.983	-638.750
5 - 1	4.200	C-21	112.540	-53.085	-583.071	C-16	75.562	-145.983	-638.750
6 - 1	5.600	C-21	37.208	-53.103	-607.851	C-16	-127.814	-145.983	-638.750
7 - 2	7.000	C-21	-85.747	-51.120	-632.631	C-16	-339.190	-145.983	-638.750
8 - 1	0.000	C-21	-437.175	108.577	-715.409	C-18	-316.135	70.842	-535.861
9 - 1	1.400	C-21	-285.820	110.959	-740.189	C-18	-216.971	70.842	-535.861
10 - 1	2.800	C-21	-126.490	112.942	-764.969	C-18	-117.783	70.842	-535.861
11 - 1	4.200	C-21	36.016	114.924	-789.749	C-18	-18.604	70.842	-535.861
12 - 1	5.600	C-21	193.358	116.906	-814.529	C-18	80.574	70.842	-535.861
13 - 1	7.000	C-21	360.694	118.889	-839.309	C-18	179.773	70.842	-535.861
4 - 9	0.000	C-21	-34.050	26.831	-652.387	C-15	175.035	-86.789	-883.536
5 - 1	1.400	C-21	-15.099	28.813	-677.167	C-15	123.581	-86.789	-883.536
6 - 1	2.800	C-21	26.627	30.796	-701.947	C-15	72.047	-86.789	-883.536
7 - 1	4.200	C-21	111.228	32.778	-726.727	C-15	20.543	-86.789	-883.536
8 - 1	5.600	C-21	184.405	34.760	-751.507	C-15	-30.541	-86.789	-883.536
9 - 1	7.000	C-21	257.582	36.743	-776.287	C-15	-82.445	-86.789	-883.536
10 - 1	0.000	C-17	-364.714	74.123	-461.223	C-22	-578.322	123.142	-572.776
11 - 1	1.500	C-17	-243.529	74.123	-487.773	C-22	-393.609	123.142	-572.776
12 - 1	3.000	C-17	-143.345	74.123	-514.323	C-22	-208.895	123.142	-572.776
13 - 1	4.500	C-17	-11.160	74.123	-540.873	C-22	-24.123	123.142	-572.776
14 - 1	6.000	C-17	80.025	74.123	-567.423	C-22	160.333	123.142	-572.776
15 - 1	7.500	C-17	191.209	74.123	-593.973	C-22	346.242	123.142	-572.776

No.② PEDESTRIAN BRIDGE

-superstructure

1. Calculation of bending moment for U.L.S.

1) For middle point of first span.  $M_{max} = 1456.5^{KNm}$

( For middle point of third span.  $M_{max} = 1181.4^{KNm}$  )

section  $b = 360^m$   $h = 50$   $d = 43.0$   $d' = 7.0$

$$A_s = Y_{25} - 29^{N^0} = 4.909 \times 29 = 142.361 \text{ cm}^2$$

$$\chi = \frac{0.87 \times 41000 \times 142.361}{0.40 \times 3000 \times 360} = 11.8^{cm}$$

$$Z = 43.0 - \frac{11.8}{2} = 37.1^{cm} < 0.95 \times 43.0 = 40.8^{cm} \quad OK$$

$$M_{RS} = 0.87 \times 41000 \times 142.361 \times 37.1 \times 10^{-5} = 1884.0^{KNm} > 1456.5^{KNm}$$

$$M_{RC} = 0.40 \times 3000 \times 360 \times 11.8 \times 37.1 \times 10^{-5} = 1891.2^{KNm} > 1456.5^{KNm} \quad OK$$

2) For middle point of second span.  $M_{max} = 557.9^{KNm}$

section  $b = 360^m$   $h = 50$   $d = 43.0$   $d' = 7.0$

$$A_s = Y_{16} - 29^{N^0} = 2.011 \times 29 = 58.319 \text{ cm}^2$$

$$\chi = \frac{0.87 \times 41000 \times 58.319}{0.40 \times 3000 \times 360} = 5.0^{cm}$$

$$Z = 43.0 - \frac{5.0}{2} = 40.5^{cm} < 0.95 \times 43.0 = 40.8^{cm} \quad OK$$

$$M_{RS} = 0.87 \times 41000 \times 58.319 \times 40.5 \times 10^{-5} = 842.5^{KNm} > M = 557.9^{KNm}$$

$$M_{RC} = 0.40 \times 3000 \times 360 \times 5.0 \times 40.5 \times 10^{-5} = 874.8^{KNm} > M = 557.9^{KNm}$$

3) For middle fulcrum on point③  $Mu.min = -2171.4^{KNm}$

(For middle fulcrum on point④  $Mu.min = -1751.2^{KNm}$ )

section  $b=360^m$   $h=50$   $d=43.5$   $d'=6.5$

$$A_s = Y_{32} - 29^{N0} = 8.042 \times 29 = 233.218 \text{ cm}^2$$

$$\chi = \frac{0.87 \times 41000 \times 233.218}{0.40 \times 3000 \times 360} = 19.4^{cm}$$

$$Z = 43.5 - \frac{19.4}{2} = 33.8^{cm} < 0.95 \times 43.5 = 41.3^{cm}$$

$$M_{RS} = 0.87 \times 41000 \times 233.218 \times 33.8 \times 10^{-5} = 2811.8^{KNm} > M = 2171.4^{KNm}$$

$$M_{RC} = 0.40 \times 3000 \times 360 \times 19.4 \times 33.8 \times 10^{-5} = 2832.7^{KNm} > M = 2171.4^{KNm} \text{ OK}$$

## 2. Calculation of shearing force for U.L.S.

1) For first fulcrum  $Su_{max} = 675.4 \text{ kN}$

section  $b = 360^m$   $h = 50$   $d = 43.0$   $d' = 7.0$

$$A_s = Y_{25} - 29^{No} = 4.909 \times 29 = 142.361 \text{ cm}^2$$

$$P = \frac{142.361}{360 \times 43.0} \times 100 = 0.920 \%$$

$$V_c = \frac{675.4 \times 10^3}{360 \times 43.0} = 43.7 \text{ N/cm}^2$$

$$\langle V_{ca} = 55.0 + 15.0 \left( \frac{0.920 - 0.50}{0.50} \right) = 67.6 \text{ N/cm}^2 \quad \text{OK}$$

2) For second fulcrum  $Su_{min} = 781.0 \text{ kN}$

section  $b = 360^m$   $h = 50$   $d = 43.5$   $d' = 6.5$

$$A_s = Y_{32} - 29^{No} = 8.042 \times 29 = 233.218 \text{ cm}^2$$

$$P = \frac{233.218}{360 \times 43.5} \times 100 = 1.490 \%$$

$$V_c = \frac{781.0 \times 10^3}{360 \times 43.5} = 49.9 \text{ N/cm}^2$$

$$\langle V_{ca} = 70.0 + 20.0 \left( \frac{1.490 - 1.00}{1.00} \right) = 79.8 \text{ N/cm}^2 \quad \text{OK}$$

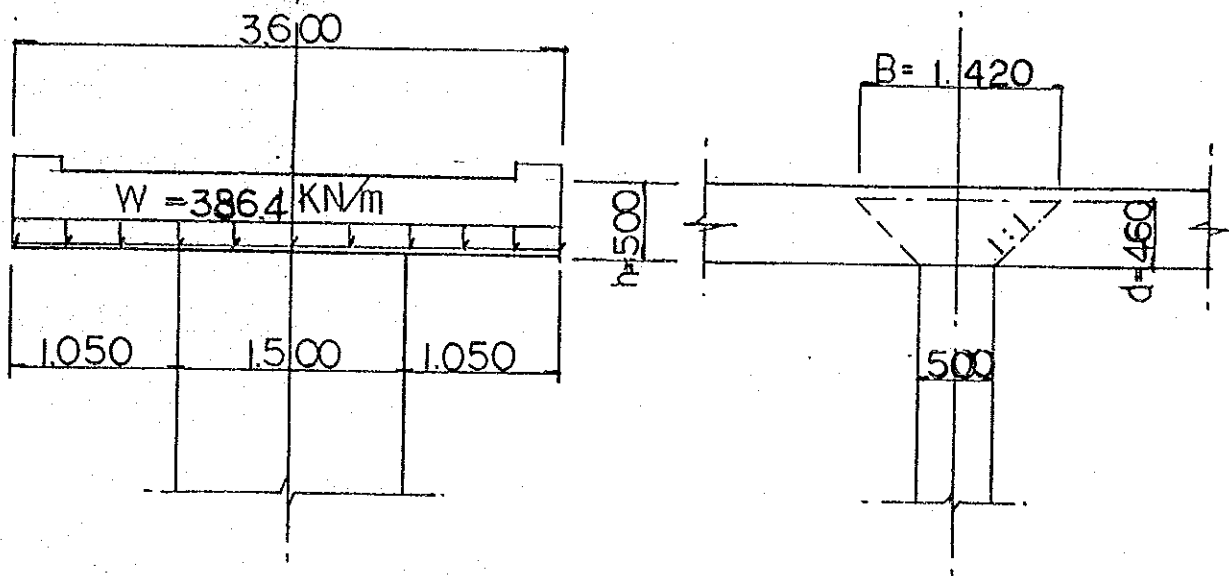
No. ② PEDESTRIAN BRIDGE

Calculation of pedestal for U.L.S.

1. For middle fulcrum

a) Reaction of middle fulcrum ...  $R_{max} = 1390.8 \text{ kN}$

b) load ...  $\omega = \frac{1390.8}{3.60} = 386.4 \text{ kN/m}$



c) bending moment and shearing force

$$M = \frac{1}{2} \times 386.4 \times 1.050^2 = 213.0 \text{ kNm}$$

$$S = 386.4 \times 1.050 = 405.8 \text{ kN}$$

d) For bending moment

$$\text{section } b = 142.0 \text{ m } \quad h = 50 \quad d = 46.0 \quad d' = 4.0$$

$$A_s = Y_{20} - 150^{\text{c}^{\text{t}^{\text{c}}}} (10^{\text{N}^{\text{o}}}) = 3.1416 \times 10 = 31.416 \text{ cm}^2$$

$$x = \frac{0.87 \times 41000 \times 31.416}{0.40 \times 3000 \times 142.0} = 6.6 \text{ cm}$$

$$Z = 46.0 - \frac{6.6}{2} = 42.7 \text{ cm} < 0.95 \times 46.0 = 43.7 \text{ cm} \quad \text{OK}$$

$$M_{RS} = 0.87 \times 41000 \times 31.416 \times 42.7 \times 10^5 = 478.5 \text{ kNm} > 213.0 \text{ kNm}$$

$$M_{RC} = 0.40 \times 3000 \times 142.0 \times 6.6 \times 42.7 \times 10^5 = 480.2 \text{ kNm} > 213.0 \text{ kNm}$$

e) For shearing force

$$V_c = \frac{405.8 \times 10^3}{2 \times 142.0 \times 46.0} = 31.1 \text{ N/cm}^2$$

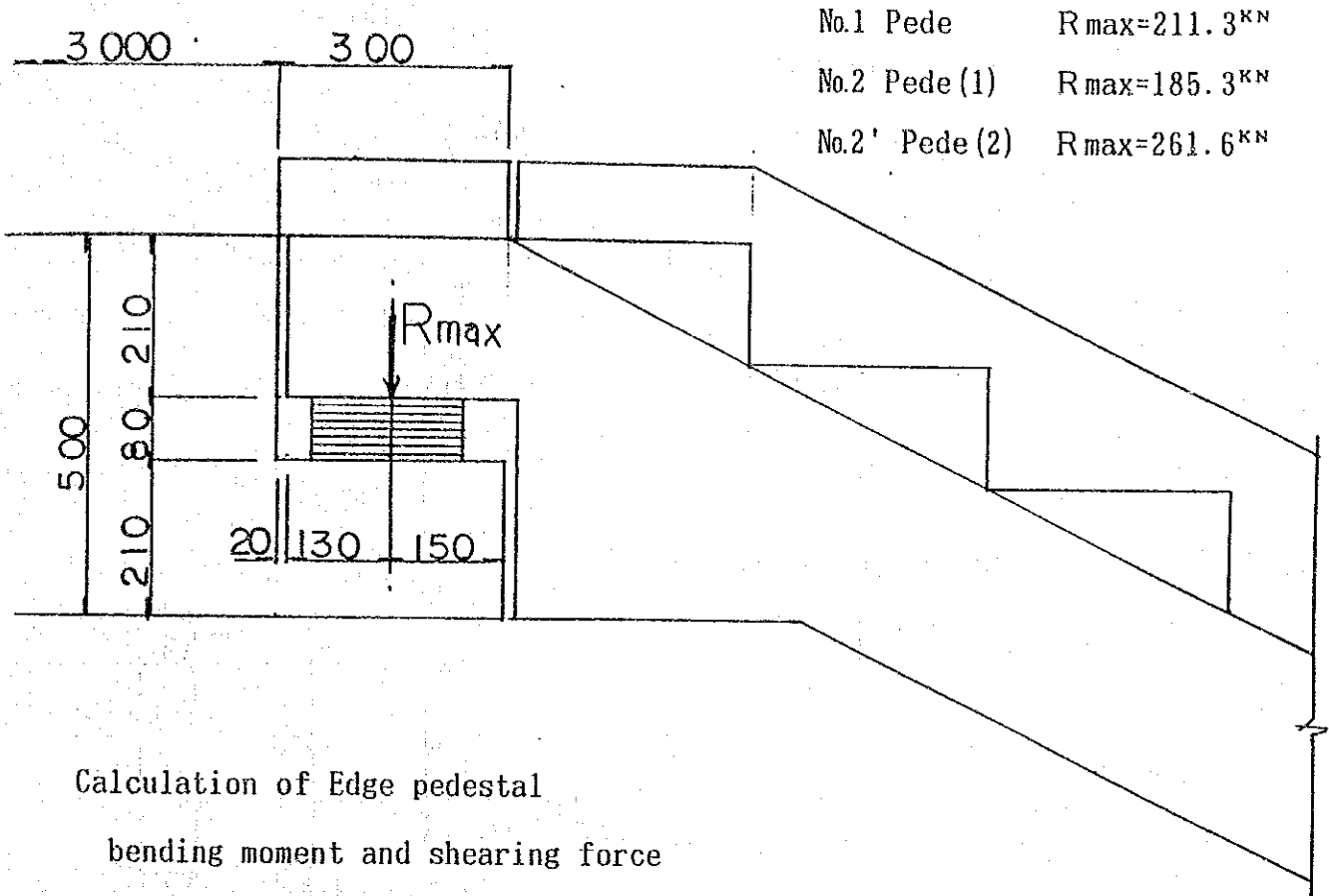
$$P = \frac{31.416}{142.0 \times 46.0} \times 100 = 0.480 \%$$

$$\leq V_{ca} = 35.0 + 20.0 \left( \frac{0.480 - 0.25}{0.25} \right) = 53.4 \text{ N/cm}^2 \quad \text{OK}$$

## No. ② PEDESTRIAN BRIDGE - PEDESTAL

Calculation of pedestal of joint for U.L.S.

