REPUBLIC OF INDONESIA

MINISTRY OF COMMUNICATIONS
DIRECTORATE GENERAL OF LAND TRANSPORT
AND INLAND WATERWAYS

TENDER DOCUMENTS
FOR
NEW RAILWAY LINE FOR CENGKARENG AIRPORT CONSTRUCTION PROJECT

STRUCTURAL CALCULATION SHEETS

PACKAGE I CIVIL AND ARCHITECTURAL WORK

6 of 11

AUGUST 1984

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

SDF
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STRUCTURAL CALCULATION SHEETS

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§§ 9. VIADUCT OF PLATFORM VP2

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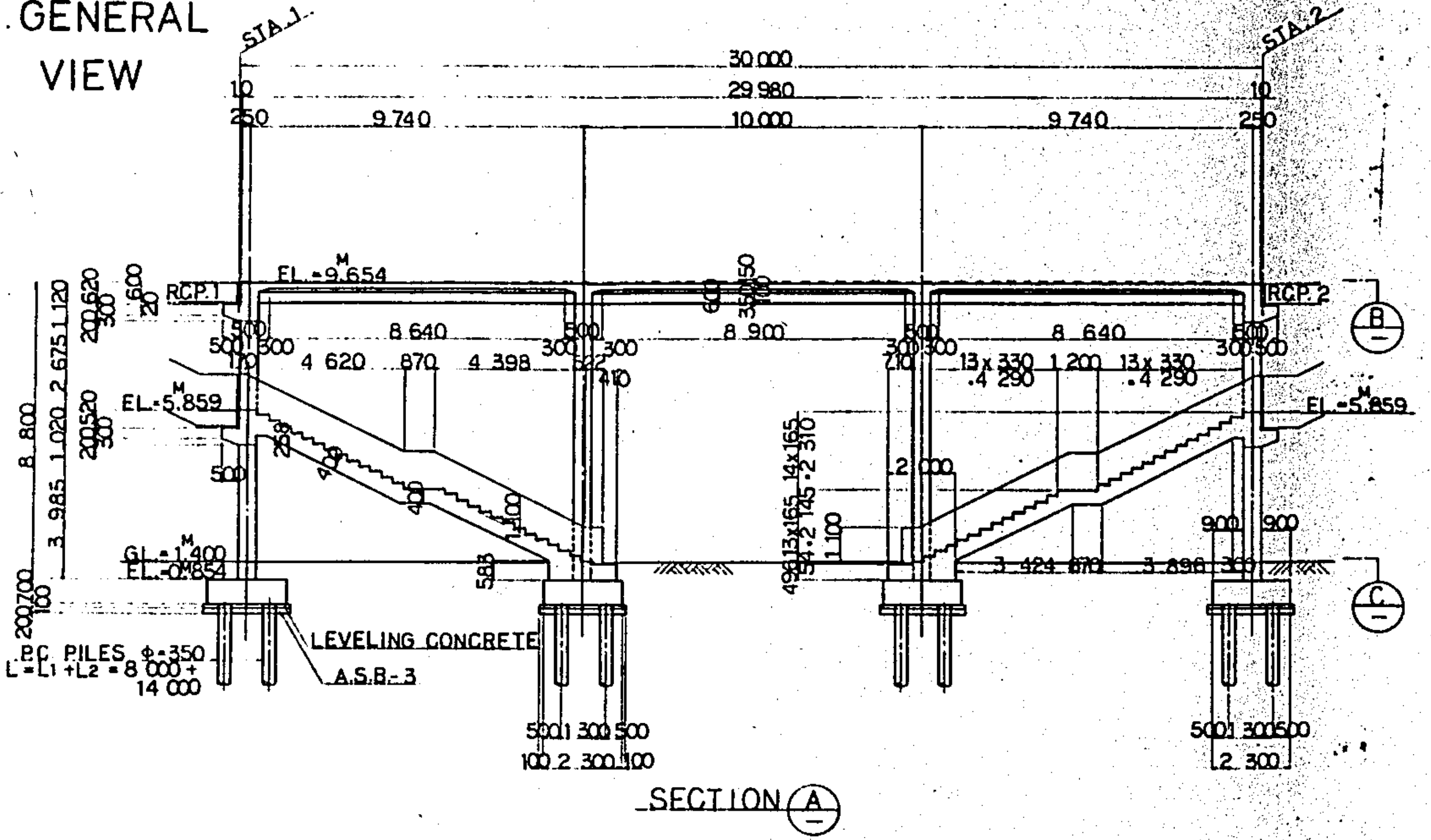
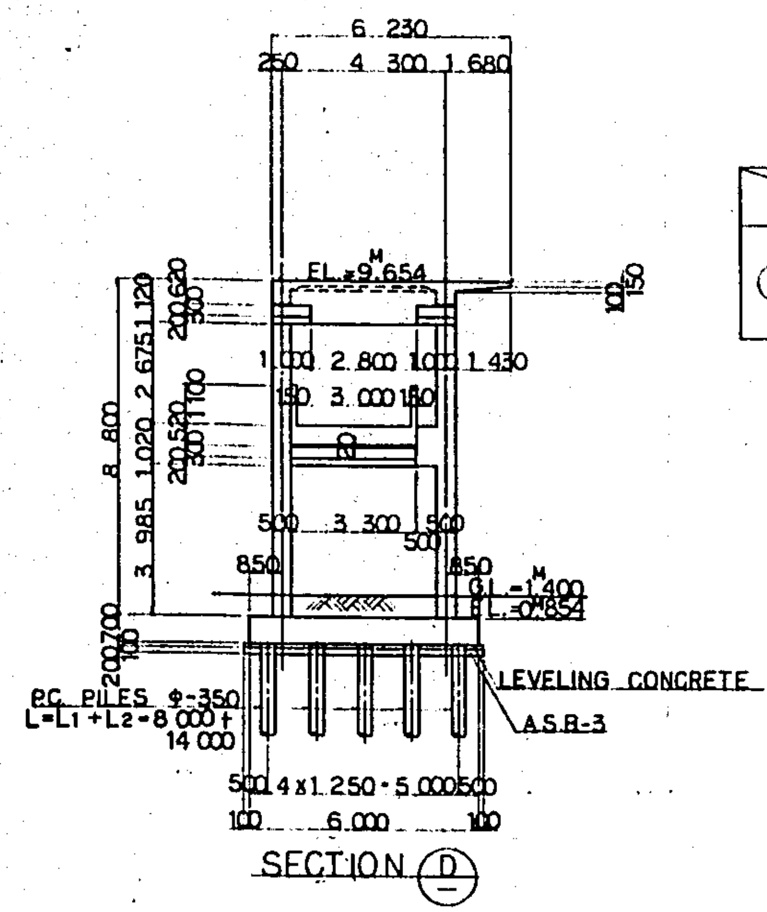
§ 1. GENERAL VIEW



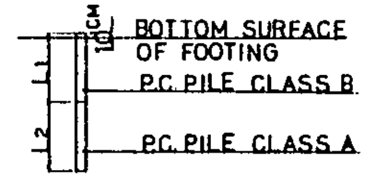


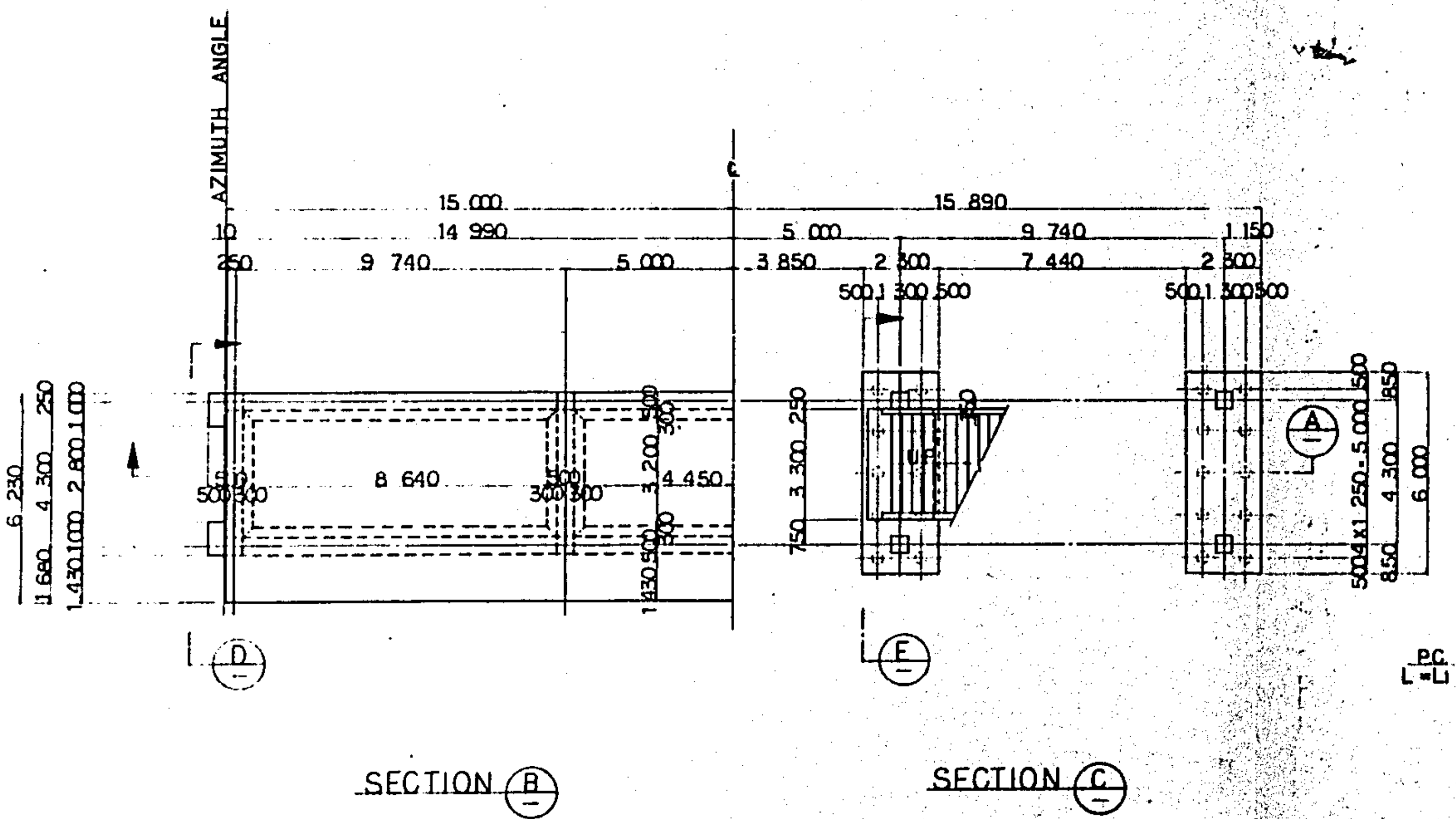
DIMENSION SCHEDULE

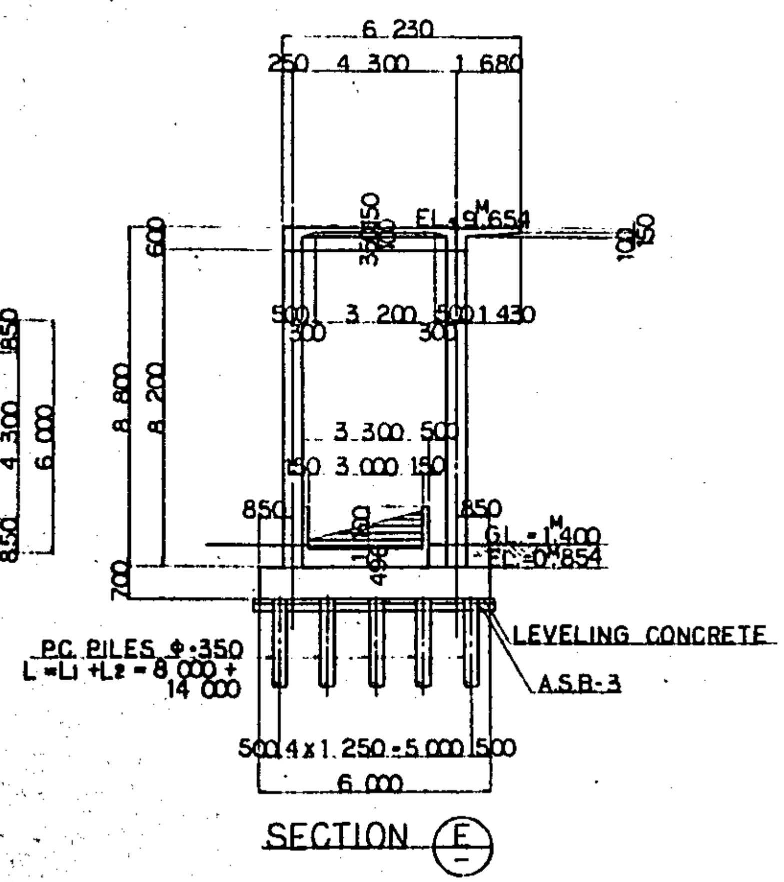
		STATION	AZIMUTH ANGLE
(VP/2)	STA.1	17K 350M 000	345° 30′ 45″
	STA.2	17K 380M 000	〃

NOTES:

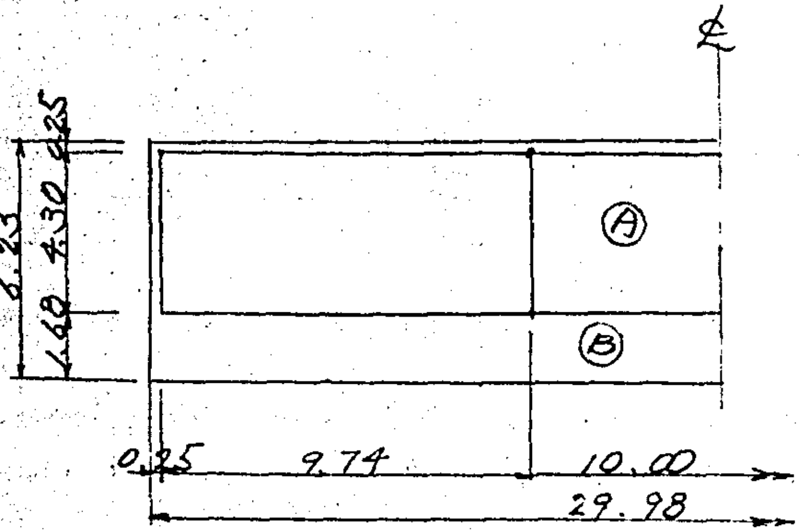
1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT: CS-229~234
3. TYPES OF P.C. PILE







§2. Calculation of slab



1. Slab for calculation

Slab Ⓐ ------- Two-way slab

Slab Ⓑ ------ Cantilever slab

2. Calculation of slab Ⓐ

Four sides fixed span

l_{dx} = 4.30 − 0.50 = 3.80 m

l_{dy} = 10.00 − 0.50 = 9.50 m

Four sides semi-fixed span

l_{ed} = 3.80 + 0.15 = 3.95 m

l_{ey} = 9.50 + 0.15 = 9.65 "

Span ratio

$$m_\lambda = \frac{l_{dx}}{l_{dy}} = \frac{3.80}{9.50} = 0.40 > 0.40$$

$$m_e = \frac{l_{ex}}{l_{ey}} = \frac{3.95}{9.65} = 0.41 > 0.40$$

From the above, the slab is considered as a two-way slab for calculation

3. load calculations

a) Dead load

slad	$2.5^{t/m^3} \times 0.15$	=	$0.375^{t/m^2}$
pavemet	1.1 " $\times 0.05$	=	0.055 "
		w =	$0.43^{t/m^2}$

b) pedestrian load

$w = 0.50^{t/m^2}$

4. Bending moment

1) Dead load

(1) Sharing of load

$l_{dx} = 3.80^{m}$ $l_{dy} = 9.50^{m}$

Coefficient of load sharing in the direction X or Y

$$C_x = \frac{l_{dy}^4}{l_{dx}^4 + l_{dy}^4} = \frac{9.50^4}{3.80^4 + 9.50^4} = 0.975$$

$$C_y = \frac{l_{dx}^4}{l_{dx}^4 + l_{dy}^4} = \frac{3.80^4}{3.80^4 + 9.50^4} = 0.025$$

Sharing load

$w_{dx} = w_d \cdot C_x = 0.43 \times 0.975 = 0.42^{t/m^2}$

$w_{dy} = w_d \cdot C_y =$ 〃 $\times 0.025 = 0.01$ 〃

(ii) Bending moment

$m_{ex1} = \frac{1}{24} w_{dx} \cdot l_{dx}^2 = \frac{1}{24} \times 0.42 \times 3.80^2 = 0.25^{tm}$

$m_{ey1} = \frac{1}{24} w_{dy} \cdot l_{dy}^2 = \frac{1}{24} \times 0.01 \times 9.50^2 = 0.04$ "

$m_{ex2} = -\frac{1}{12} w_{dx} \cdot l_{dx}^2 = -\frac{1}{12} \times 0.42 \times 3.80^2 = -0.51$ "

$m_{ey2} = -\frac{1}{24} \cdot w \cdot x^2 = -\frac{1}{24} \times 0.43 \times 3.80^2 = -0.26$ "

Torsional coefficient

$$\varphi_x = \varphi_y = \frac{5}{18} \times \frac{l_{dx}^2 \times l_{dy}^2}{l_{dx}^4 + l_{dy}^4}$$

$$= \frac{5}{18} \times \frac{3.80^2 \times 9.50^2}{3.80^4 + 9.50^4} = 0.0433$$

at the span center point

direction X

$M_x = m_{ex1} \cdot (1 - \varphi_x) = 0.25 \times (1 - 0.0433) = 0.24^{tm}$

direction Y

$M_y = m_{ey1} \cdot (1 - \varphi_y) = 0.04 \times (1 - 0.0433) = 0.04$ "

at the support point

direction X

$M_x = -0.51^{tm}$

direction Y

$M_y = -0.26^{tm}$

2) Pedestian load (people load)

$We = 0.50^{t/m^2}$

i) Sharing of load

$lex = 3.95^m$ $ley = 9.65^m$

direction X

$$Cx = \frac{ley^4}{lex^4 + ley^4} = \frac{9.65^4}{3.95^4 + 9.65^4} = 0.973$$

direction Y

$$Cy = \frac{lex^4}{lex^4 + ley^4} = \frac{3.95^4}{3.95^4 + 9.65^4} = 0.027$$

Shared load in the direction of X or Y

direction X

$Wex = We \cdot Cx = 0.50 \times 0.973 = 0.49^{t/m^2}$

direction Y

$Wey = We \cdot Cy = 0.50 \times 0.027 = 0.01$ "

ii) Bending moment

Four sides simple

$$M_1 = \frac{1}{8} w l^2 \left(1 - \frac{5}{6} \cdot \frac{lx^2 \cdot ly^2}{lx^4 + ly^4}\right)$$

Four sides fixed

$$M_2 = \frac{1}{24} w l^2 \left(1 - \frac{5}{18} \cdot \frac{lx^2 \cdot ly^2}{lx^4 + ly^4}\right)$$

Four sides semi-fixed

$$\frac{1}{2}(M_1 + M_2) = \frac{1}{12} w l^2 \cdot \left(1 - \frac{25}{36} \cdot \frac{lx^2 \cdot ly^2}{lx^4 + ly^4}\right)$$

$$mex = \frac{1}{12} wex \cdot lex^2 = \frac{1}{12} \times 0.49 \times 3.95^2 = 0.64^{tm}$$

$$mey = \frac{1}{12} wey \cdot ley^2 = \frac{1}{12} \times 0.01 \times 9.65^2 = 0.08$$

Torsional coefficient

$$\varphi x = \varphi y = \frac{25}{36} \cdot \frac{lex^2 \cdot ley^2}{lex^4 + ley^4}$$

$$= \frac{25}{36} \times \frac{3.95^2 \times 9.65^2}{3.95^4 + 9.65^4} = 0.1132$$

At the span center point

direction X

$$Mx = mex(1 - \varphi x) = 0.64 \times (1 - 0.1132) = 0.57^{tm}$$

direction Y

$$My = mey(1 - \varphi y) = 0.08 \times (1 - 0.1132) = 0.07$$

At the support point

direction X

$$Mx = -0.65^{tm}$$

direction Y

$$My = -\frac{1}{24} wex^2 = -\frac{1}{24} \times 0.50 \times 3.95^2 = -0.33^{tm}$$

5. Combined moment

(Dead load + Pedestian load)

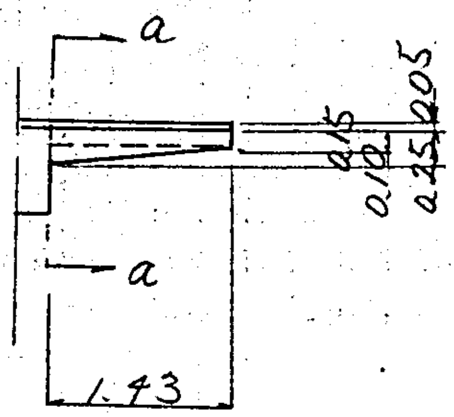
(tm)

		Dead load	Pedestian load	total
At the support point	x	−0.51	−0.65	−1.16
	y	−0.26	−0.33	−0.59
At the span center point	x	0.24	0.57	0.81
	y	0.04	0.07	0.11

6. Calculation of slab Ⓑ

1) Calculation of cantilever slab

(a) Dead load



$$M_{a-a} = 2.5^{t/m^3} \times 1.43 \times 0.15 \times 0.715$$
$$+ 2.5 \times 1.43 \times 0.10 \times 1/2 \times 0.417$$
$$+ 1.1 \times 0.05 \times 1.43 \times 0.715 = 0.51^{tm}$$

(b) Pedestrian load

$$M_{a-a} = 0.50^{t/m^2} \times 1.43 \times 0.715 = 0.51^{tm}$$

2) Combined stress

(Dead load + Pedestrian load)

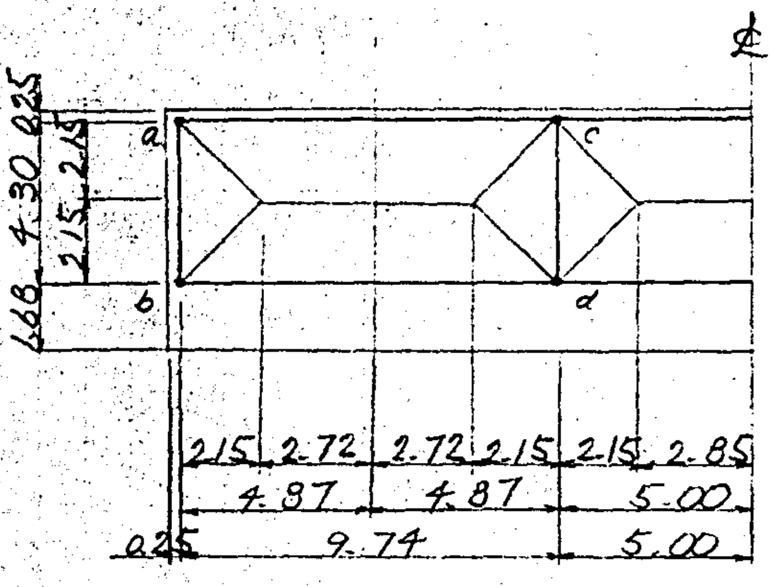
$$M_{a-a} = 0.51 + 0.51 = 1.02^{tm}$$

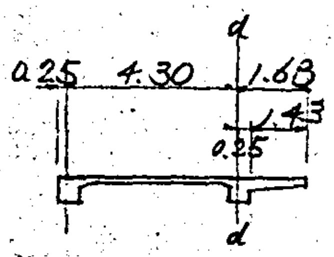
Stress calculation

	Ⓐ Salb				Ⓑ salb
	cross section		railway profile		
	at support point	at span center point	at support point	at span center point	Front face of colum
M (tm)	−1.16	0.81	−0.59	0.11	1.02
N (t)					
S (t)					
b (cm)	100	100	100	100	100
h (cm)	25	15	25	15	25
d (cm)	22	12	21	11	22
d' (cm)	3	3	4	4	3
As (cm^2)	D10-15^{cm} = 4.76	D10-15^{cm} = 4.76	D10-20^{cm} = 3.57	D10-20^{cm} = 3.57	D10-15^{cm} = 4.76
p	0.00216	0.00397	0.00170	0.00325	0.00216
As' (cm^2)					
p'					
e = M/N (cm)					
e = M/N + u (cm)					
e = M/N − u (cm)					
e/h					
d/e					
d'/h					
d'/d					
M/bd^2 (kg/cm^2)	2.40	5.63	1.34	0.91	2.11
k					
c					
j					
1/Lc	9.63	7.62	10.63	8.22	9.63
1/Ls	500	279	630	338	500
β = σs/σc					
σc (kg/cm^2)	23.1	42.9	14.2	7.5	20.3
σs (kg/cm^2)	1200	1570	840	310	1050
τ (kg/cm^2)					
σsa (kg/cm^2)	1800	〃	〃	〃	〃
σca (kg/cm^2)	90	〃	〃	〃	〃
τa (kg/cm^2)					
Nomogram number	M-1	〃	〃	〃	〃
combination	Dead load + Pedestrian load	〃	〃	〃	〃

§3. Calculation of Torsional moment

1) Dead load





For the calculation, the dimension is assumed as 10.0m

a) Moment of supporting point at the intermediate span

Pavement $1.1^{t/m^3} \times 0.05 = 0.055^{t/m^2}$

Slab $2.5'' \times 0.15 = 0.375''$

$Wd_0 = 0.43^{t/m^2}$

$l_x = 10.00^m \quad l_y = 4.30^m$

Distribution of load

$$C_y = \frac{l_x^4}{l_y^4 + l_x^4} = \frac{10.00^4}{4.30^4 + 10.00^4} = 0.967$$

$W_y = 0.43 \times 0.967 = 0.416^{t/m^2}$

Moment of supporting point

$M = \frac{1}{12} w l_y^2 = \frac{1}{12} \times 0.416 \times 4.30^2 = 0.64^{tm}$

b) Moment of cantilever slab

Pavement $1.1^{t/m^3} \times 0.05 = 0.055^{t/m^2}$

Slab $2.5'' \times 0.15 = 0.375''$

" $2.5'' \times 0.10 \times 1/2 = 0.125''$

$M_d = 0.055^{t/m^2} \times 1.68^2 \times 1/2 + 0.375^{t/m^2} \times 1.43 \times 0.965$

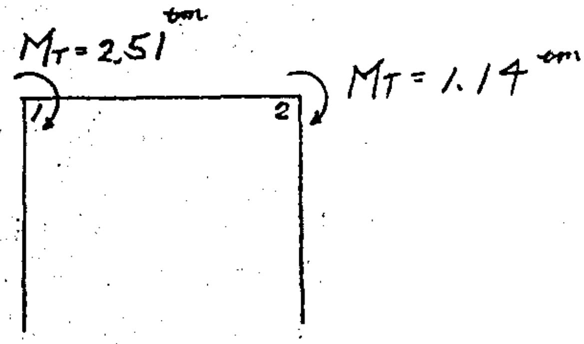
$+ 0.125^{t/m^2} \times 1.43 \times 0.727 = 0.73^{tm}$

c) Tortional moment caused by Dead load

i) ①-① Rahmen (Rigid frame)

$M_{Ta} = 0.64 \times (2.15 \times 1/2 + 2.85) = 2.51^{tm}$

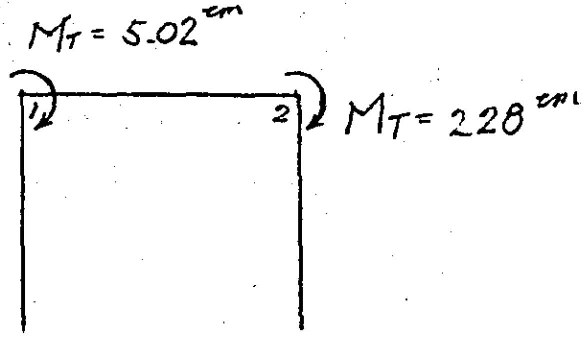
$M_{Tb} = -2.51^{tm} + 0.73 \times 5.00 = 1.14''$



ii) ②-② Rahmen (Rigid frame)

$M_{TC} = 2.51 \times 2 = 5.02^{tm}$

$M_{Td} = 1.14 \times 2 = 2.28$ "



2) Pedestrian load (People load)

a) Moment of supporting point at the intermediate span

$w = 0.35^{t/m^2}$

load carrying factor $C_y = 0.967$

Distribution of load $w_y = 0.35 \times 0.967 = 0.34^{tm}$

Moment of supporting point

$M = \frac{1}{12} \times 0.34 \times 4.30^2 = 0.52^{tm}$

b) Cantilever slab

$w = 0.35^{t/m^2}$

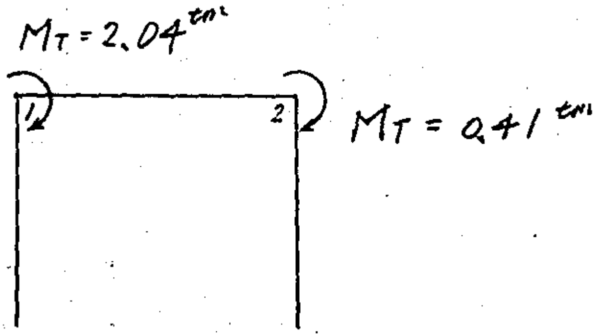
$M_d = 0.35^{t/m^2} \times 1.68^2 \times 1/2 = 0.49^{tm}$

d) Torsional moment caused by pedestrian load (people load)

i) ①-① Rahmen (Rigid frame)

$M_{Ta} = 0.52 \times (2.15 \times 1/2 + 2.85) = 2.04^{tm}$ ↻

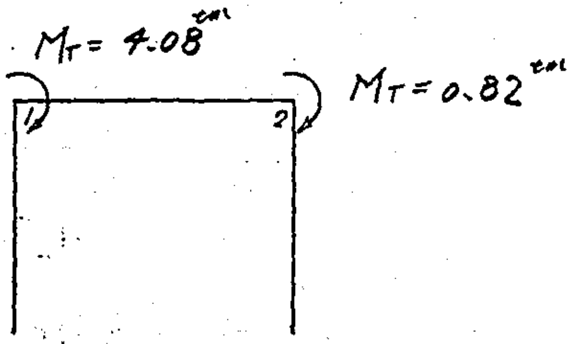
$M_{Tb} = -2.04 + 0.49 \times 5.00 = 0.41^{tm}$ ↻



ii) ②-② Rahmen (Rigid frame)

$M_{Tc} = 2.04 \times 2 = 4.08^{tm}$

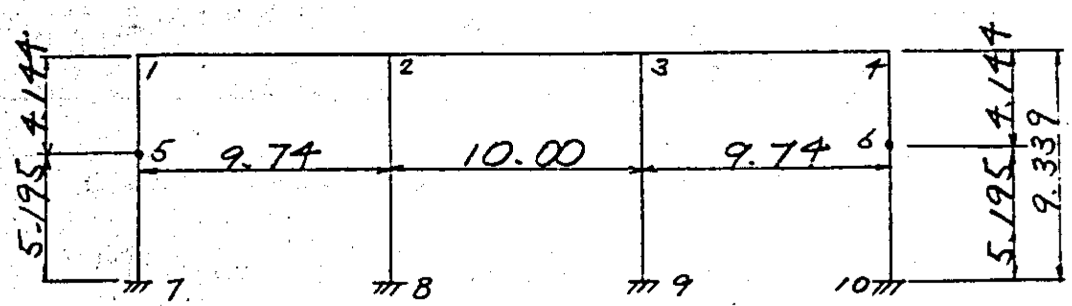
$M_{Td} = 0.41 \times 2 = 0.82$ "



§4. Rigid fram analysis on longitndinal direction of elevated structure

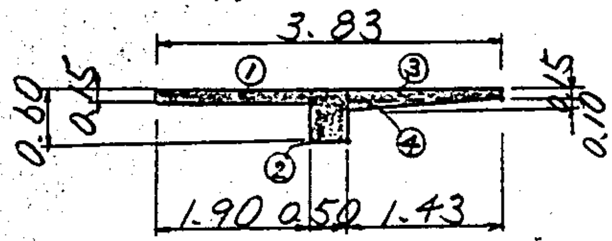
[1] Basic calculation

1. Axis of the Rahmen (Rigid frame)



2. Cross Sectional areas / moment of Inertia at area of members

(1) Upper beam (Member 1-2, 2-3, 3-4)



effective width

$b_e = 3.83^m$

	$b^{(m)}$	$h^{(m)}$	$A^{(m^2)}$	$y^{(m)}$	$A \cdot y^{(m^3)}$
①	1.900	0.150	0.285	0.075	0.02133
②	0.500	0.600	0.300	0.300	0.09000
③	1.430	0.150	0.215	0.075	0.01613
④	1.430	1/2×0.100	0.072	0.183	0.01318
Σ			0.872		0.14069

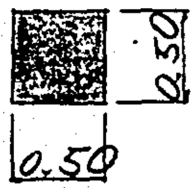
$$y = \frac{0.14069}{0.872} = 0.161^m$$

	b (m)	h (m)	A (m²)	y_0 (m)	I_o (m⁴)	$A \cdot y_0^2$ (m⁴)	$I_o + A \cdot y_0^2$ (m⁴)
①	1.900	0.150	0.285	0.086	0.00053	0.00211	0.00264
②	0.500	0.600	0.300	0.139	0.00900	0.00580	0.01480
③	1.430	0.150	0.215	0.086	0.00040	0.00159	0.00199
④	1.430	½×0.100	0.072	0.022	0.00004	0.00003	0.00007
Σ			0.872		0.00997	0.00953	0.01950

cross Sectional Area $A = 0.872\ m^2$

Moment of Inertia of area $I = 0.01950\ m^4$

(2) Column (Member 1-5-7, 2-8, 3-9, 4-6-10)



$A = 0.50 \times 0.50 = 0.250\ m^2$

$I = 1/12 \times 0.50 \times 0.50^3 = 0.00521\ m^4$

(3) axial height

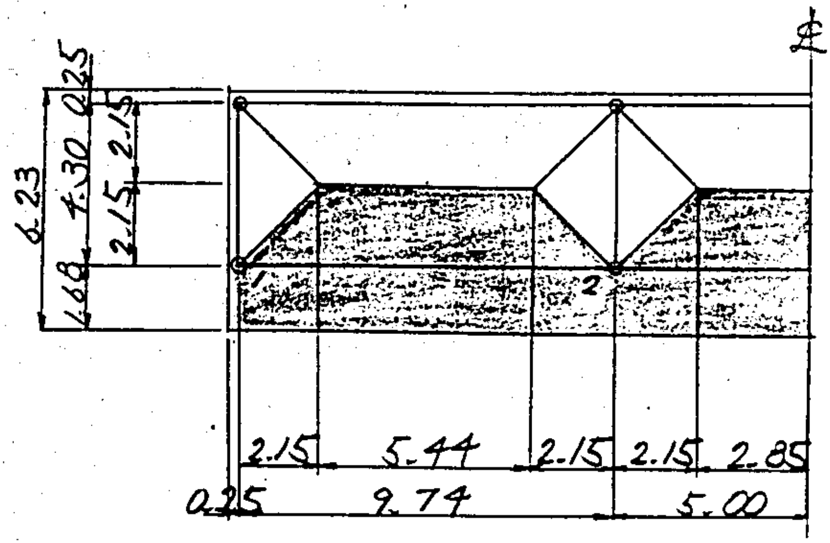
$h_1 = 9.50 - 0.161 = 9.339\ m$

$h_2 = 4.305 - 0.161 = 4.144\ m$

[2] Load calculations

1. Dead load

(1) Upper member

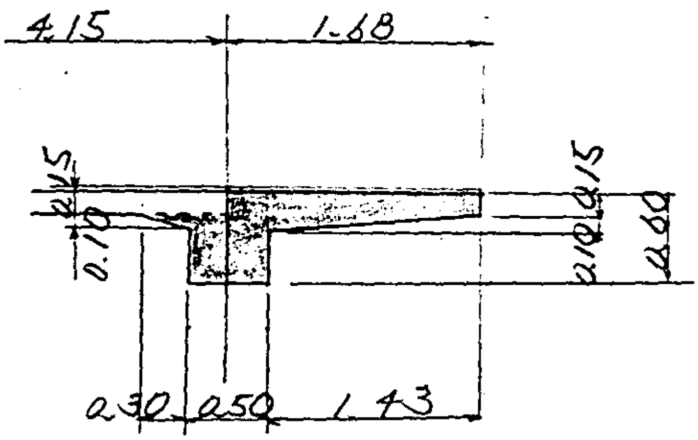


(a) Uniformly distributed load

Slab	$2.5^{t/m^3} \times 0.15$	=	$0.375^{t/m^2}$
pavement	$1.1^{\;\prime\prime} \times 0.05$	=	$0.055^{\;\prime\prime}$
		w =	$0.43^{t/m^2}$

$$w_{d1} = 0.43^{t/m^2} \times 2.15 = 0.92^{t/m}$$

(b) linear load



pavement	$1.10^{t/m^3} \times 0.05 \times 1.68$	$= 0.092^{t/m}$
Cantilever slab	$2.5'' \times (0.15+0.25) \times 1/2 \times 1.43$	$= 0.715''$
Longitudinal beam	$2.5'' \times (0.50 \times 60 - 0.25 \times 0.15)$	$= 0.656''$
Haunch of slab	$2.5'' \times 0.30 \times 0.10 \times 1/2$	$= 0.038''$

$wd_2 = 1.50^{t/m}$

Reaction of form beam

(1) Dead load

- pavmet

$1.1^{t/m^3} \times 0.05 \times (6.23 \times 9.98 - 3.30 \times 8.13) = 1.94^t$

- Slab $2.5^{t/m^3} \times 0.15 \times (4.80 \times 9.98$

$- 3.30 \times 5.35 - 3.00 \times 2.63) = 8.38^t$

- Cantilever slab

$2.5^t \times (0.15 + 0.25) \times 1/2 \times 1.43 \times 9.98 = 7.14^t$

- Slab haunch

$2.5^t \times 0.30 \times 0.10 \times 1/2 \times (8.73 + 1.65 + 3.20) = 0.51^t$

- Longitudinal beam

$2.5^t \times 0.50 \times 0.45 \times 9.98 \times 2 = 11.23^t$

- Transverse beam (A)

$2.5^t \times 0.40 \times 0.45 \times 3.80 = 1.71^t$

- Transverse beam (B)

$2.5^t \times 0.85 \times 0.45 \times (0.15 + 0.65) = 0.77^t$

- handrail

$2.5^t \times 0.15 \times 1.10 \times (2.63 \times 2 + 3.30) = 3.53^t$

total $= 35.31^t$

Reaction per on sho

$Rd = 35.21 \times 1/4 = 8.80^{t}$

(2) Pedestrian load (People load)

$0.35^{t/m^2} \times (6.23 \times 9.98 - 3.30 \times 8.13) = 12.37^{t}$

Reaction per on sho

$Rd = 12.37 \times 1/4 = 3.09^{t}$

Calculation for Seismic load

$0.21^{t/m^2} \times (6.23 \times 9.98 - 3.30 \times 8.13) = 7.42^{t}$

Reaction of stepped (A)
(Platform ~ column center).

(1) Dead load

- pevmei $1.1^{t/m^3} \times 0.05 \times 3.00 \times 9.98 = 1.65^t$
- Slab $2.5^{t/m^3} \times 0.50 \times 3.30 \times (1.118 + 0.87) = 8.20^t$
  - 〃 $2.5^t \times 0.559 \times 3.30 \times (3.63 + 3.512) = 32.94^t$
  - 〃 $2.5^t \times 0.113 \times 0.059 \times 1/2 \times 2 \times 3.30 = 0.06^t$
  - 〃 $2.5^t \times 0.124 \times 0.062 \times 1/2 \times 3.30 = 0.03^t$
  - 〃 $2.5^t \times 0.60 \times 3.30 \times 0.85 = 4.21^t$
- Step $2.5^t \times 0.33 \times 0.165 \times 1/2 \times 3.00 \times 22 = 4.49^t$
- handrail $2.5^t \times 0.15 \times 3.08 \times 0.87 \times 2 = 2.01^t$
  - 〃 $2.5^t \times 0.15 \times 0.10 \times (1.00 + 3.63 + 0.85) \times 2$
    $= 4.52^t$
  - 〃 $2.5^t \times 0.15 \times (3.08 + 1.10) \times 1/2 \times 3.63 \times 2 = 5.69^t$

total $= 63.80^t$

Reaction

$$w = 63.80 \times 1/2 \times 1/3.30 = 9.67^{t/m}$$

2) Pedestrian load (People load)

$0.35^{t/m^2} \times 3.00 \times 9.98 = 10.48^{t}$

Reaction

$w = 10.48 \times 1/2 \times 1/3.30 = 1.59^{t/m}$

Calculation for Seismic load

$0.21^{t/m^2} \times 3.00 \times 9.98 = 6.29^{t}$

Reaction of stedpped (B)
(column center – Foundation)

1) Dead load

- Pearmet $1.1^{t/m^3} \times 0.05 \times 3.00 \times 10.99 = 1.81^t$
- Slab $2.5 \times 0.40 \times 3.30 \times 0.87 = 2.87^t$
- 〃 $2.5^t \times 0.447 \times 3.30 \times (3.424 + 4.196)$
  $= 28.10^t$
- 〃 $2.5^t \times 0.30 \times 0.15 \times 1/2 \times 3.30 = 0.19^t$
- 〃 $2.5^t \times 0.094 \times 0.047 \times 1/2 \times 3.30 = 0.02^t$
- 〃 $2.5^t \times (0.55 + 1.03) \times 1/2 \times 0.96$
  $\times 3.30 = 6.26^t$
- 〃 $2.5^t \times 0.496 \times 1.04 \times 3.30 = 4.26^t$
- step $2.5^t \times 0.33 \times 0.165 \times 1/2 \times 3.00 \times 26 = 5.31^t$
- handrail $2.5^t \times 0.15 \times 1.10 \times 10.58 \times 2 = 8.73^t$

total $= 57.55^t$

Reaction

$w = 57.55 \times 1/2 \times 1/3.30 = 8.72^{t/m}$

2) Pedestrian load (People load)

$0.35^{t/m^2} \times 3.00 \times 10.99 = 11.54^{t}$

Reaction

$w = 11.54 \times 1/2 \times 1/3.30 = 1.75^{t/m}$

Calculation for Seismic load

$0.21^{t/m^2} \times 3.00 \times 10.99 = 6.92^{t}$

(c) Concentrated loads acting panel point

panel joint 1. (4)

· Uniformly distributed load

$0.43^{t/m^2} \times 2.15 \times 2.15 \times 1/2 = 0.99^t$

· 〃

$0.43^{t/m^2} \times 0.25 \times 2.15 = 0.23^t$

· linear load

$(0.092 + 0.715)^{t/m} \times 0.25 = 0.20^t$

· Haunch of slab

$2.5^{t/m^3} \times 0.30 \times 0.10 \times 1/2 \times 1.60 = 0.06^t$

· Cross beam

$2.5^t \times 0.50 \times 0.97 \times 2.40 = 2.91^t$

· Beam support

$2.5^t \times (0.30 + 0.50) \times 1/2 \times 0.50 \times 2.40 = 1.20^t$

· Reduction of linear load

$-(0.656 + 0.038)^{t/m} \times 0.25 = -0.17^t$

· Reduction of column part

$-2.5^{t/m^3} \times 0.50 \times 0.50 \times (1.12 - 0.161) = -0.60^t$

- Shed load reaction $= 10.00^{t}$
- Reaction of platform beam and stairway

  $8.80^{t} + 9.67^{t/m} \times 3.30 \times 1/2 = 24.76^{t}$

  $P_1 = P_4 = 39.58^{t}$

Panel point 2 (3)

- Uniformly distributed load

  $0.43^{t/m^2} \times 2.15 \times 2.15 \times 1/2 \times 2 = 11.13^{t}$
- Cross beam

  $2.5^{t/m^3} \times 0.50 \times 0.45 \times 1.90 = 1.07^{t}$
- Haunch of slab

  $2.5 \times 0.30 \times 0.10 \times 1/2 \times 1.60 \times 2 = 0.12^{t}$
- Reduction of linear load

  $-(0.656 + 0.038)^{t/m} \times 0.50 = -0.35^{t}$
- Compensation for column

  $2.5^{t/m^3} \times 0.50 \times 0.50 \times (0.161 - 0.15) = 0.01^{t}$
- Shed load $= 10.00^{t}$

  $P_2 = P_3 = 12.83^{t}$

Panel point moment caused by platform beam supporting part

$$M_1 = M_4 = 24.76 \times 0.52 + 2.5^{t/m^3} \times (0.50 \times 0.30 \times 0.50 + 0.50 \times 0.20 \times 1/2 \times 0.417) \times 2.40 = 13.45^{tm}$$

(2) Concentrated load at the intermediate point of column

panel point 5 (6)

- Cross beam

$2.5^{t/m^3} \times 0.50 \times 1.02 \times 1.90 = 2.42^{t}$

- Beam support

$2.5 \times (0.30 + 0.50) \times 1/2 \times 0.50 \times 2.40 = 1.20$

- Reaction of stairway

$(9.67 + 8.72)^{t/m} \times 1.65 = 30.34$

$P_5 = P_6 = 33.96^{t}$

Panel point moment caused by stairway reaction and beam supporting part

$$M_5 = M_6 = 9.67^{t/m} \times 1.65 \times 0.52 + 2.5^{t/m^3} \times (0.50 \times 0.30 \times 0.50 + 0.50 \times 0.20 \times 1/2 \times 0.417) \times 2.40 = 8.87^{tm}$$

Own weight of column

$q = 2.5^{t/m^3} \times 0.50 \times 0.50 = 0.63^{t/m}$

(3) Stairway reaction acting at foundation

$P_8 = P_9 = 8.72^{t/m} \times 3.30 \times 1/2 = 14.39^{t}$

2. Pedestrian load (People load)

$w = 0.350^{t/m^2}$

(1) Upper member

(Refer (2) 1.(1))

a) Uniformly distributed load

$w_{d1} = 0.35 \times 2.15 = 0.75^{t/m}$

b)

$w_{d2} = 0.35 \times 1.68 = 0.59^{t/m}$

c) Concentrated load acting at the panel point

(1) Panel point 1 (4)

- Uniformly distributed load

$0.35^{t/m^2} \times 2.15 \times 2.15 \times 1/2 = 0.81^{t}$

- Uniformly distributed load

$0.35^{t/m^2} \times 0.25 \times 3.83 = 0.34^{t}$

- Reaction of platform and stairway

$1.59^{t/m} \times 3.30 \times 1/2 + 3.09^{t} = 5.71^{t}$

$P_1 = P_4 = 6.86^{t}$

panel point 2.(3)

Uniforly disteributed load

$0.35^{t/m^2} \times 2.15 \times 2.15 \times 1/2 \times 2 = 1.62^{t}$

Moment caused by the reaction of platform beam

$M_1 = M_4 = 5.71 \times 0.52 = 2.97^{tm}$

(2) Concentrated load acting at the intermediate point of column.

Panel point 5.(6)

Stairway reaction

$(1.59 + 1.75)^{t/m} \times 3.30 \times 1/2 = 5.51^{t}$

Moment caused by stairway reaction

$M_5 = M_6 = 1.59^{t/m} \times 3.30 \times 1/2 \times 0.52 = 1.36^{tm}$

(3) Stairway reaction acting at foundation

$P_8 = P_9 = 1.75^{t/m} \times 3.30 \times 1/2 = 2.89^{t}$

3. Temperature change and Drying contraction

Temperature change -------- ±10°C

Drying contraction -------- −15°C

Hence,

Temperature rise ------- +10°C

Temperature drop + Drying contraction

-------- −25°C

4. Seismic load from dead load (k_H=0.10)

(derived from (2)(1) and (2)(1) horizontal force)

Panep point 1−4

Slab 2.5 t/m³ × 0.15 × 4.80 × 29.98 = 53.96 t

Cantilever slab 2.5 × (0.15+0.25) × 1/2 × 1.43 × 29.98 = 21.44 t

Haunch of slab 2.5 × 0.30 × 0.10 × 1/2 × (27.98×2 + 3.20×6) = 2.82

longitudinal beam 2.5 × 0.50 × 0.45 × 29.98 × 2 = 33.73

Cross beam (at end part) 2.5 × 0.50 × 0.97 × 3.80 × 2 = 9.22

Cross beam (at intermediate part)

2.5 t/m³ × 0.50 × 0.45 × 3.80 × 2 = 4.28 t

Beam support 2.5 × (0.30+0.50) × 1/2 × 0.50 × 4.80 × 2 = 4.80

column $2.5^{t/m^3} \times 0.50 \times 0.50 \times (\frac{9.339}{2} + 0.161 - 0.60) \times 8 = 21.16^t$

Intermediate cross beam

$2.5^t \times 0.50 \times 1.02 \times 3.30 \times 1/2 \times 2 = 4.20^t$

Intermediate cross beam suppot

$2.5^t \times (0.30 + 0.50) \times 1/2 \times 0.50 \times 4.80 \times 2 = 4.80^t$

Shed load $(13.0 + 10.0) \times 4 = 92.00^t$

Platform beam $8.80^t \times 4 = 35.20^t$

Stairway $9.67^{t/m} \times 3.30 \times 2 = 63.82^t$

" $(9.67 + 8.72)^{t/m} \times 3.30 \times 1/2 \times 2 = 60.69^t$

Pedestrian load (People load) $0.21^{t/m^2} \times 6.23 \times 29.98 = 39.22^t$

" (on platform) $7.42^t \times 1/2 \times 2 = 7.42^t$

" (on stairway) $6.29^t \times 1/2 \times 2 + 6.29^t \times 1/4 \times 2 = 9.44^t$

total $= 468.20^t$

Therefore, the seismic horizontal load is calculated as below

$H = 468.20 \times 1/2 \times 0.10 = 23.41^t$

$H_{1\sim4} = 23.41 \times 1/4 = 5.85^t$

Horizontal force transmitted from stairway to foundation

Calculation for end part

$(9.67 + 8.72)^{t/m} \times 1.65 \times 1/2 = 15.17^{t}$

$(6.29 + 6.92)^{t} \times 1/2 \times 1/4 = 1.65^{t}$

$(4.20 + 4.30)^{t} \times 1/2 \times 1/2 = 2.25^{t}$

total $= 19.07^{t}$

$H = 19.07 \times 0.1 = 1.91^{t}$

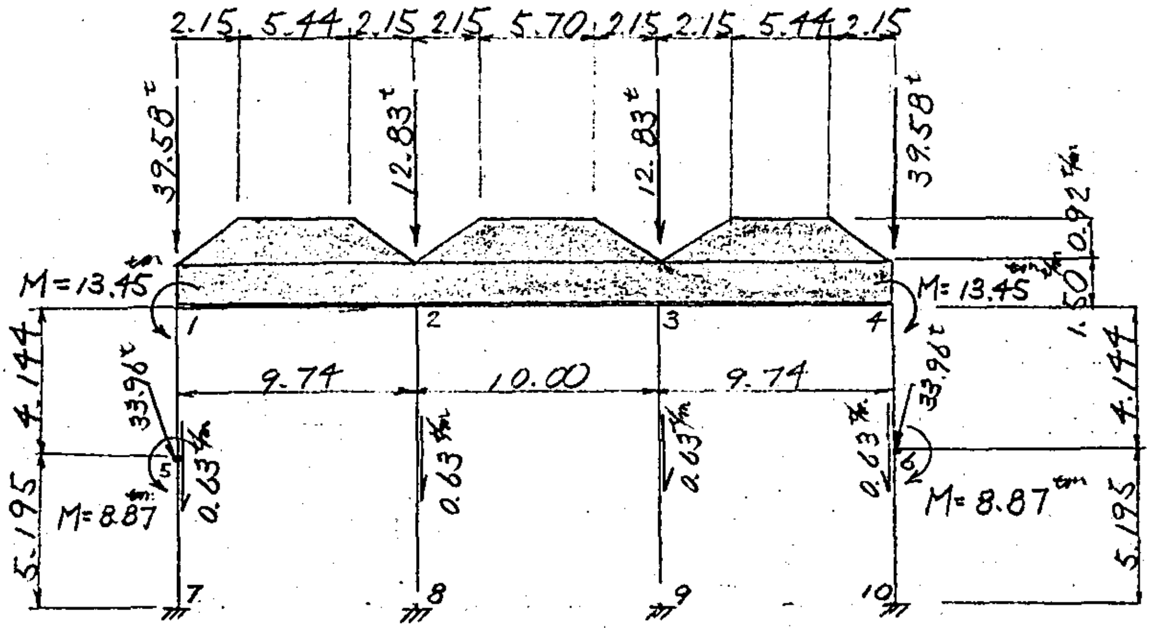
Calculation for intermediate part

$8.72^{t/m} \times 1.65 + 6.92^{t} \times 1/2 \times 1/2 = 12.66^{t}$

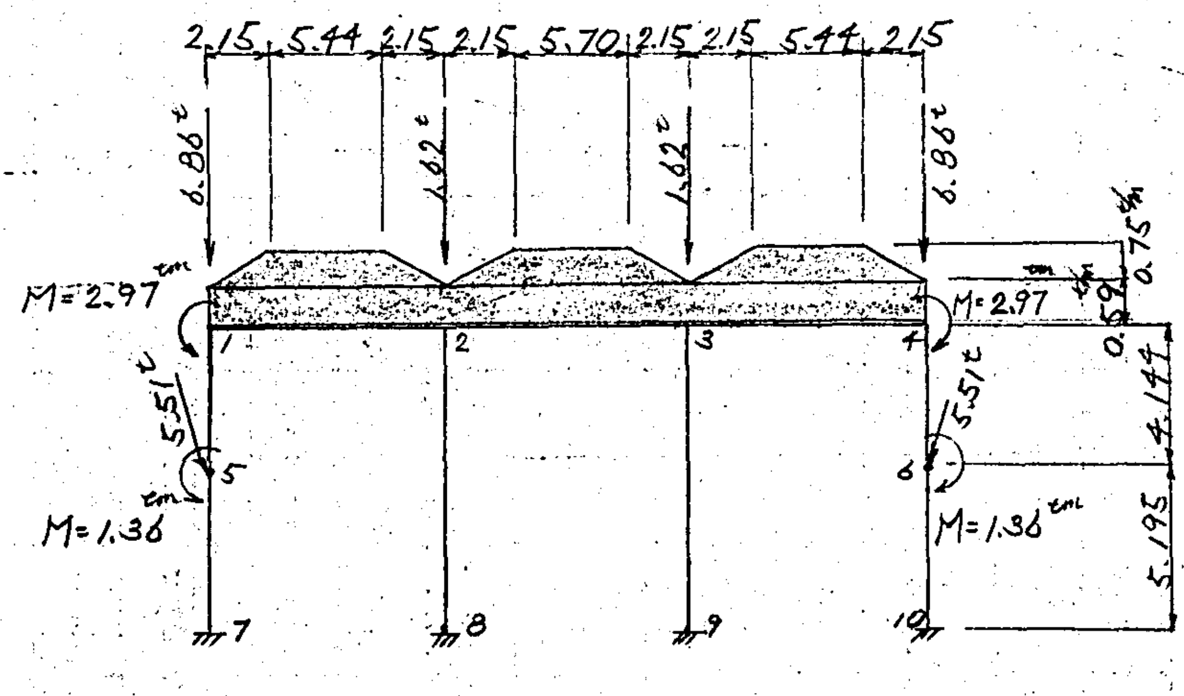
$H = 12.66 \times 0.10 = 1.27^{t}$

(3) load diagram

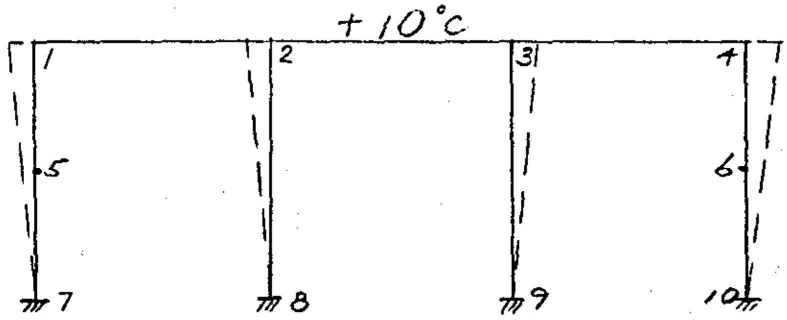
1. case 1 Dead load



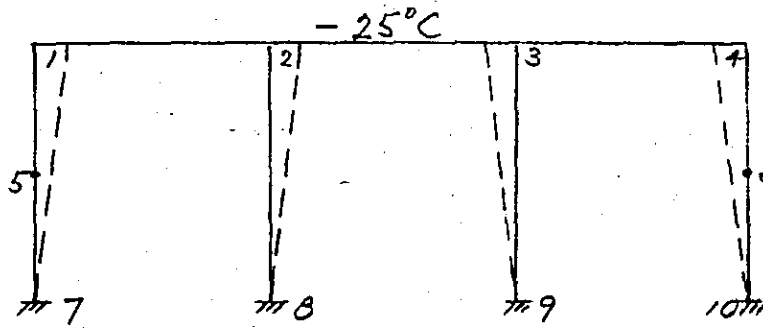
2. case 2 Pedestrian load (people load)



3. case 3 Temperature rise

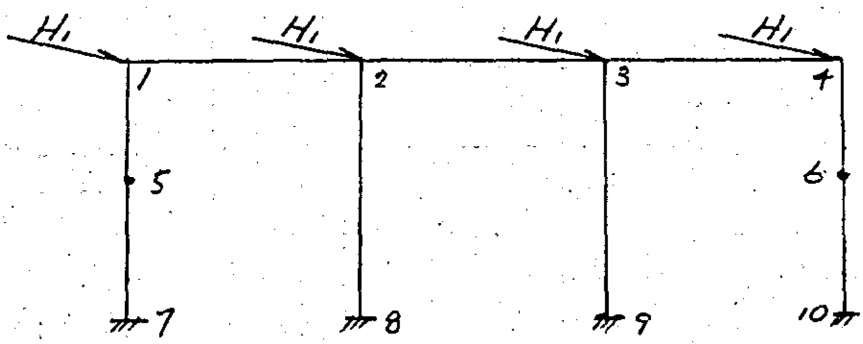


4. case 4 Temperature drop + Drying contraction



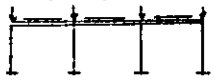
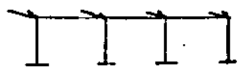
5. case 5 Seismic load from dead load

$H = 5.85^t$



(9) Combination of loads

1. Basic load

Case Number	Kind of load	Loading pattern
1	Dead load	
2	Pedestrian load	
3	Temperature rise	+ 10°C
4	Temperature drop + Drying contraction	− 25°C
5	Seismic load from dead load	

2. Combined loads

case number	Combination of loads	α
6	1 + 2	1.0000
7	1 + 3	0.8696
8	1 + 4	〃
9	1 + 5	0.6667
10	1 − 5	〃

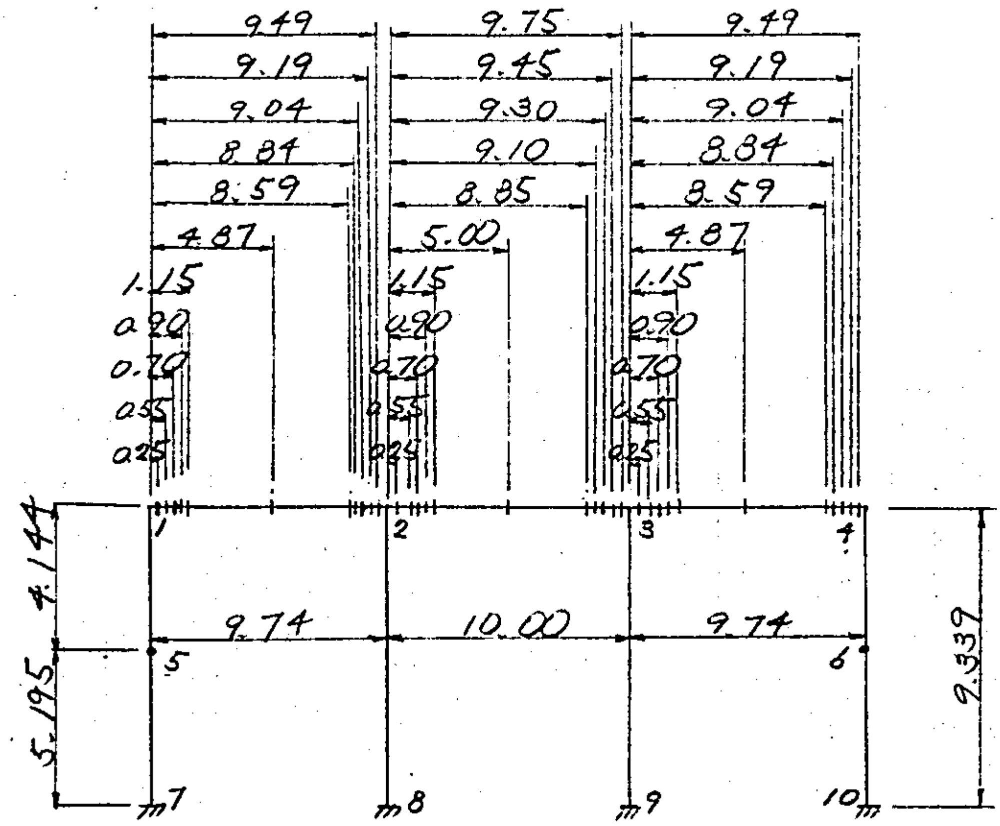
3. Critical cases

No. 1 case 1 crack

No. 2 case 6 ~ 10 synthetic

No. 3 case 9. 10 footing

9. Points for stress calculation

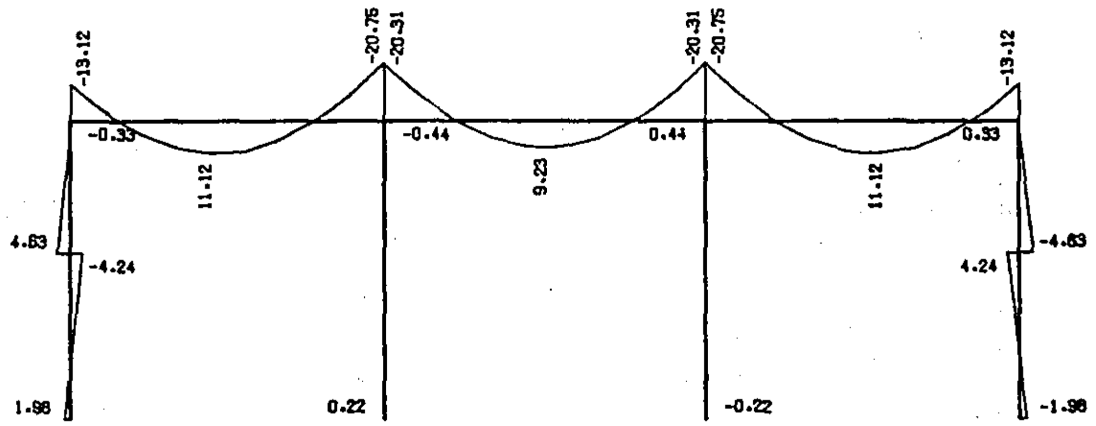


(5) Stress diagram

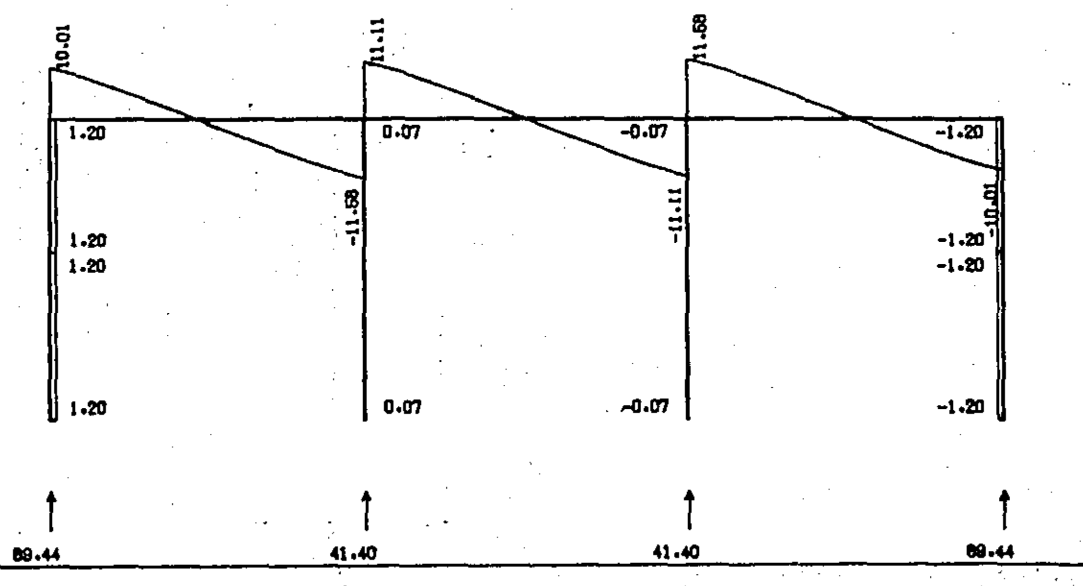
VIADUCT OF PLATFORM (NORTH SIDE) L-1

CASE 1 (DEAD LOAD)

