

DESIGN OF MAIN FRAME

* ALL STRESSES ARE REPLACED WITH SHORT TERM F = 2400. (KG/CM2)

断面設計に別紙参照
0=0

* 1 - FRAME

MEMBER	LOAD	M1	M2	MOMENT	AXIAL	LKX	LY	FC,FT	LB	C	F0	SIGMA/F	DESIGN MEMBER		
I	J	(T.M)	(T.M)	(T.M)	(T)	(M)	(M)	(KG/CM2)	(M)		FS	TAU/F			
1	6	3	-0.0	1.0	-2.0	2.0	3.3	0.00	5.00	2400.	5.00	1.75	2400. 1350.	0.406 0.028	H-150X150X7.0X10.0
2	7	4	-0.0	1.1	-2.1	2.1	2.6	0.00	5.00	807.	5.00	1.75	2400. 1350.	0.482 0.030	H-150X150X7.0X10.0
3	8	4	-0.0	0.9	-1.9	1.9	2.2	0.00	5.00	807.	5.00	1.75	2400. 1350.	0.428 0.027	H-150X150X7.0X10.0
4	9	4	-0.0	0.9	-1.9	1.9	2.4	0.00	5.00	807.	5.00	1.75	2400. 1350.	0.429 0.026	H-150X150X7.0X10.0
5	10	4	-0.0	1.1	-2.2	2.2	1.3	0.00	5.00	807.	5.00	1.75	2400. 1350.	0.459 0.031	H-150X150X7.0X10.0
6	7	3	2.0	3.8	4.7	4.7	0.4	0.00	5.00	2400.	5.00	2.23	1896. 1350.	0.584 0.147	H-300X150X6.5X9.0 H-250X149X5.5X8.0
			-4.7	0.8	-7.8	7.8	0.4	0.00	5.00	2400.	5.00	2.30	1910. 1350.	0.964 0.201	
7	8	3	7.4	0.2	2.9	7.4	0.3	0.00	5.00	2400.	5.00	2.21	1891. 1350.	0.924 0.181	H-300X150X6.5X9.0 H-250X149X5.5X8.0
			-2.9	0.9	-5.9	5.9	0.3	0.00	5.00	2400.	5.00	2.30	1910. 1350.	0.727 0.167	
8	9	3	5.9	0.9	2.9	5.9	0.3	0.00	5.00	2400.	5.00	2.30	1910. 1350.	0.727 0.167	H-300X150X6.5X9.0 H-250X149X5.5X8.0
			-2.9	0.2	-7.4	7.4	0.3	0.00	5.00	2400.	5.00	2.21	1891. 1350.	0.924 0.181	
9	10	3	7.8	0.8	4.7	7.8	0.4	0.00	5.00	2400.	5.00	2.30	1910. 1350.	0.964 0.201	H-300X150X6.5X9.0 H-250X149X5.5X8.0