### 1. Reaction



### Calculation of Edge pedestal

bending moment and shearing force

$$M_{max} = 261.6 \times 0.150 = 39.3 \text{ kNm}$$

$$S_{max} \doteq R_{max} = 261.6 \text{ kN}$$

$$\text{section } b = 300 \text{ cm } \quad h = 21.0 \quad d = 15.0 \quad d' = 6.0$$

$$A_s = Y_{16} - 150^{c/c} (21^{N^0}) = 2.011 \times 21 = 42.23 \text{ cm}^2$$

$$P = \frac{42.23}{300 \times 15.0} \times 100 = 0.938 \%$$

$$V_{ca} = 55.0 + 15.0 \left( \frac{0.938 - 0.50}{0.50} \right) = 68.1 \text{ N/cm}^2$$

$$V_c = \frac{261.6 \times 10^3}{300 \times 15.0} = 58.2 \text{ N/cm}^2 < 68.1 \text{ N/cm}^2 \quad \text{OK}$$

$$x = \frac{0.87 \times 41000 \times 42.23}{0.40 \times 3000 \times 300.0} = 4.4 \text{ cm}$$

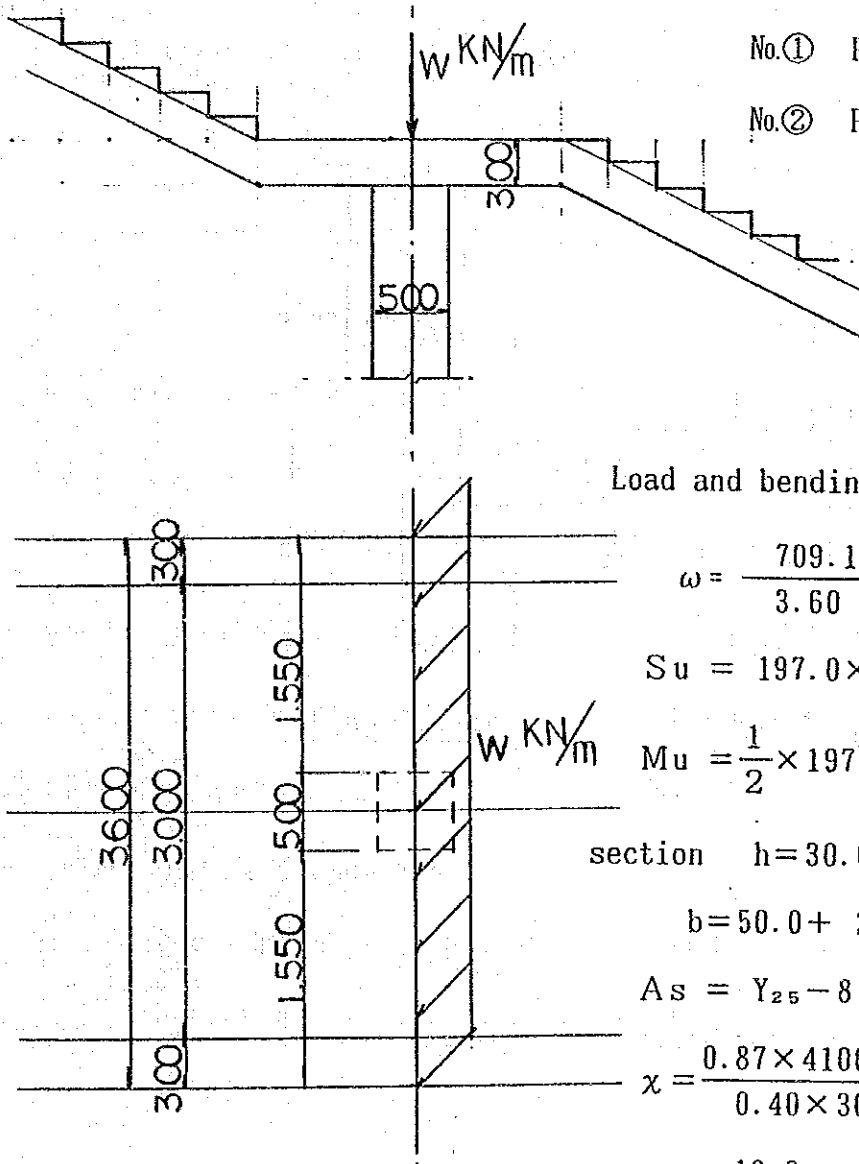
$$Z = 15.0 - \frac{4.4}{2} = 12.8 \text{ cm} < 0.95 \times 15.0 = 14.3 \text{ cm} \quad \text{OK}$$

$$M_{RS} = 0.87 \times 41000 \times 42.23 \times 12.8 \times 10^{-5} = 192.8 \text{ kNm} > M = 39.3 \text{ kNm}$$

$$M_{RC} = 0.40 \times 3000 \times 300 \times 4.4 \times 12.8 \times 10^{-5} = 202.7 \text{ kNm} > M = 39.3 \text{ kNm}$$



# Calculation of middle pedestal



Reaction

No.① Pedestrian  $R_{max}=709.1^{KN}$

No.② Pedestrian  $R_{max}=677.1^{KN}$

Load and bending moment

$$\omega = \frac{709.1}{3.60} = 197.0 \text{ KN/m}$$

$$S_u = 197.0 \times 1.55 = 305.4 \text{ KN}$$

$$M_u = \frac{1}{2} \times 197.0 \times 1.55^2 = 236.7 \text{ KNm}$$

section  $h=30.0$   $d=24.5$   $d'=5.5$

$$b = 50.0 + 2 \times 24.5 = 99.0 \text{ cm}$$

$$A_s = Y_{25} - 8 (150^{cc}) = 39.27 \text{ cm}^2$$

$$\chi = \frac{0.87 \times 41000 \times 39.27}{0.40 \times 3000 \times 99.0} = 12.0 \text{ cm}$$

$$Z = 24.5 - \frac{12.0}{2} = 18.5 \text{ cm} < 0.95 \times 24.5 = 23.3 \text{ cm}$$

$$M_{RS} = 0.87 \times 41000 \times 39.27 \times 18.5 \times 10^{-5} = 259.1 \text{ KNm} > M_u = 236.7 \text{ KNm}$$

$$M_{RC} = 0.40 \times 3000 \times 99 \times 12.0 \times 18.5 \times 10^{-5} = 263.7 \text{ KNm} > M_u = 236.7 \text{ KNm} \quad \text{OK}$$

$$P = \frac{39.27}{99.0 \times 24.5} \times 100 = 1.619 \%$$

$$V_c = \frac{305.4 \times 10^3}{99.0 \times 24.5} = 126.0 \text{ N/cm}^2$$

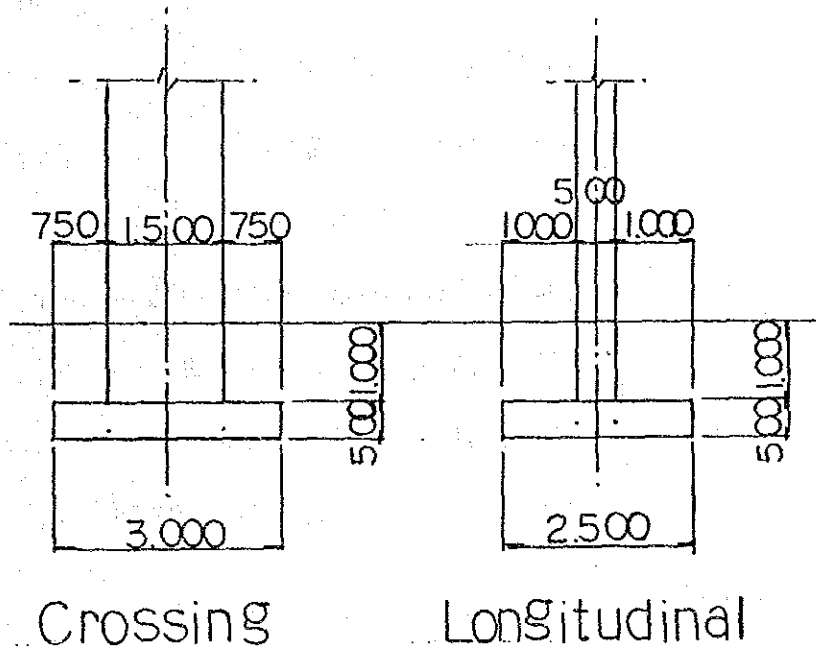
$$< V_{ca} = 70.0 + 20.0 \left( \frac{1.619 - 1.0}{1.0} \right) \times 2 = 164.8 \text{ N/cm}^2 \quad \text{OK}$$

No.② PEDESTRIAN BRIDGE - Substructure

Calculation of stability for Longitudinal direction

1. Footing and surcharge

1) Shape and size of foundation



2) load of foundation

$$\text{Footing} = 23.6 \times 30.0 \times 2.50 \times 0.50 = 88.5 \text{ KN}$$

$$\text{Surcharge} = 18.6 \times 30.0 \times 2.50 \times 1.00 = 139.5 \text{ KN}$$

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$$\text{Total} = 228.0 \text{ KN}$$

No.② PEDESTRIAN BRIDGE - Substructure

2. Calculation of stability of Foundation for S.L.S.

1) Action force for bottom slab

a) For pillar⑦~② (pillar ⑩~⑤) ... case -16

$$N = 762.7 + 228.0 = 990.7 \text{ KN}$$

$$H = 146.0 = 146.0 \text{ KN}$$

$$M = 329.2 + 146.0 \times 0.50 = 402.2 \text{ KNm}$$

b) For pillar⑧~③ (pillar ⑨~④) ... case -21

$$N = 839.3 + 228.0 = 1067.3 \text{ KN}$$

$$H = 118.9 = 118.9 \text{ KN}$$

$$M = 360.4 + 118.9 \times 0.50 = 419.9 \text{ KNm}$$

2) Stability for foundation

a) For pillar⑦~②

$$e = \frac{M}{N} = \frac{402.2}{990.7} = 0.406 \text{ m}$$

$$q = \frac{N}{B \cdot L} \left(1 \pm \frac{6e}{B}\right) = \frac{990.7}{2.50 \times 3.00} \left(1 \pm \frac{6 \times 0.406}{2.50}\right) = \begin{cases} 260.8 \text{ KN/m}^2 \\ 3.4 \text{ KN/m}^2 \end{cases} < q_a = 300 \text{ KN/m}^2$$

$$F_s = \frac{N \cdot \mu}{H} = \frac{990.7 \times 0.50}{146.0} = 3.4 > 1.5 \quad \text{OK}$$

b) For pillar⑧~③

$$e = \frac{M}{N} = \frac{419.9}{1067.3} = 0.394 \text{ m}$$

$$q = \frac{N}{B \cdot L} \left(1 \pm \frac{6e}{B}\right) = \frac{1067.3}{2.50 \times 3.00} \left(1 \pm \frac{6 \times 0.394}{2.50}\right) = \begin{cases} 276.9 \text{ KN/m}^2 \\ 7.7 \text{ KN/m}^2 \end{cases} < q_a = 300 \text{ KN/m}^2$$

### 3. Calculation of stability of Foundation for U.L.S

#### 1) Action force for bottom slab

a) For pillar ⑩~⑤ (pillar ⑦~②) ... case -14

$$N = 854.6 + 228.0 \times 1.380 = 1169.3 \text{ KN}$$

$$H = 184.6 = 184.6 \text{ KN}$$

$$M = 575.5 + 184.6 \times 0.50 = 667.8 \text{ KNm}$$

b) For pillar ⑧~③ (pillar ⑨~④) ... case -15

$$N = 1480.0 + 228.0 \times 1.38 = 1794.7 \text{ KN}$$

$$H = 368.4 = 368.4 \text{ KN}$$

$$M = 711.8 + 368.4 \times 0.50 = 896.0 \text{ KNm}$$

#### 2) Stability

a) For pillar ⑩~⑤

$$e = \frac{M}{N} = \frac{667.8}{1169.3} = 0.571 \text{ cm}$$

$$x = \frac{B}{2} - e = \frac{2.50}{2} - 0.571 = 0.679 \text{ m}$$

$$q_{\max} = \frac{2N}{3 \cdot x \cdot L} = \frac{2 \times 1169.3}{3 \times 0.679 \times 3.00} = 382.7 \text{ KN/m}^2 < q_a = 525.0 \text{ KN/m}^2$$

$$F_s = \frac{N \cdot \mu}{H} = \frac{1169.3 \times 0.50}{184.6} = 3.1 > 1.1$$

b) For pillar ⑧~③

$$e = \frac{M}{N} = \frac{896.0}{1794.7} = 0.498 \text{ cm}$$

$$x = \frac{B}{2} - e = \frac{2.500}{2} - 0.498 = 0.752 \text{ m}$$

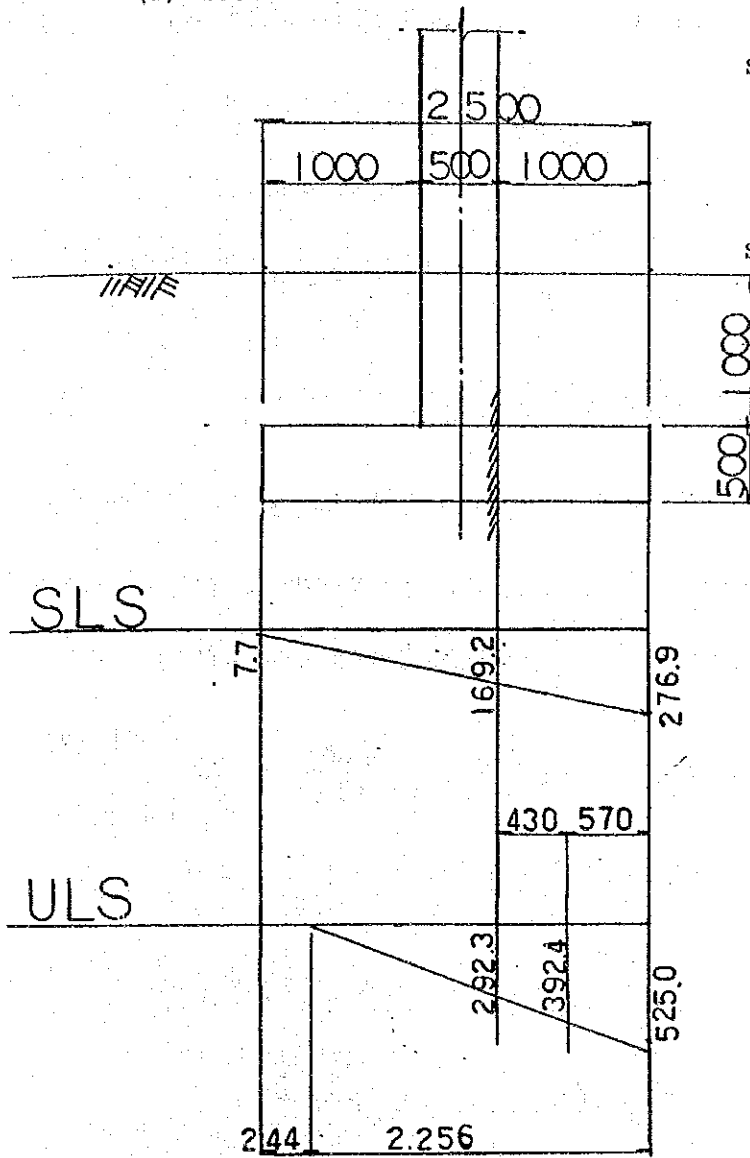
$$q_{\max} = \frac{2 \times 1794.7}{3 \times 0.752 \times 3.00} \doteq 525.0 \text{ KN/m}^2 \doteq q_a = 525.0 \text{ KN/m}^2$$

$$F_s = \frac{1794.7 \times 0.50}{368.4} = 2.4 > 1.1$$

## Calculation of stress for Longitudinal direction

1. For pillar ⑧ ~ ③ (pillar ⑨ ~ ④)

(1) load



surcharge for S.L.S.