BENDING MOMENT



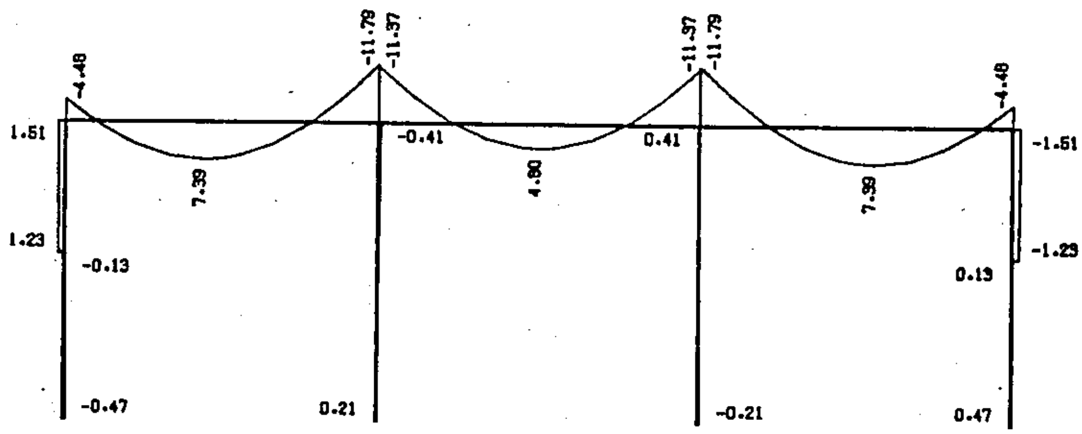
SHEARING FORCE



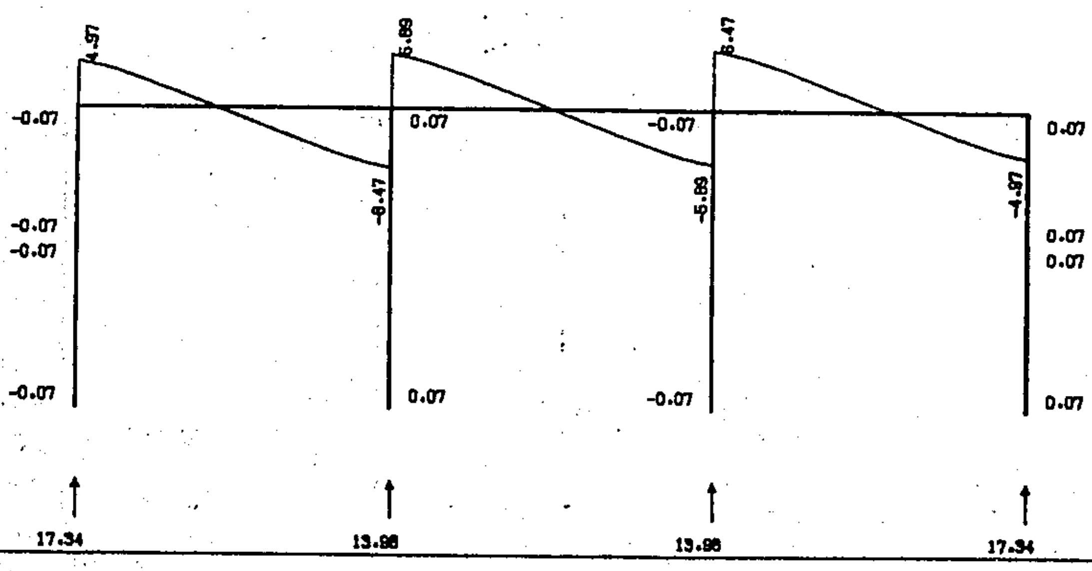
VIADUCT OF PLATFORM (NORTH SIDE) L-1

CASE 2 (PEDESTRIANS LOAD)

BENDING MOMENT



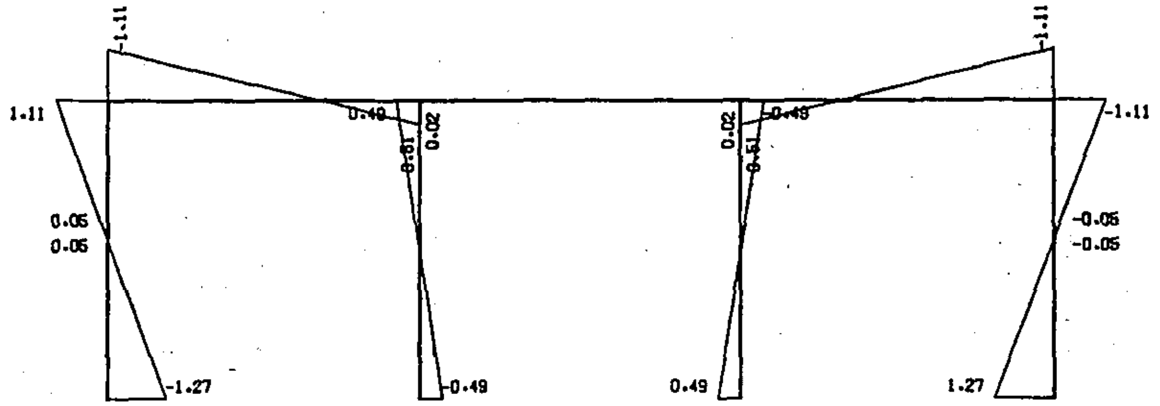
SHEARING FORCE



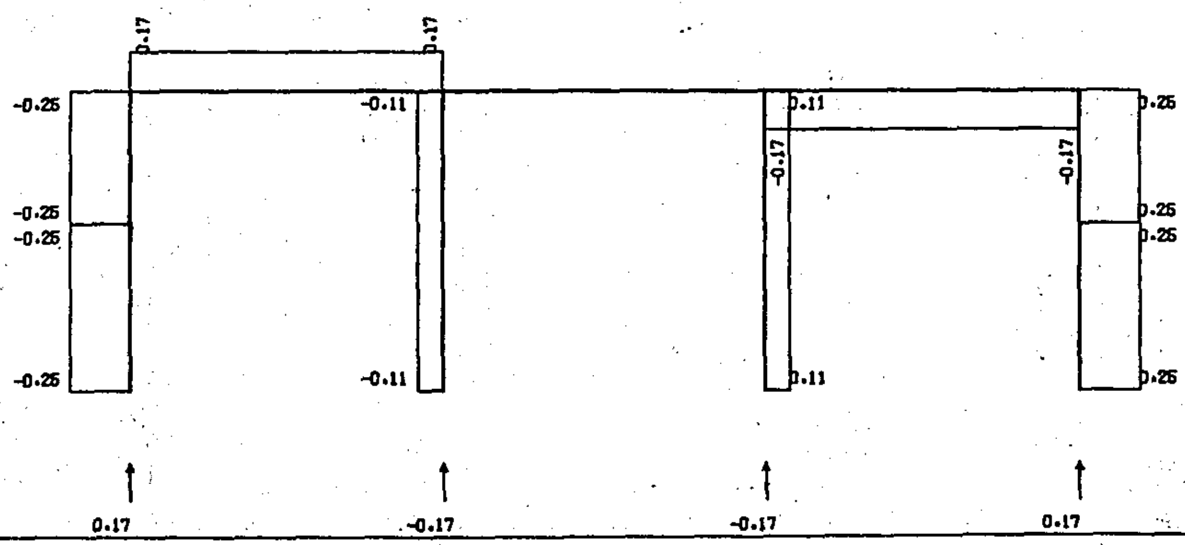
VIADUCT OF PLATFORM (NORTH SIDE) L-1

CASE 3 (TEMPERATURE)

BENDING MOMENT



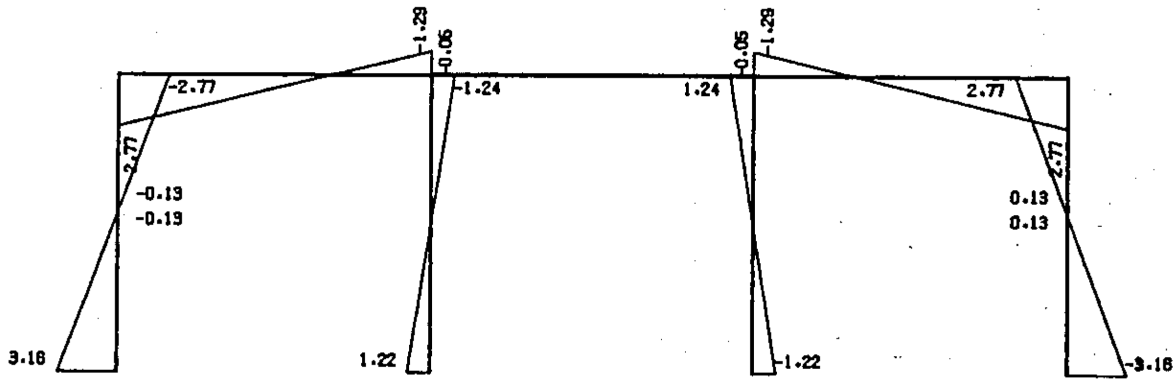
SHEARING FORCE



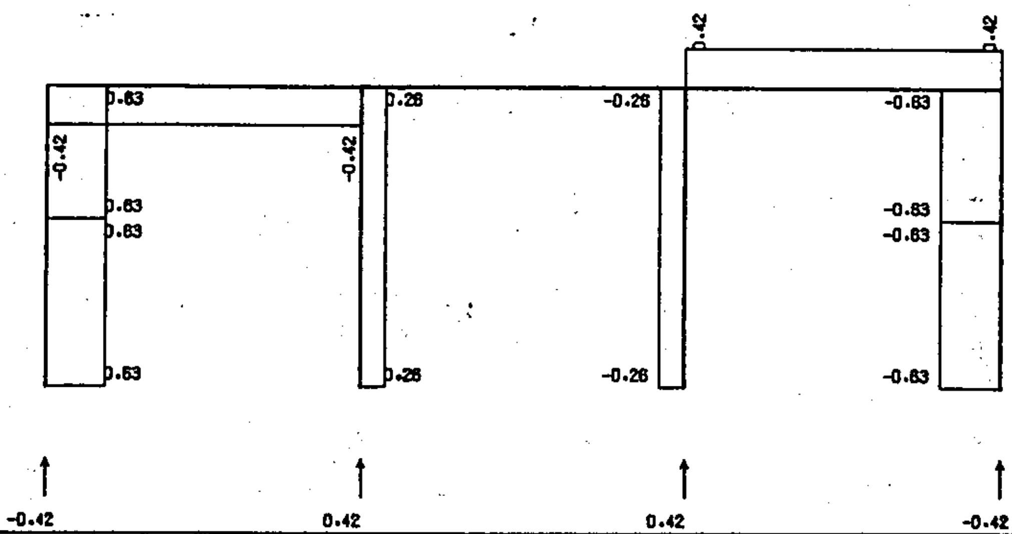
VIADUCT OF PLATFORM (NORTH SIDE) L-1

CASE 4 (TEMPERATURE + SCHRINKAGE)

BENDING MOMENT



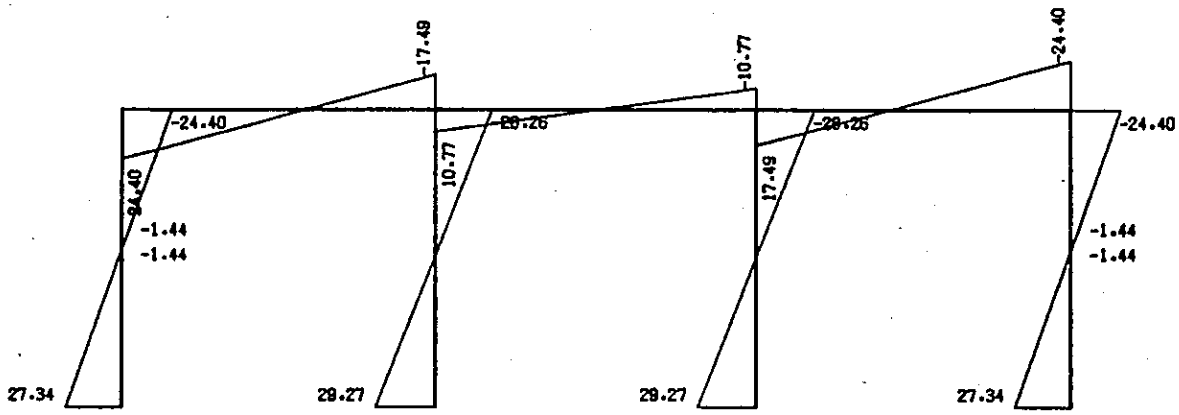
SHEARING FORCE



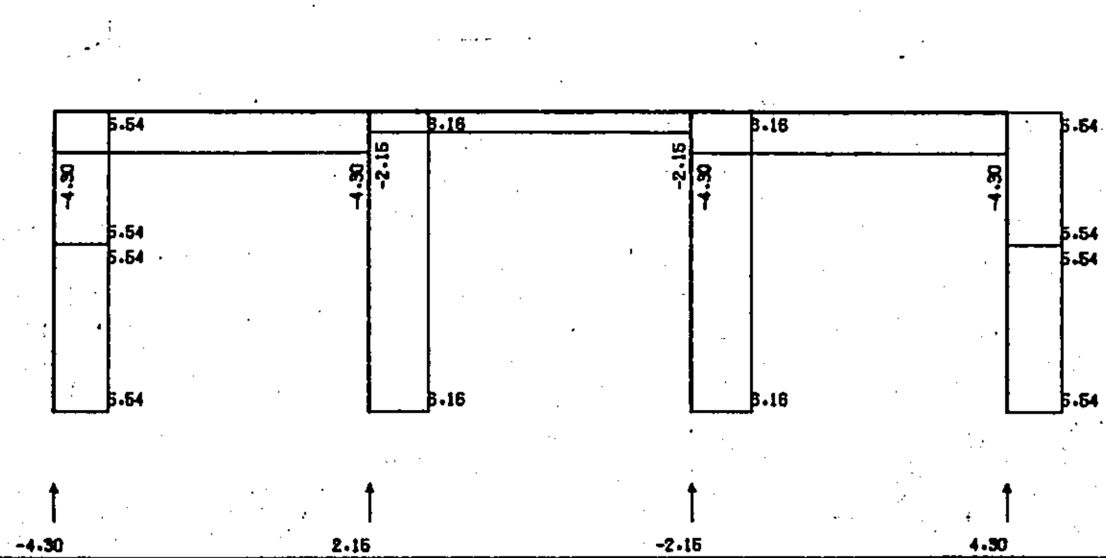
VIADUCT OF PLATFORM (NORTH SIDE) L-1

CASE 5 (SEISMIC LOAD)

BENDING MOMENT



SHEARING FORCE



INPUT DATA

```
=== INPUT DATA ===                                                        CRC-FANSY   V6.3
          5   10        20        30        40        50        60        70        80     CARD NUMBER
          ..........................................................................
TITLE     VIADUCT OF PLATFORM (NORTH SIDE) L-1                                               1
PLOT          1    2                                                                         2
JOINT        1    -9.74     9.339                                                            3
             2     0.0      9.339                                                            4
             3    10.0      9.339                                                            5
             4    19.74     9.339                                                            6
             5    -9.74     5.195                                                            7
             6    19.74     5.195                                                            8
             7    -9.74     0.0                                                              9
             8     0.0      0.0                                                             10
             9    10.0      0.0                                                             11
            10    19.74     0.0                                                             12
MEMBER       1 1        1    2                                                              13
            -3    1     1    1                                                              14
             4 2        1    5                                                              15
             5 2        5    7                                                              16
             6 2        2    8                                                              17
             7 2        3    9                                                              18
             8 2        4    6                                                              19
             9 2        6   10                                                              20
SECTION      1     0.872    0.C195                                                          21
             2     0.25     0.00521                                                         22
PROPERTY     1         2.7E+6              1.0E-5                                           23
SUPPORT      7                                                                              24
             8                                                                              25
             9                                                                              26
            10                                                                              27
POINT    1 0.25    0.55      0.7       0.9       1.15      4.87      8.59                  28
           8.84    9.04      9.19      9.49      =         3                                29
         2 0.25    C.55      0.7       C.9       1.15      5.0       8.85                  30
           9.1     9.3       9.45      9.75                                                31
PICKUP       1  1   1                                                                       32
             2  1   6   10                                                                  33
             3  1   9   10                                                                  34
LOAD         1     CASE  1 (DEAD LOAD)                                                      35
J            1               -39.58    13.45                                                36
             2               -12.83                        3                                37
             4               -39.58   -13.45                                                38
             5               -33.96     8.87                                                39
             6               -33.96    -8.87                                                40
DL           1    2-0.92      2.15      2.15               2    3                           41
             1    2-1.5                                    2    3                           42
             4    2-0.63                                   5    6    7    8                 43
             9    2-0.63                                                                    44
END                                                                                         45
LOAD         2     CASE  2 (PEDESTRIANS LOAD)                                               46
J            1               -6.86      2.97                                                47
             2               -1.62                         3                                48
             4               -6.86     -2.97                                                49
             5               -5.51      1.36                                                50
             6               -5.51     -1.36                                                51
DL           1    2-C.75      2.15      2.15               2    3                           52
             1    2-0.59                                   2    3                           53
END                                                                                         54
LOAD         3     CASE  3 (TEMPERATURE)                                                    55
T            1    3 1C.C                                                                    56
END                                                                                         57
```

```
=== INPUT DATA ===                                                          CRC-FANSY   V6.3
        5   10        20        30        40        50        60        70        80    CARD NUMBER
      ................................................................................
      LOAD           4      CASE  4 (TEMPERATURE + SCHRINKAGE)                               58
      T              1     3-25.0                                                            59
      END                                                                                    60
      LOAD           5      CASE  5 (SEISMIC LOAD)                                           61
      J              1       5.85                                 2    3    4                62
      END                                                                                    63
      MT2       6                   1    2                                                   64
                70.8696             1    3                                                   65
                80.8696             1    4                                                   66
                90.6667             1    5                                                   67
               100.6667             1   -5                                                   68
      FINISH                                                                                 69
```

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

CONTROL DATA

METHOD	STRUCTURE	J.RENUMBER	M.RENUMBER	S.F. DIS.	UNI.SPRING	STAN.STIF.	BARA	SKEW MEM.
DIS	*RAHMEN*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*

LOAD TITLE

```
LOAD  1   CASE  1 (DEAD LOAD)                 LOAD  2   CASE  2 (PEDESTRIANS LOAD)
LOAD  3   CASE  3 (TEMPERATURE)               LOAD  4   CASE  4 (TEMPERATURE + SCHRINKAGE)
LOAD  5   CASE  5 (SEISMIC LOAD)

MIX   6   CASE  6 (1+2)                       MIX   7   CASE  7 (1+3)
MIX   8   CASE  8 (1+4)                       MIX   9   CASE  9 (1+5)
MIX  10   CASE 10 (1-5)
```

PICK UP LOAD CASE

```
PICK  1      1
PICK  2      6    7    8    9   10
PICK  3      9   10
```

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

JOINT DATA

JOINT NUMBER 10

ZAHYO(M) JOINT	X	Y
1	+9.7400	9.3390
2	0.0000	9.3390
3	10.0000	9.3390
4	19.7400	9.3390
5	-9.7400	5.1950
6	19.7400	5.1950
7	-9.7400	0.0000
8	0.0000	0.0000
9	10.0000	0.0000
10	19.7400	0.0000

MEMBER DATA

MEMBER NUMBER 9

MEMBER	IIAN	JIAN	CONNECT. IIAN	JIAN	LENGTH	A	I	AES	KD(BANE)	PRO.NUM
1	1	2	FIX	FIX	9.7400	.87200	.0195000			1
2	2	3	FIX	FIX	10.0000	.87200	.0195000			1
3	3	4	FIX	FIX	9.7400	.87200	.0195000			1
4	1	5	FIX	FIX	4.1440	.25000	.0052100			1
5	5	7	FIX	FIX	5.1950	.25000	.0052100			1
6	2	8	FIX	FIX	9.3390	.25000	.0052100			1
7	3	9	FIX	FIX	9.3390	.25000	.0052100			1
8	4	6	FIX	FIX	4.1440	.25000	.0052100			1
9	6	10	FIX	FIX	5.1950	.25000	.0052100			1

PROPERTY DATA

PROPERTY NUMBER 1

PROPERTY	E	G	EPS
1	2.700E+06	0.	1.000E-05

SUPPORT DATA

SUPPORT NUMBER 4

SUPPORT	SUPPORT-JYOKEN X	Y	THET Z	X(BANE)	Y(BANE)	THET Z(BANE)
7	FIX	FIX	FIX	0.0	0.0	0.0
8	FIX	FIX	FIX	0.0	0.0	0.0
9	FIX	FIX	FIX	0.0	0.0	0.0
10	FIX	FIX	FIX	0.0	0.0	0.0

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1   CRC-FANSY   V6.3

STRUCTURAL FIGURE

```
+-------------------+-------------------+-------------------+
I 1                 I 2                 I 3                 I 4
I                   I                   I                   I
I                   I                   I                   I
+                   I                   I                   +
I 5                 I                   I                   I 6
I                   I                   I                   I
I                   I                   I                   I
+                   +                   +                   +
≡ 7                 ≡ 8                 ≡ 9                 ≡10
```

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

HOWE DATA

MEMBER	GOIKI ITAN	GOIKI JTAN	POINT 1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	......	......	.250	.550	.700	.900	1.150	4.870	8.590	8.840	9.040	9.190	9.490			
2	......	......	.250	.550	.700	.900	1.150	5.000	8.850	9.100	9.300	9.450	9.750			
3	......	......	.250	.550	.700	.900	1.150	4.870	8.590	8.840	9.040	9.190	9.490			
4	......	......														
5	......	......														
6	......	......														
7	......	......														
8	......	......														
9	......	......														

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) 1-1 CRC-FANSY V6.3

LOAD DATA

	M/J	NAME	D	W1	W2	L1	L2
LOAD - 1		CASE 1 (DEAD LOAD)					
MEMBER	1	LINEAR	Y	0.000	-.920	0.000	7.590
		LINEAR	Y	-.920	-.920	2.150	2.150
		LINEAR	Y	-.920	0.000	7.590	0.000
		LINEAR	Y	-1.500	-1.500	0.000	0.000
	2	LINEAR	Y	0.000	-.920	0.000	7.850
		LINEAR	Y	-.920	-.920	2.150	2.150
		LINEAR	Y	-.920	0.000	7.850	0.000
		LINEAR	Y	-1.500	-1.500	0.000	0.000
	3	LINEAR	Y	0.000	-.920	0.000	7.590
		LINEAR	Y	-.920	-.920	2.150	2.150
		LINEAR	Y	-.920	0.000	7.590	0.000
		LINEAR	Y	-1.500	-1.500	0.000	0.000
	4	LINEAR	Y	-.630	-.630	0.000	0.000
	5	LINEAR	Y	-.630	-.630	0.000	0.000
	6	LINEAR	Y	-.630	-.630	0.000	0.000
	7	LINEAR	Y	-.630	-.630	0.000	0.000
	8	LINEAR	Y	-.630	-.630	0.000	0.000
	9	LINEAR	Y	-.630	-.630	0.000	0.000
JOINT	1	JOINTLOAD	Y	-39.580			
		JOINTLOAD	Z	13.450			
	2	JOINTLOAD	Y	-12.830			
	3	JOINTLOAD	Y	-12.830			
	4	JOINTLOAD	Y	-39.580			
		JOINTLOAD	Z	-13.450			
	5	JOINTLOAD	Y	-33.960			
		JOINTLOAD	Z	8.870			
	6	JOINTLOAD	Y	-33.960			
		JOINTLOAD	Z	-8.870			
LOAD - 2		CASE 2 (PEDESTRIANS LOAD)					
MEMBER	1	LINEAR	Y	0.000	-.750	0.000	7.590
		LINEAR	Y	-.750	-.750	2.150	2.150
		LINEAR	Y	-.750	0.000	7.590	0.000
		LINEAR	Y	-.590	-.590	0.000	0.000
	2	LINEAR	Y	0.000	-.750	0.000	7.850
		LINEAR	Y	-.750	-.750	2.150	2.150
		LINEAR	Y	-.750	0.000	7.850	0.000
		LINEAR	Y	-.590	-.590	0.000	0.000
	3	LINEAR	Y	0.000	-.750	0.000	7.590
		LINEAR	Y	-.750	-.750	2.150	2.150
		LINEAR	Y	-.750	0.000	7.590	0.000
		LINEAR	Y	-.590	-.590	0.000	0.000
JOINT	1	JOINTLOAD	Y	-6.860			
		JOINTLOAD	Z	2.970			
	2	JOINTLOAD	Y	-1.620			
	3	JOINTLOAD	Y	-1.620			
	4	JOINTLOAD	Y	-6.860			
		JOINTLOAD	Z	-2.970			
	5	JOINTLOAD	Y	-5.510			
		JOINTLOAD	Z	1.360			

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

LOAD DATA

	M/J	NAME	D	W1	W2	L1	L2
	6	JOINTLOAD	Y	-5.510			
		JOINTLOAD	Z	-1.360			

LOAD - 3 CASE 3 (TEMPERATURE)

MEMBER	1	TEMP		10.0(DO)			
	2	TEMP		10.0(DO)			
	3	TEMP		10.0(DO)			

LOAD - 4 CASE 4 (TEMPERATURE + SCHRINKAGE)

MEMBER	1	TEMP		-25.0(DO)			
	2	TEMP		-25.0(DO)			
	3	TEMP		-25.0(DO)			

LOAD - 5 CASE 5 (SEISMIC LOAD)

JOINT	1	JOINTLOAD	X	5.850			
	2	JOINTLOAD	X	5.850			
	3	JOINTLOAD	X	5.850			
	4	JOINTLOAD	X	5.850			

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TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

MIX DATA

MIX NUMBER 5

LOAD	SS	N	S1	K1	S2	K2	S3	K3	S4	K4	S5	K5	S6	K6	S7	K7	S8	K8
6	1.0000	2	1.0000	1	1.0000	2												
7	.8696	2	1.0000	1	1.0000	3												
8	.8696	2	1.0000	1	1.0000	4												
9	.6667	2	1.0000	1	1.0000	5												
10	.6667	2	1.0000	1	-1.0000	5												

PICK UP

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 　　　　　　　　　　　　CRC-FANSY V6.3

PICK UP 1

MOMENT MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-13.121	10.013	1.197
1	.250	(1)	-10.656	9.624	1.197
2	.550	(1)	-7.853	9.123	1.197
3	.700	(1)	-6.504	8.858	1.197
4	.900	(1)	-4.769	8.490	1.197
5	1.150	(1)	-2.707	8.005	1.197
6	4.870	(1)	11.051	-.784	1.197
7	8.590	(1)	-8.537	-9.572	1.197
8	8.840	(1)	-10.991	-10.057	1.197
9	9.040	(1)	-13.039	-10.425	1.197
10	9.190	(1)	-14.623	-10.690	1.197
11	9.490	(1)	-17.906	-11.192	1.197
JTAN	9.740	(1)	-20.753	-11.580	1.197
MAX	4.329	(1)	11.121	.526	1.197
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(1)	-20.311	11.111	1.267
1	.250	(1)	-17.581	10.723	1.267
2	.550	(1)	-14.439	10.221	1.267
3	.700	(1)	-12.926	9.956	1.267
4	.900	(1)	-10.971	9.588	1.267
5	1.150	(1)	-8.634	9.103	1.267
6	5.000	(1)	9.230	-.000	1.267
7	8.850	(1)	-8.634	-9.103	1.267
8	9.100	(1)	-10.971	-9.588	1.267
9	9.300	(1)	-12.926	-9.956	1.267
10	9.450	(1)	-14.439	-10.221	1.267
11	9.750	(1)	-17.581	-10.723	1.267
JTAN	10.000	(1)	-20.311	-11.111	1.267
MAX	5.000	(1)	9.230	-.000	1.267

MOMENT MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-13.121	10.013	1.197
1	.250	(1)	-10.666	9.624	1.197
2	.550	(1)	-7.853	9.123	1.197
3	.700	(1)	-6.504	8.858	1.197
4	.900	(1)	-4.769	8.490	1.197
5	1.150	(1)	-2.707	8.005	1.197
6	4.870	(1)	11.051	-.784	1.197
7	8.590	(1)	-8.537	-9.572	1.197
8	8.840	(1)	-10.991	-10.057	1.197
9	9.040	(1)	-13.039	-10.425	1.197
10	9.190	(1)	-14.623	-10.690	1.197
11	9.490	(1)	-17.906	-11.192	1.197
JTAN	9.740	(1)	-20.753	-11.580	1.197
MAX	4.329	(1)	11.121	.526	1.197
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(1)	-20.311	11.111	1.267
1	.250	(1)	-17.581	10.723	1.267
2	.550	(1)	-14.439	10.221	1.267
3	.700	(1)	-12.926	9.956	1.267
4	.900	(1)	-10.971	9.588	1.267
5	1.150	(1)	-8.634	9.103	1.267
6	5.000	(1)	9.230	-.000	1.267
7	8.850	(1)	-8.634	-9.103	1.267
8	9.100	(1)	-10.971	-9.588	1.267
9	9.300	(1)	-12.926	-9.956	1.267
10	9.450	(1)	-14.439	-10.221	1.267
11	9.750	(1)	-17.581	-10.723	1.267
JTAN	10.000	(1)	-20.311	-11.111	1.267
MAX	5.000	(1)	9.230	-.000	1.267

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 1

MOMENT MAXIMUM						MOMENT MINIMUM					
	-L-	-CASE-	-M-	-Q-	-N-		-L-	-CASE-	-M-	-Q-	-N-
= = MEMBER 3 (3 - 4) G = =						= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(1)	-20.753	11.580	1.197	ITAN	0.000	(1)	-20.753	11.580	1.197
1	.250	(1)	-17.906	11.192	1.197	1	.250	(1)	-17.905	11.192	1.197
2	.550	(1)	-14.623	10.690	1.197	2	.550	(1)	-14.623	10.690	1.197
3	.700	(1)	-13.039	10.425	1.197	3	.700	(1)	-13.039	10.425	1.197
4	.900	(1)	-10.991	10.057	1.197	4	.900	(1)	-10.991	10.057	1.197
5	1.150	(1)	-8.537	9.572	1.197	5	1.150	(1)	-8.537	9.572	1.197
6	4.870	(1)	11.051	.784	1.197	6	4.870	(1)	11.051	.784	1.197
7	8.590	(1)	-2.707	-8.005	1.197	7	8.590	(1)	-2.707	-8.005	1.197
8	8.840	(1)	-4.769	-8.490	1.197	8	8.840	(1)	-4.769	-8.490	1.197
9	9.040	(1)	-6.504	-8.858	1.197	9	9.040	(1)	-6.504	-8.858	1.197
10	9.190	(1)	-7.853	-9.123	1.197	10	9.190	(1)	-7.853	-9.123	1.197
11	9.490	(1)	-10.666	-9.624	1.197	11	9.490	(1)	-10.666	-9.624	1.197
JTAN	9.740	(1)	-13.121	-10.013	1.197	JTAN	9.740	(1)	-13.121	-10.013	1.197
MAX	5.411	(1)	11.121	-.526	1.197	MAX	5.411	(1)	11.121	-.526	1.197
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	-.329	1.197	-49.593	ITAN	0.000	(1)	-.329	1.197	-49.593
JTAN	4.144	(1)	4.630	1.197	-52.204	JTAN	4.144	(1)	4.630	1.197	-52.204
= = MEMBER 5 (5 - 7) C = =						= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(1)	-4.240	1.197	-86.164	ITAN	0.000	(1)	-4.240	1.197	-86.164
JTAN	5.195	(1)	1.976	1.197	-89.436	JTAN	5.195	(1)	1.976	1.197	-89.436
= = MEMBER 6 (2 - 8) C = =						= = MEMBER 6 (2 - 8 / C = =					
ITAN	0.000	(1)	-.442	.071	-35.521	ITAN	0.000	(1)	-.442	.071	-35.521
JTAN	9.339	(1)	.220	.071	-41.405	JTAN	9.339	(1)	.220	.071	-41.405
= = MEMBER 7 (3 - 9) C = =						= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(1)	.442	-.071	-35.521	ITAN	0.000	(1)	.442	-.071	-35.521
JTAN	9.339	(1)	-.220	-.071	-41.405	JTAN	9.339	(1)	-.220	-.071	-41.405
= = MEMBER 8 (4 - 6) C = =						= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(1)	.329	-1.197	-49.593	ITAN	0.000	(1)	.329	-1.197	-49.593
JTAN	4.144	(1)	-4.630	-1.197	-52.204	JTAN	4.144	(1)	-4.630	-1.197	-52.204
= = MEMBER 9 (6 - 10) C = =						= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(1)	4.240	-1.197	-86.164	ITAN	0.000	(1)	4.240	-1.197	-86.164
JTAN	5.195	(1)	-1.976	-1.197	-89.436	JTAN	5.195	(1)	-1.976	-1.197	-89.436

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 1

	SHEAR MAXIMUM						SHEAR MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-13.121	10.013	1.197	ITAN	0.000	(1)	-13.121	10.013	1.197
1	.250	(1)	-10.666	9.624	1.197	1	.250	(1)	-10.666	9.624	1.197
2	.550	(1)	-7.853	9.123	1.197	2	.550	(1)	-7.853	9.123	1.197
3	.700	(1)	-6.504	8.858	1.197	3	.700	(1)	-6.504	8.858	1.197
4	.900	(1)	-4.769	8.490	1.197	4	.900	(1)	-4.769	8.490	1.197
5	1.150	(1)	-2.707	8.005	1.197	5	1.150	(1)	-2.707	8.005	1.197
6	4.870	(1)	11.051	-.784	1.197	6	4.870	(1)	11.051	-.784	1.197
7	8.590	(1)	-8.537	-9.572	1.197	7	8.590	(1)	-8.537	-9.572	1.197
8	8.840	(1)	-10.991	-10.057	1.197	8	8.840	(1)	-10.991	-10.057	1.197
9	9.040	(1)	-13.039	-10.425	1.197	9	9.040	(1)	-13.039	-10.425	1.197
10	9.190	(1)	-14.623	-10.690	1.197	10	9.190	(1)	-14.623	-10.690	1.197
11	9.490	(1)	-17.906	-11.192	1.197	11	9.490	(1)	-17.906	-11.192	1.197
JTAN	9.740	(1)	-20.753	-11.580	1.197	JTAN	9.740	(1)	-20.753	-11.580	1.197
= = MEMBER 2 (2 - 3) G = =						= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(1)	-20.311	11.111	1.267	ITAN	0.000	(1)	-20.311	11.111	1.267
1	.250	(1)	-17.581	10.723	1.267	1	.250	(1)	-17.581	10.723	1.267
2	.550	(1)	-14.439	10.221	1.267	2	.550	(1)	-14.439	10.221	1.267
3	.700	(1)	-12.926	9.956	1.267	3	.700	(1)	-12.926	9.956	1.267
4	.900	(1)	-10.971	9.588	1.267	4	.900	(1)	-10.971	9.588	1.267
5	1.150	(1)	-8.634	9.103	1.267	5	1.150	(1)	-8.634	9.103	1.267
6	5.000	(1)	9.230	-.000	1.267	6	5.000	(1)	9.230	-.000	1.267
7	8.850	(1)	-8.634	-9.103	1.267	7	8.850	(1)	-8.634	-9.103	1.267
8	9.100	(1)	-10.971	-9.588	1.267	8	9.100	(1)	-10.971	-9.588	1.267
9	9.300	(1)	-12.926	-9.956	1.267	9	9.300	(1)	-12.926	-9.956	1.267
10	9.450	(1)	-14.439	-10.221	1.267	10	9.450	(1)	-14.439	-10.221	1.267
11	9.750	(1)	-17.581	-10.723	1.267	11	9.750	(1)	-17.581	-10.723	1.267
JTAN	10.000	(1)	-20.311	-11.111	1.267	JTAN	10.000	(1)	-20.311	-11.111	1.267
= = MEMBER 3 (3 - 4) G = =						= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(1)	-20.753	11.580	1.197	ITAN	0.000	(1)	-20.753	11.580	1.197
1	.250	(1)	-17.906	11.192	1.197	1	.250	(1)	-17.906	11.192	1.197
2	.550	(1)	-14.623	10.690	1.197	2	.550	(1)	-14.623	10.690	1.197
3	.700	(1)	-13.039	10.425	1.197	3	.700	(1)	-13.039	10.425	1.197
4	.900	(1)	-10.991	10.057	1.197	4	.900	(1)	-10.991	10.057	1.197
5	1.150	(1)	-8.537	9.572	1.197	5	1.150	(1)	-8.537	9.572	1.197
6	4.870	(1)	11.051	.784	1.197	6	4.870	(1)	11.051	.784	1.197
7	8.590	(1)	-2.707	-8.005	1.197	7	8.590	(1)	-2.707	-8.005	1.197
8	8.840	(1)	-4.769	-8.490	1.197	8	8.840	(1)	-4.769	-8.490	1.197
9	9.040	(1)	-6.504	-8.858	1.197	9	9.040	(1)	-6.504	-8.858	1.197
10	9.190	(1)	-7.853	-9.123	1.197	10	9.190	(1)	-7.853	-9.123	1.197
11	9.490	(1)	-10.666	-9.624	1.197	11	9.490	(1)	-10.666	-9.624	1.197
JTAN	9.740	(1)	-13.121	-10.013	1.197	JTAN	9.740	(1)	-13.121	-10.013	1.197

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 1

SHEAR MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	-.329	1.197	-49.593
JTAN	4.144	(1)	4.630	1.197	-52.204
= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(1)	-4.240	1.197	-86.164
JTAN	5.195	(1)	1.976	1.197	-89.436
= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(1)	-.442	.071	-35.521
JTAN	9.339	(1)	.220	.071	-41.405
= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(1)	.442	-.071	-35.521
JTAN	9.339	(1)	-.220	-.071	-41.405
= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(1)	.329	-1.197	-49.593
JTAN	4.144	(1)	-4.630	-1.197	-52.204
= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(1)	4.240	-1.197	-86.164
JTAN	5.195	(1)	-1.976	-1.197	-89.436

SHEAR MINIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	-.329	1.197	-49.593
JTAN	4.144	(1)	4.630	1.197	-52.204
= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(1)	-4.240	1.197	-86.164
JTAN	5.195	(1)	1.976	1.197	-89.436
= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(1)	-.442	.071	-35.521
JTAN	9.339	(1)	.220	.071	-41.405
= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(1)	.442	-.071	-35.521
JTAN	9.339	(1)	-.220	-.071	-41.405
= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(1)	.329	-1.197	-49.593
JTAN	4.144	(1)	-4.630	-1.197	-52.204
= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(1)	4.240	-1.197	-86.164
JTAN	5.195	(1)	-1.976	-1.197	-89.436

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 1

	AXIAL MAXIMUM					AXIAL MINIMUM				
	-----L---	-CASE-	-----M---	-----Q---	-----N---	-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 1 (1 - 2) G = =										
ITAN	0.000	(1)	-13.121	10.013	1.197	0.000	(1)	-13.121	10.013	1.197
1	.250	(1)	-10.666	9.624	1.197	.250	(1)	-10.666	9.624	1.197
2	.550	(1)	-7.853	9.123	1.197	.550	(1)	-7.853	9.123	1.197
3	.700	(1)	-6.504	8.858	1.197	.700	(1)	-6.504	8.858	1.197
4	.900	(1)	-4.769	8.490	1.197	.900	(1)	-4.769	8.490	1.197
5	1.150	(1)	-2.707	8.005	1.197	1.150	(1)	-2.707	8.005	1.197
6	4.870	(1)	11.051	-.784	1.197	4.870	(1)	11.051	-.784	1.197
7	8.590	(1)	-8.537	-9.572	1.197	8.590	(1)	-8.537	-9.572	1.197
8	8.840	(1)	-10.991	-10.057	1.197	8.840	(1)	-10.991	-10.057	1.197
9	9.040	(1)	-13.039	-10.425	1.197	9.040	(1)	-13.039	-10.425	1.197
10	9.190	(1)	-14.623	-10.690	1.197	9.190	(1)	-14.623	-10.690	1.197
11	9.490	(1)	-17.906	-11.192	1.197	9.490	(1)	-17.906	-11.192	1.197
JTAN	9.740	(1)	-20.753	-11.580	1.197	9.740	(1)	-20.753	-11.580	1.197
= = MEMBER 2 (2 - 3) G = =										
ITAN	0.000	(1)	-20.311	11.111	1.267	0.000	(1)	-20.311	11.111	1.267
1	.250	(1)	-17.581	10.723	1.267	.250	(1)	-17.581	10.723	1.267
2	.550	(1)	-14.439	10.221	1.267	.550	(1)	-14.439	10.221	1.267
3	.700	(1)	-12.926	9.956	1.267	.700	(1)	-12.926	9.956	1.267
4	.900	(1)	-10.971	9.588	1.267	.900	(1)	-10.971	9.588	1.267
5	1.150	(1)	-8.634	9.103	1.267	1.150	(1)	-8.634	9.103	1.267
6	5.000	(1)	9.230	-.000	1.267	5.000	(1)	9.230	-.000	1.267
7	8.850	(1)	-8.634	-9.103	1.267	8.850	(1)	-8.634	-9.103	1.267
8	9.100	(1)	-10.971	-9.588	1.267	9.100	(1)	-10.971	-9.588	1.267
9	9.300	(1)	-12.926	-9.956	1.267	9.300	(1)	-12.926	-9.956	1.267
10	9.450	(1)	-14.439	-10.221	1.267	9.450	(1)	-14.439	-10.221	1.267
11	9.750	(1)	-17.581	-10.723	1.267	9.750	(1)	-17.581	-10.723	1.267
JTAN	10.000	(1)	-20.311	-11.111	1.267	10.000	(1)	-20.311	-11.111	1.267
= = MEMBER 3 (3 - 4) G = =										
ITAN	0.000	(1)	-20.753	11.580	1.197	0.000	(1)	-20.753	11.580	1.197
1	.250	(1)	-17.906	11.192	1.197	.250	(1)	-17.906	11.192	1.197
2	.550	(1)	-14.623	10.690	1.197	.550	(1)	-14.623	10.690	1.197
3	.700	(1)	-13.039	10.425	1.197	.700	(1)	-13.039	10.425	1.197
4	.900	(1)	-10.991	10.057	1.197	.900	(1)	-10.991	10.057	1.197
5	1.150	(1)	-8.537	9.572	1.197	1.150	(1)	-8.537	9.572	1.197
6	4.870	(1)	11.051	.784	1.197	4.870	(1)	11.051	.784	1.197
7	8.590	(1)	-2.707	-8.005	1.197	8.590	(1)	-2.707	-8.005	1.197
8	8.840	(1)	-4.769	-8.490	1.197	8.840	(1)	-4.769	-8.490	1.197
9	9.040	(1)	-6.504	-8.858	1.197	9.040	(1)	-6.504	-8.858	1.197
10	9.190	(1)	-7.853	-9.123	1.197	9.190	(1)	-7.853	-9.123	1.197
11	9.490	(1)	-10.666	-9.624	1.197	9.490	(1)	-10.666	-9.624	1.197
JTAN	9.740	(1)	-13.121	-10.013	1.197	9.740	(1)	-13.121	-10.013	1.197

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 1

AXIAL MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	-.329	1.197	-49.593
JTAN	4.144	(1)	4.630	1.197	-52.204
= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(1)	-4.240	1.197	-86.164
JTAN	5.195	(1)	1.976	1.197	-89.436
= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(1)	-.442	.071	-35.521
JTAN	9.339	(1)	.220	.071	-41.405
= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(1)	.442	-.071	-35.521
JTAN	9.339	(1)	-.220	-.071	-41.405
= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(1)	.329	-1.197	-49.593
JTAN	4.144	(1)	-4.630	-1.197	-52.204
= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(1)	4.240	-1.197	-86.164
JTAN	5.195	(1)	-1.976	-1.197	-89.436

AXIAL MINIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	-.329	1.197	-49.593
JTAN	4.144	(1)	4.630	1.197	-52.204
= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(1)	-4.240	1.197	-86.164
JTAN	5.195	(1)	1.976	1.197	-89.436
= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(1)	-.442	.071	-35.521
JTAN	9.339	(1)	.220	.071	-41.405
= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(1)	.442	-.071	-35.521
JTAN	9.339	(1)	-.220	-.071	-41.405
= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(1)	.329	-1.197	-49.593
JTAN	4.144	(1)	-4.630	-1.197	-52.204
= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(1)	4.240	-1.197	-86.164
JTAN	5.195	(1)	-1.976	-1.197	-89.436

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 2

	MOMENT MAXIMUM						MOMENT MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	7.522	3.808	.591	ITAN	0.000	(10)	-25.018	9.543	1.004
1	.250	(9)	8.442	3.549	.591	1	.250	(10)	-22.664	9.284	1.004
2	.550	(9)	9.457	3.215	.591	2	.550	(10)	-19.928	8.950	1.004
3	.700	(9)	9.926	3.038	.591	3	.700	(10)	-18.599	8.773	1.004
4	.900	(9)	10.509	2.793	.591	4	.900	(10)	-16.869	8.527	1.004
5	1.150	(9)	11.167	2.470	.591	5	1.150	(10)	-14.777	8.204	1.004
6	4.870	(6)	18.232	-1.534	1.130	6	4.870	(10)	5.062	2.345	1.004
7	8.590	(10)	2.669	-3.514	1.004	7	8.590	(9)	-14.052	-9.249	.591
8	8.840	(10)	1.750	-3.837	1.004	8	8.840	(6)	-17.237	-15.655	1.130
9	9.040	(10)	.957	-4.083	1.004	9	9.040	(6)	-20.463	-16.397	1.130
10	9.190	(10)	.332	-4.260	1.004	10	9.190	(6)	-22.952	-16.783	1.130
11	9.490	(10)	-.997	-4.594	1.004	11	9.490	(6)	-28.096	-17.503	1.130
JTAN	9.740	(10)	-2.178	-4.853	1.004	JTAN	9.740	(6)	-32.542	-18.050	1.130
MAX	4.329	(6)	18.511	.500	1.130	MAX	5.411	(10)	6.095	1.472	1.004
= = MEMBER 2 (2 - 3) G = =						= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(9)	-6.361	5.972	.845	ITAN	0.000	(6)	-31.686	17.005	1.267
1	.250	(9)	-4.900	5.713	.845	1	.250	(6)	-27.502	16.458	1.267
2	.550	(9)	-3.235	5.378	.845	2	.550	(6)	-22.671	15.738	1.267
3	.700	(9)	-2.442	5.202	.845	3	.700	(6)	-20.339	15.351	1.267
4	.900	(9)	-1.426	4.956	.845	4	.900	(6)	-17.322	14.809	1.267
5	1.150	(9)	-.227	4.633	.845	5	1.150	(6)	-13.709	14.088	1.267
6	5.000	(6)	14.028	-.000	1.267	6	5.000	(10)	6.154	1.436	.845
7	8.850	(10)	-.227	-4.633	.845	7	8.850	(6)	-13.709	-14.088	1.267
8	9.100	(10)	-1.426	-4.956	.845	8	9.100	(6)	-17.322	-14.809	1.267
9	9.300	(10)	-2.442	-5.202	.845	9	9.300	(6)	-20.339	-15.351	1.267
10	9.450	(10)	-3.235	-5.378	.845	10	9.450	(6)	-22.671	-15.738	1.267
11	9.750	(10)	-4.900	-5.713	.845	11	9.750	(6)	-27.502	-16.458	1.267
JTAN	10.000	(10)	-6.361	-5.972	.845	JTAN	10.000	(6)	-31.686	-17.005	1.267
MAX	5.000	(6)	14.028	-.000	1.267	MAX	5.000	(10)	6.154	1.436	.845

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 　　　　　 CRC-FANSY V6.3

PICK UP 2

MOMENT MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(9)	-2.178	4.853	1.004
1	.250	(9)	-.997	4.594	1.004
2	.550	(9)	.332	4.260	1.004
3	.700	(9)	.957	4.083	1.004
4	.900	(9)	1.750	3.837	1.004
5	1.150	(9)	2.669	3.514	1.004
6	4.870	(6)	19.232	1.534	1.130
7	8.590	(10)	11.167	-2.470	.591
8	8.840	(10)	10.509	-2.793	.591
9	9.040	(10)	9.926	-3.038	.591
10	9.190	(10)	9.457	-3.215	.591
11	9.490	(10)	8.442	-3.549	.591
JTAN	9.740	(10)	7.522	-3.808	.591
MAX	5.411	(5)	18.511	-.500	1.130
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(10)	16.051	-2.896	-35.931
JTAN	4.144	(6)	5.861	1.130	-64.032
= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(10)	-1.865	-2.896	-60.313
JTAN	5.195	(9)	19.545	4.492	-56.760
= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(10)	18.544	-4.059	-22.251
JTAN	9.339	(9)	19.658	4.154	-29.036
= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(10)	19.134	-4.154	-25.113
JTAN	9.339	(9)	19.365	4.059	-26.173
= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(10)	16.489	-4.492	-30.196
JTAN	4.144	(10)	-2.125	-4.492	-31.937
= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(6)	4.369	-1.130	-103.502
JTAN	5.195	(9)	16.910	2.896	-62.495

MOMENT MINIMUM

	L	CASE	M	Q	N
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(6)	-32.542	18.050	1.130
1	.250	(6)	-28.096	17.503	1.130
2	.550	(6)	-22.952	16.783	1.130
3	.700	(6)	-20.463	16.397	1.130
4	.900	(6)	-17.237	15.855	1.130
5	1.150	(10)	-14.052	9.249	.591
6	4.870	(9)	5.062	-2.345	1.004
7	8.590	(9)	-14.777	-8.204	1.004
8	8.840	(9)	-16.669	-8.527	1.004
9	9.040	(9)	-18.599	-8.773	1.004
10	9.190	(9)	-19.928	-8.950	1.004
11	9.490	(9)	-22.664	-9.284	1.004
JTAN	9.740	(9)	-25.018	-9.543	1.004
MAX	4.329	(9)	6.095	-1.472	1.004
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(9)	-16.489	4.492	-30.196
JTAN	4.144	(9)	2.125	4.492	-31.937
= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(6)	-4.369	1.130	-103.502
JTAN	5.195	(10)	-16.910	-2.896	-62.495
= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(9)	-19.134	4.154	-25.113
JTAN	9.339	(10)	-19.365	-4.059	-26.173
= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(9)	-18.544	4.059	-22.251
JTAN	9.339	(10)	-19.658	-4.154	-29.036
= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(9)	-16.051	2.896	-35.931
JTAN	4.144	(6)	-5.861	-1.130	-64.032
= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(9)	1.865	2.896	-60.313
JTAN	5.195	(10)	-19.545	-4.492	-56.760

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 2

	SHEAR MAXIMUM						SHEAR MINIMUM				
	-----L---	-CASE-	-----M---	-----Q---	-----N---		-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(6)	-17.597	14.982	1.130	ITAN	0.000	(9)	7.522	3.808	.591
1	.250	(6)	-13.919	14.435	1.130	1	.250	(9)	8.442	3.549	.591
2	.550	(6)	-9.695	13.715	1.130	2	.550	(9)	9.457	3.215	.591
3	.700	(6)	-7.667	13.328	1.130	3	.700	(9)	9.926	3.038	.591
4	.900	(6)	-5.055	12.786	1.130	4	.900	(9)	10.509	2.793	.591
5	1.150	(6)	-1.947	12.065	1.130	5	1.150	(9)	11.167	2.470	.591
6	4.870	(10)	5.062	2.345	1.004	6	4.870	(9)	9.674	-3.390	.591
7	8.590	(10)	2.669	-3.514	1.004	7	8.590	(6)	-13.363	-15.133	1.130
8	8.840	(10)	1.750	-3.837	1.004	8	8.840	(6)	-17.237	-15.855	1.130
9	9.040	(10)	.957	-4.083	1.004	9	9.040	(6)	-20.463	-16.397	1.130
10	9.190	(10)	.332	-4.260	1.004	10	9.190	(6)	-22.952	-16.783	1.130
11	9.490	(10)	-.997	-4.594	1.004	11	9.490	(6)	-28.096	-17.503	1.130
JTAN	9.740	(10)	-2.178	-4.853	1.004	JTAN	9.740	(6)	-32.542	-18.050	1.130
= = MEMBER 2 (2 - 3) G = =						= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(6)	-31.686	17.005	1.267	ITAN	0.000	(9)	-6.361	5.972	.845
1	.250	(6)	-27.502	16.458	1.267	1	.250	(9)	-4.900	5.713	.845
2	.550	(6)	-22.671	15.738	1.267	2	.550	(9)	-3.235	5.378	.845
3	.700	(6)	-20.339	15.351	1.267	3	.700	(9)	-2.442	5.202	.845
4	.900	(6)	-17.322	14.809	1.267	4	.900	(9)	-1.426	4.956	.845
5	1.150	(6)	-13.709	14.088	1.267	5	1.150	(9)	-.227	4.633	.845
6	5.000	(10)	6.154	1.436	.845	6	5.000	(9)	6.154	-1.436	.845
7	8.850	(10)	-.227	-4.633	.845	7	8.850	(6)	-13.709	-14.088	1.267
8	9.100	(10)	-1.426	-4.956	.845	8	9.100	(6)	-17.322	-14.809	1.267
9	9.300	(10)	-2.442	-5.202	.845	9	9.300	(6)	-20.339	-15.351	1.267
10	9.450	(10)	-3.235	-5.378	.845	10	9.450	(6)	-22.671	-15.738	1.267
11	9.750	(10)	-4.900	-5.713	.845	11	9.750	(6)	-27.502	-16.458	1.267
JTAN	10.000	(10)	-6.361	-5.972	.845	JTAN	10.000	(6)	-31.686	-17.005	1.267
= = MEMBER 3 (3 - 4) G = =						= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(6)	-32.542	18.050	1.130	ITAN	0.000	(9)	-2.178	4.653	1.004
1	.250	(6)	-28.096	17.503	1.130	1	.250	(9)	-.997	4.594	1.004
2	.550	(6)	-22.952	16.783	1.130	2	.550	(9)	.332	4.260	1.004
3	.700	(6)	-20.463	16.397	1.130	3	.700	(9)	.957	4.083	1.004
4	.900	(6)	-17.237	15.855	1.130	4	.900	(9)	1.750	3.837	1.004
5	1.150	(6)	-13.363	15.133	1.130	5	1.150	(9)	2.669	3.514	1.004
6	4.870	(10)	9.674	3.390	.591	6	4.870	(9)	5.062	-2.345	1.004
7	8.590	(10)	11.167	-2.470	.591	7	8.590	(6)	-1.947	-12.065	1.130
8	8.840	(10)	10.509	-2.793	.591	8	8.840	(5)	-5.055	-12.786	1.130
9	9.040	(10)	9.926	-3.038	.591	9	9.040	(6)	-7.667	-13.328	1.130
10	9.190	(10)	9.457	-3.215	.591	10	9.190	(6)	-9.695	-13.715	1.130
11	9.490	(10)	8.442	-3.549	.591	11	9.490	(6)	-13.919	-14.435	1.130
JTAN	9.740	(10)	7.522	-3.808	.591	JTAN	9.740	(6)	-17.597	-14.982	1.130

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 2

	SHEAR MAXIMUM						SHEAR MINIMUM				
	-----L---	-CASE-	-----M---	-----Q---	-----N---		-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(9)	-16.489	4.492	-30.196	ITAN	0.000	(10)	16.051	-2.896	-35.931
JTAN	4.144	(9)	2.125	4.492	-31.937	JTAN	4.144	(10)	4.049	-2.896	-37.671
= = MEMBER 5 (5 - 7) C = =						= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(9)	-3.789	4.492	-54.578	ITAN	0.000	(10)	-1.865	-2.896	-60.313
JTAN	5.195	(9)	19.545	4.492	-56.760	JTAN	5.195	(10)	-16.910	-2.896	-62.495
= = MEMBER 6 (2 - 8) C = =						= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(9)	-19.134	4.154	-25.113	ITAN	0.000	(10)	18.544	-4.059	-22.251
JTAN	9.339	(9)	19.658	4.154	-29.036	JTAN	9.339	(10)	-19.365	-4.059	-26.173
= = MEMBER 7 (3 - 9) C = =						= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(9)	-18.544	4.059	-22.251	ITAN	0.000	(10)	19.134	-4.154	-25.113
JTAN	9.339	(9)	19.365	4.059	-26.173	JTAN	9.339	(10)	-19.658	-4.154	-29.036
= = MEMBER 8 (4 - 6) C = =						= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(9)	-16.051	2.896	-35.931	ITAN	0.000	(10)	16.489	-4.492	-30.196
JTAN	4.144	(9)	-4.049	2.896	-37.671	JTAN	4.144	(10)	-2.125	-4.492	-31.937
= = MEMBER 9 (6 - 10) C = =						= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(9)	1.865	2.896	-60.313	ITAN	0.000	(10)	3.789	-4.492	-54.578
JTAN	5.195	(9)	16.910	2.896	-62.495	JTAN	5.195	(10)	-19.545	-4.492	-56.760

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 2

AXIAL MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(8)	-9.005	8.345	1.593
1	.250	(8)	-6.961	8.008	1.593
2	.550	(8)	-4.623	7.572	1.593
3	.700	(8)	-3.504	7.341	1.593
4	.900	(8)	-2.068	7.021	1.593
5	1.150	(8)	-.365	6.599	1.593
6	4.870	(8)	10.253	-1.043	1.593
7	8.590	(8)	-8.126	-8.686	1.593
8	8.840	(8)	-10.351	-9.107	1.593
9	9.040	(8)	-12.205	-9.428	1.593
10	9.190	(8)	-13.636	-9.658	1.593
11	9.490	(8)	-16.600	-10.094	1.593
JTAN	9.740	(8)	-19.166	-10.432	1.593
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(8)	-17.706	9.662	1.883
1	.250	(8)	-15.332	9.324	1.883
2	.550	(8)	-12.600	8.888	1.883
3	.700	(8)	-11.284	8.658	1.883
4	.900	(8)	-9.584	8.337	1.883
5	1.150	(8)	-7.552	7.916	1.883
6	5.000	(8)	7.983	.000	1.883
7	8.850	(8)	-7.552	-7.916	1.883
8	9.100	(8)	-9.584	-8.337	1.883
9	9.300	(8)	-11.284	-8.658	1.883
10	9.450	(8)	-12.600	-8.888	1.883
11	9.750	(8)	-15.332	-9.324	1.883
JTAN	10.000	(8)	-17.706	-9.662	1.883
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(8)	-19.166	10.432	1.593
1	.250	(8)	-16.600	10.094	1.593
2	.550	(8)	-13.636	9.658	1.593
3	.700	(8)	-12.205	9.428	1.593
4	.900	(8)	-10.351	9.107	1.593
5	1.150	(8)	-8.126	8.686	1.593
6	4.870	(8)	10.253	1.043	1.593
7	8.590	(8)	-.365	-6.599	1.593
8	8.840	(8)	-2.068	-7.021	1.593
9	9.040	(8)	-3.504	-7.341	1.593
10	9.190	(8)	-4.623	-7.572	1.593
11	9.490	(8)	-6.961	-8.008	1.593
JTAN	9.740	(8)	-9.005	-8.345	1.593

AXIAL MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	7.522	3.808	.591
1	.250	(9)	8.442	3.549	.591
2	.550	(9)	9.457	3.215	.591
3	.700	(9)	9.926	3.038	.591
4	.900	(9)	10.509	2.793	.591
5	1.150	(9)	11.167	2.470	.591
6	4.870	(9)	9.674	-3.390	.591
7	8.590	(9)	-14.052	-9.249	.591
8	8.840	(9)	-16.405	-9.572	.591
9	9.040	(9)	-18.344	-9.818	.591
10	9.190	(9)	-19.830	-9.994	.591
11	9.490	(9)	-22.879	-10.329	.591
JTAN	9.740	(9)	-25.494	-10.588	.591
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(7)	-17.645	9.662	.790
1	.250	(7)	-15.271	9.324	.790
2	.550	(7)	-12.539	8.888	.790
3	.700	(7)	-11.223	8.658	.790
4	.900	(7)	-9.523	8.337	.790
5	1.150	(7)	-7.491	7.916	.790
6	5.000	(7)	8.044	-.000	.790
7	8.850	(7)	-7.491	-7.916	.790
8	9.100	(7)	-9.523	-8.337	.790
9	9.300	(7)	-11.223	-8.658	.790
10	9.450	(7)	-12.539	-8.888	.790
11	9.750	(7)	-15.271	-9.324	.790
JTAN	10.000	(7)	-17.645	-9.662	.790
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(10)	-25.494	10.588	.591
1	.250	(10)	-22.879	10.329	.591
2	.550	(10)	-19.830	9.994	.591
3	.700	(10)	-18.344	9.818	.591
4	.900	(10)	-16.405	9.572	.591
5	1.150	(10)	-14.052	9.249	.591
6	4.870	(10)	9.674	3.390	.591
7	8.590	(10)	11.167	-2.470	.591
8	8.840	(10)	10.509	-2.793	.591
9	9.040	(10)	9.926	-3.038	.591
10	9.190	(10)	9.457	-3.215	.591
11	9.490	(10)	8.442	-3.549	.591
JTAN	9.740	(10)	7.522	-3.808	.591

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 2

AXIAL MAXIMUM						AXIAL MINIMUM					
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(9)	-16.489	4.492	-30.196	ITAN	0.000	(6)	1.177	1.130	-61.422
JTAN	4.144	(9)	2.125	4.492	-31.937	JTAN	4.144	(6)	5.861	1.130	-64.032
= = MEMBER 5 (5 - 7) C = =						= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(9)	-3.789	4.492	-54.578	ITAN	0.000	(6)	-4.369	1.130	-103.502
JTAN	5.195	(9)	19.545	4.492	-56.760	JTAN	5.195	(6)	1.501	1.130	-106.775
= = MEMBER 6 (2 - 8) C = =						= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(10)	18.544	-4.059	-22.251	ITAN	0.000	(6)	-.856	.137	-49.505
JTAN	9.339	(10)	-19.365	-4.059	-26.173	JTAN	9.339	(6)	.427	.137	-55.389
= = MEMBER 7 (3 - 9) C = =						= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(9)	-18.544	4.059	-22.251	ITAN	0.000	(6)	.856	-.137	-49.505
JTAN	9.339	(9)	19.365	4.059	-26.173	JTAN	9.339	(6)	-.427	-.137	-55.389
= = MEMBER 8 (4 - 6) C = =						= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(10)	16.489	-4.492	-30.196	ITAN	0.000	(6)	-1.177	-1.130	-61.422
JTAN	4.144	(10)	-2.125	-4.492	-31.937	JTAN	4.144	(6)	-5.861	-1.130	-64.032
= = MEMBER 9 (6 - 10) C = =						= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(10)	3.789	-4.492	-54.578	ITAN	0.000	(6)	4.369	-1.130	-103.502
JTAN	5.195	(10)	-19.545	-4.492	-56.760	JTAN	5.195	(6)	-1.501	-1.130	-106.775

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TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 3

	MOMENT MAXIMUM						MOMENT MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	7.522	3.808	.591	ITAN	0.000	(10)	-25.018	9.543	1.004
1	.250	(9)	8.442	3.549	.591	1	.250	(10)	-22.664	9.284	1.004
2	.550	(9)	9.457	3.215	.591	2	.550	(10)	-19.928	8.950	1.004
3	.700	(9)	9.926	3.038	.591	3	.700	(10)	-18.599	8.773	1.004
4	.900	(9)	10.509	2.793	.591	4	.900	(10)	-16.869	8.527	1.004
5	1.150	(9)	11.167	2.470	.591	5	1.150	(10)	-14.777	8.204	1.004
6	4.870	(9)	9.674	-3.390	.591	6	4.870	(10)	5.062	2.345	1.004
7	8.590	(10)	2.669	-3.514	1.004	7	8.590	(9)	-14.052	-9.249	.591
8	8.840	(10)	1.750	-3.837	1.004	8	8.840	(9)	-16.405	-9.572	.591
9	9.040	(10)	.957	-4.083	1.004	9	9.040	(9)	-18.344	-9.818	.591
10	9.190	(10)	.332	-4.260	1.004	10	9.190	(9)	-19.830	-9.994	.591
11	9.490	(10)	-.997	-4.594	1.004	11	9.490	(9)	-22.879	-10.329	.591
JTAN	9.740	(10)	-2.178	-4.853	1.004	JTAN	9.740	(9)	-25.494	-10.568	.591
MAX	3.247	(9)	13.051	-.771	.591	MAX	5.411	(10)	6.095	1.472	1.004
= = MEMBER 2 (2 - 3) G = =						= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(9)	-6.361	5.972	.845	ITAN	0.000	(10)	-20.723	8.844	.845
1	.250	(9)	-4.900	5.713	.845	1	.250	(10)	-18.544	8.585	.845
2	.550	(9)	-3.235	5.378	.845	2	.550	(10)	-16.018	8.251	.845
3	.700	(9)	-2.442	5.202	.845	3	.700	(10)	-14.793	8.074	.845
4	.900	(9)	-1.426	4.956	.845	4	.900	(10)	-13.203	7.828	.845
5	1.150	(9)	-.227	4.633	.845	5	1.150	(10)	-11.286	7.505	.845
6	5.000	(9)	6.154	-1.436	.845	6	5.000	(10)	6.154	1.436	.845
7	8.850	(10)	-.227	-4.633	.845	7	8.850	(9)	-11.286	-7.505	.845
8	9.100	(10)	-1.426	-4.956	.845	8	9.100	(9)	-13.203	-7.828	.845
9	9.300	(10)	-2.442	-5.202	.845	9	9.300	(9)	-14.793	-8.074	.845
10	9.450	(10)	-3.235	-5.378	.845	10	9.450	(9)	-16.018	-8.251	.845
11	9.750	(10)	-4.900	-5.713	.845	11	9.750	(9)	-18.544	-8.585	.845
JTAN	10.000	(10)	-6.361	-5.972	.845	JTAN	10.000	(9)	-20.723	-8.844	.845
MAX	4.444	(9)	6.703	-.540	.845	MAX	5.000	(10)	6.154	1.436	.845

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK-UP 3

MOMENT MAXIMUM						MOMENT MINIMUM					
	-----L---	-CASE-	-----M---	-----Q---	-----N---		-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 3 (3 - 4) G = =						= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(9)	-2.178	4.853	1.004	ITAN	0.000	(10)	-25.494	10.588	.591
1	.250	(9)	-.997	4.594	1.004	1	.250	(10)	-22.879	10.329	.591
2	.550	(9)	.332	4.260	1.004	2	.550	(10)	-19.830	9.994	.591
3	.700	(9)	.957	4.083	1.004	3	.700	(10)	-18.344	9.818	.591
4	.900	(9)	1.750	3.837	1.004	4	.900	(10)	-16.405	9.572	.591
5	1.150	(9)	2.669	3.514	1.004	5	1.150	(10)	-14.052	9.249	.591
6	4.870	(10)	9.674	3.390	.591	6	4.870	(9)	5.062	-2.345	1.004
7	8.590	(10)	11.167	-2.470	.591	7	8.590	(9)	-14.777	-8.264	1.004
8	8.840	(10)	11.509	-2.793	.591	8	8.840	(9)	-16.869	-8.527	1.004
9	9.040	(10)	9.926	-3.038	.591	9	9.040	(9)	-18.599	-8.773	1.004
10	9.190	(10)	9.457	-3.215	.591	10	9.190	(9)	-19.928	-8.950	1.004
11	9.490	(10)	8.442	-3.549	.591	11	9.490	(9)	-22.664	-9.284	1.004
JTAN	9.740	(10)	7.522	-3.808	.591	JTAN	9.740	(9)	-25.018	-9.543	1.004
MAX	6.493	(10)	13.051	.771	.591	MAX	4.329	(9)	6.095	-1.472	1.004
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(10)	16.051	-2.896	-35.931	ITAN	0.000	(9)	-16.489	4.492	-30.196
JTAN	4.144	(10)	4.049	-2.896	-37.671	JTAN	4.144	(9)	2.125	4.492	-31.937
= = MEMBER 5 (5 - 7) C = =						= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(10)	-1.865	-2.896	-60.313	ITAN	0.000	(9)	-3.789	4.492	-54.578
JTAN	5.195	(9)	19.545	4.492	-56.760	JTAN	5.195	(10)	-16.910	-2.896	-62.495
= = MEMBER 6 (2 - 8) C = =						= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(10)	19.544	-4.059	-22.251	ITAN	0.000	(9)	-19.134	4.154	-25.113
JTAN	9.339	(9)	19.658	4.154	-29.036	JTAN	9.339	(10)	-19.365	-4.059	-26.173
= = MEMBER 7 (3 - 9) C = =						= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(10)	19.134	-4.154	-25.113	ITAN	0.000	(9)	-18.544	4.059	-22.251
JTAN	9.339	(9)	19.365	4.059	-26.173	JTAN	9.339	(10)	-19.658	-4.154	-29.036
= = MEMBER 8 (4 - 6) C = =						= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(10)	16.489	-4.492	-30.196	ITAN	0.000	(9)	-16.051	2.896	-35.931
JTAN	4.144	(10)	-2.125	-4.492	-31.937	JTAN	4.144	(9)	-4.049	2.896	-37.671
= = MEMBER 9 (6 - 10) C = =						= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(10)	3.789	-4.492	-54.578	ITAN	0.000	(9)	1.865	2.896	-60.313
JTAN	5.195	(9)	16.910	2.896	-62.495	JTAN	5.195	(10)	-19.545	-4.492	-56.760

