IO HEAVY REPAIR FACTORY
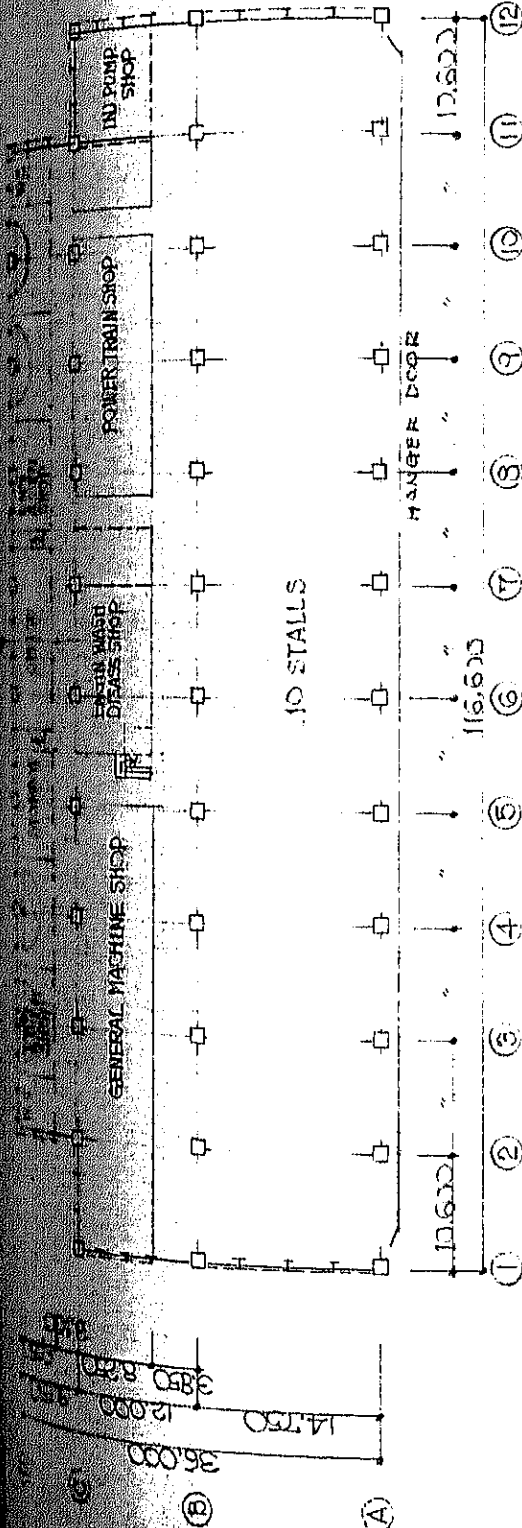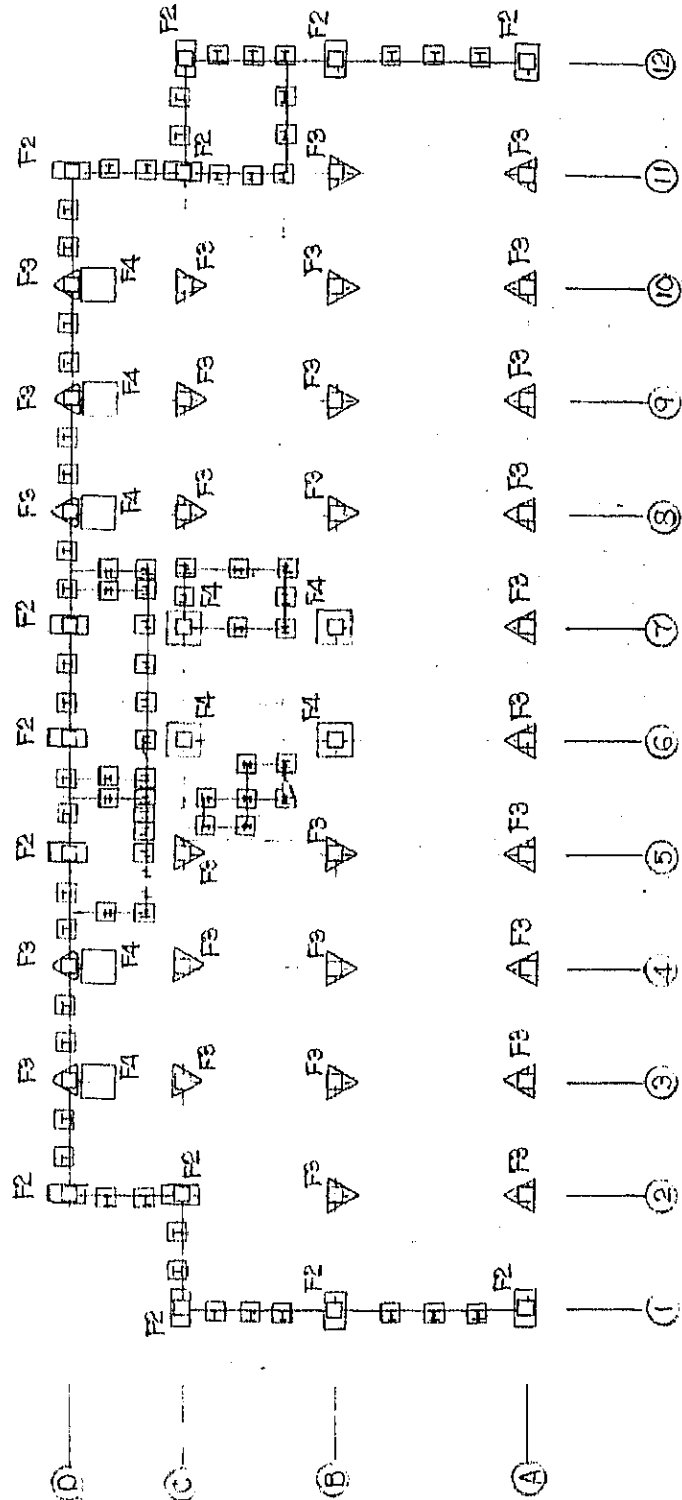
HEAVY REPAIR FACTORY