			-4.7	3.8	-2.0	4.7	0.4	0.00	5.00	2400.	5.00	2.23	1896. 1350.	0.584 0.147	

```

** INPUT DATA ** (START 007 80268)
** INPUT DATA ** (ISEZAKI SUTSANREI ZOKO(2) G8160010)
** INPUT DATA ** (-G816 80- 9-17 3 2 2 0 G8160020)
** INPUT DATA ** ( 10 5 9 1 2 1 0 G8160030)
** INPUT DATA ** ( 1110 0. 0. 2110 10. 0. 1 3110 20. 0. G8160100)
** INPUT DATA ** ( 4110 30. 0. 5110 40. 30. 0. 0. G8160111)
** INPUT DATA ** ( 7 10. 5. 8 20. 5. 9 30. 5. G8160112)
** INPUT DATA ** ( 10 40. 5. G8160113)
** INPUT DATA ** ( 3 G8160114)
** INPUT DATA ** ( 1 1 1 1 2 1 1 2 3 1 1 3 G8160200)
** INPUT DATA ** ( 1 1 1 1 6 3 G8160211)
** INPUT DATA ** ( 5 5 7 8 5 G8160301)
** INPUT DATA ** ( 4 4 4 9 3 G8160302)
** INPUT DATA ** ( 5 5 10 3 G8160304)
** INPUT DATA ** ( 6 6 7 1 11 G8160305)
** INPUT DATA ** ( 7 7 8 1 11 G8160306)
** INPUT DATA ** ( 9 8 9 1 11 G8160307)
** INPUT DATA ** ( 9 9 10 1 11 G8160308)
** INPUT DATA ** ( 2 G8160309)
** INPUT DATA ** ( 1 1 2 3 4 5 6 1 7 8 9 G8160400)
** INPUT DATA ** ( 4 G8160411)
** INPUT DATA ** ( 1 1 1.0 2 1 G8160600)
** INPUT DATA ** ( 2 1 1.0 3 2 G8160601)
** INPUT DATA ** ( 4 1 1.0 4 2 G8160602)
** INPUT DATA ** ( 4 1 1.0 3 G8160604)
** INPUT DATA ** ( 4 1 3 G8160700)
** INPUT DATA ** ( IDEAD+LIV 2SNOW 3WIND (R) 4SEIS (R) G8160711)
** INPUT DATA ** ( 4 0.91 0 10 G8160801)
** INPUT DATA ** ( IGZ -0.23 G8160901)
** INPUT DATA ** ( 2GZ -0.23 6 7 8 9 G8160902)
** INPUT DATA ** ( 3LZ 1.0 6 7 8 9 G8160903)
    
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柱の断面設計