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 3

	SHEAR MAXIMUM						SHEAR MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(10)	-25.018	9.543	1.004	ITAN	0.000	(9)	7.522	3.808	.591
1	.250	(10)	-22.664	9.284	1.004	1	.250	(9)	8.442	3.549	.591
2	.550	(10)	-19.928	8.950	1.004	2	.550	(9)	9.457	3.215	.591
3	.700	(10)	-18.599	8.773	1.004	3	.700	(9)	9.926	3.038	.591
4	.900	(10)	-16.869	8.527	1.004	4	.900	(9)	10.509	2.793	.591
5	1.150	(10)	-14.777	8.204	1.004	5	1.150	(9)	11.167	2.470	.591
6	4.870	(10)	5.062	2.345	1.004	6	4.870	(9)	9.674	-3.390	.591
7	8.590	(10)	2.669	-3.514	1.004	7	8.590	(9)	-14.052	-9.249	.591
8	8.840	(10)	1.750	-3.837	1.004	8	8.840	(9)	-16.405	-9.572	.591
9	9.040	(10)	.957	-4.083	1.004	9	9.040	(9)	-18.344	-9.818	.591
10	9.190	(10)	.332	-4.260	1.004	10	9.190	(9)	-19.830	-9.994	.591
11	9.490	(10)	-.997	-4.594	1.004	11	9.490	(9)	-22.879	-10.329	.591
JTAN	9.740	(10)	-2.178	-4.853	1.004	JTAN	9.740	(9)	-25.494	-10.588	.591
= = MEMBER 2 (2 - 3) G = =						= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(10)	-20.723	8.844	.845	ITAN	0.000	(9)	-6.361	5.972	.845
1	.250	(10)	-18.544	8.585	.845	1	.250	(9)	-4.900	5.713	.845
2	.550	(10)	-16.018	8.251	.845	2	.550	(9)	-3.235	5.378	.845
3	.700	(10)	-14.793	8.074	.845	3	.700	(9)	-2.442	5.202	.845
4	.900	(10)	-13.203	7.828	.845	4	.900	(9)	-1.426	4.956	.845
5	1.150	(10)	-11.286	7.505	.845	5	1.150	(9)	-.227	4.633	.845
6	5.000	(10)	6.154	1.436	.845	6	5.000	(9)	6.154	-1.436	.845
7	8.850	(10)	-.227	-4.633	.845	7	8.850	(9)	-11.286	-7.505	.845
8	9.100	(10)	-1.426	-4.956	.845	8	9.100	(9)	-13.203	-7.828	.845
9	9.300	(10)	-2.442	-5.202	.845	9	9.300	(9)	-14.793	-8.074	.845
10	9.450	(10)	-3.235	-5.378	.845	10	9.450	(9)	-16.018	-8.251	.845
11	9.750	(10)	-4.900	-5.713	.845	11	9.750	(9)	-18.544	-8.585	.845
JTAN	10.000	(10)	-6.361	-5.972	.845	JTAN	10.000	(9)	-20.723	-8.844	.845
= = MEMBER 3 (3 - 4) G = =						= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(10)	-25.494	10.588	.591	ITAN	0.000	(9)	-2.175	4.853	1.004
1	.250	(10)	-22.879	10.329	.591	1	.250	(9)	-.997	4.594	1.004
2	.550	(10)	-19.830	9.994	.591	2	.550	(9)	.332	4.260	1.004
3	.700	(10)	-18.344	9.818	.591	3	.700	(9)	.957	4.083	1.004
4	.900	(10)	-16.405	9.572	.591	4	.900	(9)	1.750	3.837	1.004
5	1.150	(10)	-14.052	9.249	.591	5	1.150	(9)	2.669	3.514	1.004
6	4.870	(10)	9.674	3.390	.591	6	4.870	(9)	5.062	-2.345	1.004
7	8.590	(10)	11.167	-2.470	.591	7	8.590	(9)	-14.777	-8.204	1.004
8	8.840	(10)	10.509	-2.793	.591	8	8.840	(9)	-16.869	-8.527	1.004
9	9.040	(10)	9.926	-3.038	.591	9	9.040	(9)	-18.599	-8.773	1.004
10	9.190	(10)	9.457	-3.215	.591	10	9.190	(9)	-19.928	-8.950	1.004
11	9.490	(10)	8.442	-3.549	.591	11	9.490	(9)	-22.664	-9.284	1.004
JTAN	9.740	(10)	7.522	-3.808	.591	JTAN	9.740	(9)	-25.018	-9.543	1.004

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 3

	SHEAR MAXIMUM					SHEAR MINIMUM				
	L	CASE	M	Q	N	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =										
ITAN	0.000	(9)	-16.489	4.492	-30.196	0.000	(10)	16.051	-2.896	-35.931
JTAN	4.144	(9)	2.125	4.492	-31.937	4.144	(10)	4.049	-2.896	-37.671
= = MEMBER 5 (5 - 7) C = =										
ITAN	0.000	(9)	-3.789	4.492	-54.578	0.000	(10)	-1.865	-2.896	-60.313
JTAN	5.195	(9)	19.545	4.492	-56.760	5.195	(10)	-16.910	-2.896	-62.495
= = MEMBER 6 (2 - 8) C = =										
ITAN	0.000	(9)	-19.134	4.154	-25.113	0.000	(10)	18.544	-4.059	-22.251
JTAN	9.339	(9)	19.658	4.154	-29.036	9.339	(10)	-19.365	-4.059	-26.173
= = MEMBER 7 (3 - 9) C = =										
ITAN	0.000	(9)	-18.544	4.059	-22.251	0.000	(10)	19.134	-4.154	-25.113
JTAN	9.339	(9)	19.365	4.059	-26.173	9.339	(10)	-19.658	-4.154	-29.036
= = MEMBER 8 (4 - 6) C = =										
ITAN	0.000	(9)	-15.051	2.896	-35.931	0.000	(10)	15.489	-4.492	-30.196
JTAN	4.144	(9)	-4.049	2.896	-37.671	4.144	(10)	-2.125	-4.492	-31.937
= = MEMBER 9 (6 - 10) C = =										
ITAN	0.000	(9)	1.865	2.896	-60.313	0.000	(10)	3.789	-4.492	-54.578
JTAN	5.195	(9)	16.910	2.896	-62.495	5.195	(10)	-19.545	-4.492	-56.760

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 CRC-FANSY V6.3

PICK UP 3

AXIAL MAXIMUM / AXIAL MINIMUM

= = MEMBER 1 (1 - 2) G = =

	L	CASE	M	Q	N		L	CASE	M	Q	N
ITAN	0.000	(10)	-25.018	9.543	1.004	ITAN	0.000	(9)	7.522	3.808	.591
1	.250	(10)	-22.664	9.284	1.004	1	.250	(9)	8.442	3.549	.591
2	.550	(10)	-19.928	8.950	1.004	2	.550	(9)	9.457	3.215	.591
3	.700	(10)	-18.599	8.773	1.004	3	.700	(9)	9.926	3.038	.591
4	.900	(10)	-16.869	8.527	1.004	4	.900	(9)	10.509	2.793	.591
5	1.150	(10)	-14.777	8.204	1.004	5	1.150	(9)	11.167	2.470	.591
6	4.870	(10)	5.062	2.345	1.004	6	4.870	(9)	9.674	-3.390	.591
7	8.590	(10)	2.669	-3.514	1.004	7	8.590	(9)	-14.052	-9.249	.591
8	8.840	(10)	1.750	-3.837	1.004	8	8.840	(9)	-16.405	-9.572	.591
9	9.040	(10)	.957	-4.083	1.004	9	9.040	(9)	-18.344	-9.818	.591
10	9.190	(10)	.332	-4.260	1.004	10	9.190	(9)	-19.830	-9.994	.591
11	9.490	(10)	-.997	-4.594	1.004	11	9.490	(9)	-22.879	-10.329	.591
JTAN	9.740	(10)	-2.178	-4.853	1.004	JTAN	9.740	(9)	-25.494	-10.586	.591

= = MEMBER 2 (2 - 3) G = =

	L	CASE	M	Q	N		L	CASE	M	Q	N
ITAN	0.000	(9)	-6.361	5.972	.845	ITAN	0.000	(10)	-20.723	8.844	.845
1	.250	(9)	-4.900	5.713	.845	1	.250	(10)	-18.544	8.585	.845
2	.550	(9)	-3.235	5.378	.845	2	.550	(10)	-16.018	8.251	.845
3	.700	(9)	-2.442	5.202	.845	3	.700	(10)	-14.793	8.074	.845
4	.900	(9)	-1.426	4.956	.845	4	.900	(10)	-13.203	7.828	.845
5	1.150	(9)	-.227	4.633	.845	5	1.150	(10)	-11.286	7.505	.845
6	5.000	(9)	6.154	-1.436	.845	6	5.000	(10)	6.154	1.436	.845
7	8.850	(9)	-11.286	-7.505	.845	7	8.850	(10)	-.227	-4.633	.845
8	9.100	(9)	-13.203	-7.828	.845	8	9.100	(10)	-1.426	-4.956	.845
9	9.300	(9)	-14.793	-8.074	.845	9	9.300	(10)	-2.442	-5.202	.845
10	9.450	(9)	-16.018	-8.251	.845	10	9.450	(10)	-3.235	-5.378	.845
11	9.750	(9)	-18.544	-8.585	.845	11	9.750	(10)	-4.900	-5.713	.845
JTAN	10.000	(9)	-20.723	-8.844	.845	JTAN	10.000	(10)	-6.361	-5.972	.845

= = MEMBER 3 (3 - 4) G = =

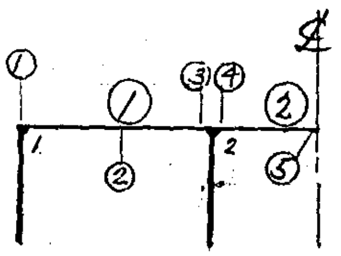
	L	CASE	M	Q	N		L	CASE	M	Q	N
ITAN	0.000	(9)	-2.178	4.853	1.004	ITAN	0.000	(10)	-25.494	10.588	.591
1	.250	(9)	-.997	4.594	1.004	1	.250	(10)	-22.879	10.329	.591
2	.550	(9)	.332	4.260	1.004	2	.550	(10)	-19.830	9.994	.591
3	.700	(9)	.957	4.083	1.004	3	.700	(10)	-18.344	9.818	.591
4	.900	(9)	1.750	3.837	1.004	4	.900	(10)	-16.405	9.572	.591
5	1.150	(9)	2.669	3.514	1.004	5	1.150	(10)	-14.052	9.249	.591
6	4.870	(9)	5.062	-2.345	1.004	6	4.870	(10)	9.674	3.390	.591
7	8.590	(9)	-14.777	-8.204	1.004	7	8.590	(10)	11.167	-2.470	.591
8	8.840	(9)	-16.869	-8.527	1.004	8	8.840	(10)	10.509	-2.793	.591
9	9.040	(9)	-18.599	-8.773	1.004	9	9.040	(10)	9.926	-3.038	.591
10	9.190	(9)	-19.928	-8.950	1.004	10	9.190	(10)	9.457	-3.215	.591
11	9.490	(9)	-22.664	-9.284	1.004	11	9.490	(10)	8.442	-3.549	.591
JTAN	9.740	(9)	-25.018	-9.543	1.004	JTAN	9.740	(10)	7.522	-3.608	.591

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) L-1 — CRC-FANSY V6.3

PICK UP 3

AXIAL MAXIMUM	L	CASE	M	Q	N	AXIAL MINIMUM	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(9)	-16.489	4.492	-30.196	ITAN	0.000	(10)	16.051	-2.896	-35.931
JTAN	4.144	(9)	2.125	4.492	-31.937	JTAN	4.144	(10)	4.049	-2.896	-37.671
= = MEMBER 5 (5 - 7) C = =						= = MEMBER 5 (5 - 7) C = =					
ITAN	0.000	(9)	-3.789	4.492	-54.578	ITAN	0.000	(10)	-1.865	-2.896	-60.313
JTAN	5.195	(9)	19.545	4.492	-56.760	JTAN	5.195	(10)	-16.910	-2.896	-62.495
= = MEMBER 6 (2 - 8) C = =						= = MEMBER 6 (2 - 8) C = =					
ITAN	0.000	(10)	18.544	-4.059	-22.251	ITAN	0.000	(9)	-19.134	4.154	-25.113
JTAN	9.339	(10)	-19.365	-4.059	-26.173	JTAN	9.339	(9)	19.658	4.154	-29.036
= = MEMBER 7 (3 - 9) C = =						= = MEMBER 7 (3 - 9) C = =					
ITAN	0.000	(9)	-18.544	4.059	-22.251	ITAN	0.000	(10)	19.134	-4.154	-25.113
JTAN	9.339	(9)	19.365	4.059	-26.173	JTAN	9.339	(10)	-19.658	-4.154	-29.036
= = MEMBER 8 (4 - 6) C = =						= = MEMBER 8 (4 - 6) C = =					
ITAN	0.000	(10)	16.489	-4.492	-30.196	ITAN	0.000	(9)	-16.051	2.896	-35.931
JTAN	4.144	(10)	-2.125	-4.492	-31.937	JTAN	4.144	(9)	-4.049	2.896	-37.671
= = MEMBER 9 (6 - 10) C = =						= = MEMBER 9 (6 - 10) C = =					
ITAN	0.000	(10)	3.789	-4.492	-54.578	ITAN	0.000	(9)	1.865	2.896	-60.313
JTAN	5.195	(10)	-19.545	-4.492	-56.760	JTAN	5.195	(9)	16.910	2.896	-62.495

(6) Calculation of upper beam



(1) Calculation of compressive stress caused by bending

(a) Summary of stresses

(i) At the support point

Pick up No. 2

		(1)				(2)			
		①	CO.	③	CO.	④	CO.	○	CO.
Combined stress	Top	-25.02	10	-32.54	6	-31.69	6		
	Bottom	8.44		—		—			
Dead load		-18.12	1	-20.75	1	-20.31	1		

(Note) CO. — Combination

(ii) Span moment

		(1)		(2)	
		②	CO.	⑤	CO.
Combined stress	Bottom	18.23	6	14.03	6

(b) Allowable stress of upper beam, safe against cracking

(i) At the support point 1

Dead load $Md = -13.12^{tm}$ (case 1)

pedestrian load $Mp = -4.48$ " (case 2)

$\Sigma M = -17.60^{tm}$

$$\alpha = \frac{4.48}{17.60} = 0.254 > 0.25$$

There fore $\sigma sa = 1000$ kg/cm²

(ii) At the support point 2, 3

Dead load $Md = -20.75^{tm}$ (case 1)

Pedestrian load $Mp = -11.79$ " (case 2)

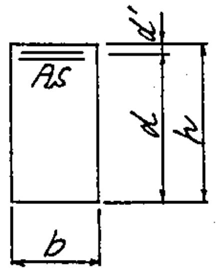
$\Sigma M = -32.54^{tm}$

$$\alpha = \frac{11.79}{32.54} = 0.36 > 0.25$$

There fore $\sigma sa = 1000$ kg/cm²

(C) Cross Section

(i) Cross Section at the support point



$b = 50^{cm}$

$h = 60$ "

$d' = 2.5 + 1.0 + 1.6 + 3.2 = 8.3^{cm}$

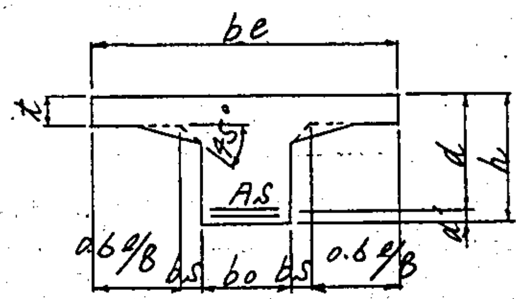
$d = 60 - 8.3 = 51.7^{cm}$

(effective height used for shearing stress calculation)

(ii) Effective width of T-beam Compression fibre

$$be = b_o + 2\left(bs + \frac{0.6}{8} \cdot l\right)$$

$$be_1 = 0.50 + 2 \times \left(0.15 + \frac{0.60}{8} \times 9.74\right) = 2.16^{m}$$



$b_o = 50^{cm}$

$h = 60$ "

$d' = 3.0 + 1.3 + 1.6 + 3.2 = 9.1^{cm}$

$d = 60 - 9.1 = 50.9^{cm}$

$t = 15^{cm}$

(d) Calculation of bending stress

	①					
	①		③		②	
M (tm)	-13.12	-25.02	-20.75	-32.54	18.23	
N (t)						
S (t)						
b (cm)	50		50		216	
h (cm)	60		60		60	
d (cm)	54.9		51.7		50.9	
d' (cm)	5.1		(9.1)	8.3	9.1	
As (cm²)	D32 - 5 = 39.71		D32 - 5/3 = 63.54		D32 - 5 = 39.71	
p	0.01447		0.02458		0.00361	
As' (cm²)				D32 - 3 = 23.83	t = 15 t/d = 0.294	
p'				0.00922		
e = M/N (cm)						
e = M/N + u (cm)						
e = M/N − u (cm)						
e/h						
d/e						
d'/h						
d'/d				0.176		
M/bd² (kg/cm²)	8.71	16.60	15.53	24.35	3.26	
k				0.514		
Lc				0.288		
j				0.827		
1/Lc	4.99				7.89	
1/Ls	82		50		325	
β = σs/σc						
σc (kg/cm²)	71.0	82.8	78.0	84.5	25.7	
σs (kg/cm²)		1360		1200	1000	
τ (kg/cm²)						
σsa (kg/cm²)	1000	1800	1000	1800	〃	
σca (kg/cm²)		90		90	〃	
τa (kg/cm²)						
Nomogram number	M-1	〃	〃	M-7.9	M-47, M-1	
Combination	D	D+P	D	D+P	-	

(e) Required minimum cross section of re-bars

(i) At the top of support point 1

$$As = \frac{M}{\sigma_{sa} \cdot j \cdot d} \times \frac{4}{3}$$

$$= \frac{25.02 \times 10^5}{1800 \times 0.875 \times 54.9} \times \frac{4}{3} = 38.58^{cm^2}$$

Hence D32 − 5 = $39.71^{cm^2} > 38.58^{cm^2}$

(ii) At the top of support point 2

$$As = \frac{20.75 \times 10^5}{1000 \times 0.875 \times 51.7} \times \frac{4}{3} = 61.16^{cm^2}$$

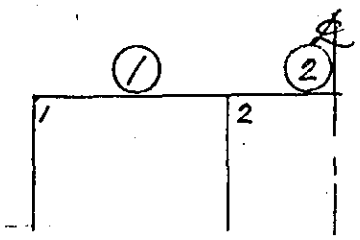
Hence D 32 − $\frac{3}{3}$ = $63.54^{cm^2} > 61.16^{cm^2}$

(iii) At the span center point

$$As = \frac{18.23 \times 10^5}{1800 \times 0.875 \times 50.9} \times \frac{4}{3} = 30.32^{cm^2}$$

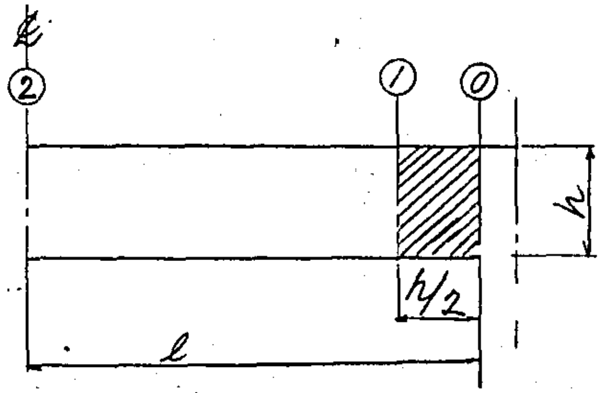
Hence D32 − 5 = $39.71^{cm^2} > 30.32^{cm^2}$

(2) Calculation of shearing stress



(a) Summary of shearing stresses

For examining Section 0, shearing stress at section 1. is used

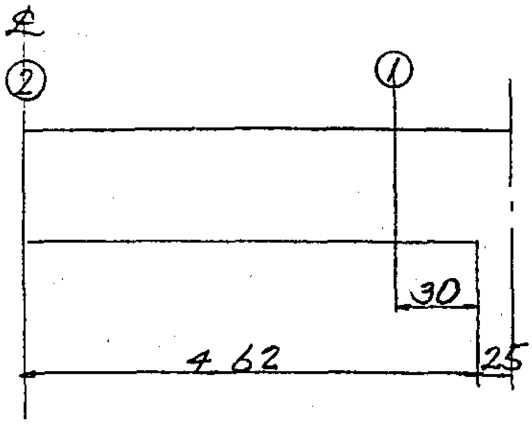


	①				②			
	Left support	CO.	Right support	CO.	Left support	CO.	Right support	CO.
⓪	14.44		-17.50		16.46			
①	13.72	6	-16.78	6	15.74	6		
②	-1.53		-1.53		0			
( )								
( )								

(Note) CO. - Combination

(b) Shearing stress

(i) Shearing stress caused by bending



(ii) Shearing stress of the member of uniform height

$$\tau = \frac{S}{b \cdot d}$$

$$\tau_1 = \frac{16.78 \times 10^3}{50 \times 51.7} = 6.49\ kg/cm^2 > 3.9\ kg/cm^2$$

$$\tau_2 = \frac{1.53 \times 10^3}{50 \times 51.7} = 0.59\ " < \ "$$

Therefore, stirrup calculation is made.

(c) Shearing stress caused by torsional moment

(i) Torsional moment

(Refer the result of computor analysis on torsional moment)

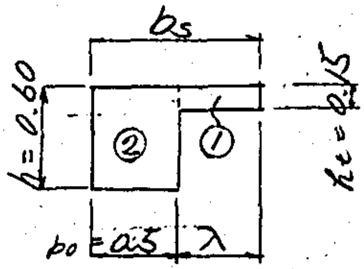
Dead load $M_d = 2.51^{tm}$

pedestrians load $M_p = 2.04$ "

Hence, Total (D + P)

$\Sigma M_{d+p} = 2.51 + 2.04 = 4.55^{tm}$

(ii). Torsional moment beared by longitudinal beam



- Effective width

$b_s = b_o + \lambda t$

$\lambda t = 3 \cdot h_t$

$= 3 \times 0.15 = 0.45^m$

$b_s = 0.50 + 0.45 = 0.95^m$

$h = 0.60^m$

Calculation of distribution ratio

	a	b	a/b	k	$I_t = k \cdot a \cdot b^3$ (m^4)
①	0.45	0.15	3.000	0.263	$0.263 \times 0.45 \times 0.15^3 = 0.00040$
②	0.60	0.50	1.200	0.166	$0.166 \times 0.60 \times 0.50^3 = 0.01245$
Total					$I_t = 0.01285$

Front face of column

$$M_{t1} = 4.55 \times \frac{0.01245}{0.01285} \times \frac{4.75}{5.00} = 4.19^{tm}$$

At the h/2 point

$$M_{t2} = \text{"} \times \text{"} \times \frac{4.45}{5.00} = 3.92^{tm}$$

(d) Shearing stress caused by torsion

Shearing stress caused the torsion is calculated followed the equation

$$\tau_t = \frac{M_t}{I_t} \cdot b \cdot \eta$$

b : shorter side length

a : longer side length

k : Table − 40. 2

(i) Front face of column

$M_t = 4.19^{tm}$

$a = 60^{cm}$ $b = 50^{cm}$

$\frac{a}{b} = \frac{60}{50} = 1.200$ $\eta = 0.759$

$\tau_{t1} = \frac{4.19 \times 10^5}{1.29 \times 10^6} \times 50 \times 0.759 = 12.33^{kg/cm^2}$

ii) at the l/2 point

$M_t = 3.92^{tm}$

$a = 60^{cm}$ $b = 50^{cm}$

$\frac{a}{b} = \frac{60}{50} = 1.200$ $\eta = 0.759$

$\tau_{t2} = \frac{3.92 \times 10^5}{1.29 \times 10^6} \times 50 \times 0.759 = 11.53^{kg/cm^2}$

(e) Combined shearing stress

Combined allowable shearing stress

$\tau_a = 17 \times 1.3 = 22.1^{kg/cm^2}$

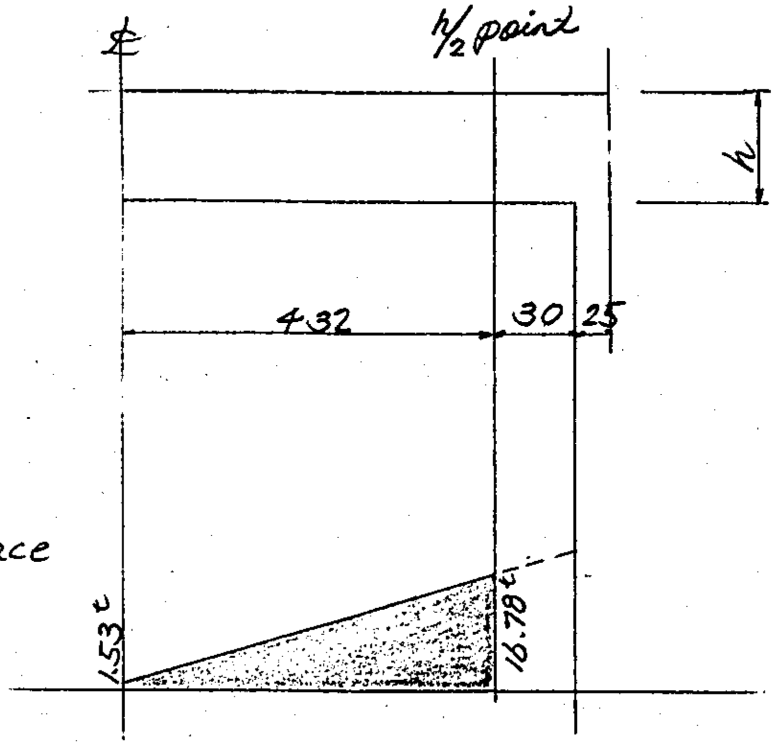
Combined shearing stress

$\tau_1 = 6.49 + 11.53 = 18.02^{kg/cm^2} < 22.1^{kg/cm^2}$

$\tau_2 = 0.59 + 0 = 0.59$ " $<$ "

(3) Calculation of diagonal tension re-bars

(a) Shearing stress caused by bending



Shearing force diagram

(i) Shearing stress beared by concrete

$$S_c = 1/2 \cdot \tau_c \cdot b \cdot d$$

where τ_c : 3.9 kg/cm²

b : Width of member (cm)

d : Effective height of member at the examining section.

$$S_{c1} = 1/2 \times 3.9 \times 50.0 \times 51.7 \times 10^{-3} = 5.04^{t}$$

(b) Shearing force beared dy stirrup

Arrange stirrups D13 - 1 sets in 15.0 cm c-c

Torsional shearing stress

$$\tau_{st} = \frac{M_t \cdot s}{0.8 \cdot A_v \cdot b_1 \cdot h_1} \times \frac{a_1}{b_1}$$

Whore

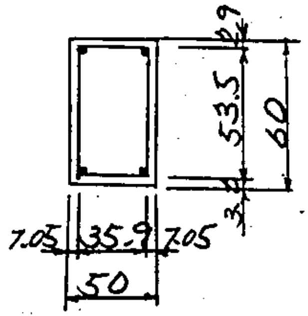
M_t : Torsional moment (tm)

s : c-c distance of stirrup (cm)

A_v : Gross cross Sectiom of coupled stirrups (cm^2)

b_1, h_1 : length of short long side of stirrup

・(i) At ℓ/2 point



$M_t = 3.92$ tm

$s = 15$ cm

$A_v = 1.267 \times 2 = 2.53$ cm^2

$h = 53.5$ cm

$b = 35.9$ "

$$\tau_{se} = \frac{3.92 \times 10^5 \times 15}{0.8 \times 2.53 \times 35.9 \times 53.5} = 1510 \ kg/cm^2 < 1800 \ kg/cm^2$$

Bending Shear beared by stirrup
In the case When Combined with torsional moment, allowable shearing stress is as 20 percent increased.

$\sigma_{sa} = 1800 \times 1.2 = 2160\ ^{kg/cm^2}$

$$S_v = \frac{(\sigma_{sa} - \sigma_{st}) \cdot A_v \cdot d}{1.15 \cdot s}$$

(i) At $l/2$ point

$(2160 - 1510) = 650\ ^{kg/cm^2} < 1800\ ^{kg/cm^2}$

$d = 51.7\ ^{cm}$

$$S_v = \frac{650 \times 2.53 \times 51.7}{1.15 \times 15 \times 10^3} = 4.93\ ^{t}$$

(c) Shear beared by turned bar

$$F_{ba} = \frac{\sigma_{sa} \cdot A_s \cdot d \cdot (\sin\theta + \cos\theta)}{s}$$

$\sigma_{sa} = 1800\ ^{kg/cm^2}$

$A_s = D32 - 2 = 15.88\ ^{cm^2}$

$\theta = \sin\theta + \cos\theta = 45°$ $\quad d = 51.7\ ^{cm}$

$$F_{ba} = \frac{1800 \times 15.88 \times 51.7 \times 1.414}{1.15 \times 100 \times 10^3} = 18.17\ ^{t}$$

(i) Total shear

$$\Sigma S_R = S_c + S_u + S_b$$

$$\Sigma S_R = 5.04 + 4.93 + 18.17$$

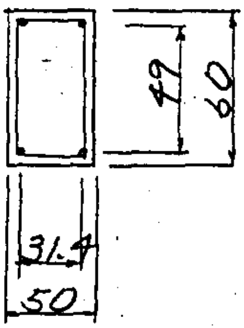
$$= 28.14^t > S = 16.78^t$$

(d) Calculation of axial re-bar arrangement, resisting torsional moment

Required re-bar arrangement is calculated followed the equation.

$$A_s = \frac{M_t \cdot (b_1 + h_1)}{0.8 \cdot \sigma_{sa} \cdot b_1 \cdot h_1}$$

(i) Front face of column



$M_t = 4.19$ tm

$\sigma_{sa} = 1{,}800$ kg/cm²

$b_1 = 31.4$ cm

$h_1 = 49.0$ cm

$$A_s = \frac{4.19 \times 10^5 \times (31.4 + 49.0)}{0.8 \times 1800 \times 31.4 \times 49.0} = 15.20 \text{ cm}^2$$

Required cross section of re-bars arranged at shorter side

$$A_{sb1} = 15.20 \times \frac{31.4}{2(31.4 + 49.0)} = 2.97 \text{ cm}^2$$

(ii) Required cross section of re-bars arranged at longer side

$$A_{sh1} = 15.20 \times \frac{49.0}{2 \times (31.4 + 49.0)} = 4.63 \text{ cm}^2$$

(iii) Top and Bottom

Minimum section of re-bars

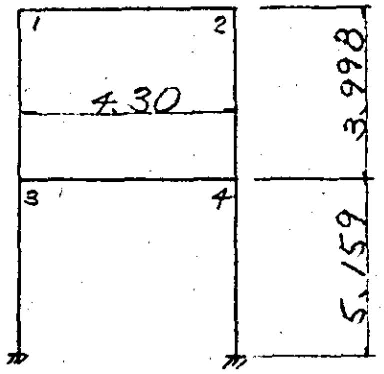
$$A_s = D25 - 1 = 5.07 \text{ cm}^2 > 4.63 \text{ cm}^2$$

Side (one side)

§5. Rigid fram analysis on transversal section ①-① of elevated structure

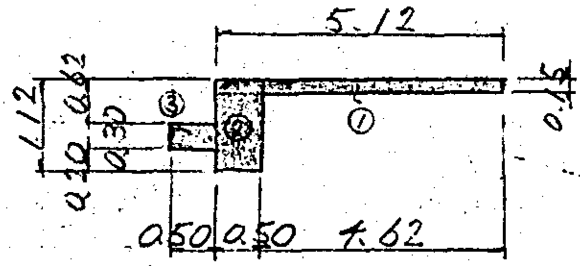
(1) Basic calculation

1. Axis of Rahmen (Rigid frame)



2. Cross Sectionl areas/moment of inertia of area of members

(1) Upper beam (Member 1-2)



	$b^{(m)}$	$h^{(m)}$	$A\ (m^2)$	$y^{(m)}$	$Ay\ (m^3)$
①	4.62	0.15	0.693	0.075	0.05198
②	0.50	1.12	0.560	0.560	0.31360
③	0.50	0.30	0.150	0.770	0.11550
Σ			1.403		0.48108

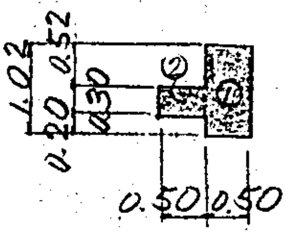
$$y = \frac{0.48108}{1.403} = 0.343^{m}$$

	$b^{(m)}$	$h^{(m)}$	$A^{(m^2)}$	$y_0^{(m)}$	$I_0^{(m^4)}$	$Ay_0^{2\,(m^4)}$	$I_0 + Ay_0^2\ ^{(m^4)}$
①	4.62	0.15	0.693	0.268	0.00130	0.04977	0.05107
②	0.50	1.12	0.560	0.217	0.05854	0.02637	0.08491
③	0.50	0.30	0.150	0.427	0.00113	0.02735	0.02848
Σ			1.403		0.06097	0.10349	0.16446

cross sectional Area $A = 1.403^{m^2}$

Mement of inertia of area $I = 0.16446^{m^4}$

(2) Intermediate beam (Member 3-4)



	$b^{(m)}$	$h^{(m)}$	$A^{(m^2)}$	$y^{(m)}$	$Ay^{(m^3)}$
①	0.50	1.02	0.510	0.510	0.26010
②	0.50	0.30	0.150	0.670	0.10050
Σ			0.660		0.36060

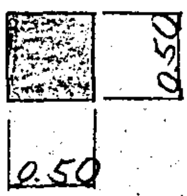
$$y = \frac{0.36060}{0.660} = 0.546^{m}$$

	$b^{(m)}$	$h^{(m)}$	$A^{(m^2)}$	$y_0^{(m)}$	$I_0^{(m^4)}$	$A y_0^2 \ ^{(m^4)}$	$I_0 + A y_0^2 \ ^{(m^4)}$
①	0.50	1.02	0.510	0.036	0.04422	0.00066	0.04488
②	0.50	0.30	0.150	0.124	0.00113	0.00231	0.00344
Σ			0.660		0.04535	0.00297	0.04832

Cross Sectional Area $A = 0.660^{m^2}$

Moment of inertia of area $I = 0.04832^{m^4}$

(3) Column (Member 1-3-5, 2-4-6)



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

$I = 1/12 \times 0.50 \times 0.50^3 = 0.00521^{m^4}$

(4) axial height

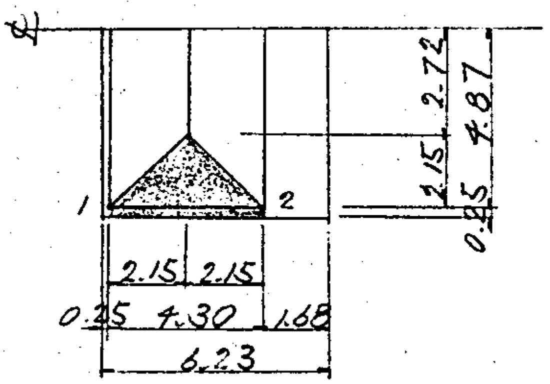
$h_1 = 3.795 - 0.343 + 0.546 = 3.998^{m}$

$h_2 = 5.705 - 0.546 = 5.159$ "

(2) load calculation

1. Dead load

(1) Upper member



a) Uniformly distributed load

Slab $2.5^{t/m^3} \times 0.15 = 0.375^{t/m^2}$

pavmet $1.1'' \times 0.05 = 0.055''$

$w = 0.43^{t/m^2}$

$wd_1 = 0.43^{t/m^2} \times 0.25 = 0.11^{t/m}$

$wd_2 = 0.43'' \times (0.25 + 2.15) = 1.03''$

b) linear load

Cross beam $2.5^{t/m^3} \times 0.50 \times 0.97 = 1.21^{t/m}$

Haunch of slab $2.5'' \times 0.30 \times 0.10 \times 1/2 = 0.04''$

Beam support $2.5'' \times (0.30 + 0.50) \times 1/2 \times 0.50 = 0.50''$

$wd_3 = 1.75^{t/m}$

d) Concentrated load acting at Panel point

Panel point 1

- Uniformly distributed load

$0.43^{t/m^2} \times 0.25 \times 5.12 = 0.55^t$

Uniformly distributed load

$0.43 \times (2.72 + 4.87) \times 1/2 \times 2.15 = 3.51$

- longitudinal beam

$2.5 \times 0.50 \times 0.45 \times 4.62 = 2.60$

- Haunch of slab

$2.5 \times 0.30 \times 0.10 \times 1/2 \times 4.32 = 0.16$

- Beam support

$2.5 \times (0.30 + 0.50) \times 1/2 \times 0.50 \times 0.25 = 0.13$

- Reduction of column part

$-2.5 \times 0.50 \times 0.50 \times (1.12 - 0.343) = -0.49$

- Shed load reaction $= 13.00$

$P_1 = 19.46^t$

Panel point 2

- Uniformly distributed load

$0.43^{t/m^2} \times 0.25 \times 5.12 = 0.55^t$

- Uniformly distributed load

$0.43^{t/m^2} \times (2.72 + 4.87) \times 1/2 \times 2.15 = 3.51$

- pavmet load

$1.1^{t/m^3} \times 0.05 \times 1.43 \times 5.12 = 0.40$

- longitndinal beam

$2.5^{t/m^3} \times 0.50 \times 0.45 \times 4.62 = 2.60$

- Contilever slab

$2.5 \times (0.15 + 0.25) \times 1/2 \times 1.43 \times 5.12 = 3.66$

- Haunch of slab

$2.5 \times 0.30 \times 0.10 \times 1/2 \times 4.32 = 0.16$

- Beam support

$2.5 \times (0.30 + 0.50) \times 1/2 \times 0.50 \times 0.25 = 0.13$

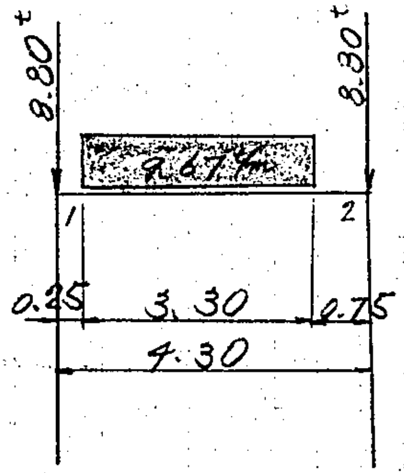
- Reduction of column part

$-2.5 \times 0.50 \times 0.50 \times (1.12 - 0.343) = -0.49$

- Shed load reaction $= 10.00$

$P_2 = 20.52^t$

e) Reaction of Platform beam and stairway Refer



(2) Intermediate member

a) linear load

Cross beam $2.5^{t/m^3} \times 0.50 \times 1.02 = 1.28^{t/m}$

Beam support

$2.5^{t/m^3} \times (0.30 + 0.50) \times 1/2 \times 0.50 = 0.50$ "

$w_{d4} = 1.78^{t/m}$

b) Concentrated load acting at Panel point

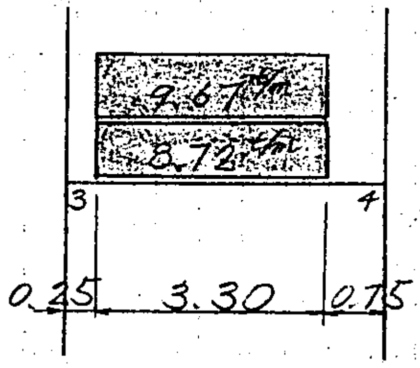
Panel point 3. (4)

Reduction of linear load

$-1.78^{t/m} \times 0.25 = -0.45^{t}$

$P_3 = P_4 = 0.45^{t}$

c) Reaction of stairway



d) Own weight of column

$q = 2.5^{t/m^3} \times 0.50 \times 0.50 = 0.63^{t/m}$

2. Pedestrian load (People load)

$w = 0.35\ t/m^2$

(1) Upper member

a) Uniformly distributed load

$w_{d1} = 0.35\ t/m^2 \times 0.25 = 0.09\ t/m$

$w_{d2} = 0.35 \times (0.25 + 2.15) = 0.84$ "

b) Concentrated load acting at panel point

panel point 1.

Uniformly distributed load

$0.35\ t/m^2 \times 0.25 \times 5.12 = 0.45^t$

Uniformly distributed load

$0.35 \times (2.72 + 4.87) \times 1/2 \times 2.15 = 2.86$ "

$P_1 = 3.31^t$

Panel point 2

- Uniformly distributed load

$0.35\ t/m^2 \times 0.25 \times 5.12 = 0.45^t$

- Uniformly distributed load

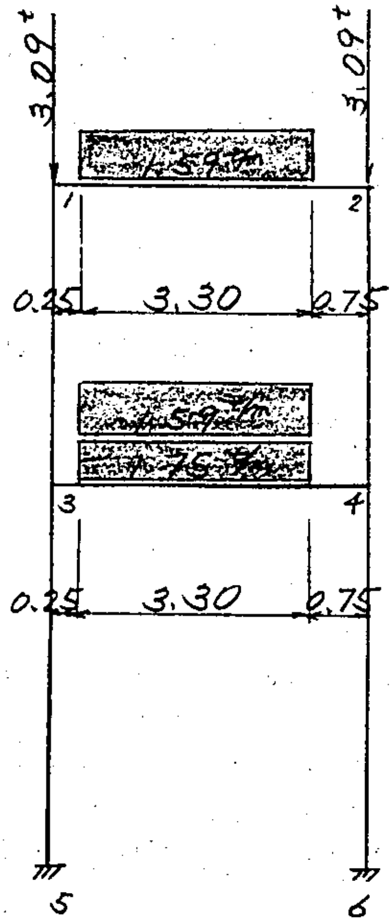
$0.35\ t/m^2 \times (2.72 + 4.87) \times 1/2 \times 2.15 = 2.86$ "

- Uniformly distributed load

$0.35\ t/m^2 \times 1.43 \times 5.12 = 2.56$ "

$P_2 = 5.87^t$

c) Reaction of platform beam and Stairway



3. Temperature change and Drying contraction

Temperature change -------- ±10°C

Drying contraction -------- −15°C

Hence,

Temperature rise ------ +10°C

Temperature drop + Drying contraction

-------- −25°C

4. Seismic load from dead load (K_H=0.10)

a) Horizontal force acting at upper member

Refer Dead load and Pedestrian land

$(0.11 + 1.03)^{t/m} \times 1/2 \times 2.15 \times 2 = 2.45^t$

$1.75^{t/m} \times 4.30 = 7.53^t$

$19.46^t + 20.52^t = 39.98^t$

$8.80^t \times 2 + 9.67^{t/m} \times 3.30 = 49.51^t$

$(7.42 + 6.29)^t \times 1/2 = 6.86^t$

$0.21^{t/m^2} \times 6.23 \times (4.87 + 0.25) = 6.70^t$

$0.63^{t/m} \times 3.998 \times 1/2 \times 2 = 2.52^t$

Total = 115.55^t

$H_1 = 115.55 \times 0.10 \times 1/2 = 5.78^t$

b) Horizontal force acting at intermediate member

$1.78^{t/m} \times 4.30 = 7.65^{t}$

$-0.45^{t} \times 2 = -0.90$ "

$(9.67 + 8.72)^{t/m} \times 3.30 = 60.69$ "

$(6.29 + 6.92)^{t} \times 1/2 = 6.61$ "

$0.63^{t/m} \times (3.998 + 5.159) \times 1/2 \times 2 = 5.77$ "

total $= 79.82^{t}$

$H = 79.82 \times 0.10 = 7.98^{t}$

c) Increased horizontal load acting at foundation

$0.63^{t/m} \times 5.159 \times 1/2 \times 2 = 3.25^{t}$

$H = 3.25 \times 0.10 = 0.33^{t}$

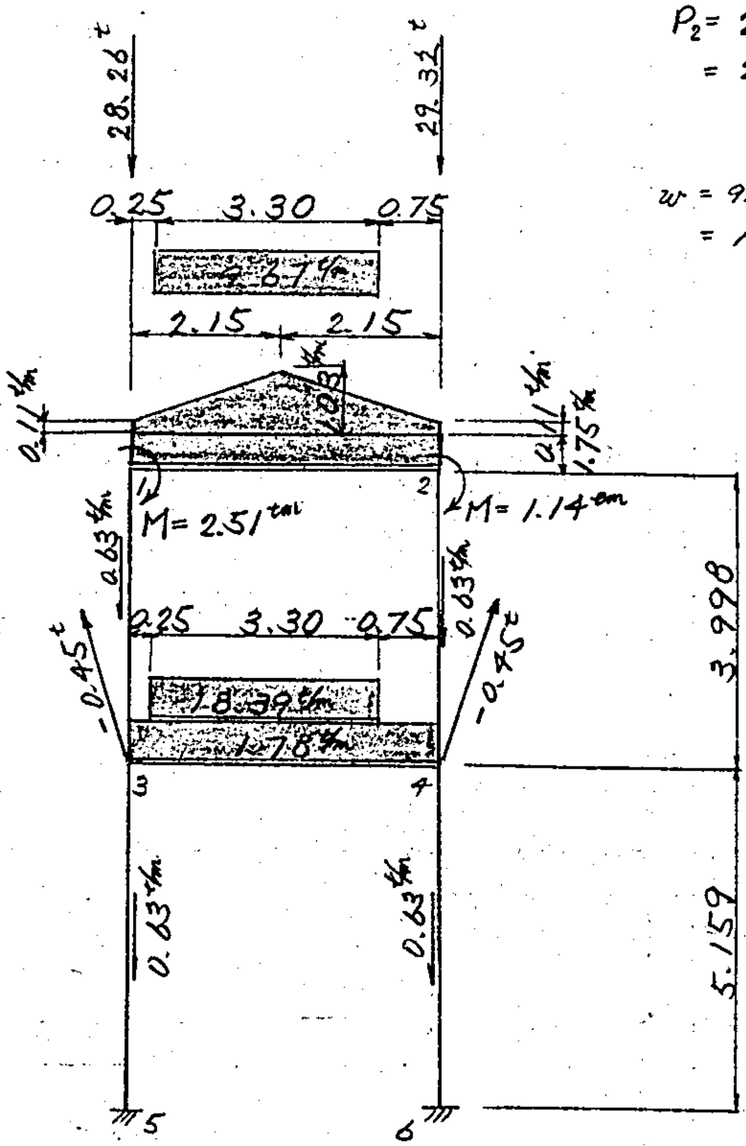
[3] loading diagram

1. case 1 Dead load

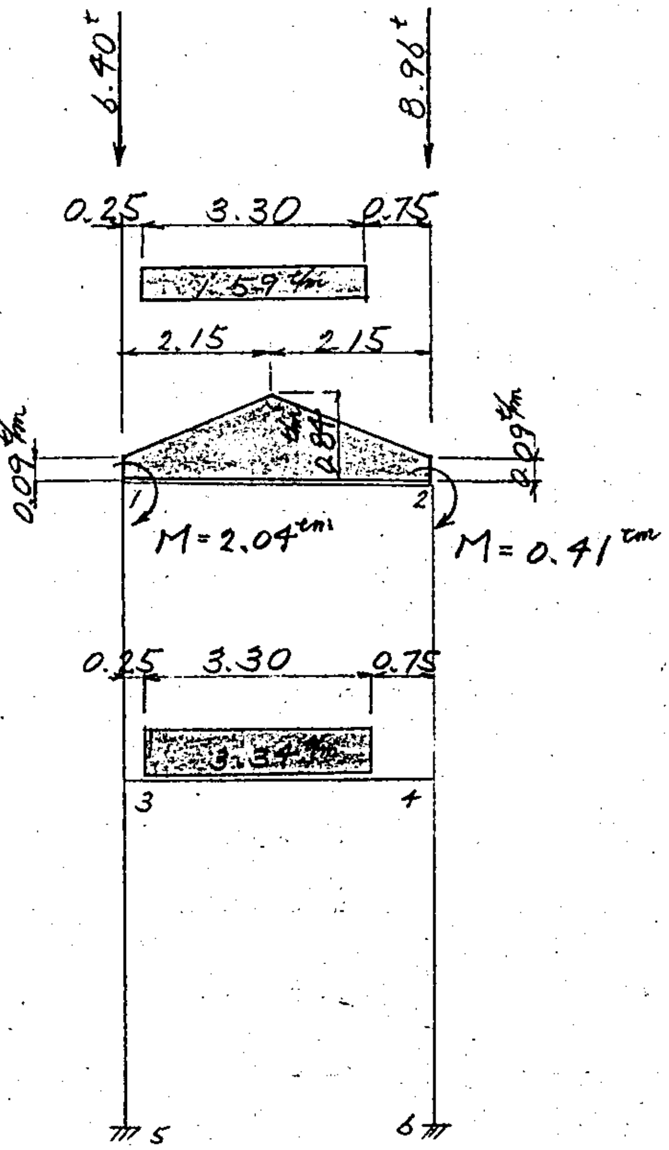
$P_1 = 19.46 + 8.80$
$= 28.26^t$

$P_2 = 20.52 + 8.80$
$= 29.32^t$

$w = 9.67 + 8.72$
$= 18.39^{t/m}$



2. case 2 Pedestrian load (People load)

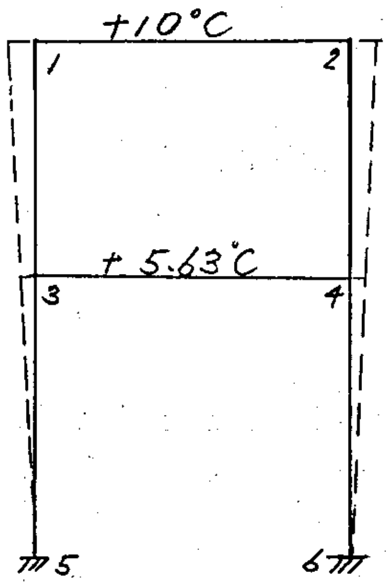


$P_1 = 3.31 + 3.09$
$= 6.40^t$

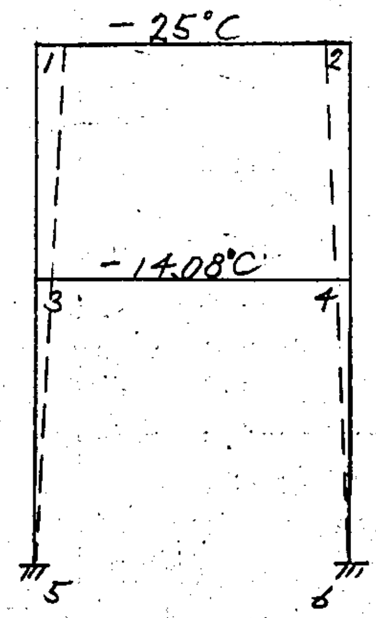
$P_2 = 5.87 + 3.09$
$= 8.96^t$

$w = 1.59 + 1.75$
$= 3.34\ t/m$

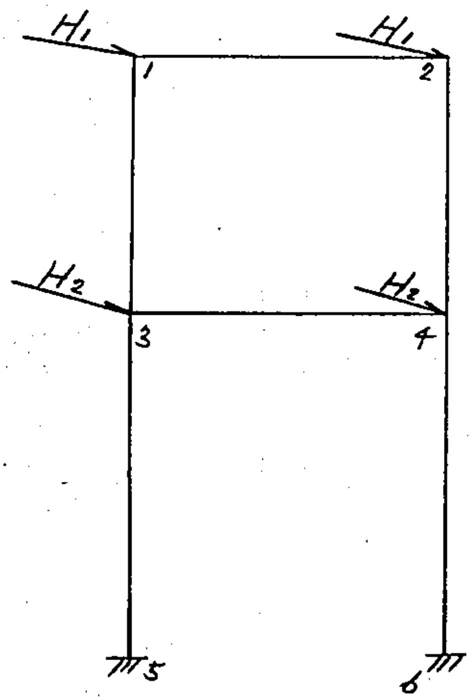
3. case 3 Temperature rise



4. case 4 Temperature drop
+ Drying contraction



5. case 5 Seismic load
from dead load

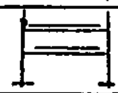


$H_1 = 5.78^t$

$H_2 = 3.99^t$

[4] Combination of loads

1. Basic load

Case Number	Kind of load	Loading Pattern
1	Dead load	
2	Pedestrian load	
3	Temperature rise	+ 10°C
4	Temperature drop + Drying contraction	- 25°C
5	Seismic load from dead load	

2. Combined loads

case number	Combination of loads	α
6	1 + 2	1.0000
7	1 + 3	0.8696
8	1 + 4	〃
9	1 + 5	0.6667
10	1 − 5	〃

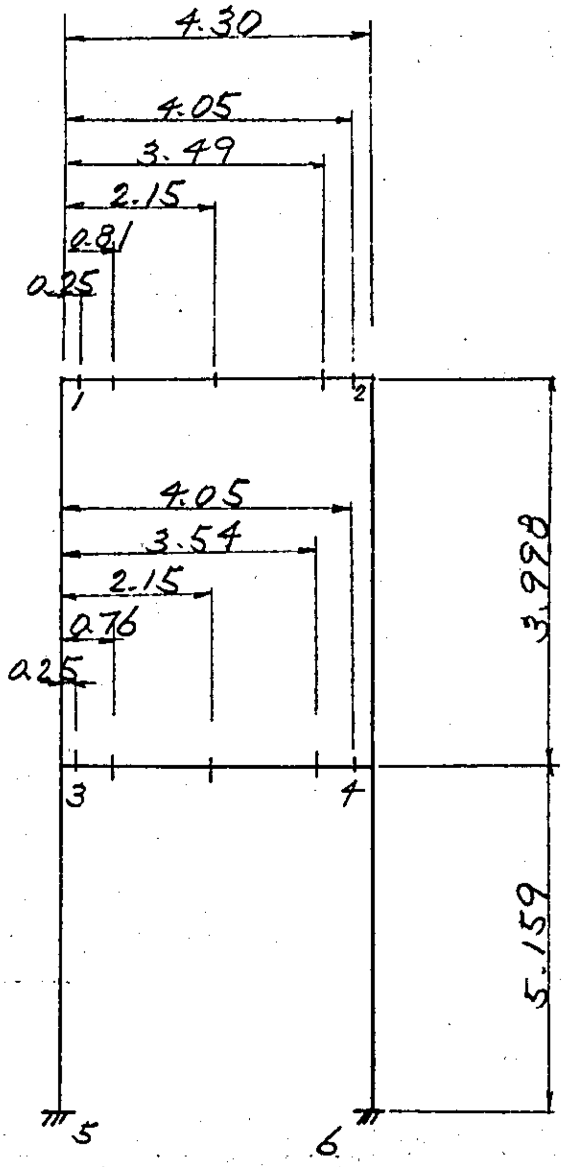
3. Critical cases

No. 1 case 1 crack

No. 2 case 6 ~ 10 synthetic

No. 3 case 9. 10 footing

4. Point of stress calculation

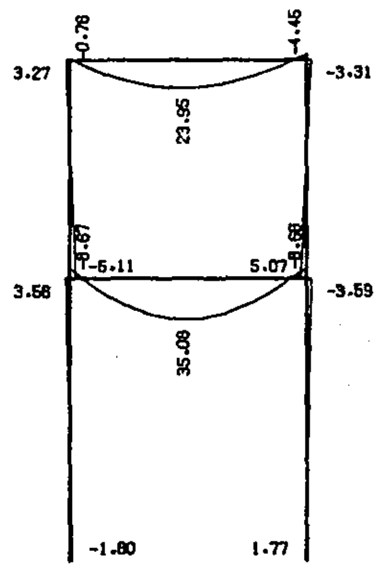


(5) Stress diagram

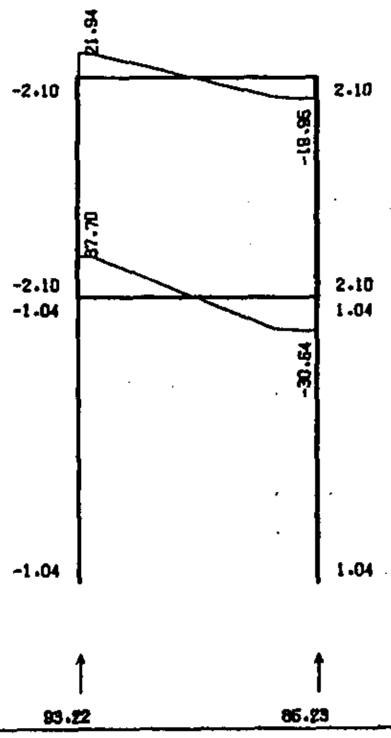
VIADUCT OF PLATFORM (NORTH SIDE) C-1

CASE 1 (DEAD LOAD)

BENDING MOMENT



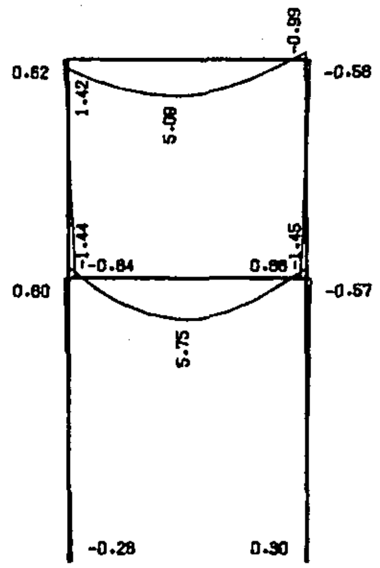
SHEARING FORCE



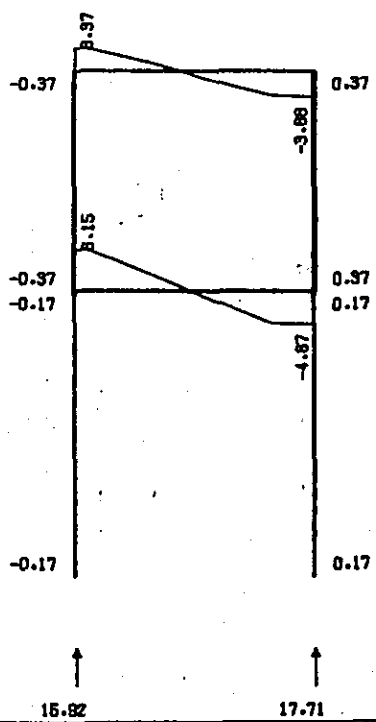
VIADUCT OF PLATFORM (NORTH SIDE) C-1

CASE 2 (PEDESTRIANS LOAD)

BENDING MOMENT



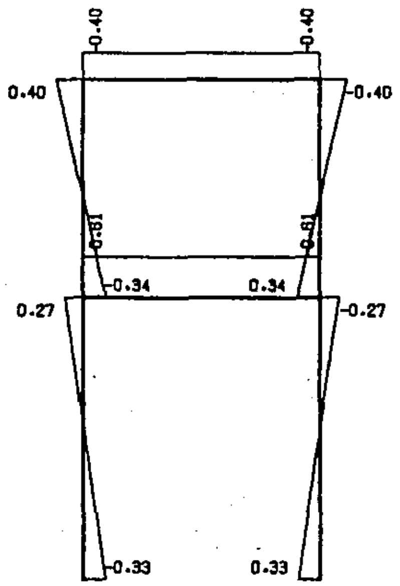
SHEARING FORCE



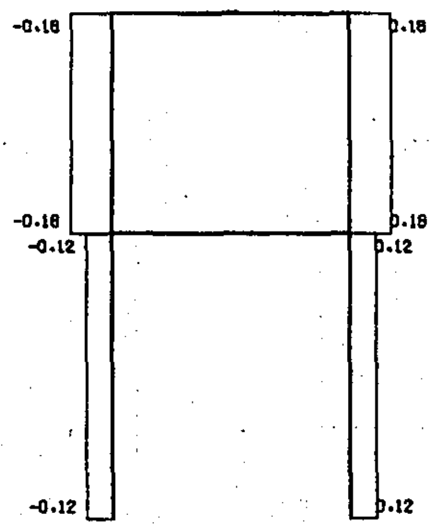
VIADUCT OF PLATFORM (NORTH SIDE) C-1

CASE 3 (TEMPERATURE)

BENDING MOMENT



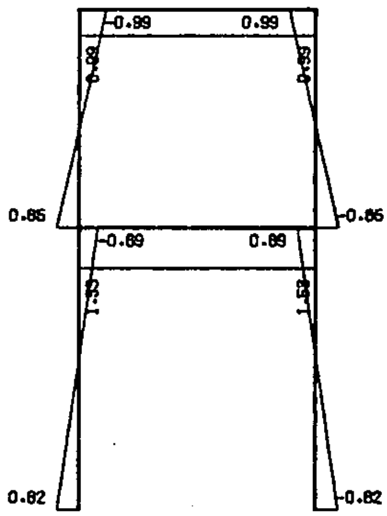
SHEARING FORCE



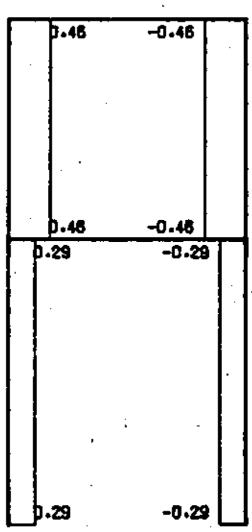
VIADUCT OF PLATFORM (NORTH SIDE) C-1

CASE 4 (TEMPERATURE + SCHRINKAGE)

BENDING MOMENT



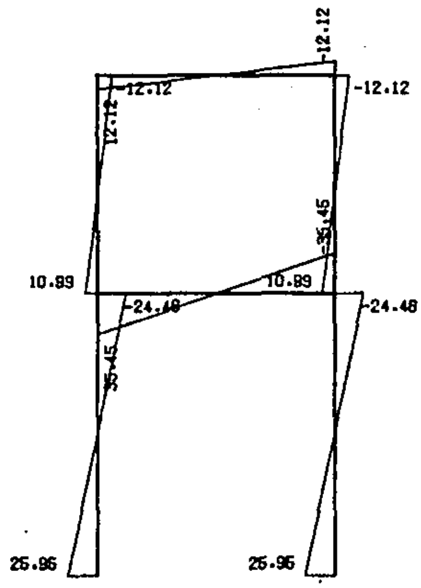
SHEARING FORCE



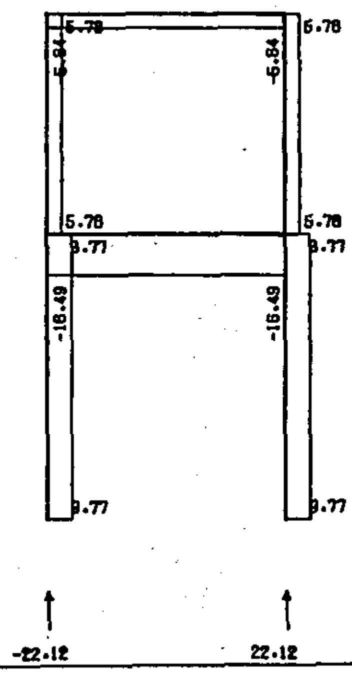
VIADUCT OF PLATFORM (NORTH SIDE) C-1

CASE 5 (SEISMIC LOAD)

BENDING MOMENT



SHEARING FORCE



INPUT DATA

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=== INPUT DATA ===                                                          CRC-FANSY  V6.3

          5   10        20        30        40        50        60        70        80     CARD NUMPER
          ....................................................................................