1F PLAN

GF KEY PLAN

□ : F1
— : FG35

1U PUMP SHOP

POWER TRAIN SHOP

GENERAL MACHINE SHOP

DECAL WASH DEGAS SHOP

HANGER DOOR

10 STALLS

10,622   16,603   10,622

36,000   12,008   14,750

Grid lines: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

Axis: Ⓐ Ⓑ Ⓒ Ⓓ

F1 F2 F3 F4 FG35

1F PLAN

MONORAIL CAPACITY 1.5t

CONTROL OFFICE

EAVES

CRANE CAPACITY 2.0t

1,2F KEY PLAN

□ : C1RA
Ⅰ : P3
× : P2

P3A
P3A
F3A

RF PLAN

RF KEYPLAN

1 : P1
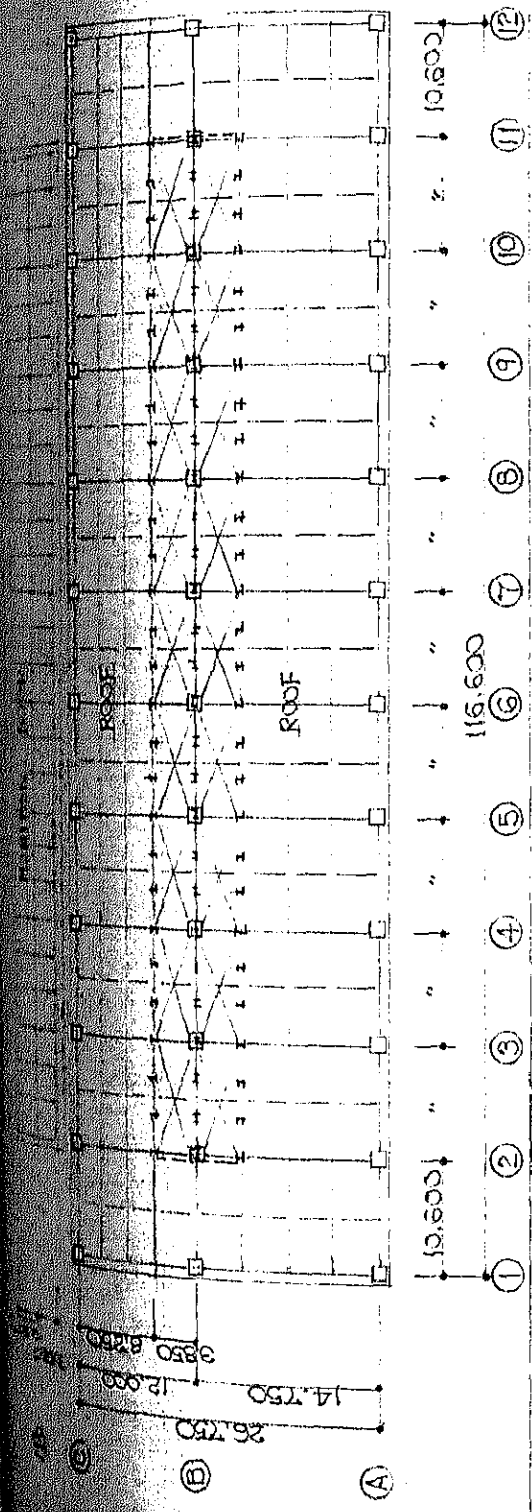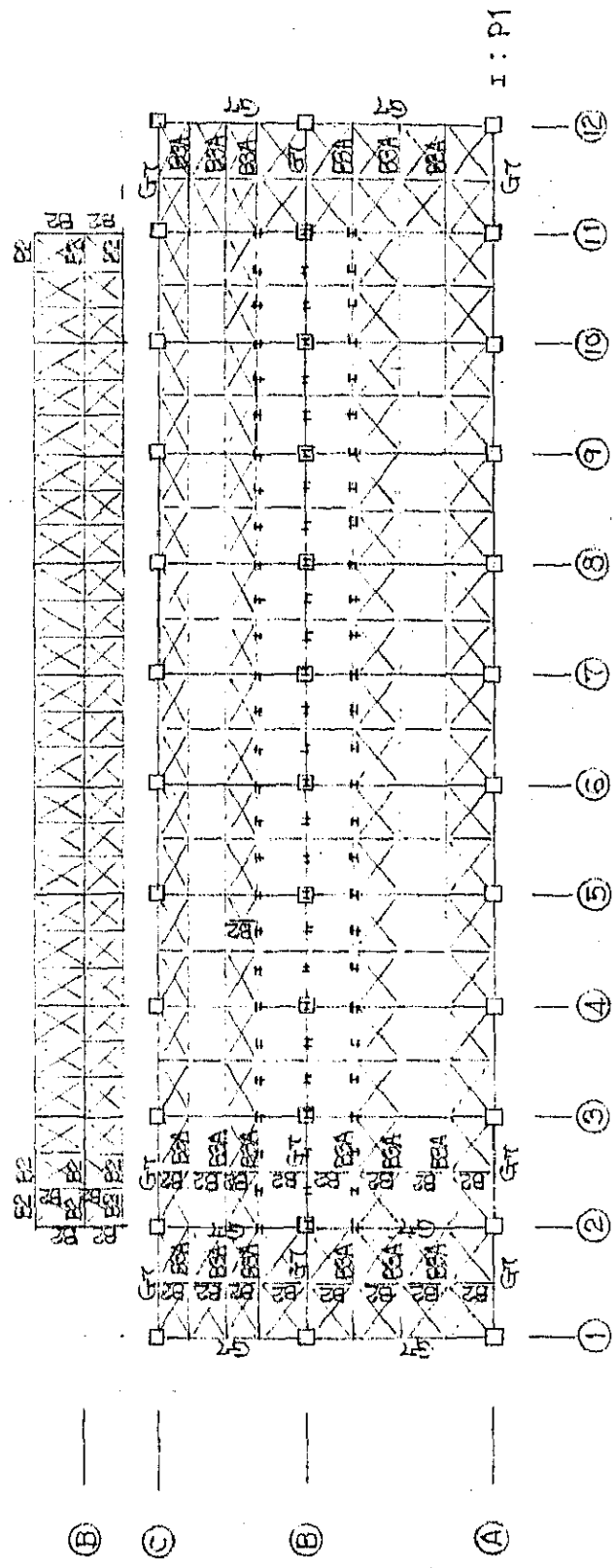
Navy Repair Factory – Section

SIDE EAVES +1.000

SIDE EAVES +500

CONT. RM. FL.