$$\omega = (23.6 \times 0.50 + 18.6 \times 1.00) = 30.4 \text{ KN/m}$$

surcharge for U.L.S.

$$\omega = (23.6 \times 0.50 + 18.6 \times 1.00) \times 1.38 = 41.9 \text{ KN/m}$$

(2) bending moment and shearing force.

a) for S.L.S.

$$M = \left[ \frac{1.00^2}{6} (2 \times 276.9 + 169.2) - \frac{1.00^2}{2} \times 30.4 \right] \times 3.00 = 315.9 \text{ KNm}$$

$$S = \left[ \frac{1.00}{2} (276.9 + 169.2) - 1.00 \times 30.4 \right] \times 3.00 = 578.0 \text{ KN}$$

a) for U.L.S.

$$M = \left[ \frac{1.00^2}{6} (2 \times 525.0 + 292.3) - \frac{1.00^2}{2} \times 41.9 \right] \times 3.00 = 608.3 \text{ KNm}$$

$$S = \left[ \frac{1.00}{2} (525.0 + 292.3) - 1.00 \times 41.9 \right] \times 3.00 = 1100.3 \text{ KN}$$

$$S_c = \left[ \frac{0.57}{2} (525.0 + 392.4) - 0.57 \times 41.9 \right] \times 3.00 = 712.8 \text{ KN}$$

(3) Calculation of stress for U.L.S.

section  $b = 15.00 + 2 \times 43.0 = 236.0 \text{ cm}$   $d = 43.0$   $d' = 7.0$

$$A_s = Y_{20-160^{c+c}} (15^{N^o}) = 3.142 \times 15 = 47.13 \text{ cm}^2$$

$$P = \frac{47.13}{236.0 \times 43.0} \times 100 = 0.464 \% > 0.15 \text{ cm}^2$$

$$X = \frac{0.87 \times 41000 \times 47.13}{0.40 \times 2500 \times 236.0} = 7.2 \text{ cm}$$

$$Z = 43.0 - \frac{7.2}{2} = 39.4 \text{ cm} < 0.95 \times 43.0 = 40.8 \text{ cm}$$

$$M_{RS} = 0.87 \times 41000 \times 47.13 \times 39.4 \times 10^{-5} = 662.4 \text{ KNm} > M = 608.3 \text{ KNm}$$

$$M_{RC} = 0.40 \times 2500 \times 236.0 \times 7.2 \times 39.4 \times 10^{-5} = 669.5 \text{ " } > \text{ " } \text{ OK}$$

$$V_c = \frac{1100.3 \times 10^3}{236.0 \times 43.0} = 108.5 \text{ N/cm}^2$$

$$< V_{ca} = \left[ 35.0 + 15.0 \left( \frac{0.464 - 0.25}{0.25} \right) \right] \frac{2 \times 300}{236.0} = 121.6 \text{ N/cm}^2$$

Check of Critical Section

$$S = \left[ \frac{0.57}{2} (525.0 + 392.4) - 0.57 \times 41.9 \right] \times 3.00 = 712.8 \text{ KN}$$

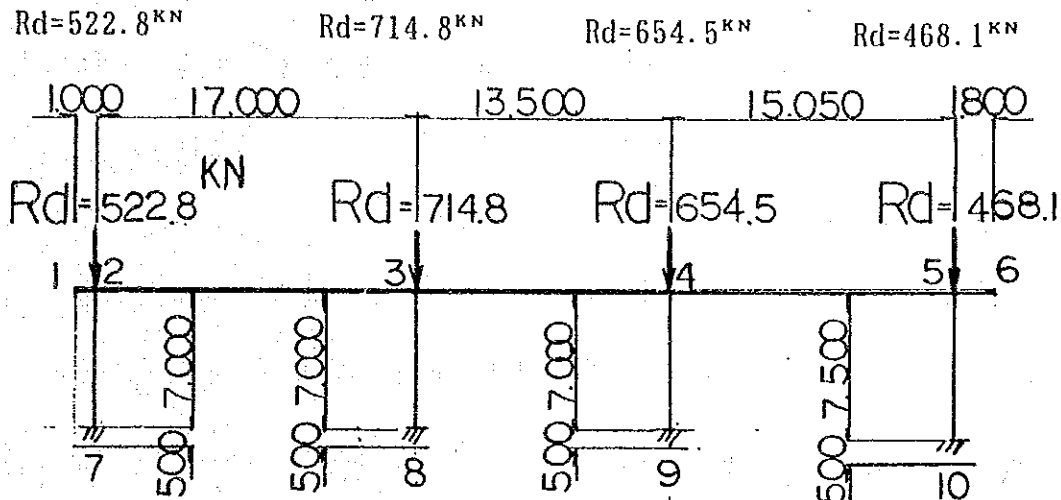
$$V_c = \frac{712.8 \times 10^3}{236.0 \times 43.0} = 70.3 \text{ N/cm}^2$$

$$< V_{ca} = \left[ 35.0 + 15.0 \left( \frac{0.464 - 0.25}{0.25} \right) \right] \frac{2 \times 43.0}{50.0} = 82.3 \text{ N/cm}^2 \text{ OK}$$

## No.② PEDESTRIAN BRIDGE

Calculation of stability of Crossing direction

### 1) Shape and Reaction



### 2) Action force and stability

#### a) For bottom slab for S.L.S.

action force for pillar ⑧~③ (seismic state)

	N <sup>kN</sup>	H <sup>kN</sup>	y <sup>m</sup>	M = H · Y <sup>kNm</sup>
Rection from Super structure	714.8	57.2	7.750	443.3
Pillar	17.70 × 7.00 = 123.9	10.0	4.000	40.0
Footing	228.0	—	—	—
Total	1066.7	67.2	—	483.3

stability

$$e = \frac{M}{N} = \frac{483.3}{1066.7} = 0.453^m < \frac{B}{6} = \frac{3.00}{6} = 0.500^m$$

$$q = \frac{N}{B \cdot L} \left(1 \pm \frac{6e}{B}\right) = \frac{1066.7}{3.00 \times 2.50} = \left(1 \pm \frac{6 \times 0.453}{3.00}\right) = \begin{cases} 271.1 \text{ kN/m}^2 \\ 13.4 \text{ kN/m}^2 \end{cases} < q_a = 300 \text{ kN/m}^2$$

$$F_s = \frac{N \cdot \mu}{H} = \frac{1066.7 \times 0.50}{67.2} = 7.9 > 1.5$$

b) For bottom slab for U.L.S.

Action force for pillar ⑧~③ (seismic state)

$$N = 1066.7 \times 1.38 = 1472.1 \text{ KN}$$

$$H = 67.2 \times 1.65 = 110.9 \text{ KN}$$

$$M = 483.3 \times 1.65 = 797.5 \text{ KNm}$$

stability

$$e = \frac{M}{N} = \frac{797.5}{1472.1} = 0.543 \text{ cm}$$

$$\chi = \frac{B}{2} - e = \frac{3.00}{2} - 0.543 = 0.957 \text{ m}$$

$$q_{\max} = \frac{2N}{3 \cdot \chi \cdot L} = \frac{2 \times 1472.1}{3 \times 0.957 \times 2.50} = 410.2 \text{ KN/m}^2 < q_a = 525.0 \text{ KN/m}^2$$

$$F_s = \frac{N \cdot \mu}{H} = \frac{1472.1 \times 0.50}{110.9} = 6.6 > 1.1$$



No.② PEDESTRIAN BRIDGE -Substructure

Calculation of stress for footing

Notice... this substructure is security

which the action force is small force or equal

than substructure of No.① pedestrian bridge.

Calculation of this case is a bridge and

the bar arrangement is apply substructure of No.① pedestrian bridge.

No.② PEDESTRIAN BRIDGE - Sub-structure

Calculation for pillar for Longitudinal direction

$$\left. \begin{array}{l} M = 1010.3 \text{ KNm} \\ H = 212.9 \text{ KN} \\ N = 912.8 \text{ KN} \end{array} \right\} \text{ for pillar } \textcircled{2} \sim \textcircled{7} \text{ from case-9 (U.L.S)}$$

section  $b = 150 \text{ cm}$   $h = 50$   $d = 44.5$   $d' = 5.5$

$$M_a = 1010.3 + 912.8 \left( 0.445 - \frac{0.50}{2} \right) = 1188.3 \text{ KNm}$$

$$A_s = A'_s = Y_{32} - 10^{N^0} = 8.042 \times 10 = 80.42 \text{ cm}^2$$

$$x = \frac{(0.87 - 0.72) \times 41000 \times 80.42}{0.40 \times 2500 \times 150} \doteq 4.4 \text{ cm}$$

$$Z = 44.5 - \frac{4.4}{2} = 42.3 \text{ cm} \doteq 0.95 \times 44.5 = 42.3 \text{ cm}$$

$$M_{RS} = 0.87 \times 41000 \times 80.42 \times 42.3 \times 10^{-5} = 1213.4 \text{ KNm} > M_a = 1188.3 \text{ KNm}$$

$$M_{RC} = (0.72 \times 41000 \times 80.42 \times 39.0 + 0.40 \times 2500 \times 150 \times 4.4 \times 42.3) \times 10^{-5} = 1205.0 \text{ KNm} > M_a = 1188.3 \text{ KNm} \text{ OK}$$

$$A_{sn} = A'_{sn} = 80.42 - \frac{912.8 \times 10^3}{0.87 \times 41000} \doteq 54.0 \text{ cm}^2$$

$$\leq A_{su} = A'_{su} = Y_{25} - 11^{N^0} = 4.909 \times 11 = 54.0 \text{ cm}^2 \text{ OK}$$

$$P = \frac{54.0}{150 \times 44.5} \times 100 = 0.809 \%$$

$$V_c = \frac{212.9 \times 10^3}{150 \times 44.5} = 31.9 \text{ N/cm}^2$$

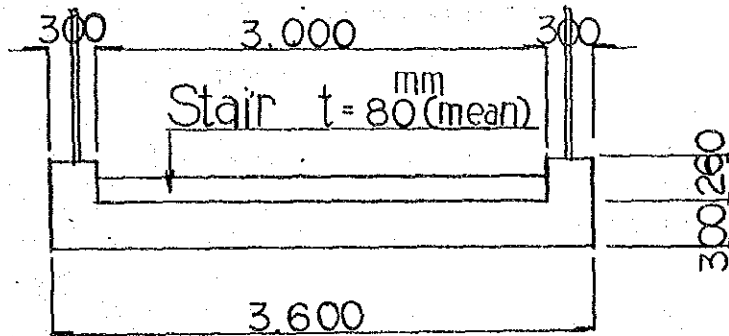
$$< V_{ca} = 50.0 + 15.0 \left( \frac{0.809 - 0.50}{0.50} \right) = 59.3 \text{ N/cm}^2 \text{ OK}$$

Note : Other case is abridge.

No.② PEDESTRIAN BRIDGE OF STAIRCASE (1)

1) Shape and factor for Calculation of stress

(1) Superstructure

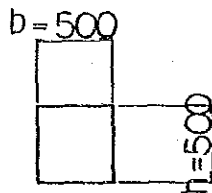


$$A = 3.60 \times 0.30 = 1.080 \text{ m}^2$$

$$I = \frac{3.60 \times 0.30^3}{12} = 0.00810 \text{ m}^4$$

$$E_{c1} = 27 \text{ KN/mm}^2 = 2.7 \times 10^7 \text{ KN/m}^3 \text{ (} f_{cu} = 30 \text{ N/mm}^2 \text{)}$$

(2) Substructure

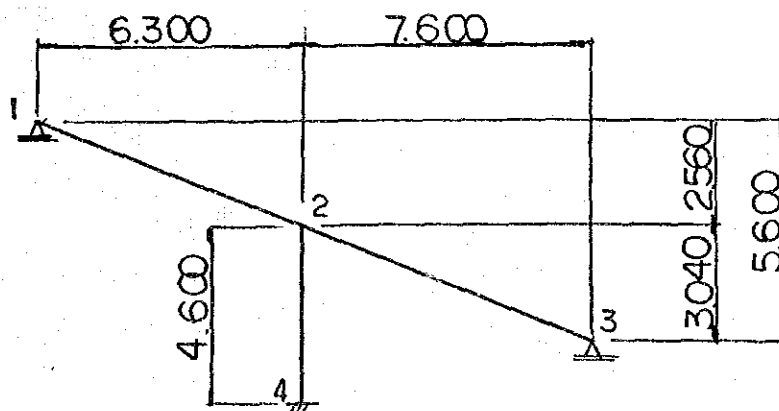


$$A = 0.50 \times 0.50 = 0.250 \text{ m}^2$$

$$I = \frac{0.50^4}{12} = 0.00521 \text{ m}^4$$

$$E_{c2} = 2.5 \text{ KN/mm}^2 = 2.5 \times 10^7 \text{ KN/m}^3 \text{ (} f_{cu} = 25 \text{ N/mm}^2 \text{)}$$