          TITLE    VIADUCT OF PLATFORM (NORTH SIDE) C-1                                          1
          PLOT          1      2                      6.0                                        2
          TYPE1-1-2     L=4.3      H=3.998,5.159  M1=1.403,0.16446      S=0                      3
                        M2=0.66,0.04832      M3-6=0.25,0.00521          P=2.7E+6,1.0E-5          4
          POINT     1 0.25       0.81      2.15      3.49      4.05                              5
                    2 0.25       0.76      2.15      3.54      4.05                              6
          PICKUP            1    1   1                                                           7
                            2    1   6   10                                                      8
                            3    1   9   10                                                      9
          LOAD              1    CASE : 1 (DEAD LOAD)                                           10
          J                 1              -28.26    -2.51                                      11
                            2              -29.32    -1.14                                      12
                            3                0.45                            4                  13
          L                 1    2-9.67    -9.67      0.25      0.75                            14
                            2    2-18.39   -18.39     0.25      0.75                            15
          D                 1  2 2-0.11    -1.03      2.15     -1.03     -0.11      2.15        16
          DL                1    2-1.75                                                         17
                            2    2-1.78                                                         18
                            3    2-0.63                                      4    5    6        19
          END                                                                                   20
          LOAD              2    CASE  2 (PEDESTRIANS LOAD)                                     21
          J                 1               -6.4     -2.04                                      22
                            2               -8.96    -0.41                                      23
          L                 1    2-1.59     -1.59     0.25      0.75                            24
                            2    2-3.34     -3.34     0.25      0.75                            25
          D                 1  2 2-0.09     -0.84     2.15     -0.84     -0.09      2.15        26
          END                                                                                   27
          LOAD              3    CASE  3 (TEMPERATURE)                                          28
          T                 1     10.0                                                          29
                            2      5.63                                                         30
          END                                                                                   31
          LOAD              4    CASE  4 (TEMPERATURE + SCHRINKAGE)                             32
          T                 1    -25.0                                                          33
                            2    -14.08                                                         34
          END                                                                                   35
          LOAD              5    CASE  5 (SEISMIC LOAD)                                         36
          J                 1      5.79                                      2                  37
                            3      3.99                                      4                  38
          END                                                                                   39
          MI2          6                1    2                                                  40
                 70.8696                1    3                                                  41
                 80.8696                1    4                                                  42
                 90.6667                1    5                                                  43
                100.6667                1   -5                                                  44
          FINISH                                                                                45
```

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TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

CONTROL DATA

METHOD	STRUCTURE	J.RENUMBER	M.RENUMBER	S.F. DIS.	UNI.SPRING	STAN.STIF.	BARA	SKEW MEM.
DIS	*RAHMEN*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*

LOAD TITLE

LOAD 1 CASE 1 (DEAD LOAD)
LOAD 2 CASE 2 (PEDESTRIANS LOAD)
LOAD 3 CASE 3 (TEMPERATURE)
LOAD 4 CASE 4 (TEMPERATURE + SCHRINKAGE)
LOAD 5 CASE 5 (SEISMIC LOAD)

MIX 6 CASE 6 (1+2)
MIX 7 CASE 7 (1+3)
MIX 8 CASE 8 (1+4)
MIX 9 CASE 9 (1+5)
MIX 10 CASE 10 (1-5)

PICK UP LOAD CASE

PICK 1 1
PICK 2 6 7 8 9 10
PICK 3 9 10

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

JOINT DATA

JOINT NUMBER 6

ZAHYO(M) JOINT	X	Y
1	0.0000	9.1570
2	4.3000	9.1570
3	0.0000	5.1590
4	4.3000	5.1590
5	0.0000	0.0000
6	4.3000	0.0000

MEMBER DATA

MEMBER NUMBER 6

MEMBER	ITAN	JTAN	CONNECT. ITAN	JTAN	LENGTH	A	I	AES	KD(PANE)	PRJ.NUM
1	1	2	FIX	FIX	4.3000	1.40300	.1644600			1
2	3	4	FIX	FIX	4.3000	.66000	.0483200			1
3	1	3	FIX	FIX	3.9980	.25000	.0052100			1
4	2	4	FIX	FIX	3.9980	.25000	.0052100			1
5	3	5	FIX	FIX	5.1590	.25000	.0052100			1
6	4	6	FIX	FIX	5.1590	.25000	.0052100			1

PROPERTY DATA

PROPERTY NUMBER 1

PROPERTY	E	G	EPS
1	2.700E+06	0.	1.000E-05

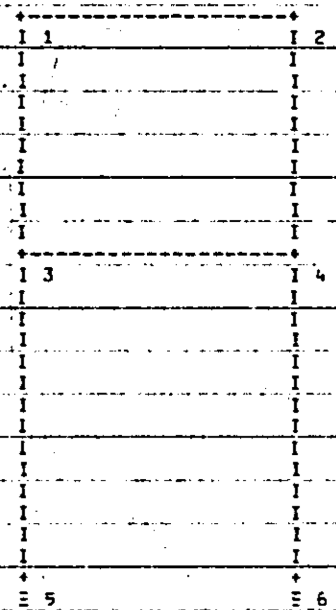
SUPPORT DATA

SUPPORT NUMBER 2

SUPPORT	SUPPORT-JYOKEN X	Y	THET Z	X(BANE)	Y(BANE)	THET Z(BANE)
5	FIX	FIX	FIX	0.0	0.0	0.0
6	FIX	FIX	FIX	0.0	0.0	0.0

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

STRUCTURAL FIGURE



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TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

MOVE DATA

MEMBER	GOIKI ITAN	GOIKI JTAN	POINT 1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	******	******	.250	.810	2.150	3.490	4.050									
2	******	******	.250	.760	2.150	3.540	4.050									
3	******	******														
4	******	******														
5	******	******														
6	******	******														

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

LOAD DATA

	M/J	NAME	D	W1	W2	L1	L2
LOAD - 1		CASE 1 (DEAD LOAD)					
MEMBER	1	LINEAR	Y	-9.670	-9.670	.250	.750
		LINEAR	Y	-.110	-1.030	0.000	2.150
		LINEAR	Y	-1.030	-.110	2.150	0.000
		LINEAR	Y	-1.750	-1.750	0.000	0.000
	2	LINEAR	Y	-18.390	-18.390	.250	.750
		LINEAR	Y	-1.780	-1.780	0.000	0.000
	3	LINEAR	Y	-.630	-.630	0.000	0.000
	4	LINEAR	Y	-.630	-.630	0.000	0.000
	5	LINEAR	Y	-.630	-.630	0.000	0.000
	6	LINEAR	Y	-.630	-.630	0.000	0.000
JOINT	1	JOINTLOAD	Y	-28.260			
		JOINTLOAD	Z	-2.510			
	2	JOINTLOAD	Y	-29.320			
		JOINTLOAD	Z	-1.140			
	3	JOINTLOAD	Y	.450			
	4	JOINTLOAD	Y	.450			
LOAD - 2		CASE 2 (PEDESTRIANS LOAD)					
MEMBER	1	LINEAR	Y	-1.590	-1.590	.250	.750
		LINEAR	Y	-.090	-.840	0.000	2.150
		LINEAR	Y	-.840	-.090	2.150	0.000
	2	LINEAR	Y	-3.340	-3.340	.250	.750
JOINT	1	JOINTLOAD	Y	-6.400			
		JOINTLOAD	Z	-2.040			
	2	JOINTLOAD	Y	-8.960			
		JOINTLOAD	Z	-.410			
LOAD - 3		CASE 3 (TEMPERATURE)					
MEMBER	1	TEMP		10.0(DO)			
	2	TEMP		5.6(DO)			
LOAD - 4		CASE 4 (TEMPERATURE + SCHRINKAGE)					
MEMBER	1	TEMP		-25.0(DO)			
	2	TEMP		-14.1(DO)			
LOAD - 5		CASE 5 (SEISMIC LOAD)					
JOINT	1	JOINTLOAD	X	5.780			
	2	JOINTLOAD	X	5.780			
	3	JOINTLOAD	X	3.990			
	4	JOINTLOAD	X	3.990			

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 GRC-FANSY V6.3

MIX DATA

MIX NUMBER 5

LOAD	SS	N	S1	K1	S2	K2	S3	K3	S4	K4	S5	K5	S6	K6	S7	K7	S8	K8
6	1.0000	2	1.0000	1	1.0000	2												
7	.8696	2	1.0000	1	1.0000	3												
8	.8696	2	1.0000	1	1.0000	4												
9	.6667	2	1.0000	1	1.0000	5												
10	.6667	2	1.0000	1	-1.0000	5												

PICK UP

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

PICK UP 1

MOMENT MAXIMUM						MOMENT MINIMUM					
	-----L---	-CASE-	-----M---	-----Q---	-----N---		-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER	1 (	1 - 2) G = =				= = MEMBER	1 (	1 - 2) G = =			
ITAN	0.000	(1)	-.762	21.941	-2.097	ITAN	0.000	(1)	-.762	21.941	-2.097
1	.250	(1)	4.664	21.463	-2.097	1	.250	(1)	4.664	21.463	-2.097
2	.810	(1)	14.846	14.879	-2.097	2	.810	(1)	14.846	14.879	-2.097
3	2.150	(1)	23.949	-1.420	-2.097	3	2.150	(1)	23.949	-1.420	-2.097
4	3.490	(1)	11.041	-17.719	-2.097	4	3.490	(1)	11.041	-17.719	-2.097
5	4.050	(1)	.478	-19.467	-2.097	5	4.050	(1)	.478	-19.467	-2.097
JTAN	4.300	(1)	-4.450	-19.946	-2.097	JTAN	4.300	(1)	-4.450	-19.946	-2.097
MAX	2.150	(1)	23.949	-1.420	-2.097	MAX	2.150	(1)	23.949	-1.420	-2.097
= = MEMBER	2 (	3 - 4) G = =				= = MEMBER	2 (	3 - 4) G = =			
ITAN	0.000	(1)	-8.667	37.700	1.058	ITAN	0.000	(1)	-8.667	37.700	1.058
1	.250	(1)	.702	37.255	1.058	1	.250	(1)	.702	37.255	1.058
2	.760	(1)	17.079	26.968	1.058	2	.760	(1)	17.079	26.968	1.058
3	2.150	(1)	35.080	-1.068	1.058	3	2.150	(1)	35.080	-1.068	1.058
4	3.540	(1)	14.110	-29.104	1.058	4	3.540	(1)	14.110	-29.104	1.058
5	4.050	(1)	-1.057	-30.196	1.058	5	4.050	(1)	-1.057	-30.196	1.058
JTAN	4.300	(1)	-8.662	-30.641	1.058	JTAN	4.300	(1)	-8.662	-30.641	1.058
MAX	2.150	(1)	35.080	-1.068	1.058	MAX	2.150	(1)	35.080	-1.068	1.058
= = MEMBER	3 (	1 - 3) C = =				= = MEMBER	3 (	1 - 3) C = =			
ITAN	0.000	(1)	3.272	-2.097	-50.201	ITAN	0.000	(1)	3.272	-2.097	-50.201
JTAN	3.998	(1)	-5.111	-2.097	-52.720	JTAN	3.998	(1)	-5.111	-2.097	-52.720
= = MEMBER	4 (	2 - 4) C = =				= = MEMBER	4 (	2 - 4) C = =			
ITAN	0.000	(1)	-3.310	2.097	-49.266	ITAN	0.000	(1)	-3.310	2.097	-49.266
JTAN	3.998	(1)	5.074	2.097	-51.784	JTAN	3.998	(1)	5.074	2.097	-51.784
= = MEMBER	5 (	3 - 5) C = =				= = MEMBER	5 (	3 - 5) C = =			
ITAN	0.000	(1)	3.556	-1.039	-89.970	ITAN	0.000	(1)	3.556	-1.039	-89.970
JTAN	5.159	(1)	-1.804	-1.039	-93.220	JTAN	5.159	(1)	-1.804	-1.039	-93.220
= = MEMBER	6 (	4 - 6) C = =				= = MEMBER	6 (	4 - 6) C = =			
ITAN	0.000	(1)	-3.589	1.039	-81.976	ITAN	0.000	(1)	-3.589	1.039	-81.976
JTAN	5.159	(1)	1.772	1.039	-85.226	JTAN	5.159	(1)	1.772	1.039	-85.226

PICK UP 1

SHEAR MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-.762	21.941	-2.097
1	.250	(1)	4.664	21.463	-2.097
2	.810	(1)	14.846	14.879	-2.097
3	2.150	(1)	23.949	-1.420	-2.097
4	3.490	(1)	11.041	-17.719	-2.097
5	4.050	(1)	.478	-19.467	-2.097
JTAN	4.300	(1)	-4.450	-19.946	-2.097
= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(1)	-8.667	37.700	1.058
1	.250	(1)	.702	37.255	1.058
2	.760	(1)	17.079	26.968	1.058
3	2.150	(1)	35.080	-1.068	1.058
4	3.540	(1)	14.110	-29.104	1.058
5	4.050	(1)	-1.057	-30.196	1.058
JTAN	4.300	(1)	-8.662	-30.641	1.058
= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(1)	3.272	-2.097	-50.201
JTAN	3.998	(1)	-5.111	-2.097	-52.720
= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(1)	-3.310	2.097	-49.266
JTAN	3.998	(1)	5.074	2.097	-51.784
= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(1)	3.556	-1.039	-89.970
JTAN	5.159	(1)	-1.804	-1.039	-93.220
= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(1)	-3.589	1.039	-81.976
JTAN	5.159	(1)	1.772	1.039	-85.226

SHEAR MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-.762	21.941	-2.097
1	.250	(1)	4.664	21.463	-2.097
2	.810	(1)	14.846	14.879	-2.097
3	2.150	(1)	23.949	-1.420	-2.097
4	3.490	(1)	11.041	-17.719	-2.097
5	4.050	(1)	.478	-19.467	-2.097
JTAN	4.300	(1)	-4.450	-19.946	-2.097
= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(1)	-8.667	37.700	1.058
1	.250	(1)	.702	37.255	1.058
2	.760	(1)	17.079	26.968	1.058
3	2.150	(1)	35.080	-1.068	1.058
4	3.540	(1)	14.110	-29.104	1.058
5	4.050	(1)	-1.057	-30.196	1.058
JTAN	4.300	(1)	-8.662	-30.641	1.058
= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(1)	3.272	-2.097	-50.201
JTAN	3.998	(1)	-5.111	-2.097	-52.720
= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(1)	-3.310	2.097	-49.266
JTAN	3.998	(1)	5.074	2.097	-51.784
= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(1)	3.556	-1.039	-89.970
JTAN	5.159	(1)	-1.804	-1.039	-93.220
= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(1)	-3.589	1.039	-81.976
JTAN	5.159	(1)	1.772	1.039	-85.226

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

PICK-UP 1

AXIAL MAXIMUM	L	CASE	M	Q	N	AXIAL MINIMUM	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-.762	21.941	-2.097	ITAN	0.000	(1)	-.762	21.941	-2.097
1	.250	(1)	4.664	21.463	-2.097	1	.250	(1)	4.664	21.463	-2.097
2	.810	(1)	14.846	14.879	-2.097	2	.810	(1)	14.846	14.879	-2.097
3	2.150	(1)	23.949	-1.420	-2.097	3	2.150	(1)	23.949	-1.420	-2.097
4	3.490	(1)	11.041	-17.719	-2.097	4	3.490	(1)	11.041	-17.719	-2.097
5	4.050	(1)	.478	-19.467	-2.097	5	4.050	(1)	.478	-19.467	-2.097
JTAN	4.300	(1)	-4.450	-19.946	-2.097	JTAN	4.300	(1)	-4.450	-19.946	-2.097
= = MEMBER 2 (3 - 4) G = =						= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(1)	-8.667	37.700	1.058	ITAN	0.000	(1)	-8.667	37.700	1.058
1	.250	(1)	.702	37.255	1.058	1	.250	(1)	.702	37.255	1.058
2	.760	(1)	17.079	26.968	1.058	2	.760	(1)	17.079	26.968	1.058
3	2.150	(1)	35.080	-1.068	1.058	3	2.150	(1)	35.080	-1.068	1.058
4	3.540	(1)	14.110	-29.104	1.058	4	3.540	(1)	14.110	-29.104	1.058
5	4.050	(1)	-1.057	-30.196	1.058	5	4.050	(1)	-1.057	-30.196	1.058
JTAN	4.300	(1)	-8.662	-30.641	1.058	JTAN	4.300	(1)	-8.662	-30.641	1.058
= = MEMBER 3 (1 - 3) C = =						= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(1)	3.272	-2.097	-50.201	ITAN	0.000	(1)	3.272	-2.097	-50.201
JTAN	3.998	(1)	-5.111	-2.097	-52.720	JTAN	3.998	(1)	-5.111	-2.097	-52.720
= = MEMBER 4 (2 - 4) C = =						= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(1)	-3.310	2.097	-49.266	ITAN	0.000	(1)	-3.310	2.097	-49.266
JTAN	3.998	(1)	5.074	2.097	-51.784	JTAN	3.998	(1)	5.074	2.097	-51.784
= = MEMBER 5 (3 - 5) C = =						= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(1)	3.556	-1.039	-89.970	ITAN	0.000	(1)	3.556	-1.039	-89.970
JTAN	5.159	(1)	-1.804	-1.039	-93.220	JTAN	5.159	(1)	-1.804	-1.039	-93.220
= = MEMBER 6 (4 - 6) C = =						= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(1)	-3.589	1.039	-81.976	ITAN	0.000	(1)	-3.589	1.039	-81.976
JTAN	5.159	(1)	1.772	1.039	-85.226	JTAN	5.159	(1)	1.772	1.039	-85.226

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

PICK UP 2

	MOMENT MAXIMUM						MOMENT MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	7.570	10.871	-1.398	ITAN	0.000	(10)	-8.586	18.385	-1.398
1	.250	(9)	10.248	10.552	-1.398	1	.250	(10)	-4.029	18.066	-1.398
2	.810	(6)	18.688	17.168	-2.462	2	.810	(10)	4.863	13.677	-1.398
3	2.150	(6)	28.956	-2.074	-2.462	3	2.150	(10)	15.967	2.811	-1.398
4	3.490	(6)	13.129	-21.316	-2.462	4	3.490	(9)	2.327	-15.570	-1.398
5	4.050	(10)	7.457	-9.222	-1.398	5	4.050	(9)	-6.820	-16.736	-1.398
JTAN	4.300	(10)	5.111	-9.541	-1.398	JTAN	4.300	(9)	-11.044	-17.055	-1.398
MAX	1.911	(6)	29.029	1.459	-2.462	MAX	2.150	(10)	15.967	2.811	-1.398
= = MEMBER 2 (3 - 4) G = =						= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(9)	17.855	14.142	.705	ITAN	0.000	(10)	-29.412	36.127	.705
1	.250	(9)	21.354	13.845	.705	1	.250	(10)	-20.417	35.830	.705
2	.760	(9)	26.666	6.987	.705	2	.760	(10)	-3.893	28.972	.705
3	2.150	(6)	40.834	-1.264	1.253	3	2.150	(9)	23.388	-11.704	.705
4	3.540	(10)	24.687	-8.411	.705	4	3.540	(9)	-5.872	-30.396	.705
5	4.050	(10)	20.181	-9.139	.705	5	4.050	(9)	-21.591	-31.124	.705
JTAN	4.300	(10)	17.859	-9.436	.705	JTAN	4.300	(9)	-29.409	-31.421	.705
MAX	2.150	(6)	40.834	-1.264	1.253	MAX	2.150	(9)	23.388	-11.704	.705
= = MEMBER 3 (1 - 3) C = =						= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(10)	10.259	-5.251	-37.226	ITAN	0.000	(9)	-5.896	2.456	-29.712
JTAN	3.998	(9)	3.921	2.456	-31.391	JTAN	3.998	(10)	-10.736	-5.251	-38.906
= = MEMBER 4 (2 - 4) C = =						= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(10)	5.871	-2.456	-29.088	ITAN	0.000	(9)	-10.284	5.251	-36.603
JTAN	3.998	(9)	10.711	5.251	-36.282	JTAN	3.998	(10)	-3.946	-2.456	-30.766
= = MEMBER 5 (3 - 5) C = =						= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(10)	18.676	-7.206	-74.732	ITAN	0.000	(9)	-13.934	5.821	-45.233
JTAN	5.159	(9)	16.096	5.821	-47.400	JTAN	5.159	(10)	-18.502	-7.206	-76.899
= = MEMBER 6 (4 - 6) C = =						= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(10)	13.913	-5.821	-39.904	ITAN	0.000	(9)	-15.697	7.206	-69.403
JTAN	5.159	(9)	15.480	7.206	-71.569	JTAN	5.159	(10)	-16.118	-5.821	-42.070

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

PICK UP 2

SHEAR MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(6)	.662	25.308	-2.462
1	.250	(6)	6.926	24.796	-2.462
2	.810	(6)	18.688	17.168	-2.462
3	2.150	(10)	15.967	2.811	-1.398
4	3.490	(10)	12.396	-8.056	-1.398
5	4.050	(10)	7.457	-9.222	-1.398
JTAN	4.300	(10)	5.1[illegible]1	-9.541	-1.398
= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(6)	-10.107	43.850	1.253
1	.250	(6)	.800	43.405	1.253
2	.760	(6)	19.879	31.415	1.253
3	2.150	(10)	23.388	10.280	.705
4	3.540	(10)	24.687	-8.411	.705
5	4.050	(10)	20.181	-9.139	.705
JTAN	4.300	(10)	17.859	-9.436	.705
= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(9)	-5.896	2.456	-29.712
JTAN	3.998	(9)	3.921	2.456	-31.391
= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(9)	-10.284	5.251	-36.603
JTAN	3.998	(9)	10.711	5.251	-38.282
= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(9)	-13.934	5.821	-45.233
JTAN	5.159	(9)	16.096	5.821	-47.400
= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(9)	-18.697	7.206	-69.403
JTAN	5.159	(9)	18.460	7.206	-71.569

SHEAR MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	7.570	10.871	-1.398
1	.250	(9)	10.248	10.552	-1.398
2	.810	(9)	14.932	6.163	-1.398
3	2.150	(9)	15.967	-4.704	-1.398
4	3.490	(6)	13.129	-21.316	-2.462
5	4.050	(6)	.453	-23.314	-2.462
JTAN	4.300	(6)	-5.441	-23.826	-2.462
= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(9)	17.855	14.142	.705
1	.250	(9)	21.354	13.845	.705
2	.760	(9)	26.666	6.987	.705
3	2.150	(9)	23.388	-11.704	.705
4	3.540	(6)	16.365	-33.943	1.253
5	4.050	(6)	-1.288	-35.068	1.253
JTAN	4.300	(6)	-10.110	-35.513	1.253
= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(10)	10.259	-5.251	-37.226
JTAN	3.998	(10)	-10.736	-5.251	-38.906
= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(10)	5.871	-2.456	-29.088
JTAN	3.998	(10)	-3.946	-2.456	-30.768
= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(10)	18.676	-7.206	-74.732
JTAN	5.159	(10)	-18.502	-7.206	-76.899
= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(10)	13.913	-5.821	-39.904
JTAN	5.159	(10)	-16.118	-5.821	-42.07[illegible]

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

PICK UP 2

	AXIAL MAXIMUM						AXIAL MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	7.570	10.871	-1.398	ITAN	0.000	(6)	.662	25.308	-2.462
1	.250	(9)	10.248	10.552	-1.398	1	.250	(6)	6.926	24.796	-2.462
2	.810	(9)	14.932	6.163	-1.398	2	.810	(6)	18.688	17.168	-2.462
3	2.150	(9)	15.967	-4.704	-1.398	3	2.150	(6)	28.956	-2.074	-2.462
4	3.490	(9)	2.327	-15.570	-1.398	4	3.490	(6)	13.129	-21.316	-2.462
5	4.050	(9)	-6.820	-16.736	-1.398	5	4.050	(6)	.453	-23.314	-2.462
JTAN	4.300	(9)	-11.044	-17.055	-1.398	JTAN	4.300	(6)	-5.441	-23.826	-2.462
= = MEMBER 2 (3 - 4) G = =						= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(6)	-10.107	43.850	1.253	ITAN	0.000	(10)	-29.412	36.127	.705
1	.250	(6)	.800	43.405	1.253	1	.250	(10)	-20.417	35.830	.705
2	.760	(6)	19.879	31.415	1.253	2	.760	(10)	-3.893	28.972	.705
3	2.150	(6)	40.834	-1.264	1.253	3	2.150	(10)	23.388	10.280	.705
4	3.540	(6)	16.365	-33.943	1.253	4	3.540	(10)	24.687	-8.411	.705
5	4.050	(6)	-1.288	-35.068	1.253	5	4.050	(10)	20.181	-9.139	.705
JTAN	4.300	(6)	-10.110	-35.513	1.253	JTAN	4.300	(10)	17.659	-9.436	.705
= = MEMBER 3 (1 - 3) C = =						= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(9)	-5.896	2.456	-29.712	ITAN	0.000	(6)	3.888	-2.462	-59.968
JTAN	3.998	(9)	3.921	2.456	-31.391	JTAN	3.998	(6)	-5.955	-2.462	-62.487
= = MEMBER 4 (2 - 4) C = =						= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(10)	5.671	-2.456	-29.088	ITAN	0.000	(6)	-3.891	2.462	-62.106
JTAN	3.998	(10)	-3.946	-2.456	-30.768	JTAN	3.998	(6)	5.952	2.462	-64.624
= = MEMBER 5 (3 - 5) C = =						= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(9)	-13.934	5.821	-45.233	ITAN	0.000	(6)	4.152	-1.209	-105.886
JTAN	5.159	(9)	16.096	5.821	-47.400	JTAN	5.159	(6)	-2.083	-1.209	-109.136
= = MEMBER 6 (4 - 6) C = =						= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(10)	13.913	-5.821	-39.904	ITAN	0.000	(6)	-4.158	1.209	-99.688
JTAN	5.159	(10)	-16.118	-5.821	-42.070	JTAN	5.159	(6)	2.077	1.209	-132.938

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

PICK UP 3

	MOMENT MAXIMUM						MOMENT MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	7.570	10.871	-1.398	ITAN	0.000	(10)	-8.586	18.385	-1.398
1	.250	(9)	10.248	10.552	-1.398	1	.250	(10)	-4.029	18.066	-1.398
2	.810	(9)	14.932	6.163	-1.398	2	.810	(10)	4.863	13.677	-1.398
3	2.150	(9)	15.967	-4.704	-1.398	3	2.150	(10)	15.967	2.811	-1.398
4	3.490	(10)	12.396	-8.056	-1.398	4	3.490	(9)	2.327	-15.570	-1.398
5	4.050	(10)	7.457	-9.222	-1.398	5	4.050	(9)	-6.820	-16.736	-1.398
JTAN	4.300	(10)	5.111	-9.541	-1.398	JTAN	4.300	(9)	-11.044	-17.055	-1.398
MAX	1.433	(9)	17.224	1.172	-1.398	MAX	2.150	(10)	15.967	2.811	-1.398
= = MEMBER 2 (3 - 4) G = =						= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(9)	17.855	14.142	.705	ITAN	0.000	(10)	-29.412	36.127	.705
1	.250	(9)	21.354	13.845	.705	1	.250	(10)	-20.417	35.630	.705
2	.760	(9)	25.666	6.987	.705	2	.760	(10)	-3.893	28.972	.705
3	2.150	(10)	23.388	10.280	.705	3	2.150	(9)	23.388	-11.704	.705
4	3.540	(10)	24.687	-8.411	.705	4	3.540	(9)	-5.872	-30.396	.705
5	4.050	(10)	20.181	-9.139	.705	5	4.050	(9)	-21.591	-31.124	.705
JTAN	4.300	(10)	17.859	-9.436	.705	JTAN	4.300	(9)	-29.409	-31.421	.705
MAX	1.433	(9)	28.323	-2.067	.705	MAX	2.150	(9)	23.388	-11.704	.705
= = MEMBER 3 (1 - 3) C = =						= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(10)	10.259	-5.251	-37.226	ITAN	0.000	(9)	-5.896	2.456	-29.712
JTAN	3.998	(9)	3.921	2.456	-31.391	JTAN	3.998	(10)	-10.736	-5.251	-38.906
= = MEMBER 4 (2 - 4) C = =						= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(10)	5.671	-2.456	-29.088	ITAN	0.000	(9)	-10.284	5.251	-36.603
JTAN	3.998	(9)	10.711	5.251	-38.282	JTAN	3.998	(10)	-3.946	-2.456	-30.768
= = MEMBER 5 (3 - 5) C = =						= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(10)	18.676	-7.206	-74.732	ITAN	0.000	(9)	-13.934	5.821	-45.233
JTAN	5.159	(9)	16.096	5.821	-47.400	JTAN	5.159	(10)	-18.502	-7.206	-76.899
= = MEMBER 6 (4 - 6) C = =						= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(10)	13.913	-5.821	-39.904	ITAN	0.000	(9)	-18.697	7.206	-69.403
JTAN	5.159	(9)	13.480	7.206	-71.569	JTAN	5.159	(10)	-16.118	-5.821	-42.070

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TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

PICK UP 3

	SHEAR MAXIMUM						SHEAR MINIMUM				
	-----L---	-CASE-	-----M---	-----Q---	-----N---		-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(10)	-8.586	18.385	-1.398	ITAN	0.000	(9)	7.570	10.871	-1.398
1	.250	(10)	-4.029	16.066	-1.398	1	.250	(9)	10.248	10.552	-1.398
2	.810	(10)	4.863	13.677	-1.398	2	.810	(9)	14.932	6.163	-1.398
3	2.150	(10)	15.967	2.811	-1.398	3	2.150	(9)	15.967	-4.704	-1.398
4	3.490	(10)	12.396	-8.056	-1.398	4	3.490	(9)	2.327	-15.570	-1.398
5	4.050	(10)	7.457	-9.222	-1.398	5	4.050	(9)	-6.820	-16.736	-1.398
JTAN	4.300	(10)	5.111	-9.541	-1.398	JTAN	4.300	(9)	-11.044	-17.055	-1.398
= = MEMBER 2 (3 - 4) G = =						= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(10)	-29.412	36.127	.705	ITAN	0.000	(9)	17.855	14.142	.705
1	.250	(10)	-20.417	35.830	.705	1	.250	(9)	21.354	13.845	.705
2	.760	(10)	-3.893	28.972	.705	2	.760	(9)	26.666	6.967	.705
3	2.150	(10)	23.388	10.280	.705	3	2.150	(9)	23.388	-11.704	.705
4	3.540	(10)	24.687	-8.411	.705	4	3.540	(9)	-5.872	-30.396	.705
5	4.050	(10)	20.181	-9.139	.705	5	4.050	(9)	-21.591	-31.124	.705
JTAN	4.300	(10)	17.859	-9.436	.705	JTAN	4.300	(9)	-29.409	-31.421	.705
= = MEMBER 3 (1 - 3) C = =						= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(9)	-5.896	2.456	-29.712	ITAN	0.000	(10)	10.259	-5.251	-37.226
JTAN	3.998	(9)	3.921	2.456	-31.391	JTAN	3.998	(10)	-10.736	-5.251	-38.906
= = MEMBER 4 (2 - 4) C = =						= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(9)	-10.284	5.251	-36.603	ITAN	0.000	(10)	5.871	-2.456	-29.088
JTAN	3.998	(9)	10.711	5.251	-38.282	JTAN	3.998	(10)	-3.946	-2.456	-30.768
= = MEMBER 5 (3 - 5) C = =						= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(9)	-13.934	5.821	-45.233	ITAN	0.000	(10)	18.676	-7.206	-74.732
JTAN	5.159	(9)	16.096	5.821	-47.400	JTAN	5.159	(10)	-18.502	-7.206	-76.899
= = MEMBER 6 (4 - 6) C = =						= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(9)	-18.697	7.206	-69.403	ITAN	0.000	(10)	13.913	-5.821	-39.904
JTAN	5.159	(9)	18.480	7.206	-71.569	JTAN	5.159	(10)	-16.118	-5.821	-42.070

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-1 CRC-FANSY V6.3

PICK UP 3

AXIAL MAXIMUM

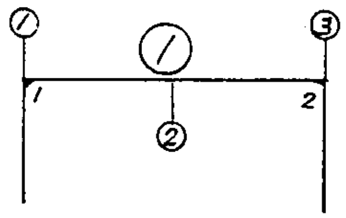
	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	7.570	10.871	-1.398
1	.250	(9)	10.248	10.552	-1.398
2	.810	(9)	14.932	6.163	-1.398
3	2.150	(9)	15.967	-4.704	-1.398
4	3.490	(9)	2.327	-15.570	-1.398
5	4.050	(9)	-6.820	-16.736	-1.398
JTAN	4.300	(9)	-11.044	-17.055	-1.398
= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(9)	17.855	14.142	.705
1	.250	(9)	21.354	13.845	.705
2	.760	(9)	26.666	6.987	.705
3	2.150	(9)	23.388	-11.704	.705
4	3.540	(9)	-5.872	-30.396	.705
5	4.050	(9)	-21.591	-31.124	.705
JTAN	4.300	(9)	-29.409	-31.421	.705
= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(9)	-5.896	2.456	-29.712
JTAN	3.998	(9)	3.921	2.456	-31.391
= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(10)	5.871	-2.456	-29.088
JTAN	3.998	(10)	-3.946	-2.456	-30.768
= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(9)	-13.934	5.821	-45.233
JTAN	5.159	(9)	16.096	5.821	-47.400
= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(10)	13.913	-5.821	-39.904
JTAN	5.159	(10)	-16.118	-5.821	-42.070

AXIAL MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(10)	-8.586	18.385	-1.398
1	.250	(10)	-4.029	18.066	-1.398
2	.810	(10)	4.863	13.677	-1.398
3	2.150	(10)	15.967	2.811	-1.398
4	3.490	(10)	12.396	-8.056	-1.398
5	4.050	(10)	7.457	-9.222	-1.398
JTAN	4.300	(10)	5.111	-9.541	-1.398
= = MEMBER 2 (3 - 4) G = =					
ITAN	0.000	(10)	-29.412	36.127	.705
1	.250	(10)	-20.417	35.830	.705
2	.760	(10)	-3.893	28.972	.705
3	2.150	(10)	23.388	10.280	.705
4	3.540	(10)	24.687	-8.411	.705
5	4.050	(10)	20.181	-9.139	.705
JTAN	4.300	(10)	17.859	-9.436	.705
= = MEMBER 3 (1 - 3) C = =					
ITAN	0.000	(10)	10.259	-5.251	-37.226
JTAN	3.998	(10)	-10.736	-5.251	-38.906
= = MEMBER 4 (2 - 4) C = =					
ITAN	0.000	(9)	-10.284	5.251	-36.603
JTAN	3.998	(9)	10.711	5.251	-38.282
= = MEMBER 5 (3 - 5) C = =					
ITAN	0.000	(10)	18.676	-7.206	-74.732
JTAN	5.159	(10)	-18.502	-7.206	-76.899
= = MEMBER 6 (4 - 6) C = =					
ITAN	0.000	(9)	-18.697	7.206	-69.403
JTAN	5.159	(9)	18.480	7.206	-71.569

[6] Calculation of upper beam

1. Stress calculation of upper beam



(a) Summary of stresses

(i) At the support point

Pick up No 2

		①			
		①	CO.	③	CO.
Combined Stress	Top	-8.59	10	-11.04	2
	Bottom	10.25	9	7.46	10
Dead load		-0.76	1	-4.45	1

(ii) Span moment

		①	
		②	CO.
Combined Stress	Bottom	28.96	6

(Note 1) Dead load is of Pick-up No. 1

(Note 2) CO. — combination

(b) Allowable stress for upper beam, safe against cracking

(i) At the support point 2

Dead load $M_d = -4.45^{tm}$ (case 1)

Pedestrian load $M_p = -0.99^{"}$ (case 2)

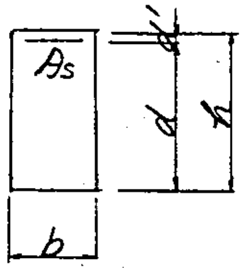
$\Sigma M = -5.44^{tm}$

$$\alpha = \frac{0.99}{5.44} = 0.18 < 0.25$$

Hence $\sigma_{sa} = 1200 \ kg/cm^2$

(C) Cross section used for stress calculation

(i) Cross section at the support point



$b = 50^{cm}$

$h = 112$ "

$d' = 2.5 + 1.0 + 3.2 + 1.3 = 8.0^{cm}$

$d = 112 - 8.0 = 104.0^{cm}$

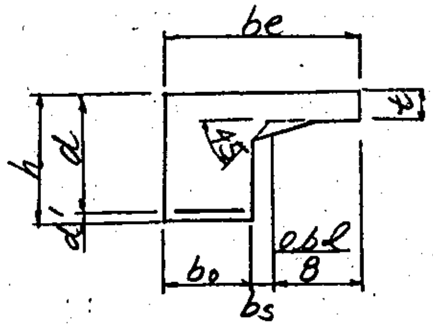
(ii) Cross section at the span center point

Effective width of T-beam at compression fibre

$$be = b_0 + bs + \frac{0.6}{8} l$$

$$be_1 = 0.50 + 0.10 + \frac{0.6}{8} \times 4.30$$

$$= 0.92^{m} < \frac{9.74}{2} = 4.87^{m}$$



$b_0 = 50^{cm}$

$h = 112$ "

$d' = 3.0 + 1.3 + 1.3 = 5.6^{cm}$

$d = 112 - 5.6 = 106.4^{cm}$

$t = 15^{cm}$

(d) Calculation of bending stress

	①		
	③		②
M (t·m)	-4.45	-11.04	28.96
N (t)			
S (t)			
b (cm)	50		92
h (cm)	112		112
d (cm)	104.0		106.4
d' (cm)	8.0		5.6
As (cm^2)	φ25 - 5 = 25.34		φ25-5 = 25.34
p	0.00487		0.00259
As' (cm^2)			t=15 $\frac{t}{d}$ =0.141
p'			
e= M/N (cm)			
e= M/N+u (cm)			
e= M/N−u (cm)			
e/h			
d/e			
d'/h			
d'/d			
M/bd² (kg/cm²)	0.82	2.04	2.78
k			0.271
c			
j			0.938
1/Lc	7.07		
1/Ls	229		
β= σs/σc			
σc (kg/cm²)		14.4	28.4
σs (kg/cm²)	190	470	1150
τ (kg/cm²)			
σsa (kg/cm²)	1200	1800	1800
σca (kg/cm²)		90	90
τa (kg/cm²)			
Nomogram number	M-1	〃	M-47.48
Combination	D	D+P	〃

(e) Required minimum cross section of re-bars

(i) At the top of support point

$$As = \frac{M}{\sigma_{sa} \cdot j \cdot d} \times \frac{4}{3}$$

$$= \frac{11.04 \times 10^5}{1800 \times 0.875 \times 112.0} \times \frac{4}{3} = 8.34^{cm^2}$$

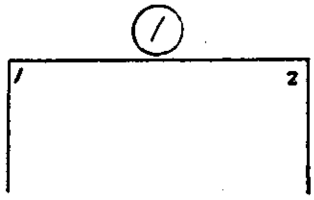
Hence $D25 - 5 = 25.34^{cm^2} > 8.34^{cm^2}$

(ii) At the span center point

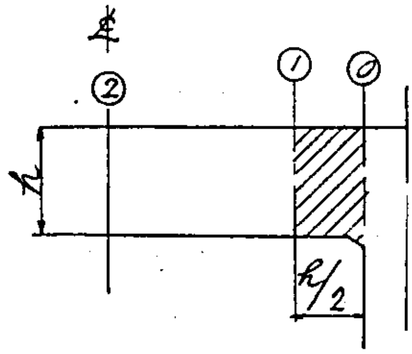
$$As = \frac{28.96 \times 10^5}{1800 \times 0.875 \times 106.4} \times \frac{4}{3} = 23.04^{cm^2}$$

Hence $D25 - 5 = 25.34^{cm^2} > 23.04^{cm^2}$

2. Shearing stress of upper beam



(1) Summary of shearing stress



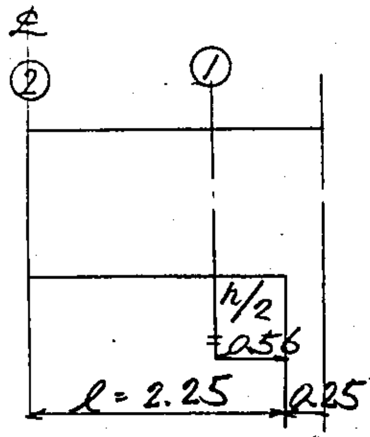
For the design of cross section of beam end, the value of shearing stress at h/2 point is applied.

	①			
	Left support	co.	Right support	co.
⓪	24.80	6	−23.31	6
①	17.17		−21.32	
②	− 2.07		− 2.07	

(Note) CO. — combination

(2) Shearing stress

(a) Shearing stress caused by bending



(i) Shearing stress of the member of uniform height

$$\tau = \frac{S}{b \cdot d}$$

$$\tau_1 = \frac{21.32 \times 10^3}{50 \times 104.0} = 4.10 \text{ kg/cm}^2 > 3.9 \text{ kg/cm}^2$$

$$\tau_2 = \frac{2.07 \times 10^3}{50 \times 104.0} = 0.40 \text{ "} < \text{ "}$$

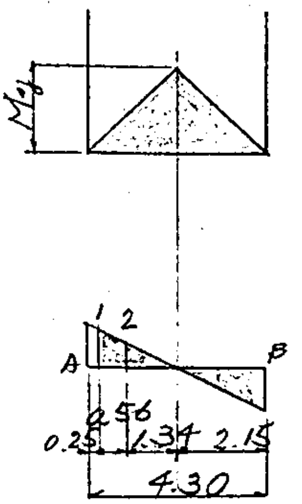
(b) Calculation of Torsional moment

1) Torsional moment caused by

i) Dead load and Pedestrian load.

$w_d = 0.43^{t/m^2} + 0.35^{t/m^2} = 0.78^{t/m^2}$

(From the load calculation)



Fixed end moment,

at negative side

$M_y = -\frac{1}{24} w_d \cdot l_x^2$

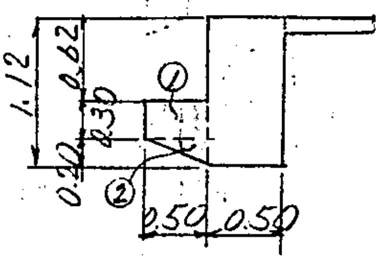
$= -\frac{1}{24} \times 0.78 \times 4.30^2 = -0.60^{tm}$

$M_{TA} = M_{TB} = -0.60 \times 2.15 \times 1/2 = -0.65^{tm}$

$M_{T1} = -0.65 \times \frac{1.90}{2.15} = -0.57^{tm}$

$M_{T2} = \quad " \quad \times \frac{1.34}{2.15} = -0.41\,"$

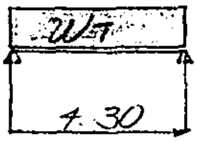
ii) Torsional moment caused by the Beam support



$W_{T①} = 2.5 \times 0.50 \times 0.30 \times 0.50 = 0.19^{tm}$

$W_{T②} = 2.5 \times 0.50 \times 0.20 \times 1/2 \times 0.667 = 0.08\,"$

$W_T = 0.27^{tm}$

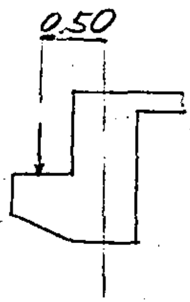


$M_{TA} = M_{TB} = 0.27 \times 4.30 \times 1/2 = 0.58^{tm}$

$W_{T1} = 0.58 \times \frac{1.90}{2.15} = 0.51^{tm}$

$W_{T2} = \;\; " \;\; \times \frac{1.34}{2.15} = 0.36^{"}$

iii) Torsional moment caused by the stairway.



$W = 9.67 + 1.59 = 11.26^{t/m}$

(From the load calculation)

$M_T = 11.26 \times 0.50 = 5.63^{tm}$

$M_{TA} = M_{TB} = 5.63 \times 4.30 \times 1/2 = 12.10^{tm}$

$M_{T1} = 12.10 \times \frac{1.90}{2.15} = 10.69^{tm}$

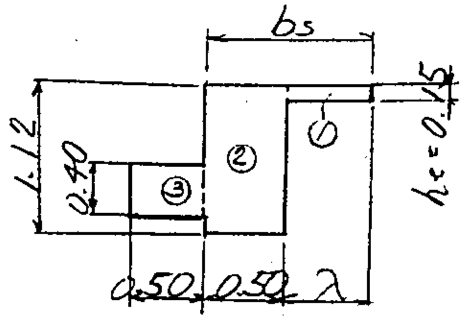
$M_{T2} = \;\; " \;\; \times \frac{1.34}{2.15} = 7.54^{"}$

iv) Combined of Torsional moment

$\Sigma M_{T1} = -0.57 + 0.51 + 10.69 = 10.63^{tm}$

$\Sigma M_{T2} = -0.41 + 0.36 + 7.54 = 7.49^{"}$

V) Torsional moment, beared by cross beam



Effective width

$b_s = b_0 + \lambda_t$

$\lambda_t = 3 \cdot h_t = 3 \times 0.15 = 0.45^m$

$b_s = 0.50 + 0.45 = 0.90^m$

$h = 1.12^m$

a) Calculation of distribution ratio

	a	b	a/b	k	$I_t = k \cdot a \cdot b^3$ (m^4)
①	0.45	0.15	3.000	0.263	$0.263 \times 0.45 \times 0.15^3 = 0.00040$
②	1.12	0.50	2.240	0.239	$0.239 \times 1.12 \times 0.50^3 = 0.03346$
③	0.50	0.40	1.250	0.169	$0.169 \times 0.50 \times 0.40^3 = 0.00541$
Total					$\Sigma I_t = 0.03927^{m^4}$

b) Torsional moment beared by the beam

Front face of colum

$$M_{t1} = 10.63 \times \frac{0.03346}{0.03927} = 9.06^{tm}$$

At the h/2 point

$$M_{t2} = 7.49 \times \text{〃} = 6.38\ \text{〃}$$

c) Shearing stress caused by torsion

Shearing stress caused by torsion is calculation followed the equation.

$$\tau_t = \frac{M_t}{I_t} \cdot b \cdot \eta$$

b : Shorter side length

a : longer side length

k : Table – 40.2

(i) Front face of column

$M_{t1} = 9.06^{tm}$

$a = 112^{cm}$ $b = 50^{cm}$

$\frac{a}{b} = \frac{112}{50} = 2.24$ $\eta = 0.948$

$$\tau_{t1} = \frac{9.06 \times 10^5}{3.927 \times 10^6} \times 50 \times 0.948 = 10.94^{kg/cm^2}$$

(ii) At the h/2 point

$M_{t2} = 6.38^{tm}$

$a = 112^{cm}$ $b = 50^{cm}$

$\frac{a}{b} = \frac{112}{50} = 2.24$ $\eta = 0.948$

$$\tau_{t2} = \frac{6.38 \times 10^5}{3.927 \times 10^6} \times 50 \times 0.948 = 7.70^{kg/cm^2}$$

vi) Combined shearing stress

Combined allowable shearing stress

$\tau_a = 17 \times 1.3 = 22.1^{kg/cm^2}$

Combined shearing stress

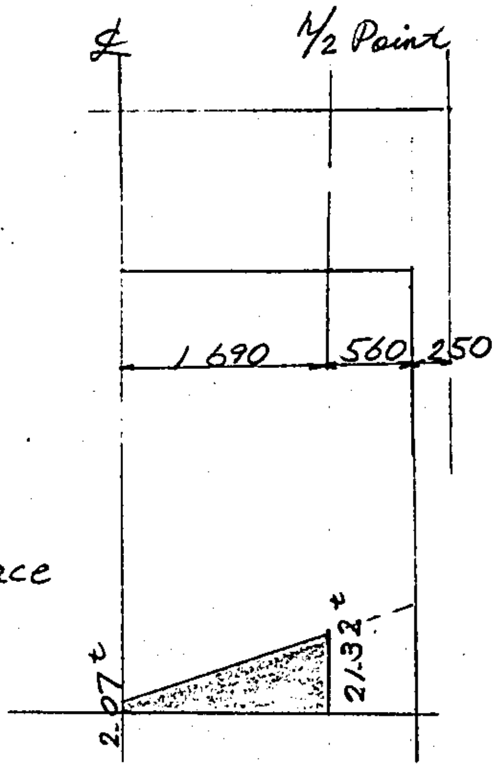
$\tau_1 = 4.00 + 7.70 = 11.70^{kg/cm^2} < 22.1^{kg/cm^2}$

$\tau_2 = 0.40 + 0 = 0.40$ " < "

Calculated as above, diagonal tension re-bars are examined.

(3) Calculation of diagonal tension re-bars

(a) Shearing stress caused by bending



Shearing force diagram

(i) Shearing stress beared by concrete

$$S_c = 1/2 \cdot \tau_c \cdot b \cdot d$$

where τ_c : 3.9 $^{kg/cm^2}$

b : Width of member (cm)

d : Effective height of member at the examining section.

$$S_{c1} = 1/2 \times 3.9 \times 50.0 \times 104.0 \times 10^{-3} = 10.14^t$$

(b) Shearing force beared dy stirrup

Arrange stirrups D13 - 1 sets in 12.5 cm c-c

Torsional shearing stress

$$\tau_{st} = \frac{M_t \cdot S}{0.8 \cdot A_w \cdot b_1 \cdot h_1} \times \frac{a_1}{b_1}$$

Whore

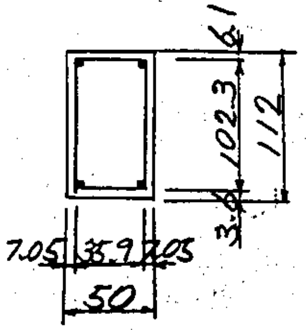
M_t : Torsional moment (cm)

S : c-c distance of stirrup (cm)

A_w : Gross cross section of coupled stirrups (cm²)

b_1, h_1 : length of short long side of stirrup

(i) At $l/2$ point



$M_t = 6.38^{tm}$

$S = 12.5^{cm}$

$A_w = 1.267 \times 2 = 2.53^{cm^2}$

$h = 102.3^{cm}$

$b = 35.9^{cm}$

$$\tau_{st} = \frac{6.38 \times 10^5 \times 12.5}{0.8 \times 2.53 \times 35.9 \times 102.3} = 1\,070^{kg/cm^2} < 1\,800^{kg/cm^2}$$

Bending Shear beared by stirrup

In the case When Combined with torsional moment, allowable shearing stress is as 20 percent increased.

$\sigma_{sa} = 1800 \times 1.2 = 2160$ Kg/cm²

$$S_v = \frac{(\sigma_{sa} - \sigma_{st}) \cdot A_v \cdot d}{1.15 \cdot s}$$

(i) At $l/2$ point

$(2160 - 1070) = 1090$ Kg/cm² < 1800 Kg/cm²

$d = 104.0$ cm

$$S_v = \frac{1090 \times 2.53 \times 104.0}{1.15 \times 12.5 \times 10^3} = 19.95^t$$

(c) Shearing stress beared by turned up bars

Disregarded the turned up bars for calculation

Total shear

$\Sigma S_R = S_c + S_v + S_b$

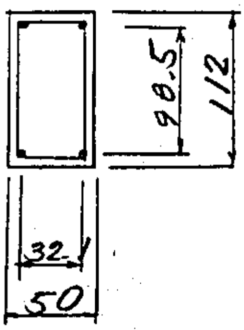
$\Sigma S_R = 10.14 + 19.95 + 0 = 30.09^t > S = 21.32^t$

(d) Calculation of axial re-bar arrangement, resisting torsional moment

Required re-bar arrangemet is calculated followed the equation.

$$As = \frac{Mt \cdot (b_1 + h_1)}{0.8 \cdot \sigma_{sa} \cdot b_1 \cdot h_1}$$

a) Front face of column



$Mt = 9.06$ tm

$\sigma_{sa} = 1\,800$ kg/cm²

$b_1 = 32.1$ cm

$h_1 = 98.5$ cm

$$As = \frac{9.06 \times 10^5 \times (32.1 + 98.5)}{0.8 \times 1800 \times 32.1 \times 98.5} = 25.99 \text{ cm}^2$$

Required cross section of re-bars arranged at shorter side

$$As_{b1} = 25.99 \times \frac{32.1}{2(32.1 + 98.5)} = 3.19 \text{ cm}^2$$

3. Required cross section of re-bars arranged at longer side

$$Ash_1 = 25.99 \times \frac{98.5}{2 \times (32.1 + 98.5)} = 9.80 \ cm^2$$

(i) Top and Bottom

Minimum section of re-bars

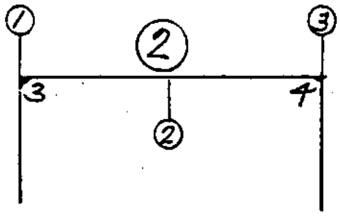
$As = D25 - 5 = 25.34^{cm^2} > 3.19^{cm^2}$

(ii) Side (one side)

$As = D22 - 3 = 11.61^{cm^2} > 9.80^{cm^2}$

[7] Calculation of Intermediate beam

1. Stress calculation of upper beam



(a) Summary of stresses

(i) At the support point

Pick up No. 2

		②			
		①	CO.	③	CO.
Combined Stress	Top	−29.41	10	−29.41	10
	Bottom	20.35	9	20.18	9
Dead load		−8.67	1	−8.66	1

(ii) Span momet

		②	
		②	CO.
Combined Stress	Bottom	40.83	6

(Note 1) Dead load is of Pick-up No. 1

(Note 2) CO. — combination

(b) Allowable stress for Intermediate beam safe against cracking

(i) At the support point 4

Dead load $M_d = -8.66^{tm}$ (case 1)

Pedstrian load $M_p = -1.45^{tm}$ (case 2)

$\Sigma M = -10.11^{tm}$

$$\alpha = \frac{-1.45}{-10.11} = 0.14 < 0.25$$

Hence $\sigma_{sa} = 1200\ kg/cm^2$

(C) Calculation of bending stress

	②			
	③		②	
M (tm)	-8.66	-29.41	40.83	
N (t)				
S (t)				
b (cm)	50		50	
h (cm)	102		102	
d (cm)	93.9		96.4	
d' (cm)	8.1		5.6	
As (cm²)	D25 - 5/1 = 30.40		D25 - 3/5 = 40.54	
p	0.00647		0.00841	
As' (cm²)				
p'				
e = M/N (cm)				
e = M/N + u (cm)				
e = M/N − u (cm)				
e/h				
d/e				
d'/h				
d'/d				
Ne/bd² (kg/cm²)	2.01	6.67	8.79	
k				
c				
j				
1/Lc	6.40		5.87	
1/Ls	175		137	
β = σs/σc				
σc (kg/cm²)		42.7	51.6	
σs (kg/cm²)	350	1170	1200	
τ (kg/cm²)				
σsa (kg/cm²)	1200	1800	1800	
σca (kg/cm²)		90	90	
τa (kg/cm²)				
Nomogram number	M-1	〃	〃	
Combination	D	D+P	〃	

(d) Required minimum cross section of re-bars

(i) At the top of support point

$$As = \frac{M}{\sigma_{sa} \cdot j \cdot d} \times \frac{4}{3}$$

$$= \frac{29.41 \times 10^5}{1800 \times 0.875 \times 93.9} \times \frac{4}{3} = 26.51^{cm^2}$$

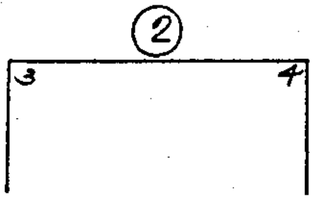
Hence D25 - $\frac{5}{7}$ = $30.40^{cm^2} > 26.51^{cm^2}$

(ii) At the span center point

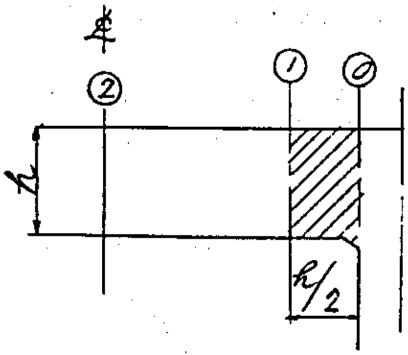
$$As = \frac{40.83 \times 10^5}{1800 \times 0.875 \times 96.4} \times \frac{4}{3} = 35.86^{cm^2}$$

Hence D25 - $\frac{3}{3}$ = $40.54^{cm^2} > 35.86^{cm^2}$

2. Shearing stress of upper beam



(1) Summary of shearing stress



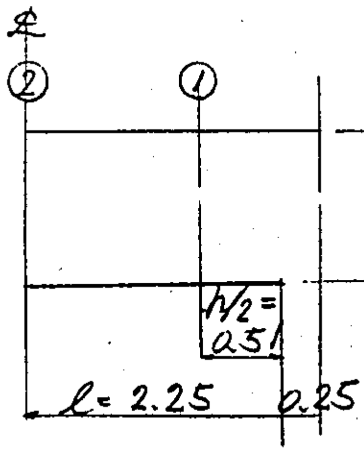
For the design of cross section of beam end, the value of shearing stress at h/2 point is applied.

	③			
	Left support	CO.	Right support	CO.
⓪	43.41	6	−35.07	6
①	31.42		−33.94	
②	−1.26		−1.26	

(Note) CO. — combination

(2) Shearing stress

(a) Shearing stress caused by bending



1) Shearing stress of the member of uniform height

$$\tau = \frac{S}{b \cdot d}$$

$$\tau_1 = \frac{33.94 \times 10^3}{50 \times 93.9} = 7.23 \text{ kg/cm}^2 > 3.9 \text{ kg/cm}^2$$

$$\tau_2 = \frac{1.26 \times 10^3}{50 \times 93.9} = 0.27 \text{ 〃} < \text{ 〃}$$

Therefore, stirrup calculation is made.

(i) Shearing stress beared by concrete

$$S_c = 1/2 \cdot \tau_c \cdot b \cdot d$$

Where, τ_c : $3.9^{kg/cm^2}$

b : width of member (cm)

d : Effective height of member at the examining section.

$$S_{c1} = 1/2 \times 3.9 \times 50 \times 93.9 \times 10^{-3} = 9.16^{t}$$

(ii) Shearing force beared by stirrup

$$S_v = \frac{A_v \cdot \sigma_{sa} \cdot d}{1.15 \cdot s}$$

where, A_v : Total cross section (cm²) of stirrup with the section s.

σ_{sa} : Allowable tensile stress of re-bar

$\sigma_{sa} = 1800^{kg/cm^2}$

s : Interval of stirrups measured along the member axis (cm)

Arranged stirrups D13 - 1 sets 15 cm ctc,

$$A_v = 1.267 \times 2 = 2.53^{cm^2}$$

$$S_{v1} = \frac{2.53 \times 1800 \times 93.9}{1.15 \times 15 \times 10^3} = 24.79^{t}$$

Calculation of diagonal tension bar

Calculation of total shear

Referr R.C. standard 39, (2), (a).

$$\Sigma S_R = S_c + S_v + S_b$$

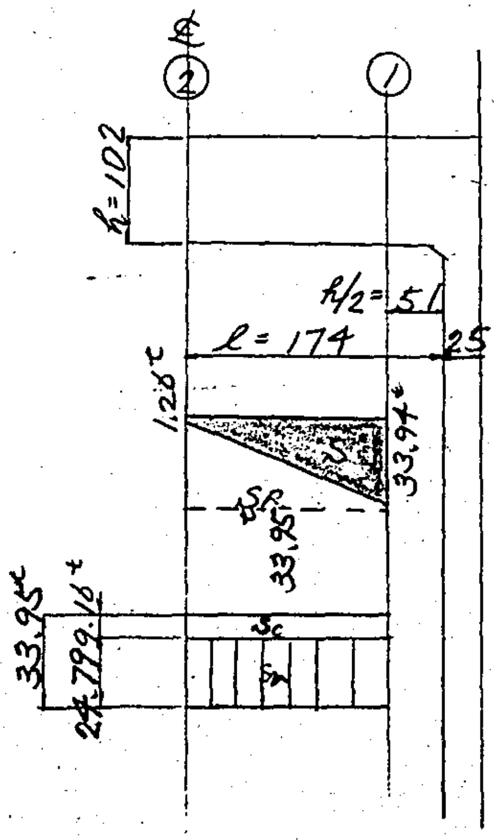
where

S_c : shearing stress beared by concrete (t)

S_v : Shearing stress beared by stirrup (t)

S_b : Shearing stress beared by turned up bars (t)

Assumed $S_v \geqq S_b$



Shearing force diagram

Resisting shearing force diagram

(iii) Shearing stress beared by turned up bars

: Disregarded the turned up bars for calculation.

(iV) Total shear

$$\Sigma S_R = S_c + S_u + S_b$$

$$\Sigma S_R = 9.16 + 24.79 + 0$$

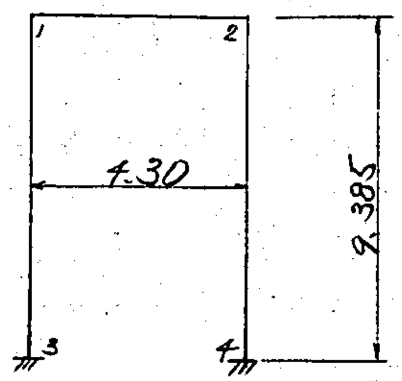
$$= 33.95^t > S_1 = 33.94^t$$

Re-bars D16 - 2 sets (one side) in axial direction

§6. Rigid fram analysis on transversal section ②-② of elevated structure

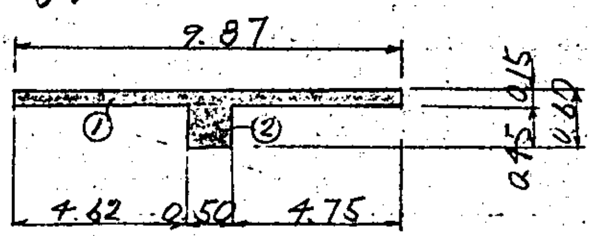
[1] Basic calculation

1. Axis of Rahmen (Rigid frame)



2. Cross sectional area / Moment in inertia of area of member

(1) Upper beam (Member 1-2)



	b^m	h^m	$A^{(m^2)}$	$y^{(m)}$	Ay (m^3)
①	9.87	0.15	1.481	0.075	0.11108
②	0.50	0.45	0.225	0.375	0.08438
Σ			1.706		0.19546

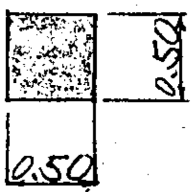
$$y = \frac{0.19546}{1.706} = 0.115^m$$

	$b^{(m)}$	$h^{(m)}$	$A^{(m^2)}$	$y_0^{(m)}$	$I_0^{(m^4)}$	$A y_0^2\ (m^4)$	$I_0 + A \cdot y_0^2\ (m^4)$
①	9.87	0.15	1.481	0.040	0.00278	0.00237	0.00515
②	0.50	0.45	0.225	0.260	0.00380	0.01521	0.01901
Σ			1.706		0.00658	0.01758	0.02416

Cross sectional area $A = 1.706^{m^2}$

Moment of inertia of area $I = 0.02416^{m^4}$

(2) Column (Member 1-3. 2-4)



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

$I = 1/12 \times 0.50 \times 0.50^3 = 0.00521^{m^4}$

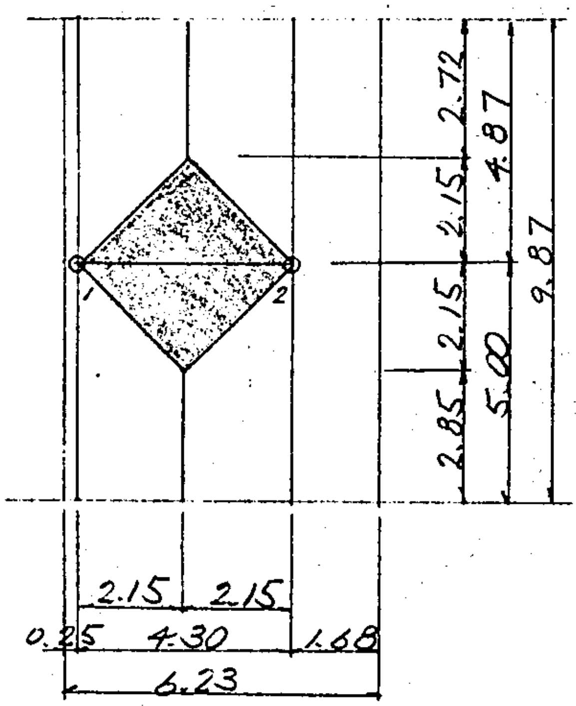
(3) axial height

$h = 9.50 - 0.115 = 9.385^{m}$

[2] Load calculation

1. Dead load

(1) Upper member



a) Uniformly distributed load

Slab	$2.5^{t/m^3}$	$\times$ 0.15	=	$0.375^{t/m^2}$
pavmet	1.1 "	$\times$ 0.05	=	0.055 "
			wd =	$0.43^{t/m^2}$

$wd_1 = 0.43^{t/m^2} \times 2.15 \times 2 = 1.85^{t/m}$

b) linear load

cross beam $2.5^{t/m^3} \times 0.50 \times 0.45 = 0.563^{t/m}$

Haunch of slab $2.5^{t} \times 0.30 \times 0.10 \times 1/2 \times 2 = 0.075^{t}$

$w_{d2} = 0.64^{t/m}$

c) concentrated load acting at panel point

Panel point 1

- Uniformly distributed load

  $0.43^{t/m^2} \times 0.25 \times 9.87 = 1.06^{t}$

- Uniformly distributed load

  $0.43^{t/m^2} \times (2.72 + 4.87) \times 1/2 \times 2.15 = 3.51^{t}$

- Uniformly distributed load

  $0.43^{t/m^2} \times (2.85 + 5.00) \times 1/2 \times 2.15 = 3.63^{t}$

- Haunch of slab

  $2.5^{t/m^3} \times 0.30 \times 0.10 \times 1/2 \times 8.77 = 0.33^{t}$

- longitudinal beam

  $2.5^{t/m^3} \times 0.50 \times 0.45 \times 9.87 = 5.55^{t}$

- Reduction of linear load

$-0.64^{t/m} \times 0.25 = -0.16^{t}$

- Reduction of column part

$-2.5^{t/m^3} \times 0.50 \times 0.50 \times (0.15 - 0.115) = -0.02^{t}$

- Shed load reaction $= 13.00^{t}$

$P_1 = 26.90^{t}$

Panel point 2

- Uniformly distributed load

$1.06^{t} + 3.51^{t} + 3.63 = 8.20^{t}$

- Cantilever slab

$2.5^{t/m^3} \times (0.15 + 0.25) \times 1/2 \times 1.43 \times 9.87 = 7.06^{t}$

- Pavmet load

$1.1^{t/m^3} \times 0.05 \times 1.43 \times 9.87 = 0.78^{t}$

- Haunch of slab (same as panel point 1) $= 0.33^{t}$
- Longitudinal beam (〃) $= 5.55^{t}$
- Reduction of linear load

(〃) $= -0.16^{t}$

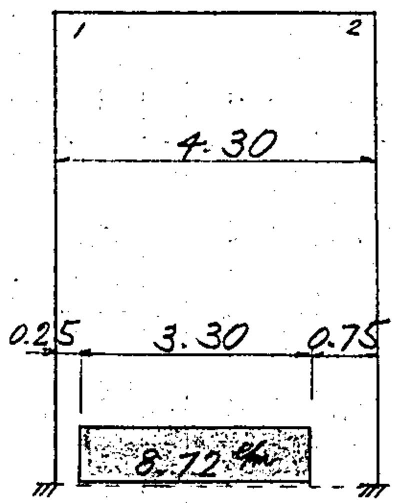
- Reduction of column part

(〃) $= -0.02^{t}$

• Shed load reation = 10.00^t

$P_2 = 31.74^t$

d) Reaction of stairway



(2) Own weight of column

$q = 2.5^{t/m^3} \times 0.50 \times 0.50 = 0.63^{t/m}$

2. Pedestrian load (People load)

$w = 0.35^{t/m^2}$

(1) Upper member

a) Uniformly distributed load

$wd_1 = 0.35^{t/m^2} \times 2.15 \times 2 = 1.51^{t/m^2}$

2) Concentrated load acting at panel point

Panel point 1

- Uniformly distributed load

  $0.35^{t/m^2} \times 0.25 \times 9.87 = 0.86^t$

- Uniformly distributed load

  $0.35^{t/m^2} \times (2.87 + 4.87) \times 1/2 \times 2.15 = 2.91^t$

- Uniformly distributed load

  $0.35^{t/m^2} \times (2.85 + 5.00) \times 1/2 \times 2.15 = 2.95^t$

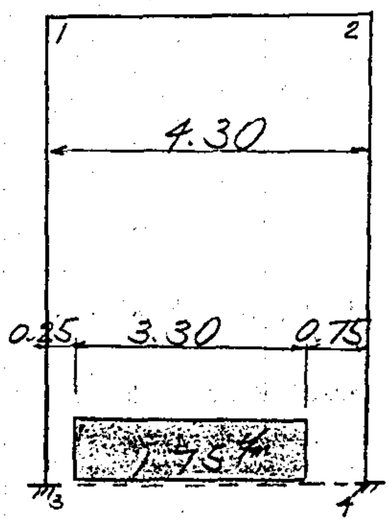
$P_1 = 6.72^t$

Panel point 2

- Uniformly distributed load $2.91 + 2.95 = 5.86^t$
- (〃) $0.35^{t/m^2} \times 1.68 \times 9.87 = 5.80^t$

$P_2 = 11.66^t$

(2) Reaction of Stairway



3 Temperature change and Drying contraction

Temperature change -------- ± 10°C

Drying contraction -------- − 15°C

Hence,

Temperature rise ------- + 10°C

Temperature drop + Drying contraction

-------- − 25°C

4. Seismic load from dead load ($kH = 0.10$)

a) Horizontal force acting at upper member

$1.85^{t/m} \times 2.15 \times 1/2 \times 2 = 3.98^{t}$

$0.64^{\prime\prime} \times 4.30 = 2.75^{\prime\prime}$

$26.90^{t} + 31.74^{t} = 58.64^{\prime\prime}$

$0.21^{t/m^2} \times 6.23 \times 9.87 = 12.91^{\prime\prime}$

$0.63^{t/m} \times 9.385 \times 1/2 \times 2 = 5.91^{\prime\prime}$

Total $= 84.19^{t}$

$H = 84.19 \times 0.10 = 8.42^{t}$

$H_1 = H_2 = 8.42 \times 1/2 = 4.21^{t}$

b) Horizontal force acting at foundation

$0.63^{t/m} \times 9.385 \times 1/2 \times 2 = 5.91^{t}$

$6.92^{t} \times 1/2 = 3.46^{t}$

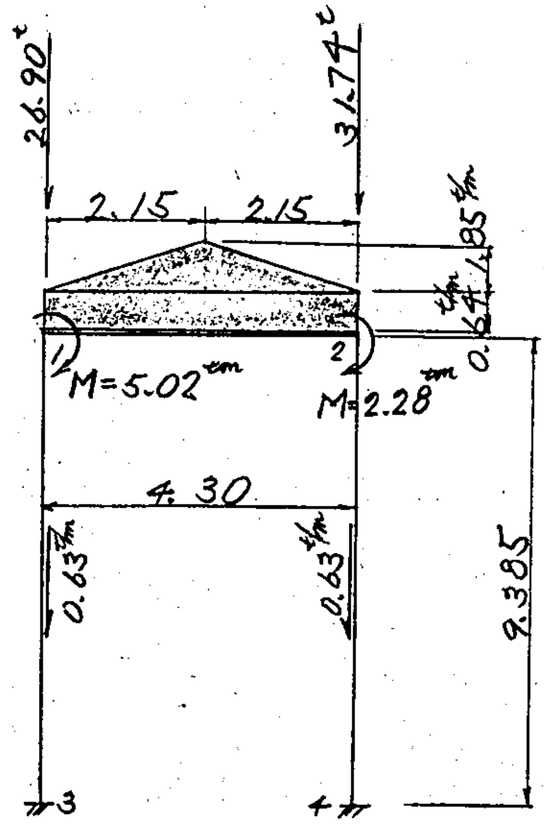
$8.72^{t/m} \times 3.30 = 28.78^{t}$

total $= 38.15^{t}$

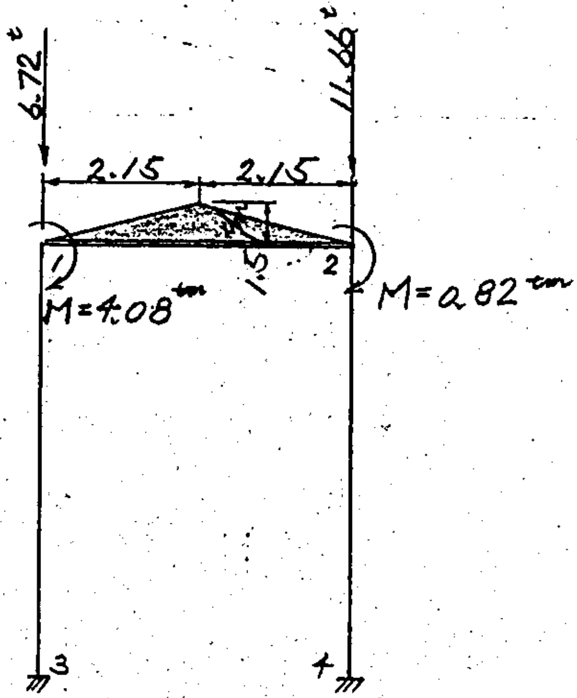
$H = 38.15 \times 0.10 = 3.82^{t}$

(3) loading diagram

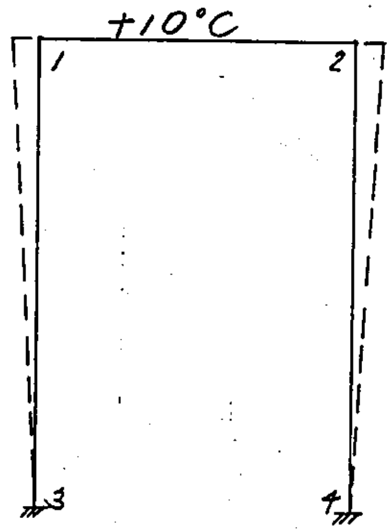
1. case 1 Dead load



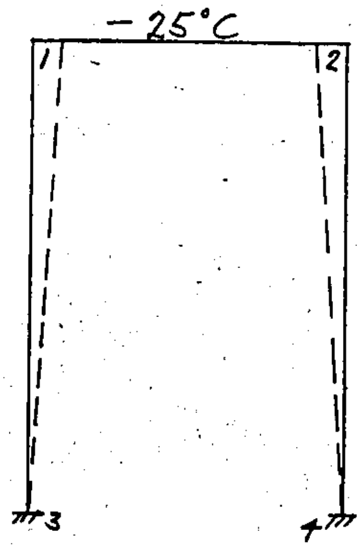
2. case 2 Pedestrians load



3. case 3 Temperature rise

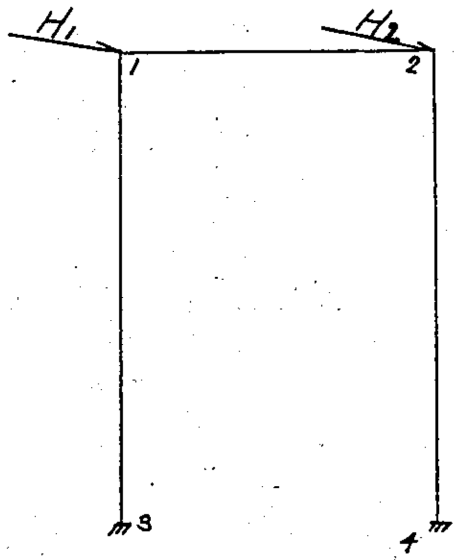


4. case 4 Temperature drop
+ Drying contraction



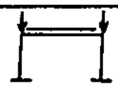
5. case 5 Seismic load from dead load

$H_1 = H_2 = 5.78^t$



(4) Combination of loads

1. Basic load

Case Number	Kind of load	Loading pattern
1	Dead load	
2	Pedestrian load	
3	Temperature rise	+ 10°C
4	Temperature drop + Drying contraction	− 25°C
5	Seismic load from dead load	

2. Combined loads

case number	Combination of loads	α
6	1 + 2	1.0000
7	1 + 3	0.8696
8	1 + 4	〃
9	1 + 5	0.6667
10	1 − 5	〃

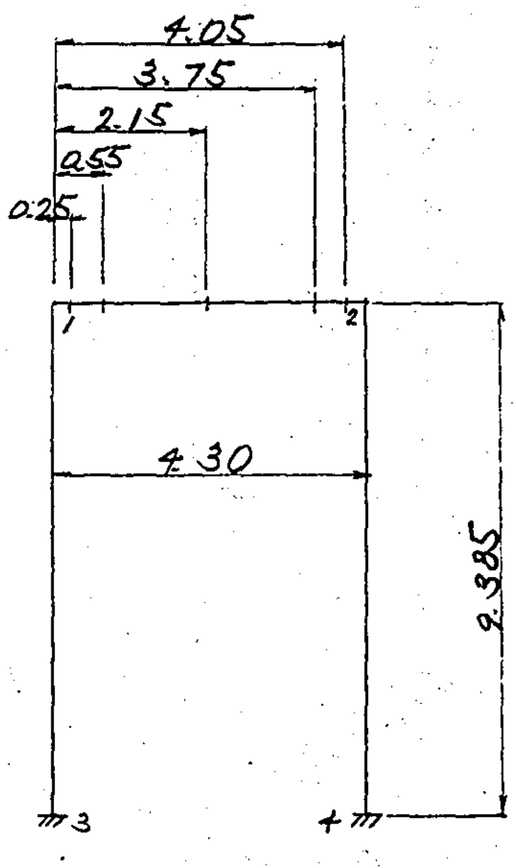
3. Critical cases

No. 1 case 1 crack

No. 2 case 6 ~ 10 synthetic

No. 3 case 9 . 10 footing

4. Point for stress calculation

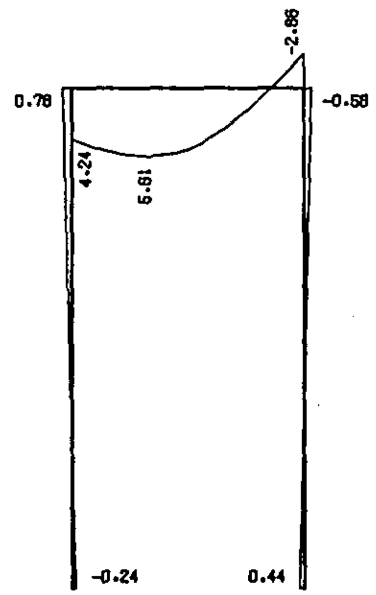


[5] Stress diagram

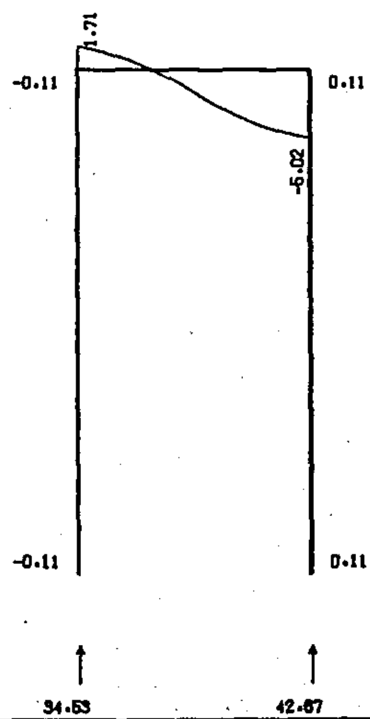
VIADUCT OF PLATFORM (NORTH SIDE) C-2

CASE 1 (DEAD LOAD)

BENDING MOMENT



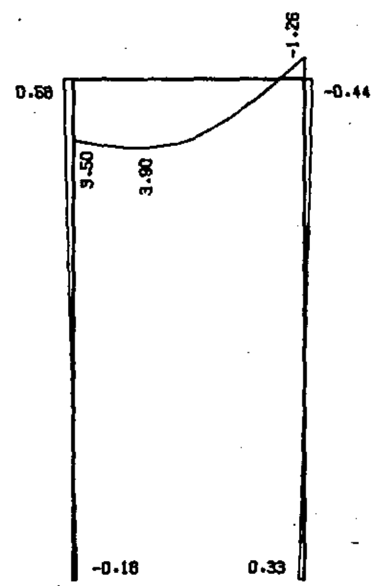
SHEARING FORCE



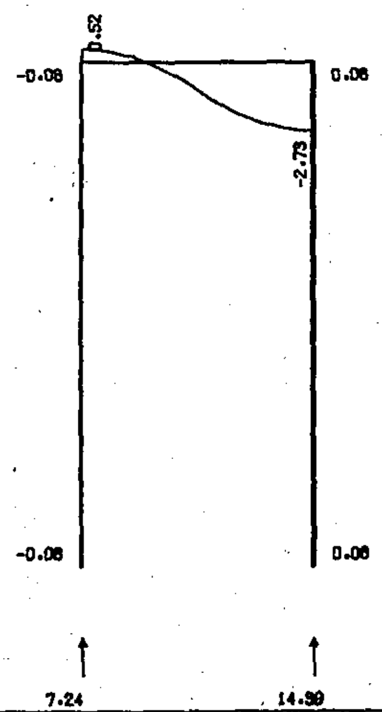
VIADUCT OF PLATFORM (NORTH SIDE) C-2

CASE 2 (PEDESTRIANS LOAD)

BENDING MOMENT



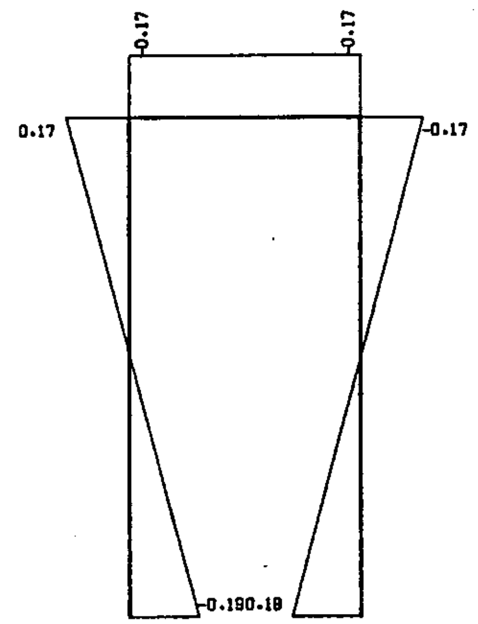
SHEARING FORCE



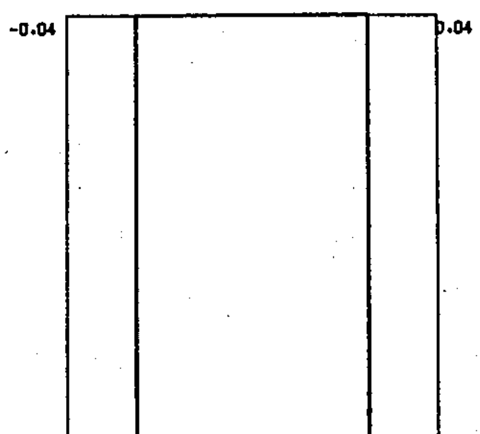
VIADUCT OF PLATFORM (NORTH SIDE) C-2

CASE 3 (TEMPERATURE)

BENDING MOMENT



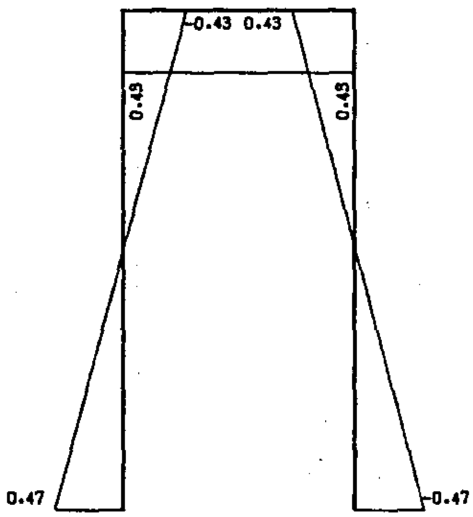
SHEARING FORCE



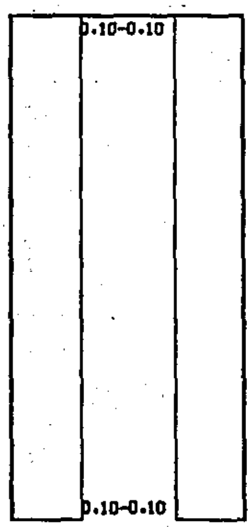
VIADUCT OF PLATFORM (NORTH SIDE) C-2

CASE 4 (TEMPERATURE + SCHRINKAGE)

BENDING MOMENT



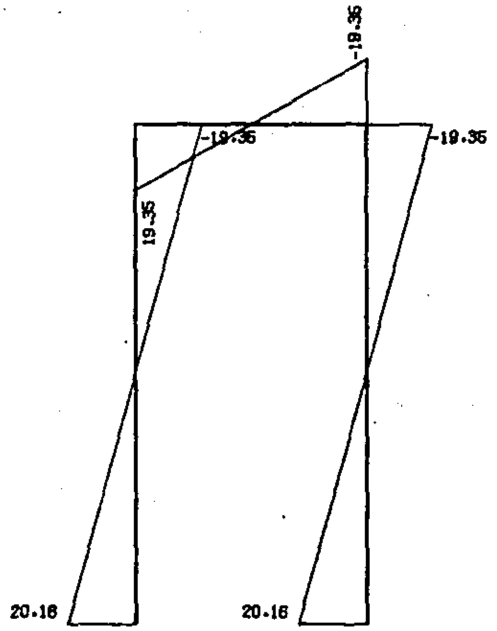
SHEARING FORCE



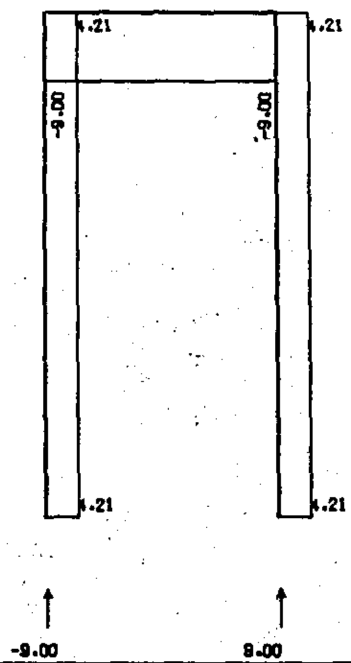
VIADUCT OF PLATFORM (NORTH SIDE) C-2

CASE 5 (SEISMIC LOAD)

BENDING MOMENT



SHEARING FORCE



INPUT DATA

