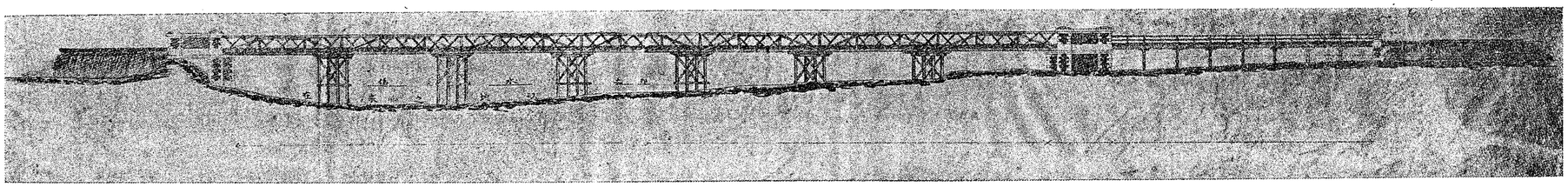
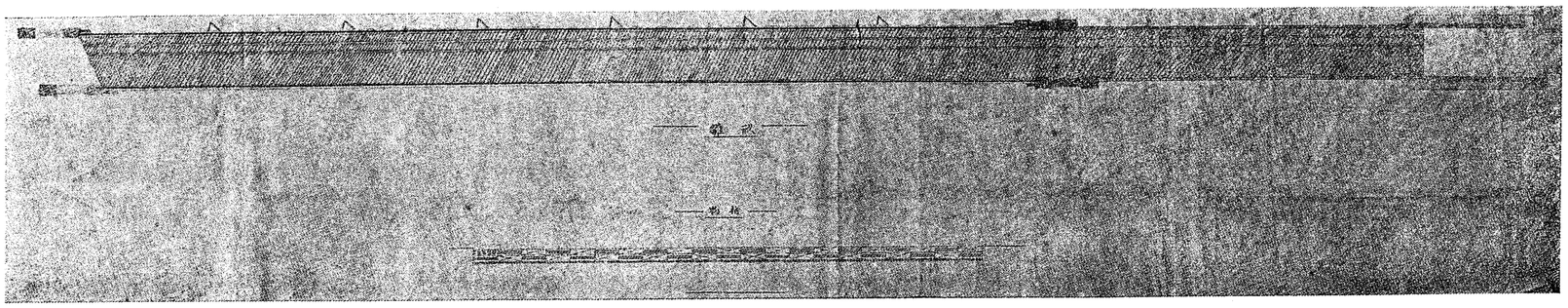
附　屬　圖　面

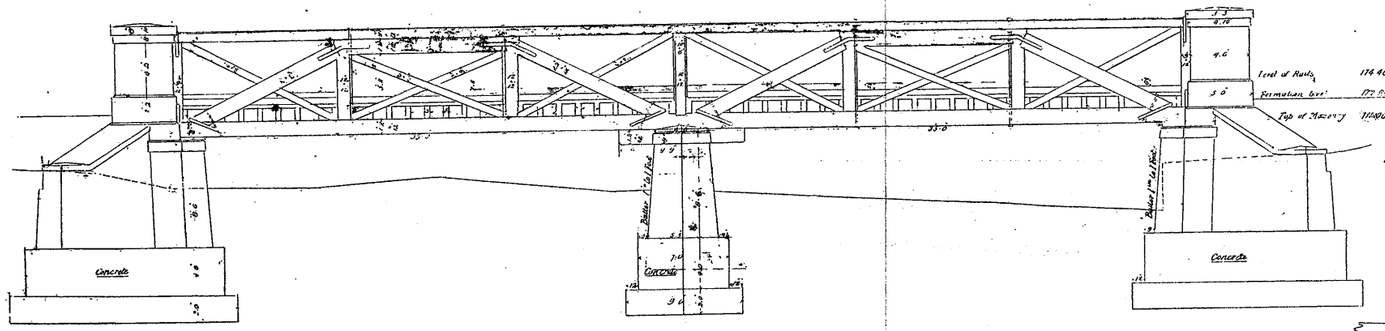
目　錄

第一圖　六鄉川橋梁（木造ノ分）

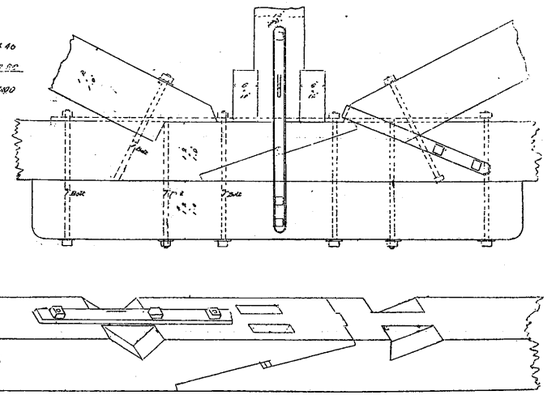


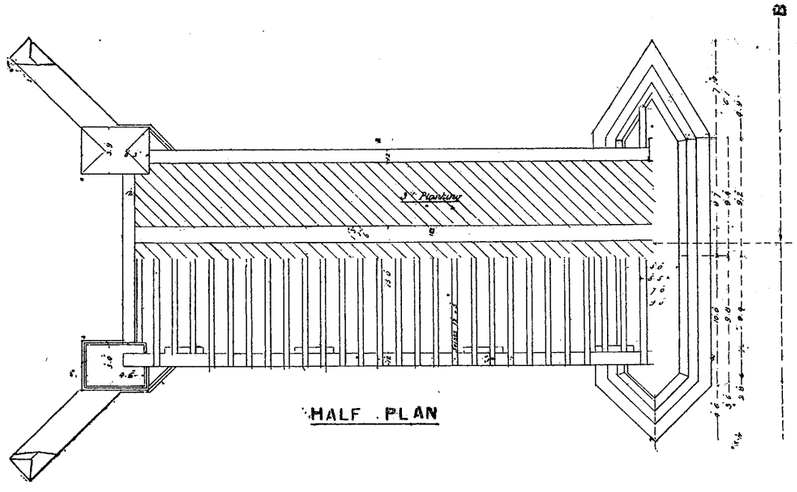


第二圖　都賀川橋梁（木造ノ分）

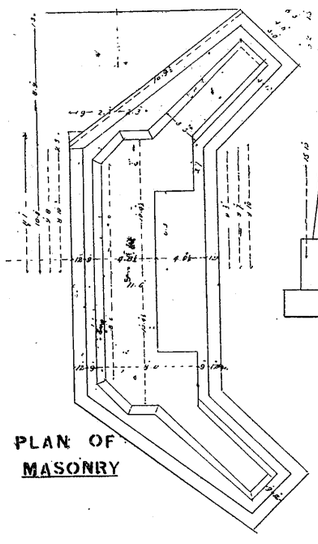


ELEVATION

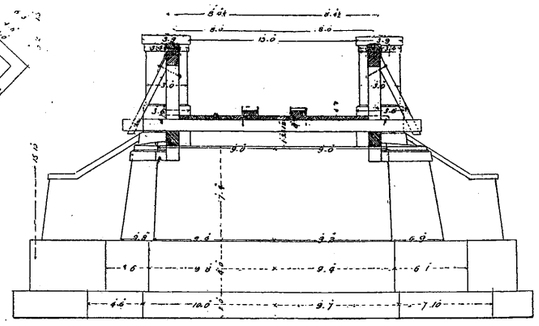




HALF PLAN

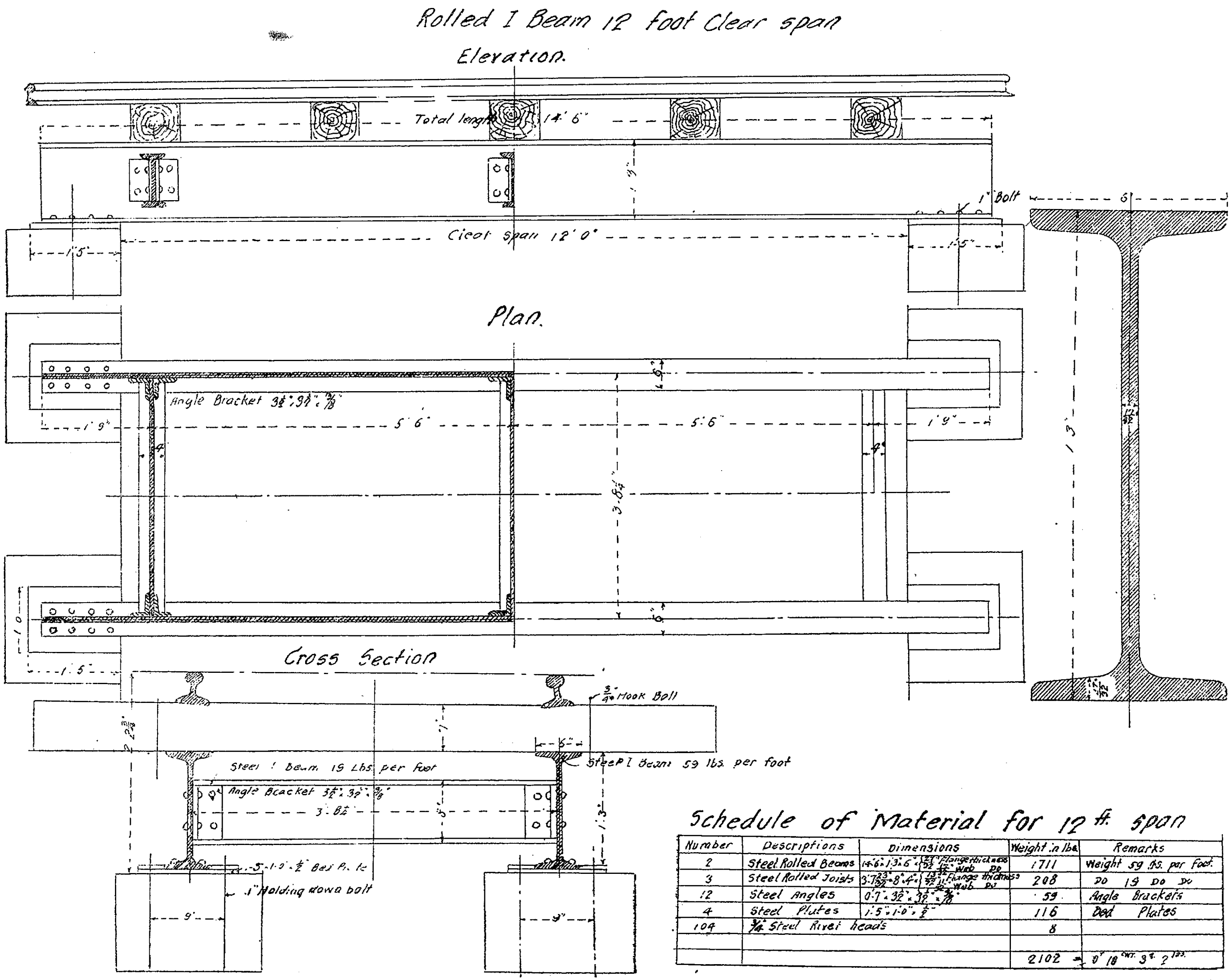


PLAN OF MASONRY



SECTION AT A_B

第三圖　古川晴一氏設計工形桁



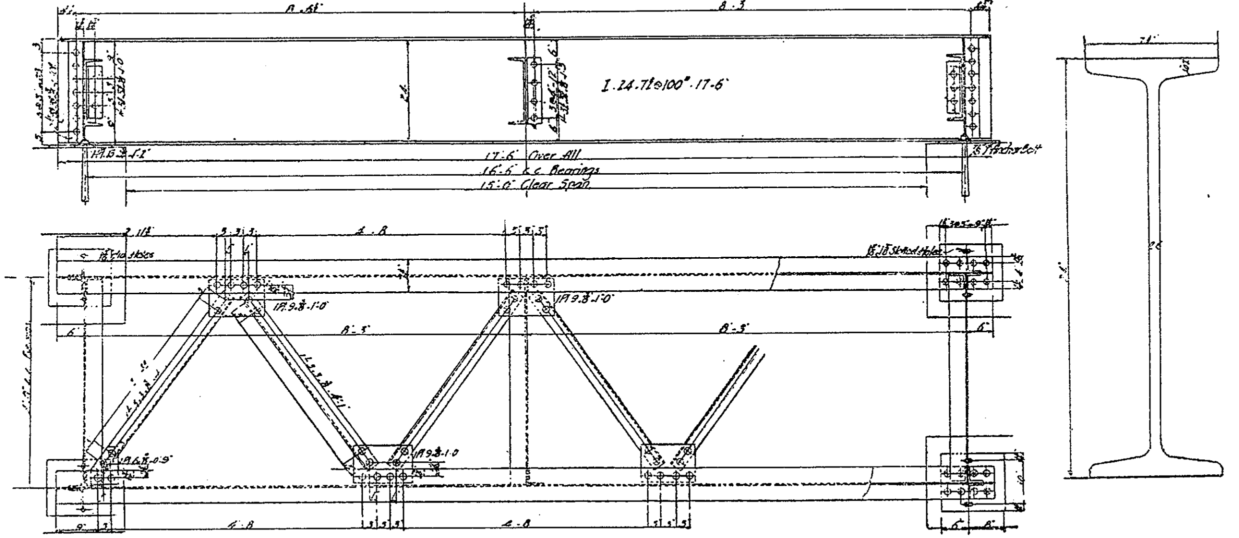
Schedule of Material for 12 ft. span

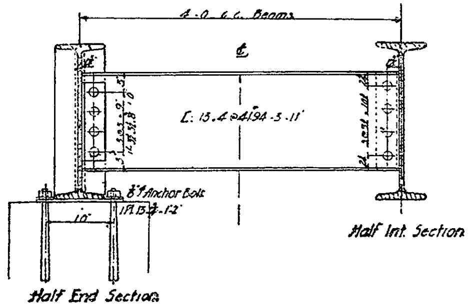
Number	Descriptions	Dimensions	Weight in lbs	Remarks
2	Steel Rolled Beams	14'6" × 1'3" × 6" {23/32" Flange thickness, 15/32" Web Do	1711	Weight 59 lbs. per Foot.
3	Steel Rolled Joists	3'7 23/32" × 8" × 4" {13/32" Flange thickness, 11/32" Web Do	208	Do 19 Do Do
12	Steel Angles	0'7" × 3½" × 3½" × 7/16"	59	Angle Brackets
4	Steel Plates	1'5" × 1'0" × ½"	116	Bed Plates
104	¾" Steel Rivet heads		8	
			2102	→ 0T 18cwt 3q 2lbs.