G5
G7
CI9
CI9A

1 T CRANE (S.L. ≒ 1.0t)

Monorail 1.0t (S.L. ≒ 1.0t)

2PL 7,150

2t CRANE (22 kg RAIL) (S.L. ≒ 3.0t)

Existing GL
GFL
1FL
GL

11,092.2
14,715.0

3,680   3,850   4,125   4,125   3,180   6,950
9,150
12,100

Ⓐ   Ⓑ   Ⓒ   Ⓓ
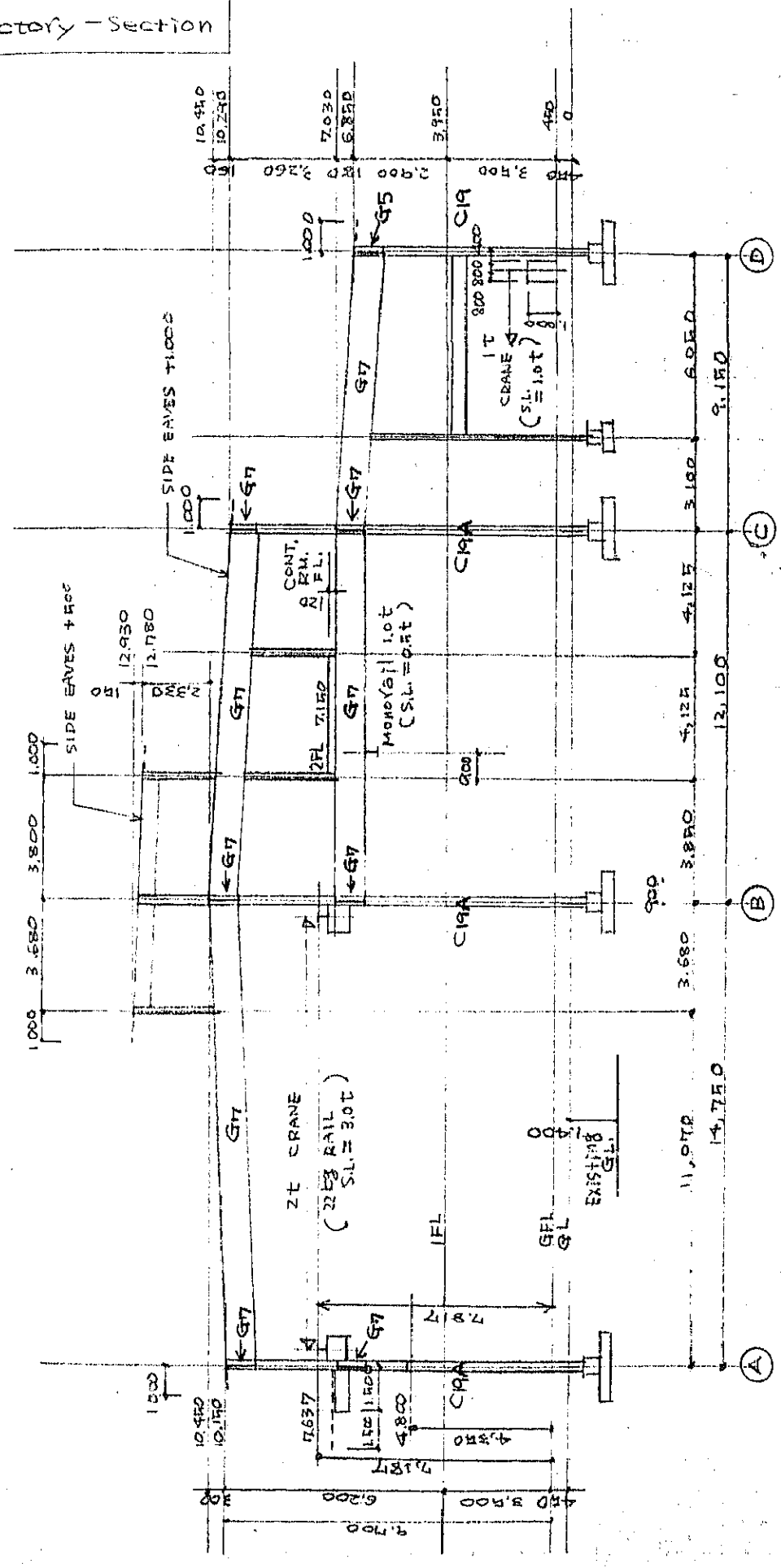
Unit Load

Floor

		D. L.		L. L.		T. L.	
roof	∧∧∧	Shell type roof	0.02	S,B	0.09	0.11	(0.15)
				G,C,F	0.017	0.09	(0.13)
		Ceiling	(0.04)	K	0.03	0.05	(0.09)
			0.02 (0.06)				
2nd floor	⊒⊓⊓	Finish	0.15	S,B	0.30	0.51	
		Deck	0.62	G,C,F	0.18	* 0.39	
		Ceiling	0.04	K	0.08	0.29	
			0.21				
						* With Above Ceiling	0.43
stair case	⟋⟋	Step	0.06	S,B	0.30	0.40	
		String	0.04	G,C,F	0.18	0.28	
				K	0.08	0.18	
			0.10				

Beam

	t/m				t/each					
	Skeleton	Finish	Σ	ℓ						
beam GA	0.25	0	0.25							
GA	0.15	0	0.15							
beam	0.05	0	0.05							
foundation beam	1.26	0	1.26							

Column

	t/m				t/each					
	Skeleton	Finish	Σ							
col	0.25	0	0.25							
	0.15	0	0.15							
	0.05	0	0.05							

Wall

	t/m2				t/m					
	Skeleton	Finish	Σ							
	0.01	0.01	0.02							
	0.01	0.07	0.08							
	0.01	0.04	0.05							
	0.49	0.11	0.60							

Wind Pressure

Velocity of Wind

Cyclone 130 Miles/Hour $= 130 \times 1609.34/3,600$

$= 58.1$ m/sec

$\rightarrow 60.0$ m/sec ($h = 15$ m)

(In 1970, At Chittagon, recorded)
103 m.p.h. $= 46.0$ m/sec

Velocity Pressure $q = \frac{1}{2}\rho V^2 = \frac{1}{2} \times \frac{1}{8}\left(60\sqrt[4]{\frac{h}{15}}\right)^2$

$= 60\sqrt{h}$

			$\overline{h}$ [m]	$60\sqrt{h}$	q [kg/m²]	cq [kg/m²]
Block	Surface					
Heavy Repair Factory	Monitor Roof	Roof Wall	12.7	214	270	
		Roof Wall	10.5, 6.9	194, 158	200, 160 140, 120	
Parts Storage	Monitor Roof	Roof Wall	9.39–9.29	184–183	180	
		Roof Wall	7.36–7.00	163	160 120	
Inspection Factory	Monitor Roof	Roof Wall				
		Roof Wall	7.20–7.00	161	160 120	
Periodical Repair Factory	Monitor Roof	Roof Wall	9.33–9.23	183	180	
		Roof Wall	7.23–7.00	161	160 120	
Paint & Body Factory	Monitor Roof	Roof Wall	9.41–9.31	184	180	
		Roof Wall	7.31–7.00	162	160 120	
Retreading & Metal Casting Factory	Monitor Roof	Roof Wall	9.45–9.30	184	180	
		Roof Wall	7.30–7.00	162	160 120	