```
=== INPUT DATA ===                                                              CRC-FANSY   V6.3
        5   10        20        30        40        50        60        70        80   CARD NUMBER
    ..........................................................................................
    TITLE     VIADUCT OF PLATFORM (NORTH SIDE) C-2                                             1
    PLOT          1     2                        6.0                                           2
    TYPE1-1-1         L=4.3     H=9.385   M1=1.706,0.02416                                     3
                      M2-3=0.25,0.00521   P=2.7E+6,1.0E-5     S=0                              4
    POINT     1-0.25        0.55       2.15       3.75       4.05                              5
    PICKUP              1    1    1                                                            6
                        2    1    6    10                                                      7
                        3    1    9    10                                                      8
    LOAD                1     CASE  1 (DEAD LOAD)                                              9
    J                   1                -26.9      -5.02                                     10
                        2                -31.74     -2.28                                     11
    DL                  1    2-1.95       2.15       2.15                                     12
                        1    2-0.64                                                           13
                        2    2-0.63                                    3                      14
    END                                                                                       15
    LOAD                2     CASE  2 (PEDESTRIANS LOAD)                                      16
    J                   1                 -6.72      -4.08                                    17
                        2                -11.66      -0.82                                    18
    DL                  1    2-1.51       2.15       2.15                                     19
    END                                                                                       20
    LOAD                3     CASE  3 (TEMPERATURE)                                           21
    T                   1      10.0                                                           22
    END                                                                                       23
    LOAD                4     CASE  4 (TEMPERATURE + SCHRINKAGE)                              24
    T                   1     -25.0                                                           25
    END                                                                                       26
    LOAD                5     CASE  5 (SEISMIC LOAD)                                          27
    J                   1      4.21                                    2                      28
    END                                                                                       29
    MT2       6                 1    2                                                        30
              70.8696           1    3                                                        31
              80.8696           1    4                                                        32
              90.6667           1    5                                                        33
              100.6667          1   -5                                                        34
    FINISH                                                                                    35
```

CONTROL DATA

METHOD	STRUCTURE	J.RENUMBER	M.RENUMBER	S.F. DIS.	UNI.SPRING	STAN.STIF.	BARA	SKEW MEM.
DIS	*RAHMEN*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*

LOAD TITLE

```
LOAD  1   CASE  1 (DEAD LOAD)                LOAD  2   CASE  2 (PEDESTRIANS LOAD)
LOAD  3   CASE  3 (TEMPERATURE)              LOAD  4   CASE  4 (TEMPERATURE + SCHRINKAGE)
LOAD  5   CASE  5 (SEISMIC LOAD)

MIX   6   CASE  6 (1+2)                      MIX   7   CASE  7 (1+3)
MIX   8   CASE  8 (1+4)                      MIX   9   CASE  9 (1+5)
MIX  10   CASE 10 (1-5)
```

PICK UP LOAD CASE

```
PICK  1      1
PICK  2      6    7    8    9   10
PICK  3      9   10
```

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

JOINT DATA

JOINT NUMBER 4

ZAHYO(M) JOINT	X	Y
1	0.0000	9.3850
2	4.3000	9.3850
3	0.0000	0.0000
4	4.3000	0.0000

MEMBER DATA

MEMBER NUMBER 3

MEMBER	ITAN	JTAN	CONNECT. ITAN	JTAN	LENGTH	A	I	AES	KD(BANE)	PRO.NUM
1	1	2	FIX	FIX	4.3000	1.76600	.0241600			1
2	1	3	FIX	FIX	9.3850	.25000	.0052100			1
3	2	4	FIX	FIX	9.3850	.25000	.0052100			1

PROPERTY DATA

PROPERTY NUMBER 1

PROPERTY	E	G	EPS
1	2.700E+06	0.	1.000E-05

SUPPORT DATA

SUPPORT NUMBER 2

SUPPORT	SUPPORT-JYOKEN X	Y	THET Z	X(BANE)	Y(BANE)	THET Z(BANE)
3	FIX	FIX	FIX	0.0	0.0	0.0
4	FIX	FIX	FIX	0.0	0.0	0.0

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

STRUCTURAL FIGURE

```
+-------------------+
I 1                 I 2
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
I                   I
+                   +
= 3                 = 4
```

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

MOVE DATA

MEMBER	GCIKI IIAN	GCIKI JIAN	POINT 1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	......	......	.250	.550	2.150	3.750	4.050									
2	......	......														
3	......	......														

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

LOAD DATA

	M/J	NAME	D	W1	W2	L1	L2
LOAD - 1		CASE 1 (DEAD LOAD)					
MEMBER	1	LINEAR	Y	0.000	-1.850	0.000	2.150
		LINEAR	Y	-1.850	0.000	2.150	0.000
		LINEAR	Y	-.640	-.640	0.000	0.000
	2	LINEAR	Y	-.630	-.630	0.000	0.000
	3	LINEAR	Y	-.630	-.630	0.000	0.000
JOINT	1	JOINTLOAD	Y	-26.900			
		JOINTLOAD	Z	-5.020			
	2	JOINTLOAD	Y	-31.740			
		JOINTLOAD	Z	-2.280			
LOAD - 2		CASE 2 (PEDESTRIANS LOAD)					
MEMBER	1	LINEAR	Y	0.000	-1.510	0.000	2.150
		LINEAR	Y	-1.510	0.000	2.150	0.000
JOINT	1	JOINTLOAD	Y	-6.720			
		JOINTLOAD	Z	-4.080			
	2	JOINTLOAD	Y	-11.660			
		JOINTLOAD	Z	-.820			
LOAD - 3		CASE 3 (TEMPERATURE)					
MEMBER	1	TEMP		10.0(CO)			
LOAD - 4		CASE 4 (TEMPERATURE + SCHRINKAGE)					
MEMBER	1	TEMP		-25.0(CO)			
LOAD - 5		CASE 5 (SEISMIC LOAD)					
JOINT	1	JOINTLOAD	X	4.210			
	2	JOINTLOAD	X	4.210			

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

MIX DATA

MIX NUMBER 5

LOAD	SS	N	S1	K1	S2	K2	S3	K3	S4	K4	S5	K5	S6	K6	S7	K7	S8	K8
6	1.0000	2	1.0000	1	1.0000	2												
7	.8696	2	1.0000	1	1.0000	3												
8	.8696	2	1.0000	1	1.0000	4												
9	.6667	2	1.0000	1	1.0000	5												
10	.6667	2	1.0000	1	-1.0000	5												

PICK UP

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 　　　　CRC-FANSY V6.3

PICK UP 1

MOMENT MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	4.239	1.713	-.109
1	.250	(1)	4.645	1.526	-.109
2	.550	(1)	5.061	1.230	-.109
3	2.150	(1)	5.017	-1.652	-.109
4	3.750	(1)	-.226	-4.535	-.109
5	4.050	(1)	-1.633	-4.830	-.109
JTAN	4.300	(1)	-2.865	-5.017	-.109
MAX	1.433	(1)	5.614	-.089	-.109
= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(1)	.781	-.109	-28.613
JTAN	9.385	(1)	-.243	-.109	-34.525
= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(1)	-.585	.109	-36.757
JTAN	9.385	(1)	.439	.109	-42.669

MOMENT MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	4.239	1.713	-.109
1	.250	(1)	4.645	1.526	-.109
2	.550	(1)	5.061	1.230	-.109
3	2.150	(1)	5.017	-1.652	-.109
4	3.750	(1)	-.226	-4.535	-.109
5	4.050	(1)	-1.633	-4.830	-.109
JTAN	4.300	(1)	-2.865	-5.017	-.109
MAX	1.433	(1)	5.614	-.089	-.109
= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(1)	.781	-.109	-28.613
JTAN	9.385	(1)	-.243	-.109	-34.525
= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(1)	-.585	.109	-36.757
JTAN	9.385	(1)	.439	.109	-42.669

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

PICK UP 1

	SHEAR MAXIMUM						SHEAR MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	4.239	1.713	-.109	ITAN	0.000	(1)	4.239	1.713	-.109
1	.250	(1)	4.645	1.526	-.109	1	.250	(1)	4.645	1.526	-.109
2	.550	(1)	5.061	1.230	-.109	2	.550	(1)	5.061	1.230	-.109
3	2.150	(1)	5.017	-1.652	-.109	3	2.150	(1)	5.017	-1.652	-.109
4	3.750	(1)	-.226	-4.535	-.109	4	3.750	(1)	-.226	-4.535	-.109
5	4.050	(1)	-1.633	-4.830	-.109	5	4.050	(1)	-1.633	-4.830	-.109
JTAN	4.300	(1)	-2.865	-5.017	-.109	JTAN	4.300	(1)	-2.865	-5.017	-.109
= = MEMBER 2 (1 - 3) C = =						= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(1)	.781	-.109	-28.613	ITAN	0.000	(1)	.781	-.109	-28.613
JTAN	9.385	(1)	-.243	-.109	-34.525	JTAN	9.385	(1)	-.243	-.109	-34.525
= = MEMBER 3 (2 - 4) C = =						= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(1)	-.585	.109	-36.757	ITAN	0.000	(1)	-.585	.109	-36.757
JTAN	9.385	(1)	.439	.109	-42.669	JTAN	9.385	(1)	.439	.109	-42.669

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

PICK UP 1

AXIAL MAXIMUM

	-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	4.239	1.713	-.109
1	.250	(1)	4.645	1.526	-.109
2	.550	(1)	5.061	1.230	-.109
3	2.150	(1)	5.017	-1.652	-.109
4	3.750	(1)	-.226	-4.535	-.109
5	4.050	(1)	-1.633	-4.830	-.109
JTAN	4.300	(1)	-2.865	-5.017	-.109
= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(1)	.781	-.109	-28.613
JTAN	9.385	(1)	-.243	-.109	-34.525
= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(1)	-.585	.109	-36.757
JTAN	9.383	(1)	.439	.109	-42.669

AXIAL MINIMUM

	-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	4.239	1.713	-.109
1	.250	(1)	4.645	1.526	-.109
2	.550	(1)	5.061	1.230	-.109
3	2.150	(1)	5.017	-1.652	-.109
4	3.750	(1)	-.226	-4.535	-.109
5	4.050	(1)	-1.633	-4.830	-.109
JTAN	4.300	(1)	-2.865	-5.017	-.109
= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(1)	.781	-.109	-28.613
JTAN	9.385	(1)	-.243	-.109	-34.525
= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(1)	-.585	.109	-36.757
JTAN	9.365	(1)	.439	.109	-42.669

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 GRC-FANSY V6.3

PICK UP 2

MOMENT MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	15.727	-4.858	-.073
1	.250	(9)	14.497	-4.983	-.073
2	.550	(9)	12.974	-5.180	-.073
3	2.150	(6)	8.465	-2.757	-.190
4	3.750	(10)	9.450	2.977	-.073
5	4.050	(10)	10.312	2.780	-.073
JTAN	4.300	(10)	10.990	2.655	-.073
MAX	2.867	(10)	6.464	3.856	-.073
= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(10)	13.421	-2.880	-25.076
JTAN	9.385	(9)	13.279	2.734	-17.018
= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(10)	12.511	-2.734	-18.506
JTAN	9.385	(9)	13.734	2.880	-34.448

MOMENT MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(10)	-10.074	7.142	-.073
1	.250	(10)	-8.303	7.017	-.073
2	.550	(10)	-6.226	6.821	-.073
3	2.150	(9)	3.345	-7.102	-.073
4	3.750	(9)	-9.751	-9.023	-.073
5	4.050	(9)	-12.489	-9.220	-.073
JTAN	4.300	(9)	-14.810	-9.345	-.073
MAX	2.150	(9)	3.345	-7.102	-.073
= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(9)	-12.380	2.734	-13.076
JTAN	9.385	(10)	-13.604	-2.880	-29.018
= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(9)	-13.290	2.880	-30.506
JTAN	9.385	(10)	-13.149	-2.734	-22.448

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

PICK UP 2

SHEAR MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(10)	-10.074	7.142	-.073
1	.250	(10)	-8.303	7.017	-.073
2	.550	(10)	-6.226	6.821	-.073
3	2.150	(10)	3.345	4.899	-.073
4	3.750	(10)	9.450	2.977	-.073
5	4.050	(10)	10.312	2.780	-.073
JTAN	4.300	(10)	10.990	2.655	-.073
= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(9)	-12.380	2.734	-13.076
JTAN	9.385	(9)	13.279	2.734	-17.018
= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(9)	-17.290	2.880	-30.506
JTAN	9.365	(9)	13.734	2.880	-34.448

SHEAR MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	15.727	-4.856	-.073
1	.250	(9)	14.497	-4.983	-.073
2	.550	(9)	12.974	-5.160	-.073
3	2.150	(9)	3.345	-7.102	-.073
4	3.750	(9)	-9.751	-9.023	-.073
5	4.050	(9)	-12.489	-9.220	-.073
JTAN	4.300	(9)	-14.810	-9.345	-.073
= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(10)	13.421	-2.680	-25.076
JTAN	9.385	(10)	-13.604	-2.680	-29.018
= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(10)	12.511	-2.734	-18.506
JTAN	9.385	(10)	-13.149	-2.734	-22.448

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

PICK UP 2

	AXIAL MAXIMUM						AXIAL MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(8)	4.060	1.499	-.011	ITAN	0.000	(6)	7.737	2.231	-.190
1	.250	(8)	4.413	1.327	-.011	1	.250	(6)	8.270	2.022	-.190
2	.550	(8)	4.775	1.070	-.011	2	.550	(6)	8.823	1.642	-.190
3	2.150	(8)	4.737	-1.437	-.011	3	2.150	(6)	8.465	-2.757	-.190
4	3.750	(8)	.177	-3.943	-.011	4	3.750	(6)	-.000	-7.157	-.190
5	4.050	(8)	-1.846	-4.200	-.011	5	4.050	(6)	-2.208	-7.536	-.190
JTAN	4.300	(8)	-2.117	-4.363	-.011	JTAN	4.300	(6)	-4.120	-7.745	-.190
= = MEMBER 2 (1 - 3) C = =						= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(9)	-12.380	2.734	-13.076	ITAN	0.000	(6)	1.363	-.190	-35.851
JTAN	9.385	(9)	13.279	2.734	-17.018	JTAN	9.385	(6)	-.424	-.190	-41.763
= = MEMBER 3 (2 - 4) C = =						= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(10)	12.511	-2.734	-18.506	ITAN	0.000	(6)	-1.020	.190	-51.145
JTAN	9.365	(10)	-13.149	-2.734	-22.448	JTAN	9.385	(6)	.767	.190	-57.056

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

PICK UP 3

	MOMENT MAXIMUM						MOMENT MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	15.727	-4.858	-.073	ITAN	0.000	(10)	-10.074	7.142	-.073
1	.250	(9)	14.497	-4.983	-.073	1	.250	(10)	-8.303	7.017	-.073
2	.550	(9)	12.974	-5.180	-.073	2	.550	(10)	-6.226	6.821	-.073
3	2.150	(9)	3.345	-7.102	-.073	3	2.150	(9)	3.345	-7.102	-.073
4	3.750	(10)	9.450	2.977	-.073	4	3.750	(9)	-9.751	-9.023	-.073
5	4.050	(10)	10.312	2.780	-.073	5	4.050	(9)	-12.489	-9.220	-.073
JTAN	4.300	(10)	10.990	2.655	-.073	JTAN	4.300	(9)	-14.810	-9.345	-.073
MAX	2.150	(9)	3.345	-7.102	-.073	MAX	2.150	(9)	3.345	-7.102	-.073
= = MEMBER 2 (1 - 3) C = =						= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(10)	13.421	-2.680	-25.076	ITAN	0.000	(9)	-12.380	2.734	-13.076
JTAN	9.385	(9)	13.279	2.734	-17.018	JTAN	9.385	(10)	-13.604	-2.880	-29.018
= = MEMBER 3 (2 - 4) C = =						= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(10)	12.511	-2.734	-18.506	ITAN	0.000	(9)	-13.290	2.880	-30.506
JTAN	9.385	(9)	13.734	2.880	-34.448	JTAN	9.385	(10)	-13.149	-2.734	-22.448

TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

PICK UP 3

	SHEAR MAXIMUM						SHEAR MINIMUM				
	----L---	-CASE-	-----M---	-----Q---	-----N---		----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(10)	-10.074	7.142	-.073	ITAN	0.000	(9)	15.727	-4.658	-.073
1	.250	(10)	-8.303	7.017	-.073	1	.250	(9)	14.497	-4.983	-.073
2	.550	(10)	-6.226	6.821	-.073	2	.550	(9)	12.974	-5.180	-.073
3	2.150	(10)	3.345	4.899	-.073	3	2.150	(9)	3.345	-7.102	-.073
4	3.750	(10)	9.450	2.977	-.073	4	3.750	(9)	-9.751	-9.023	-.073
5	4.050	(10)	10.312	2.780	-.073	5	4.050	(9)	-12.489	-9.220	-.073
JTAN	4.300	(10)	10.990	2.655	-.073	JTAN	4.300	(9)	-14.810	-9.345	-.073
= = MEMBER 2 (1 - 3) C = =						= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(9)	-12.380	2.734	-13.076	ITAN	0.000	(10)	13.421	-2.880	-25.076
JTAN	9.385	(9)	13.279	2.734	-17.018	JTAN	9.385	(10)	-13.604	-2.880	-29.018
= = MEMBER 3 (2 - 4) C = =						= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(9)	-13.290	2.880	-30.506	ITAN	0.000	(10)	12.511	-2.734	-18.506
JTAN	9.385	(9)	13.734	2.880	-34.448	JTAN	9.385	(10)	-13.149	-2.734	-22.446

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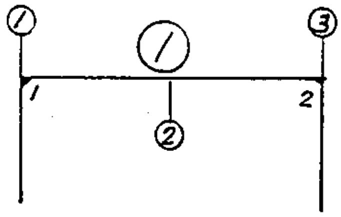
TITLE..VIADUCT OF PLATFORM (NORTH SIDE) C-2 CRC-FANSY V6.3

PICK UP 3

	AXIAL MAXIMUM						AXIAL MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	15.727	-4.858	-.073	ITAN	0.000	(10)	-10.074	7.142	-.073
1	.250	(9)	14.497	-4.983	-.073	1	.250	(10)	-8.303	7.017	-.073
2	.550	(9)	12.974	-5.180	-.073	2	.550	(10)	-6.226	6.821	-.073
3	2.150	(9)	3.345	-7.102	-.073	3	2.150	(10)	3.345	4.899	-.073
4	3.750	(9)	-9.751	-9.023	-.073	4	3.750	(10)	9.450	2.977	-.073
5	4.050	(9)	-12.489	-9.220	-.073	5	4.050	(10)	10.312	2.780	-.073
JTAN	4.300	(9)	-14.810	-9.345	-.073	JTAN	4.300	(10)	10.990	2.655	-.073
= = MEMBER 2 (1 - 3) C = =						= = MEMBER 2 (1 - 3) C = =					
ITAN	0.000	(9)	-12.380	2.734	-13.076	ITAN	0.000	(10)	13.421	-2.880	-25.076
JTAN	9.385	(9)	13.279	2.734	-17.018	JTAN	9.385	(10)	-13.604	-2.880	-29.018
= = MEMBER 3 (2 - 4) C = =						= = MEMBER 3 (2 - 4) C = =					
ITAN	0.000	(10)	12.511	-2.734	-18.506	ITAN	0.000	(9)	-13.290	2.880	-30.506
JTAN	9.385	(10)	-13.149	-2.734	-22.448	JTAN	9.385	(9)	13.734	2.880	-34.448

(6) Calculation of upper beam

1. Stress calculation of upper beam



(a) Summary of stresses

(i) At the support point

Pick up No 2

		⑴			
		①	CO.	③	CO.
Combined Stress	Top	−10.07	10	−14.81	9
	Bottom	15.73	9	10.99	10
Dead load		——		−2.87	1

(ii) Span moment

		⑴	
		②	CO.
Combined Stress	Bottom	8.47	6
		——	

(Note 1) Dead load is of Pick-up No. 1

(Note 2) CO. — combination

(b) Allowable stress for upper beam, safe against cracking

(i) At the support point 2

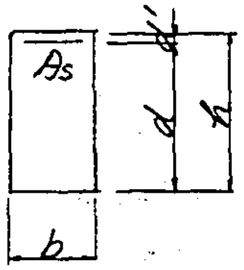
Dead load	M_d	$= -2.87^{tm}$ (case 1)
Pedestrian load	M_p	$= -1.26$ " (case 2)
	ΣM	$= -4.13^{tm}$

$$\alpha = \frac{1.26}{4.13} = 0.31 > 0.25$$

Hence $\sigma_{sa} = 1000\ kg/cm^2$

(C) Cross section used for stress calculation

(i) Cross section at the support point



$b = 50^{cm}$

$h = 60^{cm}$

$d' = 2.5 + 1.0 + 3.2 + 1.3 = 8.0^{cm}$

$d = 60 - 8.0 = 52.0^{cm}$

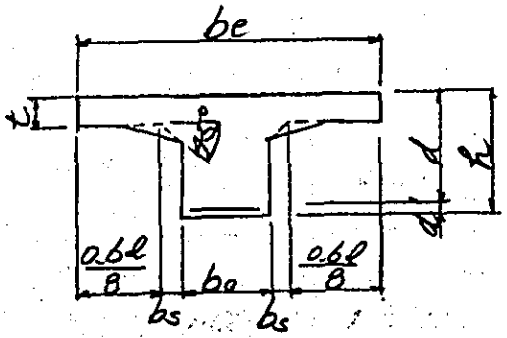
(ii) Cross section at the span center point

Effective width of T-beam at compression fibre

$$be = b_0 + 2\left(bs + \frac{0.6}{8}\cdot l\right)$$

$$be_1 = 0.50 + 2\times\left(0.10 + \frac{0.60}{8}\times 4.30\right)$$

$$= 1.35^{m}$$



$b_0 = 50^{cm}$

$h = 60$ "

$d' = 3.0 + 1.3 + 1.3 = 5.6^{cm}$

$d = 60 - 5.6 = 54.4^{cm}$

$t = 15^{cm}$

(d) Calculation of bending stress

	①			
	③		①	
M (tm)	−2.87	−14.81	−8.67	
N (t)				
S (t)				
b (cm)	50		135	
h (cm)	60		60	
d (cm)	52.0		54.4	
d′ (cm)	8.0		5.6	
As (cm²)	D25-5 = 25.34		D25-5 = 25.34	
p	0.00975		0.00345	
As′ (cm²)			t = 15 t/d = 0.276	
p′				
e = M/N (cm)				
e = M/N + u (cm)				
e = M/N − u (cm)				
e/h				
d/e				
d′/h				
d′/d				
M/bd² (kg/cm²)	2.12	10.95	2.17	
k				
c				
j				
1/Lc	5.6		8.03	
1/Ls	119		319	
β = σs/σc				
σc (kg/cm²)		61.4	17.4	
σs (kg/cm²)	250	1300	690	
τ (kg/cm²)				
σsa (kg/cm²)	1000	1800	1800	
σca (kg/cm²)		90	90	
τa (kg/cm²)				
Nomogram number	M-1	〃	M-47, M-1	
combination	D	D+P	D+P	

(e) Required minimum cross section of re-bars

(i) At the top of support point

$$As = \frac{M}{\sigma_{sa} \cdot j \cdot d} \times \frac{4}{3}$$

$$= \frac{14.81 \times 10^5}{1800 \times 0.875 \times 52.0} \times \frac{4}{3} = 24.11^{cm^2}$$

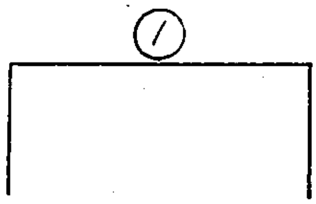
Hence $D25 - 5 = 25.34^{cm^2} > 24.11^{cm^2}$

(ii) At the span center point

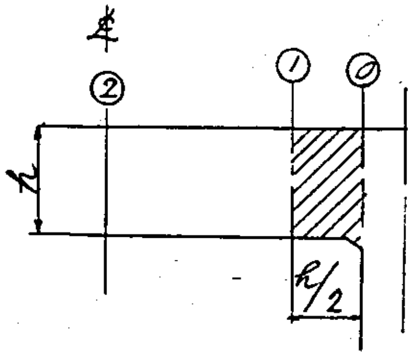
$$As = \frac{15.73 \times 10^5}{1800 \times 0.875 \times 54.4} \times \frac{4}{3} = 24.48^{cm^2}$$

Hence $D25 - 5 = 25.34^{cm^2} > 24.48^{cm^2}$

2. Shearing stress of upper beam



(1) Summary of shearing stress



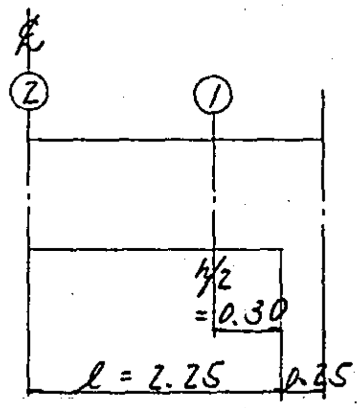
For the design of cross section of beam end, the value of shearing stress at h/2 point is applied.

	①			
	Left support	CO.	Right support	CO.
⓪	7.02	10	-9.22	9
①	6.82		-9.02	
②	4.90		-7.10	

(Note) CO. — combination

(2) Shearing stress

(a) Shearing stress caused by bending



(i) Shearing stress of the member of uniform height

$$\tau = \frac{S}{b \cdot d}$$

$$\tau_1 = \frac{9.02 \times 10^3}{50 \times 52.0} = 3.47 \ \mathrm{kg/cm^2} < 3.9 \ \mathrm{kg/cm^2}$$

$$\tau_2 = \frac{7.10 \times 10^3}{50 \times 52.0} = 2.73 \ \text{"} < \text{"} \ \text{"}$$

Calculations for diagonal Re. bars and stirrups are not required because the concrete area is sufficient to the shearing stress.

(a) ctc distance of stirrup

There fore

Arrange stirrups D13 - 1 sets in 25.0 ^{cm} ctc

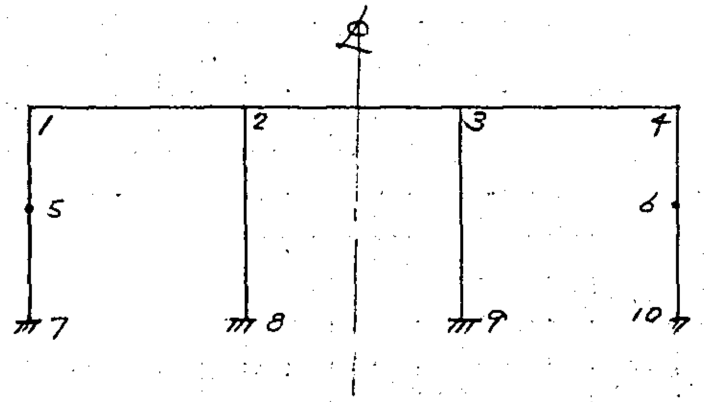
(b) Re - bars in axial direction

Side (one side)

As = D16 - 1 bars

§7. Calculation of column

1) Rahmen (Rigid frame) calculation in railway profile

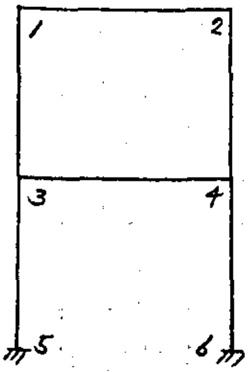


Critical cases No. 2

Member	M (tm)	N (t)	case number
1 — 5	−14.89	30.20	10
7 — 5	19.55	56.76	9
7 — 9	−16.91	62.50	10
2 — 8	18.54	22.25	10
8 — 2	19.66	29.04	9
8 — 2	−19.37	26.17	10

(Refer the result of computor analysis on stress calculation)

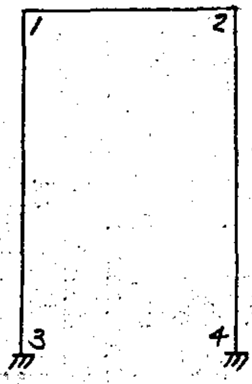
2) ①-① Rahmen (Rigid frame) calculation in the direction of railway cross section



Member	M (tm)	N (t)	case number
6 - 4	18.48	71.57	9
6 - 4	-16.12	42.07	10
2 - 4	-10.28	36.60	9

Critical cases No 2

3) ②-② Rahmen (Rigid frame) calculaion in the direction of railway cross section



Member	M (tm)	N (t)	case number
3 - 1	13.28	17.02	9
4 - 2	13.73	34.45	9
1 - 3	12.38	13.08	9

Critical cases No 2

Stress calculation

	Rahmen in railway profile					
	1—5	7—5	7—9	2—8	8—2	8—2
M (tm)	-14.89	19.55	-16.91	18.54	19.66	-19.37
N (t)	30.20	56.76	62.50	22.25	29.04	26.17
S (t)						
b (cm)	50			50		
h (cm)	50			50		
d (cm)	43.7			43.7		
d' (cm)	6.3			6.3		
As (cm²)	D29-5 = 32.12			D29-5 = 32.12		
p	0.01285			0.01285		
As' (cm²)						
p'						
e=M/N (cm)	49.30	34.44	27.06	83.33	67.70	74.02
e=M/N+u (cm)						
e=M/N−u (cm)						
e/h	0.986	0.689	0.541	1.667	1.354	1.480
d/e						
d'/h	0.126	0.126	0.126	0.126	0.126	0.126
d'/d						
Ne/bd² (kg/cm²)	12.08	22.70	25.00	8.90	11.62	10.47
k	0.462	0.519	0.574	0.412	0.428	0.478
c	0.199	0.274	0.337	0.123	0.149	0.205
j						
1/Lc						
1/Ls						
β=σs/σc						
σc (kg/cm²)	60.6	82.9	74.1	72.1	77.7	51.1
σs (kg/cm²)	810	850	580	1210	1210	630
τ (kg/cm²)						
σsa (kg/cm²)	1800			1800		
σca (kg/cm²)	90			90		
τa (kg/cm²)						
Nomogram number	MN-5.6.7	〃	〃	〃	〃	〃
combination	D+S	〃	〃	〃	〃	〃

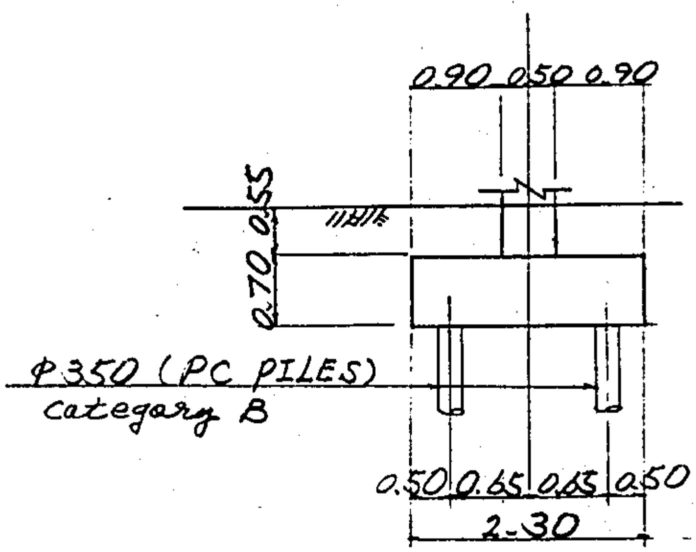
	①-① Rahmen in the direction of railway cross section			②-② Rahmen in the direction of railway cross section		
	6—4	6—4	2—4	3—1	4—2	1—3
M (tm)	18.48	-16.12	-10.28	13.28	13.73	12.38
N (t)	71.57	42.07	36.60	17.02	34.45	13.08
S (t)						
b (cm)	50			50		
h (cm)	50			50		
d (cm)	43.7			43.7		
d' (cm)	6.3			6.3		
As (cm²)	D29-5 = 32.12			D29-5 = 32.12		
p	0.01285			0.01285		
As' (cm²)						
p'						
e=M/N (cm)	25.82	38.32	28.09	78.03	39.85	94.65
e=M/N+u (cm)						
e=M/N−u (cm)						
e/h	0.516	0.766	0.562	1.561	0.797	1.893
d/e						
d'/h	0.126	0.126	0.126	0.126	0.126	0.126
d'/d						
Ne/bd² (kg/cm²)	28.63	16.83	14.64	6.81	13.78	5.23
k	0.587	0.500	0.565	0.417	0.493	0.403
c	0.351	0.250	0.327	0.131	0.241	0.110
j						
1/Lc						
1/Ls						
β=σs/σc						
σc (kg/cm²)	81.6	67.4	44.8	51.9	57.2	47.7
σs (kg/cm²)	600	760	370	860	660	840
τ (kg/cm²)						
σsa (kg/cm²)	1800			1800		
σca (kg/cm²)	90			90		
τa (kg/cm²)						
Nomogram number	MN-5.6.7	〃	〃	〃	〃	〃
combination	D+S	〃	〃	〃	〃	〃

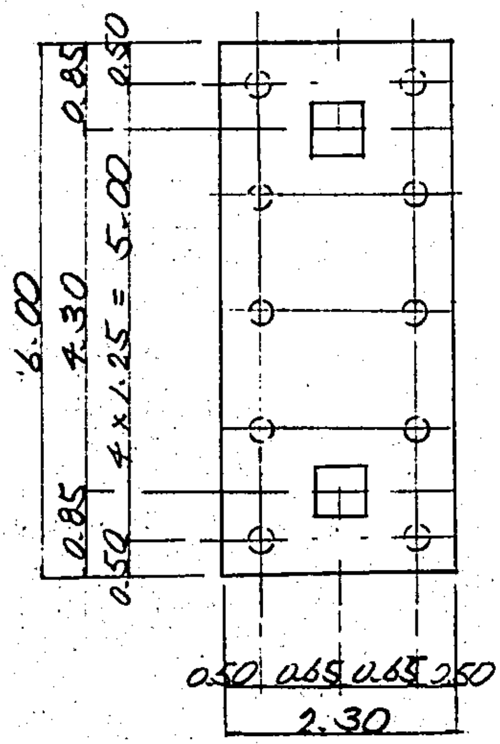
§8. Basic criteria for calculation

1. Analysis in the direction of railway profile

1) Configulation and dimension

· End part and Intermediate part





2) Own weight of footing and weight of earth

End part and Intermediate part (column part)

$N_{F1} = 2.5\ t/m^3 \times 2.30 \times 6.00 \times 0.70 \times 1/2 = 12.08^t$

$N_G = 1.8'' \times (2.30 \times 6.00 - 0.50 \times 0.50) \times 0.55 = 13.41''$

$\Sigma N = 25.49^t$

3) Horizontel force of footing

$H_F = 12.08 \times \frac{0.7}{2.5} \times 0.10 = 0.34^t$

4) Reaction of stairway

Intermediate

(Dead) $N = 28.78 \times 1/2 = 14.39^t$

(Dead + Pedestrian) $N = (28.78 + 5.78) \times 1/2 = 17.28^t$

5) Horizontal force of half portion of column and stairway

End part

$H = 2.5\ t/m^3 \times 0.50 \times 0.50 \times 9.339 \times 1/2 \times 0.10 = 0.29^t$

Intermediate part

$H = 14.39 \times 0.10 + 5.78 \times \frac{0.21}{0.35} \times 0.10 \times 1/2 + 0.29 = 1.90^t$

6) Supporting power of piles of calculation

End part

(i) Ordinary case (Dead load) $\alpha = 1.0$ case 1

$$\begin{cases} \Sigma M = 1.98 + 1.20 \times 0.70 = 2.82^{tm} \\ \Sigma N = 89.44 + 25.49 = 114.93^{t} \\ \Sigma H = 1.20^{t} \end{cases}$$

$$I = 2 \times 2.5 \times 0.65^2 = 2.113 \ m^4$$

$$P = \frac{114.93}{5} \pm \frac{2.82}{2.113} \times 0.65 = \begin{cases} 23.86^{t} < 24^{t} \\ 22.12 \ " \end{cases}$$

$$\Delta N = \pm \frac{1.20}{2 \times 0.246 \times 2.113} \times 0.65 = \pm 0.75^{t}$$

$$P_{max} = 23.86 + 0.75 = 24.61^{t}$$

$$P_{min} = 22.12 - 0.75 = 21.37 \ "$$

- Ordinary case + temporary case

(Dead load + Train load and Impact) $\alpha = 1.00$ case 12

$$\begin{cases} \Sigma M = 1.50 + 1.13 \times 0.70 = 2.29^{tm} \\ \Sigma N = 106.78 + 25.49 = 132.27^{t} \\ \Sigma H = 1.13^{t} \end{cases}$$

$$P = \frac{132.27}{5} \pm \frac{2.29}{2.113} \times 0.65 = \begin{cases} 27.15^{t} < 36^{t} \\ 25.75 \text{ "} \end{cases}$$

$$\Delta N = \pm \frac{1.13}{2 \times 0.298 \times 2.113} \times 0.65 = \pm 0.58^{t}$$

$$P_{max} = 27.15 + 0.58 = 27.73^{t}$$

$$P_{min} = 25.75 - 0.58 = 25.17^{t}$$

- Earthquak case (Dead load + Seismic load) $\alpha = 1.5$ case 21

$$\begin{cases} \Sigma M = 19.55 \times 1.50 + (4.49 \times 1.50 + 0.29) \times 0.70 + 0.34 \times 0.35 = 34.36^{tm} \\ \Sigma N = 56.76 \times 1.50 + 25.49 = 110.63^{t} \\ \Sigma H = 4.49 \times 1.50 + 0.29 + 0.34 = 7.37 \text{ "} \end{cases}$$

$$P = \frac{110.63}{5} \pm \frac{34.36}{2.113} \times 0.65 = \begin{cases} 32.70^{t} < 48^{t} \\ 11.56 \text{ "} \end{cases}$$

$$\Delta N = \pm \frac{7.42}{2 \times 0.298 \times 2.113} \times 0.65 = \pm 3.80^{t}$$

$$P_{max} = 32.70 + 3.80 = 36.50^{t}$$

$$P_{min} = 11.56 - 3.80 = 7.76^{t}$$

Horizontal force by one pile

$$H = 7.37/5 = 1.45^{t}/pile$$

Intermediate part

· Ordinary case (Dead load) $\alpha = 1.0$ case 1

$$\begin{cases} \Sigma M = 0.22 + 0.07 \times 0.70 = 0.27^{\,tm} \\ \Sigma N = 41.41 + 25.49 + 14.39 = 81.29^{\,t} \\ \Sigma H = 0.07^{\,t} \end{cases}$$

$$P = \frac{81.29}{5} \pm \frac{0.27}{2.113} \times 0.65 = \begin{cases} 16.34^{\,t} < 24^{\,t} \\ 16.18^{\,t} \end{cases}$$

$$\Delta N = \pm \frac{0.07}{2 \times 0.246 \times 2.113} \times 0.65 = \pm 0.04^{\,t}$$

$$P_{max} = 16.34 + 0.04 = 16.38^{\,t}$$

$$P_{min} = 16.18 - 0.04 = 16.14^{\,t}$$

· Ordinary case + Temporary case (Dead load + Train load and Impact) $\alpha = 1.0$ case 15

$$\begin{cases} \Sigma M = 0.43 + 0.14 \times 0.70 = 0.53^{\,tm} \\ \Sigma N = 55.39 + 25.49 + 17.28 = 98.16^{\,t} \\ \Sigma H = 0.14^{\,t} \end{cases}$$

$$P = \frac{98.16}{5} \pm \frac{0.53}{2.113} \times 0.65 = \begin{cases} 19.79^{\,t} < 36^{\,t} \\ 19.47 \end{cases}$$

$$\Delta N = \pm \frac{0.14}{2 \times 0.298 \times 2.113} \times 0.65 = \pm 0.07^{\,t}$$

$$P_{max} = 19.79 + 0.07 = 19.86^{\,t}$$

$$P_{min} = 19.47 - 0.07 = 19.40^{\,t}$$

- Earthquake case (Dead load + Seismic load) α=1.5 case 9

$$\begin{cases} \Sigma M = 19.66 \times 1.50 + (4.15 \times 1.50 + 1.90) \times 0.70 + 0.34 \times 0.35 = 35.30 \ tm \\ \Sigma N = 29.04 \times 1.50 + 25.49 + 14.39 = 83.44 \ t \\ \Sigma H = 4.15 \times 1.50 + 0.34 + 1.90 = 8.47 \ \text{"} \end{cases}$$

$$P = \frac{83.44}{5} \pm \frac{35.30}{2.113} \times 0.65 = \begin{cases} 27.55^{t} < 48^{t} \\ 5.83 \ \text{"} \end{cases}$$

$$\Delta N = \pm \frac{8.47}{2 \times 0.298 \times 2.113} \times 0.65 = \pm 4.37^{t}$$

$$P_{max} = 27.55 + 4.37 = 31.92^{t}$$

$$P_{min} = 5.83 - 4.37 = 1.46^{t}$$

Horizontal force by one pile

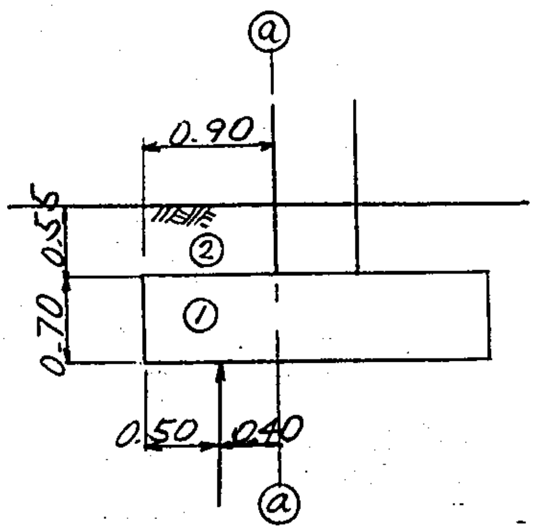
$$H = \frac{8.47}{5} = 1.69 \ t/pile$$

7) Bending moment calculation

Analysis is made calculated

bending moment at the column front.

Bending moment caused by own weight of footing



$N_1 = 2.5^{t/m^3} \times 0.90 \times 0.70 \times 3.00$

$= 4.73^t$

$N_2 = 1.8 \times 0.90 \times 0.55 \times 3.00$

$= 2.67^t$

$M_a = (4.73 + 2.67) \times 0.45 = 3.33^{tm}$

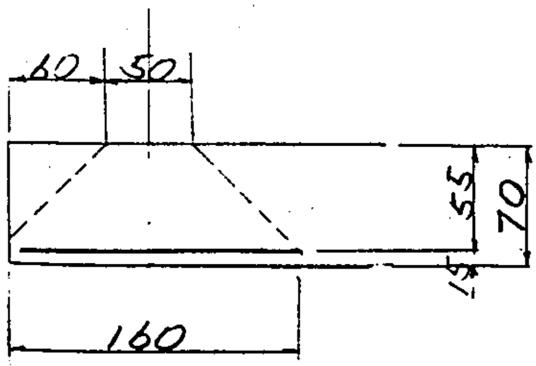
$\Sigma M_a = P \cdot n \cdot x - M_a$

(tm)

		α	Reaction of Pile	Number of piles	Arm (leverage)	P·n·x	−Ma	ΣMa
End part	Ordinary	1.00	24.61	2.50	0.40	24.61	−3.33	21.28
	Ordinary + Temporary	1.00	27.73	〃	〃	27.73	〃	24.40
	Earthquake	1.50	36.50	〃	〃	36.50	〃	33.17 (22.11)
Intermediate Part	Ordinary	1.00	16.38	〃	〃	16.38	〃	13.05
	Ordinary + Temporary	1.00	19.86	〃	〃	19.86	〃	16.53
	Earthquake	1.50	31.92	〃	〃	31.92	〃	28.59 [illegible]

8) Stress calculation

(i) End part



Botton

$M = 24.40^{tm}$

effective width

$B_0 = 50 + 2 \times 55 = 160^{cm}$

$A_s = D19 - 15^{cm}_{ctc} = 2.865 \times \frac{160}{15} = 30.56^{cm^2}$

$p = \frac{30.56}{160 \times 55} = 0.00347$

From the Nomogram M-1,

$1/L_c = 8.01 \quad 1/L_s = 317$

$\sigma_c = \frac{2440 \times 10^5}{160 \times 55^2} \times 8.01 = 40.4^{kg/cm^2} < 90^{kg/cm^2}$

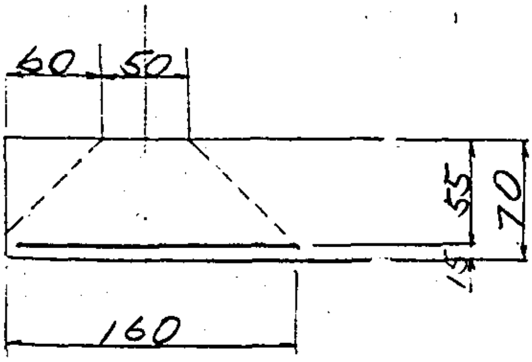
$\sigma_s = \quad " \quad \times 317 = 1600^{"} < 1800^{"}$

Check; safe against cracking

$M = 21.28^{tm}$

$\sigma_{sd} = \frac{21.28 \times 10^5}{160 \times 55^2} \times 317 = 1400^{kg/cm^2} < 1600^{kg/cm^2}$

(ii) Intermediate part



$M = 19.06^{tm}$

$B = 160^{cm}$

$A_s = D16 - 15^{cm}\ ctc = 1.986 \times \frac{160}{15} = 21.18^{cm^2}$

$\rho = \frac{21.18}{160 \times 55} = 0.00241$

From the Nomogram M-1,

$1/L_c = 9.21 \quad 1/L_s = 451$

$\sigma_c = \frac{19.06 \times 10^5}{160 \times 55^2} \times 9.21 = 363^{kg/cm^2} < 90^{kg/cm^2}$

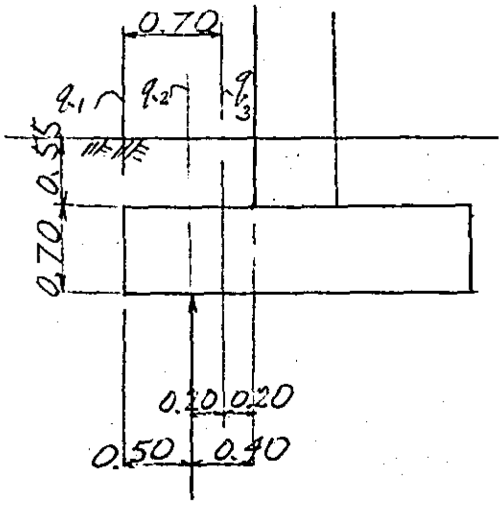
$\sigma_s = \quad " \quad \times 451 = 1780" < 1800"$

Check, safe against cracking

$M = 13.05^{tm}$

$\sigma_{sd} = \frac{13.05 \times 10^5}{160 \times 55^2} \times 451 = 1220^{kg/cm^2} < 1600^{kg/cm^2}$

9) Calculation of shearing fore caused by beading



Imposed load

$q_1 = q_2 = q_3 = 2.5^{t/m^3} \times 0.70$

$+ 1.8^{t/m^3} \times 0.55 = 2.74^{t/m}$

$\gamma_0 = \frac{2}{a_0/d} = \frac{2 \times d}{a_0}$

$a_0 = \frac{h}{2} = \frac{0.70}{2} = 0.35^m$

$d = 0.70 - 0.15 = 0.55^m$

$\gamma_0 = \frac{2 \times 0.55}{0.35} = 3.143 < 4$

Therefore, $\gamma_0 = 3.143$

$q_3' = \frac{q_3}{\gamma_0} = \frac{2.74}{3.143} = 0.87^{t/m}$

$w = 2.74^{t/m} \times 0.50 + (2.74 + 0.87) \times 1/2 \times 0.20$

$= 1.73^{t/m}$

Considered the full with

$P = 27.73 \times 2.50 = 69.33^t$

$a = 0.40^m$

$\gamma_0 = \frac{2}{a/d} = \frac{2 \times 0.55}{0.40} = 2.750 < 4$

Therefore, $\gamma = 2.750$

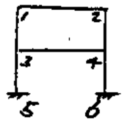
$$P' = \frac{P}{\gamma} = \frac{69.33}{2.75} = 25.21^{t}$$

$$\Sigma S = 1.73^{t/m} \times 3.00 - 25.21^{t} = -20.02^{t}$$

$$\tau = \frac{20.02 \times 10^3}{300 \times 55} = 1.22^{kg/cm^2} < 3.9^{kg/cm^2}$$

2. Analysis in the direction of railway cross section

1) Stress at the bottom of column



(i) End part

Ordinary case (Dead load) $\alpha = 1.00$ case 1

$$\begin{cases} M_5 = -1.80^{tm} \\ N_5 = 93.22^{t} \\ H_5 = -1.04^{t} \end{cases}$$

$$\begin{cases} M_6 = 1.77^{tm} \\ N_6 = 85.23^{t} \\ H_6 = 1.04^{t} \end{cases}$$

Ordinary case + Temporary case (Dead load + Pedestrian load) $\alpha = 1.00$ case 6

$$\begin{cases} M_5 = -2.08^{tm} \\ N_5 = 109.14^{t} \\ H_5 = -1.21^{t} \end{cases}$$

$$\begin{cases} M_6 = 2.08^{tm} \\ N_6 = 102.94^{t} \\ H_6 = 1.21^{t} \end{cases}$$

Earthquake case (Dead load + Seismic load)

$\alpha = 1.50$: case 9

$$\begin{cases} M_5 = 16.10 \times 1.50 = 24.15^{tm} \\ N_5 = 47.40 \times 1.50 = 71.10^{t} \\ H_5 = 5.82 \times 1.50 + \overset{※}{0.16} = 8.89^{t} \end{cases}$$

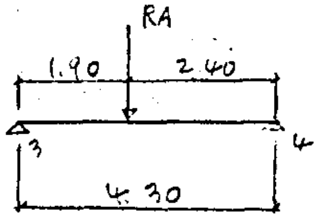
$$\begin{cases} M_6 = 18.48 \times 1.50 = 27.72^{tm} \\ N_6 = 71.57 \times 1.50 = 107.36^{t} \\ H_6 = 7.21 \times 1.50 + \overset{※}{0.16} = 10.98^{t} \end{cases}$$

※ Horizontal force of half portion of column

$H = 2.5 \times 0.50 \times 0.50 \times 5.159 \times 1/2 \times 0.10 = 0.16^{t}$

(ii) Intermediate part

a. Reaction of stairway (Dead load)



$RA = 8.72\ t/m \times 3.30$

$= 28.78^{t}$

$N_3 = 28.78 \times \frac{2.40}{4.30} = 16.06^{t}$

$N_4 = 28.78 - 16.06 = 12.72^{t}$

b. Reaction of stairway (Pedestrian load)

$RA = 1.75\ t/m \times 3.30 = 5.78^{t}$

$N_3 = 5.78 \times \frac{2.40}{4.30} = 3.23^{t}$

$N_4 = 5.78 - 3.23 = 2.55^{t}$

c. Horizontal force of half portion of column and stairway

$H_3 = (16.06 + 3.23 \times \frac{0.21\ t/m^2}{0.35} + 2.5\ t/m^3 \times 0.50 \times 0.50$
$\times 9.385 \times 1/2) \times 0.10 = 2.09^{t}$

$H_4 = (12.72 + 2.55 \times \frac{0.21}{0.35} + 2.5 \times 0.50 \times 0.50$
$\times 9.385 \times 1/2) \times 0.10 = 1.72^{t}$

Ordinary case (Dead load) $\alpha = 1.00$ case 1

$$\begin{cases} M_3 = -0.24^{tm} \\ N_3 = 34.53 + 16.06 = 50.59^{t} \\ H_3 = -0.11^{t} \end{cases}$$

$$\begin{cases} M_4 = 0.44^{tm} \\ N_4 = 42.67 + 12.72 = 55.39^{t} \\ H_4 = 0.11^{t} \end{cases}$$

Ordinary case + Temporary case (Dead load + Pedestrion load) $\alpha = 1.00$ case 6

$$\begin{cases} M_3 = -0.42^{tm} \\ N_3 = 41.76 + 16.06 + 3.23 = 61.05^{t} \\ H_3 = -0.19^{t} \end{cases}$$

$$\begin{cases} M_4 = 0.77^{tm} \\ N_4 = 57.06 + 12.72 + 2.55 = 72.33^{t} \\ H_4 = 0.19^{t} \end{cases}$$

Earthquake case (Dead load + Seismic load)

$\alpha = 1.50$ case 9

$$\begin{cases} M_3 = 13.28 \times 1.50 = 19.92^{tm} \\ N_3 = 17.02 \times 1.50 + 16.06 = 41.59^{t} \\ H_3 = 2.73 \times 1.50 + 2.09 = 6.19^{t} \end{cases}$$

$$\begin{cases} M_4 = 13.73 \times 1.50 = 20.60^{tm} \\ N_4 = 34.45 \times 1.50 + 12.72 = 64.40^{t} \\ H_4 = 2.88 \times 1.50 + 1.72 = 6.04^{t} \end{cases}$$

2) Stability calculation

		Allowable Supporting power	Case Number	Pmax	Pmin	Hmax
Eand Part	Ordinary	24^{t}	1	22.95	20.20	0
	Ordinary + Temporary	36^{t}	6	26.01	23.87	0
	Earthquake	48^{t}	9	33.10	10.06	2.06
Intermediate Part	Ordinary	24^{t}	1	15.17	13.49	0
	Ordinary + Temporary	36^{t}	6	19.04	15.10	0
	Earthquake	48^{t}	9	22.20	6.46	1.29

Analysis on the body of pile

$\beta = 0.298^{m^{-1}}$

In direction of railway profile

$H = 1.69^{t}$

$N_{max} = 31.92^{t}$ (ΔN considered)

$N_{min} = 1.46^{t}$ (〃)

$M = \frac{H}{2\beta} = \frac{1.69}{2 \times 0.298} = 2.84^{tm}$

In direction of railway cross section

$H = 2.06^{t}$

$N_{max} = 35.86^{t}$ (ΔN cosidered)

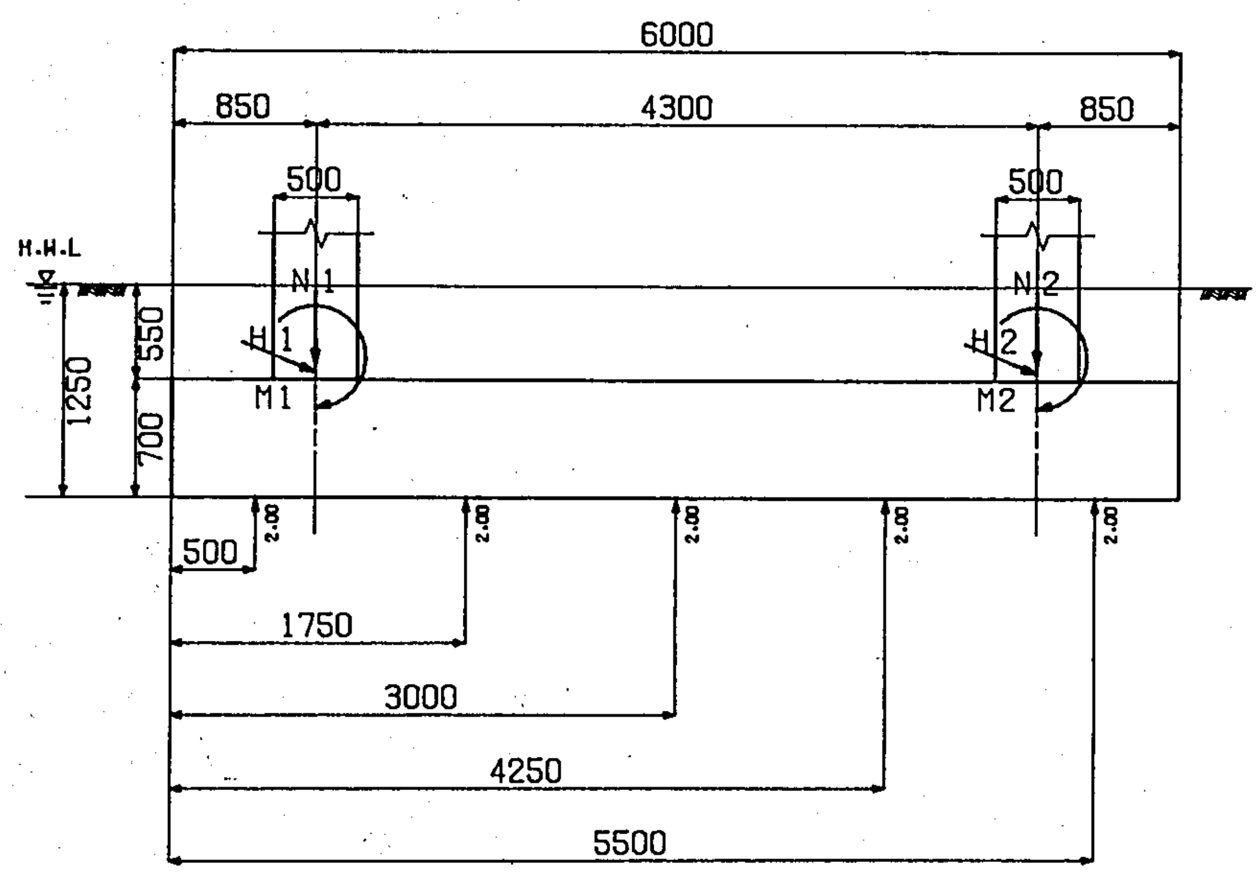
$N_{min} = 7.30^{t}$ (〃)

$$M = \frac{H}{2\beta} = \frac{2.06}{2 \times 0.298} = 3.46^{cm}$$

According to the "Interaction curve", Kind B is employed.

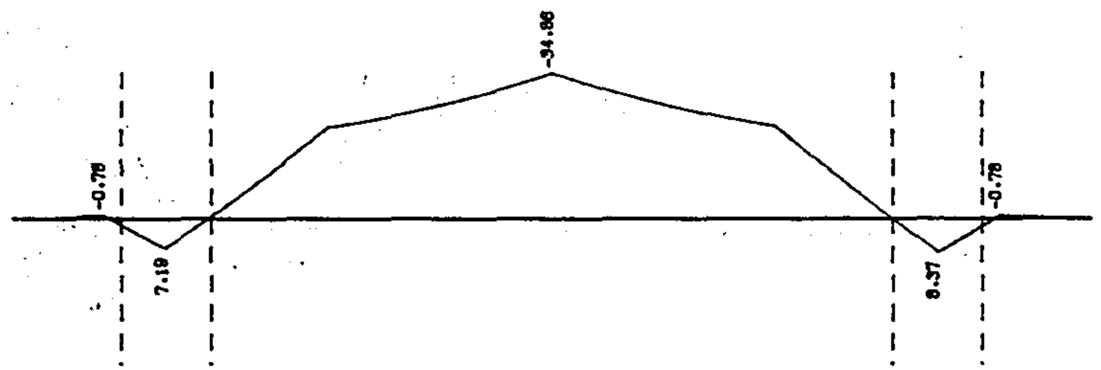
3. Stress diagram

PLATFORM (NORTH SIDE) C-2

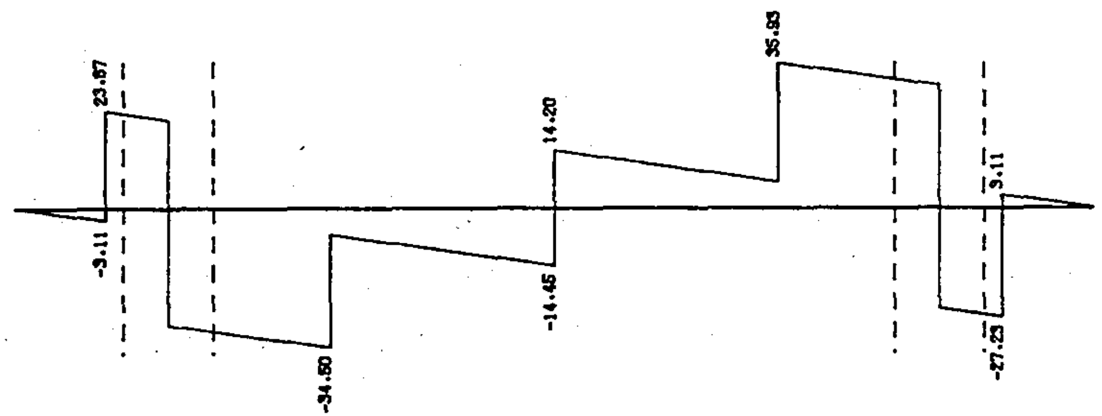


PLATFORM (NORTH SIDE) C-2 | CASE-1

BENDING MOMENT

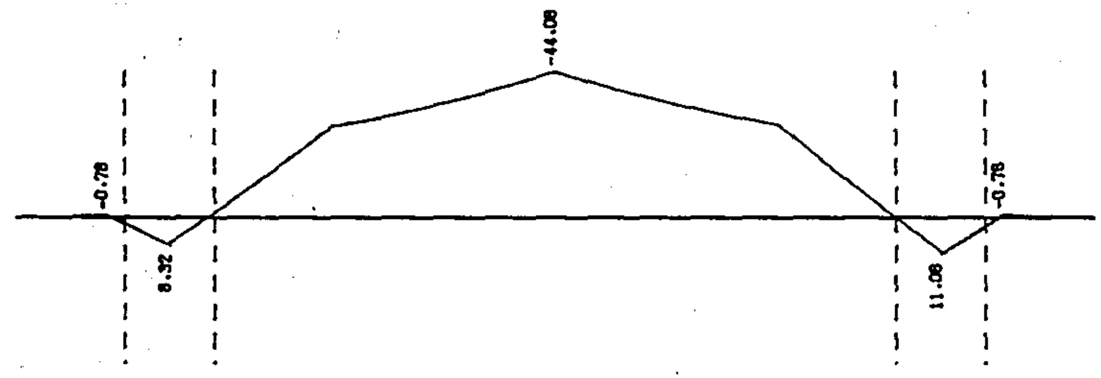


SHEARING FORCE

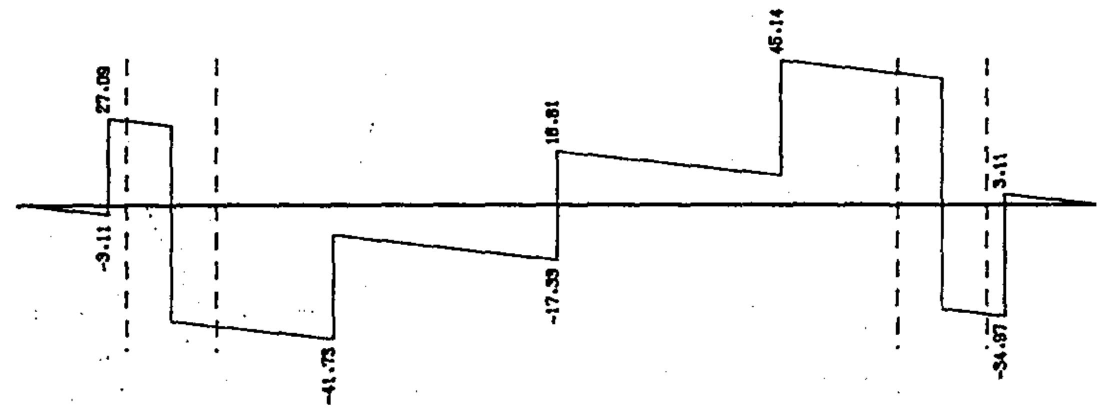


PLATFORM (NORTH SIDE) C-2	CASE-6

BENDING MOMENT

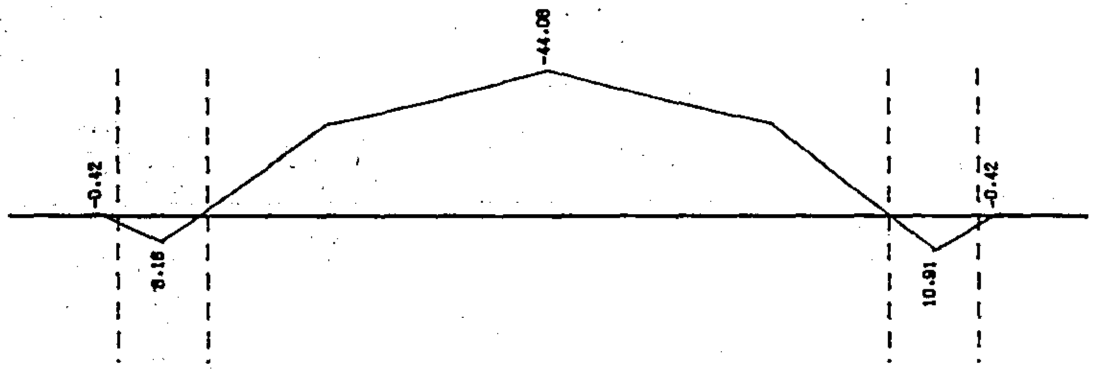


SHEARING FORCE

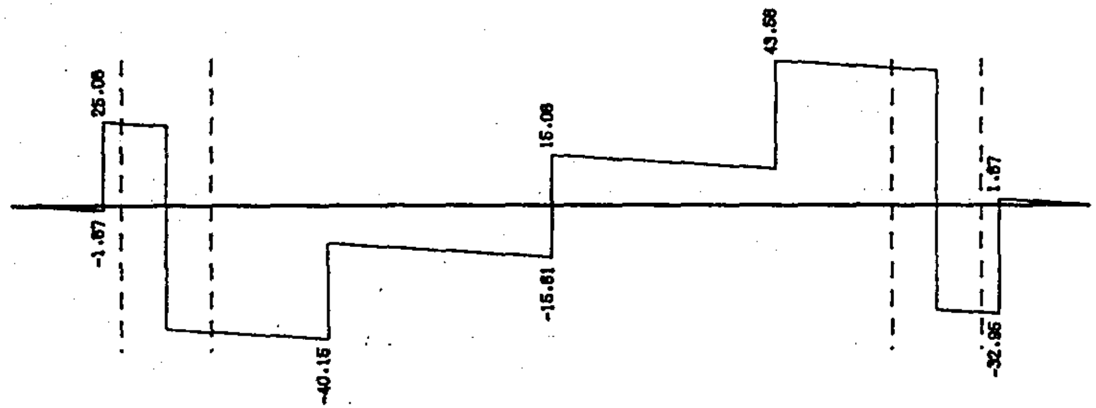


PLATFORM (NORTH SIDE) C-2 | CASE-6

BENDING MOMENT

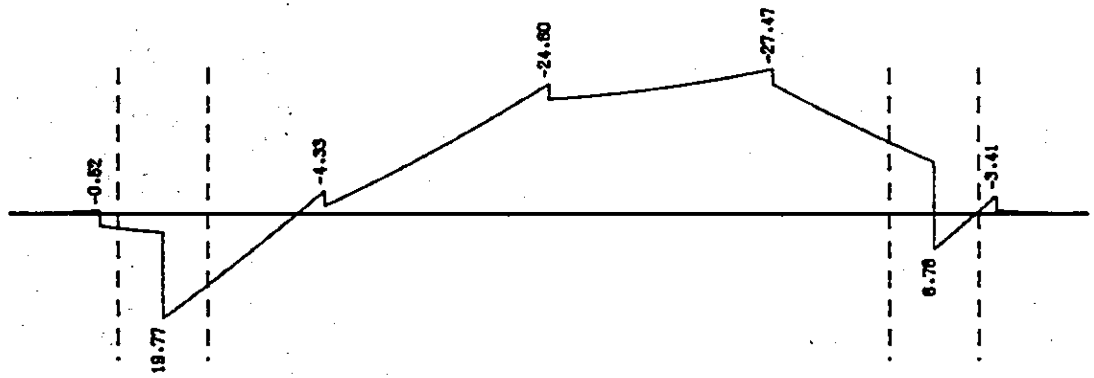


SHEARING FORCE

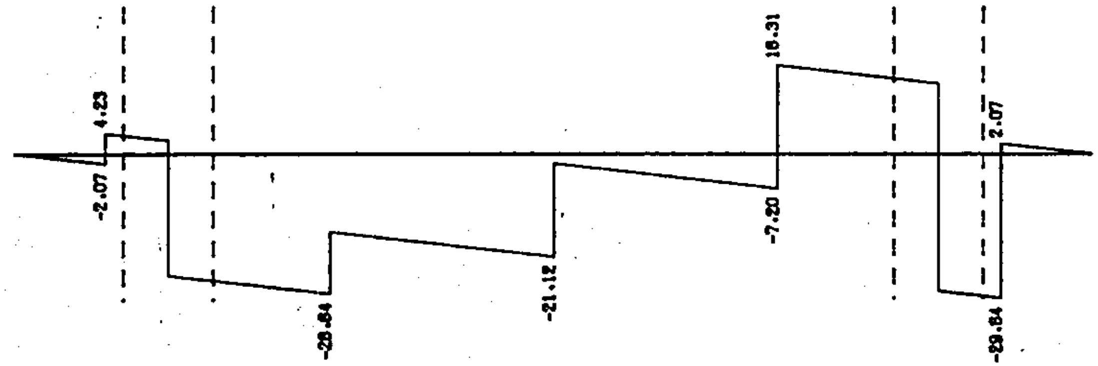


PLATFORM (NORTH SIDE) C-2 CASE-9

BENDING MOMENT



SHEARING FORCE



INPUT DATA