第四圖　E33 工形桁

Standard Steel Rolled I Beams for 10 ft. Span. 1909.

Specifications. Am Rwy Eng & M Way Associations (1906)



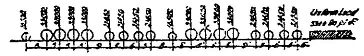


List of Materials

No. of Pcs	Descriptions	Dimensions	Weight lbs
2	I Beams	24. 71 @ 100# 17'-6"	3500.00
3	Strut [s	15. 4 @ 41.94 3'-11"	493.40
8	Stiffener Ls	3½. 3½. 3/8 1'-10"	127.50
4	Bracket Ls	" " " 1'-0"	34.00
2		1'-5"	21.25
6	Lateral	3. 3. 3/8 4'-1"	176.40
5	" Pl.	9. 3/8 1'-0"	57.66
2	"	6. 3/8 0'-9"	11.48
4	Bed	15. 3/4 1'-2"	134.77
537	Rivet Heads	7/8 dia Rivets	53.73
		Total Weight	4608.85

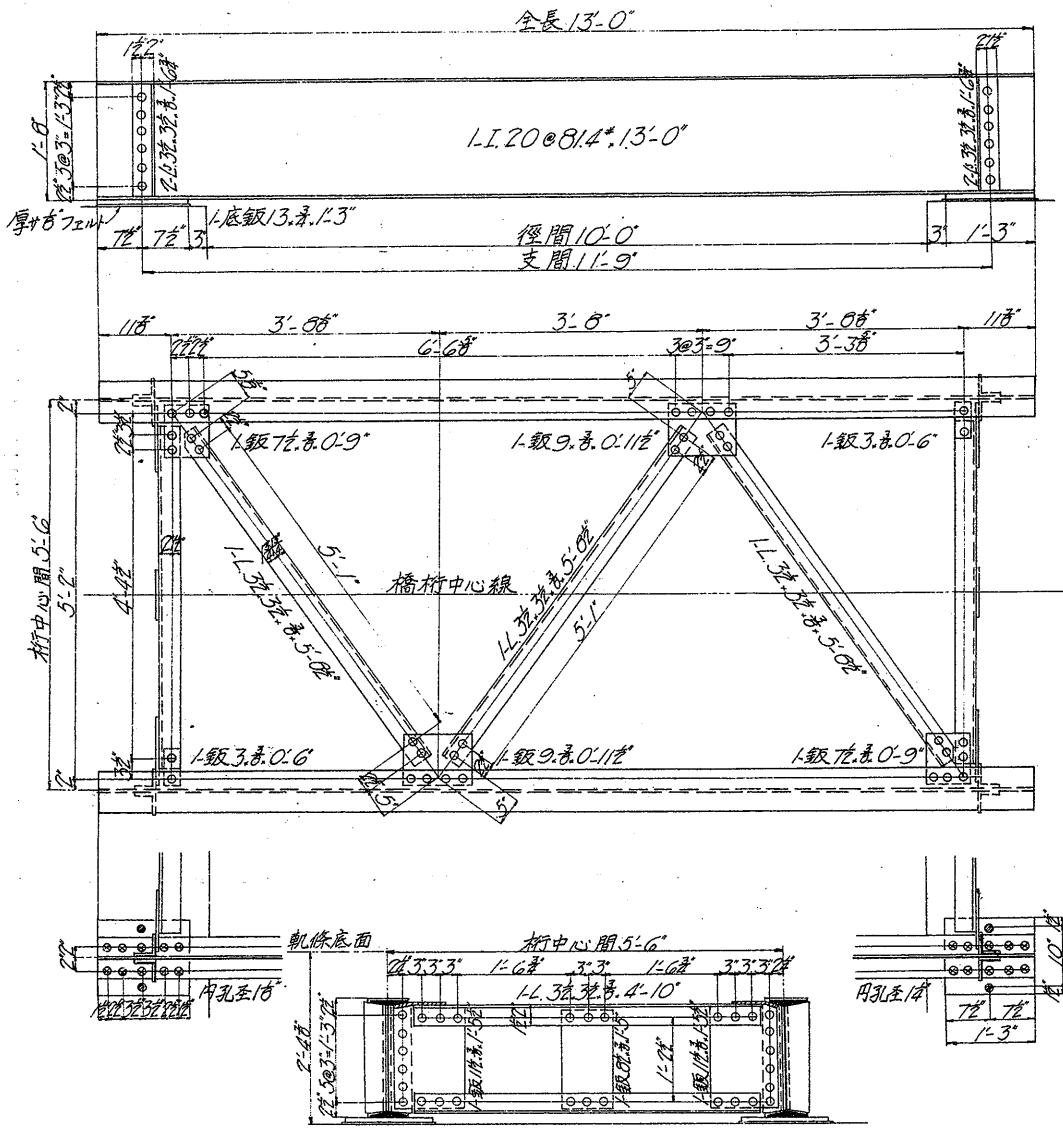
Rivets. 7/8 in diam.
Open Holes 15/16 in diam. unless otherwise noted
⊗ Countersunk other side
• Open Holes

Assumed Wheel Loads; Coopers Class "E33"



Note: Use Sheet Lead 1/8" thick between Bed Plate and Masonry

第 五 圖　　E 40　工　形　桁



数量	種別	寸法		重量(#)	摘要
2	工形	20@8.14#	13'-0"	2116	桁(米國型)
8	山形	3½.3½.⅜	1'-6⅜"	106	補剛材
4	仝	仝	4'-10"	164	支材
3	仝	仝	5'-0⅝"	146	横綫材
2	鈑	3.⅜	0'-6"	4	繋鈑
2	仝	7⅛.⅜	0'-9"	14	仝
2	仝	9.⅜	0'-11⅛"	22	仝
4	仝	11⅛.⅜	1'-5⅛"	86	
2	仝	8⅛.⅜	1'-5"	31	
4	仝	13.⅜	1'-3"	166	底鈑
276	鉄頭	至孟		34	工場鉸メ
8	アンカーボールト	至1"	1'-0"	25	
總重量 2914封度 = 1.301噸					

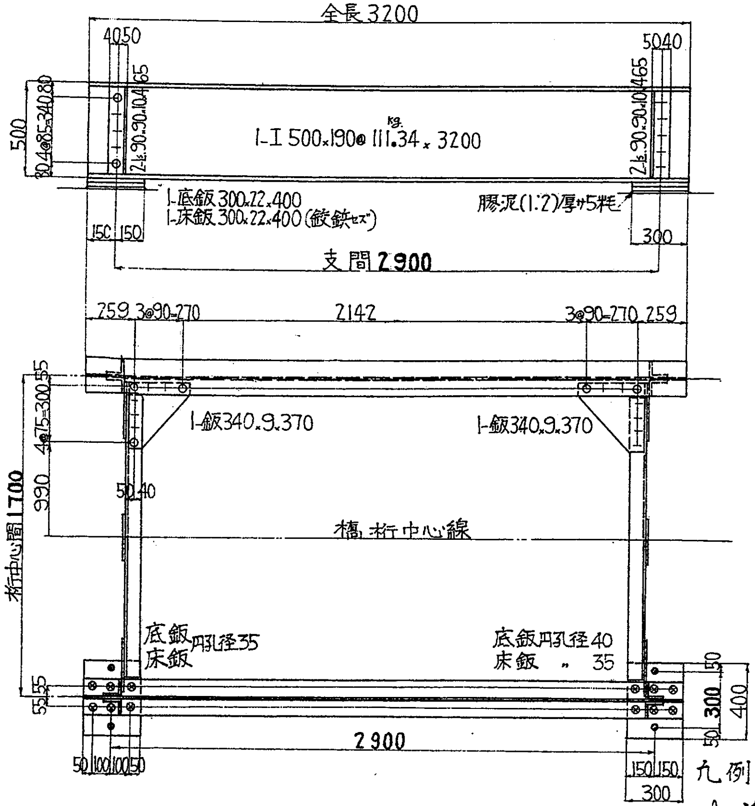
ペイント塗面積 5.9坪

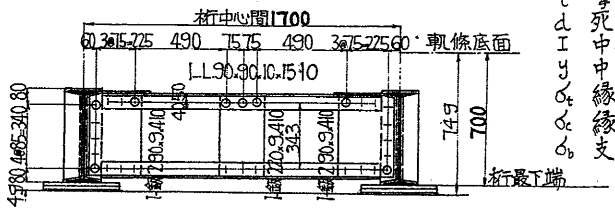
鉄；徑孟吋
符號
○　工場鉸メ　普通鉄
⊗　仝　裏側皿鉄，削リ均シ

注意
鉄孔ノ中心ヨリ剪斷縁ニ至ル距離ハ
1吋以上タルベシ

アンカーボールト

第六圖 A　　　米突式工形桁 (K. S. 18)





應力表

桁

最大彎曲率		最大剪力	
798 000	l	14 400	l
749 000	i	13 500	i
46 900	d	650	d

中央斷面

$I = 59570$

$y = 25$

	實應力	許容應力
σ_t	+669	+1200
σ_c	−669	−938

沓支面 $=1200^{cm^2}$

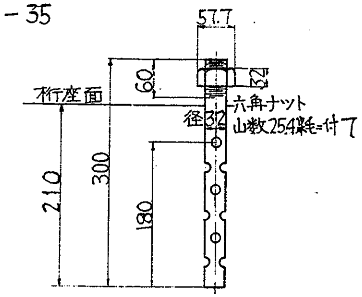
σ_b	−24	−35

材料表

種別	寸法		數量	重量(瓩)	摘要	材質
工形	500×190@111.34	3 200	2	713	桁	S39A
山形	90×90×10	465	8	50	補剛材	〃
〃	〃	1 510	4	80	支材	〃
鈑	340×9	370	4	36	繋鈑	〃
〃	290×9	410	4	34		〃
〃	220×9	410	2	13		〃
〃	300×22	400	8	166	底床鈑	〃
アンカーボールト	徑32	300	8	18		〃
鋲頭	徑19		240	11	工場鋲×	SV34
				1121		
總重量1121瓩=1.121瓲						

ペンキ塗面積16.3平米

アンカーボルト



凡例

l 活荷重彎曲率(Cm.kg)及剪力(kg)
i 衝撃 〃
d 死荷重 〃
I 中立軸ノ周リノ總斷面二次率(cm^4)
y 中立軸ヨリ縁維迄ノ距離(cm)
σ_t 縁維張應力(kg/cm²)
σ_c 縁維壓應力 〃
σ_b 支壓力

鋲徑 19粍

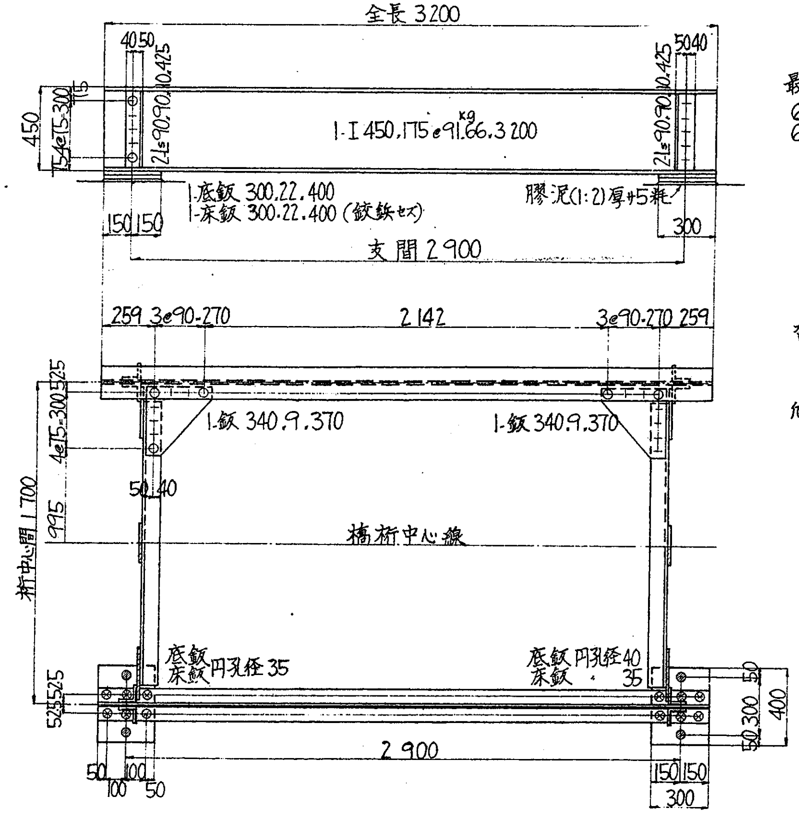
符號

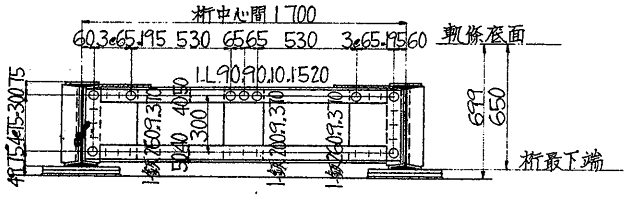
○, + 工場鋲× 普通鋲
⊗ 仝 裏側皿鋲削リ均シ

注意、

鋲孔ノ中心ヨリ剪斷縁ニ至ル距離ハ32粍以上タルベシ

第六圖 B　　米突式工形桁 (K. S. 15)