Coefficient of Wind Pressure

		D2		D3		D6		
RF	S							
	G,B							
	C							
	W							
	Σ							
	W.L.							
	Σ'							
RF	S							
	G,B							
	C							
	W							
	Σ							
	W.L.							
	Σ'							
RF	S	0.09 X	32.3	2.9	X 59.1	5.3	X 59.1	5.3
	G,B	0.43 X	0	0	X 0	0	X 10.7	4.6
		0.15 X	9.9	1.5	X 15.2	2.3	X 15.2	2.3
	C	0.05 X	7.6	0.4	X 15.2	0.8	X 21.8	1.1
		0.15 X	6.4	1.0	X 6.4	1.0	XXX 6.4	1.0
	FG	1.26 XX	3.3	4.2	XX 3.5	4.4	XX 3.5	4.4
	W	0.02 X	0	0	X 0	0	X 0	0
		0.08 X	0	0	X 0	0	X 8.3	0.7
		0.05 X	16.1	0.8	X 17.3	0.9	X 17.3	0.9
		0.60 X	4.9	2.9	X 5.3	3.2	X 5.3	3.2
	Σ		13.7	13.7	17.9	17.9	23.5	23.5
	W.L.	-0.20 X	32.3	-6.5	X 59.1	-11.8	X 59.1	-11.8
	Σ'		7.2	7.2	6.1	6.1	12.3	12.3

		PD		PD 5~6		P2		P6	
4F	S								
	G,B								
	C								
	W								
	Σ								
	W.L.								
	Σ'								
F	S								
	G,B								
	C								
	FG								
	W								
	Σ								
	W.L.								
	Σ'								
F	S	0.09 X	0	0	X 0	0	X 0	0	X 16.0 / 6.9
	G,B	0.43 X	0	0	X 10.7	4.6	X 0	0	XX 0 / 0
		0.15 XX	0	0	X 0	0	XX 0	0	XX 11.4 / 0.6
	C	0.05 XX	0	0	X 8.1	0.4	XX 0	0	XX /
		0.05 X	0	0	X 5.7	0.3	X 6.6	0.3	XX 6.6 / 0.3
	FG	1.26 XX	6.17	0.3	X 5.7	0.3	X 3.1	3.9	XX 7.3 / 6.7
	W	0.02 XX	3.5	4.4	X 3.5	4.4	X 15.4	0.3	XX 0 / 0
		0.08 X	0	0	X 8.8	0.7	XX 0	0	XX 35.8 / 2.9
		0.05 X	17.3	0.9	X 17.3	0.9	XX 0	0	XX 0 / 0
		0.60 XX	5.3	3.2	X 5.3	3.2	XX 4.6	2.8	XX 8.0 / 4.8
	Σ		8.8	8.8	14.5	14.5	7.3	7.3	22.2 / 22.2
	W.L.								
	Σ'								

		B1		B2		B3		B6	
ARF	S			0.04 × 55.3	5.0	× 101.1	9.1	×	
	G,B			0.05 × 31.0	1.6	× 46.9	2.3	×	
				0.05 × 2.3	0.1	× 2.3	0.1	×	
	C			0.02 × 0	0	× 0	0	×	
	W			0.08 × 17.4	1.4	× 0	0	×	
				0.05 × 12.2	0.6	× 24.4	1.2	×]=B3	12.7
	Σ			(0.22×0.8+0.07) 8.7	8.7	12.7	12.7	12.7	12.7
	W.L.			-0.25 × 55.3	-13.8	× 101.1	-25.3	× =B3	-25.3
	Σ'			-5.1	-5.1	-12.6	-12.6	-12.6	-12.6
R	S	0.09 × 77.6	7.0	× 101.9	9.2	× 62.0	5.6	×	
	G,B	0.25 × 18.17	4.7	× 24.0	6.0	× 24.0	6.0	×]=B3	
		0.05 × 19.9	1.0	× 45.2	2.3	× 45.2	2.3	×	
	Σ'	(0.20×0.8+0.07)12.7	12.7	26.2	17.5	26.6	13.9	26.6	13.9
	W.L.	-0.23 × 77.6	-17.8	× 101.9	-23.4	× 62.0	-14.3	× =B3	-14.3
	Σ'	-5.1	-5.1	-11.0	-5.9	-13.0	-0.4	-13.0	-0.4
IF	S	0.09 × 0	0	× 0	0	×		× 0	0
		0.43 × 0	0	× 0	0	×		× 21.9	9.4
	G,B	0.15 × 22.9	3.4	× 37.8	5.17	×		× 37.8	5.7
		0.05 × 0	0	× 0	0	×		× 35.6	1.8
	C	0.25 × 10.0	2.5	× 10.0	2.5	×		× 10.0	2.5
	FG	1.26 × 0	0	× 0	0	×		× 5.3	6.7
	W	0.02 × 0	0	× 0	0	×		× 0	0
		0.08 × 0	0	× 0	0	×		× 86.4	6.9
		0.05 × 0	0	× 0	0	×		× 0	0
		0.60 × 0	0	× 0	0	×]=B2	8.2	× 8.0	4.8
	Σ	(0.15×0.8+0.07) 18.6	5.9	34.4	8.2	34.8	8.2	64.4	37.8
	W.L.	-0.20 × 0	0	× 0	0	× 0	0	× 0	0
	Σ'	0.8	5.9	-2.8	8.2	-4.8	8.2	24.8	37.8

		A1		A2	
ARF	S				
	G,B				
	C				
	W				
	Σ				
	W.L.				
	Σ'				
R	S	0.09 × 48.6	4.4	× 88.8	8.0
	G,B	0.25 × 12.7	3.2	× 18.0	4.5
		0.05 × 11.6	0.6	× 23.3	1.2
	Σ	8.2	8.2	13.7	13.7
	W.L.	-0.23 × 48.6	-11.2	× 88.8	-20.4
	Σ'	-3.0	-3.0	-6.7	-6.7
IF	S	0.09 × 17.4	1.6	× 31.8	2.9
		0.43 × 0	0	× 0	0
	G,B	0.15 × 5.3	0.8	× 10.6	1.6
	C	0.05 × 7.6	0.4	× 13.6	0.7
	FG	0.25 × 9.7	2.4	× 9.7	2.4
	W	1.26 × 4.4	6.2	× 0	0
		0.02 × 0	0	× 0	0
		0.08 × 40.3	3.3	× 0	0
		0.05 × 51.4	2.6	× 102.8	5.1
		0.60 × 7.4	4.4	× 0	0
	Σ	29.8	21.6	26.4	12.7
	W.L.	-0.33 × 17.4	-5.7	× 31.8	-10.5
	Σ'	12.9	15.9	-4.9	1.8