```
 ===INPUT DATA CARD IMAGE===                                                              CARD
---------1---------2---------3---------4---------5---------6---------7---------8         NUMBER
TITLE      PLATFORM (NORTH SIDE)  C-2                                                       1
CONST         2    5         6.0         0       0.55      1.25         0    0.028          2
                 0.7           0         0        6.0         0       2.5                   3
                 0.7           0         0        2.3         0       1.6                   4
SWITCH        2    0    1    1    1    1    0    1    0    1    0                           5
COLC            0.65        5.15                                                            6
COLB             0.5         0.5                                                            7
COLH             0.5         0.5                                                            8
KUI             22.0        0.35 0.0006213    3500000        91       195         0         9
KL               0.5        1.75       3.0       4.25       5.5                            10
KN                 2           2         2          2         2                            11
POINT      2    1.45        4.55                                                           12
FORCE      1   -0.24        0.44                                                           13
    1      1   -0.11        0.11                                                           14
  1.0      1   50.59       55.39                                                           15
FORCE      2   -0.42        0.77                                                           16
    6      2   -0.19        0.19                                                           17
  1.0      1   61.05       72.33                                                           18
FORCE      3   -0.42        0.77                                                           19
    6      2   -0.19        0.19                                                           20
  1.0      0   61.05       72.33                                                           21
FORCE      4   19.92       20.60                                                           22
    9      3    6.19        6.04                                                           23
  1.5      1   41.59       64.40                                                           24
PICKUP     1    1    1                                                                     25
           2    2    4                                                                     26
FINISH                                                                                     27
```

PLATFORM (NORTH SIDE) C-2

1) INPUT

```
*SWITCH

A) KISO     =   2          G) FURYOKU =   0
B) KH       =   0          H) E-ANTEI2=   1
C) DELTA-M  =   1          I) SUPPORT =   0
D) KANSAN   =   1          J) E-DANMEN=   1
E) E-ANTEI1=    1          K) OUTPUT  =   0
F) PLOT     =   1

HASHIRA  =          2 (HON)    KUI       =          5 (HON)

HASHIRA                        DOSYA
   TAKASA=     0.000 ( M )        TAKASA=     0.550 ( M )

KOU-SUII =     1.250 ( M )     TEI-SUII =     0.000 ( M )

SUIHEI                         TANIJYURYO
  SHINDO =     0.028             (CONC) =     2.500 (T/M**3)
                               TANIJYURYO
ZENCHO   =     6.000 ( M )      (TSUCHI)=     1.800 (T/M**3)

*KISO

FH1      =     0.700 ( M )     BFH1     =     0.700 ( M )
FH2      =     0.000 ( M )     BFH2     =     0.000 ( M )
SR1      =     0.000 ( M )     BSR1     =     0.000 ( M )
SR2      =     6.000 ( M )     BSR2     =     2.300 ( M )
SR3      =     0.000 ( M )     BSR3     =     0.000 ( M )

*HASHIRA

HASHIRA        HASHIRA        HASHIRA
 CHUSHIN         HABA          OKUYUKI

    0.850          0.500          0.500
    5.150          0.500          0.500
```

PLATFORM (NORTH SIDE) C-2

*KUI

```
KUICHO   =    22.000 ( M )       KUIKEI   =       0.350 ( M )
I        =  0.000621 (M**4)      E        = 0.350E+07 (T/M**2)
                                 KUITOU
KH1      =    91.000 (T/M**3)    HENIRYOU=        0.000 ( M )
KH2      =   195.000 (T/M**3)
```

KUI CHUSHIN	KUI HONSU
0.500	2.000
1.750	2.000
3.000	2.000
4.250	2.000
5.500	2.000

2) LOAD

*CONCRETE

W = 24.15 (T)   H = 0.68 (T)   Y = 0.350 (M)

*DOSHA

W = 13.17 (T)   H = 0.37 (T)   Y = 0.975 (M)

*FURYOKU

W1= 17.25 (T)
W2= 0.00 (T)

PICK UP

PLATFORM (NORTH SIDE) C-2

*** PICKUP - 1 *** (1)

C	L	--------MOMENT MAXIMUM------- CASE	M	S	--------MOMENT MINIMUM------- CASE	M	S
	0.000	(1)	0.000	0.000	(1)	0.000	0.000
	0.500	(1)	-0.777	-3.110	(1)	-0.777	-3.110
	0.500	(1)	-0.777	23.866	(1)	-0.777	23.866
	0.600	(1)	1.578	23.244	(1)	1.578	23.244
*	0.850	(1)	7.195	21.690	(1)	7.195	21.690
*	0.850	(1)	6.878	-28.900	(1)	6.878	-28.900
	1.100	(1)	-0.542	-30.455	(1)	-0.542	-30.455
	1.450	(1)	-11.582	-32.632	(1)	-11.582	-32.632
	1.750	(1)	-21.651	-34.498	(1)	-21.651	-34.498
	1.750	(1)	-21.651	-6.680	(1)	-21.651	-6.680
	3.000	(1)	-34.860	-14.454	(1)	-34.860	-14.454
	3.000	(1)	-34.860	14.205	(1)	-34.860	14.205
	4.250	(1)	-21.963	6.431	(1)	-21.963	6.431
	4.250	(1)	-21.963	35.932	(1)	-21.963	35.932
	4.550	(1)	-11.464	34.066	(1)	-11.464	34.066
	4.900	(1)	0.078	31.889	(1)	0.078	31.889
*	5.150	(1)	7.656	30.334	(1)	7.856	30.334
*	5.150	(1)	8.373	-25.056	(1)	8.373	-25.056
	5.400	(1)	1.915	-26.611	(1)	1.915	-26.611
	5.500	(1)	-0.777	-27.233	(1)	-0.777	-27.233
	5.500	(1)	-0.777	3.110	(1)	-0.777	3.110
	6.000	(1)	0.000	0.000	(1)	0.000	0.000

PLATFORM (NORTH SIDE), C-2

C	L	------SHEARING MAXIMUM------- CASE	M	S	------SHEARING MINIMUM------- CASE	M	S
	0.000	(1)	0.000	0.000	(1)	0.000	0.000
	0.500	(1)	-0.777	-3.110	(1)	-0.777	-3.110
	0.500	(1)	-0.777	23.866	(1)	-0.777	23.866
	0.600	(1)	1.578	23.244	(1)	1.578	23.244
*	0.850	(1)	7.195	21.690	(1)	7.195	21.690
*	0.850	(1)	6.878	-28.900	(1)	6.878	-28.900
	1.100	(1)	-0.542	-30.455	(1)	-0.542	-30.455
	1.450	(1)	-11.582	-32.632	(1)	-11.582	-32.632
	1.750	(1)	-21.651	-34.498	(1)	-21.651	-34.498
	1.750	(1)	-21.651	-6.680	(1)	-21.651	-6.680
	3.000	(1)	-34.860	-14.454	(1)	-34.860	-14.454
	3.000	(1)	-34.860	14.205	(1)	-34.860	14.205
	4.250	(1)	-21.963	6.431	(1)	-21.963	6.431
	4.250	(1)	-21.963	35.932	(1)	-21.963	35.932
	4.550	(1)	-11.464	34.066	(1)	-11.464	34.066
	4.900	(1)	0.078	31.889	(1)	0.078	31.889
*	5.150	(1)	7.856	30.334	(1)	7.856	30.334
*	5.150	(1)	8.373	-25.056	(1)	8.373	-25.056
	5.400	(1)	1.915	-26.611	(1)	1.915	-26.611
	5.500	(1)	-0.777	-27.233	(1)	-0.777	-27.233
	5.500	(1)	-0.777	3.110	(1)	-0.777	3.110
	6.000	(1)	0.000	0.000	(1)	0.000	0.000

PLATFORM (NORTH SIDE) C-2

*** PICKUP - 2 *** (6, 6, 9)

C	L	--------MOMENT MAXIMUM-------- CASE	M	S	--------MOMENT MINIMUM-------- CASE	M	S
	0.000	(6)	0.000	0.000	(9)	0.000	0.000
	0.500	(6)	-0.418	-1.672	(6)	-0.777	-3.110
	0.500	(9)	2.373	4.230	(6)	-0.777	27.093
	0.600	(9)	2.775	3.815	(6)	1.901	26.471
*	0.850	(6)	6.324	24.917	(9)	3.539	2.779
*	0.850	(9)	19.768	-24.911	(6)	7.602	-37.140
	1.100	(9)	13.411	-25.948	(6)	-1.787	-37.976
	1.450	(9)	4.075	-27.399	(6)	-15.283	-39.146
	1.750	(9)	-4.331	-28.643	(6)	-27.268	-41.731
	1.750	(9)	-1.441	-15.937	(6)	-27.268	-9.560
	3.000	(9)	-24.602	-21.120	(6)	-44.076	-15.609
	3.000	(9)	-21.711	-2.013	(6)	-44.076	15.080
	4.250	(9)	-27.466	-7.196	(6)	-27.929	9.031
	4.250	(9)	-24.575	18.314	(6)	-27.929	45.138
	4.550	(6)	-14.667	43.273	(9)	-19.267	17.070
	4.900	(6)	0.097	41.096	(9)	-13.547	15.619
*	5.150	(6)	10.177	39.541	(9)	-9.772	14.582
*	5.150	(6)	11.080	-32.769	(9)	6.780	-28.388
	5.400	(6)	2.661	-32.619	(9)	-0.446	-29.424
	5.500	(6)	-0.416	-32.953	(9)	-3.409	-29.839
	5.500	(6)	-0.418	1.672	(6)	-0.777	3.110
	6.000	(6)	0.000	0.000	(9)	0.000	0.000

PLATFORM (NORTH SIDE) C-2

C	L	------SHEARING MAXIMUM------- CASE	M	S	------SHEARING MINIMUM------- CASE	M	S
	0.000	(6)	0.000	0.000	(6)	0.000	0.000
	0.500	(6)	-0.418	-1.672	(6)	-0.777	-3.110
	0.500	(6)	-0.777	27.093	(9)	2.373	4.230
	0.600	(6)	1.901	26.471	(9)	2.775	3.815
*	0.850	(6)	8.324	24.917	(9)	3.599	2.779
*	0.850	(9)	19.768	-24.911	(6)	7.602	-37.140
	1.100	(9)	13.411	-25.948	(6)	-1.787	-37.976
	1.450	(9)	4.075	-27.399	(6)	-15.028	-39.865
	1.750	(9)	-4.331	-28.643	(6)	-27.268	-41.731
	1.750	(6)	-27.268	-9.560	(9)	-1.441	-15.937
	3.000	(6)	-44.076	-15.609	(9)	-24.602	-21.120
	3.000	(6)	-44.076	16.805	(9)	-21.711	-2.013
	4.250	(6)	-27.839	10.900	(9)	-27.466	-7.196
	4.250	(6)	-27.929	45.138	(9)	-24.575	18.314
	4.550	(6)	-14.667	43.273	(9)	-19.267	17.070
	4.900	(6)	-0.233	41.383	(9)	-13.547	15.619
*	5.150	(6)	10.006	40.547	(9)	-9.772	14.582
*	5.150	(9)	6.780	-28.388	(6)	11.080	-32.789
	5.400	(9)	-0.446	-29.424	(6)	2.686	-34.344
	5.500	(9)	-3.409	-29.839	(6)	-0.777	-34.966
	5.500	(6)	-0.777	3.110	(6)	-0.416	1.672
	6.000	(6)	0.000	0.000	(6)	0.000	0.000

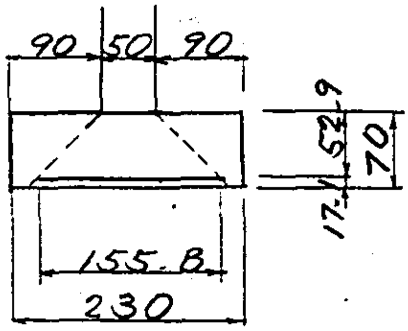
PLATFORM (NORTH SIDE), C-2

CASE	V MAX	V MIN	DELTA H
1	15.171	13.488	0.000
6	19.038	15.102	0.000
6	17.313	13.377	0.000
9	23.934	4.727	1.291

1) Stress calculation

a) End part

i) Bottom side



$M = 26.76^{tm}$

$A_s = D22 - 15^{cm}ctc$

$= 3.871 \times \frac{155.8}{15} = 40.21^{cm^2}$

$p = \frac{40.21}{155.8 \times 52.9}$

$= 0.00488$

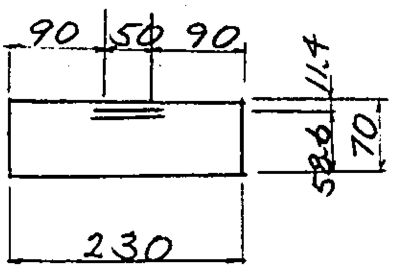
From the Nomogram M-1,

$1/L_c = 7.08 \quad 1/L_s = 230$

$\sigma_c = \frac{26.76 \times 10^5}{155.8 \times 52.9^2} \times 7.08 = 43.5^{kg/cm^2} < 90^{kg/cm^2}$

$\sigma_s = \quad " \quad \times 230 = 1410" < 1800"$

ii) Top side



$M = -71.85^{tm}$

$A_s = D32 < {7 \atop 3} = 79.42\ cm^2$

$p = \dfrac{79.42}{230 \times 58.6}$

$= 0.00589$

From the Nomogram M-1

$1/L_c = 6.61 \qquad 1/L_s = 191$

$\sigma_c = \dfrac{71.85 \times 10^5}{230 \times 58.6^2} \times 6.61 = 60.1\ kg/cm^2 < 90\ kg/cm^2$

$\sigma_s = \quad " \quad \times 191 = 1740\ " < 1800\ "$

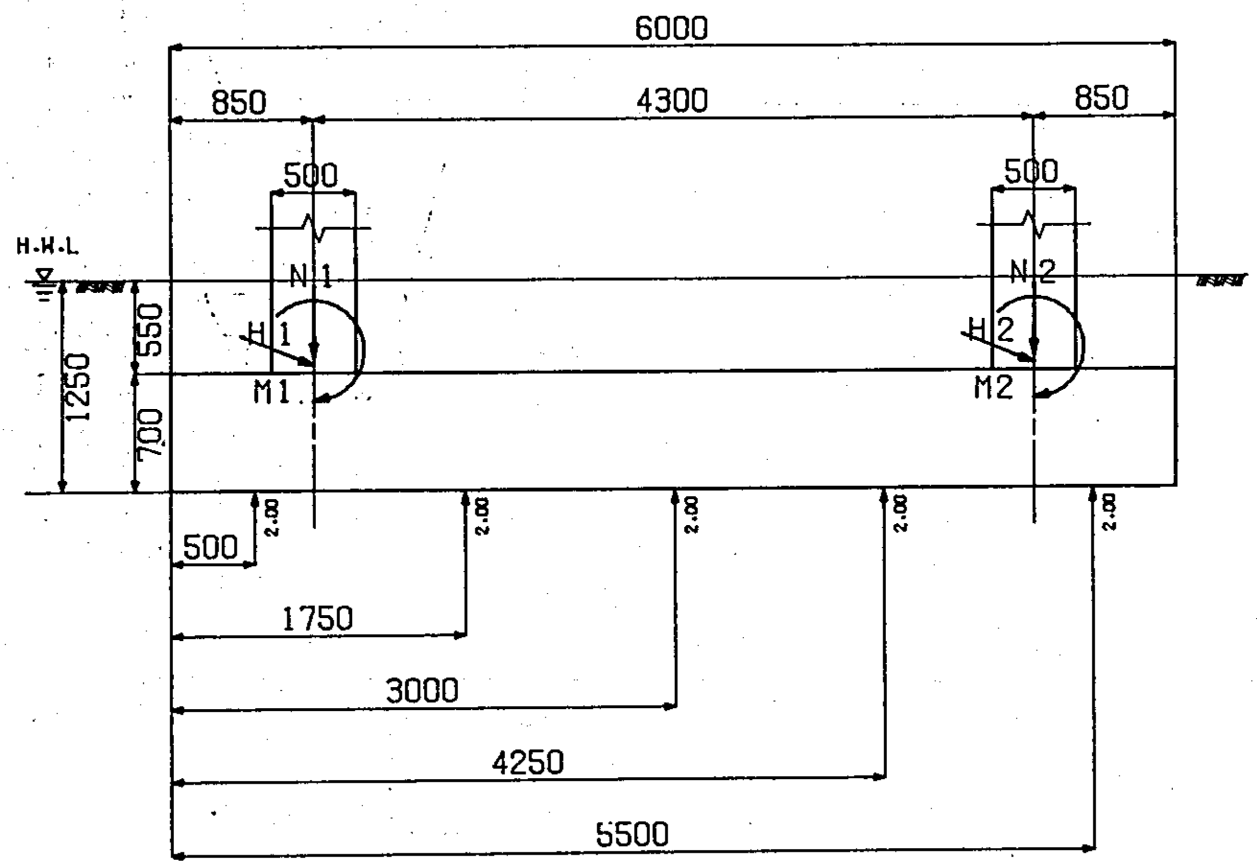
Check, safe against cracking

$M = -60.51^{tm}$

$\sigma_{sd} = \dfrac{60.51 \times 10^5}{230 \times 58.6^2} \times 191 = 1460\ kg/cm^2 < 1600\ kg/cm^2$

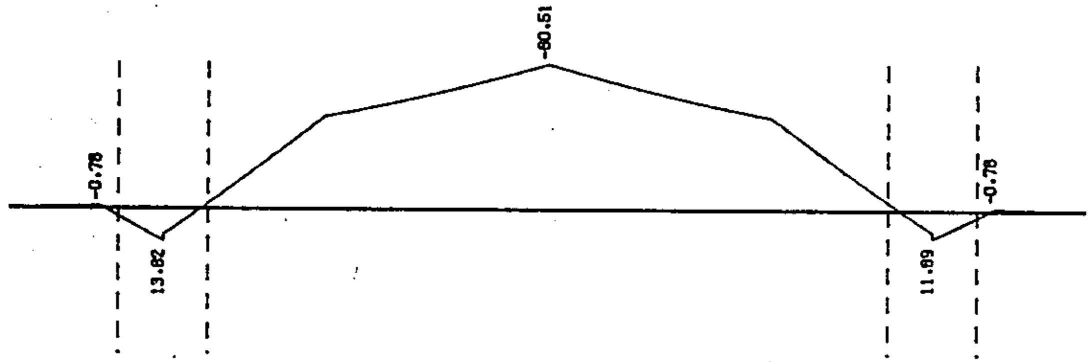
9. Stress diagram

PLATFORM (NORTH SIDE) C-1

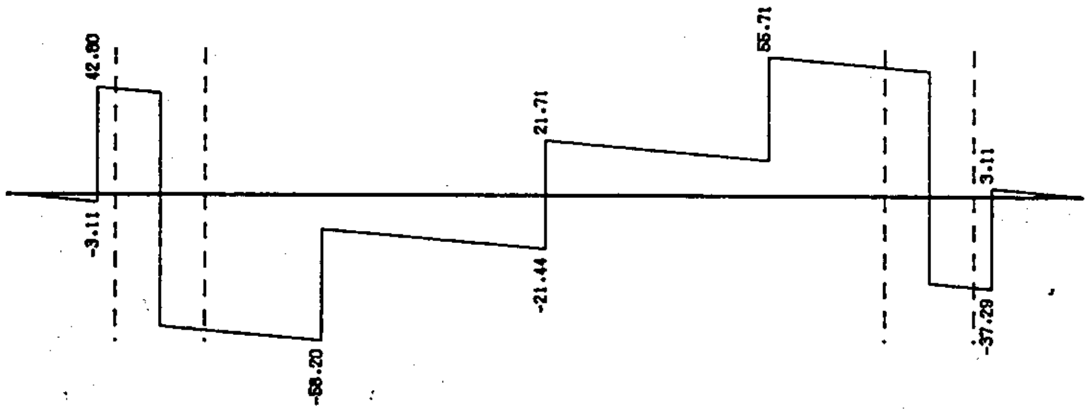


PLATFORM (NORTH SIDE) C-1 — CASE-1

BENDING MOMENT

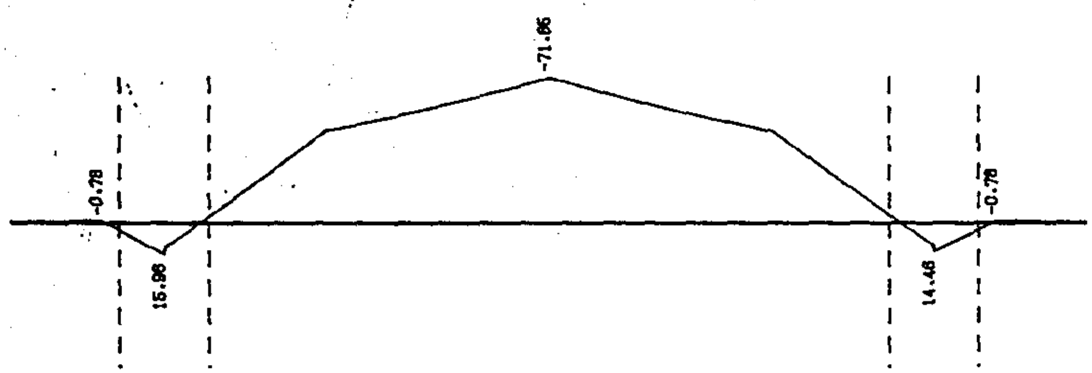


SHEARING FORCE

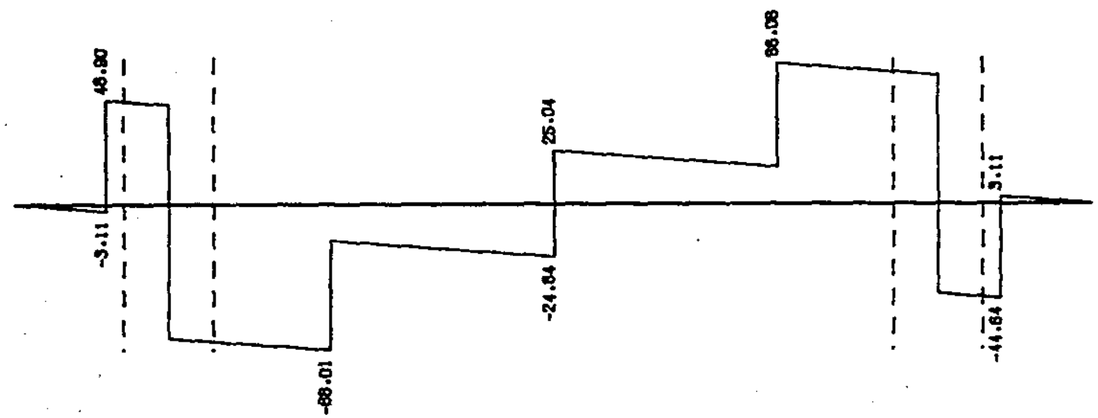


PLATFORM (NORTH SIDE) C-1 | CASE-6

BENDING MOMENT

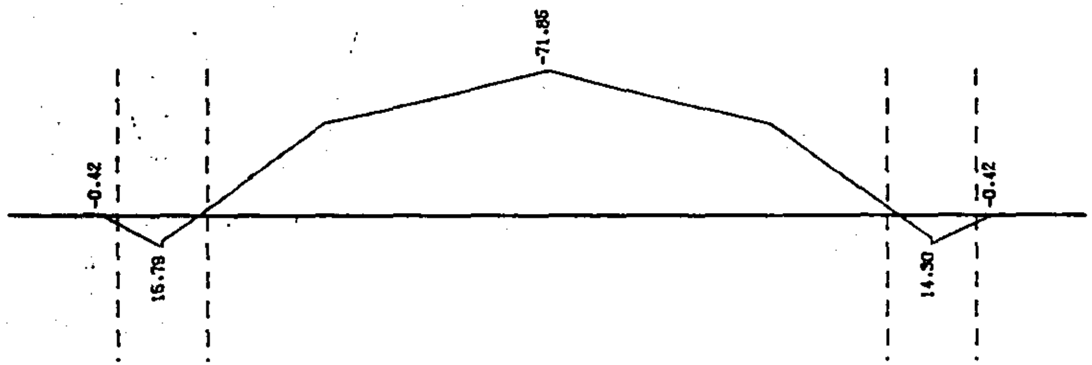


SHEARING FORCE

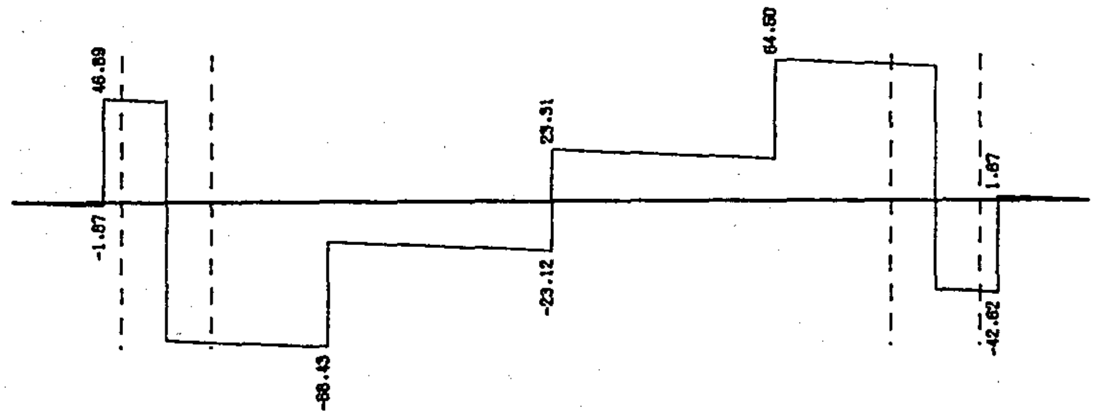


PLATFORM (NORTH SIDE) C-1 | CASE-6

BENDING MOMENT

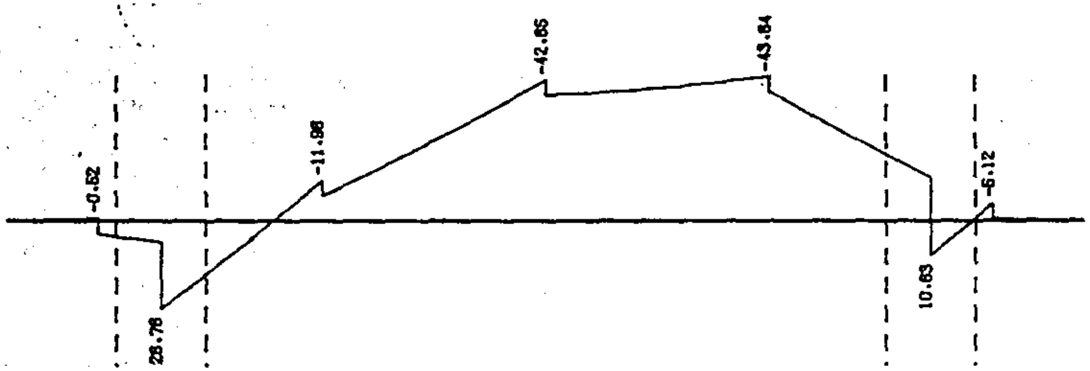


SHEARING FORCE

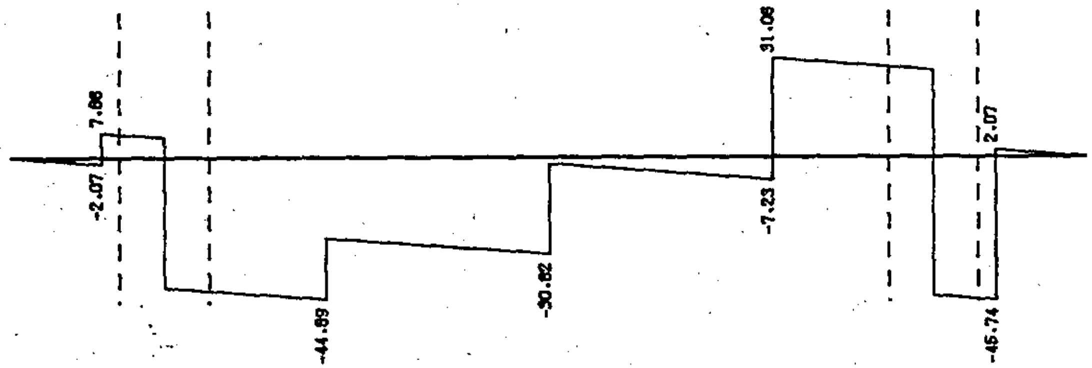


PLATFORM (NORTH SIDE) C-1 | CASE-9

BENDING MOMENT



SHEARING FORCE



INPUT DATA

```
===INPUT DATA CARD IMAGE===                                                                  CARD
---------1---------2---------3---------4---------5---------6---------7---------8            NUMBER
TITLE     PLATFORM (NORTH SIDE)  C-1                                                             1
CONST          2    5       6.0         0      0.55      1.25         0    0.028                 2
                  0.7         0         0       6.0         0       2.5                          3
                  0.7         0         0       2.3         0       1.8                          4
SWITCH         2    0    1    1    1    1    0    1    0    1    0                               5
COLC             0.85      5.15                                                                  6
COLB              0.5       0.5                                                                  7
COLH              0.5       0.5                                                                  8
KUI              22.0      0.35 0.0006213   3500000        91       195         0                9
KL                0.5      1.75       3.0      4.25       5.5                                   10
KN                  2         2         2         2         2                                   11
POINT     2      1.45      4.55                                                                 12
FORCE     1     -1.80      1.77                                                                 13
     1    1     -1.04      1.04                                                                 14
   1.0    1     93.22     85.23                                                                 15
FORCE     2     -2.08      2.08                                                                 16
     6    2     -1.21      1.21                                                                 17
   1.0    1    109.14    102.94                                                                 18
FORCE     3     -2.08      2.08                                                                 19
     6    2     -1.21      1.21                                                                 20
   1.0    0    109.14    102.94                                                                 21
FORCE     4     24.15     27.72                                                                 22
     9    3      8.89     10.99                                                                 23
   1.5    1     71.10    107.36                                                                 24
PICKUP    1    1    1                                                                           25
          2    2    4                                                                           26
FINISH                                                                                          27
```

```
PLATFORM (NORTH SIDE)  C-1

  1) INPUT

     *SWITCH

      A) KISO     =    2            G) FURYOKU =    0
      B) KH       =    0            H) E-ANTEI2=    1
      C) DELTA-M  =    1            I) SUPPORT =    0
      D) KANSAN   =    1            J) E-DANMEN=    1
      E) E-ANTEI1=     1            K) OUTPUT  =    0
      F) PLOT     =    1

      HASHIRA   =         2 (HON)   KUI       =         5 (HON)

      HASHIRA                       DOSYA
        TAKASA=      0.000 ( M )      TAKASA=      0.550 ( M )

      KOU-SUII  =    1.250 ( M )    TEI-SUII  =    0.000 ( M )

      SUIHEI                        TANIJYURYO
        SHINDO  =    0.028            (CONC)  =    2.500 (T/M**3)
                                    TANIJYURYO
      ZENCHO    =    6.000 ( M )      (TSUCHI)=    1.800 (T/M**3)

     *KISO

      FH1       =    0.700 ( M )    BFH1      =    0.700 ( M )
      FH2       =    0.000 ( M )    BFH2      =    0.000 ( M )
      SR1       =    0.000 ( M )    BSR1      =    0.000 ( M )
      SR2       =    6.000 ( M )    BSR2      =    2.300 ( M )
      SP3       =    0.000 ( M )    BSR3      =    0.000 ( M )

