No.① BOX CULVERT FOR ROAD

1. calculation for bending moment

section b=100^{cm} h=90 d=84.0 d′=6.0

1) For upper slab

a) middle point ②～③ Mu.max=1025.5^{KNm}

$$A_s = \begin{cases} Y_{32}-300^{ctc} = 8.042/0.30 \\ Y_{25}-300^{ctc} = 4.909/0.30 \end{cases} = 43.17\ cm^2$$

$$X = \frac{0.87\times41000\times43.17}{0.40\times2500\times100} = 15.4^{cm}$$

$$Z = 84.0-\frac{15.4}{2} = 76.3^{cm} < 0.95\times84.0 = 79.8^{cm} \quad OK$$

$M_{RS}=0.87\times41000\times43.17\times76.3\times10^{-5}=1175.0^{KNm} > Mu=1025.5^{KNm}$

$M_{RC}=0.40\times2500\times100\times15.4\times76.3\times10^{-5}=1175.0^{KNm} > Mu=1025.5^{KNm}$ OK

b) intersection point ②=③ Mu.min=−753.6^{KNm}

$$A_s = Y_{25}\text{-}150^{ctc} = 4.909/0.15 = 32.73\ cm^2$$

$$X = \frac{0.87\times41000\times32.73}{0.40\times2500\times100} = 11.8^{cm}$$

$$Z = 84.0-\frac{11.8}{2} = 78.1^{cm} < 0.95\times84.0 = 79.8^{cm} \quad OK$$

$M_{RS}=0.87\times41000\times32.73\times78.1\times10^{-5}=911.8^{KNm} > 753.6^{KNm}$

$M_{RC}=0.40\times2500\times100\times11.8\times78.1\times10^{-5}=921.8^{KNm} > 753.6^{KNm}$

2) For bottom slab

section b=100^{cm} h=100 d=93.0(94.0) d′=7.0(6.0)

a) middle point ④～① Mu.max=1347.1^{KNm}

$$A_s = Y_{32}\text{-}150^{ctc} = 8.042/0.150 = 53.61\ cm^2$$

$$X = \frac{0.87\times41000\times53.16}{0.40\times2500\times100} = 15.2^{cm}$$

$$Z = 94.0-\frac{19.2}{2} = 84.4^{cm} < 0.95\times94.0 = 89.3^{cm} \quad OK$$

$M_{RS}=0.87\times41000\times53.16\times84.4\times10^{-5}=1600.4^{KNm} >= 1347.1^{KNm}$

$M_{RC}=0.40\times2500\times100\times19.2\times84.4\times10^{-5}=1620.5^{KNm} >= 1347.1^{KNm}$ OK

b) intersection point ④～① Mu.min＝－917.9^{KNm}

A_s＝ Y_{25}-150^{ctc} ＝ 4.909／0.15 ＝32.73 cm^2

$$X = \frac{0.87\times 41000 \times 32.73}{0.40\times 2500\times 100} = 11.8^{cm}$$

$$Z = 93.0-\frac{11.8}{2} = 87.1^{cm} < 0.95\times 93.0 = 88.3^{cm}$$ OK

M_{RS} ＝0.87×41000 ×32.73 ×87.1×10^{-5}＝1016.8^{KNm} ＞Mu＝917.9^{KNm}

M_{RC} ＝0.40×2500×100 ×11.8×87.1×10^{-5}＝1027.8^{KNm} ＞Mu＝917.9^{KNm} OK

Notice: this bar is decide for shearing forces without bending moments.

2. calculation for shearing force (U.L.S)

a) For upper slab

intersection point ②＝③ Su.max ＝ 408.1^{KN}

section b ＝100^{cm} h ＝90 d ＝84.0 d´＝6.0

$$A_s = \left\{ \begin{array}{l} Y_{32}\text{-}300^{ctc} \\ Y_{25}\text{-}300^{ctc} \end{array} \right\} = 43.17 \text{ cm}^2$$

$$P = \frac{43.17}{100 \times 84.0}\times 100 = 0.514\ \%$$

$$Vc = \frac{408.1\times 10^3}{100\times 84.0} = 48.6 \text{ N/cm}^2$$

$$Vca = 50.0 + \frac{15.0}{0.50}(0.514-0.50) = 50.4 \text{ N/cm}^2$$

b) For bottom slab

intersection point ④＝① Su.max ＝ 487.7^{KN}

section b ＝100^{cm} h ＝100 d ＝93.0 d´＝7.0

A_s＝ Y_{32}-150^{ctc} ＝8.042/0.15＝ 53.61 cm^2

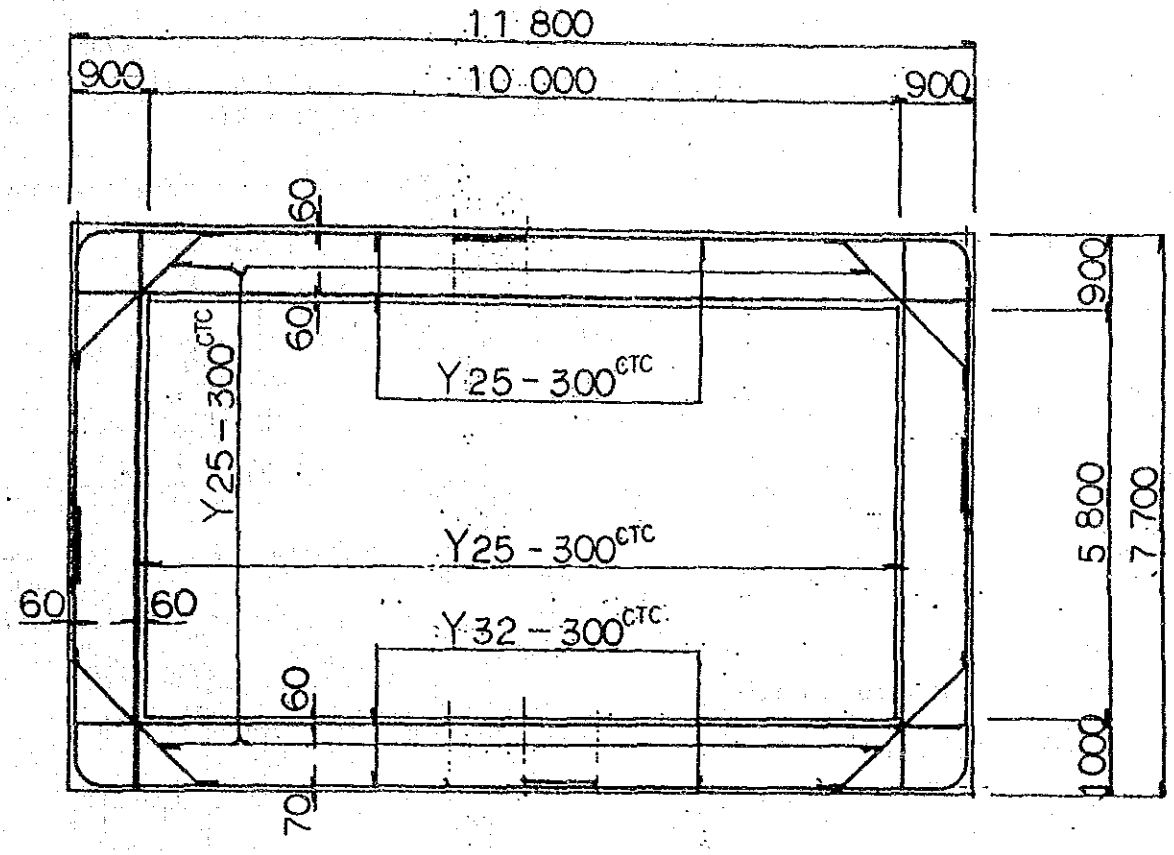
$$P = \frac{53.61}{100 \times 93.0}\times 100 = 0.577\ \%$$

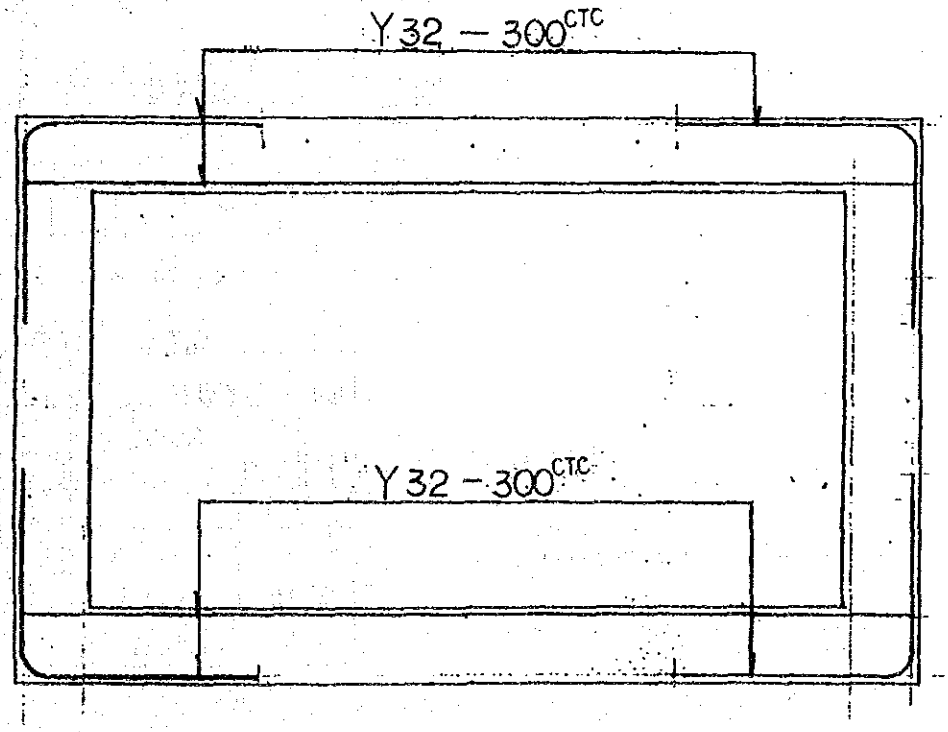
$$Vc = \frac{487.7\times 10^3}{100\times 93.0} = 52.4 \text{ N/cm}^2$$

$$\leqq Vca = 50.0 + \frac{15.0}{0.50}(0.577-0.50) = 52.4 \text{ N/cm}^2$$ OK

Notice: this bar is decide for shearing force about point ②, ③ and ④, ①

NO① BOX CULVERT FOR ROAD





NO① BOX CULVERT FOR ROAD

D= 0.2000 m

(1)Dead load

a) vertical load ----- (case-1)

For upper slab w1 = 22.6×0.50+19.6×1.50+23.6×0.90 = 61.940 kN/m

For side wall w2 = 23.6×0.80 = 18.880 〃

For bottom slab $W3 = 61.940 + \frac{2\times 18.880\times 6.60}{10.80}$ = 85.016 〃

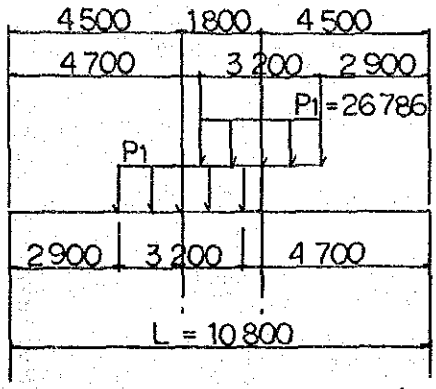
b) Horizontal load --- earth pressure ----- (case-2)

For side wall P1 = (22.6×0.50+19.60×1.95)×0.500 = 24.760 kN/m

P2 = (22.6×0.50+19.60×8.55)×0.500 = 89.440 〃

(2)Live load

a) Vertical load ------- (case-3)



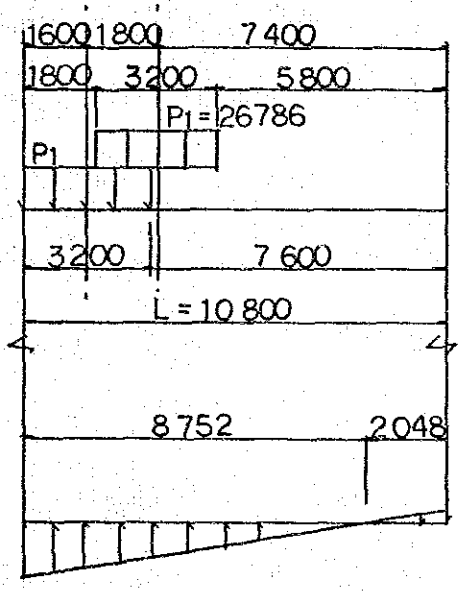
B = 0.300+2.000+0.900 = 3.200 m

$P1 = \frac{10}{3.20}\times\frac{30}{3.50}$ = 26.786 KN/m

For bottom slab

$P2 = \frac{2\times 26.786\times 3.20}{10.80}$ = 15.873 KN/m

b) Vertical load of partial ----- (case-4)

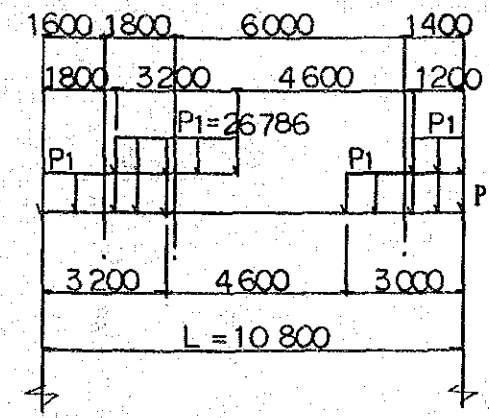


For bottom slab

$P2 = \frac{2\times 26.786\times 3.200}{10.80} \pm \frac{6\times 26.786\times 3.20(3.80+2.00)}{10.80^2}$

= 15.873 ± 25.573 = P2-1 = +41.446 KN/m, P2-2 = -9.700 KN/m

c) Vertical load of partial ------- (case-5)



For bottom slab

$P2 = \frac{26.786(2\times 3.20+3+1.20)}{10.80} + \frac{6\times 26.786(3.20\times 3.80+3.20\times 2.00-3.00\times 3.90-1.20\times 4.80)}{10.80^2}$

= 26.290 ± 1.516 = P2-1 =27.806 KN/m, P2-2 =24.774 KN/m

d) Horizontal load of live load surcharge ------- (case-6)

Pe = goko = 34.300 × 0.500 = 17.150 KN/m

BOX FOR ROAD NO 1 Depth = 2.000

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

No	X (m)	Y (m)
1	0.0000	0.0000
2	0.0000	6.6000
3	10.8000	6.6000
4	10.8000	0.0000

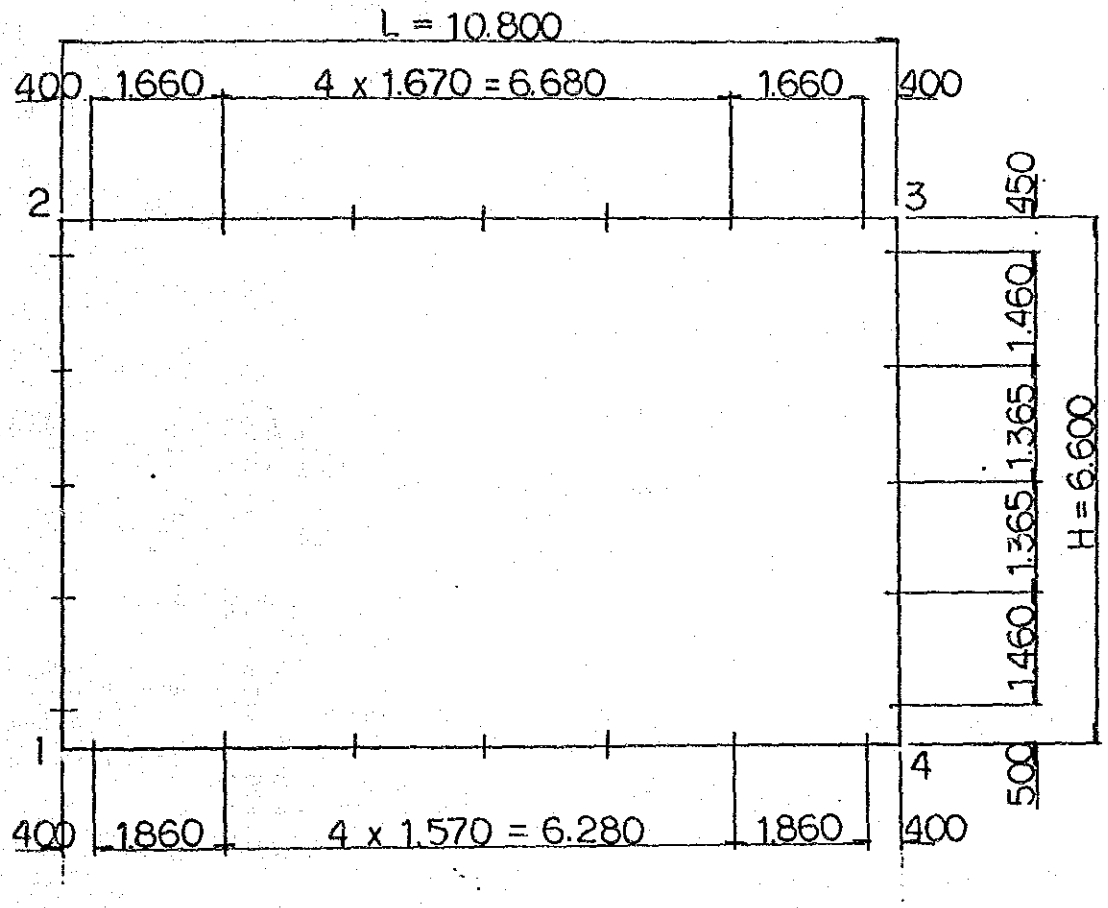
No	I	J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1	2	0.80000	0.042670	Fix - Fix	6.600	2.50E+07	1.00E-05
2	2	3	0.90000	0.060750	Fix - Fix	10.800	2.50E+07	1.00E-05
3	3	4	0.80000	0.042670	Fix - Fix	6.600	2.50E+07	1.00E-05
4	4	1	1.00000	0.083330	Fix - Fix	10.800	2.50E+07	1.00E-05

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

BOX FOR ROAD NO 1

No		L-No 1 11	L-No 2 12	L-No 3 13	L-No 4 14	L-No 5 15	L-No 6 16	L-No 7 17	L-No 8 18	L-No 9 19	L-No 10 20
1	5	0.500	1.960	3.325	4.690	6.150					
2	7	0.400	2.060	3.730	5.400	7.070	8.740	10.400			
3	5	0.450	1.910	3.275	4.640	6.100					
4	7	0.400	2.260	3.830	5.400	6.970	8.540	10.400			

CALCULATION POINTS OF EACH FORCE



: Dead load
No. : 1

No	i	-j			Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2		-Y	0.000	6.600	-18.880	-18.880
3	3-	4		-Y	0.000	6.600	-18.880	-18.880
2	2-	3		-Y	0.000	10.800	-61.940	-61.940
4	4-	1		-Y	0.000	10.800	85.016	85.016

ΣV = 0.005 (t)
ΣH = 0.000 (t)

: Earth pressure
No. : 2

No	i	-j			Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	分布荷重	全体-X	0.000	6.600	89.440	24.760
3	3-	4	分布荷重	全体-X	0.000	6.600	-24.760	-89.440

ΣV = 0.000 (t)
ΣH = 0.000 (t)

: HB live load-VL-
No. : 3
No. : 1

No	i	-j			Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3		-Y	2.900	3.200	-26.786	-26.786
2	2-	3		-Y	4.700	3.200	-26.786	-26.786
4	4-	1		-Y	0.000	10.800	15.873	15.873

ΣV = -0.002 (t)

: HB live load-VL-
No. : 4

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	0.000	3.200	-26.786	-26.786
2	2-	3	-Y	1.800	3.200	-26.786	-26.786
4	4-	1	-Y	0.000	2.048	-9.700	0.000
4	4-	1	-Y	2.048	8.752	0.000	41.446

ΣV = 0.004 (t)
ΣH = 0.000 (t)

: HB live load-VL-
No. : 5

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	0.000	3.200	-26.786	-26.786
2	2-	3	-Y	1.800	3.200	-26.786	-26.786
2	2-	3	-Y	7.800	3.000	-26.786	-26.786
2	2-	3	-Y	9.600	1.200	-26.786	-26.786
4	4-	1	-Y	0.000	10.800	24.774	27.806

ΣV = 0.000 (t)
ΣH = 0.000 (t)

: HB live load-HL-
No. : 6

i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	0.000	6.600	17.150	17.150
3	3-	4	0.000	6.600	-17.150	-17.150

ΣV = 0.000 (t)

BOX FOR ROAD NO 1

No No	C-No 1 No 7	C-No 2 No 8	C-No 3 No 9	C-No 4 No10
No 1	1.3800	1.3800	1.3800	1.3800
No 2	1.6500	1.6500	1.6500	1.6500
No 3	1.4300	0.0000	0.0000	0.0000
No 4	0.0000	1.4300	0.0000	0.0000
No 5	0.0000	0.0000	1.4300	0.0000
No 6	0.0000	0.0000	0.0000	1.6500

No 1 : 7 8 9 10

Case. 1

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	-0.002	0.000
4.	0.000	-0.002	0.000

Case. 2

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	0.000	0.000
4.	0.000	0.000	0.000

Case. 3

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	0.001	0.000
4.	0.000	0.001	0.000

Case. 4

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	-0.001	0.000
4.	0.000	-0.004	0.000

Case. 5

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	-0.001	0.000
4.	0.000	0.000	0.000

Case. 6

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	0.000	0.000
4.	0.000	0.000	0.000

Case. 7

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	-0.002	0.000
4.	0.000	-0.002	0.000

Case. 8

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	-0.004	0.000
4.	0.000	-0.009	0.000

Case. 9

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	-0.004	0.000
4.	0.000	-0.003	0.000

Case. 10

No.	RX (t)	RY (t)	RM (tm)
1.	0.000	-0.003	0.000
4.	0.000	-0.003	0.000

BOX FOR ROAD NO 1

No.	Case. 1 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 2 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 3 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	11.27220	0.00000	0.00000	-3.19066	0.00000	0.00000	2.4994
2.	-0.05676	-1.30937	-10.40786	-0.14151	0.00000	3.11516	0.04802	-0.28286	-3.2307
3.	0.00299	-1.30937	10.40786	-0.84941	0.00000	-3.11516	-0.00253	-0.28286	3.2307
4.	-0.05377	0.00000	-11.27220	-0.99092	0.00000	3.19066	0.04549	0.00000	-2.4994

No.	Case. 4 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 5 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 6 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	2.55453	0.00000	0.00000	3.56091	0.00000	0.00000	-0.9137
2.	0.96865	-0.44364	-3.01290	0.95806	-0.48014	-3.78225	0.00843	0.00000	0.9880
3.	0.95702	-0.12208	1.82438	0.96292	-0.45684	3.22269	-0.25780	0.00000	-0.9880
4.	0.01046	0.00000	-1.94637	-0.00438	0.00000	-3.58480	-0.24937	0.00000	0.9137

No.	Case. 7 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 8 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 9 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	13.86519	0.00000	0.00000	13.94402	0.00000	0.00000	15.3832
2.	-0.24314	-2.21143	-13.84269	1.07336	-2.44134	-13.53128	1.05820	-2.49353	-14.0315
3.	-1.40102	-2.21143	13.84269	-0.02886	-1.98151	11.83169	-0.02043	-2.46022	13.8313
4.	-1.64417	0.00000	-13.86519	-1.69426	0.00000	-13.07435	-1.71548	0.00000	-15.4173

No.	Case. 10 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	8.78351
2.	-0.29791	-1.80694	-7.59259
3.	-1.82278	-1.80694	7.59259
4.	-2.12069	0.00000	-8.78351

	No	L(m)	Case 1 Dead load M (tm)	S (t)	N (t)	Case 2 Earth pressure M (tm)	S (t)	N (t)	Case 3 HB live load-VL- M (tm)	S (t)	N (t)
1-	2	0.000	-391.489	12.447	-459.084	-123.092	229.379	0.000	-57.862	-10.531	-85.715
*	1	0.500	-385.265	12.447	-449.644	-19.378	185.884	0.000	-63.127	-10.531	-85.715
*	2	1.960	-367.092	12.447	-422.079	166.994	72.901	0.000	-78.503	-10.531	-85.715
*	3	3.325	-350.101	12.447	-396.308	205.229	-13.836	0.000	-92.878	-10.531	-85.715
*	4	4.690	-333.110	12.447	-370.537	137.530	-82.313	0.000	-107.253	-10.531	-85.715
*	5	6.150	-314.937	12.447	-342.972	-23.903	-135.346	0.000	-122.628	-10.531	-85.715
2-	1	6.600	-309.336	12.447	-334.476	-87.614	-147.481	0.000	-127.367	-10.531	-85.715
2-	3	0.000	-309.336	334.476	12.447	-87.614	0.000	-147.481	-127.367	85.715	-10.531
*	1	0.400	-180.500	309.700	12.447	-87.614	0.000	-147.481	-93.081	85.715	-10.531
*	2	2.060	248.261	206.880	12.447	-87.614	0.000	-147.481	49.206	85.715	-10.531
*	3	3.730	507.377	103.440	12.447	-87.614	0.000	-147.481	183.124	63.483	-10.531
*	4	5.400	593.750	0.000	12.447	-87.614	0.000	-147.481	245.226	0.000	-10.531
*	5	7.070	507.377	-103.440	12.447	-87.614	0.000	-147.481	183.124	-63.483	-10.531
*	6	8.740	248.261	-206.880	12.447	-87.614	0.000	-147.481	49.206	-85.715	-10.531
*	7	10.400	-180.500	-309.700	12.447	-87.614	0.000	-147.481	-93.081	-85.715	-10.531
3-	2	10.800	-309.336	-334.476	12.447	-87.614	0.000	-147.481	-127.367	-85.715	-10.531
3-	4	0.000	-309.336	-12.447	-334.476	-87.614	147.481	0.000	-127.367	10.531	-85.715
*	1	0.450	-314.937	-12.447	-342.972	-23.903	135.346	0.000	-122.628	10.531	-85.715
*	2	1.910	-333.110	-12.447	-370.537	137.530	82.313	0.000	-107.253	10.531	-85.715
*	3	3.275	-350.101	-12.447	-396.308	205.229	13.836	0.000	-92.878	10.531	-85.715
*	4	4.640	-367.092	-12.447	-422.079	166.994	-72.901	0.000	-78.503	10.531	-85.715
*	5	6.100	-385.265	-12.447	-449.644	-19.378	-185.884	0.000	-63.127	10.531	-85.715
4-	3	6.600	-391.489	-12.447	-459.084	-123.092	-229.379	0.000	-57.862	10.531	-85.715
4-	1	0.000	-391.489	459.086	-12.447	-123.092	0.000	-229.379	-57.862	85.714	10.531
*	1	0.400	-214.655	425.080	-12.447	-123.092	0.000	-229.379	-24.846	79.365	10.531
*	2	2.260	428.933	266.950	-12.447	-123.092	0.000	-229.379	95.316	49.841	10.531
*	3	3.830	743.267	133.475	-12.447	-123.092	0.000	-229.379	154.004	24.921	10.531
*	4	5.400	848.045	0.000	-12.447	-123.092	0.000	-229.379	173.566	0.000	10.531
*	5	6.970	743.267	-133.475	-12.447	-123.092	0.000	-229.379	154.004	-24.921	10.531
*	6	8.540	428.933	-266.950	-12.447	-123.092	0.000	-229.379	95.316	-49.841	10.531
*	7	10.400	-214.655	-425.080	-12.447	-123.092	0.000	-229.379	-24.846	-79.365	10.531
1-	4	10.800	-391.489	-459.086	-12.447	-123.092	0.000	-229.379	-57.862	-85.714	10.531

BOX FOR ROAD NO 1

	No	L(m)	Case 4 HB live load-VL- M (tm)	S (t)	N (t)	Case 5 HB live load-VL- M (tm)	S (t)	N (t)	Case 6 HB live load-HL- M (tm)	S (t)	N (t)
1-	2	0.000	-81.993	-2.422	-134.436	-122.032	1.014	-145.496	-35.248	57.725	0.000
*	1	0.500	-83.204	-2.422	-134.436	-121.525	1.014	-145.496	-8.529	49.150	0.000
*	2	1.960	-86.740	-2.422	-134.436	-120.045	1.014	-145.496	44.952	24.111	0.000
*	3	3.325	-90.046	-2.422	-134.436	-118.661	1.014	-145.496	61.887	0.701	0.000
*	4	4.690	-93.352	-2.422	-134.436	-117.278	1.014	-145.496	46.867	-22.708	0.000
*	5	6.150	-96.889	-2.422	-134.436	-115.798	1.014	-145.496	-4.565	-47.747	0.000
2-	1	6.600	-97.979	-2.422	-134.436	-115.342	1.014	-145.496	-27.788	-55.465	0.000
2-	3	0.000	-97.979	134.436	-2.422	-115.342	145.496	1.014	-27.788	0.000	-55.465
*	1	0.400	-46.347	123.722	-2.422	-59.286	134.781	1.014	-27.788	0.000	-55.465
*	2	2.060	121.220	72.293	-2.422	126.640	83.352	1.014	-27.788	0.000	-55.465
*	3	3.730	171.008	-2.976	-2.422	194.896	8.084	1.014	-27.788	0.000	-55.465
*	4	5.400	130.829	-36.994	-2.422	173.187	-25.935	1.014	-27.788	0.000	-55.465
*	5	7.070	69.049	-36.994	-2.422	129.876	-25.935	1.014	-27.788	0.000	-55.465
*	6	8.740	7.269	-36.994	-2.422	74.731	-51.114	1.014	-27.788	0.000	-55.465
*	7	10.400	-54.141	-36.994	-2.422	-55.595	-117.007	1.014	-27.788	0.000	-55.465
3-	2	10.800	-68.939	-36.994	-2.422	-106.683	-138.436	1.014	-27.788	0.000	-55.465
3-	4	0.000	-68.939	2.422	-36.994	-106.683	-1.014	-138.436	-27.788	55.465	0.000
*	1	0.450	-67.849	2.422	-36.994	-107.140	-1.014	-138.436	-4.565	47.747	0.000
*	2	1.910	-64.313	2.422	-36.994	-108.620	-1.014	-138.436	46.867	22.708	0.000
*	3	3.275	-61.007	2.422	-36.994	-110.003	-1.014	-138.436	61.887	-0.701	0.000
*	4	4.640	-57.700	2.422	-36.994	-111.387	-1.014	-138.436	44.952	-24.111	0.000
*	5	6.100	-54.164	2.422	-36.994	-112.867	-1.014	-138.436	-8.529	-49.150	0.000
4-	3	6.600	-52.953	2.422	-36.994	-113.374	-1.014	-138.436	-35.248	-57.725	0.000
4-	1	0.000	-52.953	36.998	2.422	-113.374	138.436	-1.014	-35.248	0.000	-57.725
*	1	0.400	-37.428	40.499	2.422	-59.984	128.503	-1.014	-35.248	0.000	-57.725
*	2	2.260	46.322	46.824	2.422	135.683	81.729	-1.014	-35.248	0.000	-57.725
*	3	3.830	115.544	39.412	2.422	232.502	41.492	-1.014	-35.248	0.000	-57.725
*	4	5.400	163.966	20.326	2.422	265.606	0.563	-1.014	-35.248	0.000	-57.725
*	5	6.970	173.260	-10.432	2.422	233.907	-41.059	-1.014	-35.248	0.000	-57.725
*	6	8.540	125.101	-52.863	2.422	136.319	-83.372	-1.014	-35.248	0.000	-57.725
*	7	10.400	-31.483	-118.237	2.422	-66.055	-134.397	-1.014	-35.248	0.000	-57.725
1-	4	10.800	-81.993	-134.437	2.422	-122.032	-145.496	-1.014	-35.248	0.000	-57.725