(3) Frame



## 2) Load

### (1) Dead load

$$\text{parapet} = (23.6 \times 0.30 \times 0.26 + 0.294) \times 2 = 4.270 \text{ KN/m}$$

$$\text{slab} = 23.6 \times 1.080 = 25.488 \text{ KN/m}$$

$$\text{stair} = 22.6 \times 3.00 \times 0.08 = 5.424 \text{ KN/m}$$

---

$$\omega d_1 = \dots = 35.182 \text{ KN/m}$$

$$\text{pillar } \omega_2 = 23.6 \times 0.250 = 5.900 \text{ KN/m}$$

### (2) Live load

$$\text{load length} < 30.0 \text{ m}$$

$$\omega \ell = 5.0(2.00 + 1.00 \times 0.85) = 14.250 \text{ KN/m}$$

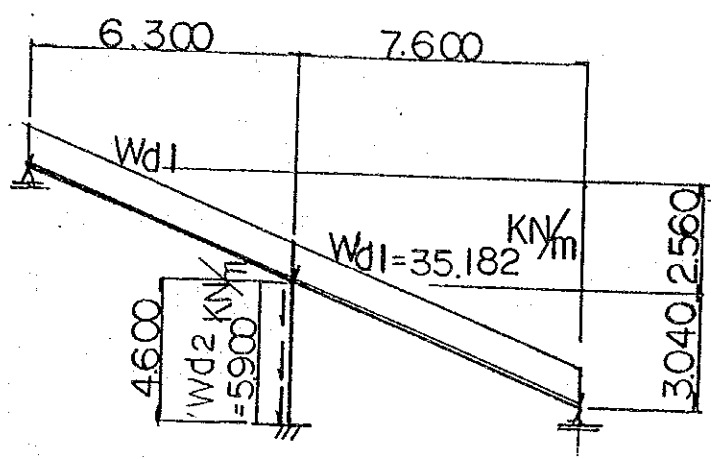
### (3) Other load

seismic

$$\text{Coefficient of seismic} \dots k_H = 0.100$$

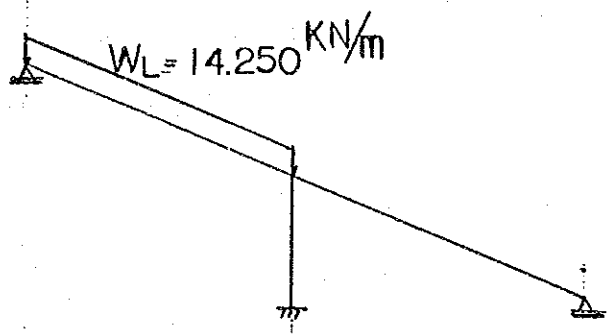
3) Loaded figure

(1) Dead load ... case-1

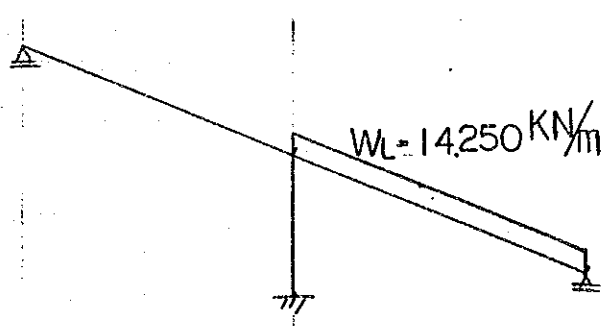


(2) Live load

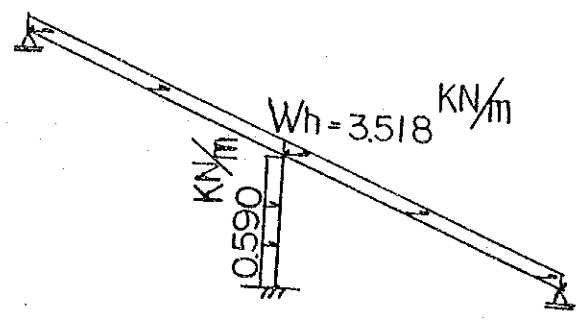
a) for first span ... case-2



b) for second span ... case-3



(3) seismic ... case-4



PEDE NO2 STAIR

	(m)	(m)
1	0.0000	10.0000
2	6.3000	7.4400
3	13.9000	4.4000
4	6.3000	2.8400

NOTE: THE DIMENSION(t) BE EXCHANG TO  
DIMENSION(KN)INTO THIS CALCULATION

PEDE NO2 STAIR

No	I	J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1	2	1.08000	0.008100	Fix - Fix	6.800	2.70E+07	1.20E-05
2	2	3	1.08000	0.008100	Fix - Fix	8.185	2.70E+07	1.20E-05
3	2	4	0.25000	0.005210	Fix - Fix	4.600	2.50E+07	1.20E-05

PEDE NO2 STAIR

\*

No. 1

	X (t/m)	Y (t/m)	M(tm/Rad)
1	Free	Fix	Free
3	Free	Fix	Free
4	Fix	Fix	Fix

PEDE NO2 STAIR

No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No
	1	2	3	4	5	6	7	8	9	10
	11	12	13	14	15	16	17	18	19	20
1	9	0.680	1.360	2.040	2.720	3.400	4.080	4.760	5.440	6.120
2	9	0.819	1.637	2.456	3.274	4.093	4.911	5.730	6.548	7.367
3	4	0.920	1.840	2.760	3.680					

PEDE NO2 STAIR

: Dead load  
 No. : 1  
 No. : 1

No	i	-j	Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-Y 0.000	6.800	-35.182	-35.182
2	2-	3	-Y 0.000	8.185	-35.182	-35.182
3	2-	4	-Y 0.000	4.600	-5.900	-5.900

$\Sigma V = -554.342 (t)$   
 $\Sigma H = 0.000 (t)$

PEDE NO2 STAIR

: Live load  
 No. : 2  
 No. : 1

No	i	-j	Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-Y 0.000	6.800	-14.250	-14.250

$\Sigma V = -96.900 (t)$   
 $\Sigma H = 0.000 (t)$

PEDE NO2 STAIR

: Live load  
 No. : 3  
 No. : 1

No	i	-j	Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y 0.000	8.185	-14.250	-14.250

$\Sigma V = -116.636 (t)$   
 $\Sigma H = 0.000 (t)$



PEDE NO2 STAIR

トル : SEISMIC  
 No. : 4  
 No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.000	6.800	3.518	3.518
2	2-	3	-X	0.000	8.185	3.518	3.518
3	2-	4	-X	0.000	4.600	0.590	0.590

$\Sigma V = 0.000$  (t)  
 $\Sigma H = 55.431$  (t)

PEDE NO2 STAIR

No	C-No 1	C-No 2	C-No 3	C-No 4	C-No 5	C-No 6	C-No 7	C-No 8
No	No 5	No 6	No 7	No 8	No 9	No10	No11	No12
$\alpha$	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
No 1	1.3800	1.3800	1.3800	1.3800	1.0000	1.0000	1.0000	1.0000
No 2	1.6500	0.0000	1.6500	0.0000	1.0000	0.0000	1.0000	0.0000
No 3	0.0000	1.6500	1.6500	0.0000	0.0000	1.0000	1.0000	0.0000
No 4	0.0000	0.0000	0.0000	1.3200	0.0000	0.0000	0.0000	0.8000

PEDE NO2 STAIR

No 1 : 5 6 7 8  
 No 2 : 9 10 11 12

PEDE NOZ STAIR

No.	Case. 1			Case. 2			Case. 3		
	RX (t)	RY (t)	RM (tm)	RX (t)	RY (t)	RM (tm)	RX (t)	RY (t)	RM (tm)
1.	0.000	83.831	0.000	0.000	42.131	0.000	0.000	-8.165	0.000
3.	0.000	112.775	0.000	0.000	-3.856	0.000	0.000	49.528	0.000
4.	0.000	357.686	-11.935	0.000	58.625	10.514	0.000	75.273	-15.346

No.	Case. 4			Case. 5			Case. 6		
	RX (t)	RY (t)	RM (tm)	RX (t)	RY (t)	RM (tm)	RX (t)	RY (t)	RM (tm)
1.	0.000	-12.596	0.000	0.000	185.272	0.000	0.000	102.284	0.000
3.	0.000	1.874	0.000	0.000	149.267	0.000	0.000	237.351	0.000
4.	-55.431	10.723	-142.002	0.000	590.338	0.878	0.000	617.807	-41.791

No.	Case. 7			Case. 8			Case. 9		
	RX (t)	RY (t)	RM (tm)	RX (t)	RY (t)	RM (tm)	RX (t)	RY (t)	RM (tm)
1.	0.000	171.801	0.000	0.000	99.129	0.000	0.000	126.012	0.000
3.	0.000	230.988	0.000	0.000	158.103	0.000	0.000	108.919	0.000
4.	0.000	714.538	-24.442	-73.169	507.760	-203.913	0.000	416.311	-1.421

No.	Case. 10			Case. 11			Case. 12		
	RX (t)	RY (t)	RM (tm)	RX (t)	RY (t)	RM (tm)	RX (t)	RY (t)	RM (tm)
1.	0.000	75.716	0.000	0.000	117.848	0.000	0.000	73.804	0.000
3.	0.000	162.303	0.000	0.000	158.447	0.000	0.000	114.274	0.000
4.	0.000	432.959	-27.281	0.000	491.584	-16.766	-44.345	366.264	-125.537

No.	Case. 1		Case. 2		Case. 3	
	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)
1.	1.07576	0.00000	-0.82622	-0.83593	0.00000	-0.59146
2.	0.96946	-0.25327	-0.42150	-0.85406	-0.04315	0.37133
3.	1.07427	0.00000	1.96737	-0.83637	0.00000	-0.17712
4.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

No.	Case. 4		Case. 5		Case. 6	
	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)
1.	4.72232	0.00000	0.33043	0.10527	0.00000	-2.11610
2.	4.71513	-0.00789	-0.58594	-0.07135	-0.42071	0.03102
3.	4.72212	0.00000	0.22533	0.10249	0.00000	2.42300
4.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

No.	Case. 7		Case. 8		Case. 9	
	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)
1.	2.20043	0.00000	-1.69085	7.71801	0.00000	-0.70402
2.	1.98539	-0.51212	-0.86321	7.56182	-0.35993	-1.35511
3.	2.19741	0.00000	4.02880	7.71558	0.00000	3.01426
4.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

No.	Case. 10		Case. 11		Case. 12	
	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)	X-DIS. (mm)	Y-DIS. (mm)	ROTA. (mmRad)
1.	2.34555	0.00000	-0.56850	1.50963	0.00000	-1.15996
2.	2.21596	-0.30867	-0.96346	1.36191	-0.35182	-0.59213
3.	2.34392	0.00000	2.94078	1.50756	0.00000	2.76366
4.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

No	L(m)	Case 1 Dead load			Case 2 Live load			Case 3 Live load		
		M (tm)	N (t)	S (t)	M (tm)	N (t)	S (t)	M (tm)	N (t)	S (t)
1-	0.000	0.000	31.578	77.710	0.000	39.032	15.860	0.000	-7.564	-3.074
* 1	0.680	45.307	22.571	55.546	23.489	30.055	12.213	-5.143	-7.564	-3.074
* 2	1.360	75.543	13.565	33.383	40.874	21.077	8.565	-10.287	-7.564	-3.074
* 3	2.040	90.708	4.559	11.219	52.154	12.100	4.917	-15.430	-7.564	-3.074
* 4	2.720	90.801	-4.447	-10.945	57.330	3.123	1.269	-20.574	-7.564	-3.074
* 5	3.400	75.823	-13.454	-33.109	56.402	-5.854	-2.379	-25.717	-7.564	-3.074
* 6	4.080	45.773	-22.460	-55.273	49.369	-14.831	-6.027	-30.861	-7.564	-3.074
* 7	4.760	0.652	-31.466	-77.436	36.231	-23.808	-9.675	-36.004	-7.564	-3.074
* 8	5.440	-59.540	-40.472	-99.600	16.989	-32.786	-13.322	-41.148	-7.564	-3.074
* 9	6.120	-134.804	-49.479	-121.764	-8.357	-41.763	-16.970	-46.291	-7.564	-3.074
2-	6.800	-225.177	-58.485	-143.928	-39.821	-50.740	-20.618	-51.437	-7.564	-3.074
2-	0.000	-237.112	65.064	162.659	-29.307	3.580	1.432	-66.782	52.309	24.923
* 1	0.819	-114.850	54.362	135.906	-26.375	3.580	1.432	-20.189	51.473	20.589
* 2	1.637	-14.608	43.674	109.185	-23.446	3.580	1.432	17.489	40.650	16.260
* 3	2.456	63.860	32.973	82.432	-20.514	3.580	1.432	46.344	29.814	11.926
* 4	3.274	120.361	22.285	55.712	-17.585	3.580	1.432	66.305	18.991	7.596
* 5	4.093	155.033	11.583	28.959	-14.653	3.580	1.432	77.422	8.155	3.262
* 6	4.911	167.793	0.895	2.238	-11.724	3.580	1.432	79.666	-2.668	-1.067
* 7	5.730	158.670	-9.806	-24.515	-8.791	3.580	1.432	73.044	-13.504	-5.402
* 8	6.548	127.688	-20.494	-51.236	-5.863	3.580	1.432	57.571	-24.327	-9.731
* 9	7.367	74.771	-31.196	-77.989	-2.930	3.580	1.432	33.210	-35.163	-14.065
3-	8.185	0.000	-41.884	-104.709	0.000	3.580	1.432	0.000	-45.985	-18.394
2-	0.000	11.935	-330.546	0.000	-10.514	0.000	-58.625	15.346	0.000	-75.273
* 1	0.920	11.935	-335.974	0.000	-10.514	0.000	-58.625	15.346	0.000	-75.273
* 2	1.840	11.935	-341.402	0.000	-10.514	0.000	-58.625	15.346	0.000	-75.273
* 3	2.760	11.935	-346.830	0.000	-10.514	0.000	-58.625	15.346	0.000	-75.273
* 4	3.680	11.935	-352.258	0.000	-10.514	0.000	-58.625	15.346	0.000	-75.273
4-	4.600	11.935	-357.686	0.000	-10.514	0.000	-58.625	15.346	0.000	-75.273

No	L(m)	Case 1 SEISMIC			Case 5			Case 6		
		M (tm)	S (t)	N (t)	M (tm)	S (t)	N (t)	M (tm)	S (t)	N (t)
1- 2	0.000	0.000	-11.670	-4.742	0.000	171.642	69.747	0.000	94.760	38.506
* 1	0.680	-7.629	-10.769	-6.958	101.281	126.244	51.299	54.037	64.174	26.077
* 2	1.360	-14.646	-9.868	-9.174	171.692	80.846	32.852	87.276	33.588	13.648
* 3	2.040	-21.050	-8.968	-11.891	211.232	35.447	14.404	99.717	3.002	1.220
* 4	2.720	-26.842	-8.067	-13.607	219.900	-9.951	-4.044	91.358	-27.584	-11.209
* 5	3.400	-32.022	-7.167	-15.823	197.698	-55.349	-22.491	62.202	-58.170	-23.638
* 6	4.080	-36.589	-6.266	-18.039	144.625	-100.748	-40.939	12.247	-88.757	-36.066
* 7	4.760	-40.544	-5.366	-20.256	60.681	-146.146	-59.386	-58.507	-119.343	-48.495
* 8	5.440	-43.886	-4.465	-22.472	-54.133	-191.844	-77.834	-150.059	-149.929	-60.923
* 9	6.120	-46.616	-3.564	-24.688	-199.819	-236.943	-96.281	-262.410	-180.515	-73.352
2- 1	6.800	-48.734	-2.664	-26.904	-376.450	-282.341	-114.729	-395.615	-211.101	-85.781
2- 3	0.000	58.005	-12.434	26.039	-375.572	230.377	92.151	-437.406	327.279	130.912
* 1	0.819	48.260	-11.364	23.364	-202.011	193.458	77.383	-191.804	272.480	108.992
* 2	1.637	39.402	-10.295	20.692	-58.844	156.584	62.633	8.699	217.748	87.099
* 3	2.456	31.408	-9.235	18.017	54.279	119.664	47.866	164.595	162.949	65.180
* 4	3.274	24.300	-8.156	15.345	137.083	82.790	33.116	275.502	108.217	43.287
* 5	4.093	18.058	-7.086	12.670	189.769	45.870	18.348	341.692	53.419	21.367
* 6	4.911	12.699	-6.017	9.998	212.210	8.996	3.598	363.003	-1.313	-0.525
* 7	5.730	8.209	-4.947	7.323	204.459	-27.923	-11.169	339.487	-56.112	-22.445
* 8	6.548	4.599	-3.878	4.651	166.536	-64.798	-25.919	271.202	-110.844	-44.338
* 9	7.367	1.861	-2.808	1.976	98.349	-101.717	-40.687	157.981	-165.643	-66.257
3- 2	8.185	0.000	-1.740	-0.696	0.000	-138.591	-55.437	0.000	-220.375	-88.150
2- 4	0.000	-106.739	52.717	-10.723	-0.878	0.000	-552.885	41.791	0.000	-580.354
* 1	0.920	-57.990	53.260	-10.723	-0.878	0.000	-560.375	41.791	0.000	-587.844
* 2	1.840	-8.741	53.803	-10.723	-0.878	0.000	-567.866	41.791	0.000	-595.335
* 3	2.760	41.007	54.346	-10.723	-0.878	0.000	-575.357	41.791	0.000	-602.826
* 4	3.680	91.255	54.888	-10.723	-0.878	0.000	-582.847	41.791	0.000	-610.316
4- 2	4.600	142.002	55.431	-10.723	-0.878	0.000	-590.338	41.791	0.000	-617.807