	X	Y		X	Y
VM	110	0.12	WN	3.27	3.27
HM	19.92	1.98	HN	3.62	0.1
SH	21.02	2.1	SN	6.89	3.27

$H = 300 \times 300 \times 10 \times 15$

$A = 119.8 \quad i_y = 7.51 \quad i_x = 13.1$

$Z_x = 1360 \quad Z_y = 450$

$l_x = 1000 \quad \lambda_x = 76.0 \quad f_c = 1.14 (1.71)$

$l_y = 500 \quad \lambda_y = 67.0$

$f_b = 1.6 (2.4)$

X方向

$$\sigma_c / f_c = 6.89 / 119.8 \times 1.71 = 0.034$$

$$\sigma_{bx} / f_b = 21.02 / 1360 \times 2.4 = 0.644$$

$$\sigma_{by} / f_b = 1.2 / 450 \times 2.4 = 0.011$$

$0.69 < 1.0$

Y方向

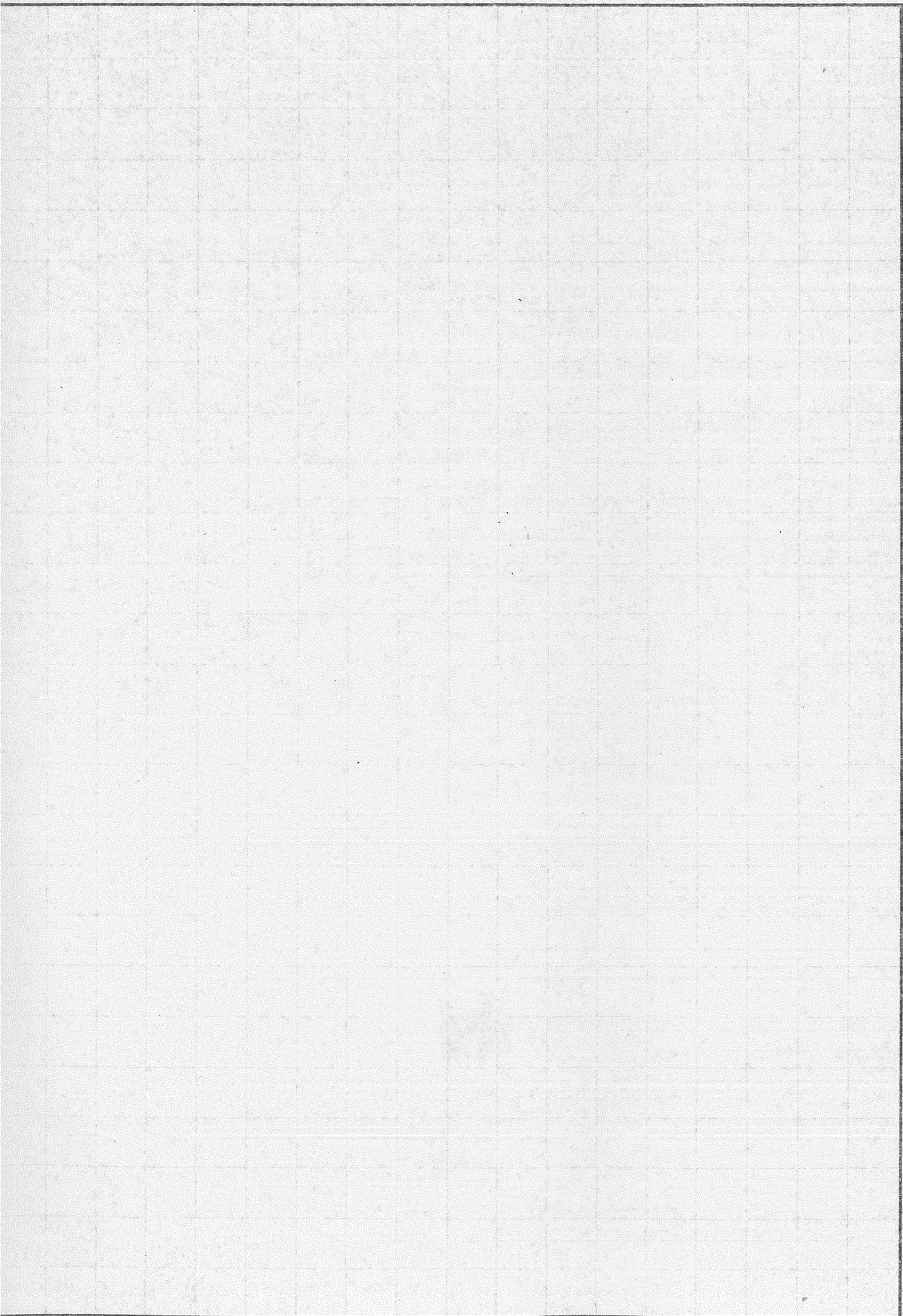
$$\sigma_c / f_c = 3.27 / 119.8 \times 1.71 = 0.017$$

$$\sigma_{bx} / f_b = 110 / 1360 \times 2.4 = 0.034$$

$$\sigma_{by} / f_b = 210 / 450 \times 2.4 = 2.2$$

$0.251 < 1.0$

No. 62

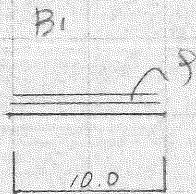


梁-梁接合部の設計

使用部位 分類番号	梁-梁 M-14-1	上, 下フランジ添板部 (1), (2), (3), (4), (5), (6)						ウェブ添板部 (7), (8)								
		(1) 上, 下添板許容引張耐力 $Nt(t)$, 許容曲げ耐力 $(t \cdot m)$ $Nt = (B - nf \times d) \times t \times ft$ $Mt = Nt \times H$ B: 板幅 (cm) H: 上下板間中心距離 (cm) nf: 幅方向ボルト列数 (本) d: ボルト穴径 (cm) t: 板厚 (cm) ft: 短期許容引張応力度 (t/cm^2) (2) H, T, B の許容剪断耐力 $Qt(t)$, 許容曲げ耐力 $M_B(t \cdot m)$ $Q_B = n \times Ts$ $M_B = Q_B \times H$ n: ボルト本数 (本) Ts: 短期許容剪断力 $(t/本)$						(1) 添板の許容剪断耐力 $Qt(t)$ $Qt = (C - nf \times d) \times t \times ft$ C: 板厚 (cm) nf: ボルト列数 (本) d: ボルト穴径 (cm) t: 板厚 (cm) ft: 短期許容剪断応力度 (t/cm^2) (2) H, T, B の許容剪断耐力 $Q_B(t)$ $Q_B = n \times Ts$ n: ボルト本数 (本) Ts: 短期許容剪断力 $(t/本)$								