BOX FOR ROAD NO 1

	No	L(m)	Case 7 M (tm)	S (t)	N (t)	Case 8 M (tm)	S (t)	N (t)	Case 9 M (tm)	S (t)	N (t)
1-	2	0.000	-826.098	380.594	-756.109	-860.605	392.190	-825.780	-917.861	397.103	-841.595
*	1	0.500	-653.911	308.827	-743.081	-682.620	320.423	-812.753	-737.419	325.336	-828.568
*	2	1.960	-343.306	122.404	-705.042	-355.085	134.000	-774.713	-402.711	138.913	-790.528
*	3	3.325	-277.327	-20.712	-669.478	-273.278	-9.116	-739.149	-314.198	-4.202	-754.964
*	4	4.690	-386.140	-133.699	-633.914	-366.262	-122.103	-703.585	-400.475	-117.190	-719.400
*	5	6.150	-649.412	-221.204	-595.874	-612.605	-209.608	-665.545	-639.645	-204.695	-681.360
2-	1	6.600	-753.581	-241.225	-584.150	-711.556	-229.629	-653.821	-736.385	-224.716	-669.636
2-	3	0.000	-753.581	584.150	-241.225	-711.556	653.821	-229.629	-736.385	669.636	-224.716
*	1	0.400	-526.760	549.959	-241.225	-459.930	604.308	-229.629	-478.433	620.123	-224.716
*	2	2.060	268.401	408.067	-241.225	371.381	388.873	-229.629	379.131	404.087	-224.716
*	3	3.730	817.485	233.527	-241.225	800.159	138.491	-229.629	834.319	154.306	-224.716
*	4	5.400	1025.485	0.000	-241.225	861.897	-52.902	-229.629	922.469	-37.087	-224.716
*	5	7.070	817.485	-233.527	-241.225	654.358	-195.648	-229.629	741.340	-179.834	-224.716
*	6	8.740	268.401	-408.067	-241.225	208.431	-338.395	-229.629	304.902	-358.586	-224.716
*	7	10.400	-526.760	-549.959	-241.225	-471.076	-480.288	-229.629	-473.154	-594.706	-224.716
3-	2	10.800	-753.581	-584.150	-241.225	-670.029	-514.478	-229.629	-724.004	-659.540	-224.716
3-	4	0.000	-753.581	241.225	-584.150	-670.029	229.629	-514.478	-724.004	224.716	-659.540
*	1	0.450	-649.412	221.204	-595.874	-571.078	209.608	-526.203	-627.263	204.695	-671.265
*	2	1.910	-386.140	133.699	-633.914	-324.736	122.103	-564.242	-388.094	117.190	-709.304
*	3	3.275	-277.327	20.712	-669.478	-231.752	9.116	-599.807	-301.817	4.202	-744.868
*	4	4.640	-343.306	-122.404	-705.042	-313.558	-134.000	-635.371	-390.330	-138.913	-780.433
*	5	6.100	-653.911	-308.827	-743.081	-641.094	-320.423	-673.410	-725.038	-325.336	-818.472
4-	3	6.600	-826.098	-380.594	-756.109	-819.078	-392.190	-686.437	-905.480	-397.103	-831.499
4-	1	0.000	-826.098	756.111	-380.594	-819.078	686.446	-392.190	-905.480	831.502	-397.103
*	1	0.400	-534.855	700.102	-380.594	-552.848	644.524	-392.190	-585.103	770.370	-397.103
*	2	2.260	525.128	439.664	-380.594	455.066	435.350	-392.190	582.852	485.264	-397.103
*	3	3.830	1042.832	219.832	-380.594	987.835	240.554	-392.190	1155.085	243.529	-397.103
*	4	5.400	1215.401	0.000	-380.594	1201.671	29.067	-392.190	1347.016	0.805	-397.103
*	5	6.970	1042.832	-219.832	-380.594	1070.369	-199.113	-392.190	1157.094	-242.909	-397.103
*	6	8.540	525.128	-439.664	-380.594	567.720	-443.985	-392.190	583.763	-487.613	-397.103
*	7	10.400	-534.855	-700.102	-380.594	-544.346	-755.690	-392.190	-593.784	-778.797	-397.103
1-	4	10.800	-826.098	-756.111	-380.594	-860.605	-825.784	-392.190	-917.861	-841.599	-397.103

BOX FOR ROAD NO 1

Case 10

	No	L(m)	M (tm)	S (t)	N (t)
1-	2	0.000	-801.514	490.900	-633.536
*	1	0.500	-577.711	404.985	-620.509
*	2	1.960	-156.876	177.247	-582.469
*	3	3.325	-42.399	-4.495	-546.905
*	4	4.690	-155.437	-156.108	-511.341
*	5	6.150	-481.587	-284.927	-473.301
2-	1	6.600	-617.297	-317.682	-461.577
2-	3	0.000	-617.297	461.577	-317.682
*	1	0.400	-439.504	427.386	-317.682
*	2	2.060	152.186	285.494	-317.682
*	3	3.730	509.767	142.747	-317.682
*	4	5.400	628.961	0.000	-317.682
*	5	7.070	509.767	-142.747	-317.682
*	6	8.740	152.186	-285.494	-317.682
*	7	10.400	-439.504	-427.386	-317.682
3-	2	10.800	-617.297	-461.577	-317.682
3-	4	0.000	-617.297	317.682	-461.577
*	1	0.450	-481.587	284.927	-473.301
*	2	1.910	-155.437	156.108	-511.341
*	3	3.275	-42.399	4.495	-546.905
*	4	4.640	-156.876	-177.247	-582.469
*	5	6.100	-577.711	-404.985	-620.509
4-	3	6.600	-801.514	-490.900	-633.536
4-	1	0.000	-801.514	633.539	-490.900
*	1	0.400	-557.484	586.610	-490.900
*	2	2.260	330.667	368.391	-490.900
*	3	3.830	764.448	184.196	-490.900
*	4	5.400	909.042	0.000	-490.900
*	5	6.970	764.448	-184.196	-490.900
*	6	8.540	330.667	-368.391	-490.900
*	7	10.400	-557.484	-586.610	-490.900
1-	4	10.800	-801.514	-633.539	-490.900

PICK-UP No. 1 *

No.	L (m)	M. MAXIMUM Case	M (tm)	S (t)	N (t)	M. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-10	-801.514	490.900	-633.536	C- 9	-917.861	397.103	-841.595
* 1	0.500	C-10	-577.711	404.985	-620.509	C- 9	-737.419	325.336	-828.568
* 2	1.960	C-10	-156.876	177.247	-582.469	C- 9	-402.711	138.913	-790.528
* 3	3.325	C-10	-42.399	-4.495	-546.905	C- 9	-314.198	-4.202	-754.964
* 4	4.690	C-10	-155.437	-156.108	-511.341	C- 9	-400.475	-117.190	-719.400
* 5	6.150	C-10	-481.587	-284.927	-473.301	C- 7	-649.412	-221.204	-595.874
2 - 1	6.600	C-10	-617.297	-317.682	-461.577	C- 7	-753.581	-241.225	-584.150
2 - 3	0.000	C-10	-617.297	461.577	-317.682	C- 7	-753.581	584.150	-241.225
* 1	0.400	C-10	-439.504	427.386	-317.682	C- 7	-526.760	549.959	-241.225
* 2	2.060	C- 9	379.131	404.687	-224.716	C-10	152.186	285.494	-317.682
* 3	3.730	C- 9	834.319	154.306	-224.716	C-10	509.767	142.747	-317.682
* 4	5.400	C- 7	1025.485	0.000	-241.225	C-10	628.961	0.000	-317.682
* 5	7.070	C- 7	817.485	-233.527	-241.225	C-10	509.767	-142.747	-317.682
* 6	8.740	C- 9	304.902	-358.586	-224.716	C-10	152.186	-285.494	-317.682
* 7	10.400	C-10	-439.504	-427.386	-317.682	C- 7	-526.760	-549.959	-241.225
3 - 2	10.800	C-10	-617.297	-461.577	-317.682	C- 7	-753.581	-584.150	-241.225
3 - 4	0.000	C-10	-617.297	317.682	-461.577	C- 7	-753.581	241.225	-584.150
* 1	0.450	C-10	-481.587	284.927	-473.301	C- 7	-649.412	221.204	-595.874
* 2	1.910	C-10	-155.437	156.108	-511.341	C- 9	-388.094	117.190	-709.304
* 3	3.275	C-10	-42.399	4.495	-546.905	C- 9	-301.817	4.202	-744.868
* 4	4.640	C-10	-156.876	-177.247	-582.469	C- 9	-390.330	-138.913	-780.433
* 5	6.100	C-10	-577.711	-404.985	-620.509	C- 9	-725.038	-325.336	-818.472
4 - 3	6.600	C-10	-801.514	-490.900	-633.536	C- 9	-905.480	-397.103	-831.499
4 - 1	0.000	C-10	-801.514	633.539	-490.900	C- 9	-905.480	831.502	-397.103
* 1	0.400	C- 7	-534.855	700.102	-380.594	C- 9	-585.103	770.370	-397.103
* 2	2.260	C- 9	582.852	485.264	-397.103	C-10	330.667	368.391	-490.900
* 3	3.830	C- 9	1155.085	243.529	-397.103	C-10	764.448	184.196	-490.900
* 4	5.400	C- 9	1347.016	0.805	-397.103	C-10	909.042	0.000	-490.900
* 5	6.970	C- 9	1137.094	-242.909	-397.103	C-10	764.448	-184.196	-490.900
* 6	8.540	C- 9	583.763	-487.613	-397.103	C-10	330.667	-368.391	-490.900
* 7	10.400	C- 7	-534.855	-700.102	-380.594	C- 9	-593.784	-778.797	-397.103
1 - 4	10.800	C-10	-801.514	-633.539	-490.900	C- 9	-917.861	-841.599	-397.103

BOX FOR ROAD NO 1

PICK-UP No. 1 *

No.	L (m)	S. MAXIMUM Case	M (tm)	S (t)	N (t)	S. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-10	-801.514	490.900	-633.536	C- 7	-826.098	380.594	-756.109
* 1	0.500	C-10	-577.711	404.985	-620.509	C- 7	-653.911	308.827	-743.081
* 2	1.960	C-10	-156.876	177.247	-582.469	C- 7	-343.306	122.404	-705.042
* 3	3.325	C- 9	-314.198	-4.202	-754.964	C- 7	-277.327	-20.712	-669.478
* 4	4.690	C- 9	-400.475	-117.190	-719.400	C-10	-155.437	-156.108	-511.341
* 5	6.150	C- 9	-639.645	-204.695	-681.360	C-10	-481.587	-284.927	-473.301
2 - 1	6.600	C- 9	-736.385	-224.716	-669.636	C-10	-617.297	-317.682	-461.577
2 - 3	0.000	C- 9	-736.385	669.636	-224.716	C-10	-617.297	461.577	-317.682
* 1	0.400	C- 9	-478.433	620.123	-224.716	C-10	-439.504	427.386	-317.682
* 2	2.060	C- 7	268.401	408.067	-241.225	C-10	152.186	285.494	-317.682
* 3	3.730	C- 7	817.485	233.527	-241.225	C- 8	800.159	138.491	-229.629
* 4	5.400	C-10	628.961	0.000	-317.682	C- 8	861.897	-52.902	-229.629
* 5	7.070	C-10	509.767	-142.747	-317.682	C- 7	817.485	-233.527	-241.225
* 6	8.740	C-10	152.186	-285.494	-317.682	C- 7	268.401	-408.067	-241.225
* 7	10.400	C-10	-439.504	-427.386	-317.682	C- 9	-473.154	-594.706	-224.716
3 - 2	10.800	C-10	-617.297	-461.577	-317.682	C- 9	-724.004	-659.540	-224.716
3 - 4	0.000	C-10	-617.297	317.682	-461.577	C- 9	-724.004	224.716	-659.540
* 1	0.450	C-10	-481.587	284.927	-473.301	C- 9	-627.263	204.695	-671.265
* 2	1.910	C-10	-155.437	156.108	-511.341	C- 9	-388.094	117.190	-709.304
* 3	3.275	C- 7	-277.327	20.712	-669.478	C- 9	-301.817	4.202	-744.868
* 4	4.640	C- 7	-343.306	-122.404	-705.042	C-10	-156.876	-177.247	-582.469
* 5	6.100	C- 7	-653.911	-308.827	-743.081	C-10	-577.711	-404.985	-620.509
4 - 3	6.600	C- 7	-826.098	-380.594	-756.109	C-10	-801.514	-490.900	-633.536
4 - 1	0.000	C- 9	-905.480	831.502	-397.103	C-10	-801.514	633.539	-490.900
* 1	0.400	C- 9	-585.103	770.370	-397.103	C-10	-557.484	586.610	-490.900
* 2	2.260	C- 9	582.852	485.264	-397.103	C-10	330.667	368.391	-490.900
* 3	3.830	C- 9	1155.085	243.529	-397.103	C-10	764.448	184.196	-490.900
* 4	5.400	C- 8	1201.671	29.067	-392.190	C-10	909.042	0.000	-490.900
* 5	6.970	C-10	764.448	-184.196	-490.900	C- 9	1157.094	-242.909	-397.103
* 6	8.540	C-10	330.667	-368.391	-490.900	C- 9	583.763	-487.613	-397.103
* 7	10.400	C-10	-557.484	-586.610	-490.900	C- 9	-593.784	-778.797	-397.103
1 - 4	10.800	C-10	-801.514	-633.539	-490.900	C- 9	-917.861	-841.599	-397.103

BOX FOR ROAD NO 1

PICK-UP No. 1 *

No.	L (m)	N. MAXIMUM Case	M (tm)	S (t)	N (t)	N. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-10	-801.514	490.900	-633.536	C- 9	-917.861	397.103	-841.595
* 1	0.500	C-10	-577.711	404.985	-620.509	C- 9	-737.419	325.336	-828.568
* 2	1.960	C-10	-156.876	177.247	-582.469	C- 9	-402.711	138.913	-790.528
* 3	3.325	C-10	-42.399	-4.495	-546.905	C- 9	-314.198	-4.202	-754.964
* 4	4.690	C-10	-155.437	-156.108	-511.341	C- 9	-400.475	-117.190	-719.400
* 5	6.150	C-10	-481.587	-284.927	-473.301	C- 9	-639.645	-204.695	-681.360
2 - 1	6.600	C-10	-617.297	-317.682	-461.577	C- 9	-736.385	-224.716	-669.636
2 - 3	0.000	C- 9	-736.385	669.636	-224.716	C-10	-617.297	461.577	-317.682
* 1	0.400	C- 9	-478.433	620.123	-224.716	C-10	-439.504	427.386	-317.682
* 2	2.060	C- 9	379.131	404.687	-224.716	C-10	152.186	285.494	-317.682
* 3	3.730	C- 9	834.319	154.306	-224.716	C-10	509.767	142.747	-317.682
* 4	5.400	C- 9	922.469	-37.087	-224.716	C-10	628.961	0.000	-317.682
* 5	7.070	C- 9	741.340	-179.834	-224.716	C-10	509.767	-142.747	-317.682
* 6	8.740	C- 9	304.902	-358.586	-224.716	C-10	152.186	-285.494	-317.682
* 7	10.400	C- 9	-473.154	-594.706	-224.716	C-10	-439.504	-427.386	-317.682
3 - 2	10.800	C- 9	-724.004	-659.540	-224.716	C-10	-617.297	-461.577	-317.682
3 - 4	0.000	C-10	-617.297	317.682	-461.577	C- 9	-724.004	224.716	-659.540
* 1	0.450	C-10	-481.587	284.927	-473.301	C- 9	-627.263	204.695	-671.265
* 2	1.910	C-10	-155.437	156.108	-511.341	C- 9	-388.094	117.190	-709.304
* 3	3.275	C-10	-42.399	4.495	-546.905	C- 9	-301.817	4.202	-744.868
* 4	4.640	C-10	-156.876	-177.247	-582.469	C- 9	-390.330	-138.913	-780.433
* 5	6.100	C-10	-577.711	-404.985	-620.509	C- 9	-725.038	-325.336	-818.472
4 - 3	6.600	C-10	-801.514	-490.900	-633.536	C- 9	-905.480	-397.103	-831.499
4 - 1	0.000	C- 7	-826.098	756.111	-380.594	C-10	-801.514	633.539	-490.900
* 1	0.400	C- 7	-534.855	700.102	-380.594	C-10	-557.484	586.610	-490.900
* 2	2.260	C- 7	525.128	439.664	-380.594	C-10	330.667	368.391	-490.900
* 3	3.830	C- 7	1042.832	219.832	-380.594	C-10	764.448	184.196	-490.900
* 4	5.400	C- 7	1215.401	0.000	-380.594	C-10	909.042	0.000	-490.900
* 5	6.970	C- 7	1042.832	-219.832	-380.594	C-10	764.448	-184.196	-490.900
* 6	8.540	C- 7	525.128	-439.664	-380.594	C-10	330.667	-368.391	-490.900
* 7	10.400	C- 7	-534.855	-700.102	-380.594	C-10	-557.484	-586.610	-490.900
1 - 4	10.800	C- 7	-826.098	-756.111	-380.594	C-10	-801.514	-633.539	-490.900

NO① BOX CULVERT FOR ROAD

D= 0.500 m

(1)Dead load

a) vertical load ----- (case-1)

For upper slab w1 = 22.6×0.50+23.6×0.90 = 32.540 kN/m

For side wall w2 = 23.6×0.80 = 18.880 〃

For bottom slab $W3 = 32.540 + \frac{2\times 18.880\times 6.60}{10.80}$ = 55.615 〃

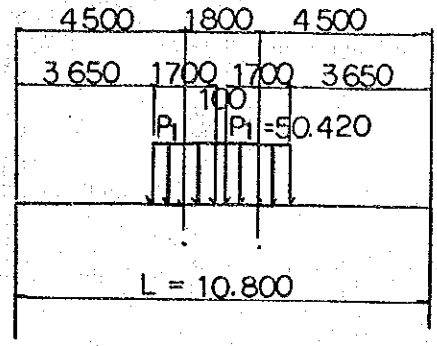
b) Horizontal load --- earth pressure ----- (case-2)

For side wall P1 = (22.6×0.50+19.60×0.45)×0.500 = 10.060 kN/m

P2 = (22.6×0.50+19.60×7.05)×0.500 = 74.740 〃

(2)Live load

a) Vertical load of center ------- (case-3)



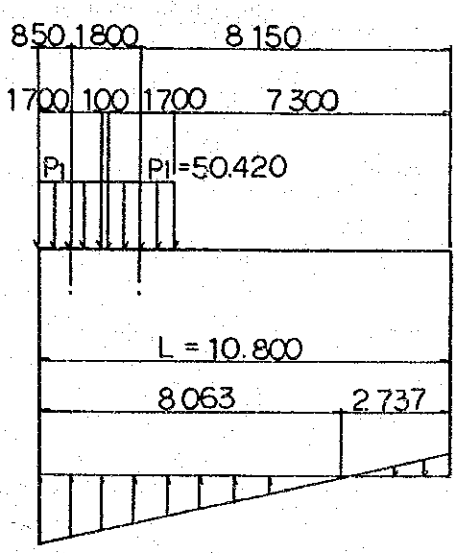
B = 0.300+0.500+0.900 = 1.700 m

load: $P1 = \frac{10 \times 30}{1.70 \times 3.50}$ = 50.420 KN/m

For bottom slab

$P2 = \frac{2\times 50.420\times 1.70}{10.80}$ = 15.873 KN/m

b) Vertical load of partial ----- (case-4)

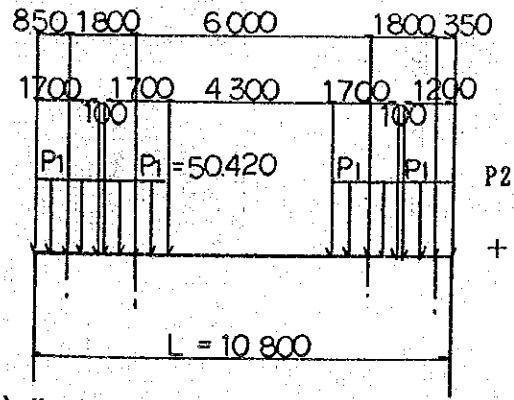


For bottom slab

$P2 = \frac{2\times 50.42\times 1.70}{10.80} + \frac{6\times 50.42\times 1.70(4.55+2.75)}{10.80^2}$

= 15.873 ± 32.187 = P2-1 = +48.060 KN/m, P2-2 = -16.314 KN/m

c) Vertical load of partial ------- (case-5)



For bottom slab

$P2 = \frac{50.420(1.70\times 3+1.20)}{10.80} + \frac{6\times 50.420(1.70\times 4.55+1.70\times 2.75-1.70\times 3.25-1.200\times 4.80)}{10.80^2}$

= 29.412 ± 2.918 = P2-1=32.330 KN/m, P2-2=26.494 KN/m

d) Horizontal load of live load surcharge ------- (case-6)

$go = \frac{40 \times 30}{10.0 \times 3.50} \fallingdotseq 34.300$ KN/m² ------- live load surcharge

Pe = goko = 34.300 × 0.500 = 17.150 KN/m

BOX FOR ROAD No 1 Depth = 0.500 For Check

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

No	X (m)	Y (m)
1	0.0000	0.0000
2	0.0000	6.6000
3	10.8000	6.6000
4	10.8000	0.0000

No	I - J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1 - 2	0.80000	0.042670	Fix - Fix	6.600	2.50E+07	1.00E-05
2	2 - 3	0.90000	0.060750	Fix - Fix	10.800	2.50E+07	1.00E-05
3	3 - 4	0.80000	0.042670	Fix - Fix	6.600	2.50E+07	1.00E-05
4	4 - 1	1.00000	0.083330	Fix - Fix	10.800	2.50E+07	1.00E-05

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

No		L-No 1 11	L-No 2 12	L-No 3 13	L-No 4 14	L-No 5 15	L-No 6 16	L-No 7 17	L-No 8 18	L-No 9 19	L-No 10 20
1	5	0.500	1.960	3.325	4.690	6.150					
2	7	0.400	2.060	3.730	5.400	7.070	8.740	10.400			
3	5	0.450	1.910	3.275	4.640	6.100					
4	7	0.400	2.260	3.830	5.400	5.970	8.540	10.400			

: Dead load
No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-Y	0.000	6.600	-18.880	-18.880
3	3-	4	-Y	0.000	6.600	-18.880	-18.880
2	2-	3	-Y	0.000	10.800	-32.540	-32.540
4	4-	1	-Y	0.000	10.800	55.616	55.616

$\Sigma V =$ 0.005 (t)
$\Sigma H =$ 0.000 (t)

: Earth pressure
No. : 2

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.000	6.600	74.740	10.060
3	3-	4	-X	0.000	6.600	-10.060	-74.740

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

: HB live load-VL-
No. : 3

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	3.650	1.700	-50.420	-50.420
2	2-	3	-Y	5.450	1.700	-50.420	-50.420
4	4-	1	-Y	0.000	10.800	15.873	15.873

: HB live load-VL-
No. : 4

No	i -j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2- 3	-Y	0.000	1.700	-50.420	-50.420
2	2- 3	-Y	1.800	1.700	-50.420	-50.420
4	4- 1	-Y	2.737	8.063	0.000	48.060
4	4- 1	-Y	0.000	2.737	-16.314	0.000

ΣV = 0.000 (t)
ΣH = 0.000 (t)

: HB live load-VL-
No. : 5

No	i -j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2- 3	-Y	0.000	1.700	-50.420	-50.420
2	2- 3	-Y	1.800	1.700	-50.420	-50.420
2	2- 3	-Y	7.800	1.700	-50.420	-50.420
2	2- 3	-Y	9.600	1.200	-50.420	-50.420
4	4- 1	-Y	0.000	10.800	26.494	32.330

ΣV = 0.004 (t)
ΣH = 0.000 (t)

: HB live load-HL-
No. : 6

No	i -j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1- 2	-X	0.000	6.600	17.150	17.150
3	3- 4	-X	0.000	6.600	-17.150	-17.150

No / No	C-No 1 / No 7	C-No 2 / No 8	C-No 3 / No 9	C-No 4 / No10
α	1.0000	1.0000	1.0000	1.0000
No 1	1.3800	1.3800	1.3800	1.3800
No 2	1.6500	1.6500	1.6500	1.6500
No 3	1.4300	0.0000	0.0000	0.0000
No 4	0.0000	1.4300	0.0000	0.0000
No 5	0.0000	0.0000	1.4300	0.0000
No 6	0.0000	0.0000	0.0000	1.6500

No 1 : 7 8 9 10

BOX FOR ROAD

No.	Case. 1 RX (t)	RY (t)	RM (tm)	Case. 2 RX (t)	RY (t)	RM (tm)	Case. 3 RX (t)	RY (t)	RM (tm)
1.	0.000	-0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.	0.000	-0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000

No.	Case. 4 RX (t)	RY (t)	RM (tm)	Case. 5 RX (t)	RY (t)	RM (tm)	Case. 6 RX (t)	RY (t)	RM (tm)
1.	0.000	0.000	0.000	0.000	-0.002	0.000	0.000	0.000	0.000
4.	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.000

No.	Case. 7 RX (t)	RY (t)	RM (tm)	Case. 8 RX (t)	RY (t)	RM (tm)	Case. 9 RX (t)	RY (t)	RM (tm)
1.	0.000	-0.004	0.000	0.000	-0.004	0.000	0.000	-0.006	0.000
4.	0.000	-0.004	0.000	0.000	-0.003	0.000	0.000	-0.005	0.000

No.	Case. 10 RX (t)	RY (t)	RM (tm)
1.	0.000	-0.003	0.000

No.	Case. 1 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 2 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 3 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	7.08468	0.00000	0.00000	-2.40753	0.00000	0.00000	2.5175
2.	-0.08010	-0.78547	-5.86495	-0.14873	0.00000	2.26829	0.05071	-0.28286	-3.2898
3.	0.00422	-0.78547	5.86495	-0.62844	0.00000	-2.26829	-0.00267	-0.28286	3.2898
4.	-0.07588	0.00000	-7.08468	-0.77717	0.00000	2.40753	0.04804	0.00000	-2.5175

No.	Case. 4 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 5 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 6 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	2.52626	0.00000	0.00000	3.92547	0.00000	0.00000	-0.9137
2.	0.57814	-0.48377	-2.58419	0.21470	-0.54275	-3.68685	0.00843	0.00000	0.9880
3.	0.58641	-0.08195	1.42259	0.23612	-0.50548	3.48332	-0.25780	0.00000	-0.9880
4.	-0.00744	0.00000	-1.71982	-0.01928	0.00000	-3.86439	-0.24937	0.00000	0.9137

No.	Case. 7 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 8 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 9 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	9.40451	0.00000	0.00000	9.41699	0.00000	0.00000	11.4179
2.	-0.28342	-1.48843	-9.05534	0.47080	-1.77573	-8.04634	-0.04892	-1.86008	-9.6232
3.	-1.03492	-1.48843	9.05534	-0.19253	-1.20113	6.38527	-0.69346	-1.80678	9.3321
4.	-1.31835	0.00000	-9.40451	-1.39769	0.00000	-8.26379	-1.41462	0.00000	-11.3305

No.	Case. 10 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	4.29691
2.	-0.34203	-1.08394	-2.72072
3.	-1.45648	-1.08394	2.72072
4.	-1.79852	0.00000	-4.29691

	No	L(m)	Case 1 Dead load M (tm)	S (t)	N (t)	Case 2 Earth pressure M (tm)	S (t)	N (t)	Case 3 HB live load-VL- M (tm)	S (t)	N (t)
1-	2	0.000	-267.270	17.566	-300.324	-92.879	179.901	0.000	-57.163	-11.121	-85.714
*	1	0.500	-258.487	17.566	-290.884	-12.067	143.756	0.000	-62.723	-11.121	-85.714
*	2	1.960	-232.841	17.566	-263.319	128.464	52.234	0.000	-78.960	-11.121	-85.714
*	3	3.325	-208.864	17.566	-237.548	152.183	-14.437	0.000	-94.141	-11.121	-85.714
*	4	4.690	-184.887	17.566	-211.777	97.358	-62.849	0.000	-109.321	-11.121	-85.714
*	5	6.150	-159.242	17.566	-184.212	-19.990	-94.420	0.000	-125.558	-11.121	-85.714
2-	1	6.600	-151.337	17.566	-175.716	-63.796	-99.939	0.000	-130.563	-11.121	-85.714
2-	3	0.000	-151.337	175.716	17.566	-63.796	0.000	-99.939	-130.563	85.714	-11.121
*	1	0.400	-83.654	162.700	17.566	-63.796	0.000	-99.939	-96.277	85.714	-11.121
*	2	2.060	141.595	108.684	17.566	-63.796	0.000	-99.939	46.008	85.714	-11.121
*	3	3.730	277.721	54.342	17.566	-63.796	0.000	-99.939	188.989	81.680	-11.121
*	4	5.400	323.096	0.000	17.566	-63.796	0.000	-99.939	255.150	0.000	-11.121
*	5	7.070	277.721	-54.342	17.566	-63.796	0.000	-99.939	188.989	-81.680	-11.121
*	6	8.740	141.595	-108.684	17.566	-63.796	0.000	-99.939	46.008	-85.714	-11.121
*	7	10.400	-83.654	-162.700	17.566	-63.796	0.000	-99.939	-96.277	-85.714	-11.121
3-	2	10.800	-151.337	-175.716	17.566	-63.796	0.000	-99.939	-130.563	-85.714	-11.121
3-	4	0.000	-151.337	-17.566	-175.716	-63.796	99.939	0.000	-130.563	11.121	-85.714
*	1	0.450	-159.242	-17.566	-184.212	-19.990	94.420	0.000	-125.558	11.121	-85.714
*	2	1.910	-184.887	-17.566	-211.777	97.358	62.849	0.000	-109.321	11.121	-85.714
*	3	3.275	-208.864	-17.566	-237.548	152.183	14.437	0.000	-94.141	11.121	-85.714
*	4	4.640	-232.841	-17.566	-263.319	128.464	-52.234	0.000	-78.960	11.121	-85.714
*	5	6.100	-258.487	-17.566	-290.884	-12.067	-143.756	0.000	-62.723	11.121	-85.714
4-	3	6.600	-267.270	-17.566	-300.324	-92.879	-179.901	0.000	-57.163	11.121	-85.714
4-	1	0.000	-267.270	300.326	-17.566	-92.879	0.000	-179.901	-57.163	85.714	11.121
*	1	0.400	-151.588	278.080	-17.566	-92.879	0.000	-179.901	-24.147	79.365	11.121
*	2	2.260	269.436	174.634	-17.566	-92.879	0.000	-179.901	96.015	49.841	11.121
*	3	3.830	475.068	87.317	-17.566	-92.879	0.000	-179.901	154.703	24.921	11.121
*	4	5.400	543.612	0.000	-17.566	-92.879	0.000	-179.901	174.266	0.000	11.121
*	5	6.970	475.068	-87.317	-17.566	-92.879	0.000	-179.901	154.703	-24.921	11.121
*	6	8.540	269.436	-174.634	-17.566	-92.879	0.000	-179.901	96.015	-49.841	11.121
*	7	10.400	-151.588	-278.080	-17.566	-92.879	0.000	-179.901	-24.147	-79.365	11.121
1-	4	10.800	-267.270	-300.326	-17.566	-92.879	0.000	-179.901	-57.163	-85.714	11.121

	No	L(m)	Case 4 HB live load-VL- M (tm)	S (t)	N (t)	Case 5 HB live load-VL- M (tm)	S (t)	N (t)	Case 6 HB live load-HL- M (tm)	S (t)	N (t)
1-	2	0.000	-88.286	1.723	-146.596	-137.762	4.462	-164.471	-35.248	57.725	0.000
*	1	0.500	-87.424	1.723	-146.596	-135.531	4.462	-164.471	-8.529	49.150	0.000
*	2	1.960	-84.908	1.723	-146.596	-129.016	4.462	-164.471	44.952	24.111	0.000
*	3	3.325	-82.556	1.723	-146.596	-122.925	4.462	-164.471	61.887	0.701	0.000
*	4	4.690	-80.204	1.723	-146.596	-116.835	4.462	-164.471	46.867	-22.708	0.000
*	5	6.150	-77.689	1.723	-146.596	-110.320	4.462	-164.471	-4.565	-47.747	0.000
2-	1	6.600	-76.913	1.723	-146.596	-108.312	4.462	-164.471	-27.788	-55.465	0.000
2-	3	0.000	-76.913	146.596	1.723	-108.312	164.471	4.462	-27.788	0.000	-55.465
*	1	0.400	-22.309	126.428	1.723	-46.557	144.303	4.462	-27.788	0.000	-55.465
*	2	2.060	119.656	47.772	1.723	125.080	65.648	4.462	-27.788	0.000	-55.465
*	3	3.730	130.461	-24.832	1.723	165.737	-6.957	4.462	-27.788	0.000	-55.465
*	4	5.400	88.991	-24.832	1.723	154.119	-6.957	4.462	-27.788	0.000	-55.465
*	5	7.070	47.521	-24.832	1.723	142.501	-6.957	4.462	-27.788	0.000	-55.465
*	6	8.740	6.051	-24.832	1.723	108.608	-54.352	4.462	-27.788	0.000	-55.465
*	7	10.400	-35.171	-24.832	1.723	-46.799	-133.007	4.462	-27.788	0.000	-55.465
3-	2	10.800	-45.104	-24.832	1.723	-104.035	-153.175	4.462	-27.788	0.000	-55.465
3-	4	0.000	-45.104	-1.723	-24.832	-104.035	-4.462	-153.175	-27.788	55.465	0.000
*	1	0.450	-45.880	-1.723	-24.832	-106.043	-4.462	-153.175	-4.565	47.747	0.000
*	2	1.910	-48.395	-1.723	-24.832	-112.558	-4.462	-153.175	46.867	22.708	0.000
*	3	3.275	-50.747	-1.723	-24.832	-118.649	-4.462	-153.175	61.887	-0.701	0.000
*	4	4.640	-53.099	-1.723	-24.832	-124.739	-4.462	-153.175	44.952	-24.111	0.000
*	5	6.100	-55.615	-1.723	-24.832	-131.254	-4.462	-153.175	-8.529	-49.150	0.000
4-	3	6.600	-56.477	-1.723	-24.832	-133.485	-4.462	-153.175	-35.248	-57.725	0.000
4-	1	0.000	-56.477	24.832	-1.723	-133.485	153.176	-4.462	-35.248	0.000	-57.725
*	1	0.400	-45.302	30.881	-1.723	-74.340	142.536	-4.462	-35.248	0.000	-57.725
*	2	2.260	29.839	46.480	-1.723	143.994	91.920	-4.462	-35.248	0.000	-57.725
*	3	3.830	102.472	43.598	-1.723	253.802	47.741	-4.462	-35.248	0.000	-57.725
*	4	5.400	159.047	26.023	-1.723	293.204	2.230	-4.462	-35.248	0.000	-57.725
*	5	6.970	176.496	-6.244	-1.723	260.108	-44.613	-4.462	-35.248	0.000	-57.725
*	6	8.540	131.753	-53.202	-1.723	152.423	-92.787	-4.462	-35.248	0.000	-57.725
*	7	10.400	-33.429	-127.849	-1.723	-74.553	-151.584	-4.462	-35.248	0.000	-57.725
1-	4	10.800	-88.286	-146.596	-1.723	-137.762	-164.473	-4.462	-35.248	0.000	-57.725