	C1			C2		C3		C6	
S									
G,B									
C									
W									
Σ									
W.L.									
Σ'									
g	0.09 × 40.6	3.7		× 74.2	6.7	× 74.2	6.7	×	
G,B	0.25 × 11.3	2.8		× 16.6	4.2	× 16.6	4.2	×] =C3	
	0.05 × 13.6	0.7		× 16.6	0.8	× 16.6	0.8	×	11.7
Σ		6.7	6.7		11.7	11.7	11.7	11.7	11.7	11.7
W.L.	−0.23 × 40.6	−9.3		× 74.2	−17.1	× 74.2	−17.1	× =C3	−17.1
Σ'		−2.6	−2.6		−5.4	−5.4	−5.4	−5.4	−5.4	−5.4
S	0.09 × 0	0		× 26.5	2.4	× 48.5	4.4	× 48.5	4.4
G,B	0.43 × 0	0		× 0	0	× 0		× 21.9	9.4
C	0.15 × 11.3	1.7		× 21.2	3.2	× 21.2	3.2	× 21.2	3.2
W	0.05 × 0	0		× 7.6	0.4	× 15.2	0.8	× 50.8	2.5
FG	0.25 × 9.9	2.5		× 9.9	2.5	× 9.9	2.5	× 9.9	2.5
	1.26 × 3.1	3.9		× 3.3	4.2	× 0	0	× 5.3	6.7
	0.02 × 0	0		× 0	0	× 0	0	× 0	0
	0.08 × 26.0	2.1		× 27.9	2.2	× 0	0	× 84.8	6.9
	0.05 × 0	0		× 0	0	× 0	0	× 0	0
	0.60 × 4.7	2.8		× 5.0	3.0	× 0	0	× 8.0	4.8
Σ		19.7	13.0		29.6	17.9	23.6	10.9	52.1	40.4
W.L.	−0.20 × 0	0		× 26.5	−5.3	× 48.5	−7.7	× =C3	−9.7
Σ'		10.4	13.0		7.2	12.6	−4.2	1.2	−25.3	30.7

	PC			PI B−C		PI A−B			
S									
G,B									
C									
W									
Σ									
W.L.									
Σ'									
g									
G,B									
Σ									
W.L.									
Σ'									
S	0.09 × 0	0		× 0	0	× 0	0		
G,B	0.43 × 0	0		× 0	0	× 0	0		
C	0.15 × 0	0		× 0	0	× 0	0		
W	0.05 × 0	0		× 0	0	× 0	0		
FG	0.25 × 9.9	0.5		× 10.0	0.5	× 10.0	0.5		
	1.26 × 3.5	4.4		× 3.3	4.2	× 3.7	4.7		
W	0.02 × 0	0		× 0	0	× 0	0		
	0.08 × 29.7	2.4		× 28.1	2.2	× 31.3	2.5		
	0.05 × 0	0		× 0	0	× 0	0		
	0.60 × 5.3	3.2		× 5.0	3.0	× 5.5	3.3		
Σ			10.5			9.9		11.0		
W.L.									
Σ'									

_____ of Beam

[t·m, t]

Load				C			Mo		Q
$(0.09×3.77)+0.20$	q	0.539	$× 10.6^2/12$	5.0	$×$	$/8$	7.6	$× 10.6/2$	2.9
				5.0			7.6		2.9
$(-0.8×0.20-0.07)$ $×3.77$	q	0.867	$× 10.6^2/12$	-8.1	$×$	$/8$	-12.2	$× 10.6/2$	-4.6
				-8.1			-12.2		-4.6
$(0.09×1.57)$ $(0.02×3.26)$ $+0.20$	q	0.405	$× 10.6^2/12$	3.8	$×$	$/8$	5.7	$× 10.6/2$	2.1
$(0.43×5.77$ $0.08×10.0)$ MF	P	3.2	$× 10.6/8$	4.3	$×$	$/4$	8.5	$× 1/2$	4.6
$0.08×4.77$									
$(309×0.38)$ CRANE	P'	1.2	$× 10.6/8$	1.6	$×$	$/4$	3.2	$× 1/2$	0.6
				9.7			17.4		4.3
$(-0.8×0.16-0.07$ $×1.57)$	q	-0.307	$× 10.6^2/12$	-2.9	$×$	$/8$	-4.3	$× 10.6/2$	-1.6
				-2.9			-4.3		-1.6
MF	P	3.2	$× 10.6/8$	4.3	$×$	$/4$	8.5	$× 1/2$	1.6
CRANE	P'	1.9	$× 10.6/8$	2.5	$×$	$/4$	5.0	$× 1/2$	1.0
$(3.09×0.62)$									
				6.8			13.5		2.6
$(0.09×2.51)+0.15$	q	0.376	$× 10.6^2/12$	3.5	$×$	$/8$	5.3	$× 10.6/2$	2.0
				3.5			5.3		2.0
$(-0.8×0.16-0.07$ $×2.51)$	q	0.497	$× 10.6^2/12$	-4.7	$×$	$/8$	-7.0	$× 10.6/2$	-2.6
				-4.7			-7.0		-2.6

Horizontal Axis

$0.8×0.14×4.87$ q 0.54 $H-700×300$ $Iy = 10,800$ $\doteq$ O.F.

Ξ_H $0.54×10.6^2×100/8×2.4 = 316.0$

J_H $5×0.0054×1060^3×300/384×2,100 = 11,963.0$

[t·m, t]

[tm, t]