採用印		組合せ部材サイズ		(1), (2) 添板短期許容引張耐力		(3), (4) 添板短期許容引張耐力		(5), (6) H, T, B 短期許容剪断耐力		短期許容曲げ耐力		(7) 添板短期許容剪断耐力		(8) H, T, B 短期許容剪断耐力		
		梁		板厚 (mm)	Nt (t)	板厚 (mm)	Nt (t)	径本数	Q_B (t)	径本数	Q_B (t)	短期許容曲げ耐力 Mt (t·m)	板厚 (mm)	Qt (t)	径本数	Q_B (t)
		(注) H-248・124・5・8		12	236			4-M20	2.83			5.7	6	1.33	2-M20	2.83
		H-250・125・6・9		"	"			"	"			"	"	"	"	"
		H-298・149・5.5・8		"	30.8			6-M20	4.24			8.9	"	1.77	3-M20	4.24
		H-300・150・6.5・9		"	"			"	"			"	"	"	"	"
		H-346・174・6・9		9	47.3			"	8.48			15.9	9	2.66	"	"
		H-350・175・7・11		"	"			"	"			"	"	"	"	"
		H-396・199・7・11		"	56.2			"	"			21.6	"	3.33	4-M20	56.6
		H-400・200・8・13		"	"			"	"			"	"	"	"	"
		H-446・199・8・12		12	74.9			"	"			32.5	"	3.99	5-M20	70.7
		H-450・200・9・14		"	"			"	"			"	"	"	"	"
		H-496・199・9・14		"	"			"	"			36.1	"	4.66	6-M20	84.8
		H-500・200・10・16		"	"			"	"			"	"	"	"	"
		H-596・199・10・15		16	99.8			8-M20	11.31			58.0	"	5.32	7-M20	99.0
		H-600・200・11・17		"	"			"	"			"	"	"	"	"
		H-606・201・12・20		19	118.6			"	"			69.5	12	7.09	"	"
		H-612・202・13・23		"	"			"	"			"	"	"	"	"

(注) H-250×125, H-300×150 シリーズはフランジ内側添板 (1), (2) は無し。

§3, 2次部材設計



$$l = 10.0 \quad @ 3.25$$

$$f = (0.135 + 0.09) \times 3.25 = 0.73 \text{ t/m}$$

$$M = 0.73 \times 10^2 \times \frac{1}{8} = 9.125 \text{ t}\cdot\text{m}$$

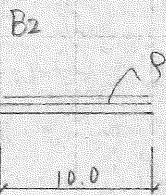
$$\theta = 0.73 \times 10 \times \frac{1}{2} = 3.65 \text{ t}$$

$$H-396 \times 199 \times 7 \times 11 \quad Zx = 1010 \quad Ix = 20000$$