     *HASHIRA

      HASHIRA        HASHIRA        HASHIRA
       CHUSHIN          HABA         OKUYUKI

          0.650          0.500          0.500
          5.150          0.500          0.500
```

PLATFORM (NORTH SIDE) C-1

*KUI

```
KUICHO   =    22.000 ( M )    KUIKEI    =      0.350 ( M )
I        =   0.000621 (M**4)  E         = 0.350E+07 (T/M**2)
                              KUITOU
KH1      =    91.000 (T/M**3)  HENIRYOU=       0.000 ( M )
KH2      =   195.000 (T/M**3)
```

KUI CHUSHIN	KUI HONSU
0.500	2.000
1.750	2.000
3.000	2.000
4.250	2.000
5.500	2.000

2) LOAD

*CONCRETE

W = 24.15 (T)   H = 0.68 (T)   Y = 0.350 (M)

*DOSHA

W = 13.37 (T)   H = 0.37 (T)   Y = 0.975 (M)

*FURYOKU

W1= 17.25 (T)
W2= 0.00 (T)

PICK UP

PLATFORM (NORTH SIDE) C-1

*** PICKUP - 1 *** (1)

C	L	--------MOMENT MAXIMUM------- CASE	M	S	--------MOMENT MINIMUM------- CASE	M	S
	0.000	(1)	0.000	0.000	(1)	0.000	0.000
	0.500	(1)	-0.777	-3.110	(1)	-0.777	-3.110
	0.500	(1)	-0.777	42.797	(1)	-0.777	42.797
	0.600	(1)	3.471	42.175	(1)	3.471	42.175
*	0.850	(1)	13.821	40.620	(1)	13.821	40.620
*	0.850	(1)	11.293	-52.600	(1)	11.293	-52.600
	1.100	(1)	-2.052	-54.155	(1)	-2.052	-54.155
	1.450	(1)	-21.387	-56.332	(1)	-21.387	-56.332
	1.750	(1)	-36.566	-58.197	(1)	-38.566	-58.197
	1.750	(1)	-36.566	-13.667	(1)	-38.566	-13.667
	3.000	(1)	-60.509	-21.442	(1)	-60.509	-21.442
	3.000	(1)	-60.509	21.712	(1)	-60.509	21.712
	4.250	(1)	-36.229	13.937	(1)	-38.229	13.937
	4.250	(1)	-36.229	55.714	(1)	-38.229	55.714
	4.550	(1)	-21.794	53.646	(1)	-21.794	53.648
	4.900	(1)	-3.326	51.671	(1)	-3.328	51.671
*	5.150	(1)	9.395	50.117	(1)	9.395	50.117
*	5.150	(1)	11.893	-35.113	(1)	11.693	-35.113
	5.400	(1)	2.920	-36.668	(1)	2.920	-36.668
	5.500	(1)	-0.777	-37.290	(1)	-0.777	-37.290
	5.500	(1)	-0.777	3.110	(1)	-0.777	3.110
	6.000	(1)	0.000	0.000	(1)	0.000	0.000

PLATFORM (NORTH SIDE) C-1

C	L	CASE	SHEARING MAXIMUM M	SHEARING MAXIMUM S	CASE	SHEARING MINIMUM M	SHEARING MINIMUM S
	0.000	(1)	0.000	0.000	(1)	0.000	0.000
	0.500	(1)	-0.777	-3.110	(1)	-0.777	-3.110
	0.500	(1)	-0.777	42.797	(1)	-0.777	42.797
	0.600	(1)	3.471	42.175	(1)	3.471	42.175
*	0.850	(1)	13.821	40.620	(1)	13.821	40.620
*	0.850	(1)	11.293	-52.600	(1)	11.293	-52.600
	1.100	(1)	-2.052	-54.155	(1)	-2.052	-54.155
	1.450	(1)	-21.367	-56.332	(1)	-21.387	-56.332
	1.750	(1)	-38.566	-58.197	(1)	-38.566	-58.197
	1.750	(1)	-38.566	-13.667	(1)	-38.566	-13.667
	3.000	(1)	-60.509	-21.442	(1)	-60.509	-21.442
	3.000	(1)	-60.509	21.712	(1)	-60.509	21.712
	4.250	(1)	-38.229	13.937	(1)	-38.229	13.937
	4.250	(1)	-38.229	55.714	(1)	-38.229	55.714
	4.550	(1)	-21.794	53.848	(1)	-21.794	53.848
	4.900	(1)	-3.328	51.671	(1)	-3.326	51.671
*	5.150	(1)	9.395	50.117	(1)	9.395	50.117
*	5.150	(1)	11.893	-35.113	(1)	11.893	-35.113
	5.400	(1)	2.920	-36.666	(1)	2.920	-36.668
	5.500	(1)	-0.777	-37.290	(1)	-0.777	-37.290
	5.500	(1)	-0.777	3.110	(1)	-0.777	3.110
	6.000	(1)	0.000	0.000	(1)	0.000	0.000

PLATFORM (NORTH SIDE) C-1

*** PICKUP - 2 *** (6, 6, 9)

C	L	CASE	MOMENT MAXIMUM M	MOMENT MAXIMUM S	CASE	MOMENT MINIMUM M	MOMENT MINIMUM S
	0.000	(6)	0.000	0.000	(9)	0.000	0.000
	0.500	(6)	-0.418	-1.672	(6)	-0.777	-3.110
	0.500	(9)	4.064	7.658	(6)	-0.777	48.902
	0.600	(9)	4.829	7.243	(6)	4.082	48.260
*	0.850	(6)	15.957	46.726	(9)	6.510	6.287
*	0.850	(9)	26.759	-41.157	(6)	12.862	-63.421
	1.100	(9)	16.340	-42.193	(6)	-3.098	-64.257
	1.450	(9)	1.319	-43.644	(6)	-25.793	-65.427
	1.750	(9)	-11.961	-44.888	(6)	-45.661	-68.012
	1.750	(9)	-7.359	-25.638	(6)	-45.661	-17.066
	3.000	(9)	-42.645	-30.820	(6)	-71.853	-23.115
	3.000	(9)	-38.043	-2.050	(6)	-71.853	23.314
	4.250	(9)	-43.845	-7.233	(6)	-45.413	17.265
	4.250	(9)	-39.243	31.057	(6)	-45.413	66.078
	4.550	(6)	-25.870	64.212	(9)	-30.112	29.813
	4.900	(6)	-3.777	62.035	(9)	-19.932	28.362
*	5.150	(6)	11.536	60.480	(9)	-12.971	27.325
*	5.150	(6)	14.465	-42.460	(9)	10.633	-44.285
	5.400	(6)	3.628	-42.290	(9)	-0.568	-45.322
	5.500	(6)	-0.418	-42.624	(9)	-5.121	-45.736
	5.500	(6)	-0.418	1.672	(6)	-0.777	3.110
	6.000	(9)	0.000	0.000	(6)	0.000	0.000

PLATFORM (NORTH SIDE) C-1

C	L	------SHEARING MAXIMUM------- CASE	M	S	------SHEARING MINIMUM------- CASE	M	S
	0.000	(6)	0.000	0.000	(6)	0.000	0.000
	0.500	(6)	-0.416	-1.672	(6)	-0.777	-3.110
	0.500	(6)	-0.777	48.902	(9)	4.084	7.658
	0.600	(6)	4.082	48.260	(9)	4.829	7.243
*	0.850	(6)	15.957	46.726	(9)	5.510	6.207
*	0.650	(9)	26.759	-41.157	(6)	12.862	-63.421
	1.100	(9)	16.340	-42.193	(6)	-3.098	-64.257
	1.450	(9)	1.319	-43.644	(6)	-25.538	-66.146
	1.750	(9)	-11.961	-44.888	(6)	-45.661	-68.012
	1.750	(6)	-45.661	-17.066	(9)	-7.359	-25.638
	3.000	(6)	-71.853	-23.115	(9)	-42.645	-30.820
	3.000	(6)	-71.853	25.039	(9)	-38.043	-2.050
	4.250	(6)	-45.324	19.133	(9)	-43.645	-7.233
	4.250	(6)	-45.413	66.078	(9)	-39.243	31.057
	4.550	(6)	-25.870	64.212	(9)	-30.112	29.813
	4.900	(6)	-4.107	62.322	(9)	-19.932	28.362
*	5.150	(6)	11.369	61.486	(9)	-12.971	27.325
*	5.150	(6)	14.296	-41.454	(9)	10.633	-44.285
	5.400	(6)	3.828	-42.290	(9)	-0.568	-45.322
	5.500	(6)	-0.416	-42.624	(9)	-5.121	-45.736
	5.500	(6)	-0.777	3.110	(6)	-0.416	1.672
	6.000	(6)	0.000	0.000	(6)	0.000	0.000

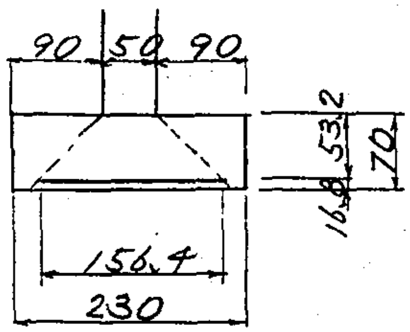
PLATFORM (NOPTH SIDE) C-1

CASE	V MAX	V MIN	DELTA H
1	22.953	20.200	0.000
6	26.006	23.873	0.000
6	24.281	22.148	0.000
9	35.857	7.298	2.055

1) Intermediate part

i) Bottom side

$M = 19.77^{tm}$



$A_s = \phi 19 - 15^{cm}\ ctc$

$= 2.865 \times \frac{156.4}{15} = 29.87^{cm^2}$

$p = \frac{29.87}{156.4 \times 53.2}$

$= 0.00359$

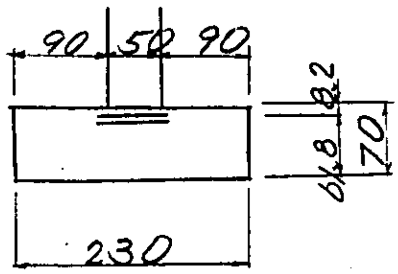
From the Nomogram M-1,

$1/L_c = 7.91 \qquad 1/L_s = 307$

$\sigma_c = \frac{19.77 \times 10^5}{156.4 \times 53.2^2} \times 7.91 = 35.3^{kg/cm^2} < 90^{kg/cm^2}$

$\sigma_s = \quad " \quad \times 307 = 1370\ " < 1800\ "$

ii) Tep side



$M = -44.08^{tm}$

$A_s = D32 - 7 = 55.59^{cm^2}$

$p = \frac{55.59}{230 \times 61.8}$

$= 0.00391$

From ehe Nomogram M-1

$1/L_c = 7.65 \qquad 1/L_s = 284$

$\sigma_c = \frac{44.08 \times 10^5}{230 \times 61.8^2} \times 7.65 = 38.4^{kg/cm^2} < 90^{kg/cm^2}$

$\sigma_s = \quad " \quad \times 284 = 1430'' < 1800''$

Check, safe against cracking

$M = -34.86$

$\sigma_{sd} = \frac{-34.86 \times 10^5}{230 \times 61.8^2} \times 284 = 1130^{kg/cm^2} < 1600^{kg/cm^2}$

2) Shearing stress h/2 point from column front

$S_{1.45} = 66.15^{t}$ (case 6)

$r = \frac{2 \times 52.9}{65} = 1.628 < 4$

$P = 25.47 \times 2 = 50.94^{t}$

$P' = \frac{50.94}{1.628} = 31.29^{t}$

$\therefore S' = 66.15 - (50.94 - 31.29) = 46.50^{t}$

$\tau = \frac{4650 \times 10^{3}}{230 \times 52.9} = 3.82\ kg/cm^2 < 3.9\ kg/cm^2$

§9. Calculation of shoes and beam supporting parts

(1) Calculation of shoes

1. Load Calculation

(1) Dead load

Refer Reaction of stairway A

$R = 63.80^t$

Reaction per one sho

$R_d = 63.80 \times 1/4 = 15.95^t$

(2) pedestrian load

$R = 10.48^t$

Reaction per one sho

$R_p = 10.48 \times 1/4 = 2.62^t$

(3) Dead load + pedestrian load

$\Sigma R = 15.95 + 2.62 = 18.57^t$

2. Calculation of rubber shoes

(1) Required ares for supporting load

$$15 \leqq \frac{R}{A} \leqq 80$$

$R_{max} = 15.95^{t}$ $\quad R_{min} = 18.95^{t}$

Hence,

$$\frac{R_{max}}{80} \leqq A \ \frac{R_{min}}{15}$$

$$\frac{R_{max}}{80} = \frac{18.57 \times 10^3}{80} = 232 \ cm^2$$

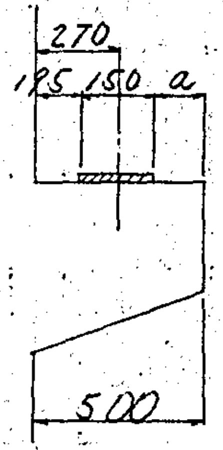
$$\frac{R_{min}}{15} = \frac{15.95 \times 10^3}{15} = 1063 \ cm^2$$

Assumed the size of rubber shoe as

$20^{cm} \times 15^{cm}$

$A = 20 \times 15 = 300 \ cm^2$

Width of beam supporting part



$a \geqq 150$ (ℓ = 10m or less)

$B = 195 + 150 + \overset{a}{150}$

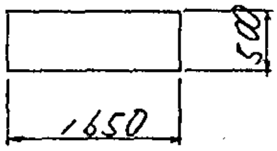
$= 495^{mm}$

$\therefore$ Say, $B = 500^{m}$

(2) Relative displacement between beam and Substructure

(a) Displacement of Beam coused by the defletion of Beam : Δld

i) Calculation of Beam deflection



$$I = \frac{1}{12} \times 1.65 \times 0.50^3 = 0.01719\ m^4$$

· Magnitude of vertical deflection at the beam center point

$$E = 2.7 \times 10^6\ t/m^2$$

$$I = 0.01719\ m^4$$

(1) Deflection caused by dead load

Uniformly distributed load (from reacting calculation of T section simple beam)

$$Rd \fallingdotseq 63.80^t$$

$$Wd = 63.80 \times 1/2 \times 1/9.98 = 3.20\ t/m$$

$$\delta b = \frac{5wl^4}{384EI} = \frac{5 \times 3.20 \times 9.48^4}{384 \times 2.7 \times 10^6 \times 0.01719}$$

$$= 0.00725^m$$

ロ) Deflection caused by pedestrian load

$R = 10.48^t$

$w = 10.48 \times 1/2 \times 1/9.98$

$= 0.53\ ^t/_m$

$$\delta e = \frac{5wl^4}{384EI} = \frac{5 \times 3.2 \times 9.48^4}{384 \times 2.7 \times 10^6 \times 0.01719}$$

$$= 0.00120^m$$

ii) Displacement of beam caused by bending deflection : $\Delta l\alpha$

(イ) Dead load

$\Delta l\alpha = h \cdot \alpha$ (Semi - fixed)

h = Distance from beam bottom to neutral axis

$h = 0.50 \times 1/2 = 0.25^m$

α = Deflection angle of beam at the support point (Radian)

$\delta = 0.00725^m$ (from calculation of T section simple beam)

$l = 9.48^m$ (span)

$\alpha = 3.2 \times \frac{\delta}{l}$

$= \frac{3.2 \times 0.00725}{9.48} = 0.0024$

$\Delta l\alpha = 25.0 \times 0.0024 = 0.06^m$

(ロ) pedestrian load

$\delta = 0.00120^m$

$\alpha = \frac{3.2 \times 0.00120}{9.48} = 0.0004$

$\Delta l = 25.0 \times 0.0004 = 0.01^m$

(b) Displacement of beam caused by temperature change : Δlt

$\Delta lt = \Delta t \cdot \alpha \cdot l$

Δt : Temperature change $\pm 20°C$

α : Coefficient of linear expansion of beam $1 \times 10^{-5}/°C$

l : span $l = 9.48 \times 1/2 = 4.74^m$

Hence

$\Delta lt = \pm 20 \times 10^{-5} \times 4.74 \pm 0.0009 = \pm 0.009^m$

(c) Displacement of beam caused by drying contraction : Δl_s

$\Delta l_s = \varepsilon_{cs} \cdot l$

ε_{cs} : Ratio of drying contraction of Concrete

20×10^{-5}

Hence

$\Delta l_s = 20 \times 10^{-5} \times 4.74 = 0.0009^{m} = 0.09^{cm}$

(d) Displacement in horizontal direction in case of earthquake

· Displacement caused by horizontal force in case of earthquake

$$\Delta e_1 = \frac{H \cdot t}{G \cdot A_c} = \frac{1.91 \times 10^3 \times 0.8}{8.0 \times 450} = 0.42^{cm}$$

Relative displacement between beam and substructure

$\Delta e_2 = 0.5^{cm}$

(e) Required thickness

1) Normal case

$\Delta m = \Delta l_\alpha + \Delta l_t + \Delta l_s + \Delta l_c$

$= 0.06 - 0.09 - 0.09 = -0.12^{cm}$

$$\Sigma te_1 = \frac{\Delta m}{0.7} = \frac{0.12}{0.7} = 0.17^{cm}$$

ロ) Temporary case

$$\Delta m' = \Delta m + \Delta l_{xe} = -0.12 + 0.01 = -0.11^{cm}$$

$$\Sigma te_2 = \frac{\Delta m'}{0.7} = \frac{0.11}{0.7} = 0.16^{cm}$$

ハ) Earthquake case

$$\Delta E = \Delta l_\alpha + \Delta l_t + \Delta l_s + (\Delta e_1 + \Delta e_2)$$

$$= 0.06 - 0.09 - 0.09 - (0.42 + 0.5) = -1.04^{cm}$$

$$Ete_3 = \frac{\Delta E}{2.0} = \frac{1.04}{2.0} = 0.52^{cm}$$

Therefore, use $Te = 8^{mm}$ of one layer.

(3) Restricted tortional strain corresponding to deflection angle at the support point

(a) $\Sigma \Delta te > \frac{a}{2} \tan\alpha$

$\Sigma \Delta te$: Average deformation of rubber shoe in vertical direction (cm)

a : Side length of rubber shoe in direction of bridge axis (cm)

α : Angle between beam bottom face and support point

$$\Delta te = Ct \cdot \frac{f}{G} \cdot \frac{te^3}{a_0^2}$$

Ct : Factor determined by the ratio of both side lengths (Refer explanation chart 174-1)

$$\frac{b_0}{a_0} = \frac{20}{15} = 1.33 \text{ then. } Ct = 1.85$$

f : Bearing stress of rubber shoe in vertical direction (kg/cm²)

(Dead load) $fd = \frac{Rd}{A} = \frac{15.95 \times 10^3}{15 \times 20} = 53.17$ kg/cm²

pedestrian load) $fp = \frac{Rp}{A} = \frac{2.62 \times 10^3}{15 \times 20} = 8.73$ "

G : Elastic modulus of rubber shoe in terms of shear (kg/cm^2)

subjected dead load $G = 6.2\ kg/cm^2$

subjected pedestrian load $G = 8.0\ kg/cm^2$

te : Thickness rubber shoe, one layer te = 12^{mm}

$$\Delta ted = 1.85 \times \frac{53.17}{6.2} \times \frac{0.8^3}{15^2} = 0.036^{cm}$$

$$\Delta tep = 1.85 \times \frac{8.73}{8.0} \times \frac{0.8^3}{15^2} = 0.005 \text{ "}$$

Hence $\Delta te = 0.036 + 0.005 = 0.041^{cm}$

$$\alpha = 0.0024 + 0.0004 = 0.00244$$

Hence $\dfrac{a \cdot \tan\alpha}{2} = \dfrac{15 \times 0.00244}{2} = 0.018^{cm}$

$< \Sigma\Delta te = 0.041^{cm}$

(b) Maximum deformation in vertical direction : $\Sigma\Delta te\ max$

$$\Sigma\Delta te\,max = \Sigma\Delta te + a.\tan\alpha/2$$

$$= 0.041 + 0.018 = 0.059^{cm}$$

$$0.15 \cdot \Sigma te = 0.15 \times 0.8 = 0.12^{cm} > \Sigma\Delta te\ max$$

(4) Safety analysis in terms of buckling when subjected vertical load

$a, b \geq 5 \cdot \Sigma te$

$a = 15^{cm}, \ b = 20^{cm} > 5 \times 0.8 = 4.0^{cm}$

Analyzes as above, dimensions of rubber shoe are determined as follows.

Bridge axis direction $a = 15^{cm}$

Cross sectional direction $b = 20^{cm}$

Thickness of the layer

$t = 0.8^{cm}$ Use one layer.

Gross thickness 1.0^{cm} (Including stainless steel cover plates)

(2) Calculation of stopper made of steel rod

1. Horizontal seismic load applied for the stopper design

$$Ksh = \Delta 4 \cdot Kh$$

$\Delta 4$: Extra factor

In direction of bridge axis $\Delta 4 = 1.2$

In direction of cross section $\Delta 4 = 1.4$

Kh : Horizontal seismic load for design $Kh = 0.22$

Horizontal seismic load applied for the stopper design will be,

Bridge axis $Ksh = 1.2 \times 0.10 = 0.12$

Cross section $Ksh = 1.4 \times 0.10 = 0.14$

2. Horizontal force acting the stopper

(1) Bridge axis

one unit stopper per one main girder is equipped, with semi-rigid construction

(a) Seismic force due to dead weight

$$Hsd = Ksh \cdot Rd$$

$$= 0.12 \times 15.95 = 1.91^{t}$$

(2) Cross sectional direction

(a) Seismic load due to dead weight

$$Hsd = 0.14 \times 15.95 = 2.23^{t}$$

Analysed as above, horizontal force calculation is made based on the case in cross sectional direction.

3. Stress calculation of the stopper made of steel rod

(1) Shearing stress

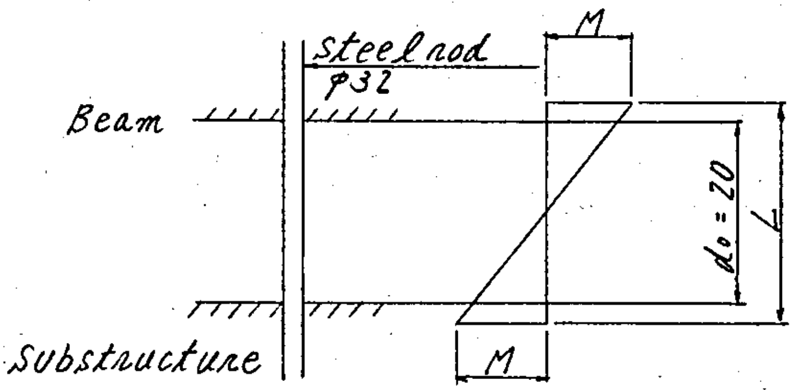
steel rod $\phi = 32^{mm}$ (SS41) $AS = 8.04\ cm^2$

$$H = 2.23^{t}$$

$$\tau = \frac{H}{AS}$$

$$= \frac{2.23 \times 10^3}{8.04} = 280\ kg/cm^2 < 850 \times 1.5 = 1275\ kg/cm^2$$

(2) Bending stress



$$L = d_0 + \tfrac{1}{2} \cdot \phi = 20 + 32 \times \tfrac{1}{2} = 36^{mm}$$

$$H = 2.23^{t}$$

$$M = \frac{1}{2} \cdot H \cdot L$$

$$= \frac{1}{2} \times 2.23 \times 0.036 = 0.04^{tm}$$

Section modulus $Z = \dfrac{\pi \cdot \phi^3}{32} = 0.098 \cdot \phi^3$

$$\sigma_s = \frac{M}{Z}$$

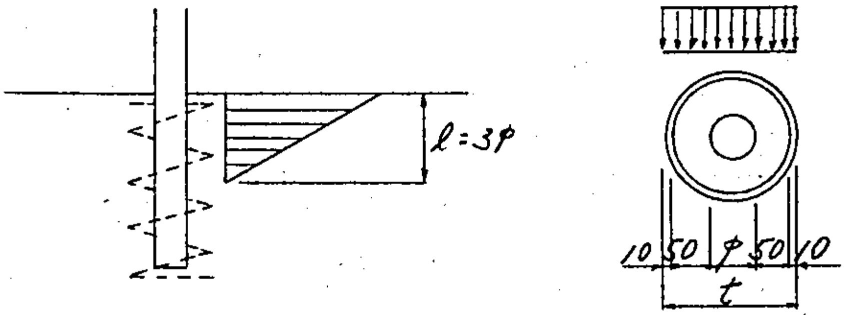
$$= \frac{0.04 \times 10^5}{0.098 \times 3.6^3} = 875 \ kg/cm^2 < 1500 \times 1.5$$
$$= 2250 \ kg/cm^2$$

(3) Combined stress

$$\sqrt{\left(\frac{\sigma_s}{\sigma_{sa}}\right)^2 + \left(\frac{\tau}{\tau_a}\right)^2} = \sqrt{\left(\frac{875}{2250}\right)^2 + \left(\frac{280}{1275}\right)^2}$$

$$= 0.45 < 1.1$$

4. Calculation of bearing stress of concrete



$$\sigma_c = \frac{2 \cdot H}{l t}$$

$H = 2.23^{t}$

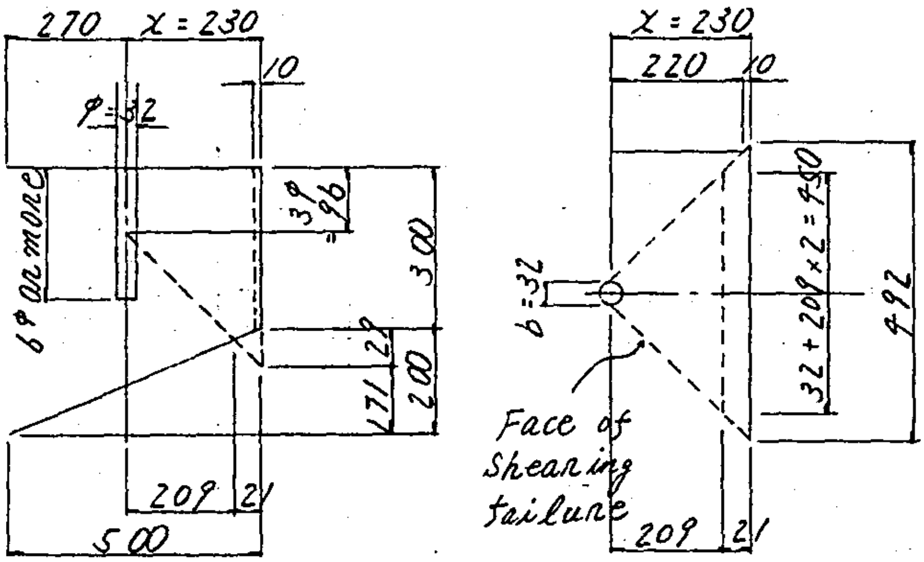
$l = 3 \cdot \phi = 3 \times 3.2 = 9.6^{cm}$

$t = 3.2 + (5.0 + 1.0) \times 2 = 15.2^{cm}$

$$\sigma_c = \frac{2 \times 2.23 \times 10^3}{9.6 \times 15.2} = 30.6\ ^{kg}/_{cm^2} < \sigma_{ca} = 240 \times 0.8 = 192\ ^{kg}/_{cm^2}$$

(3) Calculation of related part of the stopper installation

1. Shearing stress calculation



Shearing stress

$$\tau = \frac{H}{A\tau}$$

$$A\tau = \sqrt{2}\, x\, (2x + 2a + b)$$

τ : Shearing stress

$A\tau$: Ares of the face of shearing failure

$$A\tau = \sqrt{2} \times 23.0 \times (2 \times 23.0 + 2 \times 9.6 + 3.2)$$

$$- (49.2 + 45.0) \times 1/2 \times \sqrt{2} \times 2$$

$$= 2076 \text{ cm}^2$$

$H = 2.23^{t}$ (In direction of railway profile)

$$\tau = \frac{2.23 \times 10^3}{2076} = 1.07 \text{ kg/cm}^2 < 3.9 \text{ kg/cm}^2$$

2. Reinforcing bar arrangement around the part of stopper installation

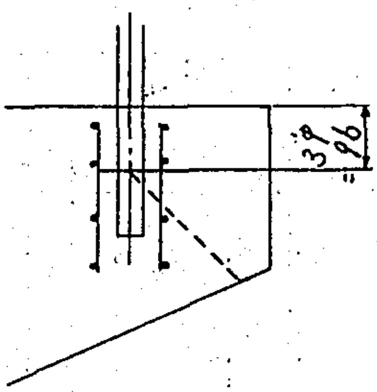
$$As' = \frac{H}{\sigma sa}$$

$$= \frac{2.23 \times 10^3}{1800 \times 1.5} = 0.83 \text{ cm}^2$$

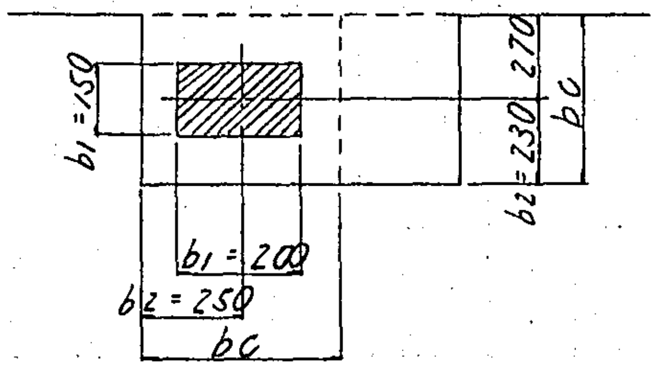
$As = D13 - 2 = 2.53 \text{ cm}^2 > As' = 0.83 \text{ cm}^2$

Therefore,

D13 - 3 bars are arranged within the range of 3ϕ



(4) Calculation of shoe bed part subjected vertical load



1. Reinforcing bar arrangement for vertical load

$$As = \frac{1}{4}\left(1 - \frac{b_1}{bc}\right)\frac{R}{\sigma sa}$$

Where,

As : Sectional area of bars (cm²)

σsa : Allowable tensile stress of bar (kg/cm²)

σsa = 1 800 kg/cm² (SD30)

R : Vertical force acting on shoe bed (kg)

R = 15.95 + 2.62 = 18.57 kg/cm²

b_1 : Acting width of bearing force (cm)

bc : Distributing width of bearing power (cm)

$bc = 2 \cdot b_2$

(1) In direction of bridge axis

$b_1 = 15.0^{cm} \qquad b_2 = 23.0^{cm}$

$b_c = 2 \cdot b_2 = 2 \times 23.0 = 46.0^{cm}$

$$As = \frac{1}{4} \times \left(1 - \frac{15.0}{46.0}\right) \times \frac{18.57 \times 10^3}{1800} = 1.74^{cm^2}$$

(2) In direction of bridge cross section

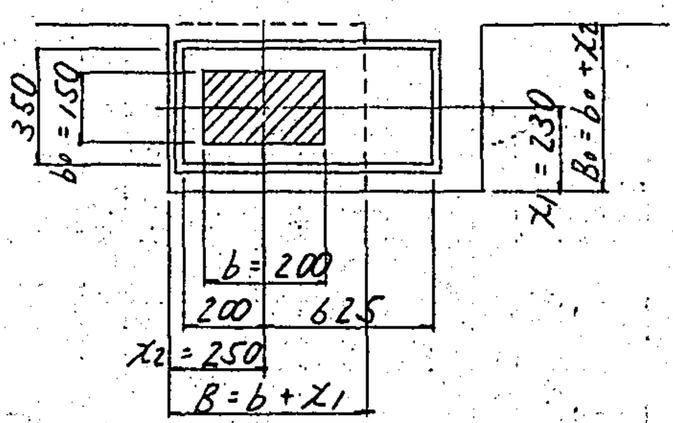
$b_1 = 20.0^{cm} \qquad b_2 = 25.0^{cm}$

$b_c = 2 \cdot b_2 = 2 \times 25.0 = 50.0^{cm}$

$$As = \frac{1}{4} \times \left(1 - \frac{20.0}{50.0}\right) \times \frac{18.57 \times 10^3}{1800} = 1.55^{cm^2}$$

2. Bar arrangement

Range of bar arrangement



B. B_0 : Range of bar arrangement

(1) In direction of bridge axis

$B' = b + x_1$

$= 20.0 + 23.0 = 43.0^{cm} < 2 \times 23.0 = 46.0^{cm}$

Therefore, the range of bar arrangement will be,

$B = 23.0 + \frac{43.0}{2} = 44.5^{cm}$

Use D13 – 150 ctc (n = 3 bars then)

$As = 1.267 \times 3 = 3.80^{cm^2} > 1.74^{cm^2}$

(2) In direction of bridge cross section

$B_0' = b_0 + x_2$

$= 15.0 + 25.0 = 40.0^{cm} > 35.0^{cm}$

Therefore, the range of bar arrangement will be,

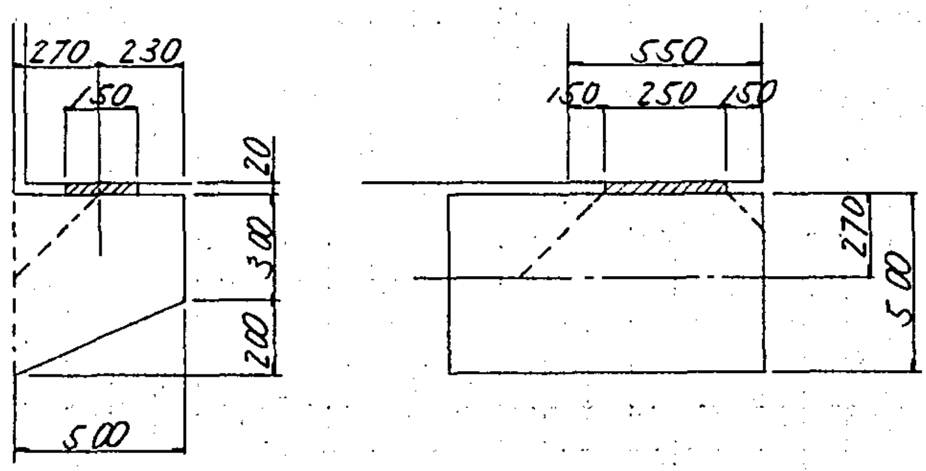
$B_0 = 35.0^{cm}$

Use D13 - 150 ctc (n = 3 bars then)

$As = 1.267 \times 3 = 3.80^{cm^2} > 1.55^{cm^2}$

(5) Calculation of beam supporting part

1. Bending stress calculation



Effective width

$B = 0.25 + 0.15 + 0.27 = 0.67^{m}$

(1) Load calculation

(a) Reaction of T section simple beam

Referred the summary table of shoe calculation and beam reaction,

$Rd = 15.95^{t}$

$Rp = 2.62$ "

(b) Own weight of beam support part

$w_1 = 2.5\,t/m^3 \times 0.50 \times 0.30 = 0.38\,t/m$

$w_2 = 2.5$ " $\times 0.50 \times 0.20 \times 1/2 = 0.13$ "

$wd = 0.51\,t/m$

(2) Bending moment calculation

Stress per $B = 1.00^{m}$ of effective width

(a) Dead load

$$Md = 15.95 \times 0.27 + 0.38 \times 0.72 \times 0.50 \times 1/2$$
$$+ 0.13 \times 0.72 \times 0.50 \times 1/3$$
$$= 4.39^{tm}$$

(b) pedestrian load

$$Mp = 2.62 \times 0.27 = 0.71^{tm}$$

(c) Dead load + pedestrian load

$$\Sigma M = 4.39 + 0.71 = 5.10^{tm}$$

(3) Allowable stress, safe against cracking

$$Md = 4.39^{\,tm}$$

$$Mp = 0.71 \;"$$

$$\Sigma M = 5.10^{\,tm}$$

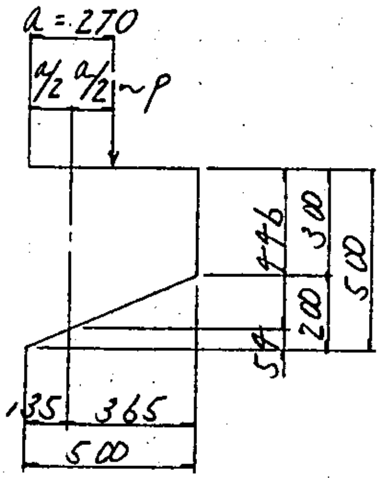
$$\alpha = \frac{Mp}{\Sigma M} = \frac{0.71}{5.10} = 0.14 < 0.25$$

Hence, determined,

$$\sigma_{sa} = 1200 \ kg/cm^2$$

	D	D + P
M (tm)	4.39	5.10
N (t)		
S (t)		
b (cm)	67	67
h (cm)	50	50
d (cm)	44.7	44.7
d' (cm)	5.3	5.3
As (cm²)	D19-150ctc (5) = 14.33	D19-150ctc (5) = 14.33
p	0.00478	0.00478
As' (cm²)		
p'		
e = M/N (cm)		
e = M/N + u (cm)		
e = M/N − u (cm)		
e/h		
d/e		
d'/h		
d'/d		
~~Ne~~ M/bd² (kg/cm²)	3.28	3.81
k		
c		
j		
1/Lc		7.12
1/Ls	233	233
$\beta = \sigma s / \sigma c$		
σc (kg/cm²)		27.1
σs (kg/cm²)	770	890
τ (kg/cm²)		
σsa (kg/cm²)	1200	1800
σca (kg/cm²)		90
τa (kg/cm²)		
~~Homogram~~ number	M-1	
combination	D	D + P

2. Calculation of shearing stress



Shearing stress is calculated at the a/2 point

Effective width is assumed as the full width

$b = 130^{cm}$

$d = 44.7 - 5.4 = 39.3^{cm}$

(1) Shearing force

$P = 18.57^t$

$a = 0.27^m \quad d = 0.393^m$

$$\gamma = \frac{2}{a/b} = \frac{2 \times 0.393}{0.27} = 2.91 < 4$$

Therefore, $\gamma = 2.90$

$$S = \frac{P}{\gamma} = \frac{18.57}{2.91} = 6.38^t$$

$$\Sigma S = 6.38 + 2.5 \times 0.365 \times 0.40 \times 1.65$$
$$+ 2.5 \times 0.365 \times 0.146 \times 1/2 \times 1.65 = 7.09^t$$

(2) Shearing stress

$$\tau = \frac{S}{b \cdot d} = \frac{7.09 \times 10^3}{1.65 \times 39.3} = 1.09^{kg/cm^2} < \tau a = 3.9^{kg/cm^2}$$

(3) Bar arrangement for resisting against diagonal tension

Shearing force per unit one meter

$S = \Sigma S / \text{Effective width } B = 1.65^{m}$

$= \frac{18.57}{1.65} = 11.25^{t}$

$As' = \frac{S \cdot \sqrt{2}}{\sigma_{sa}}$ $\sigma_{sa} = 1800^{kg/cm^2}$

$= \frac{11.25 \times 10^3 \times \sqrt{2}}{1800} = 8.84^{cm^2}$

Use diagonal tension bars D19 - 150 ctc (11 bars)

$As = 2.865 \times 11 = 31.52^{cm^2} > As' = 8.84^{cm^2}$

3. Extra bars arranged at the side face of beam support

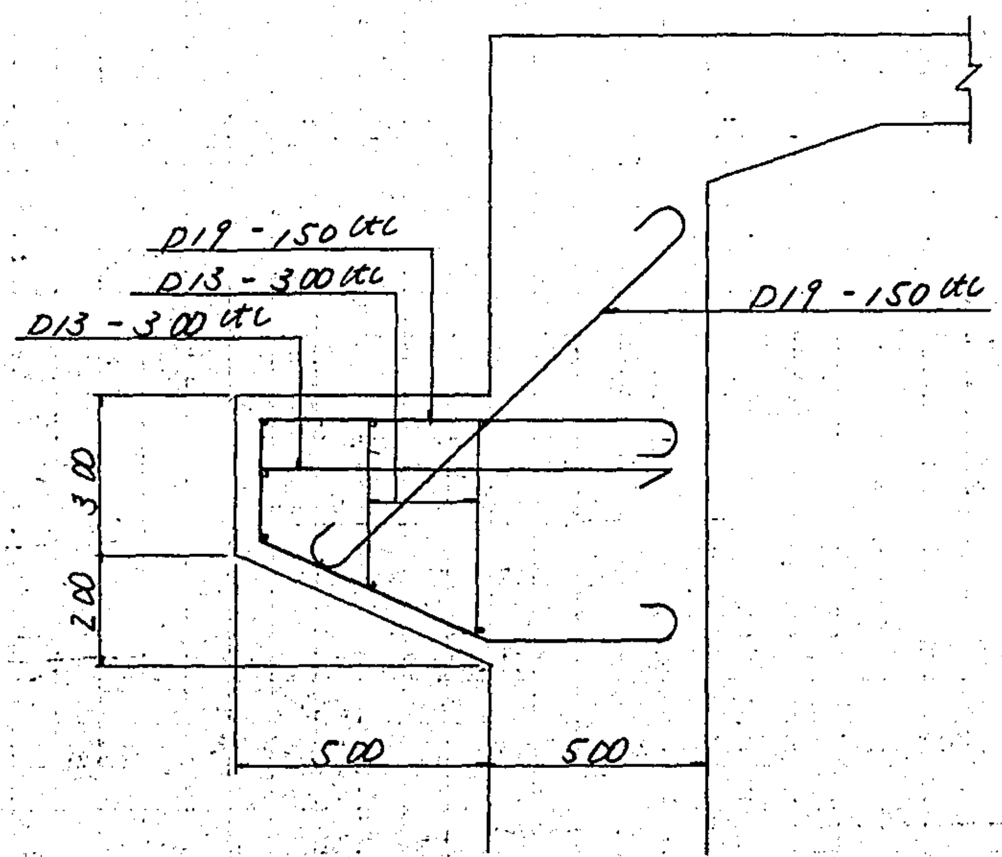
. Extra bars are arranged at the side face. With use of bars of 40% cross section of bending stress and installed in three steps formation

$As' = 31.52 \times 0.40 = 12.61^{cm^2}$

Use extra bars of D13 - 300ctc (3.33 bars) - in three steps then

$$As = 1.267 \times 5 \times 2 = 12.67\ cm^2 > As' = 12.61\ cm^2$$

4. Bar arrangement chart



§10. Calculation of stairway

1. Slab Calculation

1) Load Calculation

Pedestrian load		= 0.500 t/m
Step	$2.5\,t/m^3 \times 0.33 \times 0.165 \times 1/2 \times \frac{1}{0.33}$	= 0.206 "
pavement	1.1 " × 0.05	= 0.055 "
Slab	2.5 " × 0.447	= 1.118 "
		W' = 1.879 t/m

$l = 11.09^m$ (26°5615)

$W = W' \cdot \cos\alpha^2$

$= 1.879 \times \left(\frac{10.00}{11.18}\right)^2 = 1.503$

2) Bending moment

· At the support point

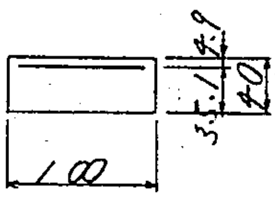
$M = -\frac{1}{12} \times 1.503 \times 11.18^2 = 15.66^{tm}$

· At the span center point

$M = \frac{1}{24} \times 1.503 \times 11.18^2 = 7.83^{tm}$

3) Calculation of Bending stress

· At the support point



$A_S = D22 - 12.5^{cm}\ ctc = 30.97\ cm^2$

$p = \dfrac{30.97}{100 \times 35.1} = 0.00882$

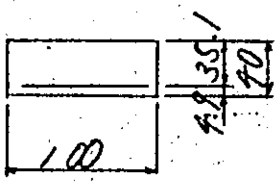
Nomogram number M-1

$1/L_C = 5.78 \qquad 1/L_S = 131$

$\sigma_c = \dfrac{15.66 \times 10^5}{100 \times 35.1^2} \times 5.78 = 73.5\ kg/cm^2 < 90\ kg/cm^2$

$\sigma_s = $ ——— " ——— $\times 131 = 1670$ " < 1800 "

· At the span center point



$A_S = D22 - 25.0^{cm}\ ctc = 15.48\ cm^2$

$p = \dfrac{15.48}{100 \times 35.1} = 0.00441$

Nomogram number M-1

$1/L_C = 7.33 \qquad 1/L_S = 252$

$\sigma_c = \dfrac{7.83 \times 10^5}{100 \times 35.1^2} \times 7.33 = 46.6\ kg/cm^2 < 90\ kg/cm^2$

$\sigma_s = $ ——— " ——— $\times 252 = 1600$ " < 1800 "

Reinforcement at the support of railway cross section shall be 1/6 of that of at the support of railway profile

$$A_S' = D22 - 12.5^{cm} ctc\ (8) = 30.97\ cm^2$$

$$30.97 \times 1/6 = 5.16\ cm^2$$

$$A_S = D16 - 25.0^{cm} ctc = 7.94\ cm^2 > 5.16\ cm^2$$

4) Shearing stress

$$S_{l/2} = 1/2 \times 1.879 \times 11.18 - 1.879 \times 0.20$$

$$= 10.13^{t}$$

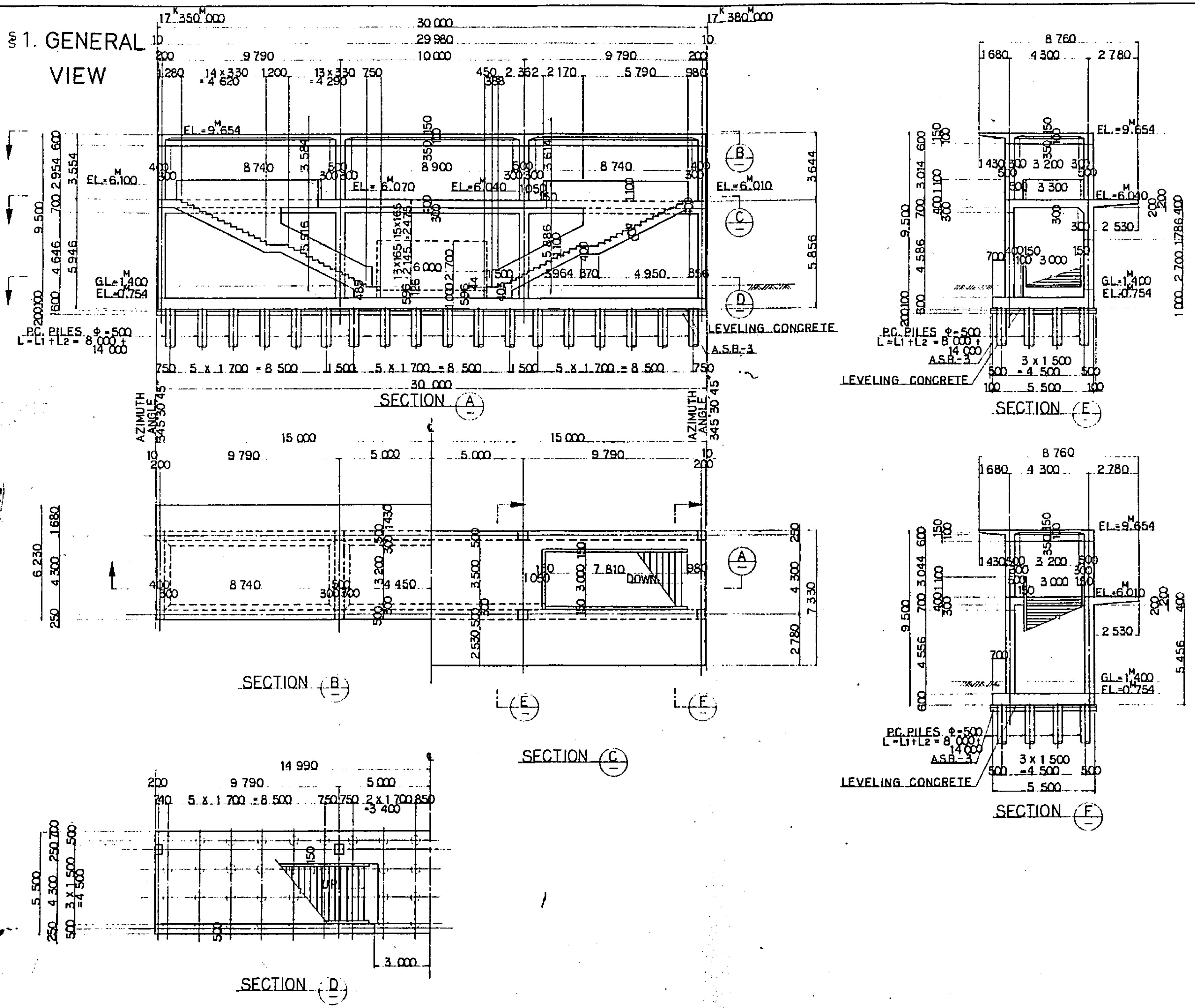
$$\tau = \frac{10.13 \times 10^3}{100 \times 35.1} = 2.89\ kg/cm^2 < 3.9\ kg/cm^2$$

§§10 VIADUCT OF PLATFORM VP5

CONTENTS

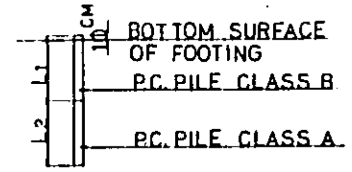
NO. 2

§1. GENERAL VIEW



NOTES :

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT: CS-238 ~ 244
3. TYPES OF P.C. PILE



§ 2. Calculation of Slab

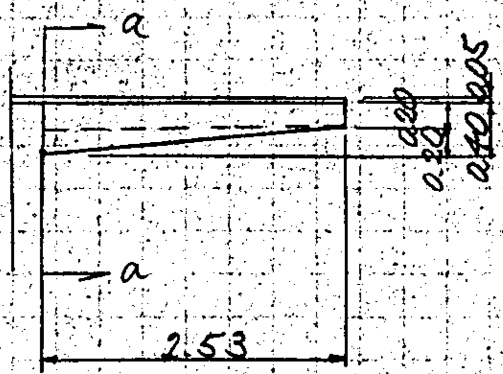
1. Upper Slab

(Refer Viaduct of platform) VP2

2. Calculation of Intermediate cantilever slab

1) load calculations

(a) Dead load



$$M_{a-a} = 2.5^{t/m^3} \times 2.53 \times 0.20 \times 1.265$$
$$+ 2.5'' \times 2.53 \times 0.20 \times 1/2 \times 0.843$$
$$+ 1.1'' \times 0.05 \times 2.53 \times 1.265 = 2.31^{tm}$$

(b) Pedestrian load

$$M_{a-a} = 0.50^{t/m^2} \times 2.53 \times 1.265 = 1.60^{tm}$$

2) Combined stress

(Dead load + Pedestrians load)

$$M_{a-a} = 2.31 + 1.60 = 3.91^{tm}$$

Allowable stress, safe against cracking

$$\frac{M_p}{M_{d+p}} = \frac{1.60}{3.91} = 0.41 > 0.25$$

Hence,

$\sigma_{sd} = 1.000^{kg/cm^2}$

Stress calculation

	a-a section		
M (tm)	2.31	3.91	
N (t)			
S (t)			
b (cm)	100		
h (cm)	40		
d (cm)	36.7		
d' (cm)	3.3		
As (cm²)	⌀16 - 20cm ctc = 9.93		
p	0.00271		
As' (cm²)			
p'			
e=M/N (cm)			
e=M/N+u (cm)			
e=M/N−u (cm)			
e/h			
d/e			
d'/h			
d'/d			
M/bd² (kg/cm²)	1.72	2.90	
k			
c			
j			
1/Lc	8.82		
1/Ls	403		
β=σs/σc			
σc (kg/cm²)		25.6	
σs (kg/cm²)	690	1170	
τ (kg/cm²)			
σsa (kg/cm²)	1000	1800	
σca (kg/cm²)		90	
τa (kg/cm²)			
Nomogram number	M-1		
combination	D	D+P	

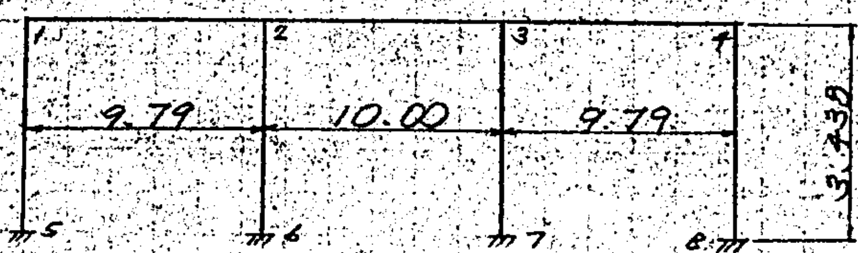
§3. Calculation of torsional moment

(Refer viaduct of platfrom) VP2

§4. Rigid frame analysis on longitudinal direction of elevated structure

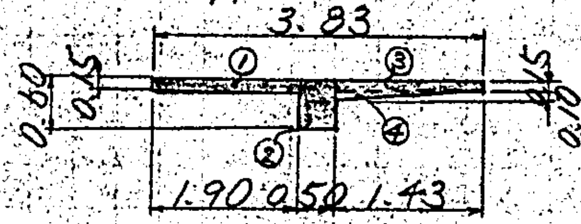
〔1〕 Basic calculation

1. Axis of the Rahmen (Rigid frame)



2. Cross Sectional area/Moment of inertia of area of members

(1) Upper beam (Member 1-2, 2-3, 3-4)



effective width

$b_e = 3.83^{m}$

	$b^{(m)}$	$h^{(m)}$	$A^{(m^2)}$	$y^{(m)}$	$A \cdot y^{(m^3)}$
①	1.900	0.150	0.285	0.075	0.02138
②	0.500	0.600	0.300	0.300	0.09000
③	1.430	0.150	0.215	0.075	0.01613
④	1.430	1/2×0.100	0.072	0.183	0.01318
Σ			0.872		0.14069

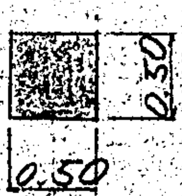
$$y = \frac{0.14069}{0.872} = 0.161^{m}$$

	b (m)	h (m)	A (m^2)	y_0 (m)	I_0 (m^4)	$A \cdot y_0^2$ (m^4)	$I_0 + A \cdot y_0^2$ (m^4)
①	1.900	0.150	0.285	0.086	0.00053	0.00211	0.00264
②	0.500	0.600	0.300	0.139	0.00900	0.00580	0.01480
③	1.430	0.150	0.215	0.086	0.00040	0.00159	0.00199
④	1.430	1/2×0.100	0.072	0.022	0.00004	0.00003	0.00007
Σ			0.872		0.00997	0.00953	0.01950

cross Sectional Area $A = 0.872^{m^2}$

Moment of Inertia of area $I = 0.01950^{m^4}$

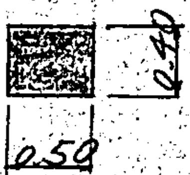
(2) column (Member 2-6. 3-7)



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

$I = 1/12 \times 0.50 \times 0.50^3 = 0.00521^{m^4}$

(3) column (Member 1-5. 4-8)



$A = 0.50 \times 0.40 = 0.200^{m^2}$

$I = 1/12 \times 0.50 \times 0.40^3 = 0.00267^{m^4}$

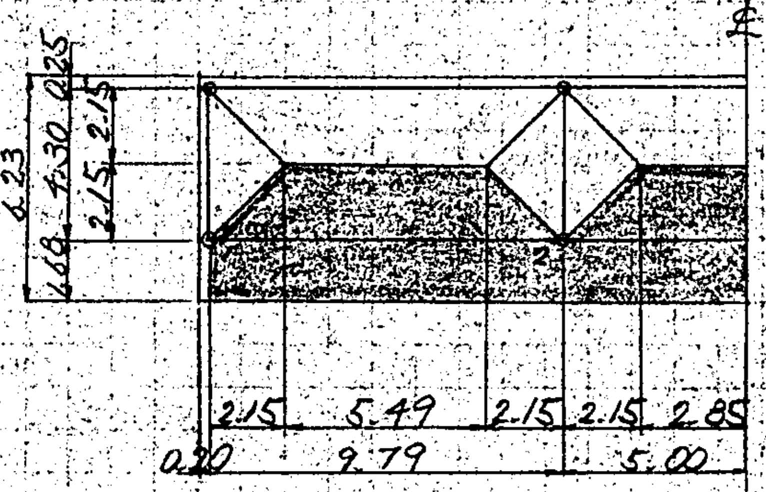
(4) axial height

$h = 3.599 - 0.161 = 3.438^{m}$

〔2〕 Load calculations

1. Dead load

(1) Upper member



(a) Uniformly distributed load

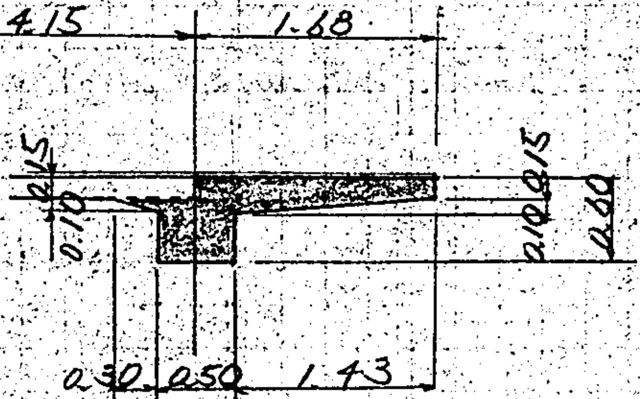
Slab $2.5^{t/m^3} \times 0.15 = 0.375^{t/m^2}$

pavement $1.1 \times 0.05 = 0.055$ "

$w = 0.43^{t/m^2}$

$W_{d1} = 0.43^{t/m^2} \times 2.15 = 0.92^{t/m}$

(b) linear load



pavement $1.10^{t/m^3} \times 0.05 \times 1.68 = 0.092^{t/m}$

Cantilever slab $2.5'' \times (0.15+0.25) \times 1/2 \times 1.43 = 0.715''$

Longitudinal beam $2.5'' \times (0.50 \times 60 - 0.25 \times 0.15) = 0.656''$

Haunch of slab $2.5'' \times 0.30 \times 0.10 \times 1/2 = 0.038''$

$wd_2 = 1.50^{t/m}$

(c) Concentrated load acting panel point

1) panel point 1 (4)

- Uniformly distributed load

  $0.43^{t/m^2} \times 2.15 \times 2.15 \times 1/2 \quad = 0.99^t$

- Uniformly distributed load

  $0.43^{t/m^2} \times 0.20 \times 2.15 \quad = 0.18$ "

- Uniformly distributed load

  $(0.092 + 0.715)^{t/m} \times 0.20 \quad = 0.16$ "

- Haunch of slab

  $2.5^{t/m^3} \times 0.30 \times 0.10 \times 1/2 \times 1.60 \quad = 0.06$ "

- Cross beam

  $2.5 \times 0.40 \times 0.45 \times 2.40 \quad = 1.08$ "

- Reduction of linear load

  $-(0.656 + 0.038)^{t/m} \times 0.20 \quad = -0.14$

- Reduction of Column part

  $-2.5^{t/m^3} \times 0.50 \times 0.40 \times (0.60 - 0.161) \quad = -0.22$ "

- Shed load reaction $\quad = 10.00$

$P_1 = P_4 = 12.11^t$

panel point 2, (3)

· Uniformly distributed load

$0.43\ ^{t}/_{m^2} \times 2.15 \times 2.15 \times 1/2 \times 2$ $= 1.98^{t}$

· Cross beam

$2.5\ ^{t}/_{m^3} \times 0.50 \times 0.45 \times 1.90$ $= 1.07$ "

· Haunch of slab

2.5 " $\times 0.30 \times 0.10 \times 1/2 \times 1.60 \times 2$ $= 0.12$ "

· Compensation for column

2.5 " $\times 0.50 \times 0.50 \times (0.161 - 0.15)$ $= 0.01$ "

· Reduction of linear load

$-(0.656 + 0.038)\ ^{t}/_{m} \times 0.50$ $= -0.35$ "

· Shed load reaction $= 20.00$ "

$P_2 = P_3 = 22.83^{t}$

Own weight of column

$g_1 = 2.5\ ^{t}/_{m^3} \times 0.50 \times 0.40 = 0.50\ ^{t}/_{m}$

$g_2 = 2.5$ " $\times 0.50 \times 0.50 = 0.63$ "

2. pedestrian load (people load)

$w = 0.35 \ t/m^2$

(1) Upper member

(Refer (2) / (1))

a) Uniformly distributed load

$wd_1 = 0.35 \times 2.15 = 0.75 \ t/m$

b) linear load

$wd_2 = 0.35 \times 1.68 = 0.59 \ t/m$

c) Concentrated load acting at the panel point

(1) panel point 1 (4)

Uniformly distributed load

$0.35 \ t/m^2 \times 2.15 \times 2.15 \times 1/2 = 0.81 \ t$

Uniformly distributed load

$0.35 \ t/m^2 \times 0.20 \times 3.83 = 0.27 \ t$

$P_1 = P_4 = 1.08 \ t$

(2) panel point 2. (3)

Uniformly distributed load

$0.35 \ t/m^2 \times 2.15 \times 2.15 \times 1/2 \times 2 = 1.62 \ t$

3. Temperature change and Drying contraction

Temperature change -------- ± 10°C

Drying contraction -------- − 15°C

Hence,

Temperature rise ------- + 10°C

Temperature drop + Drying contraction

-------- − 25°C

4. Seismic load from dead load (k_H = 0.10)

(derived from [2] (1) and [2] (2) horizontal force)

Slab 2.5 t/m³ × 0.15 × 4.80 × 29.98 = 53.96 t

Cantilever slab 2.5 × (0.15 + 0.25) × 1/2 × 1.43 × 29.98 = 21.44

Haunch of slab 2.5 × 0.30 × 0.10 × (27.98 × 2 + 3.20 × 6) = 2.82 t

longitudinal beam 2.5 × 0.50 × 0.45 × 29.98 × 2 = 33.73

Cross beam 2.5 × 0.40 × 0.45 × 3.80 × 2 = 3.42

2.5 × 0.50 × 0.45 × 3.80 × 2 = 4.28

column 2.5 × 0.50 × 0.40 × (3.438/2 + 0.161 − 0.60) × 4 = 2.56

column $2.5^{t/m^3} \times 0.50 \times 0.50 \times (\frac{3.438}{2} + 0.161 - 0.60) \times 4$

$= 3.20^t$

shed load $(23.0 + 20.0) \times 2 = 86.00^t$

" $(13.0 + 10.0) \times 2 = 46.00^t$

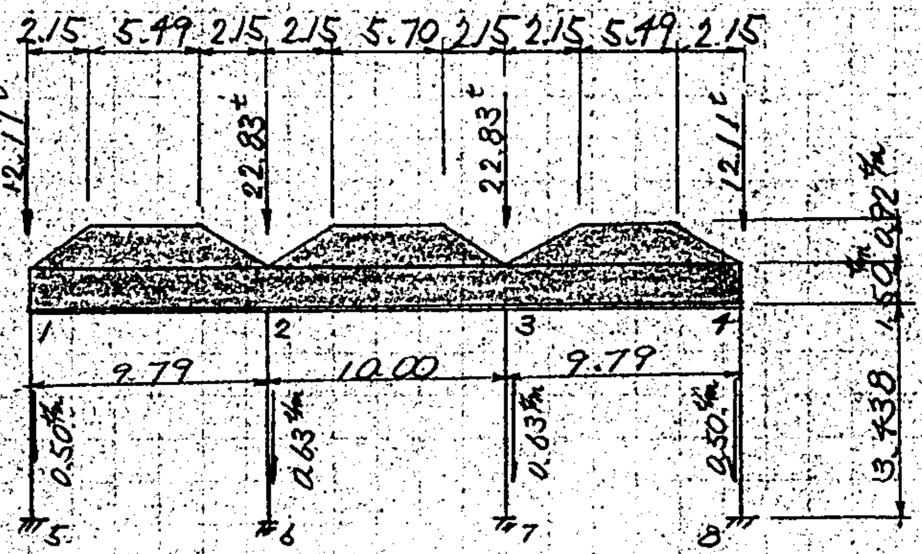
Pedestrian load $0.21^{t/m^2} \times 6.23 \times 29.98 = 39.22^t$

Total $= 296.63^t$

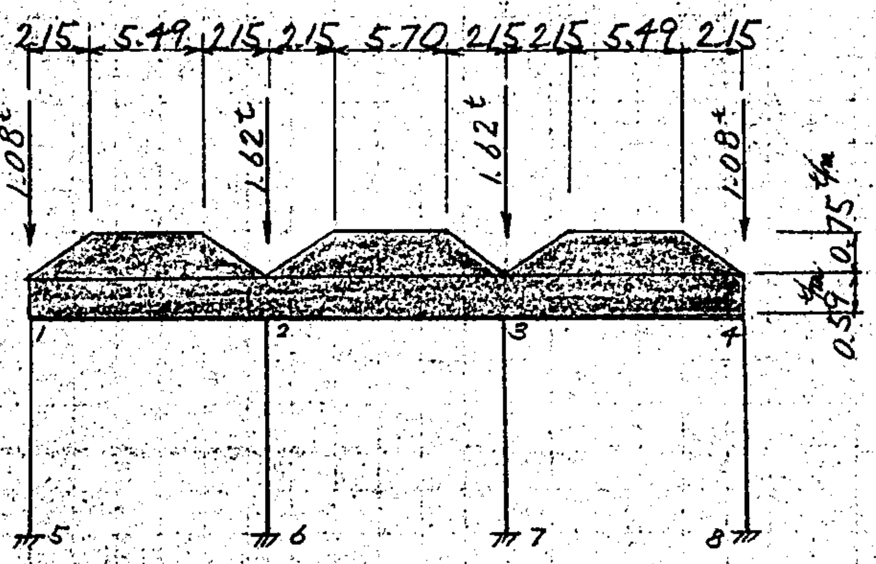
$H = 296.63 \times 1/2 \times 0.10 = 14.83^t$

[3] Loading diagram

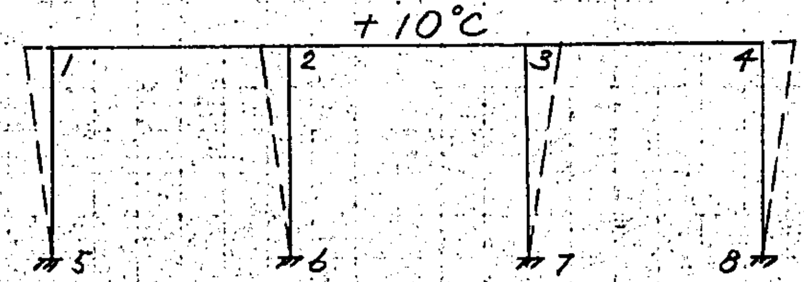
1. case 1 Dead load



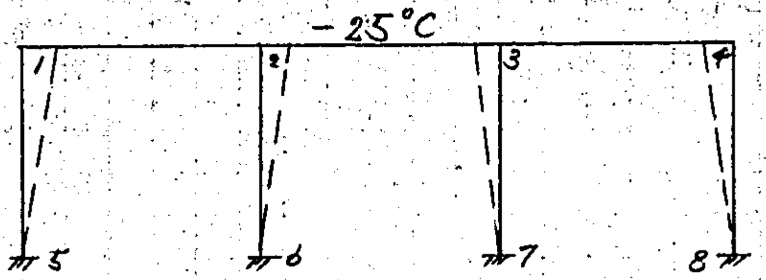
2. case 2 Pedestrian load (People load)



3. case 3 Temperature rise

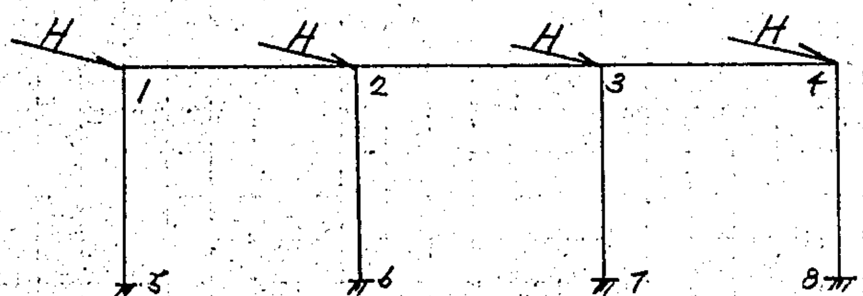


4. case 4 Temperature drop + Drying Contraction



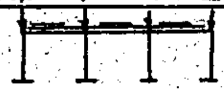
5. case 5 Seismic load from dead load

$$H = \frac{14.83}{4} = 3.71^{t}$$



[9] Combination of loads

1. Basic load

Case Number	Kind of load	Loading Pattern
1	Dead load	
2	Pedestrian load	
3	Temperature rise	+10°C
4	Temperature drop + Drying contraction	−25°C
5	Seismic load from dead load	

2. Combined loads

case number	Combination of loads	α
6	1 + 2	1.0000
7	1 + 3	0.8696
8	1 + 4	〃
9	1 + 5	0.6667
10	1 − 5	〃

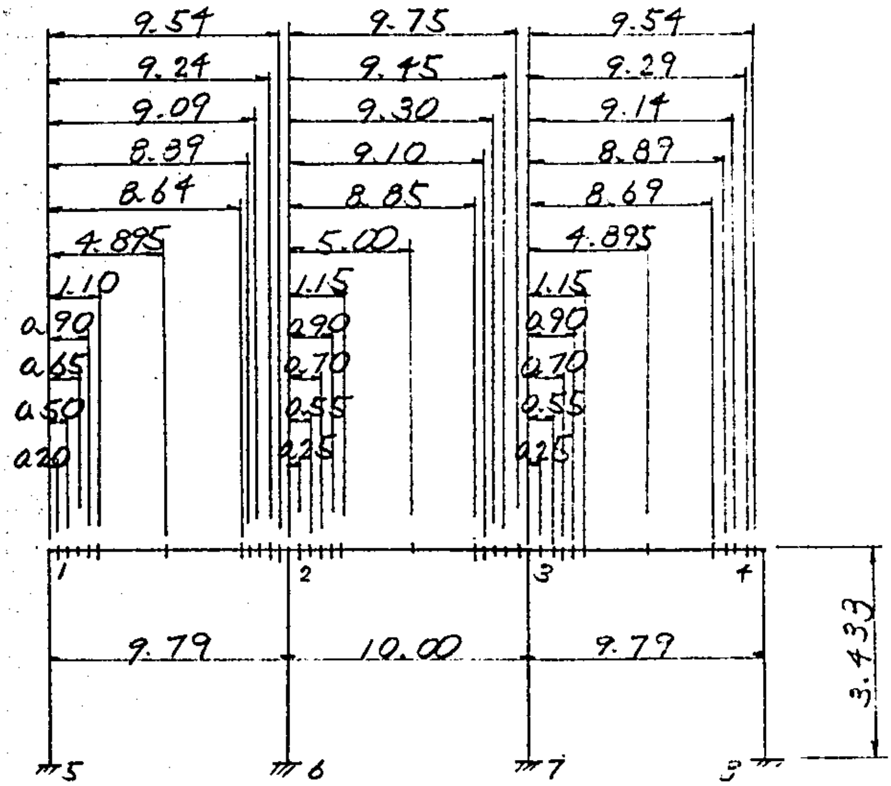
3. Critical cases

No. 1   case 1   crack

No. 2   case 6 ~ 10   synthetic

No. 3   case 9. 10   footing

9. Points for stress calculation

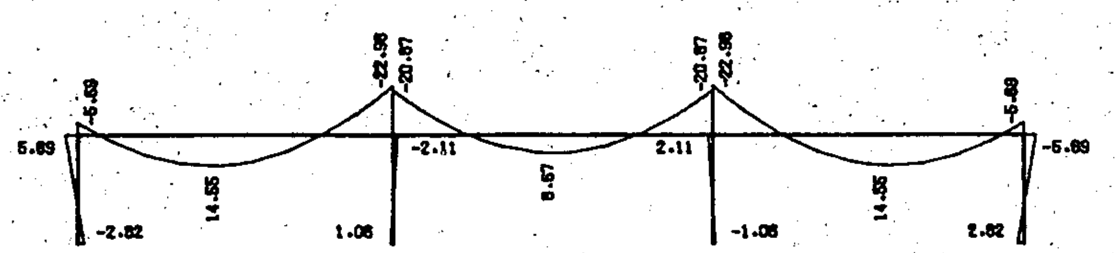


[5] Stress diagram

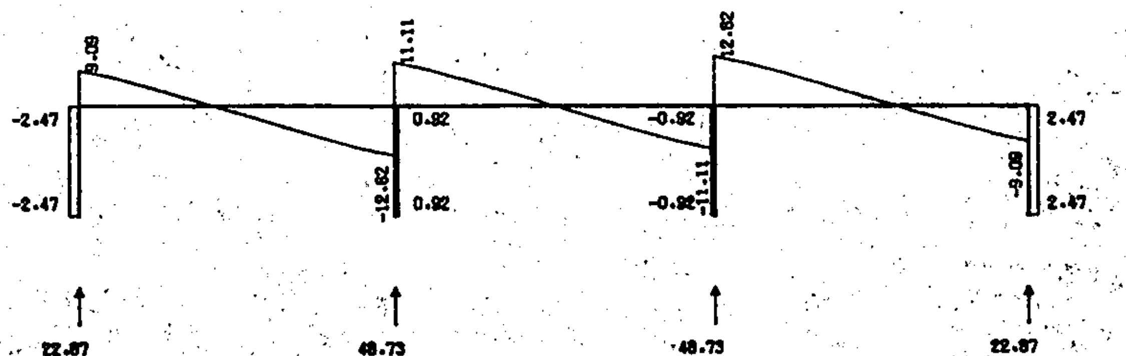
VIADUCT OF PLATFORM (CENTRAL) L-1

CASE 1 (DEAD LOAD)

BENDING MOMENT



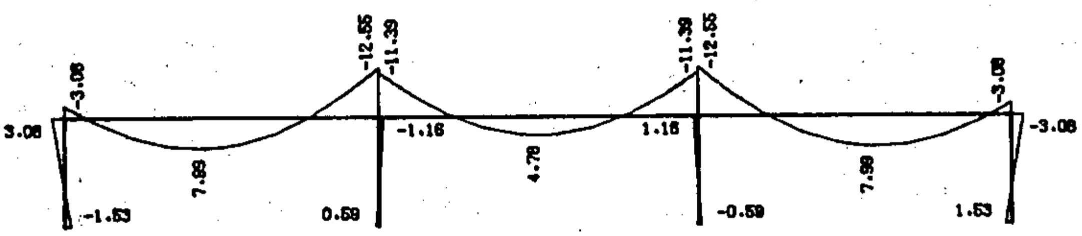
SHEARING FORCE



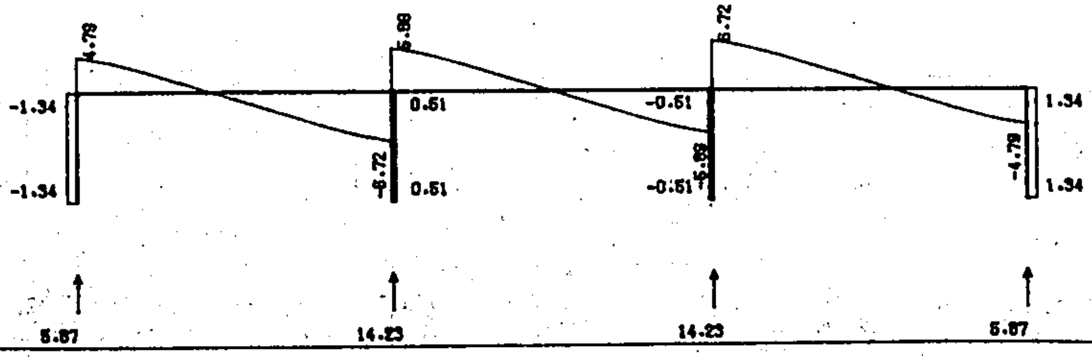
VIADUCT OF PLATFORM (CENTRAL) L-1

CASE 2 (PEDESTRIANS LOAD)

BENDING MOMENT



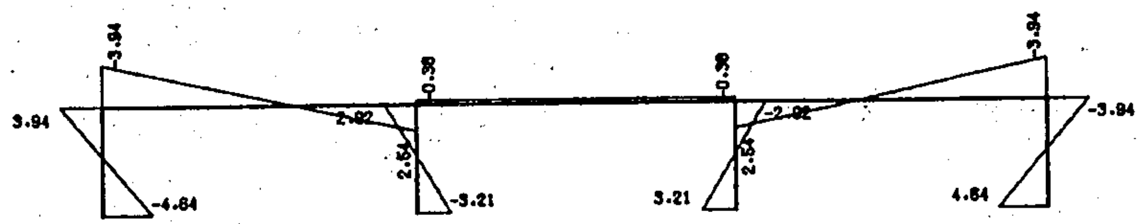
SHEARING FORCE



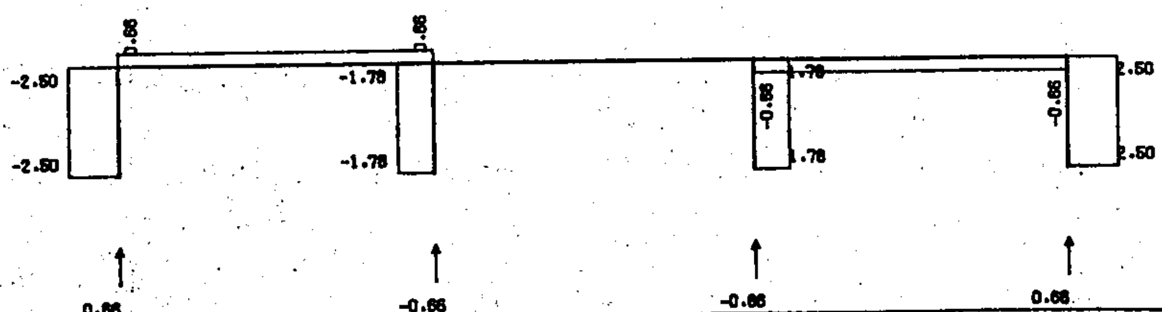
VIADUCT OF PLATFORM (CENTRAL) L-1

CASE 3 (TEMPERATURE)

BENDING MOMENT



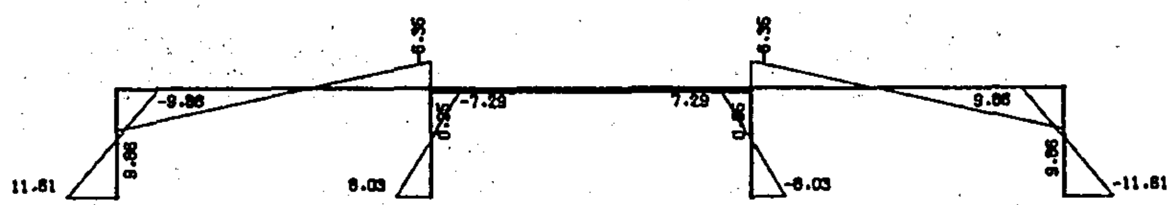
SHEARING FORCE



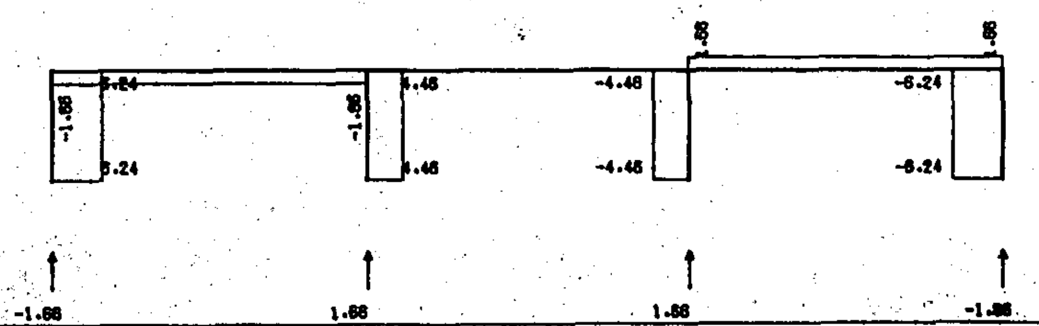
VIADUCT OF PLATFORM (CENTRAL) L-1

CASE 4 (TEMPERATURE + SCHRINKAGE)

BENDING MOMENT



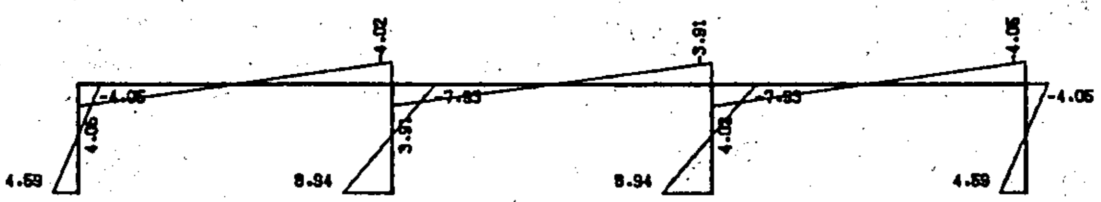
SHEARING FORCE



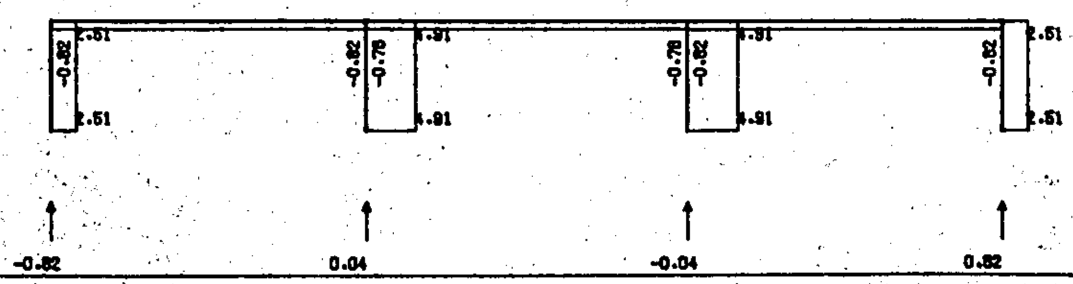
VIADUCT OF PLATFORM (CENTRAL) L-1

CASE 5 (SEISMIC LOAD)

BENDING MOMENT



SHEARING FORCE



INPUT DATA