Load				C			Mo			Q
(0.09×10.6)+0.20	q	1.154 × 14.75²/12	20.9	×	/8	31.4		× 14.75/2	8.5
				20.9			31.4			8.5
B (-0.8×0.20-0.017)×10.6	q	-7.438 × 14.75²/12	-44.2	×	/8	-46.3		× 14.75/2	-18.0
P (1.4×0.22×10.6×2.5/2)×2.5/7.5=1.34	P	(1.0×3.68)× 0.75/0.25	±2.8/6.9	0.3 × 14.75/2	±2.2	1.3 × 0.75/0.25	+1.0/-0.3
A			↑	↓		↑	↓		↑	↓
		B 47.0	41.4				68.5	60.9	B 19.0 17.0
		A 45.1	48.3						A 18.3 17.7
(0.09×10.6)+0.20	q	1.154 × 12.0²/12	13.8	×	/8	20.8		× 12.0/2	6.9
				13.8			20.8			6.9
C (-0.8×0.20-0.017)×10.6	q	-2.438 × 12.0²/12	29.3	×	/8	43.9		× 12.0/2	14.6
P	P	(0.9×6.0)× 0.31/0.69	±1.7/±3.4	0.4 × 12.0/2	±2.4	1.3 × 0.31/0.69	+0.4/-0.9
B			↑	↓		↑	↓		↑	↓
		C 24.6	31.0				41.5	46.3	C 14.2 14.0
		B 25.9	32.7						B 13.7 16.5
C (0.43×16.4)(0.05×11.9)(0.08×8.0) MF	P	8.3 × 6.0/4.5	10.7	× 6.0/3	16.0	× 1.0	8.5
CRANE	P'	(2.1×4.0)× 0.33/0.67	2.8/5.6	1.0 × 6.0	6.0	× 0.33/0.67	1.0/2.1
B			C 13.5			22.0		9.3
		B 16.3						10.4
(0.09×32.3)(0.05×10.6)	P	3.43 × 9.15/4.5	7.0	× /3	10.5	× 1.0	3.4
	q	0.15 × 9.15²/12	1.0	× /8	1.5	× 9.15/2	0.7
				8.0			12.0			4.1
(-0.8×0.20-0.017)×32.3	P	7.43 × 9.15/4.5	15.1	× /3	22.7	× 1.0	7.4
				15.1			22.7			7.4

M&Q of Column

[t·m, t]

Load				C			Mo		Q
c 0.8~0.6 q 0.14 @3.07	q	$0.422 \times 3.42^2/12$ 0.317	0.4 6.3		× /8	0.6 6.5	× 3.42/2	0.7 0.5
			D	0.4 6.3			0.6 6.5		0.7 0.5
c 0.8~0.6 q 0.14 @3.117	q	$0.422 \times 6.98/8$ 0.317	2.6 1.9		× /8	2.6 1.9	× 6.98/2	1.5 1.1
			D	2.6·0 1.9·0			2.6 1.9		1.5 1.1
c 0.8~0.6 q 0.12 @1.63	q	$0.156 \times 6.90^2/8$ 0.117	0.9 0.7		× /8	0.9 0.7	× 6.90/2	0.5 0.4
			D	0.9·0 0.7·0			0.9 0.7		0.5 0.4
M (CRANE) 2.7	M	$\frac{2.17}{2}\left(3\frac{7.45^2}{10.1^2}-1\right)$	0.9 0		×		$\frac{3\times2.17}{2\times10.1}\left(1-\frac{7.45^2}{10.1^2}\right)$	0.2
				0.9 0					0.2
$\frac{0.9}{0.6}\times0.14\times10.6\times2.6$	P_1	$\frac{6.5}{4.7} \times 0.85$	5.5 4.0	0.9 0.7 × 5.55		6.0 3.9	$\frac{3.1}{2.3}$ × 0.7, 0.3	2.2, 0.9 1.6, 0.7
" × 3.6	P_2	$\frac{12.2}{8.9} \times 0.75$	9.2 6.7	2.2 1.6 × 5.55		12.2 8.9	$\frac{4.3}{3.2}$ × 0.5	2.2, 2.7 1.6, 1.6
									TOP BTM
			D	14.5·0 10.7·0			17.2 12.8		4.4, 3.1 3.2, 2.3
$\frac{0.9}{0.6}\times0.14\times3.53$	q	$0.374 \times 3.26^2/12$ 0.296	0.4 0.3		× /8	0.5 0.4	× 3.26/2	0.6 0.5
			D	0.4 0.3			0.5 0.4		0.6 0.5
$\frac{0.9}{0.6}\times0.12\times3.53$	q	$0.354 \times 6.9^2/8$ 0.254	2.0 1.5		× /8	2.0 1.5	× 6.9/2	1.2 0.8
			D	2.0·0 1.5·0			2.0 1.5		1.2 0.8

Seismic Force

		W	k	kw	Q
					[t]
	$0.05 \times 10.6 \times 9.54$	5.1			
	$0.05 \times (31.8 + 22.6)$	2.7			
	$0.05 \times 2.48 \times 9$	1.1			
	$0.05 \times 21.2 \times 2.48$	2.6			
	$\overline{w} = 11.5 / (10.6 \times 9.54) = 0.11 \ [t/m^2]$	11.5	0.10	1.2	1.2
	$0.05 \times 10.6 \times 22.01$	11.7			
	$(0.20 \times 42.4 + 26.85)$	13.9			
	$0.05\{(10.6 \times 6) + 31.8\} + (0.15 \times 10.6)$	6.4			
	$(0.25 \times 5.38 \times 1) + (0.25 \times 1.71 \times 2)$	3.2			
	$0.05\{(6.4 \times 3) + (1.7 \times 4)\}$	1.2			
	$0.05(10.6 \times 5.38) + (10.6 \times 1.71)\} + (0.08 \times 21.2 \times 1.71)$	6.7			
	$\overline{w} = 42.1 / (10.6 \times 29.55) = 0.13$	42.1	//	4.3	5.5
	$(0.05 \times 10.6 \times 10.65) \quad + (0.25 \times 10.6 \times 4.13)$ CRANE $2.0+0.2+(1.6\times2)$	18.3 / 7.6			
	$0.20 \times (21.2 + 21.3) + (0.15 \times 10.6)$ $1.0+0.1+1.1$	10.1			
	$0.05 \times (43.0 + 13.3)$	3.3			
	$(0.25 \times 5.38 \times 2) + (0.15 \times 3.58 \times 1)$	3.2			
	$0.05\{(1.7 \times 4) + (3.2 \times 7)\}$	1.5			
	$0.05\{(10.6 \times 1.71) + (10.6 \times 3.20)\} + (0.08 \times 21.2 \times 1.71)$	5.5			
	$\overline{w} = 49.5 / (10.6 \times 14.78) = 0.32$	49.5	//	5.0	12.2
	$0.29 \times 10.6 \times 6.05$	18.6		1	↑ ½
	$0.05 \times (31.8 + 24.2)$	2.8			
	$0.08 \times 28.8 \times 4.65$	10.7			
	$\overline{w} = 32.1 / (10.6 \times 6.05) = 0.50$	32.1	//	3.3	