$$fb = 900 \times 199 \times 11 / 96 \times 500 = 0.995$$

$$Gb/fb = 9125 / 1010 \times 0.995 = 0.91 < 1.0$$

$$\delta = 5wl^4 / 384 EI = 226 \text{ mm} \quad l/442$$



$$l = 10.0$$

$$f_1 = 0.147 \times 0.8 \times 3.0 = 0.353 \text{ t/m}$$

$$f_2 = 0.445 \times 3.0 = 1.335 \text{ t/m}$$

$$Mx = 1.335 \times 10^2 \times \frac{1}{8} = 16.68 \text{ t}\cdot\text{m}$$

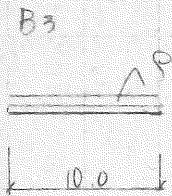
$$My = 0.353 \times 10^2 \times \frac{1}{8} = 4.41 \text{ t}\cdot\text{m}$$

$$H-390 \times 300 \times 10 \times 16 \quad Zx = 1980 \quad Zy = 481 \quad Ix = 38700$$

$$fb = 900 \times 30 \times 16 / 99 \times 500 = 2.21 \rightarrow 2.4$$

$$Gb_x / fb = 1668 / 1980 \times 2.4 = 0.25$$

$$Gb_y / fb = 441 / 481 \times 2.4 = \frac{0.38}{0.73} < 1.0$$



$$\delta = 5wl^4 / 384EI = 2.14 \text{ cm} \quad l/467$$

$$l = 10.0 \quad @ \quad 2.175$$

$$P = (0.35 + 0.06) \times 2.175 = 0.26 \text{ t/m}$$

$$W = 0.134 \times 2.0 \times 2.175 - 0.025 \times 2.175 = -0.64 \text{ t/m}$$

$$M = 0.64 \times 10^2 \times 1/8 = 8.0 \text{ t.m}$$

$$Q = 0.64 \times 10 \times 1/2 = 3.2 \text{ t}$$

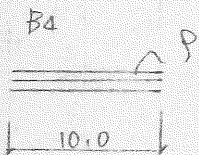
$$H-350 \times 175 \times 7 \times 11 \quad Z_x = 1177 \quad I_x = 13600$$

$$f_b = 900 \times 175 \times 1.1 / 35 \times 500 = 0.99 (1.435)$$

$$S_b / f_b = 800 / 1177 \times 1.435 = 0.7 < 1.0$$

$$\delta = 5wl^4 / 384EI = 2.91 \text{ cm} \quad l/344$$