No	Case 7			Case 8			Case 9			
	L(m)	M (tm)	S (t)	N (t)	M (tm)	S (t)	N (t)	M (tm)	S (t)	N (t)
1- 2	0.000	0.000	159.162	64.675	0.000	91.836	37.318	0.000	116.742	47.438
* 1	0.680	92.795	113.764	46.228	52.454	62.439	21.964	68.797	85.601	34.784
* 2	1.360	154.719	68.365	27.780	84.917	33.042	6.609	116.417	54.460	22.130
* 3	2.040	185.771	22.967	9.333	97.390	3.644	-8.745	142.862	23.319	9.476
* 4	2.720	185.954	-22.431	-9.115	89.874	-25.753	-24.099	148.131	-7.822	-8.178
* 5	3.400	155.265	-67.830	-27.563	62.367	-55.150	-39.453	132.224	-38.963	-15.833
* 6	4.080	93.705	-113.228	-46.010	14.869	-84.547	-54.807	95.142	-70.104	-28.487
* 7	4.760	1.275	-158.626	-64.458	-52.618	-113.945	-70.161	36.883	-101.245	-41.141
* 8	5.440	-122.027	-204.025	-82.905	-140.095	-143.342	-85.515	-42.551	-132.386	-53.795
* 9	6.120	-276.199	-249.423	-101.353	-247.563	-172.739	-100.869	-143.161	-163.527	-66.449
2- 1	6.800	-461.320	-294.821	-119.800	-375.074	-202.137	-116.223	-264.999	-194.668	-79.103
2- 3	0.000	-485.762	333.187	133.275	-250.648	208.057	124.160	-266.419	166.240	66.496
* 1	0.819	-235.323	278.388	111.355	-94.790	172.550	105.861	-141.225	139.486	55.795
* 2	1.637	-29.987	223.656	89.462	31.852	137.087	87.584	-38.053	112.766	45.106
* 3	2.456	130.747	168.897	67.543	129.586	101.580	69.285	43.346	86.013	34.405
* 4	3.274	246.487	114.125	45.650	198.173	66.116	51.009	102.776	59.292	23.717
* 5	4.093	317.515	59.326	23.730	237.782	30.609	32.710	140.381	32.539	13.016
* 6	4.911	343.659	4.594	1.838	248.316	-4.854	14.433	156.039	5.818	2.327
* 7	5.730	324.981	-50.205	-20.082	229.801	-40.361	-3.866	149.879	-20.935	-8.374
* 8	6.548	261.528	-104.936	-41.975	182.281	-75.825	-22.142	121.825	-47.655	-19.062
* 9	7.367	153.145	-159.735	-63.894	105.640	-111.332	-40.441	71.840	-74.408	-29.763
3- 2	8.185	0.000	-214.467	-85.787	0.000	-146.795	-58.718	0.000	-101.129	-40.452
2- 4	0.000	24.442	0.000	-677.085	-124.426	69.587	-470.307	1.421	0.000	-389.171
* 1	0.920	24.442	0.000	-684.576	-60.076	70.303	-477.798	1.421	0.000	-394.599
* 2	1.840	24.442	0.000	-692.066	4.932	71.020	-485.288	1.421	0.000	-400.027
* 3	2.760	24.442	0.000	-699.557	70.600	71.736	-492.779	1.421	0.000	-405.455
* 4	3.680	24.442	0.000	-707.048	136.927	72.453	-500.270	1.421	0.000	-410.883
4- 2	4.600	24.442	0.000	-714.538	203.913	73.169	-507.760	1.421	0.000	-416.311

\*

No	L(m)	Case 10			Case 11			Case 12		
		L(m)	S (t)	N (t)	M (tm)	S (t)	N (t)	M (tm)	S (t)	N (t)
1- 2	0.000	0.000	70.146	28.504	0.000	105.178	44.364	0.000	68.375	27.784
* 1	0.680	40.164	47.983	19.498	63.653	78.037	31.710	39.204	46.931	17.005
* 2	1.360	65.256	25.819	10.491	106.130	45.896	19.056	63.827	25.488	6.225
* 3	2.040	75.277	3.655	1.485	127.432	15.755	6.402	73.868	4.045	-4.554
* 4	2.720	70.227	-18.509	-7.521	127.557	-15.386	-6.252	69.327	-17.399	-15.333
* 5	3.400	50.105	-40.673	-16.527	106.507	-46.527	-18.906	50.205	-38.842	-26.112
* 6	4.080	14.912	-62.836	-25.534	64.281	-77.668	-31.560	16.502	-60.285	-36.891
* 7	4.760	-35.352	-85.000	-34.540	0.879	-108.809	-44.214	-31.783	-81.729	-47.671
* 8	5.440	-100.688	-107.154	-43.546	-83.699	-139.950	-56.868	-94.649	-103.172	-58.450
* 9	6.120	-181.095	-129.328	-52.552	-189.452	-171.091	-69.522	-172.097	-124.615	-69.229
2- 1	6.800	-276.614	-151.492	-61.558	-316.435	-202.231	-82.177	-264.165	-146.059	-80.008
2- 3	0.000	-303.895	224.968	89.987	-333.202	228.548	91.419	-190.708	152.712	85.895
* 1	0.819	-135.039	187.379	74.951	-161.413	190.959	76.384	-76.242	126.815	73.054
* 2	1.637	2.882	149.835	59.934	-20.564	153.416	61.366	16.914	100.950	60.228
* 3	2.456	110.204	112.246	44.898	89.690	115.826	46.331	88.987	75.052	47.387
* 4	3.274	186.666	74.703	29.881	169.081	78.283	31.313	139.800	49.187	34.561
* 5	4.093	232.455	37.114	14.845	217.802	40.694	10.278	169.480	23.290	21.720
* 6	4.911	247.459	-0.430	-0.172	235.735	3.151	1.260	177.952	-2.575	8.894
* 7	5.730	231.714	-38.019	-15.208	222.922	-34.439	-13.775	165.237	-28.473	-3.948
* 8	6.548	185.259	-75.562	-30.235	179.397	-71.982	-28.793	131.367	-54.338	-16.773
* 9	7.367	107.981	-113.151	-45.261	105.051	-109.571	-43.828	76.259	-80.236	-29.615
3- 2	8.185	0.000	-150.695	-60.278	0.000	-147.114	-58.846	0.000	-106.101	-42.440
2- 4	0.000	27.281	0.000	-405.819	16.766	0.000	-454.444	-73.457	42.174	-339.124
* 1	0.920	27.281	0.000	-411.247	16.766	0.000	-469.872	-34.457	42.608	-344.552
* 2	1.840	27.281	0.000	-416.675	16.766	0.000	-475.300	4.942	43.042	-349.580
* 3	2.760	27.281	0.000	-422.103	16.766	0.000	-480.728	44.741	43.477	-355.408
* 4	3.680	27.281	0.000	-427.531	16.766	0.000	-486.156	84.939	43.911	-360.836
4- 2	4.600	27.281	0.000	-432.959	16.766	0.000	-491.584	125.537	44.345	-366.264

PICK-UP No. 1 \* ULS

M. MAXIMUM

M. MINIMUM

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 5	0.000	171.642	69.747	C- 6	0.000	94.760	38.506
* 1	0.680	C- 5	101.281	126.244	51.299	C- 8	52.454	62.439	21.964
* 2	1.360	C- 5	171.692	80.846	32.852	C- 8	84.917	33.042	6.609
* 3	2.040	C- 5	211.232	35.447	14.404	C- 8	97.390	3.644	-8.745
* 4	2.720	C- 5	219.900	-9.951	-4.044	C- 8	89.874	-25.753	-24.099
* 5	3.400	C- 5	197.698	-55.349	-22.491	C- 6	62.202	-58.170	-23.638
* 6	4.080	C- 5	144.625	-100.748	-40.939	C- 6	12.247	-88.757	-36.066
* 7	4.760	C- 5	60.681	-146.146	-59.386	C- 6	-58.507	-119.343	-48.495
* 8	5.440	C- 5	-54.133	-191.544	-77.834	C- 6	-149.929	-60.923	-60.923
* 9	6.120	C- 5	-199.819	-236.943	-96.281	C- 7	-276.199	-249.423	-101.353
2 - 1	6.800	C- 8	-375.074	-202.137	-116.223	C- 7	-461.320	-294.821	-119.800
2 - 3	0.000	C- 8	-250.648	208.057	124.160	C- 7	-485.762	333.187	133.275
* 1	0.819	C- 8	-94.790	172.550	105.861	C- 7	-235.323	278.388	111.355
* 2	1.637	C- 8	31.852	137.087	87.584	C- 5	-58.844	156.584	62.633
* 3	2.456	C- 6	164.595	162.949	65.180	C- 5	54.279	119.864	47.856
* 4	3.274	C- 6	275.502	108.217	43.287	C- 5	137.083	82.790	33.116
* 5	4.093	C- 6	341.692	53.419	21.367	C- 5	189.769	45.870	18.348
* 6	4.911	C- 6	363.093	-1.913	-0.525	C- 5	212.210	8.996	3.598
* 7	5.730	C- 6	339.487	-56.112	-22.445	C- 5	204.459	-27.923	-11.169
* 8	6.548	C- 6	271.202	-110.844	-44.338	C- 5	166.536	-64.798	-25.919
* 9	7.367	C- 6	157.981	-165.643	-66.257	C- 5	98.349	-101.717	-40.687
3 - 2	8.185	C- 6	0.000	-220.375	-88.150	C- 8	0.000	-146.795	-58.718
2 - 4	0.000	C- 6	41.791	0.000	-580.354	C- 8	-124.426	69.587	-470.307
* 1	0.920	C- 6	41.791	0.000	-587.844	C- 8	-60.076	70.303	-477.798
* 2	1.840	C- 6	41.791	0.000	-595.335	C- 5	-0.878	0.000	-567.866
* 3	2.760	C- 8	70.600	71.736	-492.779	C- 5	-0.878	0.000	-575.357
* 4	3.680	C- 8	136.927	72.453	-500.270	C- 5	-0.878	0.000	-582.847
4 - 2	4.600	C- 8	203.913	73.169	-507.760	C- 5	-0.878	0.000	-590.338



S. M I N I M U M

S. M A X I M U M

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 5	0.000	171.642	69.747	C- 8	0.000	91.836	37.318
* 1	0.580	C- 5	101.281	126.244	51.299	C- 8	52.454	52.439	21.904
* 2	1.360	C- 5	171.692	80.846	32.852	C- 8	84.917	33.042	6.609
* 3	2.040	C- 5	211.232	35.447	14.404	C- 6	99.717	3.002	1.220
* 4	2.720	C- 5	219.900	-9.951	-4.044	C- 6	91.358	-27.584	-11.209
* 5	3.400	C- 8	62.367	-55.150	-39.453	C- 7	155.265	-67.830	-27.563
* 6	4.080	C- 8	14.869	-84.547	-54.807	C- 7	93.705	-113.228	-46.010
* 7	4.760	C- 8	-52.618	-113.945	-70.161	C- 7	1.275	-158.526	-64.458
* 8	5.440	C- 8	-143.342	-140.095	-85.515	C- 7	-122.027	-204.025	-82.903
* 9	6.120	C- 8	-247.563	-172.739	-100.869	C- 7	-276.199	-249.423	-101.353
2 - 1	6.800	C- 8	-375.074	-202.137	-116.223	C- 7	-461.320	-294.821	-119.800
2 - 3	0.000	C- 7	-485.762	333.187	133.275	C- 8	-250.648	208.057	124.160
* 1	0.819	C- 7	-235.323	278.388	111.355	C- 8	-94.790	172.550	105.861
* 2	1.637	C- 7	-29.987	223.656	89.462	C- 8	31.852	137.087	87.584
* 3	2.455	C- 7	130.747	168.857	67.543	C- 8	129.586	101.580	69.285
* 4	3.274	C- 7	246.487	114.125	45.650	C- 8	198.173	66.116	51.009
* 5	4.093	C- 7	317.515	59.326	23.730	C- 8	237.782	30.609	32.710
* 6	4.911	C- 5	212.210	8.996	3.598	C- 8	248.316	-4.854	14.433
* 7	5.730	C- 5	204.459	-27.923	-11.169	C- 6	339.487	-56.112	-22.445
* 8	6.548	C- 5	166.536	-64.798	-25.919	C- 6	271.202	-110.844	-44.338
* 9	7.367	C- 5	98.349	-101.717	-40.687	C- 6	157.981	-165.643	-66.257
3 - 2	8.185	C- 5	0.000	-138.591	-55.437	C- 6	0.000	-220.375	-88.150
2 - 4	0.000	C- 8	-124.426	69.587	-470.307	C- 6	41.791	0.000	-580.354
* 1	0.920	C- 8	-60.076	70.303	-477.798	C- 6	41.791	0.000	-587.844
* 2	1.840	C- 8	4.932	71.020	-485.288	C- 6	41.791	0.000	-595.335
* 3	2.760	C- 8	70.600	71.736	-492.779	C- 6	41.791	0.000	-602.826
* 4	3.680	C- 8	136.927	72.453	-500.270	C- 6	41.791	0.000	-610.316
4 - 2	4.600	C- 8	203.913	73.169	-507.760	C- 6	41.791	0.000	-617.807