	No	L(m)	Case 7 M (tm)	S (t)	N (t)	Case 8 M (tm)	S (t)	N (t)	Case 9 M (tm)	S (t)	N (t)
1-	2	0.000	-603.825	305.173	-537.018	-648.331	323.540	-624.079	-719.082	327.457	-649.641
*	1	0.500	-466.317	245.534	-523.991	-501.639	263.901	-611.052	-570.432	267.818	-636.614
*	2	1.960	-222.269	94.523	-485.952	-230.775	112.891	-573.012	-293.849	116.807	-598.574
*	3	3.325	-171.752	-15.485	-450.387	-155.187	2.883	-537.448	-212.914	6.800	-563.010
*	4	4.690	-250.833	-95.364	-414.823	-209.196	-76.997	-501.884	-261.578	-73.080	-527.446
*	5	6.150	-432.286	-147.456	-376.784	-363.832	-129.089	-463.844	-410.495	-125.172	-489.406
2-	1	6.600	-500.813	-156.563	-365.059	-424.094	-138.196	-452.120	-468.994	-134.279	-477.682
2-	3	0.000	-500.813	365.059	-156.563	-424.094	452.120	-138.196	-468.994	477.682	-134.279
*	1	0.400	-358.382	347.097	-156.563	-252.606	405.317	-138.196	-287.282	430.879	-134.279
*	2	2.060	155.929	272.554	-156.563	261.245	218.298	-138.196	269.002	243.860	-134.279
*	3	3.730	548.246	191.795	-156.563	464.551	39.481	-138.196	514.997	65.043	-134.279
*	4	5.400	705.475	0.000	-156.563	467.867	-35.510	-138.196	561.001	-9.948	-134.279
*	5	7.070	548.246	-191.795	-156.563	345.946	-110.502	-138.196	481.769	-84.940	-134.279
*	6	8.740	155.929	-272.554	-156.563	98.790	-185.494	-138.196	245.447	-227.706	-134.279
*	7	10.400	-358.382	-347.097	-156.563	-271.000	-260.036	-138.196	-287.628	-414.726	-134.279
3-	2	10.800	-500.813	-365.059	-156.563	-378.607	-277.998	-138.196	-462.879	-461.528	-134.279
3-	4	0.000	-500.813	156.563	-365.059	-378.607	138.196	-277.998	-462.879	134.279	-461.528
*	1	0.450	-432.286	147.456	-376.784	-318.345	129.089	-289.723	-404.379	125.172	-473.253
*	2	1.910	-250.833	95.364	-414.823	-163.709	76.997	-327.762	-255.462	73.080	-511.292
*	3	3.275	-171.752	15.485	-450.387	-109.700	-2.883	-363.327	-206.799	-6.800	-546.856
*	4	4.640	-222.269	-94.523	-485.952	-185.288	-112.891	-398.891	-287.733	-116.807	-582.421
*	5	6.100	-466.317	-245.534	-523.991	-456.153	-263.901	-436.930	-564.316	-267.818	-620.460
4-	3	6.600	-603.825	-305.173	-537.018	-602.845	-323.540	-449.957	-712.966	-327.457	-633.487
4-	1	0.000	-603.825	537.022	-305.173	-602.845	449.960	-323.540	-712.966	633.493	-327.457
*	1	0.400	-396.973	497.242	-305.173	-427.225	427.910	-323.540	-468.748	587.576	-327.457
*	2	2.260	355.872	312.268	-305.173	261.241	307.461	-323.540	424.482	372.441	-327.457
*	3	3.830	723.568	156.134	-305.173	648.878	182.842	-323.540	865.279	188.767	-327.457
*	4	5.400	846.133	0.000	-305.173	824.370	37.213	-323.540	1016.214	3.189	-327.457
*	5	6.970	723.568	-156.134	-305.173	754.732	-129.426	-323.540	874.297	-184.294	-327.457
*	6	8.540	355.872	-312.268	-305.173	406.977	-317.075	-323.540	436.536	-373.681	-327.457
*	7	10.400	-396.973	-497.242	-305.173	-410.246	-566.574	-323.540	-469.054	-600.516	-327.457
1-	4	10.800	-603.825	-537.022	-305.173	-648.331	-624.083	-323.540	-719.082	-649.647	-327.457

Case 10

No		L(m)	M (tm)	S (t)	N (t)
1-	2	0.000	-580.242	416.323	-414.447
*	1	0.500	-390.695	342.535	-401.420
*	2	1.960	-35.185	150.210	-363.380
*	3	3.325	64.982	1.576	-327.816
*	4	4.690	-17.173	-116.929	-292.252
*	5	6.150	-260.270	-210.336	-254.213
2-	1	6.600	-359.958	-232.176	-242.488
2-	3	0.000	-359.958	242.488	-232.176
*	1	0.400	-266.555	224.526	-232.176
*	2	2.060	44.287	149.983	-232.176
*	3	3.730	232.142	74.992	-232.176
*	4	5.400	294.760	0.000	-232.176
*	5	7.070	232.142	-74.992	-232.176
*	6	8.740	44.287	-149.983	-232.176
*	7	10.400	-266.555	-224.526	-232.176
3-	2	10.800	-359.958	-242.488	-232.176
3-	4	0.000	-359.958	232.176	-242.488
*	1	0.450	-260.270	210.336	-254.213
*	2	1.910	-17.173	116.929	-292.252
*	3	3.275	64.982	-1.576	-327.816
*	4	4.640	-35.185	-150.210	-363.380
*	5	6.100	-390.695	-342.535	-401.420
4-	3	6.600	-580.242	-416.323	-414.447
4-	1	0.000	-580.242	414.450	-416.323
*	1	0.400	-420.601	383.750	-416.323
*	2	2.260	160.412	240.995	-416.323
*	3	3.830	444.184	120.498	-416.323
*	4	5.400	538.775	0.000	-416.323
*	5	6.970	444.184	-120.498	-416.323
*	6	8.540	160.412	-240.995	-416.323
*	7	10.400	-420.601	-383.750	-416.323
1-	4	10.800	-580.242	-414.450	-416.323

PICK-UP No. 1 *

No.	L (m)	M. MAXIMUM Case	M (tm)	S (t)	N (t)	M. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-10	-580.242	416.323	-414.447	C- 9	-719.082	327.457	-649.641
* 1	0.500	C-10	-390.695	342.535	-401.420	C- 9	-570.432	267.818	-636.614
* 2	1.960	C-10	-35.185	150.210	-363.380	C- 9	-293.849	116.807	-598.574
* 3	3.325	C-10	64.982	1.576	-327.816	C- 9	-212.914	6.800	-563.010
* 4	4.690	C-10	-17.173	-116.929	-292.252	C- 9	-261.578	-73.080	-527.446
* 5	6.150	C-10	-260.270	-210.336	-254.213	C- 7	-432.286	-147.456	-376.784
2 - 1	6.600	C-10	-359.958	-232.176	-242.488	C- 7	-500.813	-156.563	-365.059
2 - 3	0.000	C-10	-359.958	242.488	-232.176	C- 7	-500.813	365.059	-156.563
* 1	0.400	C- 8	-252.606	405.317	-138.196	C- 7	-358.382	347.097	-156.563
* 2	2.060	C- 9	269.002	243.860	-134.279	C-10	44.287	149.983	-232.176
* 3	3.730	C- 7	548.246	191.795	-156.563	C-10	232.142	74.992	-232.176
* 4	5.400	C- 7	705.475	0.000	-156.563	C-10	294.760	0.000	-232.176
* 5	7.070	C- 7	548.246	-191.795	-156.563	C-10	232.142	-74.992	-232.176
* 6	8.740	C- 9	245.447	-227.706	-134.279	C-10	44.287	-149.983	-232.176
* 7	10.400	C-10	-266.555	-224.526	-232.176	C- 7	-358.382	-347.097	-156.563
3 - 2	10.800	C-10	-359.958	-242.488	-232.176	C- 7	-500.813	-365.059	-156.563
3 - 4	0.000	C-10	-359.958	232.176	-242.488	C- 7	-500.813	156.563	-365.059
* 1	0.450	C-10	-260.270	210.336	-254.213	C- 7	-432.286	147.456	-376.784
* 2	1.910	C-10	-17.173	116.929	-292.252	C- 9	-255.462	73.080	-511.292
* 3	3.275	C-10	64.982	-1.576	-327.816	C- 9	-206.799	-6.800	-546.856
* 4	4.640	C-10	-35.185	-150.210	-363.380	C- 9	-287.733	-116.807	-582.421
* 5	6.100	C-10	-390.695	-342.535	-401.420	C- 9	-564.316	-267.818	-620.460
4 - 3	6.600	C-10	-580.242	-416.323	-414.447	C- 9	-712.966	-327.457	-633.487
4 - 1	0.000	C-10	-580.242	414.450	-416.323	C- 9	-712.966	633.493	-327.457
* 1	0.400	C- 7	-396.973	497.242	-305.173	C- 9	-468.748	587.576	-327.457
* 2	2.260	C- 9	424.482	372.441	-327.457	C-10	160.412	240.995	-416.323
* 3	3.830	C- 9	865.279	188.767	-327.457	C-10	444.184	120.498	-416.323
* 4	5.400	C- 9	1016.214	3.189	-327.457	C-10	538.775	0.000	-416.323
* 5	6.970	C- 9	874.297	-184.294	-327.457	C-10	444.184	-120.498	-416.323
* 6	8.540	C- 9	436.536	-373.681	-327.457	C-10	160.412	-240.995	-416.323
* 7	10.400	C- 7	-396.973	-497.242	-305.173	C- 9	-469.054	-600.516	-327.457
1 - 4	10.800	C-10	-580.242	-414.450	-416.323	C- 9	-719.082	-649.647	-327.457

PICK-UP No. 1 *

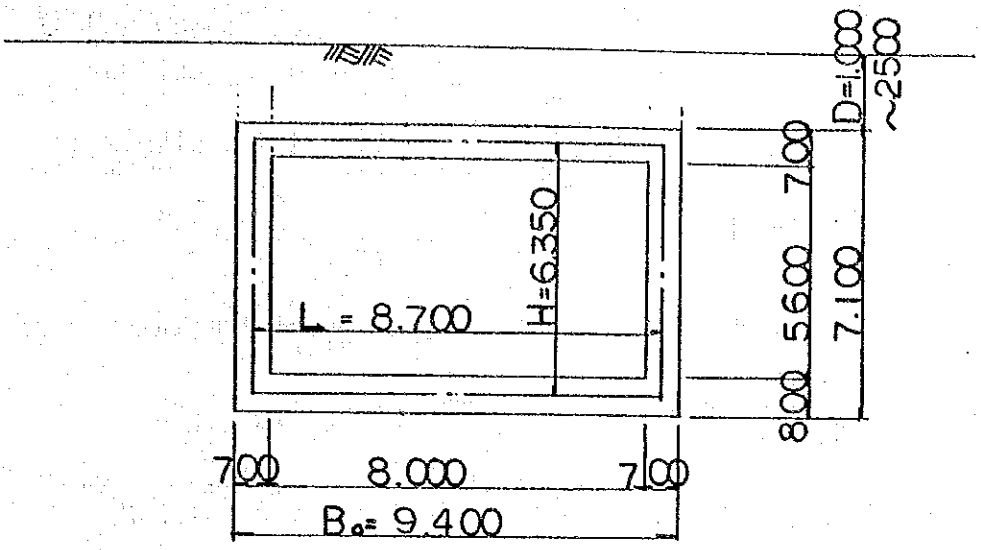
No.	L (m)	S. MAXIMUM Case	M (tm)	S (t)	N (t)	S. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-10	-580.242	416.323	-414.447	C- 7	-603.825	305.173	-537.018
* 1	0.500	C-10	-390.695	342.535	-401.420	C- 7	-466.317	245.534	-523.991
* 2	1.960	C-10	-35.185	150.210	-363.380	C- 7	-222.269	94.523	-485.952
* 3	3.325	C- 9	-212.914	6.800	-563.010	C- 7	-171.752	-15.485	-450.387
* 4	4.690	C- 9	-261.578	-73.080	-527.446	C-10	-17.173	-116.929	-292.252
* 5	6.150	C- 9	-410.495	-125.172	-489.406	C-10	-260.270	-210.336	-254.213
2 - 1	6.600	C- 9	-468.994	-134.279	-477.682	C-10	-359.958	-232.176	-242.488
2 - 3	0.000	C- 9	-468.994	477.682	-134.279	C-10	-359.958	242.488	-232.176
* 1	0.400	C- 9	-287.282	430.879	-134.279	C-10	-266.555	224.526	-232.176
* 2	2.060	C- 7	155.929	272.554	-156.563	C-10	44.287	149.983	-232.176
* 3	3.730	C- 7	548.246	191.795	-156.563	C- 8	464.551	39.481	-138.196
* 4	5.400	C- 7	705.475	0.000	-156.563	C- 8	467.867	-35.510	-138.196
* 5	7.070	C-10	232.142	-74.992	-232.176	C- 7	548.246	-191.795	-156.563
* 6	8.740	C-10	44.287	-149.983	-232.176	C- 7	155.929	-272.554	-156.563
* 7	10.400	C-10	-266.555	-224.526	-232.176	C- 9	-287.628	-414.726	-134.279
3 - 2	10.800	C-10	-359.958	-242.488	-232.176	C- 9	-462.879	-461.528	-134.279
3 - 4	0.000	C-10	-359.958	232.176	-242.488	C- 9	-462.879	134.279	-461.528
* 1	0.450	C-10	-260.270	210.336	-254.213	C- 9	-404.379	125.172	-473.253
* 2	1.910	C-10	-17.173	116.929	-292.252	C- 9	-255.462	73.080	-511.292
* 3	3.275	C- 7	-171.752	15.485	-450.387	C- 9	-206.799	-6.800	-546.856
* 4	4.640	C- 7	-222.269	-94.523	-485.952	C-10	-35.185	-150.210	-363.380
* 5	6.100	C- 7	-466.317	-245.534	-523.991	C-10	-390.695	-342.535	-401.420
4 - 3	6.600	C- 7	-603.825	-305.173	-537.018	C-10	-580.242	-416.323	-414.447
4 - 1	0.000	C- 9	-712.966	633.493	-327.457	C-10	-580.242	414.450	-416.323
* 1	0.400	C- 9	-468.748	587.576	-327.457	C-10	-420.601	383.750	-416.323
* 2	2.260	C- 9	424.482	372.441	-327.457	C-10	160.412	240.995	-416.323
* 3	3.830	C- 9	865.279	188.767	-327.457	C-10	444.184	120.498	-416.323
* 4	5.400	C- 8	824.370	37.213	-323.540	C-10	538.775	0.000	-416.323
* 5	6.970	C-10	444.184	-120.498	-416.323	C- 9	874.297	-184.294	-327.457
* 6	8.540	C-10	160.412	-240.995	-416.323	C- 9	436.536	-373.681	-327.457
* 7	10.400	C-10	-420.601	-383.750	-416.323	C- 9	-469.054	-600.516	-327.457
1 - 4	10.800	C-10	-580.242	-414.450	-416.323	C- 9	-719.082	-649.647	-327.457

PICK-UP No. 1 *

No.	L (m)	N. MAXIMUM Case	M (tm)	S (t)	N (t)	N. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C-10	-580.242	416.323	-414.447	C- 9	-719.082	327.457	-649.641
* 1	0.500	C-10	-390.695	342.535	-401.420	C- 9	-570.432	267.818	-636.614
* 2	1.960	C-10	-35.185	150.210	-363.380	C- 9	-293.849	116.807	-598.574
* 3	3.325	C-10	64.982	1.576	-327.816	C- 9	-212.914	6.800	-563.010
* 4	4.690	C-10	-17.173	-116.929	-292.252	C- 9	-261.578	-73.080	-527.446
* 5	6.150	C-10	-260.270	-210.336	-254.213	C- 9	-410.495	-125.172	-489.406
2 - 1	6.600	C-10	-359.958	-232.176	-242.488	C- 9	-468.994	-134.279	-477.682
2 - 3	0.000	C- 9	-468.994	477.682	-134.279	C-10	-359.958	242.488	-232.176
* 1	0.400	C- 9	-287.282	430.879	-134.279	C-10	-266.555	224.526	-232.176
* 2	2.060	C- 9	269.002	243.860	-134.279	C-10	44.287	149.983	-232.176
* 3	3.730	C- 9	514.997	65.043	-134.279	C-10	232.142	74.992	-232.176
* 4	5.400	C- 9	561.001	-9.948	-134.279	C-10	294.760	0.000	-232.176
* 5	7.070	C- 9	481.769	-84.940	-134.279	C-10	232.142	-74.992	-232.176
* 6	8.740	C- 9	245.447	-227.706	-134.279	C-10	44.287	-149.983	-232.176
* 7	10.400	C- 9	-287.628	-414.726	-134.279	C-10	-266.555	-224.526	-232.176
3 - 2	10.800	C- 9	-462.879	-461.528	-134.279	C-10	-359.958	-242.488	-232.176
3 - 4	0.000	C-10	-359.958	232.176	-242.488	C- 9	-462.879	134.279	-461.528
* 1	0.450	C-10	-260.270	210.336	-254.213	C- 9	-404.379	125.172	-473.253
* 2	1.910	C-10	-17.173	116.929	-292.252	C- 9	-255.462	73.080	-511.292
* 3	3.275	C-10	64.982	-1.576	-327.816	C- 9	-206.799	-6.800	-546.856
* 4	4.640	C-10	-35.185	-150.210	-363.380	C- 9	-287.733	-116.807	-582.421
* 5	6.100	C-10	-390.695	-342.535	-401.420	C- 9	-564.316	-267.818	-620.460
4 - 3	6.600	C-10	-580.242	-416.323	-414.447	C- 9	-712.966	-327.457	-633.487
4 - 1	0.000	C- 7	-603.825	537.022	-305.173	C-10	-580.242	414.450	-416.323
* 1	0.400	C- 7	-396.973	497.242	-305.173	C-10	-420.601	383.750	-416.323
* 2	2.260	C- 7	355.872	312.268	-305.173	C-10	160.412	240.995	-416.323
* 3	3.830	C- 7	723.568	156.134	-305.173	C-10	444.184	120.498	-416.323
* 4	5.400	C- 7	846.133	0.000	-305.173	C-10	538.775	0.000	-416.323
* 5	6.970	C- 7	723.568	-156.134	-305.173	C-10	444.184	-120.498	-416.323
* 6	8.540	C- 7	355.872	-312.268	-305.173	C-10	160.412	-240.995	-416.323
* 7	10.400	C- 7	-396.973	-497.242	-305.173	C-10	-420.601	-383.750	-416.323
1 - 4	10.800	C- 7	-603.825	-537.022	-305.173	C-10	-580.242	-414.450	-416.323

NO ② BOX CULVERT FOR RORD

1) Shape and Size



Where

D^m = depth of asphalt and similar surface soil.

2) Factor of section

A	= 1.00 x 0.70	= 0.7000 m^2
I	= $\frac{1.00 \times 0.70^3}{12}$	= 0.02858 m^4
A	= 1.00 x 0.80	= 0.8000 m^2
I	= $\frac{1.00 \times 0.80^3}{12}$	= 0.04267 m^4
A	=	=
I	=	=
Ec	= 25 KN/mm^2	= 2.5×10^7 KN/m^2

No.② BOX CULVERT FOR ROAD

1. calculation for bending moment (U.L.S)

1) For upper slab

section b $=100^{cm}$ h $=70$ d $=64.0$ d′ $=6.0$

a) middle point ②~③ Mu.max$=667.4^{KNm}$

$$A_s = \begin{cases} Y_{32}-300^{ctc} = 8.042/0.30 \\ Y_{25}-300^{ctc} = 4.909/0.30 \end{cases} = 43.17\ cm^2$$

$$X = \frac{0.87\times 41000 \times 43.17}{0.40\times 2500\times 100} = 15.4^{cm}$$

$$Z = 64.0-\frac{15.4}{2} = 56.3^{cm} < 0.95\times 64.0 = 60.8^{cm} \quad OK$$

$$M_{RS} = 0.87\times 41000 \times 43.17 \times 56.3\times 10^{-5} = 866.9^{KNm} > Mu = 667.4^{KNm}$$

$$M_{RC} = 0.40\times 2500\times 100 \times 15.4\times 56.3\times 10^{-5} = 867.0^{KNm} > Mu = 667.4^{KNm}$$

b) intersection point ②=③ Mu.min$=-605.3^{KNm}$

$$A_Y = Y_{25}\text{-}150^{ctc} = 4.909/0.15 = 32.73\ cm^2$$

$$X = \frac{0.87\times 41000 \times 32.73}{0.40\times 2500\times 100} = 11.8^{cm}$$

$$Z = 64.0-\frac{11.8}{2} = 58.1^{cm} < 0.95\times 64.0 = 60.8^{cm} \quad OK$$

$$M_{RS} = 0.87\times 41000 \times 32.73 \times 58.1\times 10^{-5} = 678.3^{KNm} > 605.3^{KNm}$$

$$M_{RC} = 0.40\times 2500\times 100 \times 11.8\times 58.1\times 10^{-5} = 685.5^{KNm} > 605.3^{KNm}$$

2) For bottom slab

section b $=100^{cm}$ h $=80$ d $=73.0(74.0)$ d′ $=7.0(6.0)$

a) middle point ④~① Mu.max $=805.4^{KNm}$

$$A_s = \begin{cases} Y_{32}-300^{ctc} = 8.042/0.30 \\ Y_{25}-300^{ctc} = 4.909/0.30 \end{cases} = 43.17\ cm^2$$

$$X = \frac{0.87\times 41000 \times 43.17}{0.40\times 2500\times 100} = 15.4^{cm}$$

$$Z = 73.0-\frac{15.4}{2} = 65.3^{cm} < 0.95\times 73.0 = 69.3^{cm} \quad OK$$

$$M_{RS} = 0.87\times 41000 \times 43.17 \times 65.3\times 10^{-5} = 1005.5^{KNm} > Mu = 805.4^{KNm}$$

$$M_{RC} = 0.40\times 2500\times 100 \times 15.4\times 65.3\times 10^{-5} = 1005.6^{KNm} > Mu = 805.4^{KNm}$$

OK

b) intersection point ④, ① Mu.min=−671.0^{KNm}

A_s = Y_{25}-150^{ctc} = 4.909/0.15 =32.73 cm^2

$$X = \frac{0.87\times 41000 \times 32.73}{0.40\times 2500\times 100} = 11.8^{cm}$$

$$Z = 74.0-\frac{11.8}{2} = 68.1^{cm} < 0.95\times 74.0 = 70.3^{cm}$$

M_{RS} =0.87×41000 ×32.73 ×68.1×10^{-5}=795.0^{KNm}>Mu=671.0^{KNm}

M_{RC} =0.40×2500×100 ×11.8×68.1×10^{-5}=803.5^{KNm}>Mu=671.0^{KNm}

OK

Notice: this bar is decide for shearing forces without bending moments.

2. calculation for shearing force (U.L.S)

a) For upper slab

section b =100^{cm} h =70 d=64.0 d´=6.0

intersection point ②=③ Su.max = 376.0^{KN}

A_s= Y_{32}−150^{ctc}=8.042/0.15=53.61 cm^2

$$P = \frac{53.61}{100 \times 64.0}\times 100 = 0.838\ \%$$

$$Vc = \frac{376.0\times 10^3}{100\times 64.0} = 58.8\ N/cm^2$$

$$< Vca = 50.0 + 15.0\ \frac{(0.838-0.50)}{0.50} = 60.1\ N/cm^2$$ OK

b) For bottom slab

section b =100^{cm} h =80 d =73.0 d´=7.0

intersection point ④=① Su.min =−394.8^{KN}

A_s= Y_{32}−150^{ctc}=53.61 cm^2

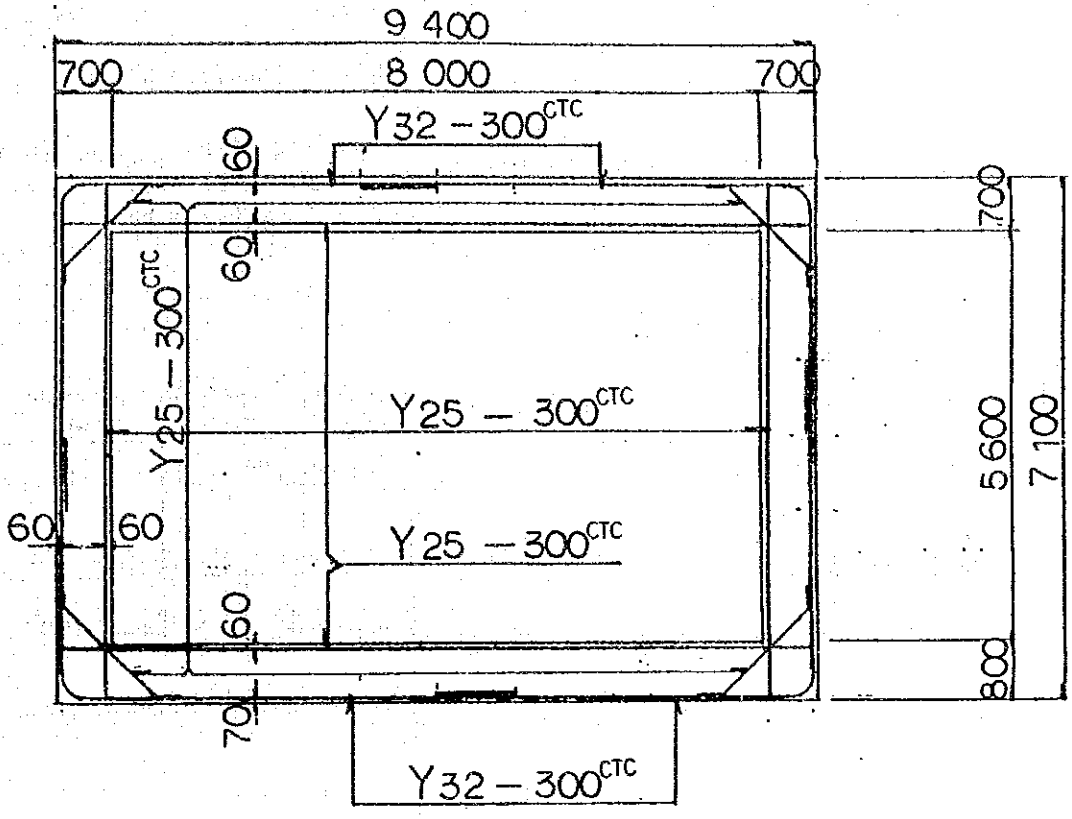
$$P = \frac{53.61}{100 \times 73.0}\times 100 = 0.734\ \%$$

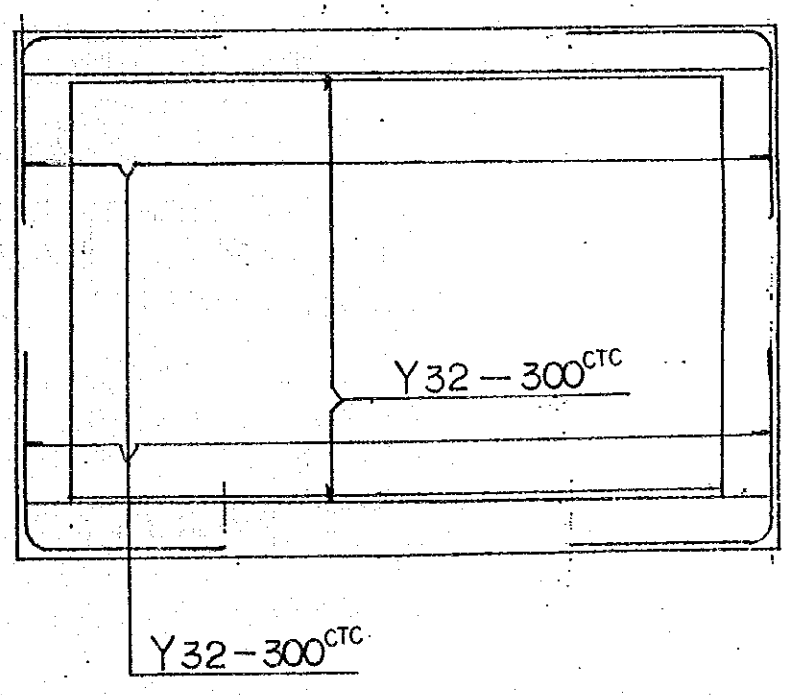
$$Vc = \frac{394.8\times 10^3}{100\times 73.0} = 54.1\ N/cm^2$$

$$< Vca = 50.0 + 15.0\ \frac{(0.734-0.50)}{0.50} = 57.0\ N/cm^2$$ OK

Notice: this bar is decide for shearing stress about point ②, ③ and ④, ①

NO② BOX CULVERT FOR ROAD





NO② BOX CULVERT FOR ROAD

D= 2.500 m

(1)Dead load

a) vertical load ····· (case-1)

For upper slab w1 = 22.6×0.50+19.6×2.00+23.6×0.70 = 67.020 kN/m

For side wall w2 = 23.6×0.70 = 16.520 〃

For bottom slab W3 = 67.020 + $\frac{2\times16.520\times6.35}{8.70}$ = 91.135 〃

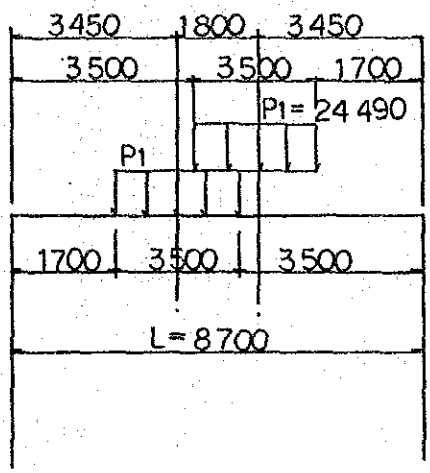
b) Horizontal load ··· earth pressure ····· (case-2)

For side wall P1 = (22.6×0.50+19.60×2.35)×0.500 = 28.680 kN/m

P2 = (22.6×0.50+19.60×8.70)×0.500 = 90.910 〃

(2)Live load

a) Vertical load ····· (case-3)



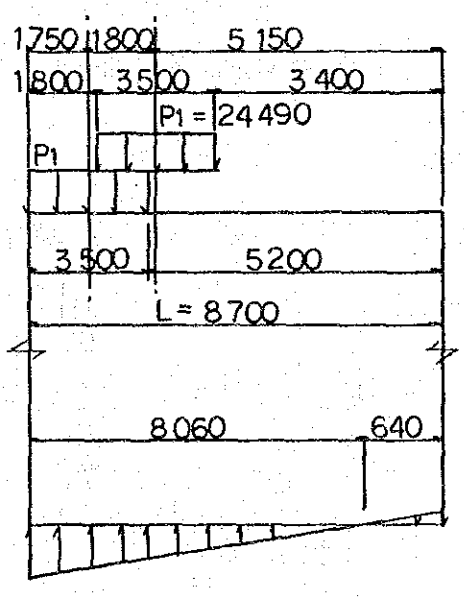
B = 0.30+2.50+0.70 = 3.500 m

load: P1 = $\frac{10}{3.50}\times\frac{30}{3.50}$ = 24.490 KN/m

For bottom slab

P2 = $\frac{2\times24.490\times3.50}{8.70}$ = 19.705 KN/m

b) Vertical load of partial ····· (case-4)



For bottom slab

P2 = $\frac{2\times24.490\times3.50}{8.70}$ $\pm$ $\frac{6\times24.490\times3.50(2.60+0.80)}{8.70^2}$

= 19.705 ± 23.102 = P2-1 = +42.807 KN/m, P2-2 = -3.397 KN/m

C) Horizontal load of live load surcharge ····· (case-5)