Wind Force

c	$q \ t/m^2$		$A \ m^2$	H_t	Q_t	⌂	⌂
$0.9 \sim 0.6$	0.22	10.6×2.48	26.3	$4.6 \sim 3.5$	$4.6 \sim 3.5$	$\dfrac{3.5 + 4.6}{8.1}$	$\dfrac{4.6 + 3.5}{8.1}$
//	0.14	10.6×1.71	18.1	$2.0 \sim 1.5$	$6.6 \sim 5.0$	$\dfrac{5.0 + 9.5}{14.5}$	$\dfrac{6.6 + 8.0}{14.6}$
//	0.12	10.6×5.00	53.0	$5.1 \sim 3.8$	$11.0 \sim 8.8$	$\dfrac{14.5 + 3.8}{18.3}$	$\dfrac{14.6 + 5.1}{19.7}$
$0.9 \sim 0.6$	0.22	10.6×2.48	22.3	$4.6 \sim 3.5$	$4.6 \sim 3.5$		
//	0.14	10.6×5.00	53.0	$5.9 \sim 4.5$	$7.5 \sim 8.0$		

SEISMIC FORCE

[t]

	W	k	kW	Q
$0.05 \times 95.9 \times 9.48$	45.5			
$0.05 \times (848 + 64.8)$	7.6			
$0.05 \times 2.48 \times 27$	3.3			
$(0.08 \times 10.05 \times 2.48) + (0.05 \times 169.6 \times 2.48)$	23.0			
$\bar{u} = 79.4 / (95.9 \times 9.54) = 0.09 \ [t/m^2]$	79.4	0.10	8.0	8.0
$0.05 \times \{(117.1 \times 13.43) - (95.4 \times 7.53)\}$	42.5			
$0.20 \times (116.6 + 161.1)$	55.5			
$0.05 \{(116.6 \times 3) + (13.43 \times 12)\}$	26.5			
$0.05 \times 171 \times 12$	9.1			
$0.05 \times 5.38 \times 6$	1.6			
$0.05 \times 26.9 \times 5.0$	6.7			
$\bar{u} = 137.1 / (117.1 \times 13.43) = 0.09$	137.1	//	13.8	21.8
$(0.05 \times 95.9 \times 4.58) \qquad + (0.24 \times 21.2 \times 2.1)$	22.0			
$0.20 \times (116.6 + 12.1 + 106.3)$	49.0			
$0.05 \times (95.4 + 41.2 + 46.9)$	9.2			
$0.25 \times 5.38 \times 12$	16.1			
$0.05 \times 3.42 \times 7$	1.2			
$(0.05 \times 117.1 \times 1.63) + (0.08 \times 25.3 \times 3.42)$	16.5			
$\bar{u} = 112.0 / (439.2 + 44.5) = 0.23$	112.0	//	11.2	33.0

Wind Force (Ⓑ)

	q t/m²		A m²	H t	Q t
$0.8 + 0.6$	0.32	7.98×2.48	19.8	6.1	6.1
	0.14	13.43×5.0	67.2	13.2	19.3

Seismic Force

[t]

	W	k	kW	Q
$0.05 \times 97.8 \times 6.08$	29.7			
$(0.20 \times 47.8) + (0.115 \times 99.4)$	23.5			
$0.05 \times (99.4 + 41.2)$	6.8			
$0.15 \times 3.68 \times 10$	5.4			
$0.09 \times 3.68 \times (18 + 19)$	6.6			
$0.05 \times 109.6 \times 3.52$	18.6			
$\bar{w} = 90.6 / (97.8 \times 6.08) = 0.17 \ [t/m^2]$	90.6	0.10	9.1	13.6
$0.28 \times 31.8 \times 4.48$	42.2			
$0.08 \times (31.8 \times 3) + (4.48 \times 15) \frac{7}{5}$	8.2			
$0.11 \times (31.8 + 68.6) \times 4.83$	38.8			
$\bar{w} = 89.6 / (31.8 \times 4.48) = 0.62$	89.2	11	9.0	

Wind Force

c	q_{t/m^2}		A $_{m^2}$	H $_t$	Q_t
$0.8 + 0.6$	0.12	4.83×3.52	17.0	2.9	2.9

Stiffness Ratio

	J	D/t	k_c					
			.1475	1200	917	1060	623	326
	201,000		136.3	167.5	219.7	189.6	—	9.49
	71,000		—	—	—	70.0	—	—
	63,100 ~ 54,600		—	—	—	—	95.2	181.9
	40,700 ~ 35,300		—	—	—	—	60.8	62.5

$$0.20 + 0.80 \sqrt[3]{\left(\frac{J_{min}}{J_{max}}\right)^2} J_{max} = 0.20 + 0.80 \sqrt[3]{\left(\frac{J_{min}}{J_{max}}\right)^2} J_{max}$$