應力表

桁

最大彎曲率		最大剪力	
665 000	l	12 000	l
624 000	i	11 300	i
44 700	d	620	d

中央断面
I = 39 200
y = 22.5

	實應力	許容應力
σ_t	+ 766	+ 1200
σ_c	− 766	− 920

沓支面 = 1 200 cm^2

σ_b	− 20	⊥ 35

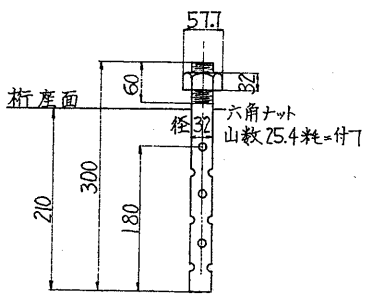
材料表

種別	寸	法	数量	重量(瓩)	摘要	材質
工形	450.175 e 91.66	3 200	2	587	桁	S39A
山形	90.90.10	425	8	45	補剛材	〃
〃	〃	1 520	4	81	支材	〃
鈑	340, 9	370	4	36	繫鈑	〃
〃	260, 9	370	4	27	〃	〃
〃	200, 9	370	2	10		〃
〃	300, 22	400	8	166	底床鈑	〃
アンカーボルト	径 32	300	8	18		〃
鋲頭	径 19		240	11	工場鋲	SV34
				981		
總重量 981 瓩 = 0.981 瓲						

ペンキ塗面積 = 15.1 平米

凡例
l　活荷重彎曲率(cm.kg)及剪力(Kg)
i　衝擊 〃
d　死荷重 〃
I　中立軸周リ總断面二次率(cm⁴)
y　中立軸ヨリ縁維迄ノ距離(cm)
σ_t　縁維張應力 (kg/cm²)
σ_c　縁維壓應力 〃
σ_b　支壓力 〃

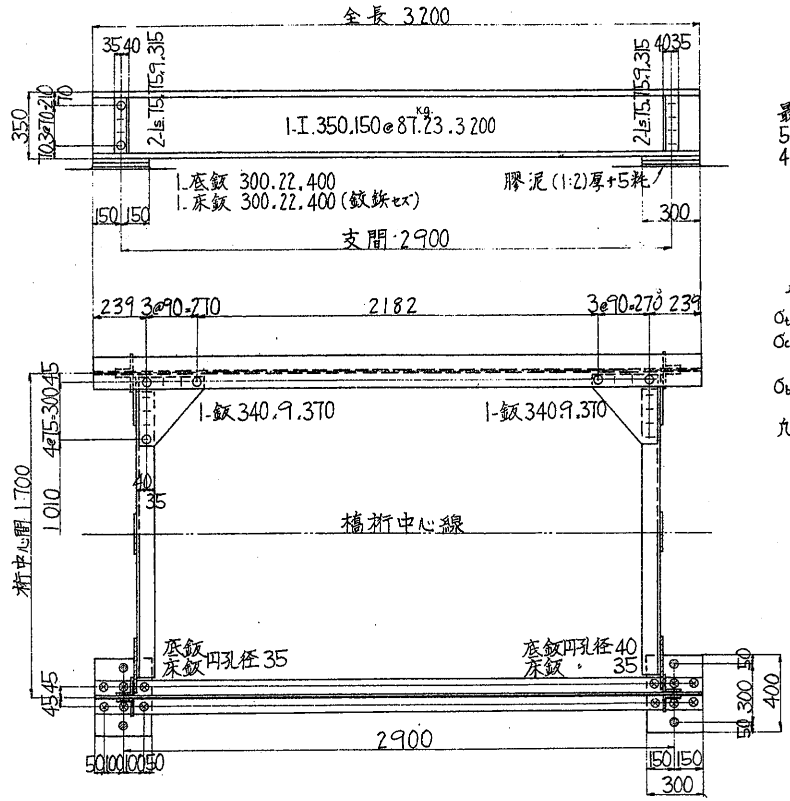
アンカーボルト

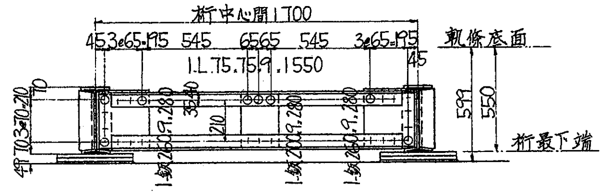


鋲徑 19粍
符號
○　工場鋲ノ普通鋲
⊗　仝　裏側皿鋲削リ均シ

注意
鋲孔ノ中心ヨリ剪断縁ニ至ル距離ハ
32粍以上タルベシ.

第六圖 C　　米突式工形桁 (K. S. 12)





應力表

桁

最大彎曲率		最大剪力	
532 000	l	9 610	l
499 000	i	9 020	i
43 400	d	600	d

中央断面

I = 22 500

y = 17.5

	實應力	許容應力
σ_t	+ 836	+ 1 200
σ_c	- 836	- 878

沓支面 = 1 200 cm^2

σ_b	-16	- 35

凡例

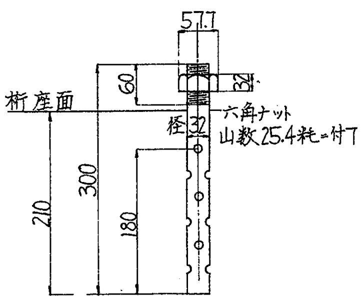
- l　活荷重彎曲率(cm.kg)及剪力(Kg)
- i　撃衝 〃
- d　死荷重 〃
- I　中立軸ノ周リノ總断面二次率(cm^4)
- y　中立軸ヨリ縁維迄ノ距離(cm)
- σ_t　縁維張應力 (kg/cm^2)
- σ_c　縁維壓應力 〃
- σ_b　支壓力

材料表

種別	寸	法	数量	重量(瓩)	摘要	材質
工形	350.150@87.23	3 200	2	558	桁	S 39 A
山形	75.75.9	315	8	25	補剛材	〃
〃	〃	1 550	4	62	支材	〃
鈑	340.9	370	4	36	繋鈑	〃
〃	260.9	280	4	21	〃	〃
〃	200.9	280	2	8	〃	〃
〃	300.22	400	8	166	底床鈑	〃
アンカーボルト	径 32	300	8	18		〃
鋲頭	径 19		224	11	工場鋲ノ	SV 34
				905.		
總重量 905瓩 = 0.905瓲						

ペンキ塗面積 = 11.7 平米

アンカーボルト



鋲徑　19粍

符號

+.○　工場鋲ノ普通鋲

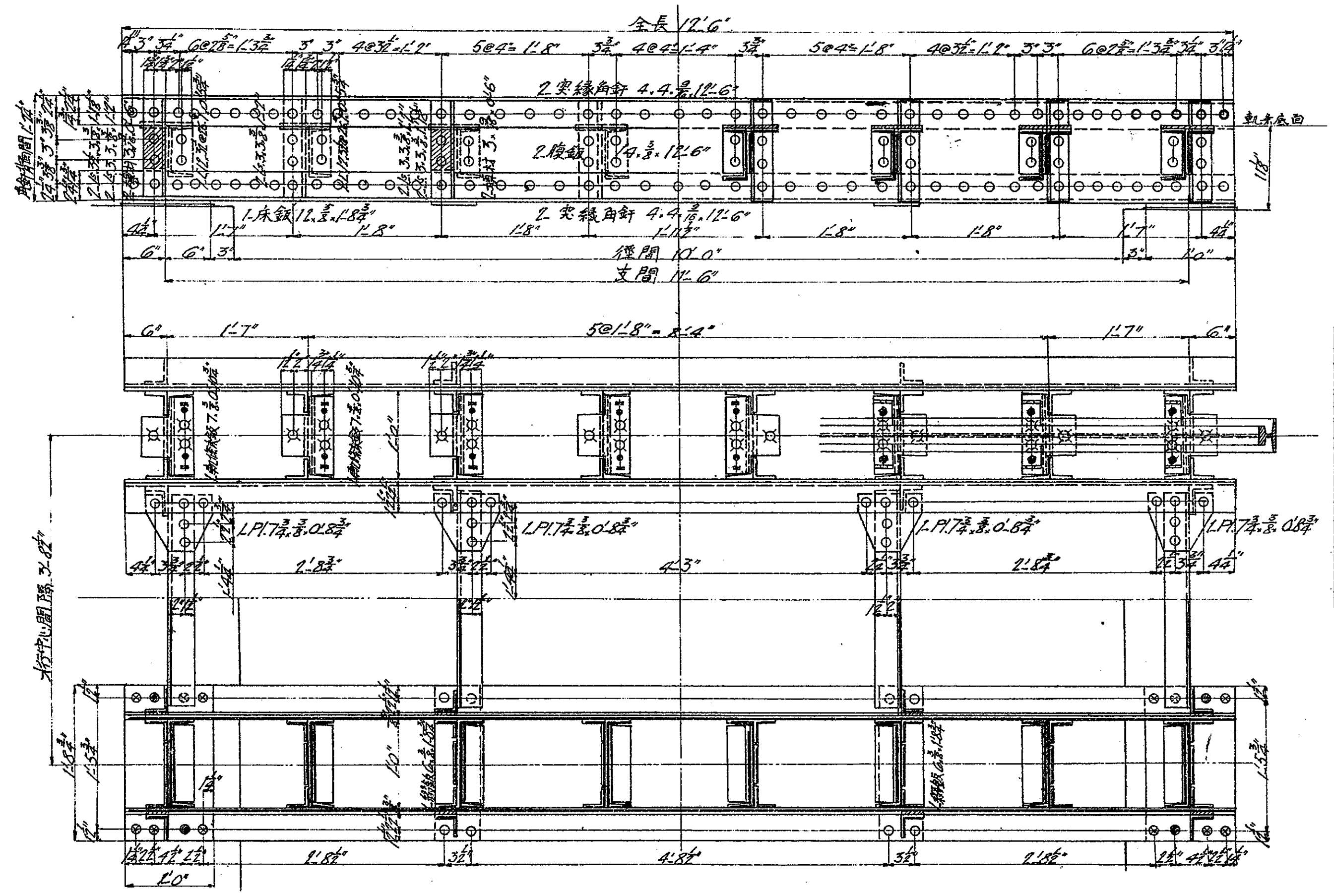
⊗　仝　裏側皿鋲削リ均シ

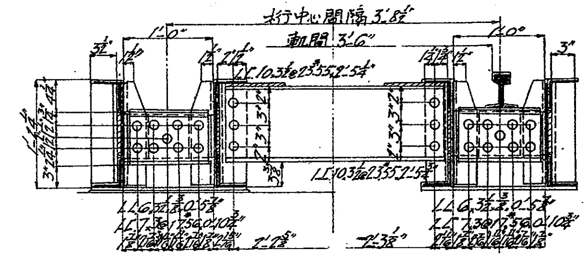
注意

鋲孔ノ中心ヨリ剪断縁ニ至ル距離ハ

32粍以上タルベシ.

第七圖　　E 33 槽 狀 桁





材 料 表

數量	種別	寸法		重量(封)	摘要	數量	種別	寸法		重量(封)	摘要
8	角鈁	4.4.5/8	12'-6"	1430	突緣角鈁	4	鈑	12.5/8	1'-8 3/4"	176	床鈑
4	鈑	14.3/8	12'-6"	893	腹鈑	1496	鋲頭	徑 3/4"		183	
8	角鈁	3 1/2.3.3/8	1'-1 1/8"	69	補剛材	32	ボールト	徑 3/4"	0'-2 3/4"	27	軌條取付用
8	仝	3.3.3/8	1'-1 1/8"	63	仝	8	アンカーボールト	徑 1"	1'-0"	25	
32	仝	仝	1'-2"	269						4164封度	
16	鈑	3.3/8	0'-6"	46	填材	32	75#軌條取付用 異形座金			37	
16	溝形	12.3 1/2@26 1/4#	0'-5 3/4"	200	軌條受桁	32	仝 角形座金			5	
16	仝	7.3@17.56	0'-10 3/4"	252	仝					42封度	
16	角鈁	6.3 1/2.3/8	0'-5 3/4"	92	仝	32	60#軌條取付用 異形座金			42	
16	鈑	7.3/8	0'-10 3/4"	93	軌條床鈑凸	32	仝 角形座金			8	
4	仝	6.3/8	1'-8 3/4"	53	綴鈑					50封度	
8	仝	7 1/2.3/8	0'-8 3/4"	58	繋鈑						
2	溝形	10.3 1/2@23.55	2'-5 1/4"	115	支材	75#軌條使用ノ場合		總重量		4206封度 = 1.878噸	
2	仝	仝	2'-5 3/4"	117	仝	60#軌條使用ノ場合		總重量		4214封度 = 1.881	

ペイント塗面坪……8.01

桁

最大彎曲率		最大剪力	
698 400"#	l	28 100#	l
672 600"#	i	27 000#	i
48 600"#	d	1 400#	d
1 419 600吋封度		56 500封度	

鋲徑 3/4吋

- ○ 工場鋲ﾒ 普通鋲
- ⊗ 仝 皿 鋲 裏面皿ノ分 削リ均シ
- ¤ 仝 仝 表面皿ノ分 削リ均シ

中央斷面

上突緣 2.Ls. 4.4.5/8 = 8.36 　 = 8.36

腹鈑 2.Pls. 14.3/8 = 10.50 − 8×3/8×(7/8+1/8) = 7.88

下突緣 2.Ls. 4.4.5/8 = 8.36 − 2×5/8×(7/8+1/8) = 7.38

27.22 總斷面　　23.62 純斷面

$I = 723$

$$f = + \frac{1\,419\,600 \times 7.33}{723} = +14\,400$$

$$f = - \frac{1\,419\,600 \times 6.93}{723} = -13\,600$$

桁端ニ於ケル腹鈑突緣連結用鋲

鋲距 = 2.625　I = 723　Q = 48

剪力

$$f = \frac{2.625 \times 56\,500 \times 48}{2 \times \frac{7}{8} \times (\frac{3}{4})^2 \times 723} = 11\,200$$