Pe = 34.300 × 0.500 = 17.150 KN/m

BOX FOR ROAD NO 2 Depth = 2500

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

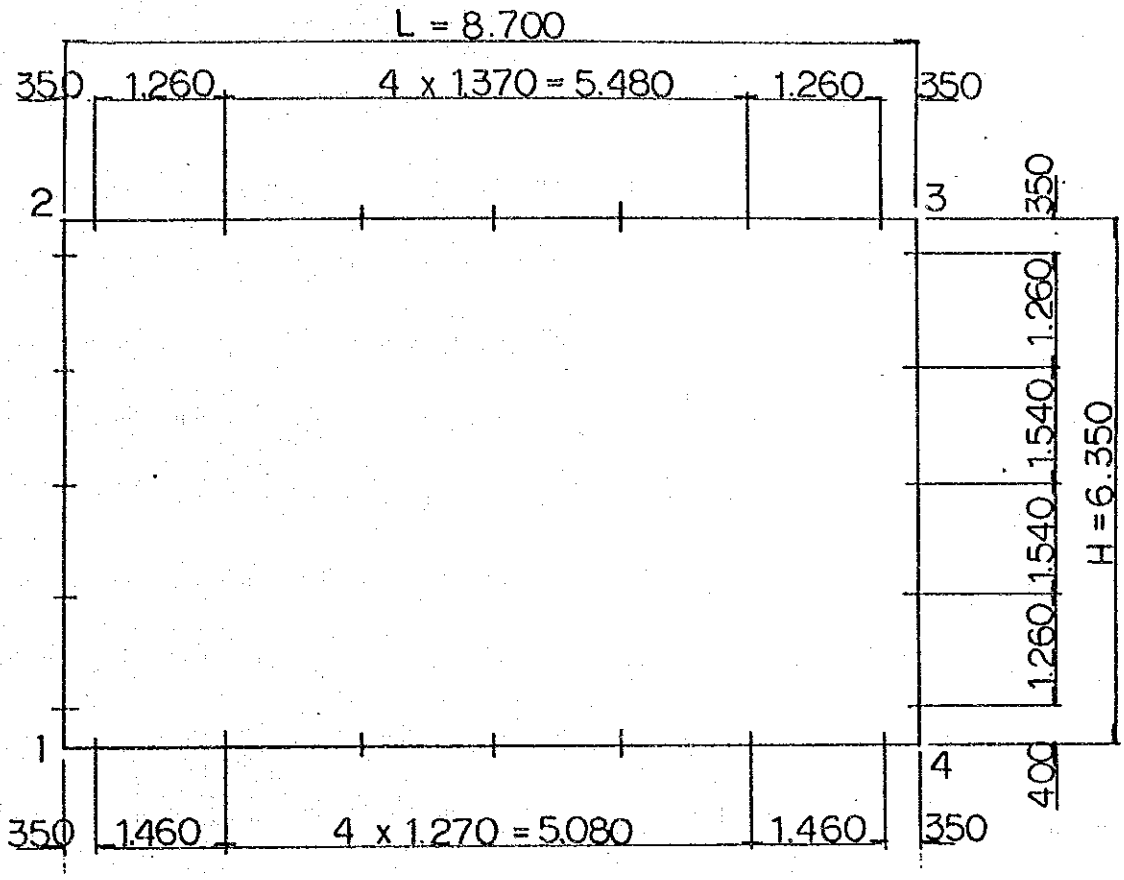
No	X (m)	Y (m)
1	0.0000	0.0000
2	0.0000	6.3500
3	8.7000	6.3500
4	8.7000	0.0000

No	I	J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1	2	0.70000	0.028580	Fix - Fix	6.350	2.50E+07	1.00E-05
2	2	3	0.70000	0.028580	Fix - Fix	8.700	2.50E+07	1.00E-05
3	3	4	0.70000	0.028580	Fix - Fix	6.350	2.50E+07	1.00E-05
4	4	1	0.80000	0.042670	Fix - Fix	8.700	2.50E+07	1.00E-05

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

No		L-No 1 / 11	L-No 2 / 12	L-No 3 / 13	L-No 4 / 14	L-No 5 / 15	L-No 6 / 16	L-No 7 / 17	L-No 8 / 18	L-No 9 / 19	L-No 10 / 20
1	5	0.400	1.660	3.200	4.740	6.000					
2	7	0.350	1.610	2.980	4.350	5.720	7.090	8.350			
3	5	0.350	1.610	3.150	4.690	5.950					
4	7	0.350	1.810	3.080	4.350	5.620	6.890	8.350			

CALCULATION POINTS OF EACH FORCE



: Dead load
No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-Y	0.000	6.350	-16.520	-16.520
3	3-	4	-Y	0.000	6.350	-16.520	-16.520
2	2-	3	-Y	0.000	8.700	-67.020	-67.020
4	4-	1	-Y	0.000	8.700	91.135	91.135

ΣV = -0.004 (t)
ΣH = 0.000 (t)

: Earth pressure
No. : 2

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	Y	0.000	6.350	90.910	28.680
3	3-	4	-X	0.000	6.350	-28.680	-90.910

ΣV = 0.000 (t)
ΣH = 0.000 (t)

: HB live load-VL-
No. : 3

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	1.700	3.500	-24.490	-24.490
2	2-	3	-Y	3.500	3.500	-24.490	-24.490
4	4-	1	-Y	0.000	8.700	19.705	19.705

ΣV = 0.003 (t)
ΣH = 0.000 (t)

BOX FOR ROAD NO 2

: HB live load-VL-
No. : 4

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	0.000	3.500	-24.490	-24.490
2	2-	3	-Y	1.800	3.500	-24.490	-24.490
4	4-	1	-Y	0.000	0.640	-3.397	0.000
4	4-	1	-Y	0.640	8.060	0.000	42.807

ΣV = -0.005 (t)
ΣH = 0.000 (t)

BOX FOR ROAD NO 2

: HB live load-HL-
No. : 5

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.000	6.350	17.150	17.150
3	3-	4	-X	0.000	6.350	-17.150	-17.150

ΣV = 0.000 (t)

BOX FOR ROAD NO 2

No / No	C-No 1 / No 6	C-No 2 / No 7	C-No 3 / No 8
No 1	1.3800	1.3800	1.3800
No 2	1.6500	1.6500	1.6500
No 3	1.4300	0.0000	0.0000
No 4	0.0000	1.4300	0.0000
No 5	0.0000	0.0000	1.6500

No 1 : 6 7 8

No.	Case. 1 RX (t)	RY (t)	RM (tm)	Case. 2 RX (t)	RY (t)	RM (tm)	Case. 3 RX (t)	RY (t)	RM (tm)
1.	0.000	0.002	0.000	0.000	0.000	0.000	0.000	-0.002	0.000
4.	0.000	0.002	0.000	0.000	0.000	0.000	0.000	-0.002	0.000

No.	Case. 4 RX (t)	RY (t)	RM (tm)	Case. 5 RX (t)	RY (t)	RM (tm)	Case. 6 RX (t)	RY (t)	RM (tm)
1.	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000

No.	Case. 7 RX (t)	RY (t)	RM (tm)	Case. 8 RX (t)	RY (t)	RM (tm)
1.	0.000	0.004	0.000	0.000	0.002	0.000
4.	0.000	0.008	0.000	0.000	0.002	0.000

BOX FOR ROAD NO 2

No.	Case. 1 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 2 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 3 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	11.90959	0.00000	0.00000	-4.68205	0.00000	0.00000	3.0300
2.	-0.03276	-1.24819	-11.23812	-0.12250	0.00000	4.66654	0.04040	-0.31102	-3.8580
3.	0.00218	-1.24819	11.23812	-0.87273	0.00000	-4.66654	-0.00269	-0.31102	3.8580
4.	-0.03058	0.00000	-11.90959	-0.99524	0.00000	4.68205	0.03770	0.00000	-3.0300

No.	Case. 4 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 5 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 6 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	3.12606	0.00000	0.00000	-1.28591	0.00000	0.00000	13.0428
2.	1.07906	-0.44066	-3.92687	0.01074	0.00000	1.40724	-0.18957	-2.16726	-13.3258
3.	1.05470	-0.18139	2.73274	-0.25337	0.00000	-1.40724	-1.44085	-2.16726	13.3258
4.	0.02132	0.00000	-2.59727	-0.24263	0.00000	1.28591	-1.63042	0.00000	-13.0428

No.	Case. 7 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 8 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	13.18011	0.00000	0.00000	6.58810
2.	1.29572	-2.35264	-13.42424	-0.22962	-1.72250	-5.48686
3.	0.07122	-1.98188	11.71664	-1.85506	-1.72250	5.48686
4.	-1.65385	0.00000	-12.42394	-2.08468	0.00000	-6.58810

BOX FOR ROAD NO 2

No	L(m)	Case 1 Dead load M (tm)	S (t)	N (t)	Case 2 Earth pressure M (tm)	S (t)	N (t)	Case 3 HB live load-VL- M (tm)	S (t)	N (t)
1- 2	0.000	-282.775	7.029	-396.439	-114.818	228.790	0.000	-49.984	-8.668	-85.715
* 1	0.400	-279.964	7.029	-389.831	-30.470	193.210	0.000	-53.451	-8.668	-85.715
* 2	1.660	-271.107	7.029	-369.016	147.189	91.382	0.000	-64.372	-8.668	-85.715
* 3	3.200	-260.282	7.029	-343.575	205.372	-11.946	0.000	-77.720	-8.668	-85.715
* 4	4.740	-249.456	7.029	-318.134	122.326	-92.032	0.000	-91.069	-8.668	-85.715
* 5	6.000	-240.600	7.029	-297.319	-25.658	-140.270	0.000	-101.990	-8.668	-85.715
2- 1	6.350	-238.139	7.029	-291.537	-76.649	-150.908	0.000	-105.023	-8.668	-85.715
2- 3	0.000	-238.139	291.537	7.029	-76.649	0.000	-150.908	-105.023	85.715	-8.668
* 1	0.350	-140.206	268.080	7.029	-76.649	0.000	-150.908	-75.023	85.715	-8.668
* 2	1.610	144.374	183.635	7.029	-76.649	0.000	-150.908	32.978	85.715	-8.668
* 3	2.980	333.059	91.817	7.029	-76.649	0.000	-150.908	130.345	54.368	-8.668
* 4	4.350	395.954	0.000	7.029	-76.649	0.000	-150.908	172.999	0.000	-8.668
* 5	5.720	333.059	-91.817	7.029	-76.649	0.000	-150.908	130.345	-54.368	-8.668
* 6	7.090	144.374	-183.635	7.029	-76.649	0.000	-150.908	32.978	-85.715	-8.668
* 7	8.350	-140.206	-268.080	7.029	-76.649	0.000	-150.908	-75.023	-85.715	-8.668
3- 2	8.700	-238.139	-291.537	7.029	-76.649	0.000	-150.908	-105.023	-85.715	-8.668
3- 4	0.000	-238.139	-7.029	-291.537	-76.649	150.908	0.000	-105.023	8.668	-85.715
* 1	0.350	-240.600	-7.029	-297.319	-25.658	140.270	0.000	-101.990	8.668	-85.715
* 2	1.610	-249.456	-7.029	-318.134	122.326	92.032	0.000	-91.069	8.668	-85.715
* 3	3.150	-260.282	-7.029	-343.575	205.372	11.946	0.000	-77.720	8.668	-85.715
* 4	4.690	-271.107	-7.029	-369.016	147.189	-91.382	0.000	-64.372	8.668	-85.715
* 5	5.950	-279.964	-7.029	-389.831	-30.470	-193.210	0.000	-53.451	8.668	-85.715
4- 3	6.350	-282.775	-7.029	-396.439	-114.818	-228.790	0.000	-49.984	8.668	-85.715
4- 1	0.000	-282.775	396.437	-7.029	-114.818	0.000	-228.790	-49.984	85.717	8.668
* 1	0.350	-149.604	364.540	-7.029	-114.818	0.000	-228.790	-21.190	78.820	8.668
* 2	1.810	285.493	231.483	-7.029	-114.818	0.000	-228.790	72.885	50.051	8.668
* 3	3.080	505.980	115.741	-7.029	-114.818	0.000	-228.790	120.559	25.025	8.668
* 4	4.350	579.476	0.000	-7.029	-114.818	0.000	-228.790	136.450	0.000	8.668
* 5	5.620	505.980	-115.741	-7.029	-114.818	0.000	-228.790	120.559	-25.025	8.668
* 6	6.890	285.493	-231.483	-7.029	-114.818	0.000	-228.790	72.885	-50.051	8.668
* 7	8.350	-149.604	-364.540	-7.029	-114.818	0.000	-228.790	-21.190	-78.820	8.668
1- 4	8.700	-282.775	-396.437	-7.029	-114.818	0.000	-228.790	-49.984	-85.717	8.668

BOX FOR ROAD NO 2

	No	L(m)	Case 4 HB live load-VL- M (tm)	S (t)	N (t)	Case 5 HB live load-HL- M (tm)	S (t)	N (t)	Case 6 M (tm)	S (t)	N (t)
1-	2	0.000	-63.799	-4.901	-121.441	-31.534	55.777	0.000	-651.157	374.809	-669.658
*	1	0.400	-65.760	-4.901	-121.441	-10.595	48.917	0.000	-513.061	316.102	-660.539
*	2	1.660	-71.935	-4.901	-121.441	37.427	27.308	0.000	-223.318	148.086	-631.814
*	3	3.200	-79.482	-4.901	-121.441	59.145	0.897	0.000	-131.465	-22.405	-596.706
*	4	4.740	-87.029	-4.901	-121.441	40.190	-25.514	0.000	-272.640	-154.547	-561.598
*	5	6.000	-93.204	-4.901	-121.441	-5.571	-47.123	0.000	-520.209	-234.140	-532.873
2-	1	6.350	-94.919	-4.901	-121.441	-23.114	-53.125	0.000	-605.287	-251.693	-524.894
2-	3	0.000	-94.919	121.441	-4.901	-23.114	0.000	-53.125	-605.287	524.894	-251.693
*	1	0.350	-53.915	112.870	-4.901	-23.114	0.000	-53.125	-427.239	492.523	-251.693
*	2	1.610	68.861	82.012	-4.901	-23.114	0.000	-53.125	119.923	375.988	-251.693
*	3	2.980	141.185	19.563	-4.901	-23.114	0.000	-53.125	519.543	204.454	-251.693
*	4	4.350	130.868	-26.723	-4.901	-23.114	0.000	-53.125	667.334	0.000	-251.693
*	5	5.720	73.434	-49.989	-4.901	-23.114	0.000	-53.125	519.543	-204.454	-251.693
*	6	7.090	4.949	-49.989	-4.901	-23.114	0.000	-53.125	119.923	-375.988	-251.693
*	7	8.350	-58.037	-49.989	-4.901	-23.114	0.000	-53.125	-427.239	-492.523	-251.693
3-	2	8.700	-75.533	-49.989	-4.901	-23.114	0.000	-53.125	-605.287	-524.894	-251.693
3-	4	0.000	-75.533	4.901	-49.989	-23.114	53.125	0.000	-605.287	251.693	-524.894
*	1	0.350	-73.818	4.901	-49.989	-5.571	47.123	0.000	-520.209	234.140	-532.873
*	2	1.610	-67.643	4.901	-49.989	40.190	25.514	0.000	-272.640	154.547	-561.598
*	3	3.150	-60.096	4.901	-49.989	59.145	-0.897	0.000	-131.465	22.405	-596.706
*	4	4.690	-52.548	4.901	-49.989	37.427	-27.308	0.000	-223.318	-148.086	-631.814
*	5	5.950	-46.374	4.901	-49.989	-10.595	-48.917	0.000	-513.061	-316.102	-660.539
4-	3	6.350	-44.413	4.901	-49.989	-31.534	-55.777	0.000	-651.157	-374.809	-669.658
4-	1	0.000	-44.413	49.985	4.901	-31.534	0.000	-55.777	-651.157	669.658	-374.809
*	1	0.350	-26.748	50.849	4.901	-31.534	0.000	-55.777	-426.205	615.778	-374.809
*	2	1.810	46.378	47.437	4.901	-31.534	0.000	-55.777	308.756	391.019	-374.809
*	3	3.080	99.799	35.262	4.901	-31.534	0.000	-55.777	681.202	195.509	-374.809
*	4	4.350	132.318	14.521	4.901	-31.534	0.000	-55.777	805.350	0.000	-374.809
*	5	5.620	133.057	-14.786	4.901	-31.534	0.000	-55.777	681.202	-195.509	-374.809
*	6	6.890	91.136	-52.659	4.901	-31.534	0.000	-55.777	308.756	-391.019	-374.809
*	7	8.350	-23.879	-106.783	4.901	-31.534	0.000	-55.777	-426.205	-615.778	-374.809
1-	4	8.700	-63.799	-121.440	4.901	-31.534	0.000	-55.777	-651.157	-669.658	-374.809

BOX FOR ROAD NO 2

No		L(m)	Case 7 M (tm)	S (t)	N (t)	Case 8 M (tm)	S (t)	N (t)
1-	2	0.000	-670.913	380.196	-720.747	-631.711	479.236	-547.086
*	1	0.400	-530.662	321.489	-711.628	-454.108	409.210	-537.967
*	2	1.660	-234.132	153.472	-682.903	-69.511	205.539	-509.242
*	3	3.200	-133.984	-17.019	-647.794	77.264	-8.530	-474.134
*	4	4.740	-266.863	-149.161	-612.686	-76.098	-184.250	-439.025
*	5	6.000	-507.645	-228.753	-583.961	-383.555	-299.498	-410.300
2-	1	6.350	-590.838	-246.306	-575.982	-493.242	-326.955	-402.321
2-	3	0.000	-590.838	575.982	-246.306	-493.242	402.321	-326.955
*	1	0.350	-397.054	531.354	-246.306	-358.095	369.950	-326.955
*	2	1.610	171.236	370.693	-246.306	34.626	253.416	-326.955
*	3	2.980	535.044	154.683	-246.306	295.011	126.708	-326.955
*	4	4.350	607.085	-38.214	-246.306	381.806	0.000	-326.955
*	5	5.720	438.160	-198.192	-246.306	295.011	-126.708	-326.955
*	6	7.090	79.842	-324.900	-246.306	34.626	-253.416	-326.955
*	7	8.350	-402.949	-441.435	-246.306	-358.095	-369.950	-326.955
3-	2	8.700	-563.116	-473.805	-246.306	-493.242	-402.321	-326.955
3-	4	0.000	-563.116	246.306	-473.805	-493.242	326.955	-402.321
*	1	0.350	-479.922	228.753	-481.784	-383.555	299.498	-410.300
*	2	1.610	-239.141	149.161	-510.509	-76.098	184.250	-439.025
*	3	3.150	-106.262	17.019	-545.618	77.264	8.530	-474.134
*	4	4.690	-206.410	-153.472	-580.726	-69.511	-205.539	-509.242
*	5	5.950	-502.940	-321.489	-609.451	-454.108	-409.210	-537.967
4-	3	6.350	-643.190	-380.196	-618.570	-631.711	-479.236	-547.086
4-	1	0.000	-643.190	618.562	-380.196	-631.711	547.083	-479.236
*	1	0.350	-434.154	575.779	-380.196	-447.935	503.065	-479.236
*	2	1.810	270.850	387.281	-380.196	152.498	319.446	-479.236
*	3	3.080	651.515	210.148	-380.196	456.771	159.723	-479.236
*	4	4.350	799.441	20.766	-380.196	558.195	0.000	-479.236
*	5	5.620	699.074	-180.867	-380.196	456.771	-159.723	-479.236
*	6	6.890	334.854	-394.749	-380.196	152.498	-319.446	-479.236
*	7	8.350	-430.051	-655.765	-380.196	-447.935	-503.065	-479.236
1-	4	8.700	-670.913	-720.743	-380.196	-631.711	-547.083	-479.236

BOX FOR ROAD NO 2

PICK-UP No. 1 *

No.	L (m)	M. MAXIMUM Case	M (tm)	S (t)	N (t)	M. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-631.711	479.236	-547.086	C- 7	-670.913	380.196	-720.747
* 1	0.400	C- 8	-454.108	409.210	-537.967	C- 7	-530.662	321.489	-711.628
* 2	1.660	C- 8	-69.511	205.539	-509.242	C- 7	-234.132	153.472	-682.903
* 3	3.200	C- 8	77.264	-8.530	-474.134	C- 7	-133.984	-17.019	-647.794
* 4	4.740	C- 8	-76.098	-184.250	-439.025	C- 6	-272.640	-154.547	-561.598
* 5	6.000	C- 8	-383.555	-299.498	-410.300	C- 6	-520.209	-234.140	-532.873
2 - 1	6.350	C- 8	-493.242	-326.955	-402.321	C- 6	-605.287	-251.693	-524.894
2 - 3	0.000	C- 8	-493.242	402.321	-326.955	C- 6	-605.287	524.894	-251.693
* 1	0.350	C- 8	-358.095	369.950	-326.955	C- 6	-427.239	492.523	-251.693
* 2	1.610	C- 7	171.236	370.693	-246.306	C- 8	34.626	253.416	-326.955
* 3	2.980	C- 7	535.044	154.683	-246.306	C- 8	295.011	126.708	-326.955
* 4	4.350	C- 6	667.334	0.000	-251.693	C- 8	381.806	0.000	-326.955
* 5	5.720	C- 6	519.543	-204.454	-251.693	C- 8	295.011	-126.708	-326.955
* 6	7.090	C- 6	119.923	-375.988	-251.693	C- 8	34.626	-253.416	-326.955
* 7	8.350	C- 8	-358.095	-369.950	-326.955	C- 6	-427.239	-492.523	-251.693
3 - 2	8.700	C- 8	-493.242	-402.321	-326.955	C- 6	-605.287	-524.894	-251.693
3 - 4	0.000	C- 8	-493.242	326.955	-402.321	C- 6	-605.287	251.693	-524.894
* 1	0.350	C- 8	-383.555	299.498	-410.300	C- 6	-520.209	234.140	-532.873
* 2	1.610	C- 8	-76.098	184.250	-439.025	C- 6	-272.640	154.547	-561.598
* 3	3.150	C- 8	77.264	8.530	-474.134	C- 6	-131.465	22.405	-596.706
* 4	4.690	C- 8	-69.511	-205.539	-509.242	C- 6	-223.318	-148.086	-631.814
* 5	5.950	C- 8	-454.108	-409.210	-537.967	C- 6	-513.061	-316.102	-660.539
4 - 3	6.350	C- 8	-631.711	-479.236	-547.086	C- 6	-651.157	-374.809	-669.658
4 - 1	0.000	C- 8	-631.711	547.083	-479.236	C- 6	-651.157	669.658	-374.809
* 1	0.350	C- 6	-426.205	615.778	-374.809	C- 8	-447.935	503.065	-479.236
* 2	1.810	C- 6	308.756	391.019	-374.809	C- 8	152.498	319.446	-479.236
* 3	3.080	C- 6	681.202	195.509	-374.809	C- 8	456.771	159.723	-479.236
* 4	4.350	C- 6	805.350	0.000	-374.809	C- 8	558.195	0.000	-479.236
* 5	5.620	C- 7	699.074	-180.867	-380.196	C- 8	456.771	-159.723	-479.236
* 6	6.890	C- 7	334.854	-394.749	-380.196	C- 8	152.498	-319.446	-479.236
* 7	8.350	C- 6	-426.205	-615.778	-374.809	C- 8	-447.935	-503.065	-479.236
1 - 4	8.700	C- 8	-631.711	-547.083	-479.236	C- 7	-670.913	-720.743	-380.196

BOX FOR ROAD NO 2

PICK-UP No. 1 *

No.	L (m)	S.MAXIMUM Case	M (tm)	S (t)	N (t)	S.MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-631.711	479.236	-547.086	C- 6	-651.157	374.809	-669.658
* 1	0.400	C- 8	-454.108	409.210	-537.967	C- 6	-513.061	316.102	-660.539
* 2	1.660	C- 8	-69.511	205.539	-509.242	C- 6	-223.318	148.086	-631.814
* 3	3.200	C- 8	77.264	-8.530	-474.134	C- 6	-131.465	-22.405	-596.706
* 4	4.740	C- 7	-266.863	-149.161	-612.686	C- 8	-76.098	-184.250	-439.025
* 5	6.000	C- 7	-507.645	-228.753	-583.961	C- 8	-383.555	-299.498	-410.300
2 - 1	6.350	C- 7	-590.838	-246.306	-575.982	C- 8	-493.242	-326.955	-402.321
2 - 3	0.000	C- 7	-590.838	575.982	-246.306	C- 8	-493.242	402.321	-326.955
* 1	0.350	C- 7	-397.054	531.354	-246.306	C- 8	-358.095	369.950	-326.955
* 2	1.610	C- 6	119.923	375.988	-251.693	C- 8	34.626	253.416	-326.955
* 3	2.980	C- 6	519.543	204.454	-251.693	C- 8	295.011	126.708	-326.955
* 4	4.350	C- 6	667.334	0.000	-251.693	C- 7	607.085	-38.214	-246.306
* 5	5.720	C- 8	295.011	-126.708	-326.955	C- 6	519.543	-204.454	-251.693
* 6	7.090	C- 8	34.626	-253.416	-326.955	C- 6	119.923	-375.988	-251.693
* 7	8.350	C- 8	-358.095	-369.950	-326.955	C- 6	-427.239	-492.523	-251.693
3 - 2	8.700	C- 8	-493.242	-402.321	-326.955	C- 6	-605.287	-524.894	-251.693
3 - 4	0.000	C- 8	-493.242	326.955	-402.321	C- 7	-563.116	246.306	-473.805
* 1	0.350	C- 8	-383.555	299.498	-410.300	C- 7	-479.922	228.753	-481.784
* 2	1.610	C- 8	-76.098	184.250	-439.025	C- 7	-239.141	149.161	-510.509
* 3	3.150	C- 6	-131.465	22.405	-596.706	C- 8	77.264	8.530	-474.134
* 4	4.690	C- 6	-223.318	-148.086	-631.814	C- 8	-69.511	-205.539	-509.242
* 5	5.950	C- 6	-513.061	-316.102	-660.539	C- 8	-454.108	-409.210	-537.967
4 - 3	6.350	C- 6	-651.157	-374.809	-669.658	C- 8	-631.711	-479.236	-547.086
4 - 1	0.000	C- 6	-651.157	669.658	-374.809	C- 8	-631.711	547.083	-479.236
* 1	0.350	C- 6	-426.205	615.778	-374.809	C- 8	-447.935	503.065	-479.236
* 2	1.810	C- 6	308.756	591.019	-374.809	C- 8	152.498	319.446	-479.236
* 3	3.080	C- 7	651.515	210.148	-380.196	C- 8	456.771	159.723	-479.236
* 4	4.350	C- 7	799.441	20.766	-380.196	C- 8	558.195	0.000	-479.236
* 5	5.620	C- 8	456.771	-159.723	-479.236	C- 6	681.202	-195.509	-374.809
* 6	6.890	C- 8	152.498	-319.446	-479.236	C- 7	334.854	-394.749	-380.196
* 7	8.350	C- 8	-447.935	-503.065	-479.236	C- 7	-430.051	-655.765	-380.196
1 - 4	8.700	C- 8	-631.711	-547.083	-479.236	C- 7	-670.913	-720.743	-380.196

BOX FOR ROAD NO 2

PICK-UP No. 1 *

No.	L (m)	N. MAXIMUM Case	M (tm)	S (t)	N (t)	N. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-631.711	479.236	-547.086	C- 7	-670.913	380.196	-720.747
* 1	0.400	C- 8	-454.108	409.210	-537.967	C- 7	-530.662	321.489	-711.628
* 2	1.660	C- 8	-69.511	205.539	-509.242	C- 7	-234.132	153.472	-682.903
* 3	3.200	C- 8	77.264	-8.530	-474.134	C- 7	-133.984	-17.019	-647.794
* 4	4.740	C- 8	-76.098	-184.250	-439.025	C- 7	-266.863	-149.161	-612.686
* 5	6.000	C- 8	-383.555	-299.498	-410.300	C- 7	-507.645	-228.753	-583.961
2 - 1	6.350	C- 8	-493.242	-326.955	-402.321	C- 7	-590.838	-246.306	-575.982
2 - 3	0.000	C- 7	-590.838	575.982	-246.306	C- 8	-493.242	402.321	-326.955
* 1	0.350	C- 7	-397.054	531.354	-246.306	C- 8	-358.095	369.950	-326.955
* 2	1.610	C- 7	171.236	370.693	-246.306	C- 8	34.626	253.416	-326.955
* 3	2.980	C- 7	535.044	154.683	-246.306	C- 8	295.011	126.708	-326.955
* 4	4.350	C- 7	607.085	-38.214	-246.306	C- 8	381.806	0.000	-326.955
* 5	5.720	C- 7	438.160	-198.192	-246.306	C- 8	295.011	-126.708	-326.955
* 6	7.090	C- 7	79.842	-324.900	-246.306	C- 8	34.626	-253.416	-326.955
* 7	8.350	C- 7	-402.949	-441.435	-246.306	C- 8	-358.095	-369.950	-326.955
3 - 2	8.700	C- 7	-563.116	-473.805	-246.306	C- 8	-493.242	-402.321	-326.955
3 - 4	0.000	C- 8	-493.242	326.955	-402.321	C- 6	-605.287	251.693	-524.894
* 1	0.350	C- 8	-383.555	299.498	-410.300	C- 6	-520.209	234.140	-532.873
* 2	1.610	C- 8	-76.098	184.250	-439.025	C- 6	-272.640	154.547	-561.598
* 3	3.150	C- 8	77.264	8.530	-474.134	C- 6	-131.465	22.405	-596.706
* 4	4.690	C- 8	-69.511	-205.539	-509.242	C- 6	-223.318	-148.086	-631.814
* 5	5.950	C- 8	-454.108	-409.210	-537.967	C- 6	-513.061	-316.102	-660.539
4 - 3	6.350	C- 8	-631.711	-479.236	-547.086	C- 6	-651.157	-374.809	-669.658
4 - 1	0.000	C- 6	-651.157	669.658	-374.809	C- 8	-631.711	547.083	-479.236
* 1	0.350	C- 6	-426.205	615.778	-374.809	C- 8	-447.935	503.065	-479.236
* 2	1.810	C- 6	308.756	391.019	-374.809	C- 8	152.498	319.446	-479.236
* 3	3.080	C- 6	681.202	195.509	-374.809	C- 8	456.771	159.723	-479.236
* 4	4.350	C- 6	805.350	0.000	-374.809	C- 8	558.195	0.000	-479.236
* 5	5.620	C- 6	681.202	-195.509	-374.809	C- 8	456.771	-159.723	-479.236
* 6	6.890	C- 6	308.756	-391.019	-374.809	C- 8	152.498	-319.446	-479.236
* 7	8.350	C- 6	-426.205	-615.778	-374.809	C- 8	-447.935	-503.065	-479.236
1 - 4	8.700	C- 6	-651.157	-669.658	-374.809	C- 8	-631.711	-547.083	-479.236

NO② BOX CULVERT FOR ROAD

D= 1.000 m

(1)Dead load

a) vertical load ----- (case-1)

For upper slab w1 = 22.6×0.50+19.6×0.50+23.6×0.70 = 37.620 kN/m

For side wall w2 = 23.6×0.70 = 16.520 〃

For bottom slab $W3 = 37.620 + \frac{2\times16.520\times6.35}{8.70}$ = 61.735 〃

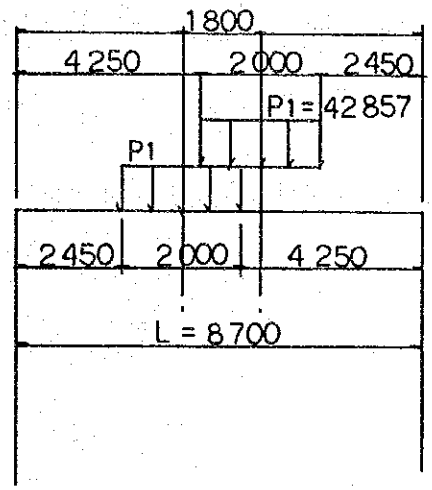
b) Horizontal load --- earth pressure ----- (case-2)

For side wall P1 = (22.6×0.50+19.60×0.85)×0.500 = 13.980 kN/m

P2 = (22.6×0.50+19.60×7.20)×0.500 = 76.210 〃

(2)Live load

a) Vertical load ------- (case-3)



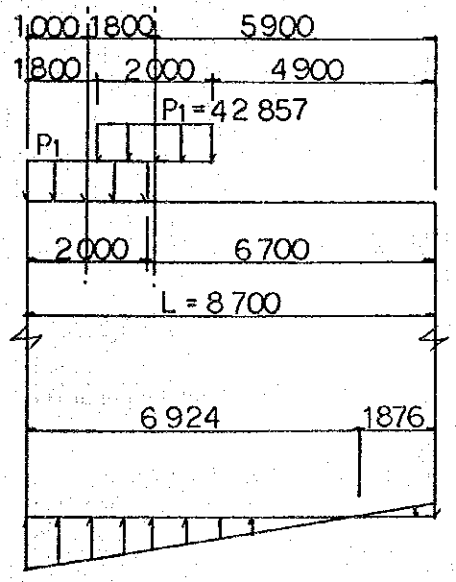
B = 0.30+1.00+0.70 = 2.000 m

$P1 = \frac{10}{2.00} \times \frac{30}{3.50}$ = 42.857 KN/m

For bottom slab

$P2 = \frac{2\times42.857\times2.00}{8.70}$ = 19.704 KN/m

b) Vertical load of partial ------- (case-4)



For bottom slab

$P2 = \frac{2\times42.857\times2.00}{8.70} + \frac{6\times42.857\times2.00(3.35+1.55)}{8.70^2}$

= 19.704 ± 33.294 = P2-1 = +52.998 KN/m, P2-2 = -13.590 KN/m

C) Horizontal load of live load surcharge ------- (case-5)

Pe = 34.300 × 0.500 = 17.150 KN/m

BOX FOR ROAD NO 2' Depth= 1.000 For Check

No	X (m)	Y (m)
1	0.0000	0.0000
2	0.0000	6.3500
3	8.7000	6.3500
4	8.7000	0.0000

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

BOX FOR ROAD NO 2

No	I	J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1 -	2	0.70000	0.028580	Fix - Fix	6.350	2.50E+07	1.00E-05
2	2 -	3	0.70000	0.028580	Fix - Fix	8.700	2.50E+07	1.00E-05
3	3 -	4	0.70000	0.028580	Fix - Fix	6.350	2.50E+07	1.00E-05
4	4 -	1	0.80000	0.042670	Fix - Fix	8.700	2.50E+07	1.00E-05