```
=== INPUT DATA ===                                                              CRC-FANSY   V6.3
         5   10        20        30        40        50        60        70        80   CARD NUMBER
         ........................................................................................
         TITLE     VIADUCT OF PLATFORM (CENTRAL) L-1                                            1
         PLOT           1    2                                                                  2
         TYPE1-3-1      L=9.79,10.0,9.79     H=3.436   M1-3=0.872,0.0195                        3
                        M4=0.2,0.00267       M5-6=0.25,0.00521    M7=0.2,0.00267                4
                        P=2.7E+6,1.0E-5      S=0                                                5
         POINT    1 0.2        0.5        0.65       0.9        1.1       4.695     8.64        6
                    8.89       9.09       9.24       9.54                                       7
                  2 0.25       0.55       0.7        0.9        1.15      5.0       8.85        8
                    9.1        9.3        9.45       9.75                                       9
                  3 0.25       0.55       0.7        0.9        1.15      4.895     8.69        10
                    8.89       9.14       9.29       9.54                                       11
         PICKUP         1    1    1                                                             12
                        2    1    6   10                                                        13
                        3    1    9   10                                                        14
         LOAD           1      CASE  1 (DEAD LOAD)                                              15
         J              1                -12.06                         4                       16
                        2                -22.83                         3                       17
         DL             1    2-0.92      2.15       2.15                2    3                  18
                        1    2-1.5                                      2    3                  19
                        4    2-0.5                                      7                       20
                        5    2-0.63                                     6                       21
         END                                                                                    22
         LOAD           2      CASE  2 (PEDESTRIANS LOAD)                                       23
         J              1                -1.08                          4                       24
                        2                -1.62                          3                       25
         DL             1    2-0.75      2.15       2.15                2    3                  26
                        1    2-0.59                                     2    3                  27
         END                                                                                    28
         LOAD           3      CASE  3 (TEMPERATURE)                                            29
         T              1    3 10.0                                                             30
         END                                                                                    31
         LOAD           4      CASE  4 (TEMPERATURE + SCHRINKAGE)                               32
         T              1    3-25.0                                                             33
         END                                                                                    34
         LOAD           5      CASE  5 (SEISMIC LOAD)                                           35
         J              1      3.71                                     2    3    4             36
         END                                                                                    37
         MT2          6               1    2                                                    38
                      70.8696         1    3                                                    39
                      80.8696         1    4                                                    40
                      90.6667         1    5                                                    41
                     100.6667         1   -5                                                    42
         FINISH                                                                                 43
```

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

CONTROL DATA

METHOD	STRUCTURE	J.RENUMBER	M.RENUMBER	S.F. DIS.	UNI.SPRING	STAN.STIF.	BARA	SKEW MEM.
DIS	*RAHMEN*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*	*OFF*

LOAD TITLE

```
LOAD  1   CASE  1 (DEAD LOAD)                 LOAD  2   CASE  2 (PEDESTRIANS LOAD)
LOAD  3   CASE  3 (TEMPERATURE)               LOAD  4   CASE  4 (TEMPERATURE + SCHRINKAGE)
LOAD  5   CASE  5 (SEISMIC LOAD)

MIX   6   CASE  6 (1+2)                       MIX   7   CASE  7 (1+3)
MIX   8   CASE  8 (1+4)                       MIX   9   CASE  9 (1+5)
MIX  10   CASE 10 (1-5)
```

PICK UP LOAD CASE

```
PICK  1     1
PICK  2     6   7   8   9   10
PICK  3     9  10
```

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

JOINT DATA

JOINT NUMBER 8

JOINT	X	Y
1	-.0000	3.4380
2	9.7900	3.4380
3	19.7900	3.4380
4	29.5800	3.4380
5	-.0000	0.0000
6	9.7900	0.0000
7	19.7900	0.0000
8	29.5800	0.0000

MEMBER DATA

MEMBER NUMBER 7

MEMBER	ITAN	JTAN	CONNECT. ITAN	JTAN	LENGTH	A	I	PRO.NUM
1	1	2	FIX	FIX	9.7900	.87200	.0195000	1
2	2	3	FIX	FIX	10.0000	.87200	.0195000	1
3	3	4	FIX	FIX	9.7900	.87200	.0195000	1
4	1	5	FIX	FIX	3.4380	.20000	.0026700	1
5	2	6	FIX	FIX	3.4380	.25000	.0052100	1
6	3	7	FIX	FIX	3.4380	.25000	.0052100	1
7	4	8	FIX	FIX	3.4380	.20000	.0026700	1

PROPERTY DATA

PROPERTY NUMBER 1

PROPERTY	E	G	EPS
1	2.700E+06	0.	1.000E-05

SUPPORT DATA

SUPPORT NUMBER 4

SUPPORT	X	Y	THET Z
5	FIX	FIX	FIX
6	FIX	FIX	FIX
7	FIX	FIX	FIX
8	FIX	FIX	FIX

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1   CRC-FANSY V6.3

STRUCTURAL FIGURE

```
+-------------------+-------------------+-------------------+
I 1                 I 2                 I 3                 I 4
I                   I                   I                   I
+                   +                   +                   +
≡ 5                 ≡ 6                 ≡ 7                 ≡ 8
```

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

MOVE DATA

MEMBER	ITAN	JTAN	POINT 1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	......	......	.200	.500	.650	.900	1.100	4.895	8.640	8.890	9.090	9.240	9.540			
2	......	......	.250	.550	.700	.900	1.150	5.000	8.850	9.100	9.300	9.450	9.750			
3	......	......	.250	.550	.700	.900	1.150	4.895	8.690	8.890	9.140	9.290	9.540			
4	......	......														
5	......	......														
6	......	......														
7	......	......														

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

LOAD DATA

	M/J	NAME	D	W1	W2	L1	L2
LOAD - 1		CASE 1 (DEAD LOAD)					
MEMBER	1	LINEAR	Y	0.000	-.920	0.000	7.640
		LINEAR	Y	-.920	-.920	2.150	2.150
		LINEAR	Y	-.920	0.000	7.640	0.000
		LINEAR	Y	-1.500	-1.500	0.000	0.000
	2	LINEAR	Y	0.000	-.920	0.000	7.850
		LINEAR	Y	-.920	-.920	2.150	2.150
		LINEAR	Y	-.920	0.000	7.850	0.000
		LINEAR	Y	-1.500	-1.500	0.000	0.000
	3	LINEAR	Y	0.000	-.920	0.000	7.640
		LINEAR	Y	-.920	-.920	2.150	2.150
		LINEAR	Y	-.920	0.000	7.640	0.000
		LINEAR	Y	-1.500	-1.500	0.000	0.000
	4	LINEAR	Y	-.500	-.500	0.000	0.000
	5	LINEAR	Y	-.630	-.630	0.000	0.000
	6	LINEAR	Y	-.630	-.630	0.000	0.000
	7	LINEAR	Y	-.500	-.500	0.000	0.000
JOINT	1	JOINTLOAD	Y	-12.060			
	2	JOINTLOAD	Y	-22.830			
	3	JOINTLOAD	Y	-22.830			
	4	JOINTLOAD	Y	-12.060			
LOAD - 2		CASE 2 (PEDESTRIANS LOAD)					
MEMBER	1	LINEAR	Y	0.000	-.750	0.000	7.640
		LINEAR	Y	-.750	-.750	2.150	2.150
		LINEAR	Y	-.750	0.000	7.640	0.000
		LINEAR	Y	-.590	-.590	0.000	0.000
	2	LINEAR	Y	0.000	-.750	0.000	7.850
		LINEAR	Y	-.750	-.750	2.150	2.150
		LINEAR	Y	-.750	0.000	7.850	0.000
		LINEAR	Y	-.590	-.590	0.000	0.000
	3	LINEAR	Y	0.000	-.750	0.000	7.640
		LINEAR	Y	-.750	-.750	2.150	2.150
		LINEAR	Y	-.750	0.000	7.640	0.000
		LINEAR	Y	-.590	-.590	0.000	0.000
JOINT	1	JOINTLOAD	Y	-1.080			
	2	JOINTLOAD	Y	-1.620			
	3	JOINTLOAD	Y	-1.620			
	4	JOINTLOAD	Y	-1.080			
LOAD - 3		CASE 3 (TEMPERATURE)					
MEMBER	1	TEMP		10.0(DO)			
	2	TEMP		10.0(DO)			
	3	TEMP		10.0(DO)			
LOAD - 4		CASE 4 (TEMPERATURE + SCHRINKAGE)					
MEMBER	1	TEMP		-25.0(DO)			
	2	TEMP		-25.0(DO)			
	3	TEMP		-25.0(DO)			

LOAD DATA

LOAD - 5 CASE 5 (SEISMIC LOAD)

	M/J	NAME	D	W1	W2	L1	L2
JOINT	1	JOINTLOAD	X	3.710			
	2	JOINTLOAD	X	3.710			
	3	JOINTLOAD	X	3.710			
	4	JOINTLOAD	X	3.710			

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

MIX DATA

MIX NUMBER 5

LOAD	SS	N	S1	K1	S2	K2	S3	K3	S4	K4	S5	K5	S6	K6	S7	K7	S8	K8
6	1.0000	2	1.0000	1	1.0000	2												
7	.8696	2	1.0000	1	1.0000	3												
8	.8696	2	1.0000	1	1.0000	4												
9	.6667	2	1.0000	1	1.0000	5												
10	.6667	2	1.0000	1	-1.0000	5												

PICK UP

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 1

MOMENT MAXIMUM

= = MEMBER 1 (1 - 2) G = =

	-----L---	-CASE-	-----M---	-----Q---	-----N---
ITAN	0.000	(1)	-5.688	9.091	-2.475
1	.200	(1)	-3.901	8.782	-2.475
2	.500	(1)	-1.339	8.287	-2.475
3	.650	(1)	-.116	8.025	-2.475
4	.900	(1)	1.834	7.567	-2.475
5	1.100	(1)	3.309	7.182	-2.475
6	4.895	(1)	13.950	-1.766	-2.475
7	8.640	(1)	-9.564	-10.615	-2.475
8	8.890	(1)	-12.279	-11.100	-2.475
9	9.090	(1)	-14.536	-11.468	-2.475
10	9.240	(1)	-16.276	-11.733	-2.475
11	9.540	(1)	-19.872	-12.235	-2.475
JTAN	9.790	(1)	-22.980	-12.623	-2.475
MAX	4.351	(1)	14.553	-.450	-2.475

= = MEMBER 2 (2 - 3) G = =

	-----L---	-CASE-	-----M---	-----Q---	-----N---
ITAN	0.000	(1)	-20.874	11.111	-1.552
1	.250	(1)	-18.144	10.723	-1.552
2	.550	(1)	-15.002	10.221	-1.552
3	.700	(1)	-13.488	9.956	-1.552
4	.900	(1)	-11.534	9.588	-1.552
5	1.150	(1)	-9.197	9.103	-1.552
6	5.000	(1)	8.667	-.000	-1.552
7	6.850	(1)	-9.197	-9.103	-1.552
8	9.100	(1)	-11.534	-9.588	-1.552
9	9.300	(1)	-13.488	-9.956	-1.552
10	9.450	(1)	-15.002	-10.221	-1.552
11	9.750	(1)	-18.144	-10.723	-1.552
JTAN	10.000	(1)	-20.874	-11.111	-1.552
MAX	5.000	(1)	8.667	-.000	-1.552

MOMENT MINIMUM

= = MEMBER 1 (1 - 2) G = =

	-----L---	-CASE-	-----M---	-----Q---	-----N---
ITAN	0.000	(1)	-5.688	9.091	-2.475
1	.200	(1)	-3.901	8.782	-2.475
2	.500	(1)	-1.339	8.287	-2.475
3	.650	(1)	-.116	8.025	-2.475
4	.900	(1)	1.834	7.567	-2.475
5	1.100	(1)	3.309	7.182	-2.475
6	4.895	(1)	13.950	-1.766	-2.475
7	8.640	(1)	-9.564	-10.615	-2.475
8	8.890	(1)	-12.279	-11.100	-2.475
9	9.090	(1)	-14.536	-11.468	-2.475
10	9.240	(1)	-16.276	-11.733	-2.475
11	9.540	(1)	-19.872	-12.235	-2.475
JTAN	9.790	(1)	-22.980	-12.623	-2.475
MAX	4.351	(1)	14.553	-.450	-2.475

= = MEMBER 2 (2 - 3) G = =

	-----L---	-CASE-	-----M---	-----Q---	-----N---
ITAN	0.000	(1)	-20.874	11.111	-1.552
1	.250	(1)	-18.144	10.723	-1.552
2	.550	(1)	-15.002	10.221	-1.552
3	.700	(1)	-13.488	9.956	-1.552
4	.900	(1)	-11.534	9.588	-1.552
5	1.150	(1)	-9.197	9.103	-1.552
6	5.000	(1)	8.667	-.000	-1.552
7	8.850	(1)	-9.197	-9.103	-1.552
8	9.100	(1)	-11.534	-9.588	-1.552
9	9.300	(1)	-13.488	-9.956	-1.552
10	9.450	(1)	-15.002	-10.221	-1.552
11	9.750	(1)	-18.144	-10.723	-1.552
JTAN	10.000	(1)	-20.874	-11.111	-1.552
MAX	5.000	(1)	8.667	-.000	-1.552

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 1

MOMENT MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(1)	-22.980	12.623	-2.475
1	.250	(1)	-19.872	12.235	-2.475
2	.550	(1)	-16.276	11.733	-2.475
3	.700	(1)	-14.536	11.468	-2.475
4	.900	(1)	-12.279	11.100	-2.475
5	1.150	(1)	-9.564	10.615	-2.475
6	4.895	(1)	13.950	1.766	-2.475
7	8.690	(1)	3.309	-7.182	-2.475
8	8.890	(1)	1.834	-7.567	-2.475
9	9.140	(1)	-.116	-8.025	-2.475
10	9.290	(1)	-1.339	-8.287	-2.475
11	9.540	(1)	-3.463	-8.702	-2.475
JTAN	9.790	(1)	-5.688	-9.091	-2.475
MAX	5.439	(1)	14.553	.450	-2.475
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	5.688	-2.475	-21.151
JTAN	3.438	(1)	-2.819	-2.475	-22.870
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(1)	-2.106	.922	-46.564
JTAN	3.438	(1)	1.065	.922	-48.730
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(1)	2.106	-.922	-46.564
JTAN	3.438	(1)	-1.065	-.922	-48.730
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(1)	-5.688	2.475	-21.151
JTAN	3.438	(1)	2.819	2.475	-22.870

MOMENT MINIMUM

	L	CASE	M	Q	N
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(1)	-22.980	12.623	-2.475
1	.250	(1)	-19.872	12.235	-2.475
2	.550	(1)	-16.276	11.733	-2.475
3	.700	(1)	-14.536	11.468	-2.475
4	.900	(1)	-12.279	11.100	-2.475
5	1.150	(1)	-9.564	10.615	-2.475
6	4.895	(1)	13.950	1.766	-2.475
7	8.690	(1)	3.309	-7.182	-2.475
8	8.890	(1)	1.834	-7.567	-2.475
9	9.140	(1)	-.116	-8.025	-2.475
10	9.290	(1)	-1.339	-8.287	-2.475
11	9.540	(1)	-3.463	-8.702	-2.475
JTAN	9.790	(1)	-5.688	-9.091	-2.475
MAX	5.439	(1)	14.553	.450	-2.475
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	5.688	-2.475	-21.151
JTAN	3.438	(1)	-2.819	-2.475	-22.870
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(1)	-2.106	.922	-46.564
JTAN	3.438	(1)	1.065	.922	-48.730
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(1)	2.106	-.922	-46.564
JTAN	3.438	(1)	-1.065	-.922	-48.730
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(1)	-5.688	2.475	-21.151
JTAN	3.438	(1)	2.819	2.475	-22.870

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 1

	SHEAR MAXIMUM					SHEAR MINIMUM					
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =						= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-5.688	9.091	-2.475	ITAN	0.000	(1)	-5.688	9.091	-2.475
1	.200	(1)	-3.901	8.782	-2.475	1	.200	(1)	-3.901	8.782	-2.475
2	.500	(1)	-1.339	8.287	-2.475	2	.500	(1)	-1.339	8.287	-2.475
3	.650	(1)	-.116	8.025	-2.475	3	.650	(1)	-.116	8.025	-2.475
4	.900	(1)	1.834	7.567	-2.475	4	.900	(1)	1.834	7.567	-2.475
5	1.100	(1)	3.309	7.182	-2.475	5	1.100	(1)	3.309	7.182	-2.475
6	4.895	(1)	13.950	-1.766	-2.475	6	4.895	(1)	13.950	-1.766	-2.475
7	8.640	(1)	-9.564	-10.615	-2.475	7	8.640	(1)	-9.564	-10.615	-2.475
8	8.890	(1)	-12.279	-11.100	-2.475	8	8.890	(1)	-12.279	-11.100	-2.475
9	9.090	(1)	-14.536	-11.468	-2.475	9	9.090	(1)	-14.536	-11.468	-2.475
10	9.240	(1)	-16.276	-11.733	-2.475	10	9.240	(1)	-16.276	-11.733	-2.475
11	9.540	(1)	-19.872	-12.235	-2.475	11	9.540	(1)	-19.872	-12.235	-2.475
JTAN	9.790	(1)	-22.980	-12.623	-2.475	JTAN	9.790	(1)	-22.980	-12.623	-2.475
= = MEMBER 2 (2 - 3) G = =						= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(1)	-20.874	11.111	-1.552	ITAN	0.000	(1)	-20.874	11.111	-1.552
1	.250	(1)	-18.144	10.723	-1.552	1	.250	(1)	-18.144	10.723	-1.552
2	.550	(1)	-15.002	10.221	-1.552	2	.550	(1)	-15.002	10.221	-1.552
3	.700	(1)	-13.488	9.956	-1.552	3	.700	(1)	-13.488	9.956	-1.552
4	.900	(1)	-11.534	9.588	-1.552	4	.900	(1)	-11.534	9.588	-1.552
5	1.150	(1)	-9.197	9.103	-1.552	5	1.150	(1)	-9.197	9.103	-1.552
6	5.000	(1)	8.667	-.000	-1.552	6	5.000	(1)	8.667	-.000	-1.552
7	8.850	(1)	-9.197	-9.103	-1.552	7	8.850	(1)	-9.197	-9.103	-1.552
8	9.100	(1)	-11.534	-9.588	-1.552	8	9.100	(1)	-11.534	-9.588	-1.552
9	9.300	(1)	-13.488	-9.956	-1.552	9	9.300	(1)	-13.488	-9.956	-1.552
10	9.450	(1)	-15.002	-10.221	-1.552	10	9.450	(1)	-15.002	-10.221	-1.552
11	9.750	(1)	-18.144	-10.723	-1.552	11	9.750	(1)	-18.144	-10.723	-1.552
JTAN	10.000	(1)	-20.874	-11.111	-1.552	JTAN	10.000	(1)	-20.874	-11.111	-1.552
= = MEMBER 3 (3 - 4) G = =						= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(1)	-22.980	12.623	-2.475	ITAN	0.000	(1)	-22.980	12.623	-2.475
1	.250	(1)	-19.872	12.235	-2.475	1	.250	(1)	-19.872	12.235	-2.475
2	.550	(1)	-16.276	11.733	-2.475	2	.550	(1)	-16.276	11.733	-2.475
3	.700	(1)	-14.536	11.468	-2.475	3	.700	(1)	-14.536	11.468	-2.475
4	.900	(1)	-12.279	11.100	-2.475	4	.900	(1)	-12.279	11.100	-2.475
5	1.150	(1)	-9.564	10.615	-2.475	5	1.150	(1)	-9.564	10.615	-2.475
6	4.895	(1)	13.950	1.766	-2.475	6	4.895	(1)	13.950	1.766	-2.475
7	8.690	(1)	3.309	-7.182	-2.475	7	8.690	(1)	3.309	-7.182	-2.475
8	8.890	(1)	1.834	-7.567	-2.475	6	8.890	(1)	1.834	-7.567	-2.475
9	9.140	(1)	-.116	-8.025	-2.475	9	9.140	(1)	-.116	-8.025	-2.475
10	9.290	(1)	-1.339	-8.287	-2.475	10	9.290	(1)	-1.339	-8.287	-2.475
11	9.540	(1)	-3.463	-8.702	-2.475	11	9.540	(1)	-3.463	-8.702	-2.475
JTAN	9.790	(1)	-5.688	-9.091	-2.475	JTAN	9.790	(1)	-5.688	-9.091	-2.475

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 1

SHEAR MAXIMUM	L	CASE	M	Q	N	SHEAR MINIMUM	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	5.688	-2.475	-21.151	ITAN	0.000	(1)	5.688	-2.475	-21.151
JTAN	3.438	(1)	-2.819	-2.475	-22.870	JTAN	3.438	(1)	-2.819	-2.475	-22.870
= = MEMBER 5 (2 - 6) C = =						= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(1)	-2.106	.922	-46.564	ITAN	0.000	(1)	-2.106	.922	-46.564
JTAN	3.438	(1)	1.065	.922	-48.730	JTAN	3.438	(1)	1.065	.922	-48.730
= = MEMBER 6 (3 - 7) C = =						= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(1)	2.106	-.922	-46.564	ITAN	0.000	(1)	2.106	-.922	-46.564
JTAN	3.438	(1)	-1.065	-.922	-48.730	JTAN	3.438	(1)	-1.065	-.922	-48.730
= = MEMBER 7 (4 - 8) C = =						= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(1)	-5.688	2.475	-21.151	ITAN	0.000	(1)	-5.688	2.475	-21.151
JTAN	3.438	(1)	2.819	2.475	-22.870	JTAN	3.438	(1)	2.819	2.475	-22.878

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 1.

AXIAL MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-5.688	9.091	-2.475
1	.200	(1)	-3.901	8.782	-2.475
2	.500	(1)	-1.339	8.287	-2.475
3	.650	(1)	-.116	8.025	-2.475
4	.900	(1)	1.834	7.567	-2.475
5	1.100	(1)	3.309	7.182	-2.475
6	4.895	(1)	13.950	-1.766	-2.475
7	8.640	(1)	-9.564	-10.615	-2.475
8	8.890	(1)	-12.279	-11.100	-2.475
9	9.090	(1)	-14.536	-11.468	-2.475
10	9.240	(1)	-16.276	-11.733	-2.475
11	9.540	(1)	-19.872	-12.235	-2.475
JTAN	9.790	(1)	-22.980	-12.623	-2.475
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(1)	-20.874	11.111	-1.552
1	.250	(1)	-18.144	10.723	-1.552
2	.550	(1)	-15.002	10.221	-1.552
3	.700	(1)	-13.488	9.956	-1.552
4	.900	(1)	-11.534	9.588	-1.552
5	1.150	(1)	-9.197	9.103	-1.552
6	5.000	(1)	8.667	-.000	-1.552
7	8.850	(1)	-9.197	-9.103	-1.552
8	9.100	(1)	-11.534	-9.588	-1.552
9	9.300	(1)	-13.488	-9.956	-1.552
10	9.450	(1)	-15.002	-10.221	-1.552
11	9.750	(1)	-18.144	-10.723	-1.552
JTAN	10.000	(1)	-20.874	-11.111	-1.552
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(1)	-22.980	12.623	-2.475
1	.250	(1)	-19.872	12.235	-2.475
2	.550	(1)	-16.276	11.733	-2.475
3	.700	(1)	-14.536	11.468	-2.475
4	.900	(1)	-12.279	11.100	-2.475
5	1.150	(1)	-9.564	10.615	-2.475
6	4.895	(1)	13.950	1.766	-2.475
7	8.690	(1)	3.309	-7.182	-2.475
8	8.890	(1)	1.834	-7.567	-2.475
9	9.140	(1)	-.116	-8.025	-2.475
10	9.290	(1)	-1.339	-8.287	-2.475
11	9.540	(1)	-3.463	-8.702	-2.475
JTAN	9.790	(1)	-5.688	-9.091	-2.475

AXIAL MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(1)	-5.688	9.091	-2.475
1	.200	(1)	-3.901	8.782	-2.475
2	.500	(1)	-1.339	8.287	-2.475
3	.650	(1)	-.116	8.025	-2.475
4	.900	(1)	1.834	7.567	-2.475
5	1.100	(1)	3.309	7.182	-2.475
6	4.895	(1)	13.950	-1.766	-2.475
7	8.640	(1)	-9.564	-10.615	-2.475
8	8.890	(1)	-12.279	-11.100	-2.475
9	9.090	(1)	-14.536	-11.468	-2.475
10	9.240	(1)	-16.276	-11.733	-2.475
11	9.540	(1)	-19.872	-12.235	-2.475
JTAN	9.790	(1)	-22.980	-12.623	-2.475
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(1)	-20.874	11.111	-1.552
1	.250	(1)	-18.144	10.723	-1.552
2	.550	(1)	-15.002	10.221	-1.552
3	.700	(1)	-13.488	9.956	-1.552
4	.900	(1)	-11.534	9.588	-1.552
5	1.150	(1)	-9.197	9.103	-1.552
6	5.000	(1)	8.667	-.000	-1.552
7	8.850	(1)	-9.197	-9.103	-1.552
8	9.100	(1)	-11.534	-9.588	-1.552
9	9.300	(1)	-13.488	-9.956	-1.552
10	9.450	(1)	-15.002	-10.221	-1.552
11	9.750	(1)	-18.144	-10.723	-1.552
JTAN	10.000	(1)	-20.874	-11.111	-1.552
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(1)	-22.980	12.623	-2.475
1	.250	(1)	-19.872	12.235	-2.475
2	.550	(1)	-16.276	11.733	-2.475
3	.700	(1)	-14.536	11.468	-2.475
4	.900	(1)	-12.279	11.100	-2.475
5	1.150	(1)	-9.564	10.615	-2.475
6	4.895	(1)	13.950	1.766	-2.475
7	8.690	(1)	3.309	-7.182	-2.475
8	8.890	(1)	1.834	-7.567	-2.475
9	9.140	(1)	-.116	-8.025	-2.475
10	9.290	(1)	-1.339	-8.287	-2.475
11	9.540	(1)	-3.463	-8.702	-2.475
JTAN	9.790	(1)	-5.688	-9.091	-2.475

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 — CRC-FANSY V6.3

PICK UP 1

AXIAL MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	5.688	-2.475	-21.151
JTAN	3.438	(1)	-2.819	-2.475	-22.870
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(1)	-2.106	.922	-46.564
JTAN	3.438	(1)	1.065	.922	-48.730
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(1)	2.106	-.922	-46.564
JTAN	3.438	(1)	-1.065	-.922	-48.730
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(1)	-5.688	2.475	-21.151
JTAN	3.438	(1)	2.819	2.475	-22.870

AXIAL MINIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(1)	5.688	-2.475	-21.151
JTAN	3.438	(1)	-2.819	-2.475	-22.870
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(1)	-2.106	.922	-46.564
JTAN	3.438	(1)	1.065	.922	-48.730
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(1)	2.106	-.922	-46.564
JTAN	3.438	(1)	-1.065	-.922	-48.730
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(1)	-5.688	2.475	-21.151
JTAN	3.438	(1)	2.819	2.475	-22.870

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 2

	MOMENT MAXIMUM					MOMENT MINIMUM				
	L	CASE	M	Q	N	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =										
ITAN	0.000	(8)	3.628	6.465	3.278	0.000	(6)	-8.771	13.877	-3.816
1	.200	(8)	4.895	6.197	3.278	.200	(7)	-6.707	8.213	-4.324
2	.500	(8)	6.690	5.767	3.278	.500	(7)	-4.306	7.782	-4.324
3	.650	(8)	7.538	5.539	3.278	.650	(7)	-3.156	7.555	-4.324
4	.900	(8)	8.874	5.141	3.278	.900	(7)	-1.317	7.156	-4.324
5	1.100	(8)	9.868	4.806	3.278	1.100	(7)	.081	6.821	-4.324
6	4.895	(6)	21.609	-2.733	-3.816	4.895	(10)	9.288	-.628	-.852
7	8.640	(10)	-4.331	-6.528	-.852	8.640	(6)	-14.865	-16.426	-3.816
8	8.890	(10)	-6.004	-6.851	-.852	8.890	(6)	-19.063	-17.148	-3.816
9	9.090	(10)	-7.399	-7.097	-.852	9.090	(6)	-22.547	-17.690	-3.816
10	9.240	(10)	-8.477	-7.273	-.852	9.240	(6)	-25.230	-18.076	-3.816
11	9.540	(10)	-10.709	-7.608	-.852	9.540	(6)	-30.763	-18.797	-3.816
JTAN	9.790	(10)	-12.644	-7.866	-.852	9.790	(6)	-35.531	-19.343	-3.816
MAX	4.351	(6)	22.540	-.688	-3.816	4.351	(10)	9.391	.249	-.852
= = MEMBER 2 (2 - 3) G = =										
ITAN	0.000	(9)	-11.308	6.886	-1.035	0.000	(6)	-32.264	17.005	-2.385
1	.250	(9)	-9.618	6.627	-1.035	.250	(6)	-28.080	16.458	-2.385
2	.550	(9)	-7.680	6.293	-1.035	.550	(6)	-23.249	15.738	-2.385
3	.700	(9)	-6.749	6.116	-1.035	.700	(6)	-20.917	15.351	-2.385
4	.900	(9)	-5.550	5.870	-1.035	.900	(6)	-17.900	14.809	-2.385
5	1.150	(9)	-4.122	5.547	-1.035	1.150	(6)	-14.287	14.088	-2.385
6	5.000	(6)	13.450	-.000	-2.385	5.000	(9)	5.778	-.522	-1.035
7	8.850	(10)	-4.122	-5.547	-1.035	8.850	(6)	-14.287	-14.088	-2.385
8	9.100	(10)	-5.550	-5.870	-1.035	9.100	(6)	-17.900	-14.809	-2.385
9	9.300	(10)	-6.749	-6.116	-1.035	9.300	(6)	-20.917	-15.351	-2.385
10	9.450	(10)	-7.680	-6.293	-1.035	9.450	(6)	-23.249	-15.738	-2.385
11	9.750	(10)	-9.618	-6.627	-1.035	9.750	(6)	-28.080	-16.458	-2.385
JTAN	10.000	(10)	-11.308	-6.886	-1.035	10.000	(6)	-32.264	-17.005	-2.385
MAX	5.000	(6)	13.450	-.000	-2.385	5.000	(9)	5.778	-.522	-1.035

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 2

	MOMENT MAXIMUM						MOMENT MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 3 (3 - 4) G = =						= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(9)	-12.644	7.866	-.852	ITAN	0.000	(6)	-35.531	19.343	-3.816
1	.250	(9)	-10.709	7.608	-.852	1	.250	(6)	-30.763	18.797	-3.816
2	.550	(9)	-8.477	7.273	-.852	2	.550	(6)	-25.230	18.076	-3.816
3	.700	(9)	-7.399	7.097	-.852	3	.700	(6)	-22.547	17.690	-3.816
4	.900	(9)	-6.004	6.851	-.852	4	.900	(6)	-19.063	17.148	-3.816
5	1.150	(9)	-4.331	6.528	-.852	5	1.150	(6)	-14.865	16.426	-3.816
6	4.895	(6)	21.609	2.733	-3.816	6	4.895	(9)	9.288	.628	-.852
7	6.690	(8)	9.868	-4.806	3.278	7	8.690	(7)	.081	-6.821	-4.324
8	8.890	(8)	8.874	-5.141	3.278	8	8.890	(7)	-1.317	-7.156	-4.324
9	9.140	(8)	7.538	-5.539	3.278	9	9.140	(7)	-3.156	-7.555	-4.324
10	9.290	(8)	6.690	-5.767	3.278	10	9.290	(7)	-4.306	-7.782	-4.324
11	9.540	(8)	5.203	-6.128	3.278	11	9.540	(7)	-6.298	-8.143	-4.324
JTAN	9.790	(8)	3.628	-6.465	3.278	JTAN	9.790	(6)	-8.771	-13.877	-3.816
MAX	5.439	(6)	22.540	.688	-3.816	MAX	5.439	(9)	9.391	-.249	-.852
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(6)	6.771	-3.816	-27.017	ITAN	0.000	(8)	-3.628	3.278	-16.953
JTAN	3.438	(8)	7.641	3.278	-18.448	JTAN	3.438	(7)	-6.489	-4.324	-20.463
= = MEMBER 5 (2 - 6) C = =						= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(10)	3.882	-2.657	-31.017	ITAN	0.000	(8)	-8.174	4.678	-41.932
JTAN	3.438	(8)	7.908	4.678	-43.815	JTAN	3.438	(10)	-5.252	-2.657	-32.461
= = MEMBER 6 (3 - 7) C = =						= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(8)	8.174	-4.678	-41.932	ITAN	0.000	(9)	-3.882	2.657	-31.017
JTAN	3.438	(9)	5.252	2.657	-32.461	JTAN	3.438	(8)	-7.908	-4.678	-43.815
= = MEMBER 7 (4 - 8) C = =						= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(8)	3.628	-3.278	-16.953	ITAN	0.000	(6)	-8.771	3.816	-27.017
JTAN	3.438	(7)	6.489	4.324	-20.463	JTAN	3.438	(8)	-7.641	-3.278	-18.448

PICK UP 2

	SHEAR MAXIMUM					SHEAR MINIMUM				
	L	CASE	M	Q	N	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =										
ITAN	0.000	(6)	-8.771	13.877	-3.816	0.000	(9)	-1.090	5.511	-2.448
1	.200	(6)	-6.039	13.443	-3.816	.200	(9)	-.009	5.306	-2.448
2	.500	(6)	-2.110	12.734	-3.816	.500	(9)	1.534	4.976	-2.448
3	.650	(6)	-.228	12.354	-3.816	.650	(9)	2.268	4.801	-2.448
4	.900	(6)	2.777	11.681	-3.816	.900	(9)	3.430	4.496	-2.448
5	1.100	(6)	5.056	11.108	-3.816	1.100	(9)	4.304	4.239	-2.448
6	4.895	(10)	9.288	-.628	-.852	4.895	(8)	13.658	-2.976	3.278
7	8.640	(10)	-4.331	-6.528	-.852	8.640	(6)	-14.865	-16.426	-3.816
8	8.890	(10)	-6.004	-6.851	-.852	8.890	(6)	-19.063	-17.148	-3.816
9	9.090	(10)	-7.399	-7.097	-.852	9.090	(6)	-22.547	-17.690	-3.816
10	9.240	(10)	-8.477	-7.273	-.852	9.240	(6)	-25.230	-18.076	-3.816
11	9.540	(10)	-10.709	-7.608	-.852	9.540	(6)	-30.763	-18.797	-3.816
JTAN	9.790	(10)	-12.644	-7.866	-.852	9.790	(6)	-35.531	-19.343	-3.816
= = MEMBER 2 (2 - 3) G = =										
ITAN	0.000	(6)	-32.264	17.005	-2.385	0.000	(9)	-11.308	6.886	-1.035
1	.250	(6)	-28.080	16.458	-2.385	.250	(9)	-9.618	6.627	-1.035
2	.550	(6)	-23.249	15.738	-2.385	.550	(9)	-7.680	6.293	-1.035
3	.700	(6)	-20.917	15.351	-2.385	.700	(9)	-6.749	6.116	-1.035
4	.900	(6)	-17.900	14.809	-2.385	.900	(9)	-5.550	5.870	-1.035
5	1.150	(6)	-14.287	14.088	-2.385	1.150	(9)	-4.122	5.547	-1.035
6	5.000	(10)	5.778	.522	-1.035	5.000	(9)	5.778	-.522	-1.035
7	8.850	(10)	-4.122	-5.547	-1.035	8.850	(6)	-14.287	-14.088	-2.385
8	9.100	(10)	-5.550	-5.870	-1.035	9.100	(6)	-17.900	-14.809	-2.385
9	9.300	(10)	-6.749	-6.116	-1.035	9.300	(6)	-20.917	-15.351	-2.385
10	9.450	(10)	-7.680	-6.293	-1.035	9.450	(6)	-23.249	-15.738	-2.385
11	9.750	(10)	-9.618	-6.627	-1.035	9.750	(6)	-28.080	-16.458	-2.385
JTAN	10.000	(10)	-11.308	-6.886	-1.035	10.000	(6)	-32.264	-17.005	-2.385
= = MEMBER 3 (3 - 4) G = =										
ITAN	0.000	(6)	-35.531	19.343	-3.816	0.000	(9)	-12.644	7.866	-.852
1	.250	(6)	-30.763	18.797	-3.816	.250	(9)	-10.709	7.608	-.852
2	.550	(6)	-25.230	18.076	-3.816	.550	(9)	-8.477	7.273	-.852
3	.700	(6)	-22.547	17.690	-3.816	.700	(9)	-7.399	7.097	-.852
4	.900	(6)	-19.063	17.148	-3.816	.900	(9)	-6.004	6.851	-.852
5	1.150	(6)	-14.865	16.426	-3.816	1.150	(9)	-4.331	6.528	-.852
6	4.895	(8)	13.658	2.976	3.278	4.895	(9)	9.288	.628	-.852
7	8.690	(10)	4.304	-4.239	-2.448	8.690	(6)	5.056	-11.108	-3.816
8	8.890	(10)	3.430	-4.496	-2.448	8.890	(6)	2.777	-11.681	-3.816
9	9.140	(10)	2.268	-4.801	-2.446	9.140	(6)	-.228	-12.354	-3.816
10	9.290	(10)	1.534	-4.976	-2.448	9.290	(6)	-2.110	-12.734	-3.816
11	9.540	(10)	.255	-5.252	-2.448	9.540	(6)	-5.369	-13.330	-3.816
JTAN	9.790	(10)	-1.090	-5.511	-2.448	9.790	(6)	-8.771	-13.877	-3.816

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 2

SHEAR MAXIMUM	L	CASE	M	Q	N	SHEAR MINIMUM	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(8)	-3.628	3.278	-16.953	ITAN	0.000	(7)	8.376	-4.324	-18.968
JTAN	3.438	(8)	7.641	3.278	-18.448	JTAN	3.438	(7)	-6.489	-4.324	-20.463
= = MEMBER 5 (2 - 6) C = =						= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(8)	-8.174	4.678	-41.932	ITAN	0.000	(10)	3.882	-2.657	-31.017
JTAN	3.436	(8)	7.908	4.678	-43.815	JTAN	3.438	(10)	-5.252	-2.657	-32.461
= = MEMBER 6 (3 - 7) C = =						= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(9)	-3.882	2.657	-31.017	ITAN	0.000	(8)	8.174	-4.678	-41.932
JTAN	3.438	(9)	5.252	2.657	-32.461	JTAN	3.438	(8)	-7.908	-4.678	-43.815
= = MEMBER 7 (4 - 8) C = =						= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(7)	-8.376	4.324	-18.968	ITAN	0.000	(8)	3.628	-3.278	-16.953
JTAN	3.438	(7)	6.489	4.324	-20.463	JTAN	3.438	(8)	-7.641	-3.278	-18.448

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 2

AXIAL MAXIMUM

	-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(8)	3.628	6.465	3.278
1	.200	(8)	4.895	6.197	3.278
2	.500	(8)	6.690	5.767	3.278
3	.650	(8)	7.538	5.539	3.278
4	.900	(8)	8.874	5.141	3.278
5	1.100	(8)	9.868	4.806	3.278
6	4.895	(8)	13.658	-2.976	3.278
7	8.640	(8)	-12.181	-10.671	3.278
8	8.890	(8)	-14.902	-11.092	3.278
9	9.090	(8)	-17.153	-11.413	3.278
10	9.240	(8)	-18.882	-11.643	3.278
11	9.540	(8)	-22.441	-12.079	3.278
JTAN	9.790	(8)	-25.504	-12.417	3.276
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(8)	-17.330	9.662	7.956
1	.250	(8)	-14.956	9.324	7.956
2	.550	(8)	-12.223	8.888	7.956
3	.700	(8)	-10.907	8.658	7.956
4	.900	(8)	-9.207	8.337	7.956
5	1.150	(8)	-7.175	7.916	7.956
6	5.000	(8)	8.359	.000	7.956
7	8.850	(6)	-7.175	-7.916	7.956
8	9.100	(8)	-9.207	-8.337	7.956
9	9.300	(8)	-10.907	-8.658	7.956
10	9.450	(8)	-12.223	-8.888	7.956
11	9.750	(8)	-14.956	-9.324	7.956
JTAN	10.000	(8)	-17.330	-9.662	7.956
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(8)	-25.504	12.417	3.278
1	.250	(8)	-22.441	12.079	3.278
2	.550	(8)	-18.882	11.643	3.278
3	.700	(6)	-17.153	11.413	3.278
4	.900	(6)	-14.902	11.092	3.278
5	1.150	(8)	-12.181	10.671	3.278
6	4.895	(6)	13.658	2.976	3.278
7	8.690	(8)	9.868	-4.806	3.278
8	8.690	(6)	8.874	-5.141	3.278
9	9.140	(8)	7.538	-5.539	3.278
10	9.290	(6)	6.690	-5.767	3.278
11	9.540	(8)	5.203	-6.128	3.278
JTAN	9.790	(8)	3.628	-6.465	3.278

AXIAL MINIMUM

	-----L---	-CASE-	-----M---	-----Q---	-----N---
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(7)	-8.376	8.481	-4.324
1	.200	(7)	-6.707	8.213	-4.324
2	.500	(7)	-4.306	7.782	-4.324
3	.650	(7)	-3.156	7.555	-4.324
4	.900	(7)	-1.317	7.156	-4.324
5	1.100	(7)	.081	6.821	-4.324
6	4.895	(7)	11.520	-.960	-4.324
7	8.640	(7)	-6.771	-8.655	-4.324
8	8.890	(7)	-8.988	-9.077	-4.324
9	9.090	(7)	-10.836	-9.397	-4.324
10	9.240	(7)	-12.262	-9.628	-4.324
11	9.540	(7)	-15.217	-10.064	-4.324
JTAN	9.790	(7)	-17.776	-10.401	-4.324
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(7)	-18.481	9.662	-5.072
1	.250	(7)	-16.107	9.324	-5.072
2	.550	(7)	-13.374	8.888	-5.072
3	.700	(7)	-12.058	8.658	-5.072
4	.900	(7)	-10.359	8.337	-5.072
5	1.150	(7)	-8.326	7.916	-5.072
6	5.000	(7)	7.208	-.000	-5.072
7	8.850	(7)	-8.326	-7.916	-5.072
8	9.100	(7)	-10.359	-8.337	-5.072
9	9.300	(7)	-12.058	-8.658	-5.072
10	9.450	(7)	-13.374	-8.888	-5.072
11	9.750	(7)	-16.107	-9.324	-5.072
JTAN	10.000	(7)	-18.481	-9.662	-5.072
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(7)	-17.776	10.401	-4.324
1	.250	(7)	-15.217	10.064	-4.324
2	.550	(7)	-12.262	9.628	-4.324
3	.700	(7)	-10.836	9.397	-4.324
4	.900	(7)	-8.988	9.077	-4.324
5	1.150	(7)	-6.771	8.655	-4.324
6	4.895	(7)	11.520	.960	-4.324
7	8.690	(7)	.081	-6.821	-4.324
8	8.890	(7)	-1.317	-7.156	-4.324
9	9.140	(7)	-3.156	-7.555	-4.324
10	9.290	(7)	-4.306	-7.782	-4.324
11	9.540	(7)	-6.298	-8.143	-4.324
JTAN	9.790	(7)	-8.376	-8.481	-4.324

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 2

AXIAL MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(9)	1.090	.026	-13.552
JTAN	3.438	(9)	1.178	.026	-14.698
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(10)	3.882	-2.657	-31.017
JTAN	3.438	(10)	-5.252	-2.657	-32.461
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(9)	-3.882	2.657	-31.017
JTAN	3.438	(9)	5.252	2.657	-32.461
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(10)	-1.090	-.026	-13.552
JTAN	3.438	(10)	-1.178	-.026	-14.698

AXIAL MINIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(6)	8.771	-3.816	-27.017
JTAN	3.438	(6)	-4.347	-3.816	-28.736
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(6)	-3.267	1.431	-60.798
JTAN	3.438	(6)	1.652	1.431	-62.964
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(6)	3.267	-1.431	-60.798
JTAN	3.438	(6)	-1.652	-1.431	-62.964
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(6)	-8.771	3.816	-27.017
JTAN	3.438	(6)	4.347	3.816	-28.736

TITLE,.VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 3

MOMENT MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(9)	-1.090	5.511	-2.448
1	.200	(9)	-.009	5.306	-2.448
2	.500	(9)	1.534	4.976	-2.448
3	.650	(9)	2.268	4.801	-2.448
4	.900	(9)	3.430	4.496	-2.448
5	1.100	(9)	4.304	4.239	-2.448
6	4.895	(9)	9.313	-1.727	-2.448
7	8.640	(10)	-4.331	-6.528	-.852
8	8.890	(10)	-6.004	-6.851	-.352
9	9.090	(10)	-7.399	-7.097	-.852
10	9.240	(10)	-8.477	-7.273	-.852
11	9.540	(10)	-10.709	-7.608	-.852
JTAN	9.790	(10)	-12.644	-7.866	-.852
MAX	4.351	(9)	10.013	-.849	-2.448
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(9)	-11.308	6.886	-1.035
1	.250	(9)	-9.618	6.627	-1.035
2	.550	(9)	-7.680	6.293	-1.035
3	.700	(9)	-6.749	6.116	-1.035
4	.900	(9)	-5.550	5.870	-1.035
5	1.150	(9)	-4.122	5.547	-1.035
6	5.000	(9)	5.778	-.522	-1.035
7	8.850	(10)	-4.122	-5.547	-1.035
8	9.100	(10)	-5.550	-5.870	-1.035
9	9.300	(10)	-6.749	-6.116	-1.035
10	9.450	(10)	-7.680	-6.293	-1.035
11	9.750	(10)	-9.618	-6.627	-1.035
JTAN	10.000	(10)	-11.308	-6.886	-1.035
MAX	5.556	(10)	5.819	-.375	-1.035

MOMENT MINIMUM

	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =					
ITAN	0.000	(10)	-6.494	6.610	-.852
1	.200	(10)	-5.192	6.404	-.852
2	.500	(10)	-3.320	6.074	-.852
3	.650	(10)	-2.422	5.900	-.852
4	.900	(10)	-.985	5.595	-.852
5	1.100	(10)	.109	5.337	-.852
6	4.895	(10)	9.288	-.628	-.852
7	8.640	(9)	-8.421	-7.627	-2.448
8	8.890	(9)	-10.369	-7.950	-2.448
9	9.090	(9)	-11.984	-8.195	-2.448
10	9.240	(9)	-13.226	-8.372	-2.448
11	9.540	(9)	-15.789	-8.706	-2.448
JTAN	9.790	(9)	-17.998	-8.965	-2.448
MAX	4.351	(10)	9.391	.249	-.852
= = MEMBER 2 (2 - 3) G = =					
ITAN	0.000	(10)	-16.526	7.930	-1.035
1	.250	(10)	-14.575	7.671	-1.035
2	.550	(10)	-12.324	7.336	-1.035
3	.700	(10)	-11.237	7.160	-1.035
4	.900	(10)	-9.829	6.914	-1.035
5	1.150	(10)	-8.140	6.591	-1.035
6	5.000	(9)	5.778	-.522	-1.035
7	8.850	(9)	-8.140	-6.591	-1.035
8	9.100	(9)	-9.829	-6.914	-1.035
9	9.300	(9)	-11.237	-7.160	-1.035
10	9.450	(9)	-12.324	-7.336	-1.035
11	9.750	(9)	-14.575	-7.671	-1.035
JTAN	10.000	(9)	-16.526	-7.930	-1.035
MAX	5.000	(9)	5.778	-.522	-1.035

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 3.

MOMENT MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(9)	-12.644	7.866	-.852
1	.250	(9)	-10.709	7.608	-.852
2	.550	(9)	-8.477	7.273	-.852
3	.700	(9)	-7.399	7.097	-.852
4	.900	(9)	-6.004	6.851	-.852
5	1.150	(9)	-4.331	6.528	-.852
6	4.895	(10)	9.313	1.727	-2.448
7	8.690	(10)	4.304	-4.239	-2.448
8	8.890	(10)	3.430	-4.496	-2.448
9	9.140	(10)	2.268	-4.801	-2.448
10	9.290	(10)	1.534	-4.976	-2.448
11	9.540	(10)	.255	-5.252	-2.448
JTAN	9.790	(10)	-1.090	-5.511	-2.448
MAX	5.439	(10)	10.013	.849	-2.448
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(10)	6.494	-3.325	-14.651
JTAN	3.438	(9)	1.178	.026	-14.698
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(10)	3.882	-2.657	-31.017
JTAN	3.438	(9)	6.672	3.887	-32.516
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(10)	6.690	-3.887	-31.072
JTAN	3.438	(9)	5.252	2.657	-32.461
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(10)	-1.090	-.026	-13.552
JTAN	3.438	(9)	4.937	3.325	-15.797

MOMENT MINIMUM

	L	CASE	M	Q	N
= = MEMBER 3 (3 - 4) G = =					
ITAN	0.000	(10)	-17.998	8.965	-2.448
1	.250	(10)	-15.789	8.706	-2.448
2	.550	(10)	-13.226	8.372	-2.448
3	.700	(10)	-11.984	8.195	-2.448
4	.900	(10)	-10.369	7.950	-2.448
5	1.150	(10)	-8.421	7.627	-2.448
6	4.895	(9)	9.288	.628	-.852
7	8.690	(9)	-.109	-5.337	-.852
8	8.890	(9)	-.985	-5.595	-.852
9	9.140	(9)	-2.422	-5.900	-.852
10	9.290	(9)	-3.320	-6.074	-.852
11	9.540	(9)	-4.874	-6.351	-.852
JTAN	9.790	(9)	-6.494	-6.610	-.852
MAX	5.439	(9)	9.391	-.249	-.852
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(9)	1.090	.026	-13.552
JTAN	3.438	(10)	-4.937	-3.325	-15.797
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(9)	-6.690	3.887	-31.072
JTAN	3.438	(10)	-5.252	-2.657	-32.461
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(9)	-3.882	2.657	-31.017
JTAN	3.438	(10)	-6.672	-3.887	-32.516
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(9)	-6.494	3.325	-14.651
JTAN	3.438	(10)	-1.178	-.026	-14.698

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 3

	SHEAR MAXIMUM					SHEAR MINIMUM				
	L	CASE	M	Q	N	L	CASE	M	Q	N
= = MEMBER 1 (1 - 2) G = =										
ITAN	0.000	(10)	-6.494	6.610	-.852	0.000	(9)	-1.090	5.511	-2.448
1	.200	(10)	-5.192	6.404	-.852	.200	(9)	-.009	5.306	-2.448
2	.500	(10)	-3.320	6.074	-.852	.500	(9)	1.534	4.976	-2.448
3	.650	(10)	-2.422	5.900	-.852	.650	(9)	2.268	4.801	-2.448
4	.900	(10)	-.985	5.595	-.852	.900	(9)	3.430	4.496	-2.448
5	1.100	(10)	.109	5.337	-.852	1.100	(9)	4.304	4.239	-2.448
6	4.895	(10)	9.288	-.628	-.852	4.895	(9)	9.313	-1.727	-2.448
7	8.640	(10)	-4.331	-6.528	-.852	8.640	(9)	-8.421	-7.627	-2.448
8	8.890	(10)	-6.004	-6.851	-.852	8.890	(9)	-10.369	-7.950	-2.448
9	9.090	(10)	-7.399	-7.097	-.852	9.090	(9)	-11.984	-8.195	-2.448
10	9.240	(10)	-8.477	-7.273	-.852	9.240	(9)	-13.226	-8.372	-2.448
11	9.540	(10)	-10.709	-7.608	-.852	9.540	(9)	-15.789	-8.706	-2.448
JTAN	9.790	(10)	-12.644	-7.866	-.852	9.790	(9)	-17.998	-8.965	-2.448
= = MEMBER 2 (2 - 3) G = =										
ITAN	0.000	(10)	-16.526	7.930	-1.035	0.000	(9)	-11.308	6.886	-1.035
1	.250	(10)	-14.575	7.671	-1.035	.250	(9)	-9.618	6.627	-1.035
2	.550	(10)	-12.324	7.336	-1.035	.550	(9)	-7.680	6.293	-1.035
3	.700	(10)	-11.237	7.160	-1.035	.700	(9)	-6.749	6.116	-1.035
4	.900	(10)	-9.629	6.914	-1.035	.900	(9)	-5.550	5.870	-1.035
5	1.150	(10)	-8.140	6.591	-1.035	1.150	(9)	-4.122	5.547	-1.035
6	5.000	(10)	5.778	.522	-1.035	5.000	(9)	5.778	-.522	-1.035
7	8.850	(10)	-4.122	-5.547	-1.035	8.850	(9)	-8.140	-6.591	-1.035
8	9.100	(10)	-5.550	-5.870	-1.035	9.100	(9)	-9.829	-6.914	-1.035
9	9.300	(10)	-6.749	-6.116	-1.035	9.300	(9)	-11.237	-7.160	-1.035
10	9.450	(10)	-7.680	-6.293	-1.035	9.450	(9)	-12.324	-7.336	-1.035
11	9.750	(10)	-9.618	-6.627	-1.035	9.750	(9)	-14.575	-7.671	-1.035
JTAN	10.000	(10)	-11.308	-6.886	-1.035	10.000	(9)	-16.526	-7.930	-1.035
= = MEMBER 3 (3 - 4) G = =										
ITAN	0.000	(10)	-17.998	8.965	-2.448	0.000	(9)	-12.644	7.866	-.852
1	.250	(10)	-15.789	8.706	-2.448	.250	(9)	-10.709	7.608	-.852
2	.550	(10)	-13.226	8.372	-2.448	.550	(9)	-8.477	7.273	-.852
3	.700	(10)	-11.984	8.195	-2.448	.700	(9)	-7.399	7.097	-.852
4	.900	(10)	-10.369	7.950	-2.448	.900	(9)	-6.004	6.851	-.852
5	1.150	(10)	-8.421	7.627	-2.448	1.150	(9)	-4.331	6.528	-.852
6	4.895	(10)	9.313	1.727	-2.448	4.895	(9)	9.288	.628	-.852
7	8.690	(10)	4.304	-4.239	-2.448	8.690	(9)	.109	-5.337	-.852
8	8.890	(10)	3.430	-4.496	-2.448	8.890	(9)	-.985	-5.595	-.852
9	9.140	(10)	2.268	-4.801	-2.448	9.140	(9)	-2.422	-5.900	-.852
10	9.290	(10)	1.534	-4.976	-2.448	9.290	(9)	-3.320	-6.074	-.852
11	9.540	(10)	.255	-5.252	-2.448	9.540	(9)	-4.874	-6.351	-.852
JTAN	9.790	(10)	-1.090	-5.511	-2.448	9.790	(9)	-6.494	-6.610	-.852

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 3

	SHEAR MAXIMUM						SHEAR MINIMUM				
	L	CASE	M	Q	N		L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =						= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(9)	1.090	.026	-13.552	ITAN	0.000	(10)	6.494	-3.325	-14.651
JTAN	3.438	(9)	1.178	.026	-14.698	JTAN	3.438	(10)	-4.937	-3.325	-15.797
= = MEMBER 5 (2 - 6) C = =						= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(9)	-6.690	3.887	-31.072	ITAN	0.000	(10)	3.882	-2.657	-31.017
JTAN	3.438	(9)	6.672	3.887	-32.516	JTAN	3.438	(10)	-5.252	-2.657	-32.461
= = MEMBER 6 (3 - 7) C = =						= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(9)	-3.882	2.657	-31.017	ITAN	0.000	(10)	6.690	-3.887	-31.072
JTAN	3.438	(9)	5.252	2.657	-32.461	JTAN	3.438	(10)	-6.672	-3.887	-32.516
= = MEMBER 7 (4 - 8) C = =						= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(9)	-6.494	3.325	-14.651	ITAN	0.000	(10)	-1.090	-.026	-13.552
JTAN	3.438	(9)	4.937	3.325	-15.797	JTAN	3.438	(10)	-1.178	-.026	-14.698

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 3

AXIAL MAXIMUM

= = MEMBER 1 (1 - 2) G = =

	L	CASE	M	Q	N
ITAN	0.000	(10)	-6.494	6.610	-.852
1	.200	(10)	-5.192	6.404	-.852
2	.500	(10)	-3.320	6.074	-.852
3	.650	(10)	-2.422	5.900	-.852
4	.900	(10)	-.985	5.595	-.852
5	1.100	(10)	.109	5.337	-.852
6	4.895	(10)	9.288	-.628	-.852
7	8.640	(10)	-4.331	-6.528	-.852
8	8.890	(10)	-6.004	-6.851	-.852
9	9.090	(10)	-7.399	-7.097	-.852
10	9.240	(10)	-8.477	-7.273	-.852
11	9.540	(10)	-10.709	-7.608	-.852
JTAN	9.790	(10)	-12.644	-7.866	-.852

= = MEMBER 2 (2 - 3) G = =

	L	CASE	M	Q	N
ITAN	0.000	(9)	-11.308	6.886	-1.035
1	.250	(9)	-9.618	6.627	-1.035
2	.550	(9)	-7.680	6.293	-1.035
3	.700	(9)	-6.749	6.116	-1.035
4	.900	(9)	-5.550	5.870	-1.035
5	1.150	(9)	-4.122	5.547	-1.035
6	5.000	(9)	5.778	-.522	-1.035
7	8.850	(9)	-8.140	-6.591	-1.035
8	9.100	(9)	-9.829	-6.914	-1.035
9	9.300	(9)	-11.237	-7.160	-1.035
10	9.450	(9)	-12.324	-7.336	-1.035
11	9.750	(9)	-14.575	-7.671	-1.035
JTAN	10.000	(9)	-16.526	-7.930	-1.035

= = MEMBER 3 (3 - 4) G = =

	L	CASE	M	Q	N
ITAN	0.000	(9)	-12.644	7.866	-.852
1	.250	(9)	-10.709	7.608	-.852
2	.550	(9)	-8.477	7.273	-.852
3	.700	(9)	-7.399	7.097	-.852
4	.900	(9)	-6.004	6.851	-.852
5	1.150	(9)	-4.331	6.528	-.852
6	4.895	(9)	9.288	.628	-.852
7	8.690	(9)	.109	-5.337	-.852
8	8.890	(9)	-.985	-5.595	-.852
9	9.140	(9)	-2.422	-5.900	-.852
10	9.290	(9)	-3.320	-6.074	-.852
11	9.540	(9)	-4.874	-6.351	-.852
JTAN	9.790	(9)	-6.494	-6.610	-.852

AXIAL MINIMUM

= = MEMBER 1 (1 - 2) G = =

	L	CASE	M	Q	N
ITAN	0.000	(9)	-1.090	5.511	-2.448
1	.200	(9)	-.089	5.306	-2.448
2	.500	(9)	1.534	4.976	-2.448
3	.650	(9)	2.268	4.801	-2.448
4	.900	(9)	3.430	4.496	-2.448
5	1.100	(9)	4.304	4.239	-2.448
6	4.895	(9)	9.313	-1.727	-2.448
7	8.640	(9)	-8.421	-7.627	-2.448
8	8.890	(9)	-10.369	-7.950	-2.448
9	9.090	(9)	-11.984	-8.195	-2.448
10	9.240	(9)	-13.226	-8.372	-2.448
11	9.540	(9)	-15.789	-8.706	-2.448
JTAN	9.790	(9)	-17.998	-8.965	-2.448

= = MEMBER 2 (2 - 3) G = =

	L	CASE	M	Q	N
ITAN	0.000	(10)	-16.526	7.930	-1.035
1	.250	(10)	-14.575	7.671	-1.035
2	.550	(10)	-12.324	7.336	-1.035
3	.700	(10)	-11.237	7.160	-1.035
4	.900	(10)	-9.829	6.914	-1.035
5	1.150	(10)	-8.140	6.591	-1.035
6	5.000	(10)	5.778	.522	-1.035
7	8.850	(10)	-4.122	-5.547	-1.035
8	9.100	(10)	-5.550	-5.870	-1.035
9	9.300	(10)	-6.749	-6.116	-1.035
10	9.450	(10)	-7.680	-6.293	-1.035
11	9.750	(10)	-9.618	-6.627	-1.035
JTAN	10.000	(10)	-11.308	-6.886	-1.035

= = MEMBER 3 (3 - 4) G = =

	L	CASE	M	Q	N
ITAN	0.000	(10)	-17.998	8.965	-2.448
1	.250	(10)	-15.789	8.706	-2.448
2	.550	(10)	-13.226	8.372	-2.448
3	.700	(10)	-11.984	8.195	-2.448
4	.900	(10)	-10.369	7.950	-2.448
5	1.150	(10)	-8.421	7.627	-2.448
6	4.895	(10)	9.313	1.727	-2.448
7	8.690	(10)	4.304	-4.239	-2.448
8	8.890	(10)	3.430	-4.496	-2.448
9	9.140	(10)	2.268	-4.801	-2.448
10	9.290	(10)	1.534	-4.976	-2.448
11	9.540	(10)	.255	-5.252	-2.448
JTAN	9.790	(10)	-1.090	-5.511	-2.448

TITLE..VIADUCT OF PLATFORM (CENTRAL) L-1 CRC-FANSY V6.3

PICK UP 3

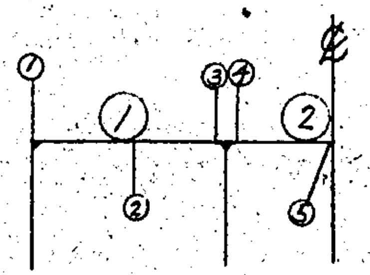
AXIAL MAXIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(9)	1.090	.026	-13.552
JTAN	3.438	(9)	1.178	.026	-14.698
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(10)	3.882	-2.657	-31.017
JTAN	3.438	(10)	-5.252	-2.657	-32.461
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(9)	-3.882	2.657	-31.017
JTAN	3.438	(9)	5.252	2.657	-32.461
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(10)	-1.090	-.026	-13.552
JTAN	3.438	(10)	-1.178	-.026	-14.698

AXIAL MINIMUM

	L	CASE	M	Q	N
= = MEMBER 4 (1 - 5) C = =					
ITAN	0.000	(10)	6.494	-3.325	-14.651
JTAN	3.438	(10)	-4.937	-3.325	-15.797
= = MEMBER 5 (2 - 6) C = =					
ITAN	0.000	(9)	-6.690	3.887	-31.072
JTAN	3.438	(9)	6.672	3.887	-32.516
= = MEMBER 6 (3 - 7) C = =					
ITAN	0.000	(10)	6.690	-3.887	-31.072
JTAN	3.438	(10)	-6.672	-3.887	-32.516
= = MEMBER 7 (4 - 8) C = =					
ITAN	0.000	(9)	-6.494	3.325	-14.651
JTAN	3.438	(9)	4.937	3.325	-15.797

(6) Calculation of upper beam



(1) Calculation of compressive stress caused by bending

(a) Summary of stresses

(i) At the support point

Pick up No. 2

		(1)				(2)			
		①	CO.	③	CO.	④	CO.		
Combined stress	Top	-8.77	8	-35.53	6	-32.26	6		
	Bottom	4.90	8	——		——			
Dead load		-5.69	1	-22.98	1	20.87	1		

(Note) CO. — Combination

(ii) Span moment

		(1)		(2)	
		②	CO.	⑤	CO.
Combined stress	Bottom	21.61	6	13.45	6

(b) Allowable stress of upper beam,

safe against cracking

(i) At the support point 1

Dead load	M_d = −5.69 tm (case 1)
pedestrian load	M_p = −3.08 " (case 2)
	ΣM = −8.77 tm

$$\alpha = \frac{3.08}{8.77} = 0.35 > 0.25$$

There fore σ_{sa} = 1 000 kg/cm²

(ii) At the support point 2, 3

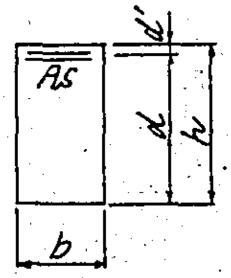
Dead load	M_d = −22.98 tm (case 1)
pedestrian load	M_p = −12.55 " (case 2)
	ΣM = −35.53 tm

$$\alpha = \frac{12.55}{35.53} = 0.35 > 0.25$$

There fore σ_{sa} = 1 000 kg/cm²

(C) Cross Section

(i) Cross Section at the support point



$b = 50^{cm}$

$h = 60$ "

$d' = 2.5 + 1.0 + 1.6 + 3.2 = 8.3^{cm}$

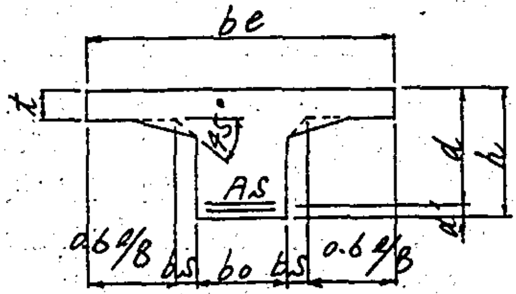
$d = 60 - 8.3 = 51.7^{cm}$

(effective height used for shearing stress calculation)

(ii) Effective width of T-beam Compression fibre

$$be = b_o + 2\left(bs + \frac{0.6}{8} \cdot l\right)$$

$$be_1 = 50 + 2 \times \left(0.10 + \frac{0.60}{8} \times 9.79\right) = 2.17^{m}$$



$b_o = 50^{cm}$

$h = 60$ "

$d' = 3.0 + 1.3 + 1.6 + 3.2 = 9.1^{cm}$

$d = 60 - 9.1 = 50.9^{cm}$

$t = 15^{cm}$

(d) Calculation of bending stress

	①					
	①		③		②	
M (tm)	-5.69	-8.77	-22.98	-35.53	21.61	
N (t)						
S (t)						
b (cm)	50		50	50	217	
h (cm)	60		60	60	60	
d (cm)	54.9		51.7	51.7	50.9	
d' (cm)	5.1		8.3	8.3 (9.1)	9.1	
As (cm²)	D32-5 = 39.71		D32-5/4 = 71.48	D32-5/4 = 71.48	D32-5 = 39.71	
p	0.01447		0.02765	0.02765	0.00360	
As' (cm²)				D32-3 = 23.83	t = 15, t/d = 0.295	
p'				0.00922		
e = M/N (cm)						
e = M/N + u (cm)						
e = M/N − u (cm)						
e/h						
d/e						
d'/h						
d'/d						
M/bd² (kg/cm²)	3.78	5.82	17.19	26.59	3.84	
k				0.535		
≠ Lc				0.296		
j				0.822		
1/Lc	4.99		4.24		7.91	
1/Ls	82		45		307	
β = σs/σc						
σc (kg/cm²)		29.0		89.7	30.4	
σs (kg/cm²)	310	480	770	1170	1180	
τ (kg/cm²)						
σsa (kg/cm²)	1000	1800	1000	1800	"	
σca (kg/cm²)		90		90	"	
τa (kg/cm²)						
Nomogram number	M-1	"	"	M-7.9	M-47.48	
Combination	D	D+P	D	D+P	"	

(e) Required minimum cross section of re-bars

(i) At the top of support point 1

$$As = \frac{M}{\sigma_{sa} \cdot j \cdot d} \times \frac{4}{3}$$

$$= \frac{5.69 \times 10^5}{1000 \times 0.875 \times 54.9} \times \frac{4}{3} = 15.79^{cm^2}$$

Hence $D32 - 5 = 39.71^{cm^2} > 15.79^{cm^2}$

(ii) At the top of support point 2

$$As = \frac{22.98 \times 10^5}{1000 \times 0.875 \times 51.7} \times \frac{4}{3} = 67.73^{cm^2}$$

Hence $D32 - 9 = 71.48^{cm^2} > 67.73^{cm^2}$

(iii) At the span center point

$$As = \frac{21.61 \times 10^5}{1800 \times 0.875 \times 50.9} \times \frac{4}{3} = 35.94^{cm^2}$$

Hence $D32 - 5 = 39.71^{cm^2} > 35.94^{cm^2}$