PICK-UP No. 1 \* ULS

N. MAXIMUM

N. MINIMUM

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 5	0.000	171.642	69.747	C- 8	0.000	91.836	37.318
* 1	0.680	C- 5	101.281	126.244	51.299	C- 8	52.454	62.439	21.964
* 2	1.360	C- 5	171.692	80.846	32.852	C- 8	84.917	33.042	6.609
* 3	2.040	C- 5	211.232	35.447	14.404	C- 8	97.390	3.644	-8.745
* 4	2.720	C- 5	219.900	-9.951	-4.044	C- 8	89.874	-25.753	-24.099
* 5	3.400	C- 5	197.698	-55.349	-22.491	C- 8	62.367	-55.150	-39.453
* 6	4.080	C- 6	12.247	-88.757	-36.066	C- 8	14.869	-84.547	-54.807
* 7	4.760	C- 6	-58.507	-119.343	-48.495	C- 8	-52.918	-113.945	-70.161
* 8	5.440	C- 6	-150.059	-149.923	-60.923	C- 8	-143.342	-143.342	-85.515
* 9	6.120	C- 6	-262.410	-180.515	-73.352	C- 7	-276.199	-249.423	-101.353
2 - 1	6.800	C- 6	-395.615	-211.101	-85.781	C- 7	-461.320	-294.821	-119.800
2 - 3	0.000	C- 7	-485.762	333.187	133.275	C- 5	-575.572	230.377	92.151
* 1	0.819	C- 7	-235.323	278.388	111.355	C- 5	-202.011	193.458	77.383
* 2	1.637	C- 7	-29.987	223.656	89.462	C- 5	-58.844	156.584	62.633
* 3	2.456	C- 8	129.586	101.580	69.285	C- 5	54.279	119.664	47.866
* 4	3.274	C- 8	198.173	66.116	51.009	C- 5	137.083	82.790	33.116
* 5	4.093	C- 8	237.782	30.609	32.710	C- 5	189.769	45.870	18.348
* 6	4.911	C- 8	248.316	-4.854	14.433	C- 6	363.003	-1.313	-0.525
* 7	5.730	C- 8	229.801	-40.361	-3.866	C- 6	339.487	-56.112	-22.445
* 8	6.548	C- 8	182.291	-75.825	-22.142	C- 6	271.202	-110.844	-44.338
* 9	7.367	C- 8	105.640	-111.332	-40.441	C- 6	157.981	-165.643	-66.257
3 - 2	8.185	C- 5	0.000	-138.591	-55.437	C- 6	0.000	-220.375	-88.150
2 - 4	0.000	C- 8	-124.426	69.587	-470.307	C- 7	24.442	0.000	-677.083
* 1	0.920	C- 8	-60.076	70.303	-477.798	C- 7	24.442	0.000	-684.576
* 2	1.840	C- 8	4.932	71.020	-485.288	C- 7	24.442	0.000	-692.066
* 3	2.760	C- 8	70.600	71.736	-492.779	C- 7	24.442	0.000	-699.557
* 4	3.680	C- 8	136.927	72.453	-500.270	C- 7	24.442	0.000	-707.048
4 - 2	4.600	C- 8	203.913	73.169	-507.760	C- 7	24.442	0.000	-714.538

M. MAXIMUM

M. MINIMUM

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)
1 -	0.000	C-9	0.000	116.742	47.438	C-10	0.000	70.146	28.504
* 1	0.680	C-9	68.797	85.601	34.784	C-12	39.204	46.931	17.005
* 2	1.360	C-9	116.417	54.460	22.130	C-12	63.827	25.488	6.225
* 3	2.040	C-9	142.862	23.319	9.476	C-12	73.868	4.045	-4.554
* 4	2.720	C-9	148.131	-7.822	-3.178	C-12	69.327	-17.399	-15.333
* 5	3.400	C-9	132.224	-38.963	-15.833	C-10	50.105	-40.673	-16.527
* 6	4.080	C-9	95.142	-70.104	-28.487	C-10	14.912	-62.836	-25.534
* 7	4.760	C-9	36.883	-101.245	-41.141	C-10	-35.352	-85.000	-34.540
* 8	5.440	C-9	-42.551	-132.386	-53.795	C-10	-100.688	-107.164	-43.546
* 9	6.120	C-9	-143.161	-163.527	-66.449	C-11	-189.452	-171.091	-69.522
2 -	6.800	C-12	-264.165	-146.059	-80.008	C-11	-316.433	-202.231	-82.177
2 -	0.000	C-12	-190.708	152.712	85.895	C-11	-333.202	228.548	91.419
* 1	0.819	C-12	-76.242	126.815	73.054	C-11	-161.413	190.959	76.384
* 2	1.637	C-12	16.914	100.950	60.228	C-9	-38.053	112.766	45.106
* 3	2.456	C-10	110.204	112.246	44.898	C-9	43.346	86.013	34.405
* 4	3.274	C-10	186.666	74.703	29.881	C-9	102.776	59.292	23.717
* 5	4.093	C-10	232.455	37.114	14.845	C-9	140.381	32.539	13.016
* 6	4.911	C-10	247.459	-0.430	-0.172	C-9	156.069	5.818	2.327
* 7	5.730	C-10	231.714	-38.019	-15.208	C-9	149.879	-20.933	-8.374
* 8	6.548	C-10	185.259	-75.562	-30.225	C-9	121.825	-47.655	-19.062
* 9	7.367	C-10	107.981	-113.151	-45.261	C-9	71.840	-74.408	-29.763
3 -	8.185	C-10	0.000	-150.695	-60.278	C-12	0.000	-106.101	-42.440
2 -	0.000	C-10	27.281	0.000	-405.819	C-12	-73.457	42.174	-339.124
* 1	0.920	C-10	27.281	0.000	-411.247	C-12	-34.457	42.608	-344.552
* 2	1.840	C-10	27.281	0.000	-416.675	C-9	1.421	0.000	-400.027
* 3	2.760	C-12	44.741	43.477	-355.408	C-9	1.421	0.000	-405.455
* 4	3.680	C-12	84.939	43.911	-360.836	C-9	1.421	0.000	-410.883
4 -	4.600	C-12	125.537	44.345	-366.264	C-9	1.421	0.000	-416.311

S. M I N I M U M

S. M A X I M U M

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-9	0.000	116.742	47.438	C-12	0.000	68.375	27.784
* 1	0.680	C-9	68.797	85.601	34.784	C-12	39.204	46.931	17.005
* 2	1.360	C-9	116.417	54.460	22.130	C-12	63.827	25.488	6.225
* 3	2.040	C-9	142.862	23.319	9.476	C-10	75.277	3.655	1.485
* 4	2.720	C-9	148.131	-7.822	-3.178	C-10	70.227	-18.509	-7.521
* 5	3.400	C-12	50.205	-38.842	-26.112	C-11	106.507	-46.527	-18.906
* 6	4.080	C-12	16.502	-60.285	-36.891	C-11	64.281	-77.668	-31.560
* 7	4.760	C-12	-31.783	-81.729	-47.671	C-11	0.879	-108.809	-44.214
* 8	5.440	C-12	-94.649	-103.172	-58.450	C-11	-83.699	-139.950	-56.868
* 9	6.120	C-12	-172.097	-124.615	-69.229	C-11	-189.452	-171.091	-69.522
2 - 1	6.800	C-12	-264.165	-146.059	-80.008	C-11	-316.435	-202.231	-82.177
2 - 3	0.000	C-11	-333.202	228.548	91.419	C-12	-190.708	152.712	85.895
* 1	0.819	C-11	-161.413	190.959	76.384	C-12	-76.242	126.815	73.054
* 2	1.637	C-11	-20.564	153.416	61.366	C-12	16.914	100.950	60.228
* 3	2.456	C-11	89.690	115.826	46.331	C-12	88.987	75.052	47.387
* 4	3.274	C-11	169.081	78.283	31.313	C-12	139.800	49.187	34.561
* 5	4.093	C-11	217.802	40.694	16.278	C-12	169.480	23.290	21.720
* 6	4.911	C-9	156.069	5.818	2.327	C-12	177.952	-2.576	3.894
* 7	5.730	C-9	149.879	-20.935	-8.374	C-10	231.714	-38.019	-15.208
* 8	6.548	C-9	121.825	-47.655	-19.062	C-10	185.259	-75.562	-30.225
* 9	7.367	C-9	71.840	-74.408	-29.763	C-10	107.981	-113.151	-45.261
3 - 2	8.185	C-9	0.000	-101.129	-40.452	C-10	0.000	-150.695	-60.278
2 - 4	0.000	C-12	-73.457	42.174	-339.124	C-10	27.281	0.000	-405.819
* 1	0.920	C-12	-34.457	42.608	-344.552	C-10	27.281	0.000	-411.247
* 2	1.840	C-12	4.942	43.042	-349.980	C-10	27.281	0.000	-416.675
* 3	2.760	C-12	44.741	43.477	-355.408	C-10	27.281	0.000	-422.103
* 4	3.680	C-12	84.939	43.911	-360.836	C-10	27.281	0.000	-427.531
4 - 2	4.600	C-12	125.537	44.345	-366.264	C-10	27.281	0.000	-432.959

N. MAXIMUM

N. MINIMUM

No.	L (m)	Case	M (tm)	S (t)	N (t)	Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-9	0.000	116.742	47.438	C-12	0.000	68.375	27.784
* 1	0.680	C-9	68.797	85.601	39.204	C-12	39.204	46.931	17.005
* 2	1.360	C-9	116.417	54.460	22.130	C-12	63.827	25.488	6.225
* 3	2.040	C-9	142.862	23.319	9.476	C-12	73.868	4.045	-4.554
* 4	2.720	C-9	148.131	-7.822	-3.178	C-12	69.327	-17.399	-15.333
* 5	3.400	C-9	132.224	-38.963	-15.833	C-12	50.205	-38.842	-26.112
* 6	4.080	C-10	14.912	-62.836	-25.534	C-12	16.502	-60.285	-30.891
* 7	4.760	C-10	-35.352	-85.000	-34.540	C-12	-31.783	-81.729	-47.671
* 8	5.440	C-10	-100.688	-107.164	-43.546	C-12	-94.649	-103.172	-58.450
* 9	6.120	C-10	-181.095	-129.328	-52.552	C-11	-189.452	-171.091	-69.522
2 - 1	6.800	C-10	-276.614	-151.492	-61.558	C-11	-316.435	-202.231	-82.177
2 - 3	0.000	C-11	-333.202	228.548	91.419	C-9	-266.419	166.240	66.496
* 1	0.819	C-11	-161.413	190.959	76.384	C-9	-141.225	139.486	55.795
* 2	1.637	C-11	-20.564	153.416	61.366	C-9	-38.053	112.766	45.106
* 3	2.456	C-12	88.987	75.052	47.387	C-9	43.346	86.013	34.405
* 4	3.274	C-12	139.800	49.187	34.561	C-9	102.776	59.292	23.717
* 5	4.093	C-12	169.480	23.290	21.720	C-9	140.381	32.539	13.016
* 6	4.911	C-12	177.952	-2.576	8.894	C-10	247.459	-0.430	-0.172
* 7	5.730	C-12	165.237	-28.473	-3.948	C-10	231.714	-38.019	-15.208
* 8	6.548	C-12	131.367	-54.338	-16.773	C-10	185.259	-75.562	-30.225
* 9	7.367	C-12	76.259	-80.236	-29.615	C-10	107.981	-113.151	-45.261
3 - 2	8.185	C-9	0.000	-101.129	-40.452	C-10	0.000	-150.695	-60.278
2 - 4	0.000	C-12	-73.457	42.174	-339.124	C-11	16.766	0.000	-464.444
* 1	0.920	C-12	-34.457	42.608	-344.552	C-11	16.766	0.000	-469.872
* 2	1.840	C-12	4.942	43.042	-349.980	C-11	16.766	0.000	-475.300
* 3	2.760	C-12	44.741	43.477	-355.408	C-11	16.766	0.000	-480.728
* 4	3.680	C-12	84.939	43.911	-360.836	C-11	16.766	0.000	-486.156
4 - 2	4.600	C-12	125.537	44.345	-366.264	C-11	16.766	0.000	-491.584

No.② PEDESTRIAN BRIDGE OF STAIRCASE (1) -- Superstructure

1. Calculation of bending moment for U.L.S

1) For middle point of second span ...  $M_{u,max} = 363.0 \text{ kNm}$

(For middle point of first span ...  $M_{u,max} = 219.9 \text{ kNm}$ )

$$\text{section } b = 360 \text{ cm } \quad h = 30 \quad d = 23.5 \quad d' = 6.5$$

$$A_s = Y_{16} - 25^{N0} = 2.011 \times 25 = 50.275 \text{ cm}^2$$

$$\chi = \frac{0.87 \times 41000 \times 50.275}{0.40 \times 3000 \times 360} = 4.2 \text{ cm}$$

$$Z = 23.5 - \frac{4.2}{2} = 21.4 \text{ cm} < 0.95 \times 23.5 = 22.4 \text{ cm} \quad \text{OK}$$

$$M_{RS} = 0.87 \times 41000 \times 50.275 \times 21.4 \times 10^{-5} = 383.8 \text{ kNm} > M_u = 363.0 \text{ kNm}$$

$$M_{RC} = 0.40 \times 3000 \times 360 \times 4.2 \times 21.4 \times 10^{-5} = 388.3 \text{ kNm} > M_u = 363.0 \text{ kNm} \quad \text{OK}$$

2) For middle fulcrum ...  $M_{u,min} = -485.8 \text{ kNm}$

$$\text{section } b = 360 \text{ cm } \quad h = 30 \quad d = 24.0 \quad d' = 6.0$$

$$A_s = Y_{20} - 25^{N0} = 3.1416 \times 25 = 78.54 \text{ cm}^2$$

$$\chi = \frac{0.87 \times 41000 \times 78.54}{0.40 \times 3000 \times 360} = 6.6 \text{ cm}$$

$$Z = 24.0 - \frac{6.6}{2} = 20.7 \text{ cm} < 0.95 \times 24.0 = 22.8 \text{ cm}$$

$$M_{RS} = 0.87 \times 41000 \times 78.54 \times 20.7 \times 10^{-5} = 580.0 \text{ kNm} > M_u = 485.8 \text{ kNm}$$

$$M_{RC} = 0.40 \times 3000 \times 360 \times 6.6 \times 20.7 \times 10^{-5} = 590.2 \text{ kNm} > M_u = 485.8 \text{ kNm}$$

2. Calculation of bending moment for S.L.S.

1) For middle point of second span ... Ms.max = 247.5<sup>kNm</sup>

(For middle point of first span ... Ms.max = 148.2<sup>kNm</sup>)

$$\text{section} \quad b = 360^{\text{cm}} \quad h = 30 \quad d = 23.5 \quad d' = 6.5$$

$$A_s = Y_{16-25}^{N^0} = 50.275 \text{ cm}^2$$

$$x = \frac{0.80 \times 41000 \times 50.275}{\frac{1}{2} \times 0.50 \times 3000 \times 360} = 6.3^{\text{cm}}$$

$$Z = 23.5 - \frac{6.3}{2} = 21.4^{\text{cm}}$$

$$M_{RS} = 0.80 \times 41000 \times 50.275 \times 21.4 \times 10^{-5} = 352.9^{\text{kNm}} > M = 247.5^{\text{kNm}}$$

$$M_{RC} = \frac{1}{2} \times 0.50 \times 3000 \times 360 \times 6.3 \times 21.4 \times 10^{-5} = 364.0^{\text{kNm}} > M = 247.5^{\text{kNm}} \text{ OK}$$

2) For middle fulcrum ... Ms.min = -333.2<sup>kNm</sup>

$$\text{section} \quad b = 360^{\text{cm}} \quad h = 30 \quad d = 24.0 \quad d' = 6.0$$

$$A_s = Y_{20-25}^{N^0} = 78.54 \text{ cm}^2$$

$$x = \frac{0.80 \times 41000 \times 78.54}{\frac{1}{2} \times 0.50 \times 3000 \times 360} = 9.6^{\text{cm}}$$

$$Z = 24.0 - \frac{9.6}{3} = 20.8^{\text{cm}}$$

$$M_{RS} = 0.80 \times 41000 \times 78.54 \times 20.8 \times 10^{-5} = 535.8^{\text{kNm}} > M = 333.2^{\text{kNm}}$$

$$M_{RC} = \frac{1}{2} \times 0.50 \times 3000 \times 360 \times 9.6 \times 20.8 \times 10^{-5} = 539.1^{\text{kNm}} > M = 333.2^{\text{kNm}}$$

Note : U.L.S is critical state than S.L.S.