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

BOX FOR ROAD NO 2

No		L-No 1 11	L-No 2 12	L-No 3 13	L-No 4 14	L-No 5 15	L-No 6 16	L-No 7 17	L-No 8 18	L-No 9 19	L-No 10 20
1	5	0.400	1.660	3.200	4.740	6.000					
2	7	0.350	1.610	2.980	4.350	5.720	7.090	8.350			
3	5	0.350	1.610	3.150	4.690	5.950					
4	7	0.350	1.810	3.080	4.350	5.620	6.890	8.350			

: Dead load
No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-Y	0.000	6.350	-16.520	-16.520
3	3-	4	-Y	0.000	6.350	-16.520	-16.520
2	2-	3	-Y	0.000	8.700	-37.620	-37.620
4	4-	1	-Y	0.000	8.700	61.735	61.735

ΣV = -0.003 (t)
ΣH = 0.000 (t)

: Earth pressure
No. : 2

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.000	6.350	76.210	13.980
3	3-	4	-X	0.000	6.350	-13.980	-76.210

ΣV = 0.000 (t)
ΣH = 0.000 (t)

: HB live load-VL-
No. : 3

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	2.450	2.000	-42.857	-42.857
2	2-	3	-Y	4.250	2.000	-42.857	-42.857
4	4-	1	-Y	0.000	8.700	19.704	19.704

BOX FOR ROAD NO 2'

: HB live load-VL-
No. : 4

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	0.000	2.000	-42.857	-42.857
2	2-	3	-Y	1.800	2.000	-42.857	-42.857
4	4-	1	-Y	0.000	1.776	-13.590	0.000
4	4-	1	-Y	1.776	6.924	0.000	52.998

ΣV = -0.017 (t)
ΣH = 0.000 (t)

BOX FOR ROAD NO 2

: HB live load-HL-
No. : 5

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.000	6.350	17.150	17.150
3	3-	4	-X	0.000	6.350	-17.150	-17.150

ΣV = 0.000 (t)
ΣH = 0.000 (t)

BOX FOR ROAD NO 2'

No	C-No 1 No 6	C-No 2 No 7	C-No 3 No 8
No 1	1.3800	1.3800	1.3800
No 2	1.6500	1.6500	1.6500
No 3	1.4300	0.0000	0.0000
No 4	0.0000	1.4300	0.0000
No 5	0.0000	0.0000	1.6500

BOX FOR ROAD NO 2'

No 1 : 6 7 8

BOX FOR ROAD NO 2'

No.	Case. 1 RX (t)	RY (t)	RM (tm)	Case. 2 RX (t)	RY (t)	RM (tm)	Case. 3 RX (t)	RY (t)	RM (tm)
1.	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.002	0.000
4.	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.002	0.000

No.	Case. 4 RX (t)	RY (t)	RM (tm)	Case. 5 RX (t)	RY (t)	RM (tm)	Case. 6 RX (t)	RY (t)	RM (tm)
1.	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.005	0.000
4.	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.005	0.000

No.	Case. 7 RX (t)	RY (t)	RM (tm)	Case. 8 RX (t)	RY (t)	RM (tm)
1.	0.000	0.012	0.000	0.000	0.002	0.000
4.	0.000	0.017	0.000	0.000	0.002	0.000

BOX FOR ROAD NO 2'

No.	Case. 1 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 2 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 3 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	7.77762	0.00000	0.00000	-3.57985	0.00000	0.00000	3.0699
2.	-0.05245	-0.78413	-6.70253	-0.13171	0.00000	3.46033	0.04458	-0.31102	-3.9836
3.	0.00350	-0.78413	6.70253	-0.65556	0.00000	-3.46033	-0.00297	-0.31102	3.9836
4.	-0.04896	0.00000	-7.77762	-0.78727	0.00000	3.57985	0.04160	0.00000	-3.0699

No.	Case. 4 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 5 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 6 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	3.11440	0.00000	0.00000	-1.28591	0.00000	0.00000	9.2164
2.	1.17591	-0.49704	-3.64846	0.01074	0.00000	1.40724	-0.22596	-1.52685	-9.2365
3.	1.16726	-0.12500	2.12462	-0.25337	0.00000	-1.40724	-1.08110	-1.52685	9.2365
4.	0.00757	0.00000	-2.32617	-0.24263	0.00000	1.28591	-1.30706	0.00000	-9.2164

No.	Case. 7 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 8 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	9.27995	0.00000	0.00000	2.70462
2.	1.39185	-1.79286	-8.75725	-0.27199	-1.08210	-1.21799
3.	0.59234	-1.26084	6.57815	-1.49491	-1.08210	1.21799
4.	-1.35373	0.00000	-8.15279	-1.76689	0.00000	-2.70462

No	L(m)	Case 1 Dead load M (tm)	S (t)	N (t)	Case 2 Earth pressure M (tm)	S (t)	N (t)	Case 3 HB live load-VL- M (tm)	S (t)	N (t)
1- 2	0.000	-198.663	11.254	-268.549	-87.789	180.981	0.000	-48.999	-9.564	-85.714
* 1	0.400	-194.161	11.254	-261.941	-21.388	151.281	0.000	-52.825	-9.564	-85.714
* 2	1.660	-179.981	11.254	-241.126	115.109	67.975	0.000	-64.876	-9.564	-85.714
* 3	3.200	-162.649	11.254	-215.685	154.676	-12.715	0.000	-79.605	-9.564	-85.714
* 4	4.740	-145.317	11.254	-190.244	87.877	-70.163	0.000	-94.334	-9.564	-85.714
* 5	6.000	-131.136	11.254	-169.429	-20.883	-99.879	0.000	-106.385	-9.564	-85.714
2- 1	6.350	-127.197	11.254	-163.647	-56.837	-105.372	0.000	-109.732	-9.564	-85.714
2- 3	0.000	-127.197	163.647	11.254	-56.837	0.000	-105.372	-109.732	85.714	-9.564
* 1	0.350	-72.225	150.480	11.254	-56.837	0.000	-105.372	-79.732	85.714	-9.564
* 2	1.610	87.517	103.079	11.254	-56.837	0.000	-105.372	28.267	85.714	-9.564
* 3	2.980	193.431	51.539	11.254	-56.837	0.000	-105.372	139.676	63.000	-9.564
* 4	4.350	228.735	0.000	11.254	-56.837	0.000	-105.372	185.552	0.000	-9.564
* 5	5.720	193.431	-51.539	11.254	-56.837	0.000	-105.372	139.676	-63.000	-9.564
* 6	7.090	87.517	-103.079	11.254	-56.837	0.000	-105.372	28.267	-85.714	-9.564
* 7	8.350	-72.225	-150.480	11.254	-56.837	0.000	-105.372	-79.732	-85.714	-9.564
3- 2	8.700	-127.197	-163.647	11.254	-56.837	0.000	-105.372	-109.732	-85.714	-9.564
3- 4	0.000	-127.197	-11.254	-163.647	-56.837	105.372	0.000	-109.732	9.564	-85.714
* 1	0.350	-131.136	-11.254	-169.429	-20.883	99.879	0.000	-106.385	9.564	-85.714
* 2	1.610	-145.317	-11.254	-190.244	87.877	70.163	0.000	-94.334	9.564	-85.714
* 3	3.150	-162.649	-11.254	-215.685	154.676	12.715	0.000	-79.605	9.564	-85.714
* 4	4.690	-179.981	-11.254	-241.126	115.109	-67.975	0.000	-64.876	9.564	-85.714
* 5	5.950	-194.161	-11.254	-261.941	-21.388	-151.281	0.000	-52.825	9.564	-85.714
4- 3	6.350	-198.663	-11.254	-268.549	-87.789	-180.981	0.000	-48.999	9.564	-85.714
4- 1	0.000	-198.663	268.547	-11.254	-87.789	0.000	-180.981	-48.999	85.712	9.564
* 1	0.350	-108.453	246.940	-11.254	-87.789	0.000	-180.981	-20.207	78.816	9.564
* 2	1.810	186.282	156.807	-11.254	-87.789	0.000	-180.981	73.864	50.048	9.564
* 3	3.080	335.641	78.403	-11.254	-87.789	0.000	-180.981	121.535	25.024	9.564
* 4	4.350	385.427	0.000	-11.254	-87.789	0.000	-180.981	137.425	0.000	9.564
* 5	5.620	335.641	-78.403	-11.254	-87.789	0.000	-180.981	121.535	-25.024	9.564
* 6	6.890	186.282	-156.807	-11.254	-87.789	0.000	-180.981	73.864	-50.048	9.564
* 7	8.350	-108.453	-246.940	-11.254	-87.789	0.000	-180.981	-20.207	-78.816	9.564
1- 4	8.700	-198.663	-268.547	-11.254	-87.789	0.000	-180.981	-48.999	-85.712	9.564

No	L(m)	Case 4 HB live load-VL- M (tm)	S (t)	N (t)	Case 5 HB live load-HL- M (tm)	S (t)	N (t)	Case 6 M (tm)	S (t)	N (t)
1- 2	0.000	-70.570	-1.740	-136.980	-31.534	55.777	0.000	-489.075	300.473	-493.169
* 1	0.400	-71.266	-1.740	-136.980	-10.595	48.917	0.000	-378.773	251.468	-484.050
* 2	1.660	-73.459	-1.740	-136.980	37.427	27.308	0.000	-151.216	114.013	-455.325
* 3	3.200	-76.139	-1.740	-136.980	59.145	0.897	0.000	-83.074	-19.126	-420.216
* 4	4.740	-78.819	-1.740	-136.980	40.190	-25.514	0.000	-190.437	-113.915	-385.108
* 5	6.000	-81.012	-1.740	-136.980	-5.571	-47.123	0.000	-367.555	-162.946	-356.383
2- 1	6.350	-81.621	-1.740	-136.980	-23.114	-53.125	0.000	-426.230	-172.010	-348.404
2- 3	0.000	-81.621	136.980	-1.740	-23.114	0.000	-53.125	-426.230	348.404	-172.010
* 1	0.350	-36.303	121.980	-1.740	-23.114	0.000	-53.125	-307.469	330.233	-172.010
* 2	1.610	83.372	67.980	-1.740	-23.114	0.000	-53.125	67.415	264.820	-172.010
* 3	2.980	127.028	0.695	-1.740	-23.114	0.000	-53.125	372.890	161.214	-172.010
* 4	4.350	94.243	-34.448	-1.740	-23.114	0.000	-53.125	487.213	0.000	-172.010
* 5	5.720	47.049	-34.448	-1.740	-23.114	0.000	-53.125	372.890	-161.214	-172.010
* 6	7.090	-0.145	-34.448	-1.740	-23.114	0.000	-53.125	67.415	-264.820	-172.010
* 7	8.350	-43.549	-34.448	-1.740	-23.114	0.000	-53.125	-307.469	-330.233	-172.010
3- 2	8.700	-55.606	-34.448	-1.740	-23.114	0.000	-53.125	-426.230	-348.404	-172.010
3- 4	0.000	-55.606	1.740	-34.448	-23.114	53.125	0.000	-426.230	172.010	-348.404
* 1	0.350	-54.997	1.740	-34.448	-5.571	47.123	0.000	-367.555	162.946	-356.383
* 2	1.610	-52.804	1.740	-34.448	40.190	25.514	0.000	-190.437	113.915	-385.108
* 3	3.150	-50.124	1.740	-34.448	59.145	-0.897	0.000	-83.074	19.126	-420.216
* 4	4.690	-47.443	1.740	-34.448	37.427	-27.308	0.000	-151.216	-114.013	-455.325
* 5	5.950	-45.250	1.740	-34.448	-10.595	-48.917	0.000	-378.773	-251.468	-484.050
4- 3	6.350	-44.554	1.740	-34.448	-31.534	-55.777	0.000	-489.075	-300.473	-493.169
4- 1	0.000	-44.554	34.438	1.740	-31.534	0.000	-55.777	-489.075	493.164	-300.473
* 1	0.350	-31.723	38.725	1.740	-31.534	0.000	-55.777	-323.411	453.484	-300.473
* 2	1.810	32.477	46.501	1.740	-31.534	0.000	-55.777	217.844	287.962	-300.473
* 3	3.080	88.710	39.998	1.740	-31.534	0.000	-55.777	492.129	143.981	-300.473
* 4	4.350	128.845	21.149	1.740	-31.534	0.000	-55.777	583.557	0.000	-300.473
* 5	5.620	137.202	-10.045	1.740	-31.534	0.000	-55.777	492.129	-143.981	-300.473
* 6	6.890	98.104	-53.585	1.740	-31.534	0.000	-55.777	217.844	-287.962	-300.473
* 7	8.350	-25.820	-118.893	1.740	-31.534	0.000	-55.777	-323.411	-453.484	-300.473
1- 4	8.700	-70.570	-136.973	1.740	-31.534	0.000	-55.777	-489.075	-493.164	-300.473

BOX FOR ROAD NO 2'

No	L(m)	Case 7 M (tm)	Case 7 S (t)	Case 7 N (t)	Case 8 M (tm)	Case 8 S (t)	Case 8 N (t)
1- 2	0.000	-519.921	311.661	-566.479	-471.038	406.182	-370.598
* 1	0.400	-405.144	262.656	-557.360	-320.716	345.858	-361.479
* 2	1.660	-163.489	125.201	-528.635	3.310	172.748	-332.754
* 3	3.200	-78.118	-7.937	-493.527	128.350	-3.968	-297.645
* 4	4.740	-168.251	-102.727	-458.418	10.774	-142.336	-262.537
* 5	6.000	-331.272	-151.758	-429.693	-224.617	-227.022	-233.812
2- 1	6.350	-386.032	-160.822	-421.714	-307.452	-245.990	-225.833
2- 3	0.000	-386.032	421.714	-160.822	-307.452	225.833	-245.990
* 1	0.350	-245.365	382.094	-160.822	-231.590	207.662	-245.990
* 2	1.610	146.214	239.460	-160.822	-11.146	142.249	-245.990
* 3	2.980	354.804	72.118	-160.822	135.015	71.124	-245.990
* 4	4.350	356.641	-49.261	-160.822	183.735	0.000	-245.990
* 5	5.720	240.434	-120.385	-160.822	135.015	-71.124	-245.990
* 6	7.090	26.786	-191.509	-160.822	-11.146	-142.249	-245.990
* 7	8.350	-255.727	-256.923	-160.822	-231.590	-207.662	-245.990
3- 2	8.700	-348.830	-275.094	-160.822	-307.452	-225.833	-245.990
3- 4	0.000	-348.830	160.822	-275.094	-307.452	245.990	-225.833
* 1	0.350	-294.070	151.758	-283.073	-224.617	227.022	-233.812
* 2	1.610	-131.049	102.727	-311.798	10.774	142.336	-262.537
* 3	3.150	-40.916	7.937	-346.906	128.350	3.968	-297.645
* 4	4.690	-126.287	-125.201	-382.014	3.310	-172.748	-332.754
* 5	5.950	-367.942	-262.656	-410.739	-320.716	-345.858	-361.479
4- 3	6.350	-482.719	-311.661	-419.858	-471.038	-406.182	-370.598
4- 1	0.000	-482.719	419.841	-311.661	-471.038	370.595	-406.182
* 1	0.350	-339.880	396.155	-311.661	-346.548	340.777	-406.182
* 2	1.810	158.660	282.890	-311.661	60.187	216.394	-406.182
* 3	3.080	445.189	165.394	-311.661	266.302	108.197	-406.182
* 4	4.350	571.287	30.243	-311.661	335.007	0.000	-406.182
* 5	5.620	514.533	-122.562	-311.661	266.302	-108.197	-406.182
* 6	6.890	252.507	-293.020	-311.661	60.187	-216.394	-406.182
* 7	8.350	-331.439	-510.794	-311.661	-346.548	-340.777	-406.182
1- 4	8.700	-519.921	-566.467	-311.661	-471.038	-370.595	-406.182

PICK-UP No. 1 *

No.	L (m)	M. MAXIMUM Case	M (tm)	S (t)	N (t)	M. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-471.038	406.182	-370.598	C- 7	-519.921	311.661	-566.479
* 1	0.400	C- 8	-320.716	345.858	-361.479	C- 7	-405.144	262.636	-557.360
* 2	1.660	C- 8	3.310	172.748	-332.754	C- 7	-163.489	125.201	-528.635
* 3	3.200	C- 8	128.350	-3.968	-297.645	C- 6	-83.074	-19.126	-420.216
* 4	4.740	C- 8	10.774	-142.336	-262.537	C- 6	-190.437	-113.915	-385.108
* 5	6.000	C- 8	-224.617	-227.022	-233.812	C- 6	-367.555	-162.946	-356.383
2 - 1	6.350	C- 8	-307.452	-245.990	-225.833	C- 6	-426.230	-172.010	-348.404
2 - 3	0.000	C- 8	-307.452	225.833	-245.990	C- 6	-426.230	348.404	-172.010
* 1	0.350	C- 8	-231.590	207.662	-245.990	C- 6	-307.469	330.233	-172.010
* 2	1.610	C- 7	146.214	239.460	-160.822	C- 8	-11.146	142.249	-245.990
* 3	2.980	C- 6	372.890	161.214	-172.010	C- 8	135.015	71.124	-245.990
* 4	4.350	C- 6	487.213	0.000	-172.010	C- 8	183.735	0.000	-245.990
* 5	5.720	C- 6	372.890	-161.214	-172.010	C- 8	135.015	-71.124	-245.990
* 6	7.090	C- 6	67.415	-264.820	-172.010	C- 8	-11.146	-142.249	-245.990
* 7	8.350	C- 8	-231.590	-207.662	-245.990	C- 6	-307.469	-330.233	-172.010
3 - 2	8.700	C- 8	-307.452	-225.833	-245.990	C- 6	-426.230	-348.404	-172.010
3 - 4	0.000	C- 8	-307.452	245.990	-225.833	C- 6	-426.230	172.010	-348.404
* 1	0.350	C- 8	-224.617	227.022	-233.812	C- 6	-367.555	162.946	-356.383
* 2	1.610	C- 8	10.774	142.336	-262.537	C- 6	-190.437	113.915	-385.108
* 3	3.150	C- 8	128.350	3.968	-297.645	C- 6	-83.074	19.126	-420.216
* 4	4.690	C- 8	3.310	-172.748	-332.754	C- 6	-151.216	-114.013	-455.325
* 5	5.950	C- 8	-320.716	-345.858	-361.479	C- 6	-378.773	-251.468	-484.050
4 - 3	6.350	C- 8	-471.038	-406.182	-370.598	C- 6	-489.075	-300.473	-493.169
4 - 1	0.000	C- 8	-471.038	370.595	-406.182	C- 6	-489.075	493.164	-300.473
* 1	0.350	C- 6	-323.411	453.484	-300.473	C- 8	-346.548	340.777	-406.182
* 2	1.810	C- 6	217.844	287.962	-300.473	C- 8	60.187	216.394	-406.182
* 3	3.080	C- 6	492.129	143.981	-300.473	C- 8	266.302	108.197	-406.182
* 4	4.350	C- 6	583.557	0.000	-300.473	C- 8	335.007	0.000	-406.182
* 5	5.620	C- 7	514.533	-122.562	-311.661	C- 8	266.302	-108.197	-406.182
* 6	6.890	C- 7	252.507	-293.020	-311.661	C- 8	60.187	-216.394	-406.182
* 7	8.350	C- 6	-323.411	-453.484	-300.473	C- 8	-346.548	-340.777	-406.182
1 - 4	8.700	C- 8	-471.038	-370.595	-406.182	C- 7	-519.921	-566.467	-311.661

BOX FOR ROAD NO 2

PICK-UP No. 1 *

No.	L (m)	S. MAXIMUM Case	M (tm)	S (t)	N (t)	S. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-471.038	406.182	-370.598	C- 6	-489.075	300.473	-493.169
* 1	0.400	C- 8	-320.716	345.858	-361.479	C- 6	-378.773	251.468	-484.050
* 2	1.660	C- 8	3.310	172.748	-332.754	C- 6	-151.216	114.013	-455.325
* 3	3.200	C- 8	128.350	-3.968	-297.645	C- 6	-83.074	-19.126	-420.216
* 4	4.740	C- 7	-168.251	-102.727	-458.418	C- 8	10.774	-142.336	-262.537
* 5	6.000	C- 7	-331.272	-151.758	-429.693	C- 8	-224.617	-227.022	-233.812
2 - 1	6.350	C- 7	-386.032	-160.822	-421.714	C- 8	-307.452	-245.990	-225.833
2 - 3	0.000	C- 7	-386.032	421.714	-160.822	C- 8	-307.452	225.833	-245.990
* 1	0.350	C- 7	-245.365	382.094	-160.822	C- 8	-231.590	207.662	-245.990
* 2	1.610	C- 6	67.415	264.820	-172.010	C- 8	-11.146	142.249	-245.990
* 3	2.980	C- 6	372.890	161.214	-172.010	C- 8	135.015	71.124	-245.990
* 4	4.350	C- 6	487.213	0.000	-172.010	C- 7	356.641	-49.261	-160.822
* 5	5.720	C- 8	135.015	-71.124	-245.990	C- 6	372.890	-161.214	-172.010
* 6	7.090	C- 8	-11.146	-142.249	-245.990	C- 6	67.415	-264.820	-172.010
* 7	8.350	C- 8	-231.590	-207.662	-245.990	C- 6	-307.469	-330.233	-172.010
3 - 2	8.700	C- 8	-307.452	-225.833	-245.990	C- 6	-426.230	-348.404	-172.010
3 - 4	0.000	C- 8	-307.452	245.990	-225.833	C- 7	-348.830	160.822	-275.094
* 1	0.350	C- 8	-224.617	227.022	-233.812	C- 7	-294.070	151.758	-283.073
* 2	1.610	C- 8	10.774	142.336	-262.537	C- 7	-131.049	102.727	-311.798
* 3	3.150	C- 6	-83.074	19.126	-420.216	C- 8	128.350	3.968	-297.645
* 4	4.690	C- 6	-151.216	-114.013	-455.325	C- 8	3.310	-172.748	-332.754
* 5	5.950	C- 6	-378.773	-251.468	-484.050	C- 8	-320.716	-345.858	-361.479
4 - 3	6.350	C- 6	-489.075	-300.473	-493.169	C- 8	-471.038	-406.182	-370.598
4 - 1	0.000	C- 6	-489.075	493.164	-300.473	C- 8	-471.038	370.595	-406.182
* 1	0.350	C- 6	-323.411	453.484	-300.473	C- 8	-346.548	340.777	-406.182
* 2	1.810	C- 6	217.844	287.962	-300.473	C- 8	60.187	216.394	-406.182
* 3	3.080	C- 7	445.189	165.394	-311.661	C- 8	266.302	108.197	-406.182
* 4	4.350	C- 7	571.287	30.243	-311.661	C- 8	335.007	0.000	-406.182
* 5	5.620	C- 8	266.302	-108.197	-406.182	C- 6	492.129	-143.981	-300.473
* 6	6.890	C- 8	60.187	-216.394	-406.182	C- 7	252.507	-293.020	-311.661
* 7	8.350	C- 8	-346.548	-340.777	-406.182	C- 7	-331.439	-510.794	-311.661
1 - 4	8.700	C- 8	-471.038	-370.595	-406.182	C- 7	-519.921	-566.467	-311.661

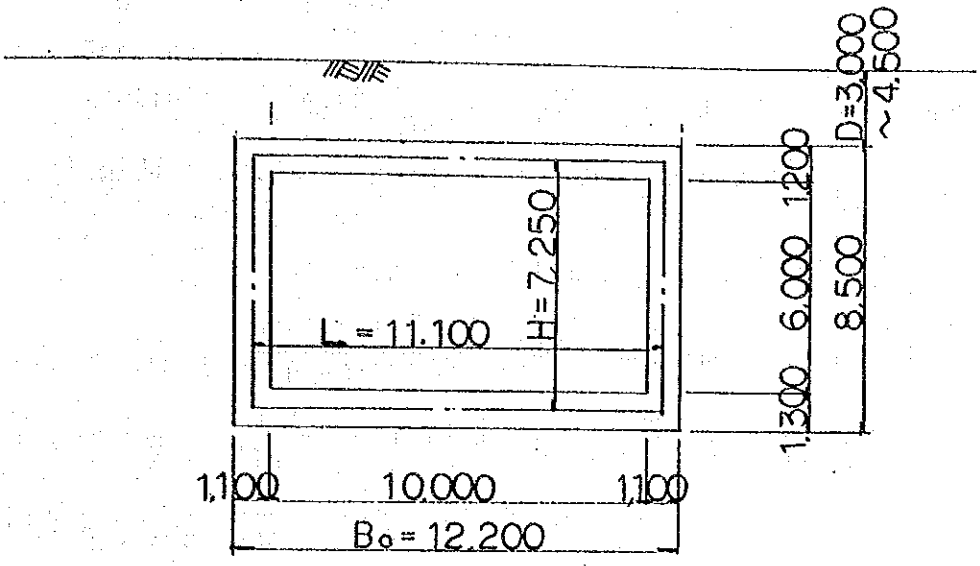
BOX FOR ROAD NO 2

PICK-UP No. 1 *

No.	L (m)	N. MAXIMUM Case	M (tm)	S (t)	N (t)	N. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-471.038	406.182	-370.598	C- 7	-519.921	311.661	-566.479
* 1	0.400	C- 8	-320.716	345.858	-361.479	C- 7	-405.144	262.656	-557.360
* 2	1.660	C- 8	3.310	172.748	-332.754	C- 7	-163.489	125.201	-528.635
* 3	3.200	C- 8	128.350	-3.968	-297.645	C- 7	-78.118	-7.937	-493.527
* 4	4.740	C- 8	10.774	-142.336	-262.537	C- 7	-168.251	-102.727	-458.418
* 5	6.000	C- 8	-224.617	-227.022	-233.812	C- 7	-331.272	-151.758	-429.693
2 - 1	6.350	C- 8	-307.452	-245.990	-225.833	C- 7	-386.032	-160.822	-421.714
2 - 3	0.000	C- 7	-386.032	421.714	-160.822	C- 8	-307.452	225.833	-245.990
* 1	0.350	C- 7	-245.365	382.094	-160.822	C- 8	-231.590	207.662	-245.990
* 2	1.610	C- 7	146.214	239.460	-160.822	C- 8	-11.146	142.249	-245.990
* 3	2.980	C- 7	354.804	72.118	-160.822	C- 8	135.015	71.124	-245.990
* 4	4.350	C- 7	356.641	-49.261	-160.822	C- 8	183.735	0.000	-245.990
* 5	5.720	C- 7	240.434	-120.385	-160.822	C- 8	135.015	-71.124	-245.990
* 6	7.090	C- 7	26.786	-191.509	-160.822	C- 8	-11.146	-142.249	-245.990
* 7	8.350	C- 7	-255.727	-256.923	-160.822	C- 8	-231.590	-207.662	-245.990
3 - 2	8.700	C- 7	-348.830	-275.094	-160.822	C- 8	-307.452	-225.833	-245.990
3 - 4	0.000	C- 8	-307.452	245.990	-225.833	C- 6	-426.230	172.010	-348.404
* 1	0.350	C- 8	-224.617	227.022	-233.812	C- 6	-367.555	162.946	-356.383
* 2	1.610	C- 8	10.774	142.336	-262.537	C- 6	-190.437	113.915	-385.108
* 3	3.150	C- 8	128.350	3.968	-297.645	C- 6	-83.074	19.126	-420.216
* 4	4.690	C- 8	3.310	-172.748	-332.754	C- 6	-151.216	-114.013	-455.325
* 5	5.950	C- 8	-320.716	-345.858	-361.479	C- 6	-378.773	-251.468	-484.050
4 - 3	6.350	C- 8	-471.038	-406.182	-370.598	C- 6	-489.075	-300.473	-493.169
4 - 1	0.000	C- 6	-489.075	493.164	-300.473	C- 8	-471.038	370.595	-406.182
* 1	0.350	C- 6	-323.411	453.484	-300.473	C- 8	-346.548	340.777	-406.182
* 2	1.810	C- 6	217.844	287.962	-300.473	C- 8	60.187	216.394	-406.182
* 3	3.080	C- 6	492.129	143.981	-300.473	C- 8	266.302	108.197	-406.182
* 4	4.350	C- 6	583.557	0.000	-300.473	C- 8	335.007	0.000	-406.182
* 5	5.620	C- 6	492.129	-143.981	-300.473	C- 8	266.302	-108.197	-406.182
* 6	6.890	C- 6	217.844	-287.962	-300.473	C- 8	60.187	-216.394	-406.182
* 7	8.350	C- 6	-323.411	-453.484	-300.473	C- 8	-346.548	-340.777	-406.182
1 - 4	8.700	C- 6	-489.075	-493.164	-300.473	C- 8	-471.038	-370.595	-406.182

NO ③ BOX CULVERT FOR RORD

1) Shape and Size



Where

D^m = depth of asphalt and similar surface soil.

2) Factor of section

$A = 1.00 \times 1.10 = 1.1000\,m^2$

$I = \frac{1.00 \times 1.10^3}{12} = 0.11092\,m^4$

$A = 1.00 \times 1.20 = 1.2000\,m^2$

$I = \frac{1.00 \times 1.20^3}{12} = 0.14400\,m^4$

$A = 1.00 \times 1.30 = 1.3000\,m^2$

$I = \frac{1.00 \times 1.30^3}{12} = 0.18308\,m^4$

$Ec = 25\ KN/mm^2 = 2.5 \times 10^7\ KN/m^2$

No.③ BOX CULVERT FOR ROAD

1. calculation for bending moment (U.L.S)

1) For upper slab

section b=100^{cm} h=120 d=114.0 d´=6.0

a) middle point ②~③ Mu.max=1628.0^{KNm}

$$A_s = \begin{cases} Y_{32}-250^{ctc} = 8.042/0.25 \\ Y_{25}-250^{ctc} = 4.909/0.25 \end{cases} = 51.80\ cm^2$$

$$X = \frac{0.87\times 41000 \times 51.80}{0.40\times 2500\times 100} = 18.6^{cm}$$

$$Z = 114.0-\frac{18.6}{2} = 104.7^{cm} < 0.95\times 114.0 = 108.3^{cm}$$

M_{RS} =0.87×41000 ×51.80 ×104.7 ×10^{-5}=1934.5^{KNm} >Mu=1628.0^{KNm}

M_{RC} =0.40×2500×100 ×18.6×104.7 ×10^{-5}=1947.4^{KNm} >Mu=1628.0^{KNm} OK

b) intersection point ②=③ Mu.min=1296.3^{KNm}

$$A_s = Y_{25}-125^{ctc} = 4.909/0.125 = 39.27\ cm^2$$

$$X = \frac{0.87\times 41000 \times 39.27}{0.40\times 2500\times 100} = 14.00^{cm}$$

$$Z = 114.0-\frac{14.00}{2} = 107.0^{cm} < 0.95\times 114.0 = 108.3^{cm}$$ OK

M_{RS} =0.87×41000 ×39.27 ×107.0 ×10^{-5}=1498.8^{KNm} >Mu=1296.3^{KNm}

M_{RC} =0.40×2500×100 ×14.0×107.0 ×10^{-5}=1498.0^{KNm} >Mu=1296.3^{KNm} OK

2) For bottom slab

section b =100^{cm} h =130 d =123.0(124.0) d´=7.0(6.0)

a) middle point ④~① Mu.max =2055.8^{KNm}

$$A_s = \begin{cases} Y_{32}-250^{ctc} = 8.042/0.25 \\ Y_{25}-250^{ctc} = 4.909/0.25 \end{cases} = 51.80\ cm^2$$

$$X = \frac{0.87\times 41000 \times 51.80}{0.40\times 2500\times 100} = 18.6^{cm}$$

$$Z = 124.0-\frac{18.6}{2} = 114.7^{cm} < 0.95\times 124.0 = 117.8^{cm}$$ OK

M_{RS} =0.87×41000 ×51.80 ×114.7 ×10^{-5}=2119.3^{KNm} >Mu=2055.8^{KNm}

M_{RC} =0.40×2500×100 ×18.6×114.7 ×10^{-5}=2133.4^{KNm} >Mu=2055.8^{KNm} OK

b) intersection point ④=① Mu.min=−1515.9^{KNm}

$A_s = Y_{25}-125^{ctc} = 4.909/0.125 = 39.27\ cm^2$

$$X = \frac{0.87\times 41000\times 39.27}{0.40\times 2500\times 100} = 14.0\ ^{cm}$$

$$Z = 123.0-\frac{14.0}{2} = 116.0^{cm} < 0.95\times 123.0 = 116.8^{cm}$$

$M_{RS} = 0.87\times 41000\times 39.27\times 116.0\times 10^{-5} = 1624.9^{KNm} > Mu = 1515.9^{KNm}$

$M_{RC} = 0.40\times 2500\times 100\times 14.0\times 116.0\times 10^{-5} = 1624.0^{KNm} > Mu = 1515.9^{KNm}$ OK

Notice: this bar is decide for shearing forces without bending moments.