床石

支面　12 × 20.75 = 249□"

$$f = - \frac{56\,500}{249} = -230$$

凡例

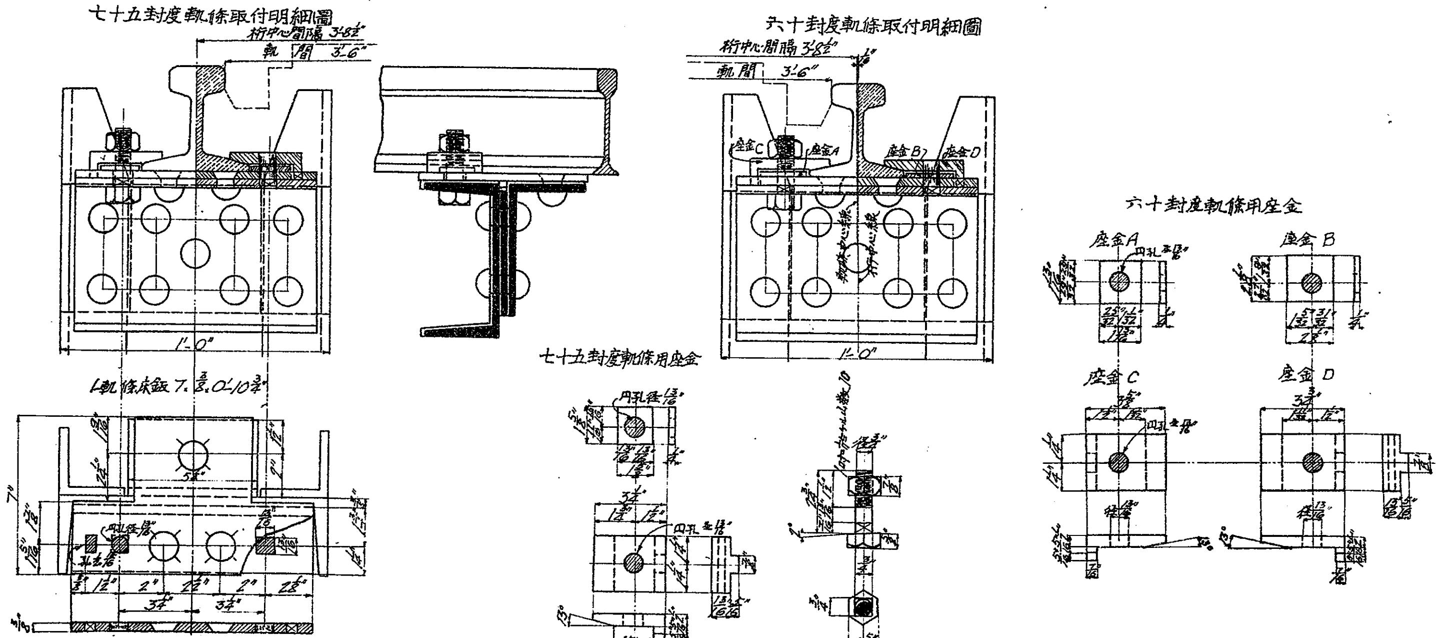
- \+ ――― 張力
- − ――― 壓力
- d ――― 静荷重彎曲率又ハ剪力
- l ――― 動荷重彎曲率又ハ剪力
- i ――― 衝撃彎曲率又ハ剪力
- f ――― 實應力(封/□")
- I ――― 腹鈑ニ直角ナル中立軸ノ周リノ物量力率(吋)
- Q ――― 腹鈑ニ直角ナル中立軸ノ周リノ突緣斷面能率(吋)

注意

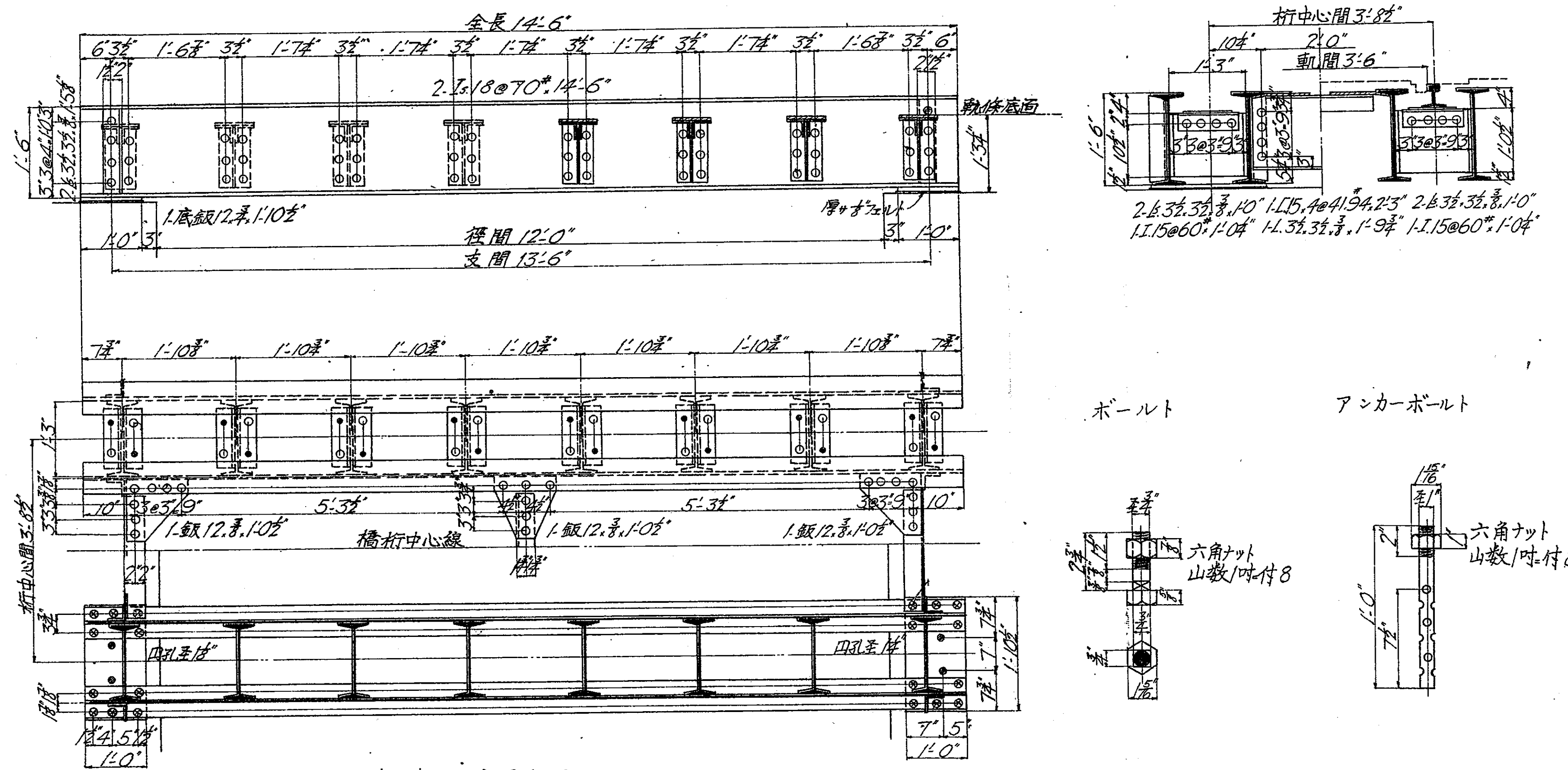
鋲孔ノ中心ヨリ剪斷緣ニ至ル距離ハ1 1/4吋以上タルベシ

床鈑下ニハ厚サ1/2吋ノ「アスファルトフェルト」ノ類ヲ置クベシ

アンカーボールトハ大正六年達第五〇七號ニヨル



第八圖　　E 40　槽狀桁



材料表

数量	種別	寸法		重量(#)	摘要
4	工形	18@70#	14'-6"	4060	桁(米國型)
16	仝	15@60#	1'-0¼"	980	軌條受桁(米國型)
32	山形	3½×3½×⅜	1'-0"	272	
16	鈑	7½×⅜	0'-9½"	121	軌條底鈑
8	山形	3½×3½×⅜	1'-5⅝"	97	補剛材
4	鈑	12×⅜	1'-10½"	230	底鈑
6	仝	12×⅜	1'-0½"	67	繫鈑 ▽▽
1	山形	3½×3½×⅜	1'-9¾"	15	支材
2	溝形	15.4@41.94#	2'-3"	189	仝(製鉄所型)
744	鋲頭	径⅞"		143	工場鋲ノ
32	ボールト	径¾"	0'-2¾"	27	軌條取付用
8	アンカーボールト	径1"	1'-0"	25	
				6226	
32	75封度軌條取付用異形座金			36	3½×2½×½L.ヨリ製作ノコト
32	仝　角形座金			5	
				41	
32	60封度軌條取付用異形座金			41	4×2½×½L.ヨリ製作ノコト
32	仝　角形座金			7	
				48	

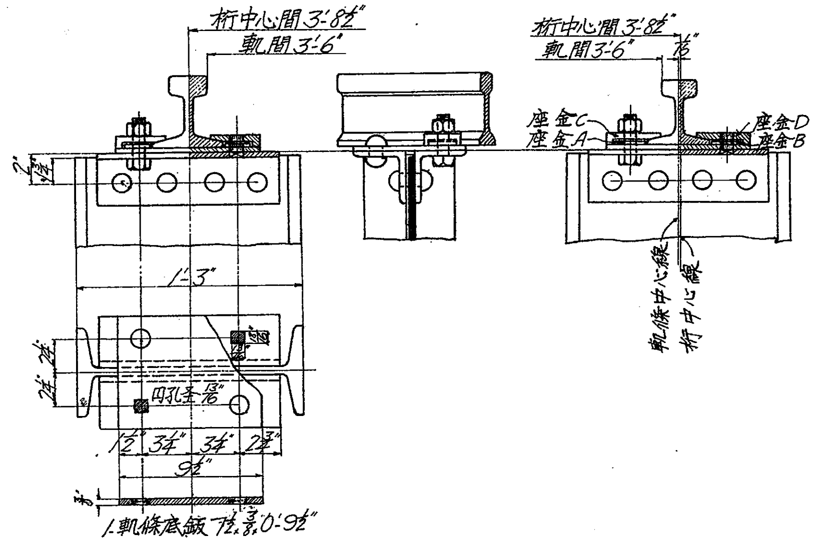
總重量
75封度軌條使用ノ場合 6,267封度 = 2.798噸
60封度軌條使用ノ場合 6,274封度 = 2.801噸