No.② PEDESTRIAN BRIDGE OF STAIRCASE (1) - Superstructure

3. Calculation of shearing stress for U.L.S.

For middle fulcrum  $S_u \text{ max} = 333.2 \text{ kN}$

section  $b = 360 \text{ cm}$   $h = 30$   $d = 24.0$   $d' = 6.0$

$$A_s = Y_{20} - 25^{N0} = 3.1416 \times 25 = 78.54 \text{ cm}^2$$

$$P = \frac{78.54}{360 \times 24.0} \times 100 = 0.909 \%$$

$$V_c = \frac{333.2 \times 10^3}{360 \times 24.0} = 38.6 \text{ N/cm}^2$$

$$< V_{ca} = 55.0 + 15.0 \left( \frac{0.909 - 0.50}{0.50} \right) = 67.3 \text{ N/cm}^2 \quad \text{OK}$$



No. ② PEDESTRIAN BRIDGE OF STAIRCASE (1) - Substructure

Calculation for bottom of pillar for Longitudinal direction.

$$\left. \begin{array}{l} M = 204.0 \text{ KNm} \\ H = 73.2 \text{ KN} \\ N = 507.8 \text{ KN} \end{array} \right\} \text{ for pillar } \textcircled{4} \sim \textcircled{2} \text{ from case-8 (U.L.S)}$$

section  $b = 50 \text{ cm}$   $h = 50$   $d = 43.5$   $d' = 6.5$

$$A_s = A'_s = Y_{32} - 3^{N0} = 8.042 \times 3 = 24.126 \text{ cm}^2$$

$$M_a = 204.0 + 507.8 \left( 0.435 - \frac{0.500}{2} \right) = 298.0 \text{ KNm}$$

$$x = \frac{(0.87 - 0.72) \times 41000 \times 24.126}{0.40 \times 2500 \times 50} = 4.4 \text{ cm}$$

$$Z = 43.5 - \frac{4.4}{2} = 41.3 \text{ cm} \doteq 0.95 \times 43.5 = 41.3 \text{ cm}$$

$$M_{RS} = 0.87 \times 41000 \times 24.126 \times 41.3 \times 10^{-5} = 355.4 \text{ KNm} > M_a = 298.0 \text{ KNm}$$

$$M_{RC} = (0.72 \times 41000 \times 24.126 \times 37.0 + 0.40 \times 2500 \times 50 \times 4.4 \times 41.3) \times 10^{-5} = 354.4 \text{ KNm} > M_a = 298.0 \text{ KNm} \text{ OK}$$

$$A_{sn} = A'_{sn} = 24.126 - \frac{507.8 \times 10^3}{0.87 \times 41000} = 9.9 \text{ cm}^2$$

$$< A_{su} = A'_{su} = Y_{25} - 4^{N0} = 4.909 \times 4 = 19.636 \text{ cm}^2$$

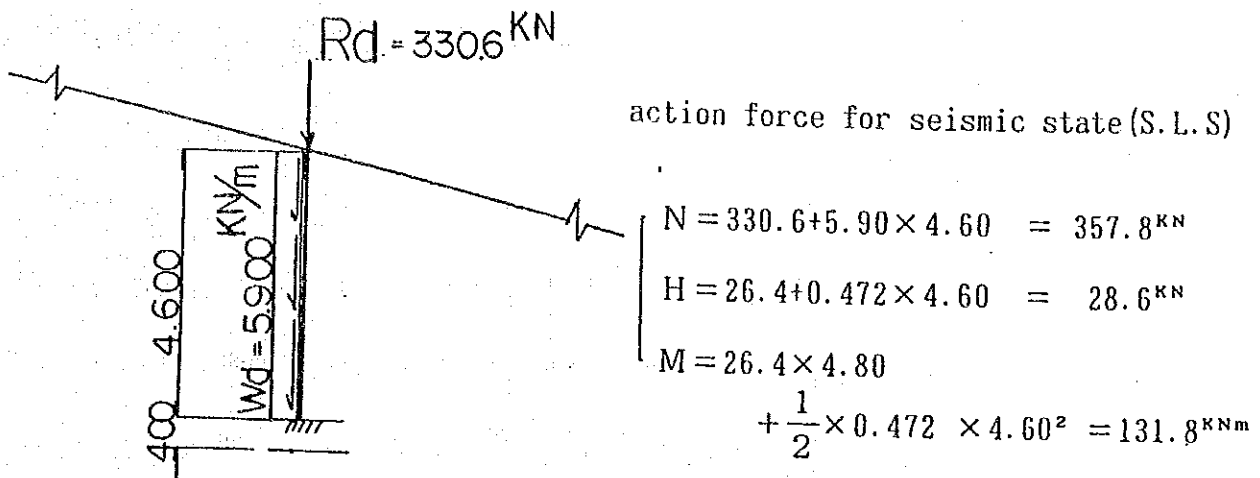
$$P = \frac{19.636}{50 \times 43.5} \times 100 = 0.903 \%$$

$$V_c = \frac{73.2 \times 10^3}{50 \times 43.5} = 33.6 \text{ N/cm}^2$$

$$< V_{ca} = 50.0 + 15.0 \left( \frac{0.903 - 0.50}{0.50} \right) = 62.1 \text{ N/cm}^2$$

No. ② PEDESTRIAN BRIDGE OF STAIRCASE (1) - Substructure

Calculation for bottom of pillar for crossing direction.



action force for seismic state for U.L.S

$$\begin{cases} N = 357.8 \times 1.38 = 493.8 \text{ kN} \\ H = 28.6 \times 1.65 = 47.2 \text{ kN} \\ M = 131.8 \times 1.65 = 217.5 \text{ kNm} \end{cases}$$

Calculation for bottom of pillar (U.L.S)

section  $b = 50 \text{ cm}$   $h = 50$   $d = 43.5$   $d' = 6.5$

$$A_s = A'_s = Y_{32} - 3^{N^0} = 8.042 \times 3 = 24.126 \text{ cm}^2$$

$$M_a = 217.5 + 493.8 \left( 0.435 - \frac{0.50}{2} \right) = 308.9 \text{ kNm}$$

$$x = \frac{(0.87 - 0.72) \times 41000 \times 24.126}{0.40 \times 2500 \times 50} = 4.4 \text{ cm}$$

$$Z = 43.5 - \frac{4.4}{2} = 41.3 \text{ cm} < 0.95 \times 43.5 = 41.3 \text{ cm}$$

$$M_{RS} = 0.87 \times 41000 \times 24.126 \times 41.3 \times 10^{-5} = 355.4 \text{ kNm} < M_a = 308.9 \text{ kNm}$$

$$M_{RC} = (0.72 \times 41000 \times 24.126 \times 37.0 + 0.40 \times 2500 \times 50 \times 4.4 \times 41.3) \times 10^{-5} = 354.4 \text{ kNm} < M_a = 308.9 \text{ kNm} \quad \text{OK}$$

$$A_{sn} = A'_{sn} = 24.126 - \frac{507.0 \times 10^3}{0.87 \times 41000} = 10.0 \text{ cm}^2$$

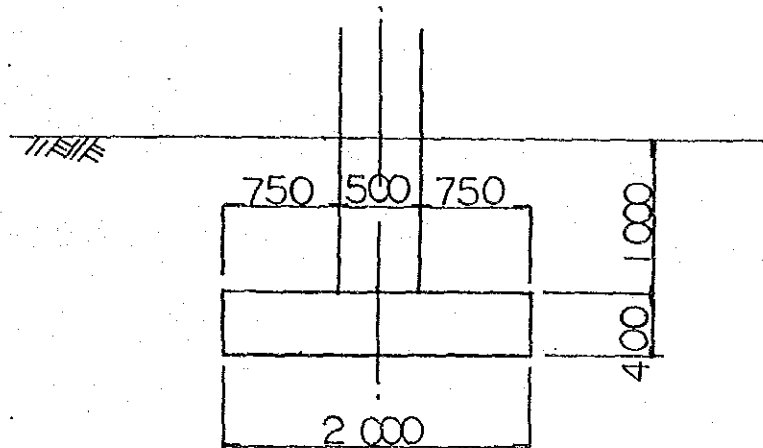
$$< A_{su} = A'_{su} = Y_{25} - 4^{N^0} = 4.909 \times 4 = 19.636 \text{ cm}^2 \quad \text{OK}$$

No.② PEDESTRIAN BRIDGE OF STAIRCASE (1) - Substructure

Calculation of stability for Longitudinal direction.

1. Footing and surcharge

1) Shape and size of foundation



Both direction

2) Load of foundation

$$\text{Footing} = 23.6 \times 2.00 \times 2.00 \times 0.40 = 37.8 \text{ KN}$$

$$\text{Surcharge} = 18.6 \times 2.00 \times 2.00 \times 1.00 = 74.4 \text{ KN}$$

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$$\text{Total} = 112.2 \text{ KN}$$

2. Calculation of stability of foundation

1) action force

a) action force for bottom slab from case-12 (S.L.S)

$$N = 366.3 + 112.2 = 478.5 \text{ KN}$$

$$H = 44.4 = 44.4 \text{ KN}$$

$$M = 125.6 + 44.4 \times 0.40 = 143.4 \text{ KNm}$$

b) action force for bottom slab from case-8 (U.L.S)

$$N = 507.8 + 112.2 \times 1.380 = 662.7 \text{ kN}$$

$$H = 73.2 = 73.2 \text{ kN}$$

$$M = 204.0 + 73.2 \times 0.40 = 233.3 \text{ kNm}$$

2) stability of foundation

a) for S.L.S

$$e = \frac{M}{N} = \frac{143.4}{478.5} = 0.300 \text{ m}$$

$$q = \frac{N}{B \cdot L} \left(1 \pm \frac{6e}{B}\right) = \frac{478.5}{2.00^2} = \left(1 \pm \frac{6 \times 0.300}{2.00}\right) = \begin{cases} 227.3 \text{ KN/m}^2 \\ 11.9 \text{ KN/m}^2 \end{cases} < q_a = 300 \text{ KN/m}^2$$

$$F_s = \frac{N \cdot \mu}{H} = \frac{478.5 \times 0.50}{44.4} = 5.4 > 1.5$$

b) for U.L.S

$$e = \frac{M}{N} = \frac{233.3}{662.7} = 0.352 \text{ m}$$

$$x = \frac{B}{2} - e = \frac{2.00}{2} - 0.352 = 0.648 \text{ m}$$

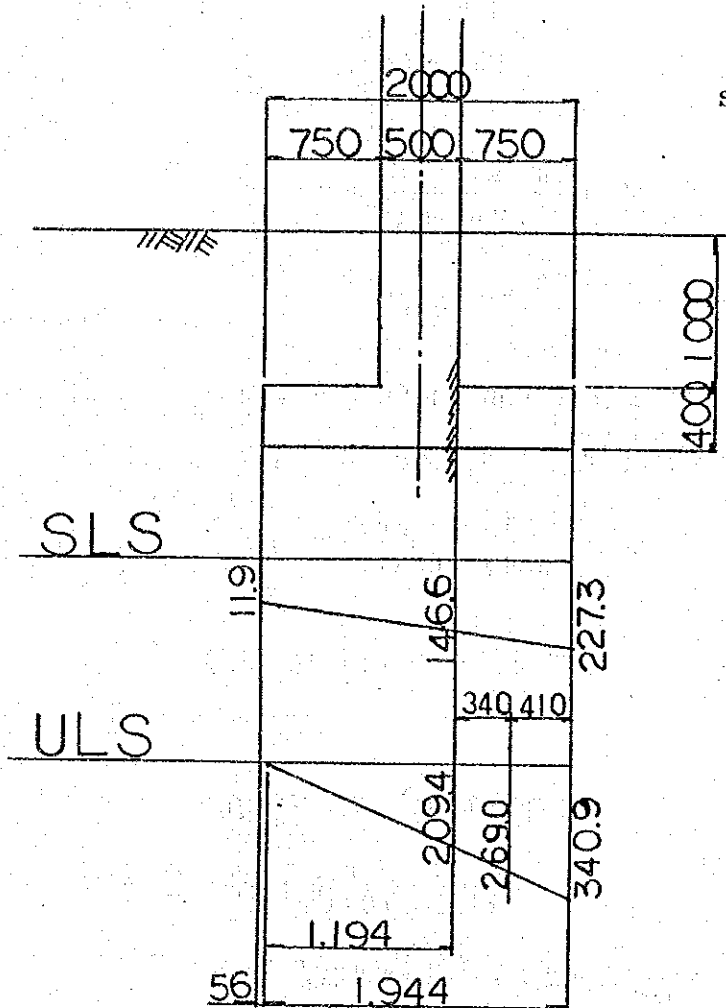
$$q_{\max} = \frac{2N}{3 \cdot x \cdot L} = \frac{2 \times 662.7}{3 \times 0.648 \times 2.00} = 340.9 \text{ KN/m}^2 < q_a = 525 \text{ KN/m}^2 \quad \text{OK}$$

$$F_s = \frac{N \cdot \mu}{H} = \frac{662.7 \times 0.50}{73.2} = 4.5 > 1.1 \quad \text{OK}$$

No.② Pedestrian Br. - Staircase(1) - Substructure

Calculation of stress of foundatin for Longitudinal direction.