2. calculation for shearing force (U.L.S)

a) For upper slab

section b =100^{cm} h =120 d =114.0 d ′ =6.0

intersection point ②=③ Su.max = 530.8^{KN}

$A_s = Y_{32}-125^{ctc} = 8.042/0.125 = 64.33\ cm^2$

$$P = \frac{64.33}{100\times 114.0}\times 100 = 0.564\ \%$$

$$Vc = \frac{530.8\times 10^3}{100\times 114.0} = 46.6\ N/cm^2$$

$$< Vca = 50.0 + 15.0\ \frac{(0.564-0.50)}{0.50} = 51.9\ N/cm^2$$

b) For bottom slab

section b =100^{cm} h =130 d =123.0 d ′ =7.0

intersection point ④=① Su.max =589.9^{KN}

$A_s = Y_{32}-125^{ctc} = 8.042/0.125 = 64.33\ cm^2$

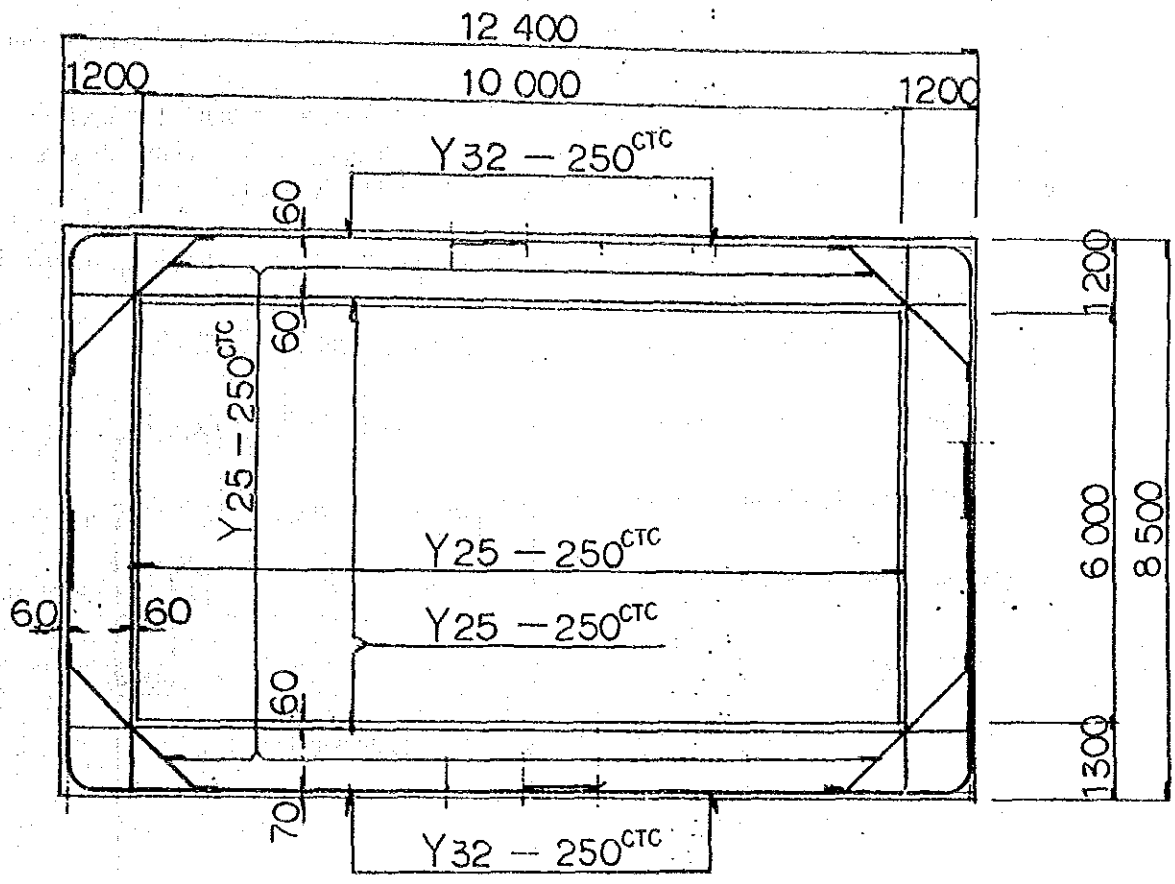
$$P = \frac{64.33}{100\times 123.0}\times 100 = 0.523\ \%$$

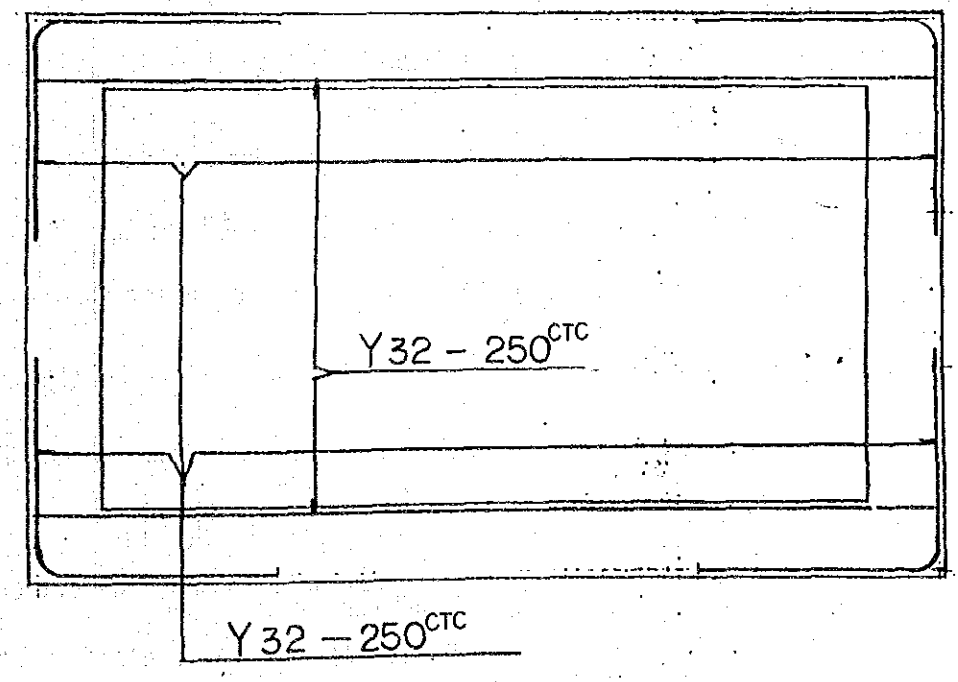
$$Vc = \frac{589.9\times 10^3}{100\times 123.0} = 48.0\ N/cm^2$$

$$< Vca = 50.0 + 15.0\ \frac{(0.523-0.500)}{0.500} = 50.6\ N/cm^2$$ OK

Notice: this bar is decide for shearing force about point ②, ③ and ④, ①, and the Bararrangement of this box culvert is arrange only at space 125mm

NO③BOX CULVERT FOR ROAD





NO③ BOX CULVERT FOR ROAD

D= 4.500 m

(1)Dead load

a) vertical load ----- (case-1)

For upper slab w1 = 22.6×0.50+19.6×4.00+23.6×1.20 = 118.020 kN/m

For side wall w2 = 23.6×1.10 = 25.960 〃

For bottom slab $W3 = 118.020 + \frac{2\times 25.960\times 7.25}{11.10}$ = 151.932 〃

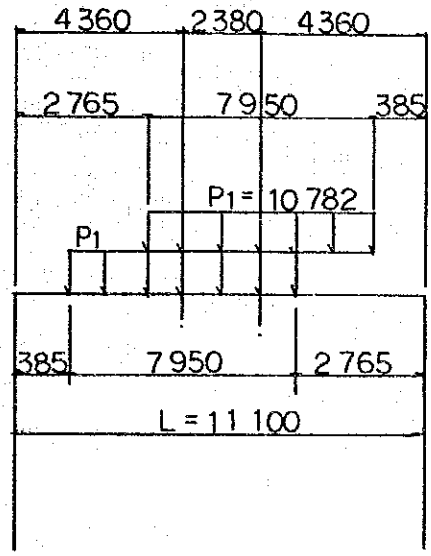
b) Horizontal load --- earth pressure ----- (case-2)

For side wall P1 = (22.6×0.50+19.60×4.60)×0.500 = 50.730 kN/m

P2 = (22.6×0.50+19.60×11.85)×0.500 = 121.780 〃

(2)Live load

a) Vertical load ------- (case-3)



Skew angle θ =49°

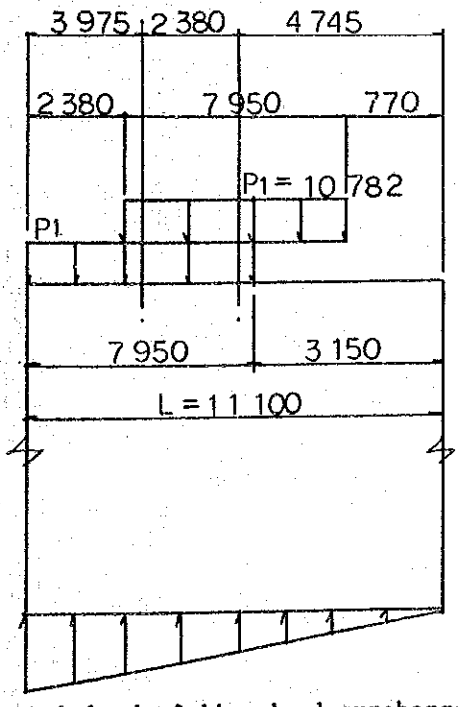
B =(0.30+4.50+1.20)cosec49° ≒ 7.950 m

$P1 = \frac{10}{7.95}\times\frac{30}{3.50}$ = 10.782 KN/m

For bottom slab

$P2 = \frac{2\times 10.782\times 7.950}{11.10}$ = 15.444 KN/m

b) Vertical load of partial ------- (case-4)



For bottom slab

$P2 = \frac{2\times 10.782\times 7.95}{11.10} + \frac{6\times 10.782\times 7.95(1.575-0.805)}{11.10^2}$

= 15.444 ± 3.214 = P2-1 = 18.658 KN/m, P2-2 = 12.230 KN/m

C) Horizontal load of live load surcharge ------- (case-5)

Pe = 34.300 × 0.500 = 17.150 KN/m

BOX FOR ROAD NO 3 Depth = 4.500

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

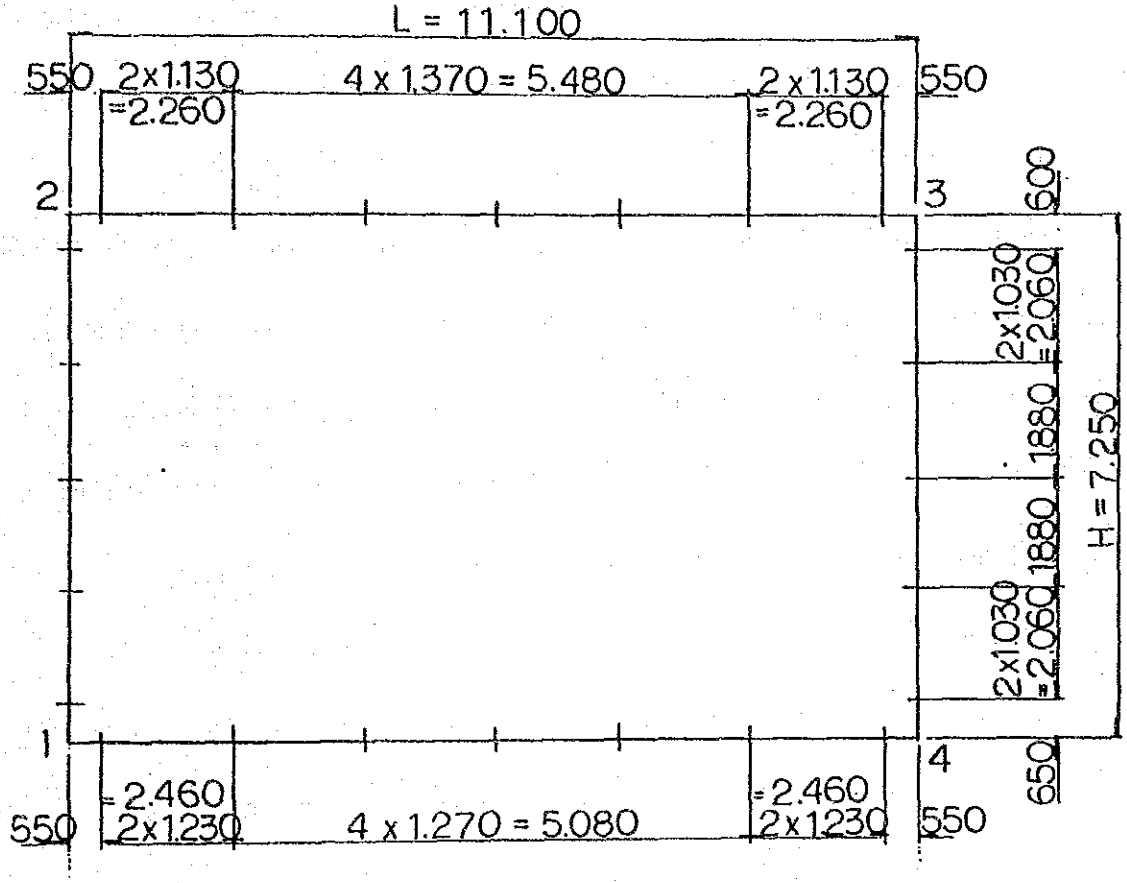
No	X (m)	Y (m)
1	0.0000	0.0000
2	0.0000	7.2500
3	11.1000	7.2500
4	11.1000	0.0000

No	I - J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1 - 2	1.10000	0.110920	Fix - Fix	7.250	2.50E+07	1.00E-05
2	2 - 3	1.20000	0.144000	Fix - Fix	11.100	2.50E+07	1.00E-05
3	3 - 4	1.10000	0.110920	Fix - Fix	7.250	2.50E+07	1.00E-05
4	4 - 1	1.30000	0.183080	Fix - Fix	11.100	2.50E+07	1.00E-05

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

No		L-No 1 / 11	L-No 2 / 12	L-No 3 / 13	L-No 4 / 14	L-No 5 / 15	L-No 6 / 16	L-No 7 / 17	L-No 8 / 18	L-No 9 / 19	L-No 10 / 20
1	7	0.650	1.680	2.710	3.650	4.590	5.620	6.650			
2	9	0.550	1.680	2.810	4.180	5.550	6.920	8.290	9.420	10.550	
3	7	0.600	1.630	2.660	3.600	4.540	5.570	6.600			
4	9	0.550	1.780	3.010	4.280	5.550	6.820	8.090	9.320	10.550	

CALCULATION POINTS OF EACH FORCE



: Dead load
No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-Y	0.000	7.250	-25.960	-25.960
2	2-	3	-Y	0.000	11.100	-118.020	-118.020
3	3-	4	-Y	0.000	7.250	-25.960	-25.960
4	4-	1	-Y	0.000	11.100	151.932	151.932

ΣV = 0.003 (t)
ΣH = 0.000 (t)

: Earth pressure
No. : 2

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.000	7.250	121.780	50.730
3	3-	4	-X	0.000	7.250	-50.730	-121.780

ΣV = 0.000 (t)
ΣH = 0.000 (t)

: HB live load-VL-
No. : 3

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	0.385	7.950	-10.782	-10.782
2	2-	3	-Y	2.765	7.950	-10.782	-10.782
4	4-	1	-Y	0.000	11.100	15.444	15.444

ΣV = -0.005 (t)
ΣH = 0.000 (t)

BOX FOR ROAD NO 3

: HB live load-VL-
No. : 4

No	i -j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2- 3	-Y	0.000	7.950	-10.782	-10.782
2	2- 3	-Y	2.380	7.950	-10.782	-10.782
4	4- 1	-Y	0.000	11.100	12.230	18.658

ΣV = -0.005 (t)
ΣH = 0.000 (t)

BOX FOR ROAD NO 3

: HB live load-HL-
No. : 5

No	i -j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1- 2	-X	0.000	7.250	17.150	17.150
3	3- 4	-X	0.000	7.250	-17.150	-17.150

BOX FOR ROAD NO 3

No	C-No 1	C-No 2	C-No 3
No	No 6	No 7	No 8
No 1	1.3800	1.3800	1.3800
No 2	1.6500	1.6500	1.6500
No 3	1.4300	0.0000	0.0000
No 4	0.0000	1.4300	0.0000
No 5	0.0000	0.0000	1.6500

No 1 : 6 7 8

BOX FOR ROAD NO 3

No.	Case. 1 RX (t)	RY (t)	RM (tm)	Case. 2 RX (t)	RY (t)	RM (tm)	Case. 3 RX (t)	RY (t)	RM (tm)
1.	0.000	-0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.000
4.	0.000	-0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.000

No.	Case. 4 RX (t)	RY (t)	RM (tm)	Case. 5 RX (t)	RY (t)	RM (tm)	Case. 6 RX (t)	RY (t)	RM (tm)
1.	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.002	0.000
4.	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.002	0.000

No.	Case. 7 RX (t)	RY (t)	RM (tm)	Case. 8 RX (t)	RY (t)	RM (tm)
1.	0.000	0.002	0.000	0.000	-0.002	0.000

BOX FOR ROAD NO 3

No.	Case. 1 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 2 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 3 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	9.52468	0.00000	0.00000	-2.53104	0.00000	0.00000	1.0719
2.	-0.06859	-1.97494	-8.89664	-0.13110	0.00000	2.49915	0.01769	-0.22598	-1.2339
3.	0.00274	-1.97494	8.89664	-1.10538	0.00000	-2.49915	-0.00071	-0.22598	1.2339
4.	-0.06585	0.00000	-9.52468	-1.23648	0.00000	2.53104	0.01698	0.00000	-1.0719

No.	Case. 4 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 5 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 6 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	1.09068	0.00000	0.00000	-0.48711	0.00000	0.00000	10.5007
2.	0.00971	-0.24237	-1.24647	0.00553	0.00000	0.51505	-0.28568	-3.04857	-9.9183
3.	-0.00822	-0.20959	1.20938	-0.22104	0.00000	-0.51505	-1.82109	-3.04857	9.9183
4.	0.01655	0.00000	-1.04944	-0.21552	0.00000	0.48711	-2.10678	0.00000	-10.5007

No.	Case. 7 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 8 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	10.52751	0.00000	0.00000	8.16411
2.	-0.29709	-3.07201	-9.93623	-0.30186	-2.72542	-7.30394
3.	-1.83184	-3.02514	9.88319	-2.18481	-2.72542	7.30394
4.	-2.10739	0.00000	-10.46853	-2.48666	0.00000	-8.16411

BOX FOR ROAD NO 3

No	L(m)	Case 1 Dead load M (tm)	S (t)	N (t)	Case 2 Earth pressure M (tm)	S (t)	N (t)	Case 3 HB live load-VL- M (tm)	S (t)	N (t)
1- 2	0.000	-774.476	19.281	-843.221	-208.731	362.031	0.000	-70.170	-4.972	-85.717
* 1	0.650	-761.944	19.281	-826.347	1.312	284.945	0.000	-73.402	-4.972	-85.717
* 2	1.680	-742.085	19.281	-799.608	235.370	171.271	0.000	-78.523	-4.972	-85.717
* 3	2.710	-722.226	19.281	-772.869	357.699	67.994	0.000	-83.645	-4.972	-85.717
* 4	3.650	-704.102	19.281	-748.467	380.901	-17.185	0.000	-88.319	-4.972	-85.717
* 5	4.590	-685.978	19.281	-724.065	328.104	-93.705	0.000	-92.993	-4.972	-85.717
* 6	5.620	-666.119	19.281	-697.326	192.635	-167.609	0.000	-98.115	-4.972	-85.717
* 7	6.650	-646.259	19.281	-670.587	-13.601	-231.115	0.000	-103.236	-4.972	-85.717
2- 1	7.250	-634.691	19.281	-655.011	-162.107	-263.317	0.000	-106.220	-4.972	-85.717
2- 3	0.000	-634.691	655.011	19.281	-162.107	0.000	-263.317	-106.220	85.717	-4.972
* 1	0.550	-292.285	590.100	19.281	-162.107	0.000	-263.317	-59.222	83.938	-4.972
* 2	1.680	299.178	456.737	19.281	-162.107	0.000	-263.317	28.744	71.754	-4.972
* 3	2.810	739.941	323.375	19.281	-162.107	0.000	-263.317	102.932	59.085	-4.972
* 4	4.180	1072.209	161.687	19.281	-162.107	0.000	-263.317	163.642	29.543	-4.972
* 5	5.550	1182.965	0.000	19.281	-162.107	0.000	-263.317	183.878	0.000	-4.972
* 6	6.920	1072.209	-161.687	19.281	-162.107	0.000	-263.317	163.642	-29.543	-4.972
* 7	8.290	739.941	-323.375	19.281	-162.107	0.000	-263.317	102.932	-59.085	-4.972
* 8	9.420	299.178	-456.737	19.281	-162.107	0.000	-263.317	28.744	-71.754	-4.972
* 9	10.550	-292.285	-590.100	19.281	-162.107	0.000	-263.317	-59.222	-83.938	-4.972
3- 2	11.100	-634.691	-655.011	19.281	-162.107	0.000	-263.317	-106.220	-85.717	-4.972
3- 4	0.000	-634.691	-19.281	-655.011	-162.107	263.317	0.000	-106.220	4.972	-85.717
* 1	0.600	-646.259	-19.281	-670.587	-13.601	231.115	0.000	-103.236	4.972	-85.717
* 2	1.630	-666.119	-19.281	-697.326	192.635	167.609	0.000	-98.115	4.972	-85.717
* 3	2.660	-685.978	-19.281	-724.065	328.104	93.705	0.000	-92.993	4.972	-85.717
* 4	3.600	-704.102	-19.281	-748.467	380.901	17.185	0.000	-88.319	4.972	-85.717
* 5	4.540	-722.226	-19.281	-772.869	357.699	-67.994	0.000	-83.645	4.972	-85.717
* 6	5.570	-742.085	-19.281	-799.608	235.370	-171.271	0.000	-78.523	4.972	-85.717
* 7	6.600	-761.944	-19.281	-826.347	1.312	-284.945	0.000	-73.402	4.972	-85.717
4- 3	7.250	-774.476	-19.281	-843.221	-208.731	-362.031	0.000	-70.170	4.972	-85.717
4- 1	0.000	-774.476	843.223	-19.281	-208.731	0.000	-362.031	-70.170	85.714	4.972
* 1	0.550	-333.684	759.660	-19.281	-208.731	0.000	-362.031	-25.363	77.220	4.972
* 2	1.780	485.769	572.784	-19.281	-208.731	0.000	-362.031	57.935	58.224	4.972
* 3	3.010	1075.364	385.907	-19.281	-208.731	0.000	-362.031	117.868	39.228	4.972
* 4	4.280	1442.941	192.954	-19.281	-208.731	0.000	-362.031	155.232	19.614	4.972
* 5	5.550	1565.466	0.000	-19.281	-208.731	0.000	-362.031	167.687	0.000	4.972
* 6	6.820	1442.941	-192.954	-19.281	-208.731	0.000	-362.031	155.232	-19.614	4.972
* 7	8.090	1075.364	-385.907	-19.281	-208.731	0.000	-362.031	117.868	-39.228	4.972
* 8	9.320	485.769	-572.784	-19.281	-208.731	0.000	-362.031	57.935	-58.224	4.972
* 9	10.550	-333.684	-759.660	-19.281	-208.731	0.000	-362.031	-25.363	-77.220	4.972
1- 4	11.100	-774.476	-843.223	-19.281	-208.731	0.000	-362.031	-70.170	-85.714	4.972

BOX FOR ROAD NO 3

	No	L(m)	Case 4 HB live load-VL- M (tm)	S (t)	N (t)	Case 5 HB live load-HL- M (tm)	S (t)	N (t)	Case 6 M (tm)	S (t)	N (t)
1-	2	0.000	-71.823	-4.847	-91.933	-40.171	63.101	0.000	-1513.526	616.849	-1286.220
*	1	0.650	-74.973	-4.847	-91.933	-2.778	51.954	0.000	-1154.283	489.655	-1262.934
*	2	1.680	-79.965	-4.847	-91.933	41.637	34.289	0.000	-748.004	302.094	-1226.034
*	3	2.710	-84.957	-4.847	-91.933	67.858	16.625	0.000	-526.080	131.686	-1189.135
*	4	3.650	-89.513	-4.847	-91.933	75.909	0.504	0.000	-469.470	-8.859	-1155.460
*	5	4.590	-94.069	-4.847	-91.933	68.806	-15.617	0.000	-538.258	-135.117	-1121.784
*	6	5.620	-99.061	-4.847	-91.933	43.623	-33.282	0.000	-741.700	-257.057	-1084.885
*	7	6.650	-104.053	-4.847	-91.933	0.246	-50.946	0.000	-1061.907	-361.844	-1047.985
2-	1	7.250	-106.961	-4.847	-91.933	-33.409	-61.236	0.000	-1295.244	-414.977	-1026.490
2-	3	0.000	-106.961	91.933	-4.847	-33.409	0.000	-61.236	-1295.244	1026.490	-414.977
*	1	0.550	-58.029	86.003	-4.847	-33.409	0.000	-61.236	-755.518	934.369	-414.977
*	2	1.680	32.271	78.819	-4.847	-33.409	0.000	-61.236	186.493	732.906	-414.977
*	3	2.810	107.806	56.999	-4.847	-33.409	0.000	-61.236	900.834	530.749	-414.977
*	4	4.180	165.658	27.457	-4.847	-33.409	0.000	-61.236	1446.179	265.375	-414.977
*	5	5.550	183.037	-2.086	-4.847	-33.409	0.000	-61.236	1627.961	0.000	-414.977
*	6	6.920	159.942	-31.629	-4.847	-33.409	0.000	-61.236	1446.179	-265.375	-414.977
*	7	8.290	96.997	-57.506	-4.847	-33.409	0.000	-61.236	900.834	-530.749	-414.977
*	8	9.420	25.132	-69.689	-4.847	-33.409	0.000	-61.236	186.493	-732.906	-414.977
*	9	10.550	-60.239	-79.501	-4.847	-33.409	0.000	-61.236	-755.518	-934.369	-414.977
3-	2	11.100	-103.965	-79.501	-4.847	-33.409	0.000	-61.236	-1295.244	-1026.490	-414.977
3-	4	0.000	-103.965	4.847	-79.501	-33.409	61.236	0.000	-1295.244	414.977	-1026.490
*	1	0.600	-101.057	4.847	-79.501	0.246	50.946	0.000	-1061.907	361.844	-1047.985
*	2	1.630	-96.065	4.847	-79.501	43.623	33.282	0.000	-741.700	257.057	-1084.885
*	3	2.660	-91.073	4.847	-79.501	68.806	15.617	0.000	-538.258	135.117	-1121.784
*	4	3.600	-86.517	4.847	-79.501	75.909	-0.504	0.000	-469.470	8.859	-1155.460
*	5	4.540	-81.961	4.847	-79.501	67.858	-16.625	0.000	-526.080	-131.686	-1189.135
*	6	5.570	-76.969	4.847	-79.501	41.637	-34.289	0.000	-748.004	-302.094	-1226.034
*	7	6.600	-71.977	4.847	-79.501	-2.778	-51.954	0.000	-1154.283	-489.655	-1262.934
4-	3	7.250	-68.827	4.847	-79.501	-40.171	-63.101	0.000	-1513.526	-616.849	-1286.220
4-	1	0.000	-68.827	79.498	4.847	-40.171	0.000	-63.101	-1513.526	1286.218	-616.849
*	1	0.550	-26.969	72.684	4.847	-40.171	0.000	-63.101	-841.159	1158.755	-616.849
*	2	1.780	52.761	56.812	4.847	-40.171	0.000	-63.101	408.803	873.702	-616.849
*	3	3.010	112.428	40.063	4.847	-40.171	0.000	-63.101	1308.147	588.648	-616.849
*	4	4.280	151.842	21.850	4.847	-40.171	0.000	-63.101	1868.834	294.324	-616.849
*	5	5.550	167.532	2.703	4.847	-40.171	0.000	-63.101	2055.730	0.000	-616.849
*	6	6.820	158.312	-17.378	4.847	-40.171	0.000	-63.101	1868.834	-294.324	-616.849
*	7	8.090	122.997	-38.393	4.847	-40.171	0.000	-63.101	1308.147	-588.648	-616.849
*	8	9.320	62.799	-59.636	4.847	-40.171	0.000	-63.101	408.803	-873.702	-616.849
*	9	10.550	-24.068	-81.756	4.847	-40.171	0.000	-63.101	-841.159	-1158.755	-616.849
1-	4	11.100	-71.823	-91.930	4.847	-40.171	0.000	-63.101	-1513.526	-1286.218	-616.849

BOX FOR ROAD NO 3

No		L(m)	Case 7 M (tm)	S (t)	N (t)	Case 8 M (tm)	S (t)	N (t)
1-	2	0.000	-1515.891	617.028	-1295.109	-1479.466	728.077	-1163.645
*	1	0.650	-1156.530	489.835	-1271.823	-1053.901	582.490	-1140.359
*	2	1.680	-750.066	302.273	-1234.923	-567.014	365.782	-1103.459
*	3	2.710	-527.957	131.866	-1198.024	-294.501	166.228	-1066.560
*	4	3.650	-471.178	-8.679	-1164.349	-217.924	-0.917	-1032.884
*	5	4.590	-539.797	-134.937	-1130.673	-291.748	-153.774	-999.209
*	6	5.620	-743.053	-256.878	-1093.774	-529.418	-304.861	-962.310
*	7	6.650	-1063.075	-361.664	-1056.874	-913.873	-438.794	-925.410
2-	1	7.250	-1296.304	-414.797	-1035.379	-1198.474	-508.906	-903.915
2-	3	0.000	-1296.304	1035.379	-414.797	-1198.474	903.915	-508.906
*	1	0.550	-753.811	937.322	-414.797	-725.954	814.338	-508.906
*	2	1.680	191.536	735.859	-414.797	90.265	630.298	-508.906
*	3	2.810	907.805	527.766	-414.797	698.518	446.257	-508.906
*	4	4.180	1449.063	262.392	-414.797	1157.047	223.129	-508.906
*	5	5.550	1626.758	-2.983	-414.797	1309.891	0.000	-508.906
*	6	6.920	1440.889	-268.358	-414.797	1157.047	-223.129	-508.906
*	7	8.290	892.349	-528.490	-414.797	698.518	-446.257	-508.906
*	8	9.420	181.328	-729.953	-414.797	90.265	-630.298	-508.906
*	9	10.550	-756.973	-928.024	-414.797	-725.954	-814.338	-508.906
3-	2	11.100	-1292.020	-1017.601	-414.797	-1198.474	-903.915	-508.906
3-	4	0.000	-1292.020	414.797	-1017.601	-1198.474	508.906	-903.915
*	1	0.600	-1058.790	361.664	-1039.096	-913.873	438.794	-925.410
*	2	1.630	-738.769	256.878	-1075.996	-529.418	304.861	-962.310
*	3	2.660	-535.512	134.937	-1112.895	-291.748	153.774	-999.209
*	4	3.600	-466.894	8.679	-1146.571	-217.924	0.917	-1032.884
*	5	4.540	-523.672	-131.866	-1180.246	-294.501	-166.228	-1066.560
*	6	5.570	-745.782	-302.273	-1217.146	-567.014	-365.782	-1103.459
*	7	6.600	-1152.245	-489.835	-1254.045	-1053.901	-582.490	-1140.359
4-	3	7.250	-1511.606	-617.028	-1277.331	-1479.466	-728.077	-1163.645
4-	1	0.000	-1511.606	1277.330	-617.028	-1479.466	1163.647	-728.077
*	1	0.550	-843.455	1152.269	-617.028	-871.172	1048.331	-728.077
*	2	1.780	401.404	871.682	-617.028	259.673	790.441	-728.077
*	3	3.010	1300.369	589.842	-617.028	1073.314	532.552	-728.077
*	4	4.280	1863.986	297.521	-617.028	1580.570	266.276	-728.077
*	5	5.550	2055.508	3.865	-617.028	1749.055	0.000	-728.077
*	6	6.820	1873.239	-291.126	-617.028	1580.570	-266.276	-728.077
*	7	8.090	1315.482	-587.454	-617.028	1073.314	-532.552	-728.077
*	8	9.320	415.757	-875.721	-617.028	259.673	-790.441	-728.077
*	9	10.550	-839.306	-1165.241	-617.028	-871.172	-1048.331	-728.077
1-	4	11.100	-1515.891	-1295.107	-617.028	-1479.466	-1163.647	-728.077