$$H-396 \times 199 \times 7 \times 11 \quad \delta = 5wl^4 / 384EI = 1.98 \text{ cm} \quad l/505$$



$$l = 10.0$$

$$P = 0.134 \times 2.0 \times 1.0 - 0.025 \times 1.0 = 0.233 \text{ t/m}$$

$$M = 0.233 \times 10^2 \times 1/8 = 2.91 \text{ t.m}$$

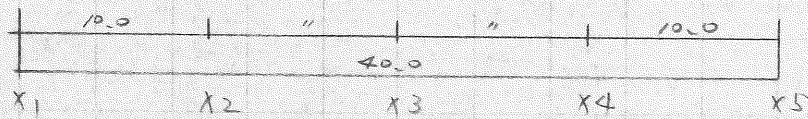
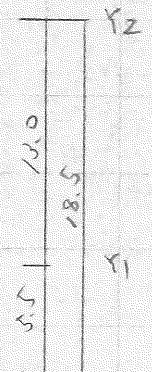
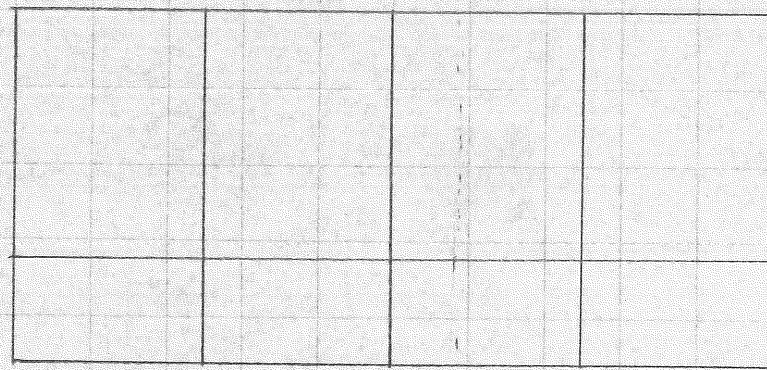
$$Q = 0.233 \times 10 \times 1/2 = 1.165 \text{ t}$$

$$H-300 \times 150 \times 6.5 \times 9 \quad Z_x = 481 \quad I_x = 17210 \quad f_b = 900 \times 15 \times 0.9 / 30 \times 500 = 0.81 (1.21)$$

$$S_b / f_b = 291 / 481 \times 1.21 = 0.5 < 1.0$$

$$\delta = 5wl^4 / 384EI = 2.0 \text{ cm} \quad l/500$$

84 地中梁設計



仮定荷重

床荷重

237 @ 150	27 x 15	360
断熱材		20
押込コ- @ 12	20 x 12	240
		<hr/>
		620 kg/m ²

上載荷重

$$500 \times F_{0.1}^M = 2000 \text{ kg/m}^2$$

腰壁

W₁₅ 440 kg/m²

石壁

Pc版	195
断熱材 (2cm厚)	35
柱	20
	<hr/>
	250

梁

$$b \times D = 35 \times 120$$

$$.24 \times 35 \times 120 = 1008 \rightarrow 1.01 \text{ t/m}$$

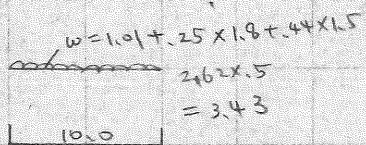
$$b \times D = 35 \times 100$$

$$.24 \times 35 \times 100 = 840 \rightarrow .84$$

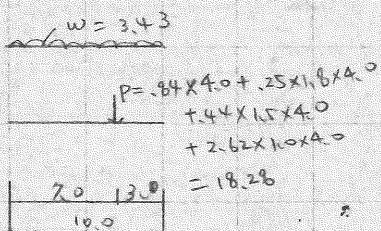
7A-717ト

自重 3.27t

CM₀Q



$$\left\{ \begin{array}{l} C = 28.6 \\ M_0 = 42.9 \\ Q = 17.2 \end{array} \right.$$



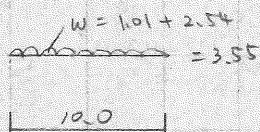
$$C_E = 28.6 + \frac{16.56 \times 7 \times 3.0^2}{10^2} = 40.1$$

$$C_{E_0} = 28.6 + \frac{16.56 \times 7.0^2 \times 3.0}{10^2} = 55.5$$

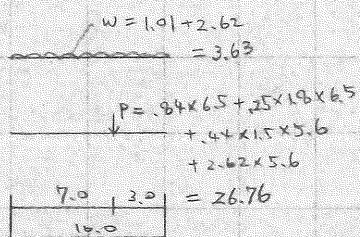