ペイント塗面積 10坪

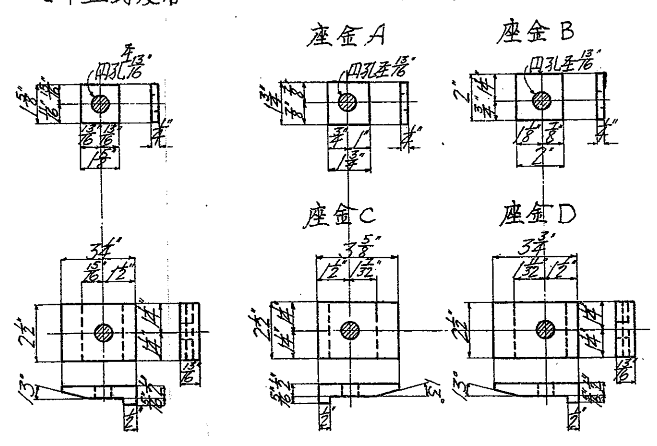
鋲：徑⅞吋
符號
○ 工場鋲ノ　普通鋲
⊗ 仝　裏側皿鋲，削リ均シ

注意
鋲孔ノ中心ヨリ剪断諸端ニ至ル距離ハ1½吋以上タルヘシ

軌條取付明細圖



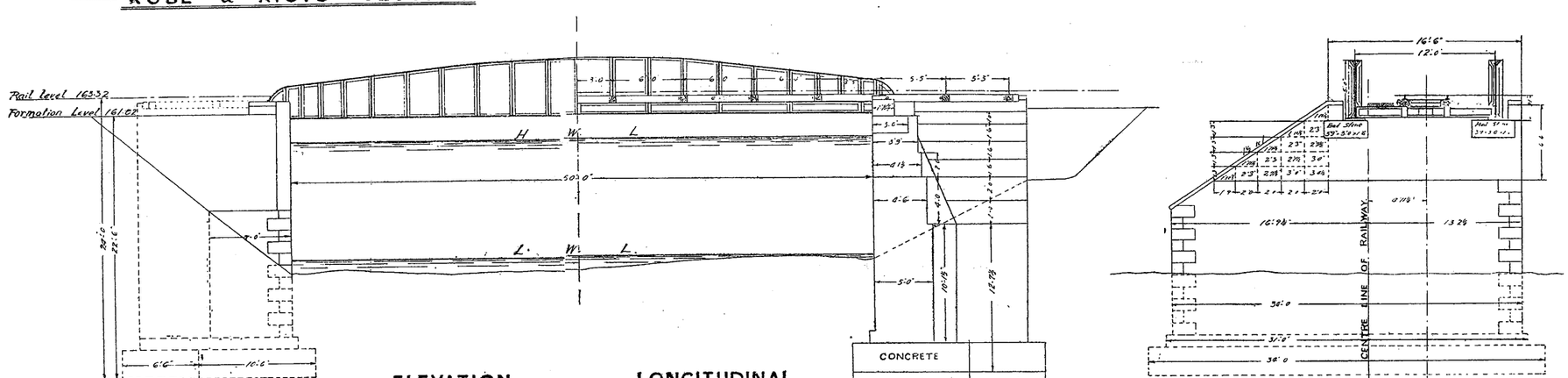
軌條用座金



座金A.Bハ軌條ノ形正確ノ場合ハ圖ノ如ク用ヒ不正確ノ場合ハ適宜變換シテ用フルモノトス

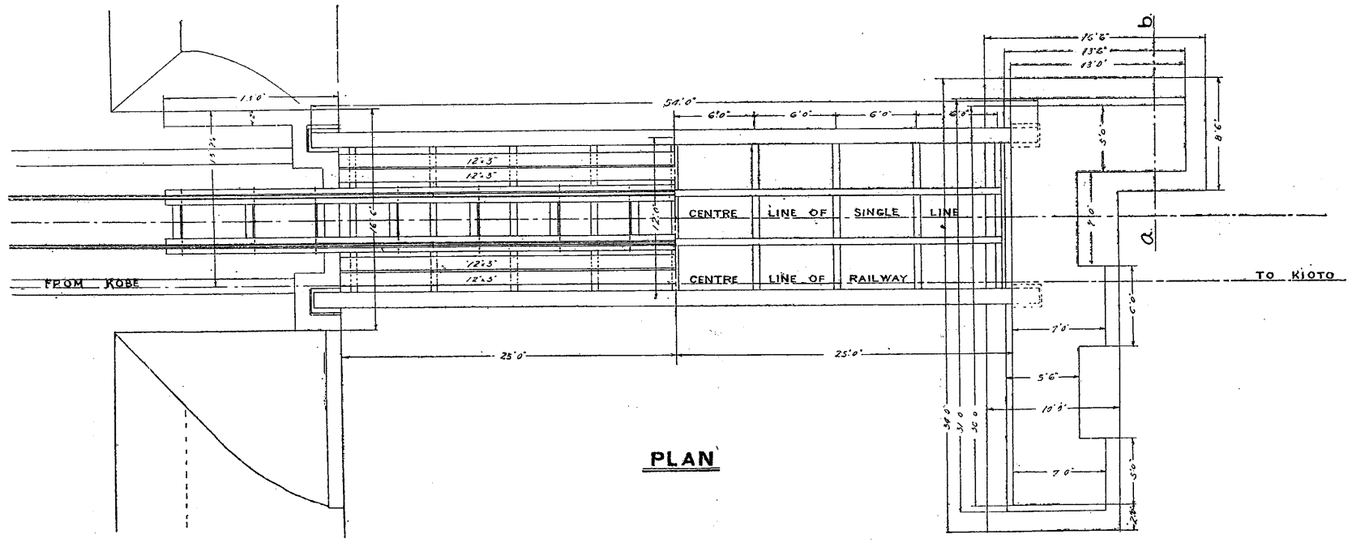
第九圖　檜ノ尾川橋梁

KOBE & KIOTO SECTION

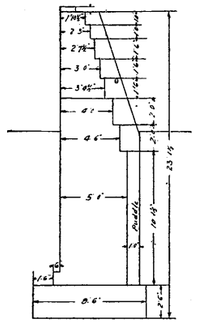


ELEVATION　　LONGITUDINAL SECTION

FRONT ELEVATION OF ABUTMENT

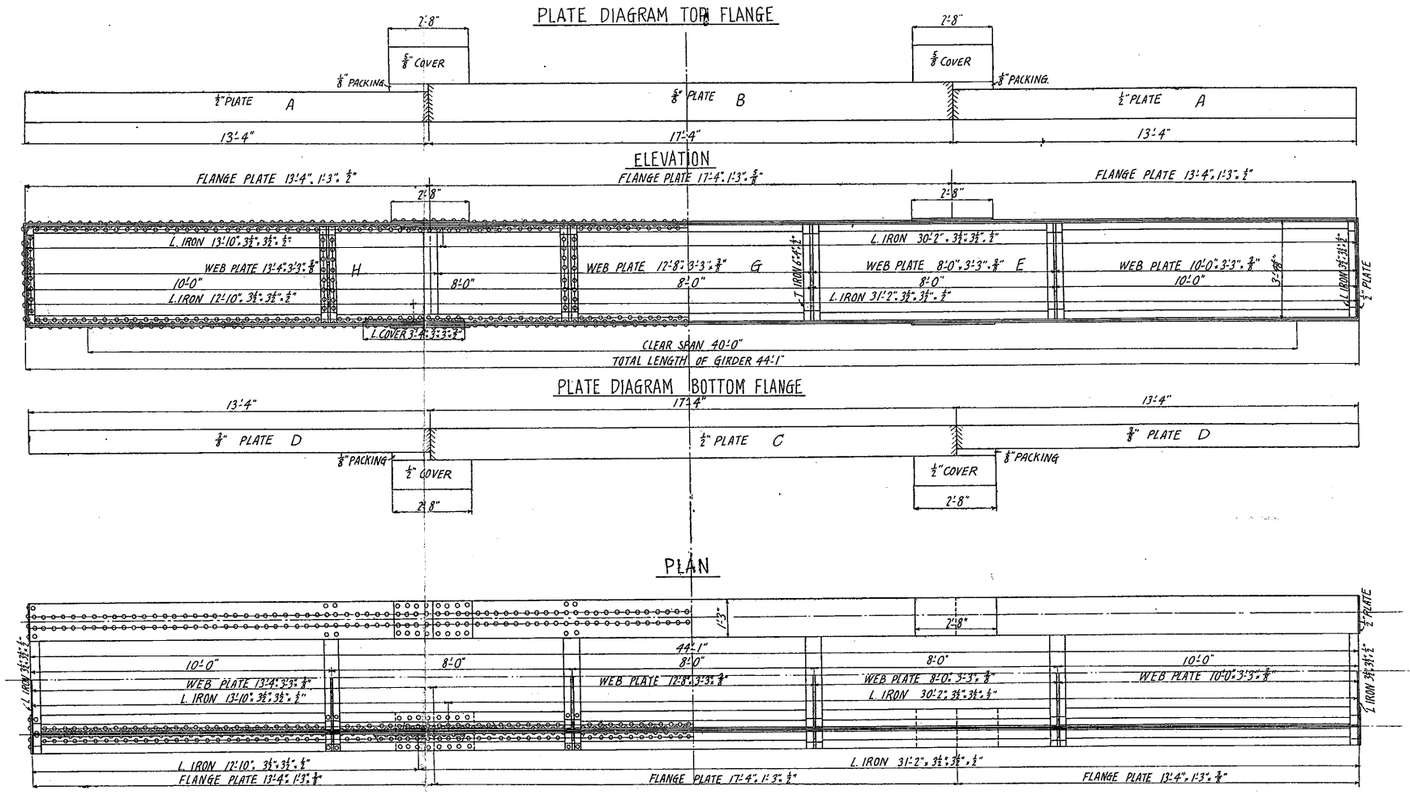


PLAN



SECTION ON LINE a b.

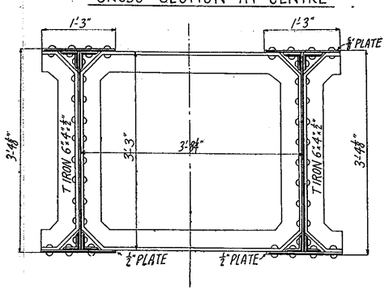
第十圖　ぽーなる型鋼鐵鈑桁



NOTES

RIVETS TO BE COUNTERSUNK WHERE GIRDERS REST ON ABUTMENTS
ALL RIVET HOLES TO BE DRILLED NOT PUNCHED

CROSS SECTION AT CENTRE



FOR ONE SPAN.

NUMBER	DESCRIPTION		DIMENSIONS	WEIGHT OF LBS.	REMARKS
4	PLATE IRONS	A	13'-4", 1'-3", ½"	1338	TOP FLANGE
2	DO	B	17'-4", 1'-3", ⅝"	1083	DO
2	DO	C	17'-4", 1'-3", ½"	867	BOTTOM FLANGE
4	DO	D	13'-4", 1'-3", ⅜"	1000	DO
8	DO		1'-4", 1'-3", ⅜"	67	PACKINGS
4	DO		2'-8", 1'-3", ½"	267	COVER PLATE
4	DO		2'-8", 1'-3", ⅜"	334	DO
2	DO	E	8'-0", 3'-3", ⅜"	780	WEBS
2	DO	F	10'-0", 3'-3", ⅜"	975	DO
2	DO	G	12'-8", 3'-3", ½"	1735	DO
2	DO	H	13'-4", 3'-3", ½"	1300	DO
4	DO		2'-8", 6", ½"	80	WEB COVERS
4	DO		3'-3", 3'-3", ½"	312	END PLATES
4	L. IRONS		30'-2", 3½", 3½", ½"	1307	CONNECTING WEB & FLANGES
4	DO		13'-10", 3½", 3½", ½"	599	DO
4	DO		12'-10", 3½", 3½", ½"	556	DO
4	DO		31'-2", 3½", 3½", ½"	1351	DO
4	DO		4'-6", 3½", 3½", ½"	195	OUTSIDE STIFFENERS
2	DO		13'-6", 3½", 3½", ½"	293	INSIDE STIFFENERS
8	DO		3'-6", 3½", 3½", ½"	244	COVERS
8	T IRONS		4'-6", 6"×4", ½"	570	OUTSIDE STIFFENERS
4	DO			855	INSIDE STIFFENERS
				7,812	

第十一圖　ぼーなる型鋼鐵鈑桁

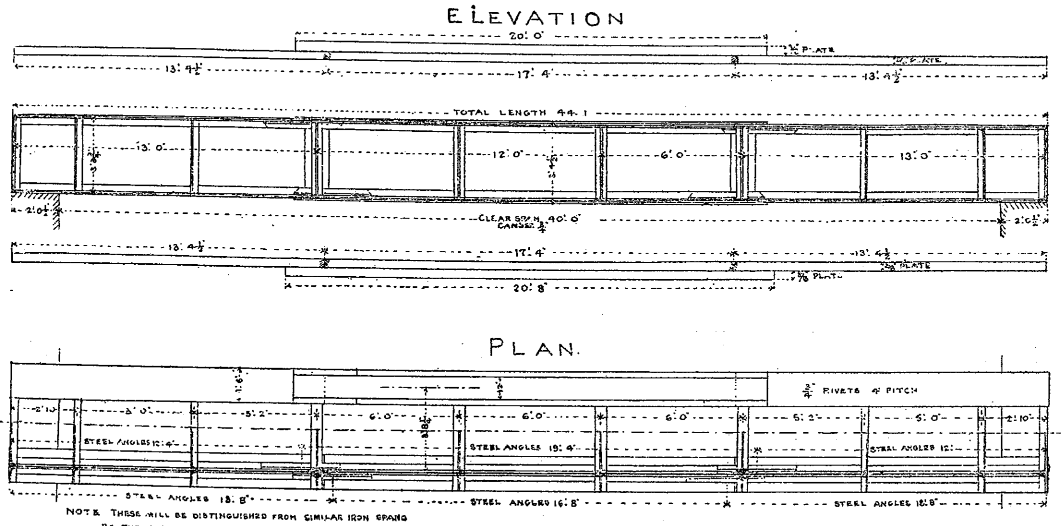
PLATE GIRDERS　JUNE 1894

40 FEET SPAN.

C. A. W. Pownall (signed)

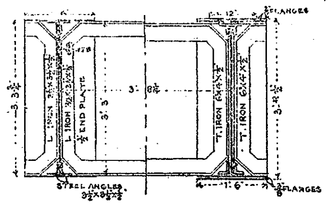
ELEVATION

PLAN



NOTE. THESE WILL BE DISTINGUISHED FROM SIMILAR IRON SPANS BY THE SECOND PLATE 12" WIDE IN TOP FLANGE.

CROSS SECTION



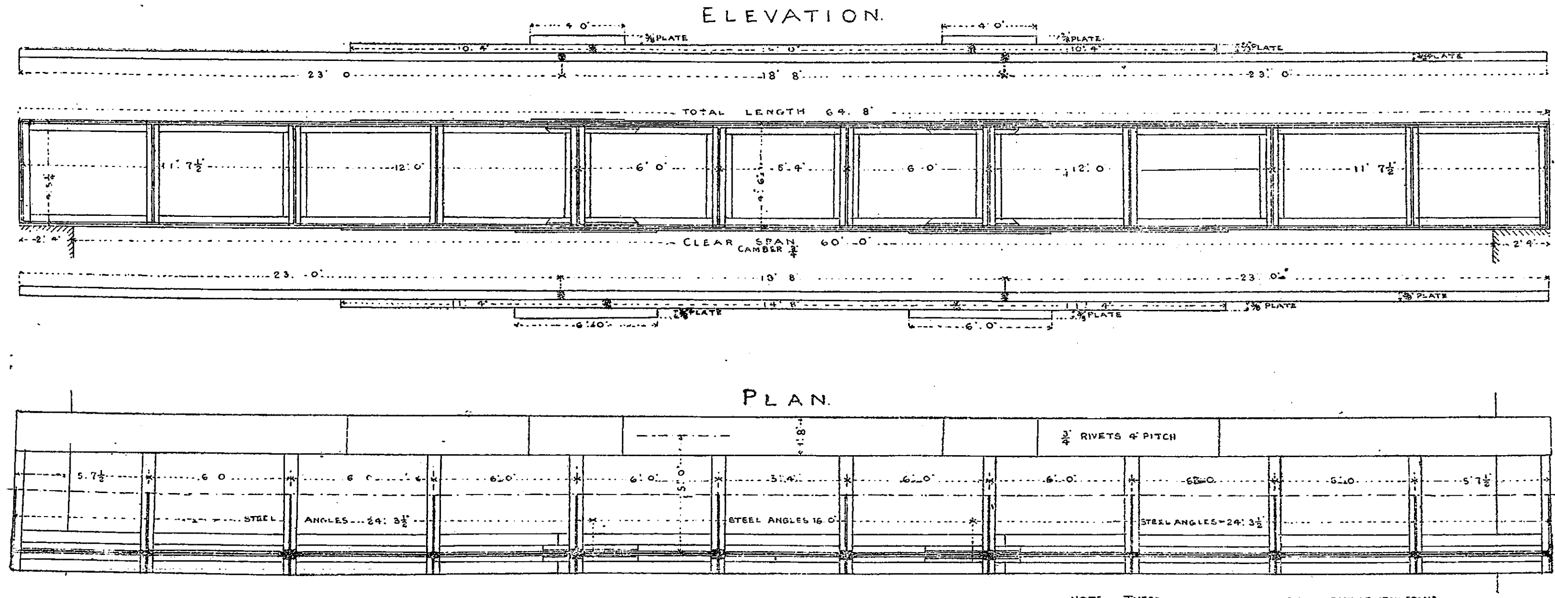
SCHEDULE OF MATERIALS
FOR ONE SPAN

NO	DESCRIPTIONS	DIMENSIONS	WEIGHT IN LBS	REMARKS
2	STEEL PLATES	20' 0" x 1' 0" x 3/8"	624	FLANGES
4	DO	17' 4" x 1' 6" x 3/8"	1622	DO
8	DO	13' 4½" x 1' 6" x 3/8"	2,304	DO
2	DO	20' 8" x 1' 6" x 3/8"	967	DO
4	DO	13' 0" x 3' 3" x 3/8"	2,656	WEBS
2	DO	12' 0" x 3' 3" x 3/8"	217	DO
2	DO	6' 0" x 3' 3" x 3/8"	608	DO
8	DO	2' 8" x 1' 0" x 3/8"	332	WEB COVERS
8	DO	2' 8" x 5" x 3/8"	83	FLANGE COVERS
8	DO	2' 8" x 5 5/16" x 3/8"	147	DO
4	DO	3' 3" x 1' 6" x ½"	406	END PLATES
8	STEEL ANGLES	12' 4" x 3½ x 3½ x ½"	1,111	CONNECTING WEBS AND FLANGES
4	DO	19' 4" x 3½ x 3½ x ½"	871	DO
6	DO	15' 8" x 3½ x 3½ x ½"	1,231	DO
4	DO	16' 8" x 3½ x 3½ x ½"	751	DO
16	DO	3' 4" x 3 x 3 x ½"	509	ANGLE COVERS
6	ANGLE IRONS	13' 0" x 3½ x 3½ x ½"	845	STIFFENERS
12	DO	4' 3" x 3½ x 3½ x ½"	552	DO
4	TEE IRONS	12' 0" x 6" x 4" x ½"	823	DO
8	DO	4' 3" x 6" x 4" x ½"	538	DO
4,648	RIVET HEADS		375	
		TOTAL	18,753	= 8 T 7 C 1 Q 21 LBS

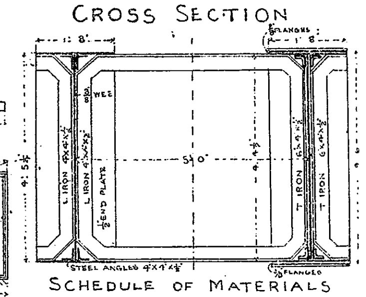
60 FEET SPAN.