1) load



surcharge for S.L.S.

$$\omega = (23.6 \times 0.40 + 18.6 \times 1.00) \times 2.00 = 56.1 \text{ kN/m}$$

surcharge for U.L.S.

$$\omega = (23.6 \times 0.40 + 18.6 \times 1.00) \times 2.00 \times 1.38 = 77.4 \text{ kN/m}$$

(2) bending moment and shearing force.

a) for S.L.S

$$M = \frac{0.75^2 \times 20}{6} (2 \times 227.3 + 146.6) - \frac{0.75^2}{2} \times 56.1 = 97.0 \text{ KNm}$$

$$S = \frac{0.75 \times 20}{2} (227.3 + 146.6) - 0.75 \times 56.1 = 238.4 \text{ KN}$$

a) for U.L.S

$$M = \frac{0.75^2 \times 20}{6} (2 \times 340.9 + 209.4) - \frac{0.75^2}{2} \times 77.4 = 144.5 \text{ KNm}$$

$$S = \frac{0.75 \times 20}{2} (340.9 + 209.4) - 0.75 \times 77.4 = 354.7 \text{ KN}$$

$$S_C = \frac{0.41 \times 20}{2} (340.9 + 269.0) - 0.41 \times 77.4 = 210.3 \text{ KN}$$

### 3) Calculation of stress

$$\text{section } b = 50 + 34.0 \times 2 = 118.0 \text{ cm} \quad h = 40 \quad d = 34.0 \quad d' = 6.0$$

$$A_s = Y_{12} - 130^{ctc} (11^{No}) = 1.131 \times 11 = 12.441 \text{ cm}^2$$

$$P = \frac{12.441}{118.0 \times 34.0} \times 100 = 0.310\%$$

$$x = \frac{0.87 \times 41000 \times 12.441}{0.40 \times 2500 \times 118.0} = 3.8 \text{ cm}$$

$$Z = 34.0 - \frac{3.8}{2} = 32.1 \text{ cm} \approx 0.95 \times 34.0 = 32.3 \text{ cm}$$

$$M_{RS} = 0.87 \times 41000 \times 12.441 \times 32.1 \times 10^{-5} = 145.0 \text{ KNm} > M = 144.5 \text{ KNm}$$

$$M_{RC} = 0.40 \times 2500 \times 118.0 \times 3.8 \times 32.1 \times 10^{-5} = 145.0 \text{ " } > \dots$$

$$V_c = \frac{354.7 \times 10^3}{118.0 \times 34.0} = 88.4 \text{ N/cm}^2$$

$$\leq V_{ca} = \left[ 35.0 + 15.0 \left( \frac{0.310 - 0.25}{0.25} \right) \right] \frac{2 \times 200}{118} = 130.8 \text{ N/cm}^2 \text{ OK}$$

### Check of Critical Section

$$V_c = \frac{218.3 \times 10^3}{118.0 \times 34.0} = 54.5 \text{ N/cm}^2$$

$$< V_{ca} = \left[ 35.0 + 15.0 \left( \frac{0.310 - 0.25}{0.25} \right) \right] \frac{2 \times 34.0}{37.5} = 70.0 \text{ N/cm}^2 \text{ OK}$$

No.② Pedestrian Br. - Staircase(1) - Substructure

Calculation of stability for Crossing direction

1. Calculation of stability of Foundation

1) action force

a) action force of bottom slab for S.L.S.

$$N = 357.8 + 112.2 = 470.0^{KN}$$

$$H = 28.6 = 28.6^{KN}$$

$$M = 131.8 + 28.6 \times 0.40 = 143.3^{KNm}$$

b) action force of bottom slab for U.L.S.

$$N = 493.8 + 112.2 \times 1.38 = 648.7^{KN}$$

$$H = 47.2 = 47.2^{KN}$$

$$M = 217.5 + 47.2 \times 0.40 = 236.4^{KNm}$$

2) Stability of Foundation

a) for S.L.S

$$e = \frac{M}{N} = \frac{143.3}{470.0} = 0.305^m$$

$$q = \frac{N}{B \cdot L} \left(1 \pm \frac{6e}{B}\right) = \frac{470.0}{2.00^2} \left(1 \pm \frac{6 \times 0.305}{2.00}\right) = \begin{pmatrix} 225.1 \text{ KN/m}^2 \\ 10.0 \text{ KN/m}^2 \end{pmatrix} \leq q_a = 300 \text{ KN/m}^2$$

b) for U.L.S

$$e = \frac{M}{N} = \frac{236.4}{648.7} = 0.365^m$$

$$x = \frac{B}{2} - e = \frac{2.00}{2} - 0.365 = 0.635^m$$

$$q_{max} = \frac{2N}{3 \cdot x \cdot L} = \frac{2 \times 648.7}{3 \times 0.635 \times 2.00} = 340.6 \text{ KN/m}^2 < 525 \text{ KN/m}^2$$

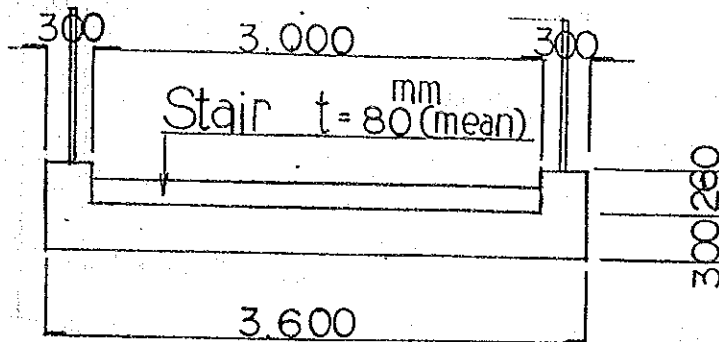
3) Calculation of stress

Notice ... this case is abridge and is apply Longitudinal direction.

No. ② PEDESTRIAN BRIDGE OF STAIRCASE (2)

1) Shape and factor for calculation of stress

(1) Superstructure



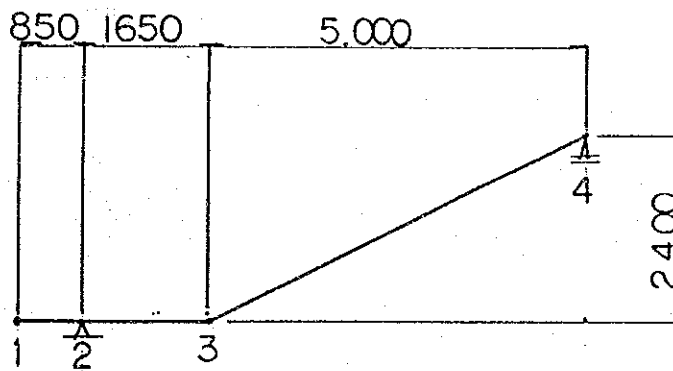
$$A = 360 \times 0.30 = 1.080 \text{ m}^2$$

$$I = \frac{360 \times 0.30^3}{12} = 0.00810 \text{ m}^4$$

$$E_c = 27 \text{ KN/mm}^2 = 2.7 \times 10^7 \text{ KN/m}^2$$

( $f_{cu} = 30 \text{ N/mm}^2$ )

(2) Frame



2) Load ... from staircase (1)

(1) Dead load

$$\omega_d = 35.182 \text{ KN/m}$$

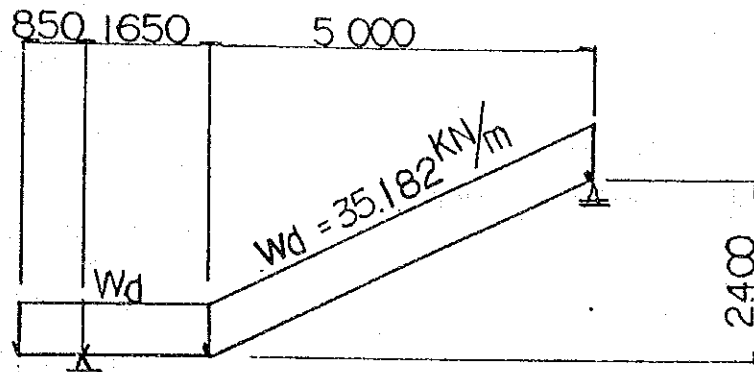
(2) Live load

$$\omega_l = 14.250 \text{ KN/m}$$

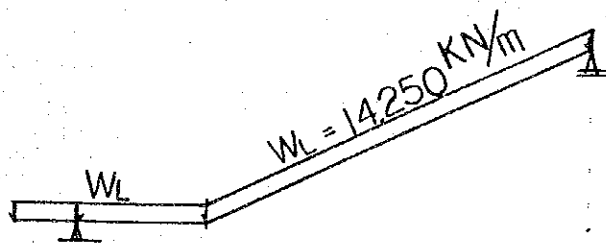


3) Loaded figure

(1) Dead load ... case-1



(2) Live load ... case-2



Pedestrian No 2 Staircase

No	X (m)	Y (m)
1	0.0000	0.0000
2	0.8500	0.0000
3	2.5000	0.0000
4	7.5000	2.4000

NOTE: THE DIMENSION(I) BE EXCHANG TO  
DIMENSION(KN) INTO THIS CALCULATION

Pedestrian No 2 Staircase

No	I	J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1	2	1.08000	0.008100	Fix - Fix	0.850	2.70E+07	1.20E-05
2	2	3	1.08000	0.008100	Fix - Fix	1.650	2.70E+07	1.20E-05
3	3	4	1.08000	0.008100	Fix - Fix	5.546	2.70E+07	1.20E-05

Pedestrian No 2 Staircase

No. 1

No	X (t/m)	Y (t/m)	M (tm/Rad)
2	Fix	Fix	Free
4	Free	Fix	Free

Pedestrian No 2 Staircase

No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No	L-No
	1	2	3	4	5	6	7	8	9	10
	11	12	13	14	15	16	17	18	19	20
1	0									
2	2	0.550	1.100							
3	4	1.109	2.218	3.328	4.437					

Pedestrian No 2 Staircase

: Dead load  
 No. : 1  
 No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1	2	-Y	0.000	0.850	-35.182	-35.182
2	2	3	-Y	0.000	1.650	-35.182	-35.182
3	3	4	-Y	0.000	5.546	-35.182	-35.182

$\Sigma V = -283.074 (t)$   
 $\Sigma H = 0.000 (t)$

Pedestrian No 2 Staircase

: Live load  
 No. : 2  
 No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2	3	-Y	0.000	1.650	-14.250	-14.250
3	3	4	-Y	0.000	5.546	-14.250	-14.250

$\Sigma V = -102.543 (t)$   
 $\Sigma H = 0.000 (t)$

Pedestrian No 2 Staircase

No	C-No 1	C-No 2
No	No 3	No 4
$\alpha$	1.0000	1.0000
No 1	1.3800	1.0000
No 2	1.6500	1.0000

Pedestrian No 2 Staircase

No.	Case. 1		RM (tm)	Case. 2		RM (tm)	Case. 3	
	RX (t)	RY (t)		RX (t)	RY (t)		RX (t)	RY (t)
2.	0.000	156.020	0.000	0.000	50.307	0.000	298.314	0.000
4.	0.000	127.055	0.000	0.000	52.236	0.000	261.524	0.000

No.	Case. 4		RM (tm)
	RX (t)	RY (t)	
2.	0.000	205.327	0.000
4.	0.000	179.290	0.000

Pedestrian No 2 Staircase

No.	Case. 1			Case. 2			Case. 3		
	X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	1.84743	-2.16933	0.00000	0.79894	-0.93993	0.00000	3.86771	-4.5446
2.	0.00000	0.00000	-2.18580	0.00000	0.00000	-0.93993	0.00000	0.00000	-4.5673
3.	0.00000	-3.90361	-1.61715	0.00000	-1.39879	-0.67359	0.00000	-6.86699	-3.3464
4.	-1.58304	0.00000	2.31479	-0.67026	0.00000	0.96607	-3.29052	0.00000	4.7884

No.	Case. 4		
	X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	2.64637	-3.10926
2.	0.00000	0.00000	-3.12573
3.	0.00000	-4.70240	-2.29274
4.	-2.25330	0.00000	3.28086

Pedestrian No 2 Staircase

U.L.S

No	L(m)	Case 1 Dead load		Case 2 Live load		Case 3	
		M (tm)	S (t)	M (tm)	S (t)	M (tm)	S (t)
1- 2	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2- 1	0.850	-12.709	-29.905	0.000	0.000	-17.539	-41.268
2- 3	0.000	-12.709	126.115	0.000	50.307	-17.539	257.046
* 1	0.550	51.333	106.765	25.514	42.470	112.936	217.411
* 2	1.100	104.732	87.415	46.717	34.632	221.613	177.776
3- 2	1.650	147.489	68.065	63.609	26.795	308.490	138.141
3- 4	0.000	147.489	61.352	63.609	24.156	308.490	124.537
* 1	1.109	196.035	26.187	82.498	9.909	406.650	52.469
* 2	2.218	205.573	-8.987	85.587	-4.338	424.909	-19.560
* 3	3.328	175.058	-44.193	72.858	-18.598	363.175	-91.673
* 4	4.437	107.543	-79.368	44.333	-32.845	221.558	-163.722
4- 3	5.546	0.000	-114.543	0.000	-47.092	0.000	-235.770
				-29.454		-11.595	
				-12.570		-4.756	
				4.314		2.082	
				21.213		8.927	
				38.097		15.766	
				54.980		22.604	

Pedestrian No 2 Staircase --- SLS

No	L(m)	Case 4		N (t)
		M (tm)	S (t)	
1- 2	0.000	0.000	0.000	0.000
2- 1	0.850	-12.709	-29.905	0.000
2- 3	0.000	-12.709	176.422	0.000
* 1	0.550	76.846	149.235	0.000
* 2	1.100	151.449	122.047	0.000
3- 2	1.650	211.098	94.860	0.000
3- 4	0.000	211.098	85.518	-41.049
* 1	1.109	278.533	36.096	-17.326
* 2	2.218	291.160	-13.325	6.396
* 3	3.328	248.915	-62.791	30.140
* 4	4.437	151.876	-112.213	53.862
4- 3	5.546	0.000	-161.634	77.585

No.② Pedestrian Br. - Staircase (2) - Superstructure

1. Calculation of bending moment for U.L.S.

section  $b = 360 \text{ cm}$   $h = 30$   $d = 23.5$   $d' = 6.5$

middle span ...  $M_u \text{ max} = 424.9 \text{ kNm}$  ... case-3

$$A_s = Y_{20} - 25^{N0} = 3.1416 \times 25 = 78.54 \text{ cm}^2$$

$$x = \frac{0.87 \times 41000 \times 78.54}{0.40 \times 3000 \times 360} = 6.6 \text{ cm}$$

$$Z = 23.5 - \frac{6.6}{2} = 20.2 \text{ cm} < 0.95 \times 23.5 = 22.3 \text{ cm}$$

$$M_{RS} = 0.87 \times 41000 \times 78.54 \times 20.2 \times 10^{-5} = 565.9 \text{ kNm} > M_u = 424.9 \text{ kNm}$$

$$M_{RC} = 0.40 \times 3000 \times 360 \times 6.6 \times 20.2 \times 10^{-5} = 575.9 \text{ kNm} > M_u = 424.9 \text{ kNm} \text{ OK}$$

2. Calculation of shearing stress for U.L.S.

end fulcrum ...  $S_u \text{ max} = 257.1 \text{ kN}$  ... case-3

$$P = \frac{78.54}{360 \times 23.5} \times 100 = 0.928 \%$$

$$V_c = \frac{257.1 \times 10^3}{360 \times 23.5} = 30.4 \text{ N/cm}^2$$

$$< V_{ca} = 55.0 + 15.0 \left( \frac{0.928 - 0.50}{0.50} \right) = 67.8 \text{ N/cm}^2 \text{ OK}$$

3. Calculation of bending moment for S.L.S.

section  $b = 360 \text{ cm}$   $h = 30$   $d = 23.5$   $d' = 6.5$

middle span ...  $M_s \text{ max} = 291.2 \text{ kNm}$  ... (case-4)

$$A_s = Y_{20} - 25^{N0} = 3.1416 \times 25 = 78.54 \text{ cm}^2$$

$$x = \frac{0.80 \times 41000 \times 78.54}{\frac{1}{2} \times 0.50 \times 3000 \times 360} = 9.6 \text{ cm}$$

$$Z = 23.5 - \frac{9.6}{3} = 20.3 \text{ cm}$$

$$M_{RS} = 0.80 \times 41000 \times 78.54 \times 20.3 \times 10^{-5} = 522.9 \text{ kNm} > M_s = 291.2 \text{ kNm}$$

$$M_{RC} = \frac{1}{2} \times 0.50 \times 3000 \times 360 \times 9.6 \times 20.3 \times 10^{-5} = 526.2 \text{ kNm} > M_s = 291.2 \text{ kNm} \text{ OK}$$