$$M_0 = 42.9 + \frac{16.56 \times 7 \times 3}{10} = 81.3$$

$$Q_E = 17.2 + \frac{16.56 \times 3}{10} = 22.7$$

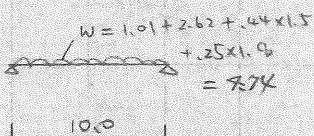
$$Q_{E_0} = 17.2 + \frac{16.56 \times 7}{10} = 30.0$$



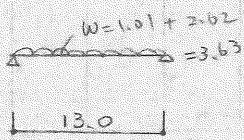
$$\left\{ \begin{array}{l} C = 29.6 \\ M_0 = 77.7 \\ Q = 17.8 \end{array} \right.$$



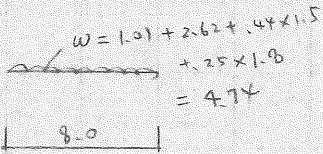
$$\left\{ \begin{array}{l} C_E = 47.1 \\ C_{E_0} = 69.6 \\ M_0 = 101.6 \\ Q_E = 26.2 \\ Q_{E_0} = 36.9 \end{array} \right.$$



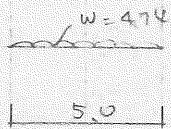
$$\left\{ \begin{array}{l} C = 39.5 \\ M_0 = 59.3 \\ Q = 23.7 \end{array} \right.$$



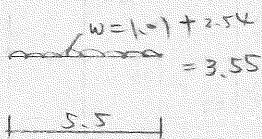
$$\left\{ \begin{aligned} C &= 51.1 \\ M_0 &= 76.7 \\ Q &= 23.6 \end{aligned} \right.$$



$$\left\{ \begin{aligned} C &= 25.3 \\ M_0 &= 37.9 \\ Q &= 19.0 \end{aligned} \right.$$

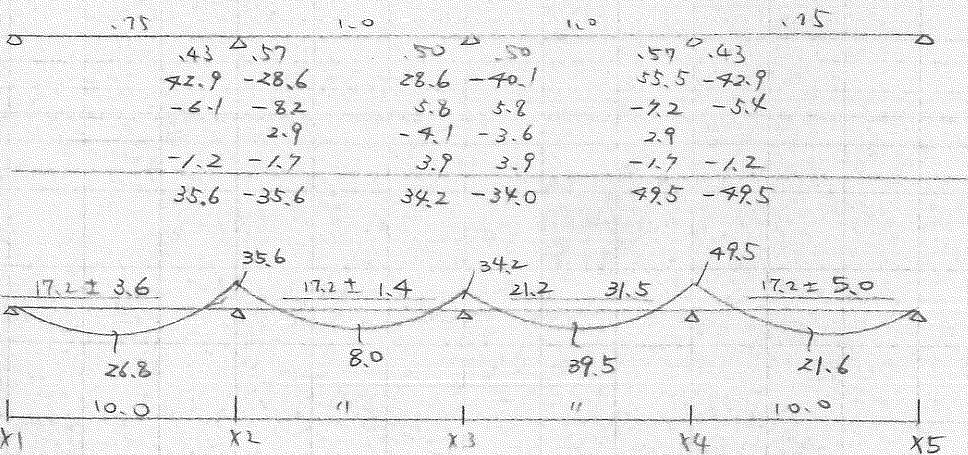


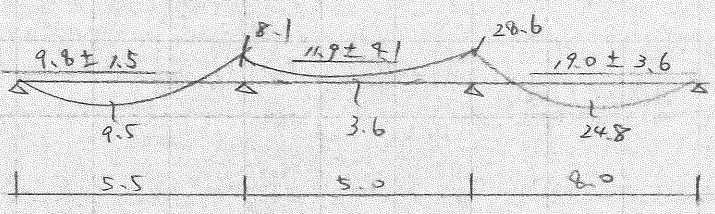
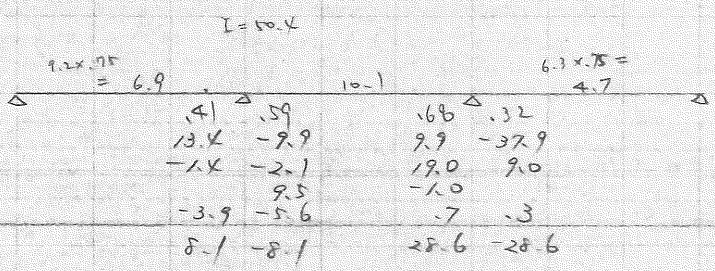
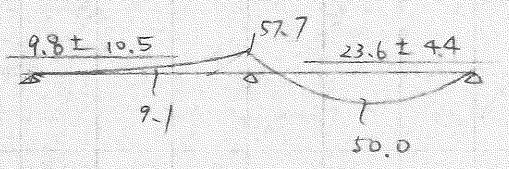
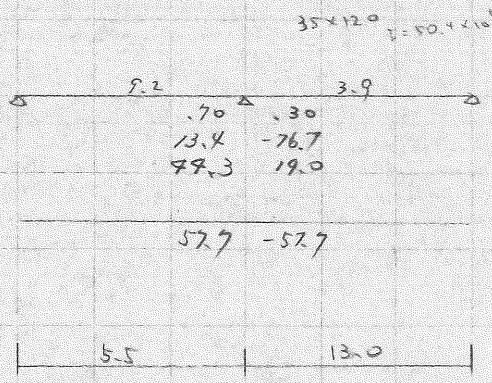
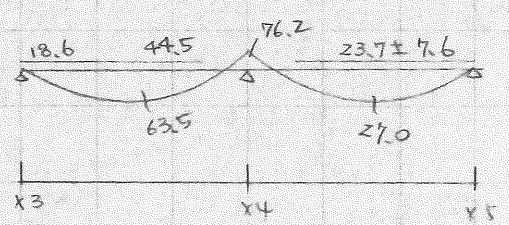
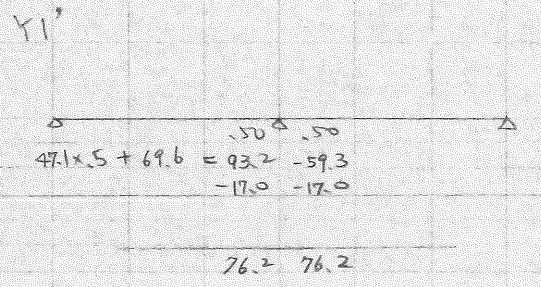
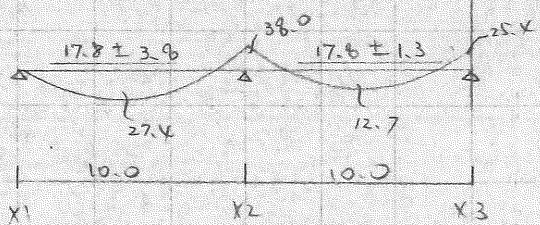
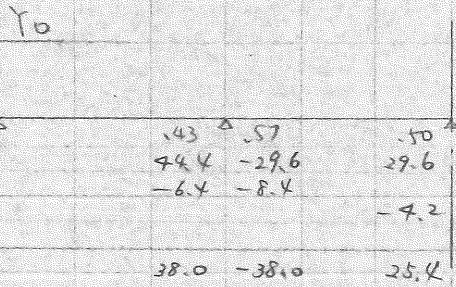
$$\left\{ \begin{aligned} C &= 9.9 \\ M_0 &= 14.8 \\ Q &= 11.9 \end{aligned} \right.$$



$$\left\{ \begin{aligned} C &= 8.9 \\ M_0 &= 13.4 \\ Q &= 9.8 \end{aligned} \right.$$

Y2 (1)





上部構造からの影響は応力が小さいので無視する