ELEVATION

PLAN



CROSS SECTION



SCHEDULE OF MATERIALS
FOR ONE SPAN

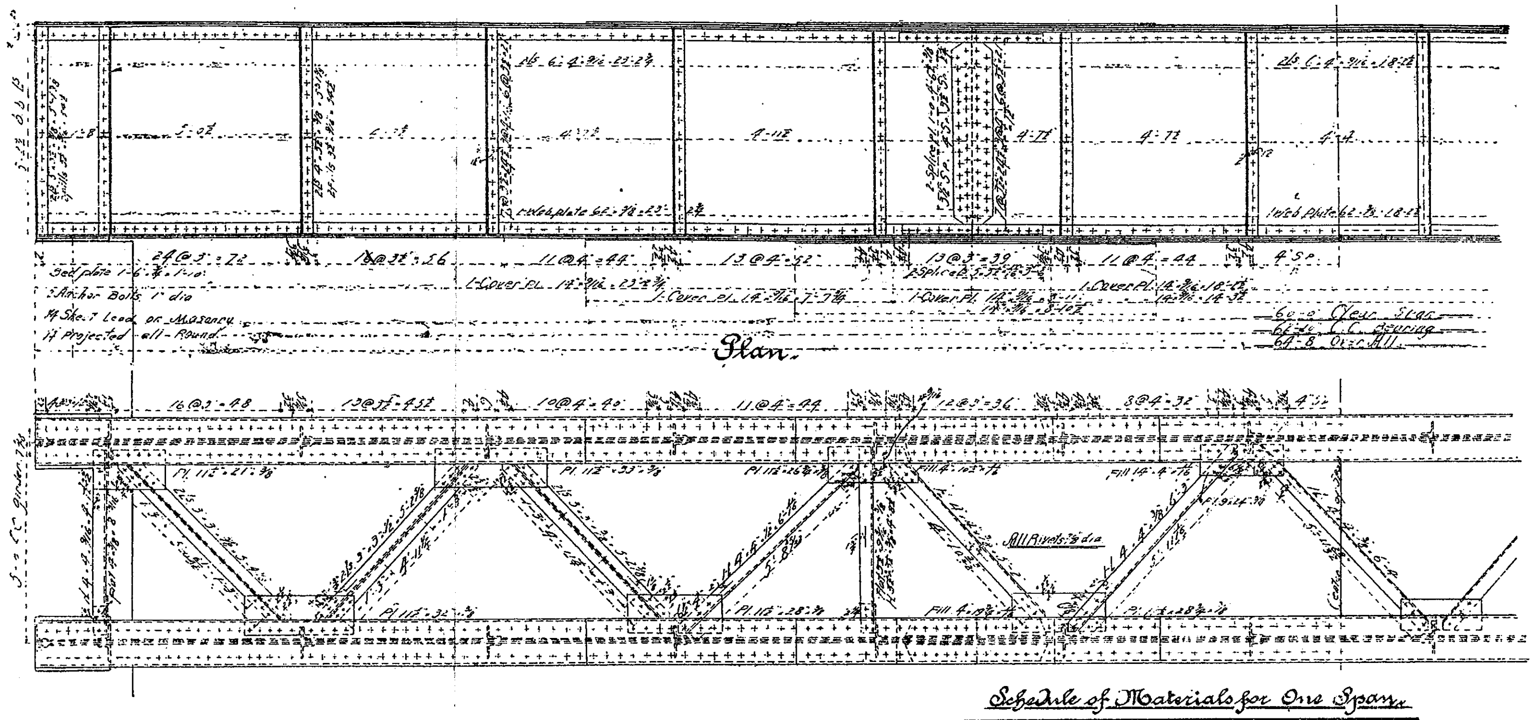
NO	DESCRIPTIONS	DIMENSIONS	WEIGHT IN LBS	REMARKS
2	STEEL PLATES	16' 0" x 1' 8" x 3/8"	829	FLANGES
4	DO	10' 4" x 1' 8" x 3/8"	1,070	DO
8	DO	23' 0" x 1' 8" x 3/8"	4765	DO
4	DO	18' 8" x 1' 8" x 3/8"	1,934	DO
4	DO	4' 0" x 1' 8" x 3/8"	414	FLANGE COVERS
2	DO	14' 8" x 1' 8" x 3/8"	759	FLANGES
4	DO	11' 4" x 1' 8" x 3/8"	1173	DO
4	DO	6' 0" x 1' 8" x 3/8"	624	FLANGE COVERS
4	DO	12' 0" x 4' 4½" x 3/8"	3276	WEBS
4	DO	11' 7½" x 4' 4½" x 3/8"	3,173	DO
4	DO	6' 0" x 4' 4½" x 3/8"	1638	DO
2	DO	5' 4" x 4' 4½" x 3/8"	727	DO
24	DO	3' 3½" x 1' 0" x 3/8"	1,388	WEB COVERS
4	DO	4' 4½" x 1' 8" x ½"	607	END PLATES
16	STEEL ANGLES	24' 0½" x 4" x 4" x ½"	5,070	CONNECTING WEBS AND FLANGES
8	DO	16' 0" x 4" x 4" x ½"	1669	DO
16	DO	4' 0" x 3½" x 3½" x ½"	720	ANGLE COVERS
2	ANGLE IRONS	18' 0" x 4 x 4 x ½"	450	STIFFENERS
4	DO	5' 6" x 4" x 4" x ½"	275	DO
10	TEE IRONS	18' 0" x 6" x 4" x ½"	2,850	DO
20	DO	5' 6" x 6" x 4" x ½"	1740	DO
8280	RIVET HEADS		667	
		TOTAL	35,813	= 15 T 19 C 3 Q 1 LBS

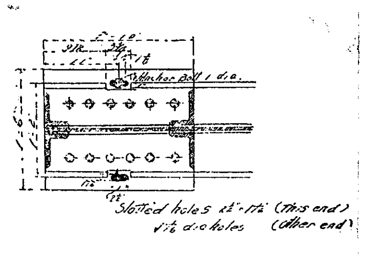
NOTE. THESE WILL BE DISTINGUISHED FROM SIMILAR IRON SPANS BY THE FLANGES BEING 1' 8" WIDE INSTEAD OF 1' 6".

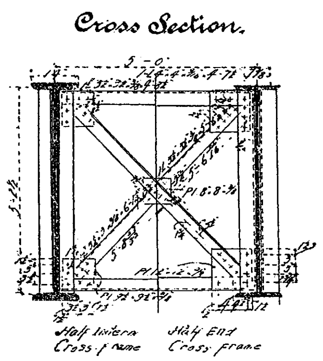
第十二圖　杉文三氏設計鋼鈑桁

Standard Steel Plate Girder for 60 foot Span.

Elevation.





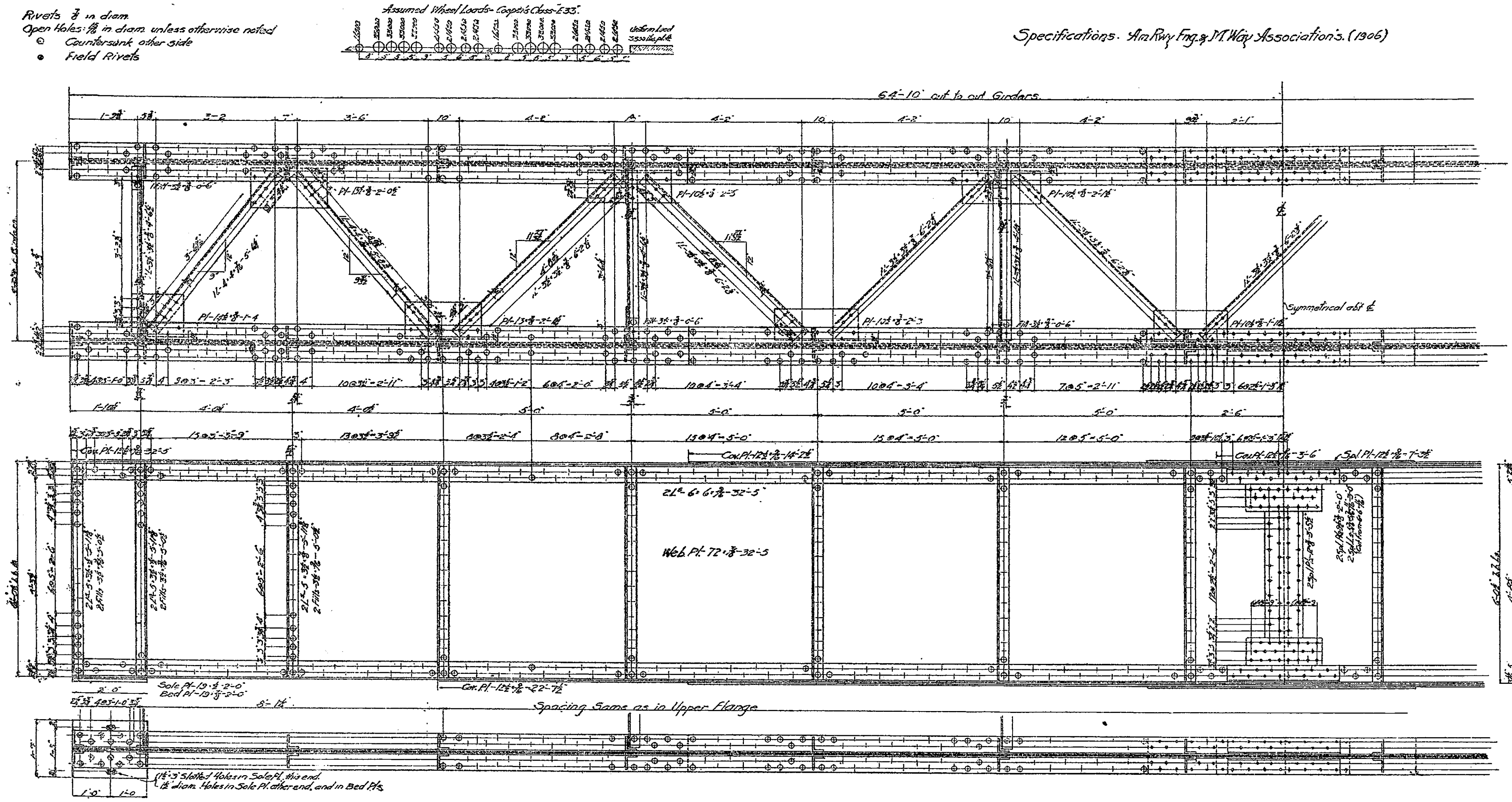


Schedule of Materials for One Span.

Number	Descriptions.	Dimensions.	Weight in lbs	Remarks.
8	Steel Plates.	9/16" × 14" × 23'-2¾"	4975	Flange Plate
4	Do.	9/16" × 14" × 18'-2½"	1950	Do.
8	Do.	9/16" × 14" × 7'-7⅜"	1637	Do.
8	Do.	9/16" × 14" × 3'-11"	839	Do.
4	Do.	9/16" × 14" × 14'-3½"	1530	Do.
8	Do.	[illegible] × 14" × 8'-10½"	1901	Flange Splice plate
4	Do.	⅜" × 5'-2" × 23'-7⅜"	7345	Web Plate
2	Do.	⅜" × 5'-2" × 16'-2½"	2879	Do.
64	Do.	9/16" × 3½" × 4'-6½"	1947	Filler plate
8	Do.	⅜" × 1'-0" × 4'-6½"	556	Web splice plate
2	Do.	⅜" × 11½" × 1'-9"	51	Gusset Plate (Lateral)
2	Do.	⅜" × 11½" × 2'-8"	78	Do.
2	Do.	⅜" × 11½" × 2'-9"	81	Do.
2	Do.	⅜" × 11½" × 2'-4"	68	Do.
2	Do.	⅜" × 11½" × 2'-2¾"	65	Do.
2	Do.	⅜" × 11½" × 2'-4¾"	70	Do.
2	Do.	⅜" × 9" × 2'-0"	46	Do.
8	Do	⅜" × 1'-0" × 1'-0"	122	Do. (Cross Frame)
4	Do.	⅜" × 8" × 8"	28	Do.
8	Do.	⅜" × 9½" × 9½"	77	Do.
2	Do.	⅜" × 4" × 8 9/16"	7	Packing
2	Do.	⅜" × 3½" × 9 7/16"	7	Do.
4	Do.	[illegible] × 1'-6" × 2'-10"	337	Bed plate
16	Steel Angles	6" × 4" × 9/16" × 23'-2¾"	6727	Flange Angle
8	Do.	6" × 4" × 9/16" × 18'-2½"	2637	Do.
16	Do.	5" × 3½" × 7/16" × 3'-6"	1030	Splice Angle
16	Do.	5" × 3½" × ⅜" × 5'-1¼"	843	End Stiffener
48	Do.	4" × 3½" × ⅜" × 5'-1½"	2234	Intermediate Stiffener
4	Do.	4" × 4" × 7/16" × 4'-7½"	268	Strut
4	Do.	3½" × 3½" × ⅜" × 4'-8½"	160	Do.
4	Do.	3½" × 3½" × ⅜" × 5'-[illegible]	201	Cross Frame
4	Do.	3½" × 3" × ⅜" × 6'-4½"	190	Do.
4	Do.	3" × 3" × ⅜" × 5'-4⅜"	246	Lateral Bracing
4	Do.	3" × 3" × ⅜" × 5'-2⅜"	136	Do.
4	Do.	3" × 3" × [illegible] × 5'-2⅜"	130	Do.
2	Do.	4" × 4" × ⅜" × 6'-7⅛"	33	Do.
2	Do.	4" × 4" × ⅜" × 5'-2"	101	Do.
2	Do.	4" × 4" × ⅜" × 6'-3"	129	Do.
1	Do.	4" × 4" × ⅜" × 6'-4"	62	Do.
7052	⅞" dia Rivet Heads		1301	
2	Steel plates	⅜" × 4" × [illegible]	16	Filler Plate
2	Do.	⅜" × 4" × 1'-3⅜"	3.	Do.
2	Do.	9/16" × 4" × 1'-4"	22	Do.
		Total weight	43289.	19T 6C 2Q 1lbs.