BOX FOR ROAD NO 3

PICK-UP No. 1 *

No.	L (m)	M. MAXIMUM Case	M (tm)	S (t)	N (t)	M. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-1479.466	728.077	-1163.645	C- 7	-1515.891	617.028	-1295.109
* 1	0.650	C- 8	-1053.901	582.490	-1140.359	C- 7	-1156.530	489.835	-1271.823
* 2	1.680	C- 8	-567.014	365.782	-1103.459	C- 7	-750.066	302.273	-1234.923
* 3	2.710	C- 8	-294.501	166.228	-1066.560	C- 7	-527.957	131.866	-1198.024
* 4	3.650	C- 8	-217.924	-0.917	-1032.884	C- 7	-471.178	-8.679	-1164.349
* 5	4.590	C- 8	-291.748	-153.774	-999.209	C- 7	-539.797	-134.937	-1130.673
* 6	5.620	C- 8	-529.418	-304.861	-962.310	C- 7	-743.053	-256.878	-1093.774
* 7	6.650	C- 8	-913.873	-438.794	-925.410	C- 7	-1063.075	-361.664	-1056.874
2 - 1	7.250	C- 8	-1198.474	-508.906	-903.915	C- 7	-1296.304	-414.797	-1035.379
2 - 3	0.000	C- 8	-1198.474	903.915	-508.906	C- 7	-1296.304	1035.379	-414.797
* 1	0.550	C- 8	-725.954	814.338	-508.906	C- 6	-755.518	934.369	-414.977
* 2	1.680	C- 7	191.536	735.859	-414.797	C- 8	90.265	630.298	-508.906
* 3	2.810	C- 7	907.805	527.766	-414.797	C- 8	698.518	446.257	-508.906
* 4	4.180	C- 7	1449.063	262.392	-414.797	C- 8	1157.047	223.129	-508.906
* 5	5.550	C- 6	1627.961	0.000	-414.977	C- 8	1309.891	0.000	-508.906
* 6	6.920	C- 6	1446.179	-265.375	-414.977	C- 8	1157.047	-223.129	-508.906
* 7	8.290	C- 6	900.834	-530.749	-414.977	C- 8	698.518	-446.257	-508.906
* 8	9.420	C- 6	186.493	-732.906	-414.977	C- 8	90.265	-630.298	-508.906
* 9	10.550	C- 8	-725.954	-814.338	-508.906	C- 7	-756.973	-928.024	-414.797
3 - 2	11.100	C- 8	-1198.474	-903.915	-508.906	C- 6	-1295.244	-1026.490	-414.977
3 - 4	0.000	C- 8	-1198.474	508.906	-903.915	C- 6	-1295.244	414.977	-1026.490
* 1	0.600	C- 8	-913.873	438.794	-925.410	C- 6	-1061.907	361.844	-1047.985
* 2	1.630	C- 8	-529.418	304.861	-962.310	C- 6	-741.700	257.057	-1084.885
* 3	2.660	C- 8	-291.748	153.774	-999.209	C- 6	-538.258	135.117	-1121.784
* 4	3.600	C- 8	-217.924	0.917	-1032.884	C- 6	-469.470	8.859	-1155.460
* 5	4.540	C- 8	-294.501	-166.228	-1066.560	C- 6	-526.080	-131.686	-1189.135
* 6	5.570	C- 8	-567.014	-365.782	-1103.459	C- 6	-748.004	-302.094	-1226.034
* 7	6.600	C- 8	-1053.901	-582.490	-1140.359	C- 6	-1154.283	-489.655	-1262.934
4 - 3	7.250	C- 8	-1479.466	-728.077	-1163.645	C- 6	-1513.526	-616.849	-1286.220
4 - 1	0.000	C- 8	-1479.466	1163.647	-728.077	C- 6	-1513.526	1286.218	-616.849
* 1	0.550	C- 6	-841.159	1158.755	-616.849	C- 8	-871.172	1048.331	-728.077
* 2	1.780	C- 6	408.803	873.702	-616.849	C- 8	259.673	790.441	-728.077
* 3	3.010	C- 6	1308.147	588.648	-616.849	C- 8	1073.314	532.552	-728.077
* 4	4.280	C- 6	1868.834	294.324	-616.849	C- 8	1580.570	266.276	-728.077
* 5	5.550	C- 6	2055.730	0.000	-616.849	C- 8	1749.055	0.000	-728.077
* 6	6.820	C- 7	1873.239	-291.126	-617.028	C- 8	1580.570	-266.276	-728.077
* 7	8.090	C- 7	1315.482	-587.454	-617.028	C- 8	1073.314	-532.552	-728.077
* 8	9.320	C- 7	415.757	-875.721	-617.028	C- 8	259.673	-790.441	-728.077
* 9	10.550	C- 7	-839.306	-1165.241	-617.028	C- 8	-871.172	-1048.331	-728.077
1 - 4	11.100	C- 8	-1479.466	-1163.647	-728.077	C- 7	-1515.891	-1295.107	-617.028

BOX FOR ROAD NO 3

PICK-UP No. 1 *

No.	L (m)	S. MAXIMUM Case	M (tm)	S (t)	N (t)	S. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-1479.466	728.077	-1163.645	C- 6	-1513.526	616.849	-1286.220
* 1	0.650	C- 8	-1053.901	582.490	-1140.359	C- 6	-1154.283	489.655	-1262.934
* 2	1.680	C- 8	-567.014	365.782	-1103.459	C- 6	-748.004	302.094	-1226.034
* 3	2.710	C- 8	-294.501	166.228	-1066.560	C- 6	-526.080	131.686	-1189.135
* 4	3.650	C- 8	-217.924	-0.917	-1032.884	C- 6	-469.470	-8.859	-1155.460
* 5	4.590	C- 7	-539.797	-134.937	-1130.673	C- 8	-291.748	-153.774	-999.209
* 6	5.620	C- 7	-743.053	-256.878	-1093.774	C- 8	-529.418	-304.861	-962.310
* 7	6.650	C- 7	-1063.075	-361.664	-1056.874	C- 8	-913.873	-438.794	-925.410
2 - 1	7.250	C- 7	-1296.304	-414.797	-1035.379	C- 8	-1198.474	-508.906	-903.915
2 - 3	0.000	C- 7	-1296.304	1035.379	-414.797	C- 8	-1198.474	903.915	-508.906
* 1	0.550	C- 7	-753.811	937.322	-414.797	C- 8	-725.954	814.338	-508.906
* 2	1.680	C- 7	191.536	735.859	-414.797	C- 8	90.265	630.298	-508.906
* 3	2.810	C- 6	900.834	530.749	-414.977	C- 8	698.518	446.257	-508.906
* 4	4.180	C- 6	1446.179	265.375	-414.977	C- 8	1157.047	223.129	-508.906
* 5	5.550	C- 6	1627.961	0.000	-414.977	C- 7	1626.758	-2.983	-414.797
* 6	6.920	C- 8	1157.047	-223.129	-508.906	C- 7	1440.889	-268.358	-414.797
* 7	8.290	C- 8	698.518	-446.257	-508.906	C- 6	900.834	-530.749	-414.977
* 8	9.420	C- 8	90.265	-630.298	-508.906	C- 6	186.493	-732.906	-414.977
* 9	10.550	C- 8	-725.954	-814.338	-508.906	C- 6	-755.518	-934.369	-414.977
3 - 2	11.100	C- 8	-1198.474	-903.915	-508.906	C- 6	-1295.244	-1026.490	-414.977
3 - 4	0.000	C- 8	-1198.474	508.906	-903.915	C- 7	-1292.020	414.797	-1017.601
* 1	0.600	C- 8	-913.873	438.794	-925.410	C- 7	-1058.790	361.664	-1039.096
* 2	1.630	C- 8	-529.418	304.861	-962.310	C- 7	-738.709	256.878	-1075.996
* 3	2.660	C- 8	-291.748	153.774	-999.209	C- 7	-535.512	134.937	-1112.895
* 4	3.600	C- 6	-469.470	8.859	-1155.460	C- 8	-217.924	0.917	-1032.884
* 5	4.540	C- 6	-526.080	-131.686	-1189.135	C- 8	-294.501	-166.228	-1066.560
* 6	5.570	C- 6	-748.004	-302.094	-1226.034	C- 8	-567.014	-365.782	-1103.459
* 7	6.600	C- 6	-1154.283	-489.655	-1262.934	C- 8	-1053.901	-582.490	-1140.359
4 - 3	7.250	C- 6	-1513.526	-616.849	-1286.220	C- 8	-1479.466	-728.077	-1163.645
4 - 1	0.000	C- 6	-1513.526	1286.218	-616.849	C- 8	-1479.466	1163.647	-728.077
* 1	0.550	C- 6	-841.159	1158.755	-616.849	C- 8	-871.172	1048.331	-728.077
* 2	1.780	C- 6	408.803	873.702	-616.849	C- 8	259.673	790.441	-728.077
* 3	3.010	C- 7	1300.369	589.842	-617.028	C- 8	1073.314	532.552	-728.077
* 4	4.280	C- 7	1863.986	297.521	-617.028	C- 8	1580.570	266.276	-728.077
* 5	5.550	C- 7	2055.508	3.865	-617.028	C- 8	1749.655	0.000	-728.077
* 6	6.820	C- 8	1580.570	-266.276	-728.077	C- 6	1868.834	-294.324	-616.849
* 7	8.090	C- 8	1073.314	-532.552	-728.077	C- 6	1308.147	-588.648	-616.849
* 8	9.320	C- 8	259.673	-790.441	-728.077	C- 7	415.757	-875.721	-617.028
* 9	10.550	C- 8	-871.172	-1048.331	-728.077	C- 7	-839.306	-1163.241	-617.028
1 - 4	11.100	C- 8	-1479.466	-1163.647	-728.077	C- 7	-1515.891	-1295.107	-617.028

BOX FOR ROAD NO 3

PICK-UP No. 1 *

No.	L (m)	N. MAXIMUM Case	M (tm)	S (t)	N (t)	N. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-1479.466	728.077	-1163.645	C- 7	-1315.891	617.028	-1295.109
* 1	0.630	C- 8	-1053.901	582.490	-1140.359	C- 7	-1156.530	489.635	-1271.823
* 2	1.680	C- 8	-567.014	365.782	-1103.459	C- 7	-750.066	302.273	-1234.923
* 3	2.710	C- 8	-294.501	166.228	-1066.560	C- 7	-527.957	131.866	-1198.024
* 4	3.650	C- 8	-217.924	-0.917	-1032.884	C- 7	-471.178	-8.679	-1164.349
* 5	4.590	C- 8	-291.748	-153.774	-999.209	C- 7	-539.797	-134.937	-1130.673
* 6	5.620	C- 8	-529.418	-304.861	-962.310	C- 7	-743.053	-256.878	-1093.774
* 7	6.650	C- 8	-913.873	-438.794	-925.410	C- 7	-1063.075	-361.664	-1056.874
2 - 1	7.250	C- 8	-1198.474	-508.906	-903.915	C- 7	-1296.304	-414.797	-1035.379
2 - 3	0.000	C- 7	-1296.304	1035.379	-414.797	C- 8	-1198.474	903.915	-508.906
* 1	0.550	C- 7	-753.811	937.322	-414.797	C- 8	-725.954	814.338	-508.906
* 2	1.680	C- 7	191.536	735.859	-414.797	C- 8	90.265	630.298	-508.906
* 3	2.810	C- 7	907.805	527.760	-414.797	C- 8	698.518	446.257	-508.906
* 4	4.180	C- 7	1449.063	262.392	-414.797	C- 8	1157.047	223.129	-508.906
* 5	5.550	C- 7	1626.758	-2.983	-414.797	C- 8	1309.891	0.000	-508.906
* 6	6.920	C- 7	1440.889	-268.358	-414.797	C- 8	1157.047	-223.129	-508.906
* 7	8.290	C- 7	892.349	-528.490	-414.797	C- 8	698.518	-446.257	-508.906
* 8	9.420	C- 7	181.328	-729.953	-414.797	C- 8	90.265	-630.298	-508.906
* 9	10.550	C- 7	-756.973	-928.024	-414.797	C- 8	-725.954	-814.338	-508.906
3 - 2	11.100	C- 7	-1292.020	-1017.601	-414.797	C- 8	-1198.474	-903.915	-508.906
3 - 4	0.000	C- 8	-1198.474	508.906	-903.915	C- 6	-1295.244	414.977	-1026.490
* 1	0.600	C- 8	-913.873	438.794	-925.410	C- 6	-1061.907	361.844	-1047.985
* 2	1.630	C- 8	-529.418	304.861	-962.310	C- 6	-741.700	257.057	-1084.885
* 3	2.660	C- 8	-291.748	153.774	-999.209	C- 6	-538.258	135.117	-1121.784
* 4	3.600	C- 8	-217.924	0.917	-1032.884	C- 6	-469.470	8.859	-1155.460
* 5	4.540	C- 8	-294.501	-166.228	-1066.560	C- 6	-526.080	-131.686	-1189.135
* 6	5.570	C- 8	-567.014	-365.782	-1103.459	C- 6	-748.004	-302.094	-1226.034
* 7	6.600	C- 8	-1053.901	-582.490	-1140.359	C- 6	-1154.283	-489.655	-1262.934
4 - 3	7.250	C- 8	-1479.466	-728.077	-1163.645	C- 6	-1513.526	-616.849	-1286.220
4 - 1	0.000	C- 6	-1513.526	1286.218	-616.849	C- 8	-1479.466	1163.647	-728.077
* 1	0.550	C- 6	-841.159	1158.755	-616.849	C- 8	-871.172	1048.331	-728.077
* 2	1.780	C- 6	408.803	873.702	-616.849	C- 8	259.673	790.441	-728.077
* 3	3.010	C- 6	1308.147	588.648	-616.849	C- 8	1073.314	532.552	-728.077
* 4	4.280	C- 6	1868.834	294.324	-616.849	C- 8	1580.570	266.276	-728.077
* 5	5.550	C- 6	2055.730	0.000	-616.849	C- 8	1749.655	0.000	-728.077
* 6	6.820	C- 6	1868.834	-294.324	-616.849	C- 8	1580.570	-266.276	-728.077
* 7	8.090	C- 6	1308.147	-588.648	-616.849	C- 8	1073.314	-532.552	-728.077
* 8	9.320	C- 6	408.803	-873.702	-616.849	C- 8	259.673	-790.441	-728.077
* 9	10.550	C- 6	-841.159	-1158.755	-616.849	C- 8	-871.172	-1048.331	-728.077
1 - 4	11.100	C- 6	-1513.526	-1286.218	-616.849	C- 8	-1479.466	-1163.647	-728.077

NO③ BOX CULVERT FOR ROAD

D= 3.000 m

(1)Dead load

a) vertical load ----- (case-1)

For upper slab w1 = 22.6×0.50+19.6×2.50+23.6×1.20 = 88.620 kN/m

For side wall w2 = 23.6×1.10 = 25.960 〃

For bottom slab $W3 = 88.620 + \frac{2\times 25.960\times 7.25}{11.10}$ = 122.532 〃

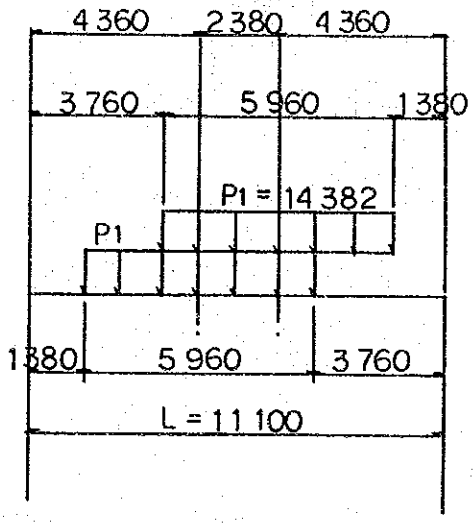
b) Horizontal load --- earth pressure ----- (case-2)

For side wall P1 = (22.6×0.50+19.60×3.10)×0.500 = 36.030 kN/m

P2 = (22.6×0.50+19.60×10.35)×0.500 = 107.080 〃

(2)Live load

a) Vertical load of center ------- (case-3)



Skew angle $\theta = 49°$

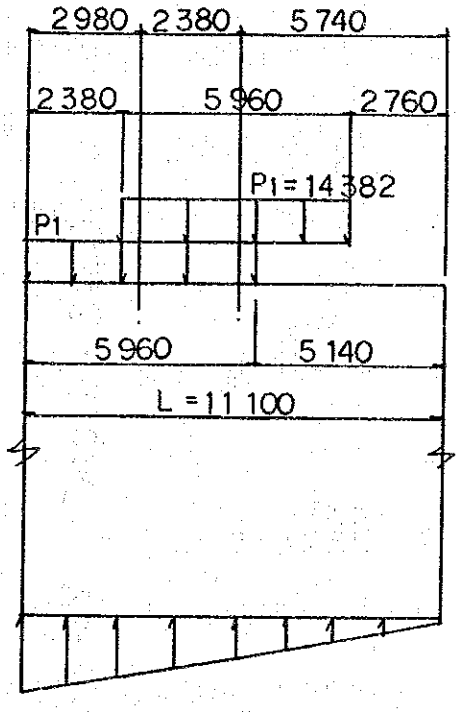
$B = (0.30+3.00+1.20)\mathrm{cosec}49° \fallingdotseq 5.960$ m

$P1 = \frac{10}{5.96}\times\frac{30}{3.50} = 14.382$ KN/m

For bottom slab

$P2 = \frac{2\times 14.382\times 5.960}{11.10} = 15.444$ KN/m

b) Vertical load of partial ------- (case-4)



For bottom slab

$P2 = \frac{2\times 14.382\times 5.96}{11.10} + \frac{6\times 14.382\times 5.96(2.57+0.190)}{11.10^2}$

$= 15.444 \pm 11.521 = \begin{cases} P2\text{-}1 = 26.965 \text{ KN/m} \\ P2\text{-}2 = 3.923 \text{ KN/m} \end{cases}$

C) Horizontal load of live load surcharge ------- (case-5)

Pe = 34.300 × 0.500 = 17.150 KN/m

BOX FOR ROAD No 3' ..... Depth = 3.000

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

No	X (m)	Y (m)
1	0.0000	0.0000
2	0.0000	7.2500
3	11.1000	7.2500
4	11.1000	0.0000

No	I - J	A (m2)	I (m4)	I - J	L (m)	E (t/m2)	EPS
1	1 - 2	1.10000	0.110920	Fix - Fix	7.250	2.50E+07	1.00E-05
2	2 - 3	1.20000	0.144000	Fix - Fix	11.100	2.50E+07	1.00E-05
3	3 - 4	1.10000	0.110920	Fix - Fix	7.250	2.50E+07	1.00E-05
4	4 - 1	1.30000	0.183080	Fix - Fix	11.100	2.50E+07	1.00E-05

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

No		L-No 1 / 11	L-No 2 / 12	L-No 3 / 13	L-No 4 / 14	L-No 5 / 15	L-No 6 / 16	L-No 7 / 17	L-No 8 / 18	L-No 9 / 19	L-No 10 / 20
1	7	0.650	1.680	2.710	3.650	4.590	5.620	6.650			
2	9	0.550	1.680	2.810	4.180	5.550	6.920	8.290	9.420	10.550	
3	7	0.600	1.630	2.660	3.600	4.540	5.570	6.600			
4	9	0.550	1.780	3.010	4.280	5.550	6.820	8.090	9.320	10.550	

: Dead load
No. : 1

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-Y	0.000	7.250	-25.960	-25.960
2	2-	3	-Y	0.000	11.100	-88.620	-88.620
3	3-	4	-Y	0.000	7.250	-25.960	-25.960
4	4-	1	-Y	0.000	11.100	122.532	122.532

ΣV = 0.003 (t)
ΣH = 0.000 (t)

: Earth pressure
No. : 2

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.000	7.250	107.080	36.030
3	3-	4	-X	0.000	7.250	-36.030	-107.080

ΣV = 0.000 (t)
ΣH = 0.000 (t)

: HB live load-VL-
No. : 3

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	1.380	5.960	-14.382	-14.382
2	2-	3	-Y	3.760	5.960	-14.382	-14.382
4	4-	1	-Y	0.000	11.100	15.444	15.444

BOX FOR ROAD NO 3'

: HB live load-VL-
No. : 4

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
2	2-	3	-Y	0.000	5.960	-14.382	-14.382
2	2-	3	-Y	2.380	5.960	-14.382	-14.382
4	4-	1	-Y	0.000	11.100	3.923	26.965

ΣV = -0.005 (t)
ΣH = 0.000 (t)

: HB live load-HL-
No. : 5

No	i	-j		Li (m)	Lo (m)	Pi (t/m)	Pj (t/m)
1	1-	2	-X	0.000	7.250	17.150	17.150
3	3-	4	-X	0.000	7.250	-17.150	-17.150

ΣV = 0.000 (t)
ΣH = 0.000 (t)

BOX FOR ROAD NO 3'

No / No	C-No 1 / No 6	C-No 2 / No 7	C-No 3 / No 8
No 1	1.3800	1.3800	1.3800
No 2	1.6500	1.6500	1.6500
No 3	1.4300	0.0000	0.0000
No 4	0.0000	1.4300	0.0000
No 5	0.0000	0.0000	1.6500

No 1 : 6 7 8

No.	Case. 1 RX (t)	RY (t)	RM (tm)	Case. 2 RX (t)	RY (t)	RM (tm)	Case. 3 RX (t)	RY (t)	RM (tm)
1.	0.000	-0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.000
4.	0.000	-0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.000

No.	Case. 4 RX (t)	RY (t)	RM (tm)	Case. 5 RX (t)	RY (t)	RM (tm)	Case. 6 RX (t)	RY (t)	RM (tm)
1.	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.000
4.	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.001	0.000

No.	Case. 7 RX (t)	RY (t)	RM (tm)	Case. 8 RX (t)	RY (t)	RM (tm)
1.	0.000	0.001	0.000	0.000	-0.002	0.000
4.	0.000	0.002	0.000	0.000	-0.002	0.000

BOX FOR ROAD NO 3'

No.	Case. 1 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 2 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 3 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	7.57076	0.00000	0.00000	-2.11352	0.00000	0.00000	1.1012
2.	-0.08166	-1.54477	-6.82306	-0.13584	0.00000	2.05768	0.02465	-0.22598	-1.3270
3.	0.00327	-1.54477	6.82306	-0.91591	0.00000	-2.05768	-0.00099	-0.22598	1.3270
4.	-0.07840	0.00000	-7.57076	-1.05175	0.00000	2.11352	0.02367	0.00000	-1.1012

No.	Case. 4 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 5 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 6 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	1.14316	0.00000	0.00000	-0.48711	0.00000	0.00000	8.5351
2.	0.17043	-0.28540	-1.36004	0.00553	0.00000	0.51505	-0.30158	-2.45493	-7.9182
3.	0.15077	-0.16656	1.14023	-0.22104	0.00000	-0.51505	-1.50815	-2.45493	7.9182
4.	0.01815	0.00000	-1.00895	-0.21552	0.00000	0.48711	-1.80973	0.00000	-8.5351

No.	Case. 7 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)	Case. 8 X-DIS.(mm)	Y-DIS.(mm)	ROTA.(mmRad)
1.	0.00000	0.00000	8.59792	0.00000	0.00000	6.15661
2.	-0.09312	-2.53991	-7.96552	-0.32771	-2.13178	-5.17082
3.	-1.29114	-2.36995	7.65119	-1.87146	-2.13178	5.17082
4.	-1.81762	0.00000	-8.40313	-2.19918	0.00000	-6.15661

BOX FOR ROAD NO 3'

	No	L(m)	Case 1 Dead load M (tm)	S (t)	N (t)	Case 2 Earth pressure M (tm)	S (t)	N (t)	Case 3 HB live load-VL- M (tm)	S (t)	N (t)
1-	2	0.000	-633.748	22.954	-680.051	-174.299	307.944	0.000	-67.754	-6.930	-85.717
*	1	0.650	-618.828	22.954	-663.177	3.693	240.413	0.000	-72.258	-6.930	-85.717
*	2	1.680	-595.185	22.954	-636.438	199.681	141.880	0.000	-79.396	-6.930	-85.717
*	3	2.710	-571.542	22.954	-609.699	299.535	53.744	0.000	-86.534	-6.930	-85.717
*	4	3.650	-549.965	22.954	-585.297	315.836	-17.617	0.000	-93.048	-6.930	-85.717
*	5	4.590	-528.388	22.954	-560.895	269.127	-80.319	0.000	-99.562	-6.930	-85.717
*	6	5.620	-504.745	22.954	-534.156	155.243	-139.082	0.000	-106.700	-6.930	-85.717
*	7	6.650	-481.102	22.954	-507.417	-13.811	-187.447	0.000	-113.838	-6.930	-85.717
2-	1	7.250	-467.329	22.954	-491.841	-133.471	-210.829	0.000	-117.996	-6.930	-85.717
2-	3	0.000	-467.329	491.841	22.954	-133.471	0.000	-210.829	-117.996	85.717	-6.930
*	1	0.550	-210.220	443.100	22.954	-133.471	0.000	-210.829	-70.852	85.717	-6.930
*	2	1.680	233.903	342.959	22.954	-133.471	0.000	-210.829	25.361	81.402	-6.930
*	3	2.810	564.868	242.819	22.954	-133.471	0.000	-210.829	108.163	65.150	-6.930
*	4	4.180	814.364	121.409	22.954	-133.471	0.000	-210.829	182.654	39.407	-6.930
*	5	5.550	897.530	0.000	22.954	-133.471	0.000	-210.829	209.648	0.000	-6.930
*	6	6.920	814.364	-121.409	22.954	-133.471	0.000	-210.829	182.654	-39.407	-6.930
*	7	8.290	564.868	-242.819	22.954	-133.471	0.000	-210.829	108.163	-65.150	-6.930
*	8	9.420	233.903	-342.959	22.954	-133.471	0.000	-210.829	25.361	-81.402	-6.930
*	9	10.550	-210.220	-443.100	22.954	-133.471	0.000	-210.829	-70.852	-85.717	-6.930
3-	2	11.100	-467.329	-491.841	22.954	-133.471	0.000	-210.829	-117.996	-85.717	-6.930
3-	4	0.000	-467.329	-22.954	-491.841	-133.471	210.829	0.000	-117.996	6.930	-85.717
*	1	0.600	-481.102	-22.954	-507.417	-13.811	187.447	0.000	-113.838	6.930	-85.717
*	2	1.630	-504.745	-22.954	-534.156	155.243	139.082	0.000	-106.700	6.930	-85.717
*	3	2.660	-528.388	-22.954	-560.895	269.127	80.319	0.000	-99.562	6.930	-85.717
*	4	3.600	-549.965	-22.954	-585.297	315.836	17.617	0.000	-93.048	6.930	-85.717
*	5	4.540	-571.542	-22.954	-609.699	299.535	-53.744	0.000	-86.534	6.930	-85.717
*	6	5.570	-595.185	-22.954	-636.438	199.681	-141.880	0.000	-79.396	6.930	-85.717
*	7	6.600	-618.828	-22.954	-663.177	3.693	-240.413	0.000	-72.258	6.930	-85.717
4-	3	7.250	-633.748	-22.954	-680.051	-174.299	-307.944	0.000	-67.754	6.930	-85.717
4-	1	0.000	-633.748	680.053	-22.954	-174.299	0.000	-307.944	-67.754	85.714	6.930
*	1	0.550	-278.252	612.660	-22.954	-174.299	0.000	-307.944	-22.947	77.220	6.930
*	2	1.780	382.630	461.946	-22.954	-174.299	0.000	-307.944	60.351	58.224	6.930
*	3	3.010	858.134	311.231	-22.954	-174.299	0.000	-307.944	120.284	39.228	6.930
*	4	4.280	1154.582	155.616	-22.954	-174.299	0.000	-307.944	157.648	19.614	6.930
*	5	5.550	1253.398	0.000	-22.954	-174.299	0.000	-307.944	170.103	0.000	6.930
*	6	6.820	1154.582	-155.616	-22.954	-174.299	0.000	-307.944	157.648	-19.614	6.930
*	7	8.090	858.134	-311.231	-22.954	-174.299	0.000	-307.944	120.284	-39.228	6.930
*	8	9.320	382.630	-461.946	-22.954	-174.299	0.000	-307.944	60.351	-58.224	6.930
*	9	10.550	-278.252	-612.660	-22.954	-174.299	0.000	-307.944	-22.947	-77.220	6.930
1-	4	11.100	-633.748	-680.053	-22.954	-174.299	0.000	-307.944	-67.754	-85.714	6.930

BOX FOR ROAD NO 3'

	No	L(m)	Case 4 HB live load-VL- M (tm)	S (t)	N (t)	Case 5 HB live load-HL- M (tm)	S (t)	N (t)	Case 6 M (tm)	S (t)	N (t)
1-	2	0.000	-76.557	-5.314	-108.257	-40.171	63.101	0.000	-1259.053	529.875	-1061.045
*	1	0.650	-80.011	-5.314	-108.257	-2.778	51.954	0.000	-951.218	418.448	-1037.759
*	2	1.680	-85.484	-5.314	-108.257	41.637	34.289	0.000	-605.418	255.869	-1000.860
*	3	2.710	-90.957	-5.314	-108.257	67.858	16.625	0.000	-418.239	110.444	-963.960
*	4	3.650	-95.952	-5.314	-108.257	75.909	0.504	0.000	-370.881	-7.301	-930.285
*	5	4.590	-100.947	-5.314	-108.257	68.806	-15.617	0.000	-427.489	-110.759	-896.609
*	6	5.620	-106.421	-5.314	-108.257	43.623	-33.282	0.000	-592.977	-207.718	-859.710
*	7	6.650	-111.894	-5.314	-108.257	0.246	-50.946	0.000	-849.497	-287.521	-822.810
2-	1	7.250	-115.082	-5.314	-108.257	-33.409	-61.236	0.000	-1033.875	-326.101	-801.315
2-	3	0.000	-115.082	108.257	-5.314	-33.409	0.000	-61.236	-1033.875	801.315	-326.101
*	1	0.550	-57.716	100.347	-5.314	-33.409	0.000	-61.236	-611.649	734.053	-326.101
*	2	1.680	46.494	84.095	-5.314	-33.409	0.000	-61.236	138.826	589.689	-326.101
*	3	2.810	131.009	61.659	-5.314	-33.409	0.000	-61.236	713.964	428.255	-326.101
*	4	4.180	188.489	22.252	-5.314	-33.409	0.000	-61.236	1164.791	223.897	-326.101
*	5	5.550	191.981	-17.154	-5.314	-33.409	0.000	-61.236	1318.160	0.000	-326.101
*	6	6.920	148.113	-42.754	-5.314	-33.409	0.000	-61.236	1164.791	-223.897	-326.101
*	7	8.290	76.043	-62.457	-5.314	-33.409	0.000	-61.236	713.964	-428.255	-326.101
*	8	9.420	4.672	-63.177	-5.314	-33.409	0.000	-61.236	138.826	-589.689	-326.101
*	9	10.550	-66.718	-63.177	-5.314	-33.409	0.000	-61.236	-611.649	-734.053	-326.101
3-	2	11.100	-101.465	-63.177	-5.314	-33.409	0.000	-61.236	-1033.875	-801.315	-326.101
3-	4	0.000	-101.465	5.314	-63.177	-33.409	61.236	0.000	-1033.875	326.101	-801.315
*	1	0.600	-98.277	5.314	-63.177	0.246	50.946	0.000	-849.497	287.521	-822.810
*	2	1.630	-92.803	5.314	-63.177	43.623	33.282	0.000	-592.977	207.718	-859.710
*	3	2.660	-87.330	5.314	-63.177	68.806	15.617	0.000	-427.489	110.759	-896.609
*	4	3.600	-82.335	5.314	-63.177	75.909	-0.504	0.000	-370.881	7.301	-930.285
*	5	4.540	-77.340	5.314	-63.177	67.858	-16.625	0.000	-418.239	-110.444	-963.960
*	6	5.570	-71.867	5.314	-63.177	41.637	-34.289	0.000	-605.418	-255.869	-1000.860
*	7	6.600	-66.394	5.314	-63.177	-2.778	-51.954	0.000	-951.218	-418.448	-1037.759
4-	3	7.250	-62.940	5.314	-63.177	-40.171	-63.101	0.000	-1259.053	-529.875	-1061.045
4-	1	0.000	-62.940	63.174	5.314	-40.171	0.000	-63.101	-1259.053	1061.044	-529.875
*	1	0.550	-28.845	60.702	5.314	-40.171	0.000	-63.101	-704.395	955.895	-529.875
*	2	1.780	41.343	52.902	5.314	-40.171	0.000	-63.101	326.739	720.745	-529.875
*	3	3.010	100.006	41.962	5.314	-40.171	0.000	-63.101	1068.638	485.595	-529.875
*	4	4.280	144.386	27.370	5.314	-40.171	0.000	-63.101	1531.167	242.797	-529.875
*	5	5.550	168.108	9.430	5.314	-40.171	0.000	-63.101	1685.343	0.000	-529.875
*	6	6.820	166.921	-11.858	5.314	-40.171	0.000	-63.101	1531.167	-242.797	-529.875
*	7	8.090	136.572	-36.494	5.314	-40.171	0.000	-63.101	1068.638	-485.595	-529.875
*	8	9.320	75.370	-63.546	5.314	-40.171	0.000	-63.101	326.739	-720.745	-529.875
*	9	10.550	-21.038	-93.738	5.314	-40.171	0.000	-63.101	-704.395	-955.895	-529.875
1-	4	11.100	-76.557	-108.255	5.314	-40.171	0.000	-63.101	-1259.053	-1061.044	-529.875

BOX FOR ROAD NO 3'