$$0.20 + 0.80 \sqrt[3]{\left(\frac{54600}{63,100}\right)^2} = 0.94$$

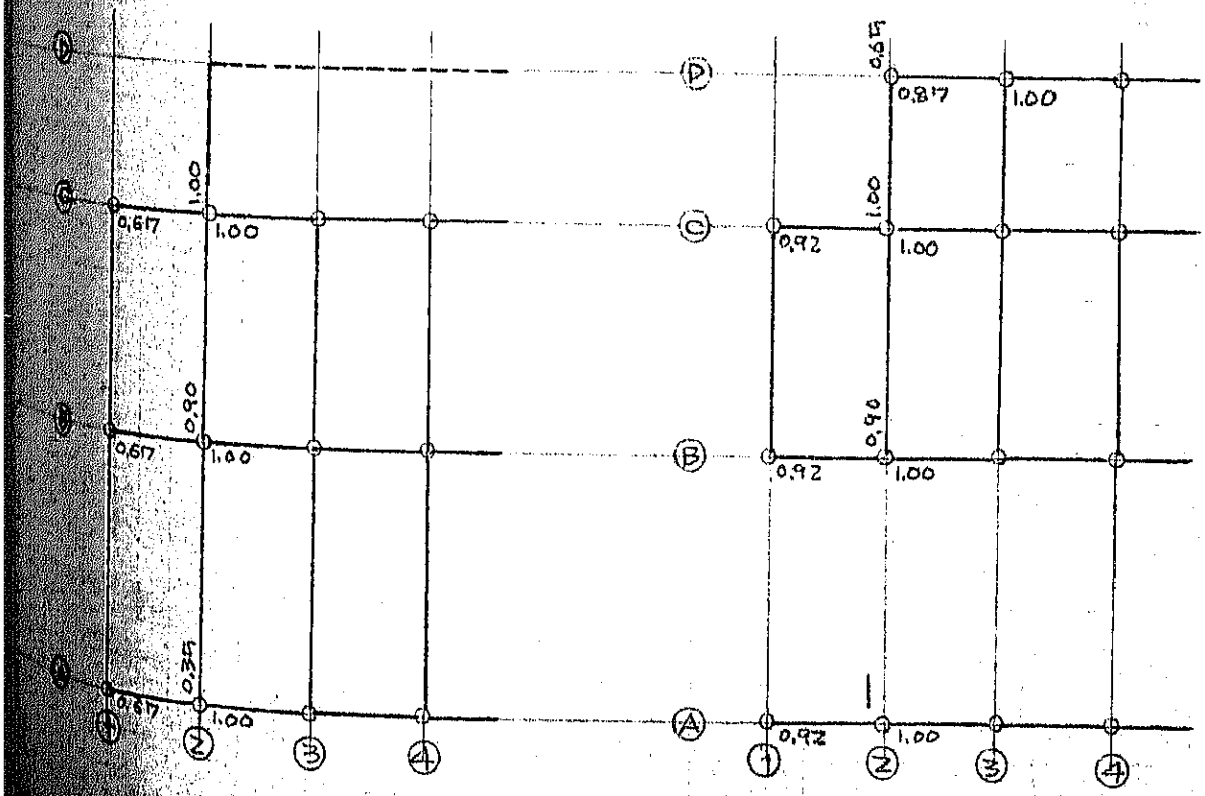$$0.20 + 0.80 \sqrt[3]{\left(\frac{35300}{44,700}\right)^2} = 0.93$$
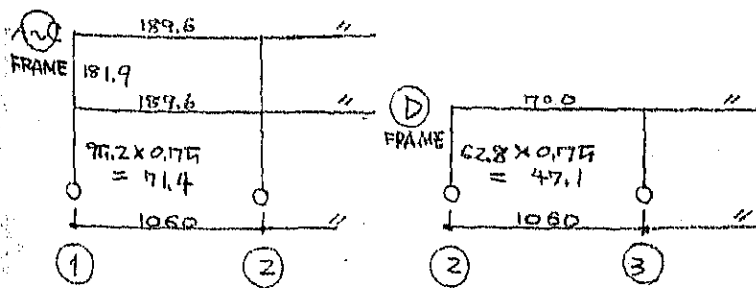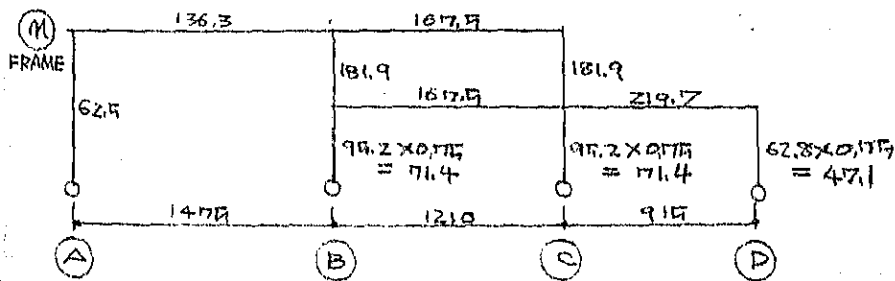
Distribution Factor & Inflection Point

k	Σkb	E	a	D	D'	Yo	Y1	Y2,3	ΣY	Pi	Q	Mu	ML	Q	Mu	ML
												K.L.			W.L.	
136.3	2.18	0.20	12.7 ↓ 12.7	0.35	0			0	9.49				2.3	21.6	0
41.3	1.30	0.39	71.5 ↓ 32.3	0.90	0.40	−0.05		0.35	3.26				5.9	12.4	6.7
34.7	1.52	0.43	78.7 ↓ 35.8	1.00	0.45	0.05		0.50	3.26				6.5	10.6	10.6
67.5	2.35	0.21	14.7	0.90	0			0	6.23				6.1	38.1	0
7.2	5.42	0.23	16.3	1.00	0			0	"				6.8	42.4	0
24.7	4.66	0.23	10.6	0.65	0			0	"				4.4	27.5	0
97.2	1.04	0.34	62.3	0.617	0.40			0.40	3.26	1.3	1.4	2.9			
4	3.08	0.51	92.8	1.00	0.45			0.45	"	2.0	3.6	2.9			
96	2.66	0.21	15.0	0.92	0			0	6.23	2.6	16.0	0			
2	5.31	0.23	16.3	1.00	0			0	"	2.8	17.4	0			
70.0	1.49	0.19	8.8	0.817	0			0	6.23	1.2	7.6	0			
0.0	2.97	0.21	10.1	1.00	0			0	"	1.4	8.7	0			

$$\cfrac{1}{\frac{1}{71.5}\left(\frac{326}{949}\right)^2 + \frac{1}{14.7}\left(\frac{623}{949}\right)^2} = \cfrac{1}{(1.65\times10^{-3}) + (2.93\times10^{-2})} = 32.3$$

$$\cfrac{1}{\frac{1}{78.7}\left(\frac{326}{949}\right)^2 + \frac{1}{16.3}\left(\frac{623}{949}\right)^2} = \cfrac{1}{(1.50\times10^{-3}) + (2.64\times10^{-2})} = 35.8$$

Unit Stress

FL	Q		ΣD	Q/ΣD		Q		ΣD	/ΣD
				K.L.					W.L.
R	5.5	0.35+0.90+1.00	2.25	2.5		14.6		2.25	6.5
	$(87 \times \frac{1.90}{2.25})$ $+5.0+1.7$ 11.4	0.90+1.00+0.65	2.55	4.5	$(14.6 \times \frac{1.90}{2.25})$ $+5.1$	17.4		2.55	6.8
R	21.8	(0.67×2)+10.0	11.34	2.0		6.1		11.34	0.6
	33.0	(0.92×2)+10.0	11.84	2.8		19.3		11.84	1.7
	13.6	(0.87×2)+8.00	9.74	1.4		2.9		9.74	0.3

Deflection by Horizontal Force

	FL	LOAD	Q		ΣP·D₀	$h_0^2/12EK_0$	δ	δ/h₀	
	R	K.L₁	5.5		2.25 × 32.3	$623^3/12×2,100$	1.17	1/532	
		W.L₁	14.6		//	//	3.09	1/201	
	1	K.L₁		11.4	2.55 × 16.3	$326^2/12×2,100$	1.16	1/282	
		W.L₁		17.4	//	//	1.77	1/185	
	R	K.L₁	21.8		11.34 × 92.8	$623^2/12×2,100$	3.19	1/195	
		W.L₁		6.1	//	//	0.09	1/698	
	1	K.L₁	33.0		11.84 × 16.3	$326^2/12×2,100$	0.72	1/452	
		W.L₁		19.3	//	//	0.43	1/772	
	1	K.L₁	13.6		9.74 × 10.1	$326^2/12×2,100$	0.78	1/554	
		W.L₁		2.9	//	//	0.12	1/2598	