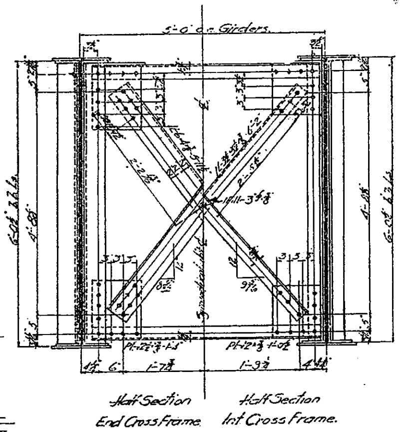
第十三圖　E33　上路鋼鈑桁

Standard Steel Deck Plate Girders for 60ft. Span. 1909



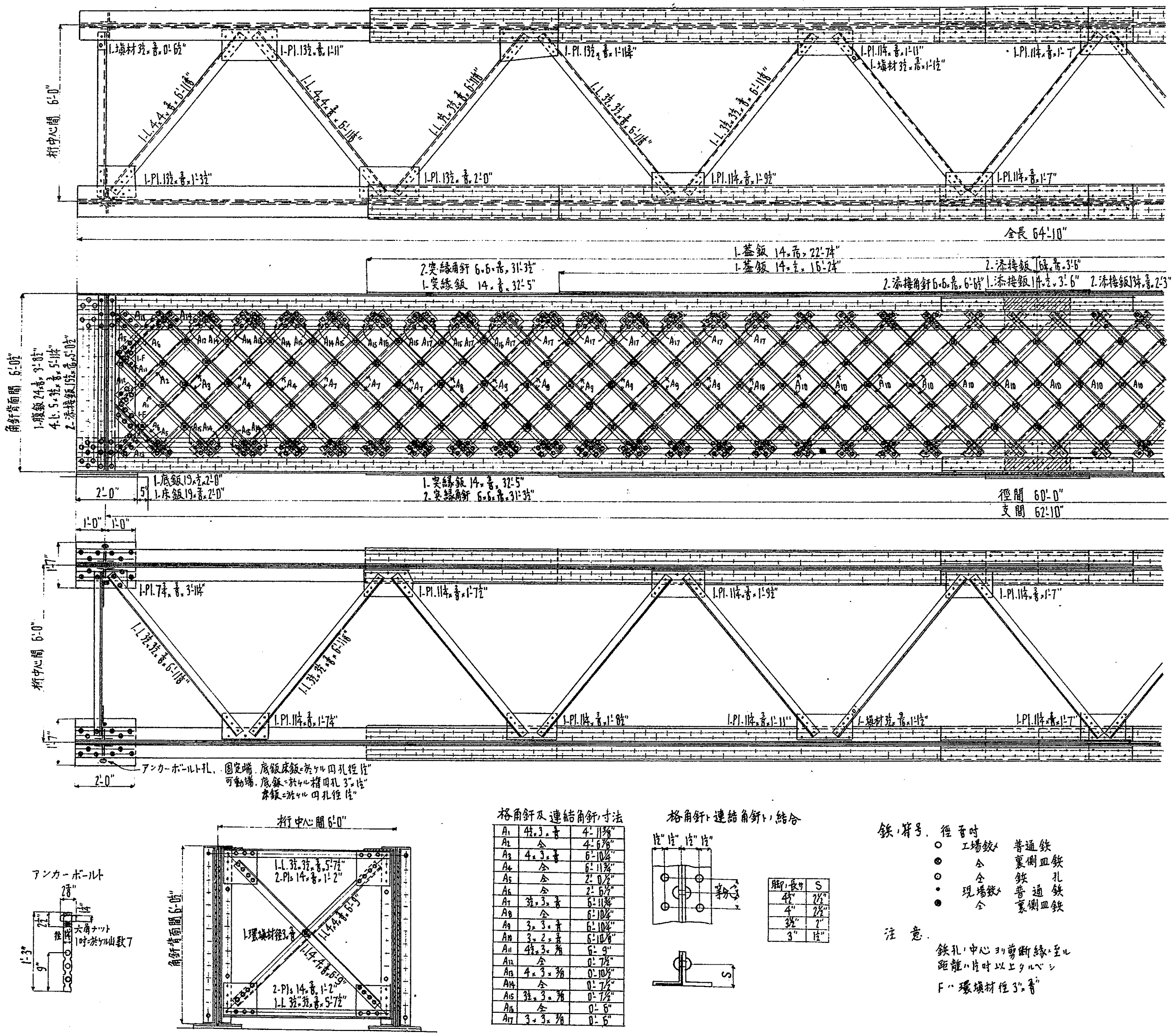
List of Materials.

No. of Pcs.	Descriptions	Dimensions		Weight lbs.
	Girders			
2	Cov. Pls.	12½·5/16	14'-2½	673.15
1	"	" "	22'-7½	540.74
1	"	" "	32'-5	774.75
4	Flange Ls.	6·6·⅜	32'-5	2839.70
1	Web Pl.	72·⅜	32'-5	2977.80
4	End Stiffs.	6·3½·⅜	5'-1⅞	325.56
4	Fills	5½·⅜	5'-0½	135.12
12	Stiffeners	5·3½·⅜	5'-1⅞	742.28
12	Fills	3½·⅜	5'-0½	405.35
1	Sole Pl.	19·¾	2'-6	64.62
				9483.07
	Splices			
2	Spl. Pls.	12½·5/16	7'-3½	348.55
2	Cov. Pls.	"	3'-6	168.30
4	Spl. Ls.	6·6·11/16	3'-0	318.00
4	Spl. Pls.	3½·⅜	2'-0	96.96
2	"	" "	3'-5½	108.38
	Laterals & Cross Frames			1040.18
6	Strut Ls.	5½·3½·⅜	4'-6½	231.63
6	"		4'-6½	231.65
4	End Cross Fr. Ls.	6·4·⅜	3'-11½	293.14
8	Int. "	3½·3½·⅜	6'-2	419.33
16	Gusset Pls.	12·⅜	1'-0½	653.00
8	"	12½·⅜	1'-1	170.63
2	Lateral Ls.	4·4·⅜	5'-6⅜	124.77
2	"		5'-6⅞	129.18
9	"	3½·3½·⅜	6'-2⅞	472.34
6	Fills	3½·⅜	0'-6	13.41
2	Lateral Pls.	14½·⅜	1'-4	49.33
2	"	13½·⅜	2'-0½	70.31
2	"	13·⅜	2'-1½	64.77
4	"	10½·⅜	2'-3	120.31
2	"	" "	2'-1½	56.9[illegible]
2	"	"	1'-11½	52.43
6	Packing Rings	3⅞·⅜		4.51
				2764.75
	Total Weight.			
4	Girders			37932.00
2	Splices			2080.00
	Lateral System			2765.00
4	Bed Pls.	19·⅞	2'-0	452.00
6812	Rivet heads			1183.00
				44412.00



Note: Use Sheet Lead ¼" thick between Bed Plates & Masonry

第十四圖　鋼格鈑桁



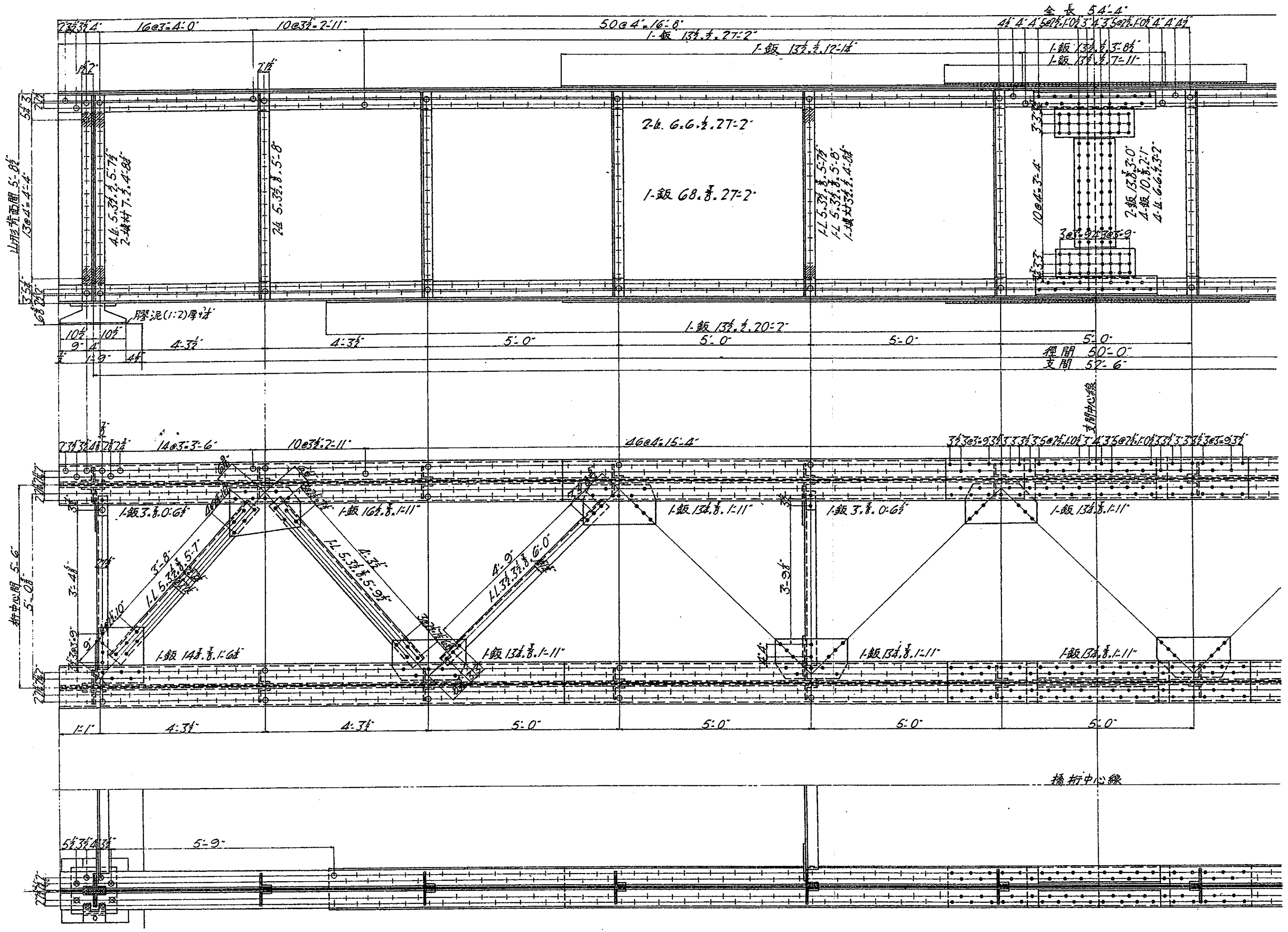
鋲符号 徑5/8吋
○ 工場鋲メ 普通鋲
◎ 仝 裏側皿鋲
⊙ 仝 鋲孔
• 現場鋲メ 普通鋲
● 仝 裏側皿鋲

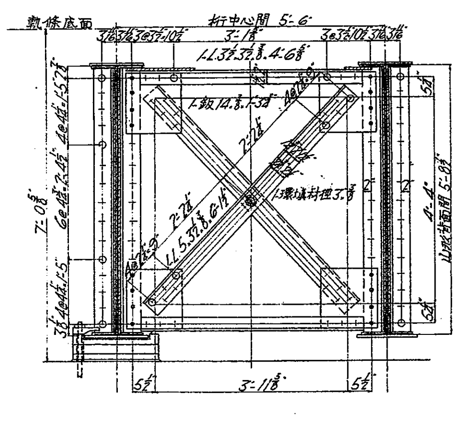
注意.
鋲孔ノ中心ヨリ剪断縁ニ至ル距離ハ1吋以上タルベシ
F ハ環填材径3"ナリ