	No	L(m)	Case 7 M (tm)	S (t)	N (t)	Case 8 M (tm)	S (t)	N (t)
1-	2	0.000	-1271.642	532.187	-1093.278	-1228.448	643.903	-938.470
*	1	0.650	-962.305	420.759	-1069.992	-852.473	514.082	-915.184
*	2	1.680	-614.124	258.180	-1033.092	-423.180	322.356	-878.285
*	3	2.710	-424.565	112.755	-996.192	-182.529	147.785	-841.385
*	4	3.650	-375.034	-4.990	-962.517	-112.573	3.440	-807.710
*	5	4.590	-429.470	-108.448	-928.842	-171.585	-126.618	-774.035
*	6	5.620	-592.577	-205.406	-891.942	-368.418	-252.722	-737.135
*	7	6.650	-846.717	-285.210	-855.043	-686.303	-361.672	-700.235
2-	1	7.250	-1029.708	-323.790	-833.548	-920.265	-417.231	-678.741
2-	3	0.000	-1029.708	833.548	-323.790	-920.265	678.741	-417.231
*	1	0.550	-592.865	754.974	-323.790	-565.455	611.478	-417.231
*	2	1.680	169.045	593.540	-323.790	47.435	473.284	-417.231
*	3	2.810	746.634	423.263	-323.790	504.167	335.090	-417.231
*	4	4.180	1173.135	199.366	-323.790	848.472	167.545	-417.231
*	5	5.550	1292.897	-24.530	-323.790	963.240	0.000	-417.231
*	6	6.920	1115.398	-228.683	-323.790	848.472	-167.545	-417.231
*	7	8.290	668.033	-424.404	-323.790	504.167	-335.090	-417.231
*	8	9.420	109.240	-563.627	-323.790	47.435	-473.284	-417.231
*	9	10.550	-605.737	-701.821	-323.790	-565.455	-611.478	-417.231
3-	2	11.100	-1010.236	-769.083	-323.790	-920.265	-678.741	-417.231
3-	4	0.000	-1010.236	323.790	-769.083	-920.265	417.231	-678.741
*	1	0.600	-827.245	285.210	-790.578	-686.303	361.672	-700.235
*	2	1.630	-573.105	205.406	-827.478	-368.418	252.722	-737.135
*	3	2.660	-409.997	108.448	-864.377	-171.585	126.618	-774.035
*	4	3.600	-355.562	4.990	-898.052	-112.573	-3.440	-807.710
*	5	4.540	-405.092	-113.935	-931.728	-182.529	-147.785	-841.385
*	6	5.570	-594.651	-258.180	-968.627	-423.180	-322.356	-878.285
*	7	6.600	-942.832	-420.759	-1005.527	-852.473	-514.082	-915.184
4-	3	7.250	-1252.170	-532.187	-1028.813	-1228.448	-643.903	-938.470
4-	1	0.000	-1252.170	1028.811	-532.187	-1228.448	938.473	-643.903
*	1	0.550	-712.830	932.275	-532.187	-737.863	845.471	-643.903
*	2	1.780	299.557	713.135	-532.187	174.154	637.485	-643.903
*	3	3.010	1039.641	489.504	-532.187	830.350	429.499	-643.903
*	4	4.280	1512.202	253.889	-532.187	1239.448	214.750	-643.903
*	5	5.550	1682.491	13.485	-532.187	1375.814	0.000	-643.903
*	6	6.820	1544.427	-231.706	-532.187	1239.448	-214.750	-643.903
*	7	8.090	1091.930	-481.685	-532.187	830.350	-429.499	-643.903
*	8	9.320	348.215	-728.355	-532.187	174.154	-637.485	-643.903
*	9	10.550	-701.665	-979.516	-532.187	-737.863	-845.471	-643.903
1-	4	11.100	-1271.642	-1093.277	-532.187	-1228.448	-938.473	-643.903

BOX FOR ROAD NO 3'

PICK-UP No. 1 *

No.	L (m)	M. MAXIMUM Case	M (tm)	S (t)	N (t)	M. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-1228.448	643.903	-938.470	C- 7	-1271.642	532.187	-1093.278
* 1	0.650	C- 8	-852.473	514.082	-915.184	C- 7	-962.305	420.759	-1069.992
* 2	1.680	C- 8	-423.180	322.356	-878.285	C- 7	-614.124	258.180	-1033.092
* 3	2.710	C- 8	-182.529	147.785	-841.385	C- 7	-424.565	112.755	-996.192
* 4	3.650	C- 8	-112.573	3.440	-807.710	C- 7	-375.034	-4.990	-962.517
* 5	4.590	C- 8	-171.585	-126.618	-774.035	C- 7	-429.470	-108.448	-928.842
* 6	5.620	C- 8	-368.418	-252.722	-737.135	C- 6	-592.977	-207.718	-859.710
* 7	6.650	C- 8	-686.303	-361.672	-700.235	C- 6	-849.497	-287.521	-822.810
2 - 1	7.250	C- 8	-920.265	-417.231	-678.741	C- 6	-1033.875	-326.101	-801.315
2 - 3	0.000	C- 8	-920.265	678.741	-417.231	C- 6	-1033.875	801.315	-326.101
* 1	0.550	C- 8	-565.455	611.478	-417.231	C- 6	-611.649	734.053	-326.101
* 2	1.680	C- 7	169.045	593.540	-323.790	C- 8	47.435	473.284	-417.231
* 3	2.810	C- 7	746.634	423.263	-323.790	C- 8	504.167	335.090	-417.231
* 4	4.180	C- 7	1173.135	199.366	-323.790	C- 8	848.472	167.545	-417.231
* 5	5.550	C- 6	1318.100	0.000	-326.101	C- 8	963.240	0.000	-417.231
* 6	6.920	C- 6	1164.791	-223.897	-326.101	C- 8	848.472	-167.545	-417.231
* 7	8.290	C- 6	713.964	-428.255	-326.101	C- 8	504.167	-335.090	-417.231
* 8	9.420	C- 6	138.826	-589.689	-326.101	C- 8	47.435	-473.284	-417.231
* 9	10.550	C- 8	-565.455	-611.478	-417.231	C- 6	-611.649	-734.053	-326.101
3 - 2	11.100	C- 8	-920.265	-678.741	-417.231	C- 6	-1033.875	-801.315	-326.101
3 - 4	0.000	C- 8	-920.265	417.231	-678.741	C- 6	-1033.875	326.101	-801.315
* 1	0.600	C- 8	-686.303	361.672	-700.235	C- 6	-849.497	287.521	-822.810
* 2	1.630	C- 8	-368.418	252.722	-737.135	C- 6	-592.977	207.718	-859.710
* 3	2.660	C- 8	-171.585	126.618	-774.035	C- 6	-427.489	110.759	-896.609
* 4	3.600	C- 8	-112.573	-3.440	-807.710	C- 6	-370.881	7.301	-930.285
* 5	4.540	C- 8	-182.529	-147.785	-841.385	C- 6	-418.239	-110.444	-963.960
* 6	5.570	C- 8	-423.180	-322.356	-878.285	C- 6	-605.418	-255.869	-1000.860
* 7	6.600	C- 8	-852.473	-514.082	-915.184	C- 6	-951.218	-418.448	-1037.759
4 - 3	7.250	C- 8	-1228.448	-643.903	-938.470	C- 6	-1259.053	-529.875	-1061.045
4 - 1	0.000	C- 8	-1228.448	938.473	-643.903	C- 6	-1259.053	1061.044	-529.875
* 1	0.550	C- 6	-704.395	955.895	-529.875	C- 8	-737.863	845.471	-643.903
* 2	1.780	C- 6	326.739	720.745	-529.875	C- 8	174.154	637.485	-643.903
* 3	3.010	C- 6	1068.638	485.595	-529.875	C- 8	830.350	429.499	-643.903
* 4	4.280	C- 6	1531.167	242.797	-529.875	C- 8	1239.448	214.750	-643.903
* 5	5.550	C- 6	1685.343	0.000	-529.875	C- 8	1375.814	0.000	-643.903
* 6	6.820	C- 7	1544.427	-231.706	-532.187	C- 8	1239.448	-214.750	-643.903
* 7	8.090	C- 7	1091.930	-481.685	-532.187	C- 8	830.350	-429.499	-643.903
* 8	9.320	C- 7	348.215	-728.355	-532.187	C- 8	174.154	-637.485	-643.903
* 9	10.550	C- 7	-701.665	-979.516	-532.187	C- 8	-737.863	-845.471	-643.903
1 - 4	11.100	C- 8	-1228.448	-938.473	-643.903	C- 7	-1271.642	-1093.277	-532.187

BOX FOR ROAD NO 3'

PICK-UP No. 1 *

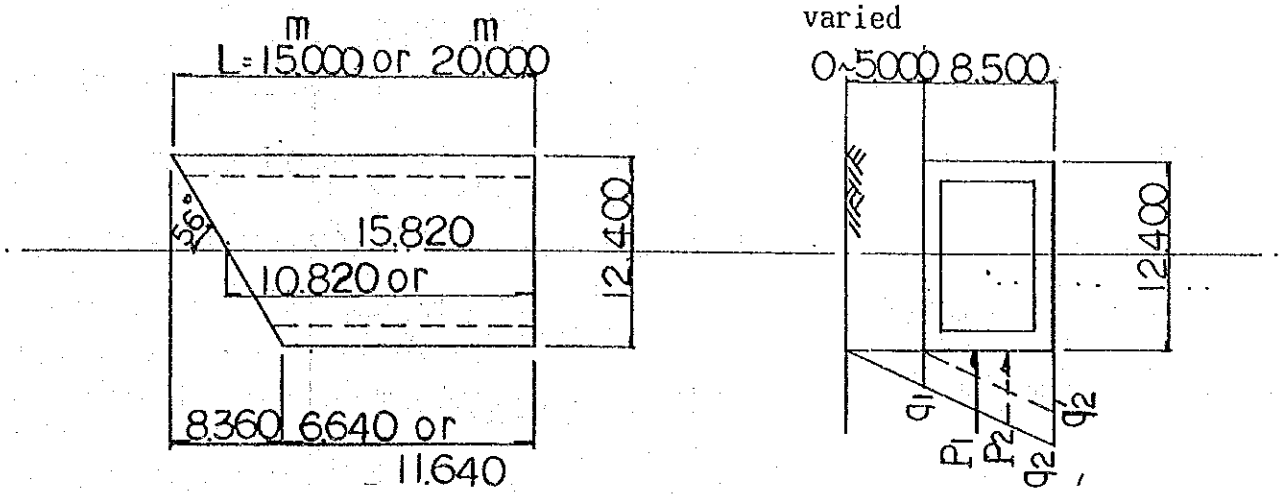
No.	L (m)	S. MAXIMUM Case	M (tm)	S (t)	N (t)	S. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-1228.448	643.903	-938.470	C- 6	-1259.053	529.875	-1061.045
* 1	0.650	C- 8	-852.473	514.082	-915.184	C- 6	-951.218	418.448	-1037.759
* 2	1.680	C- 8	-423.180	322.356	-878.285	C- 6	-605.418	255.869	-1000.860
* 3	2.710	C- 8	-182.529	147.785	-841.385	C- 6	-418.239	110.444	-963.960
* 4	3.650	C- 8	-112.573	3.440	-807.710	C- 6	-370.881	-7.301	-930.285
* 5	4.590	C- 7	-429.470	-108.448	-928.842	C- 8	-171.585	-126.618	-774.035
* 6	5.620	C- 7	-592.577	-205.406	-891.942	C- 8	-368.418	-252.722	-737.135
* 7	6.650	C- 7	-846.717	-285.210	-855.043	C- 8	-686.303	-361.672	-700.235
2 - 1	7.250	C- 7	-1029.708	-323.790	-833.548	C- 8	-920.265	-417.231	-678.741
2 - 3	0.000	C- 7	-1029.708	833.548	-323.790	C- 8	-920.265	678.741	-417.231
* 1	0.550	C- 7	-592.865	754.974	-323.790	C- 8	-565.455	611.478	-417.231
* 2	1.680	C- 7	169.045	593.540	-323.790	C- 8	47.435	473.284	-417.231
* 3	2.810	C- 6	713.964	428.255	-326.101	C- 8	504.167	335.090	-417.231
* 4	4.180	C- 6	1164.791	223.897	-326.101	C- 8	848.472	167.545	-417.231
* 5	5.550	C- 6	1318.160	0.000	-326.101	C- 7	1292.897	-24.530	-323.790
* 6	6.920	C- 8	848.472	-167.545	-417.231	C- 7	1115.398	-228.683	-323.790
* 7	8.290	C- 8	504.167	-335.090	-417.231	C- 6	713.964	-428.255	-326.101
* 8	9.420	C- 8	47.435	-473.284	-417.231	C- 6	138.826	-589.689	-326.101
* 9	10.550	C- 8	-565.455	-611.478	-417.231	C- 6	-611.649	-734.053	-326.101
3 - 2	11.100	C- 8	-920.265	-678.741	-417.231	C- 6	-1033.875	-801.315	-326.101
3 - 4	0.000	C- 8	-920.265	417.231	-678.741	C- 7	-1010.236	323.790	-769.083
* 1	0.600	C- 8	-686.303	361.672	-700.235	C- 7	-827.245	285.210	-790.578
* 2	1.630	C- 8	-368.418	252.722	-737.135	C- 7	-573.105	205.406	-827.478
* 3	2.660	C- 8	-171.585	126.618	-774.035	C- 7	-409.997	108.448	-864.377
* 4	3.600	C- 6	-370.881	7.301	-930.285	C- 8	-112.573	-3.440	-807.710
* 5	4.540	C- 6	-418.239	-110.444	-963.960	C- 8	-182.529	-147.785	-841.385
* 6	5.570	C- 6	-605.418	-255.869	-1000.860	C- 8	-423.180	-322.356	-878.285
* 7	6.600	C- 6	-951.218	-418.448	-1037.759	C- 8	-852.473	-514.082	-915.184
4 - 3	7.250	C- 6	-1259.053	-529.875	-1061.045	C- 8	-1228.448	-643.903	-938.470
4 - 1	0.000	C- 6	-1259.053	1061.044	-529.875	C- 8	-1228.448	938.473	-643.903
* 1	0.550	C- 6	-704.395	955.895	-529.875	C- 8	-737.863	845.471	-643.903
* 2	1.780	C- 6	326.739	720.745	-529.875	C- 8	174.154	637.485	-643.903
* 3	3.010	C- 7	1039.641	489.504	-532.187	C- 8	830.350	429.499	-643.903
* 4	4.280	C- 7	1512.202	253.889	-532.187	C- 8	1239.448	214.750	-643.903
* 5	5.550	C- 7	1682.491	13.485	-532.187	C- 6	1685.343	0.000	-529.875
* 6	6.820	C- 8	1239.448	-214.750	-643.903	C- 6	1531.167	-242.797	-529.875
* 7	8.090	C- 8	830.350	-429.499	-643.903	C- 6	1068.638	-485.595	-529.875
* 8	9.320	C- 8	174.154	-637.485	-643.903	C- 7	348.215	-728.353	-532.187
* 9	10.550	C- 8	-737.863	-845.471	-643.903	C- 7	-701.665	-979.510	-532.187
1 - 4	11.100	C- 8	-1228.448	-938.473	-643.903	C- 7	-1271.642	-1093.277	-532.187

BOX FOR ROAD NO 3'

PICK-UP No. 1 *

No.	L (m)	N. MAXIMUM Case	M (tm)	S (t)	N (t)	N. MINIMUM Case	M (tm)	S (t)	N (t)
1 - 2	0.000	C- 8	-1228.448	643.903	-938.470	C- 7	-1271.642	532.187	-1093.278
* 1	0.650	C- 8	-852.473	514.082	-915.184	C- 7	-962.305	420.759	-1069.992
* 2	1.680	C- 8	-423.180	322.356	-878.285	C- 7	-614.124	258.180	-1033.092
* 3	2.710	C- 8	-182.529	147.785	-841.385	C- 7	-424.565	112.755	-996.192
* 4	3.650	C- 8	-112.573	3.440	-807.710	C- 7	-375.034	-4.990	-962.517
* 5	4.590	C- 8	-171.585	-126.618	-774.035	C- 7	-429.470	-108.448	-928.842
* 6	5.620	C- 8	-368.418	-252.722	-737.135	C- 7	-592.577	-205.406	-891.942
* 7	6.650	C- 8	-686.303	-361.672	-700.235	C- 7	-846.717	-285.210	-855.043
2 - 1	7.250	C- 8	-920.265	-417.231	-678.741	C- 7	-1029.708	-323.790	-833.548
2 - 3	0.000	C- 7	-1029.708	833.548	-323.790	C- 8	-920.265	678.741	-417.231
* 1	0.550	C- 7	-592.865	754.974	-323.790	C- 8	-565.455	611.478	-417.231
* 2	1.680	C- 7	169.045	593.540	-323.790	C- 8	47.435	473.284	-417.231
* 3	2.810	C- 7	746.634	423.263	-323.790	C- 8	504.167	335.090	-417.231
* 4	4.180	C- 7	1173.135	199.366	-323.790	C- 8	848.472	167.545	-417.231
* 5	5.550	C- 7	1292.897	-24.530	-323.790	C- 8	963.240	0.000	-417.231
* 6	6.920	C- 7	1115.398	-228.683	-323.790	C- 8	848.472	-167.545	-417.231
* 7	8.290	C- 7	668.033	-424.404	-323.790	C- 8	504.167	-335.090	-417.231
* 8	9.420	C- 7	109.240	-563.627	-323.790	C- 8	47.435	-473.284	-417.231
* 9	10.550	C- 7	-605.737	-701.821	-323.790	C- 8	-565.455	-611.478	-417.231
3 - 2	11.100	C- 7	-1010.236	-769.083	-323.790	C- 8	-920.265	-678.741	-417.231
3 - 4	0.000	C- 8	-920.265	417.231	-678.741	C- 6	-1033.875	326.101	-801.315
* 1	0.600	C- 8	-686.303	361.672	-700.235	C- 6	-849.497	287.521	-822.810
* 2	1.630	C- 8	-368.418	252.722	-737.135	C- 6	-592.977	207.718	-859.710
* 3	2.660	C- 8	-171.585	126.618	-774.035	C- 6	-427.489	110.759	-896.609
* 4	3.600	C- 8	-112.573	-3.440	-807.710	C- 6	-370.881	7.301	-930.285
* 5	4.540	C- 8	-182.529	-147.785	-841.385	C- 6	-418.239	-110.444	-963.960
* 6	5.570	C- 8	-423.180	-322.356	-878.285	C- 6	-605.418	-255.869	-1000.860
* 7	6.600	C- 8	-852.473	-514.082	-915.184	C- 6	-951.218	-418.448	-1037.759
4 - 3	7.250	C- 8	-1228.448	-643.903	-938.470	C- 6	-1259.053	-529.875	-1061.045
4 - 1	0.000	C- 6	-1259.053	1061.044	-529.875	C- 8	-1228.448	938.473	-643.903
* 1	0.550	C- 6	-704.395	955.895	-529.875	C- 8	-737.863	845.471	-643.903
* 2	1.780	C- 6	326.739	720.745	-529.875	C- 8	174.154	637.485	-643.903
* 3	3.010	C- 6	1068.638	485.595	-529.875	C- 8	830.350	429.499	-643.903
* 4	4.280	C- 6	1531.167	242.797	-529.875	C- 8	1239.448	214.750	-643.903
* 5	5.550	C- 6	1685.343	0.000	-529.875	C- 8	1375.814	0.000	-643.903
* 6	6.820	C- 6	1531.167	-242.797	-529.875	C- 8	1239.448	-214.750	-643.903
* 7	8.090	C- 6	1068.638	-485.595	-529.875	C- 8	830.350	-429.499	-643.903
* 8	9.320	C- 6	326.739	-720.745	-529.875	C- 8	174.154	-637.485	-643.903
* 9	10.550	C- 6	-704.395	-955.895	-529.875	C- 8	-737.863	-845.471	-643.903
1 - 4	11.100	C- 6	-1259.053	-1061.044	-529.875	C- 8	-1228.448	-938.473	-643.903

Calculation of revolution for skew box culverts [TO NO3 BOX FOR ROAD]



where

L : construction length

load

earth pressure

$q_1 = 19.6 \times 0.50 \times 5.00 = 49.000$ KN/m²

$q_2 = 19.6 \times 0.50 \times 13.50 = 132.300$ KN/m²

$q_2' = 19.6 \times 0.50 \times 8.50 = 83.300$ KN/m²

$P_1 = \frac{1}{2}(49.000+132.300) \times 8.50 = 770.525$ KN/m

$P_2 = \frac{1}{2} \times 83.300 \times 8.50 = 354.025$ KN/m

$P_1 - P_2 = 416.500$ KN/m

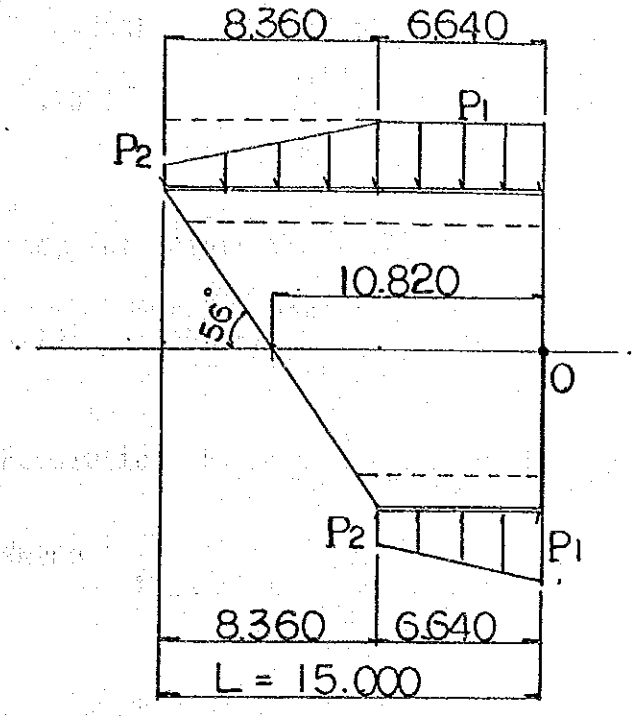
weight of concrete and surcharge

$w_1 = 23.6(12.4 \times 8.5 - 10.0 \times 6.0) \times 10.820 = 11592.980$ KN
(15.820) (16950.180)

$w_1 = 18.6 \times 12.4 \times 10.820 \times 5.00/2 = 6238.812$ KN
(15.820) (9121.8120)

$w = 17831.9$ KN
(26072.0)

study of safety for L = 15.00 m



Revolution force for point 0

	P_H (KN)		x (m)	Mo (KN·m)
+	770.525 × 15.000	= 11557.9	7.500	86684.3
−	$\frac{1}{2}$ × 416.500 × 8.360	= −1741.0	12.213	−21263.8
−	770.525 × 6.640	= −5116.3	3.320	−16986.1
+	$\frac{1}{2}$ × 416.500 × 6.640	= 1382.8	4.427	6121.6
total		= 6083.4		54556.0

Resistance force for point 0

Pv(KN)	$P_H = 0.55 \cdot P$(KN)	x (m)	M_R(KNm)
17831.9	9807.5	5.410	53058.6

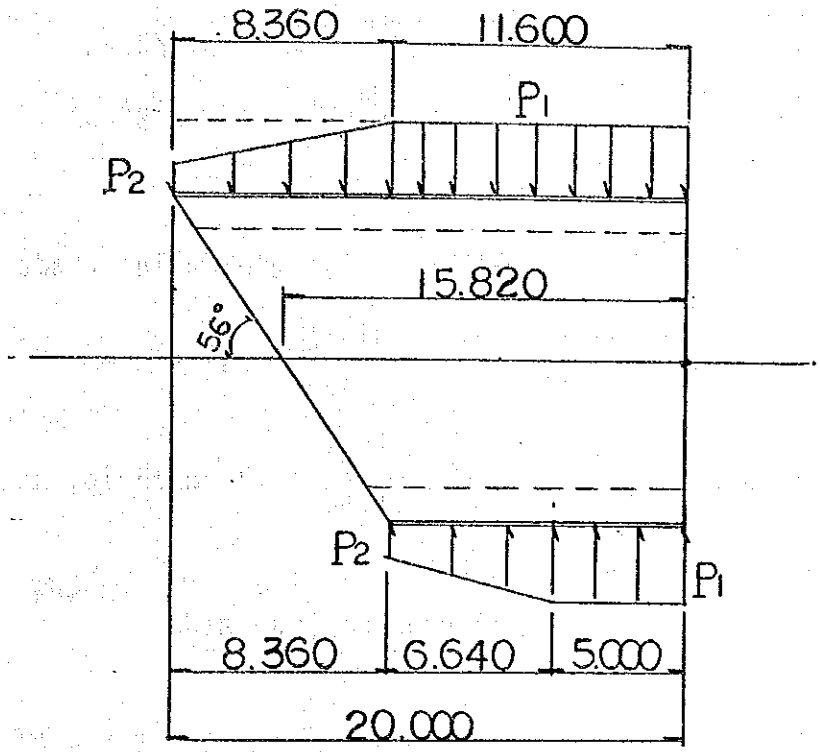
stady of safety for revolution

Slide $Fs = \dfrac{9807.5 \times 1.2 \times 1.15}{6083.4 \times 1.5 \times 1.15} = 1.29 > 1.0$ OK

Revolution $F_R = \dfrac{53058.6 \times 1.2 \times 1.15}{54556.0 \times 1.5 \times 1.15} = 0.78 < 1.0$ OUT

Where
this case is insecurity

study of safety for L = 20.00 m



Revolution force for point 0

	P_H (KN)		x (m)	Mo (KN·m)
+	770.525 × 20.000	= 15410.5	10.000	154105.0
−	$\frac{1}{2}$ × 416.500 × 8.360	= −1741.0	17.213	−29967.8
−	770.525 × 6.640	= −8968.9	5.820	−52199.0
+	$\frac{1}{2}$ × 416.500 × 6.640	= 1382.8	9.427	13035.8
total		= 6083.4	——	84974.0

Resistance force for point 0

Pv(KN)	$P_H = 0.55 \cdot Pv$ (KN)	x (m)	M_R (KNm)
26072.0	14339.6	7.910	113426.2

stady of safety for revolution

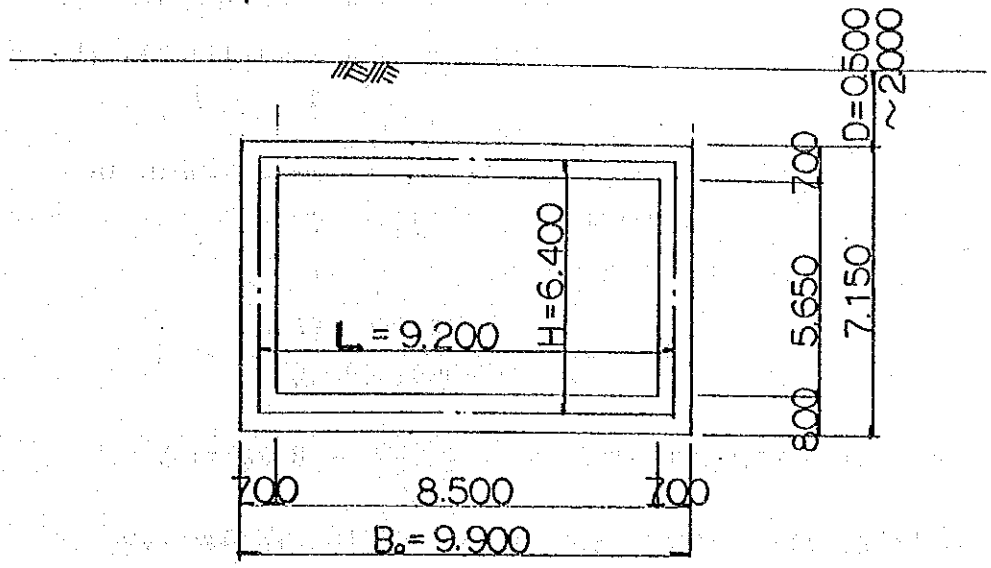
Slide $Fs = \dfrac{14339.6 \times 1.2 \times 1.15}{6083.4 \times 1.5 \times 1.15} = 1.57 > 1.0$ OK

Revolution $F_R = \dfrac{113426.2 \times 1.2 \times 1.15}{84974.0 \times 1.5 \times 1.15} = 1.07 > 1.0$ OK

Where
this case is security

NO ④ BOX CULVERT FOR RORD (Similar Box - NO.⑤, NO.⑥)

1) Shape and Size



Where

D^m = depth of asphalt and similar surface soil.

2) Factor of section

$A = 1.00 \times 0.70 = 0.7000\ m^2$

$I = \frac{1.00 \times 0.70^3}{12} = 0.02858\ m^2$

$A = 1.00 \times 0.80 = 0.8000\ m^2$

$I = \frac{1.00 \times 0.80^3}{12} = 0.04267\ m^2$

$A =$ $=$

$I =$ $=$

$Ec = 25\ KN/mm^2 = 2.5 \times 10^7\ KN/m^2$

No.④ BOX CULVERT FOR ROAD

application Boxculverts No.⑤⑥

1. calculation for bending moment (U.L.S)

1) For upper slab

section $b=100^{cm}$ $h=70$ $d=64.0$ $d'=6.0$

a) middle point ②~③ $Mu.max=675.6^{KNm}$

$$A_s=\begin{cases} Y_{32}-300^{ctc}= 8.042/0.300 \\ Y_{25}-300^{ctc}= 4.909/0.300 \end{cases}=43.17\ cm^2$$

$$X=\frac{0.87\times 41000\times 43.17}{0.40\times 2500\times 100}=15.4^{cm}$$

$$Z=64.0-\frac{15.4}{2}=56.3^{cm}<0.95\times 64.0=60.8^{cm}$$

$M_{RS}=0.87\times 41000\times 43.17\times 56.3\times 10^{-5}=867.0^{KNm}>Mu=675.6^{KNm}$

$M_{RC}=0.40\times 2500\times 100\times 15.4\times 56.3\times 10^{-5}=867.0^{KNm}>Mu=675.6^{KNm}$ OK

b) intersection point ②=③ $Mu.min=-548.8^{KNm}$

$$A_s=Y_{25}-150^{ctc}=4.909/0.15=32.73\ cm^2$$

$$X=\frac{0.87\times 41000\times 32.73}{0.40\times 2500\times 100}=11.8^{cm}$$

$$Z=64.0-\frac{11.8}{2}=58.1^{cm}<0.95\times 64.0=60.8^{cm}$$ OK

$M_{RS}=0.87\times 41000\times 32.73\times 58.1\times 10^{-5}=678.3^{KNm}>Mu=598.8^{KNm}$

$M_{RC}=0.40\times 2500\times 100\times 11.8\times 58.1\times 10^{-5}=685.5^{KNm}>Mu=598.8^{KNm}$ OK

2) For bottom slab

section $b=100^{cm}$ $h=80$ $d=73.0(74.0)$ $d'=7.0(6.0)$

a) middle point ④~① $Mu.max=805.8^{KNm}$

$$A_s=\begin{cases} Y_{32}-300^{ctc}= 8.042/0.300 \\ Y_{25}-300^{ctc}= 4.909/0.300 \end{cases}=43.17\ cm^2$$

$$X=\frac{0.87\times 41000\times 43.17}{0.40\times 2500\times 100}=15.4^{cm}$$

$$Z=74.0-\frac{15.4}{2}=66.3^{cm}<0.95\times 74.0=70.3^{cm}$$ OK

$M_{RS}=0.87\times 41000\times 43.17\times 66.3\times 10^{-5}=1021.0^{KNm}>Mu=805.8^{KNm}$

$M_{RC}=0.40\times 2500\times 100\times 15.4\times 66.3\times 10^{-5}=1021.0^{KNm}>Mu=805.8^{KNm}$

OK

b) intersection point ④=① Mu.min=−674.9^{KNm}

$A_s = Y_{25} - 150^{ctc} = 4.909/0.15 = 32.73\ cm^2$

$$X = \frac{0.87\times 41000 \times 32.73}{0.40\times 2500\times 100} = 11.8^{cm}$$

$$Z = 73.0 - \frac{11.8}{2} = 67.1^{cm} < 0.95\times 73.0 = 69.3^{cm} \quad OK$$

$M_{RS} = 0.87\times 41000 \times 32.73 \times 67.1\times 10^{-5} = 783.4^{KNm} > Mu = 674.9^{Nm}$

$M_{RC} = 0.40\times 2500\times 100 \times 11.8\times 67.1\times 10^{-5} = 791.8^{KNm} > Mu = 674.9^{Nm}$ OK

Notice: this bar is decide for shearing forces without bending moments.

2. calculation for shearing force (U.L.S)

a) For upper slab

section b =100^{cm} h =70 d=64.0 d´=6.0

intersection point ②=③ Su.max = 358.7^{KN}

$A_s = Y_{32} - 150^{ctc} = 8.042/0.15 = 53.61\ cm^2$

$$P = \frac{53.61}{100\times 64.0}\times 100 = 0.838\ \%$$

$$Vc = \frac{358.7\times 10^3}{100\times 64.0} = 56.1\ N/cm^2$$

$$< Vca = 50.0 + 15.0\ \frac{(0.838-0.50)}{0.50} = 60.1\ N/cm^2$$

b) For bottom slab

section b =100 h =80 d=73.0 d´=7.0

intersection point ④=① Su.min =−390.2^{KN}

$A_s = Y_{32} - 150^{ctc} = 53.61\ cm^2$

$$P = \frac{53.61}{100\times 73.0}\times 100 = 0.734\ \%$$

$$Vc = \frac{390.2\times 10^3}{100\times 73.0} = 53.5\ N/cm^2$$

$$< Vca = 50.0 + 15.0\ \frac{(0.734-0.50)}{0.50} = 57.0\ N/cm^2 \quad OK$$

Notice: this bar is decide for shearing force about point ②, ③ and ④, ①