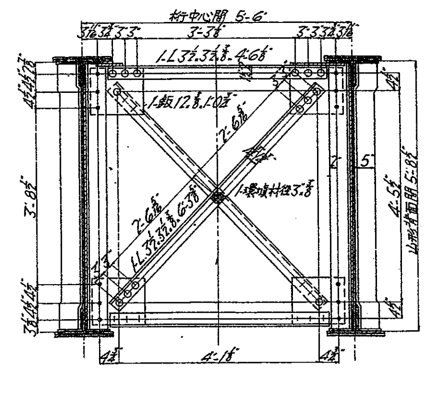
材料表

数量	種別	寸法		重量(#)	摘要
		主桁			
8	鈑	14×7/16	22'-7 1/4"	3 767	蓋鈑
8	仝	14×1/2	16'-2 1/4"	3 082	仝
4	仝	仝	3'-5"	333	添接鈑
8	仝	6 3/4×9/16	3'-6"	361	仝
16	角鈑	6×6×9/16	31'-3 1/2"	18 965	突縁角鈑
8	仝	仝	6'-6 1/2"	1 146	添接角鈑
8	鈑	14×3/8	32'-5"	4 629	突縁鈑
8	仝	13 3/4×3/8	2'-3"	304	添接鈑
8	仝	5 3/4×9/16	2'-6"	60	填材
4	仝	24×3/8	3'-8 1/2"	454	腹鈑
16	角鈑	5×3 1/2×3/8	5'-11 1/4"	988	補剛材
8	鈑	15 1/2×9/16	5'-0 1/2"	1 195	添接鈑
4	角鈑	4 1/2×3×3/8	4'-11 3/8"	180	格角鈑
4	仝	仝	4'-1 3/8"	166	仝
8	仝	4×3×3/8	6'-10 1/4"	466	仝
16	仝	仝	6'-11 3/4"	949	仝
8	仝	仝	2'-0 1/2"	139	仝
8	仝	仝	2'-6 1/2"	173	仝
24	仝	3 1/2×3×3/8	6'-11 3/4"	1 323	仝
8	仝	仝	6'-1 1/4"	433	仝
48	仝	3×3×3/8	6'-10 1/4"	2 369	仝
60	仝	3×2×3/8	6'-10 1/4"	2 426	仝
4	仝	4 1/2×3×3/8	6'-9"	27	連結角鈑
12	仝	仝	0'-7 1/2"	68	仝
8	仝	4×3×3/8	0'-10 5/8"	60	仝
40	仝	仝	0'-7 1/2"	213	仝
48	仝	3 1/2×3×3/8	0'-7 1/2"	237	仝
16	仝	仝	0'-6"	63	仝
96	仝	3×3×3/8	0'-6"	346	仝
16	鈑	3×3/8	0'-9"	46	填材
506	仝	徑3"×3/8"		380	環填材
4	仝	19×1/2"	2'-0"	238	底鈑
4	仝	19×3/8	2'-0"	452	床鈑
				38 058 封度	
		横綫構及對傾綫構			
4	角鈑	4×4×3/8	6'-11 5/8"	272	横綫材
22	仝	3 1/2×3 1/2×3/8	6'-4 1/8"	1 295	仝
2	鈑	13 1/2×3/8	1'-3 1/2"	44	繋鈑
2	仝	仝	1'-11"	66	仝
2	仝	仝	2'-0"	69	仝
2	仝	仝	1'-11 3/4"	68	仝
4	仝	11 3/8×3/8	1'-9 1/2"	103	仝
4	仝	仝	1'-11"	116	仝
4	仝	仝	1'-7"	96	仝
2	仝	仝	1'-8 1/2"	49	仝
2	仝	仝	1'-7 1/2"	41	仝
2	仝	仝	1'-7 1/4"	46	仝
2	仝	7 3/4×3/8	0'-11 1/4"	19	仝
2	仝	3 1/2×3/8	0'-6 1/2"	5	填材
4	仝	3 1/2×9/16	1'-1 1/2"	30	仝
4	角鈑	3 1/2×3 1/2×3/8	5'-7 1/2"	191	支材
4	仝	4×4×3/8	6'-9"	265	對傾綫構
8	鈑	14×3/8	1'-2"	167	繋鈑
2	仝	徑5×3/8		2	環填材
				2 938 封度	
		鋲頭			
7504	鋲頭	徑 3/8"		1447	工場鋲メ
1568		仝		302	現場鋲メ
				1 749 封度	
		アンカーボールト			
8	アンカーボールト	徑 1 1/4"	1'-3"	49	
		総重量		42 794 封度 = 19.104 噸	

第十五圖　　E40 上路鋼鈑桁

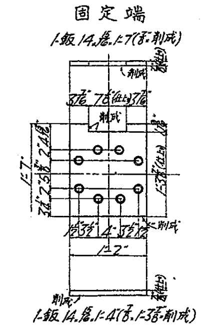






底鈑

固定端



可動端

材料表

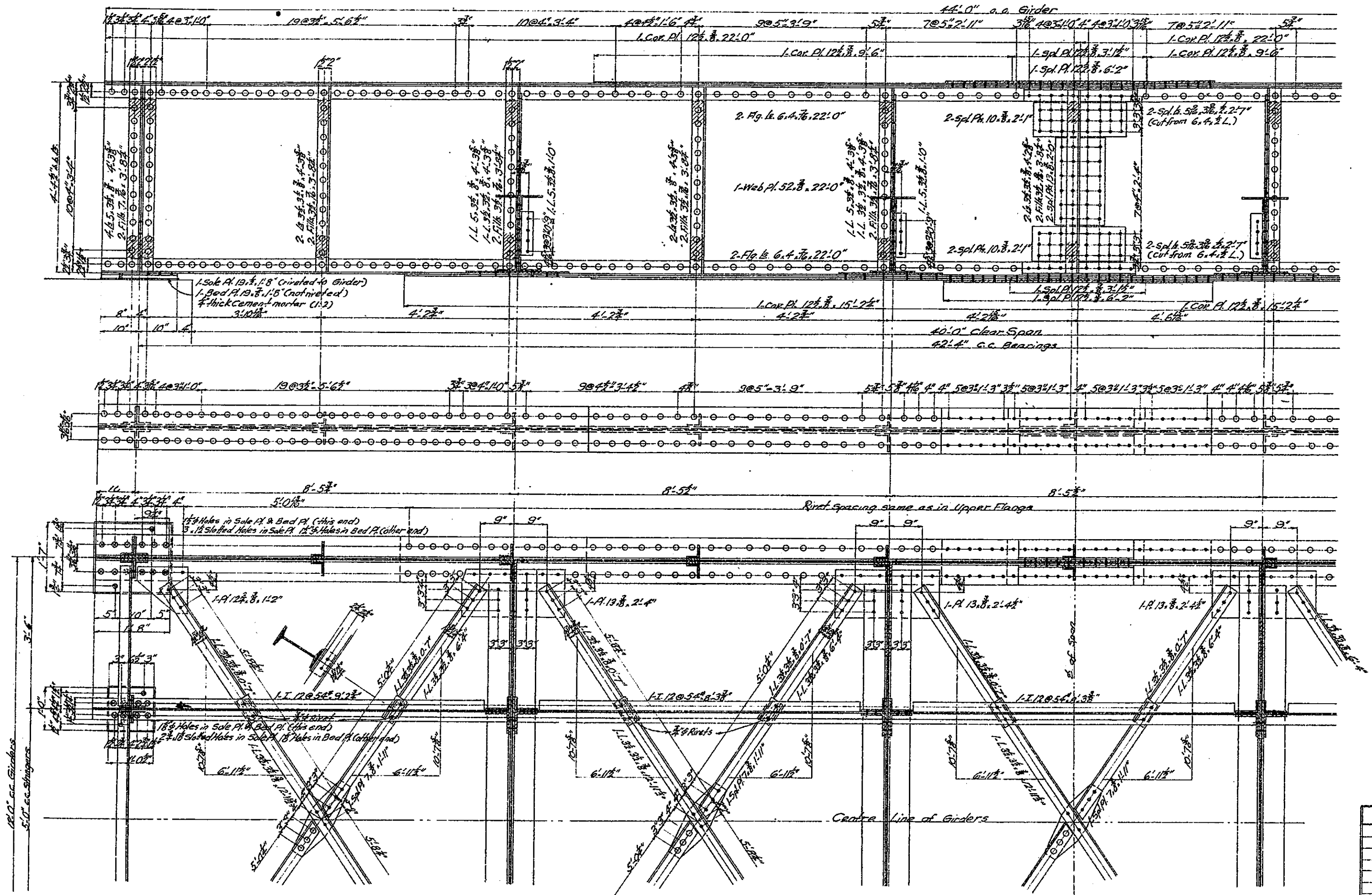
數量	種別	寸法		重量(封)	摘要
桁					
8	鈑	13½.½	12'-1½"	2222	突緣
4	〃	〃	20'-2"	1851	〃
4	〃	〃	27'-2"	2494	〃
4	〃	〃	3'-8½"	340	添接
4	〃	〃	7'-11"	727	〃
16	山形	6.6.½	27'-2"	8519	突緣
8	〃	〃	3'-2"	497	添接
4	鈑	68.⅜	27'-2"	9421	腹鈑
8	〃	10.⅜	2'-1"	213	添接
4	〃	13.⅜	3'-0"	199	〃
16	山形	5.3½.½	5'-7½"	1224	補剛材
4	〃	5.3½.⅜	5'-7½"	234	〃
36	〃	〃	5'-8"	2122	〃
8	鈑	7.½	4'-8½"	446	塡材
4	〃	3½.½	4'-8½"	112	〃
2	〃	14.7/16	1'-7"	121	底鈑ヨリ削成円
2	〃	〃	1'-4"	110	仝ヨリ1-3/16ニ削成
				30852	
橫綾構及對傾綾構					
2	山形	5.3½.⅜	5'-7"	116	橫綾材
2	〃	〃	5'-9½"	120	〃
7	〃	3½.3½.⅜	6'-0"	357	〃
4	〃	〃	4'-6⅜"	155	支材
4	〃	〃	4'-6⅜"	153	〃
4	〃	〃	6'-3⅜"	214	對傾材
4	〃	5.3½.⅜	6'-1½"	255	〃
4	鈑	3.⅜	0'-6½"	8	繋鈑
2	〃	14½.⅜	1'-6¼"	57	〃
2	〃	16½.⅜	1'-11"	81	〃
8	〃	13¼.⅜	1'-11"	259	〃
8	〃	14.⅜	1'-3¼"	187	〃
8	〃	12.⅜	1'-0⅜"	130	〃
4	〃	徑3.⅜		3	環塡材
				2095	
鋲頭					
4400	鋲頭	徑⅞"		848	工場鋲ノ
1368	〃	〃		264	現場鋲ノ
				1112	
鑄鐵沓及附屬品					
4	鑄鐵沓	達第644號E40上路		1840	
4	座金	50呎用		50	中軟鋼
4	アンカーボールト	徑1¼"	2'-6"	45	
				1935	
總重量35994封度=16.069噸					

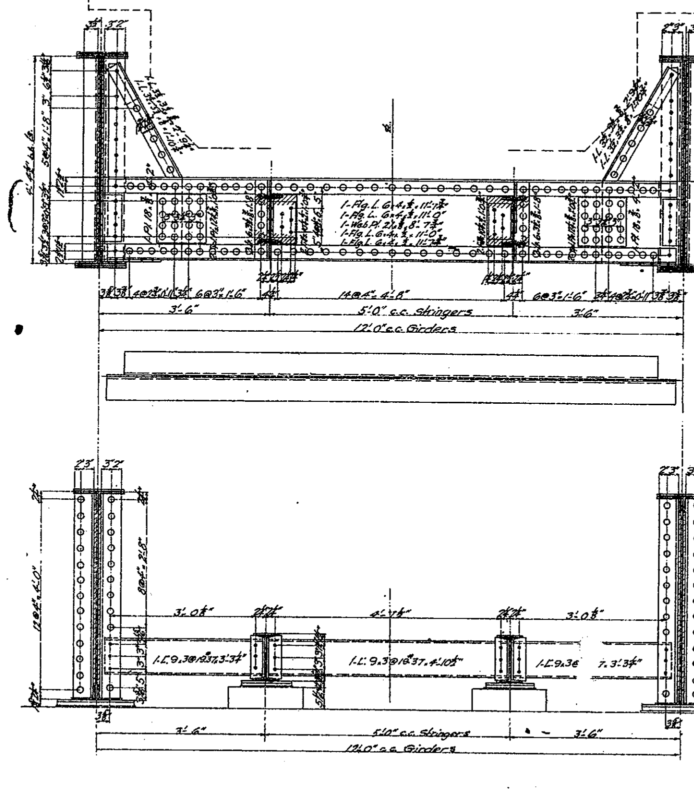
ペイント塗面積 63坪

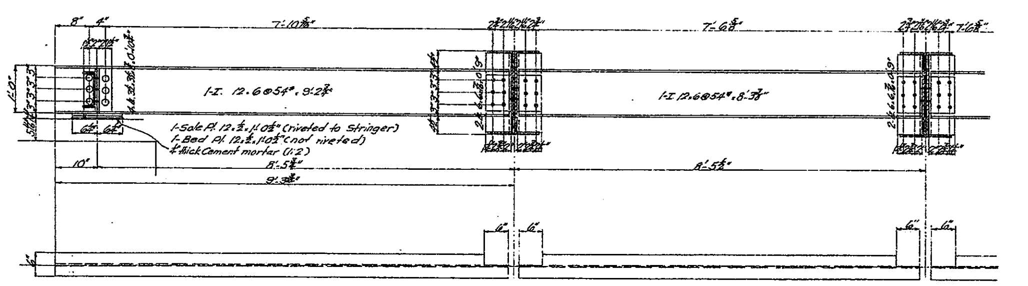
鋲:徑⅞吋
符號
○ 工場鋲ノ 普通鋲
◎ 仝 裏側皿鋲 削リ均シ
⊜ 仝 兩側皿鋲 削リ均シ
• 現場鋲ノ 普通鋲
◎ 鋲孔

注意: 鋲孔ノ中心ヨリ剪斷緣ニ至ル距離ハ 1½吋以上ナルベシ

第十六圖　　E 33 下路鋼鈑桁





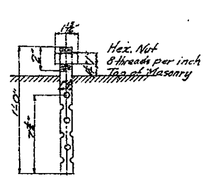


Rivets: 7/8 in. diam. except where otherwise noted

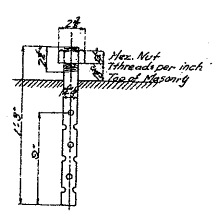
- ○ Shop. two full heads
- ⊗ 〃 countersunk other side. chipped
- • Field, two full heads
- ⊛ 〃 countersunk other side, chipped

The minimum distance from the centre of any rivet hole to a sheared edge shall be 1½ inches for 7/8 in. diam. rivet and 1¼ inches for ¾ in. diam. rivet

Anchor Bolt



Anchor Bolt



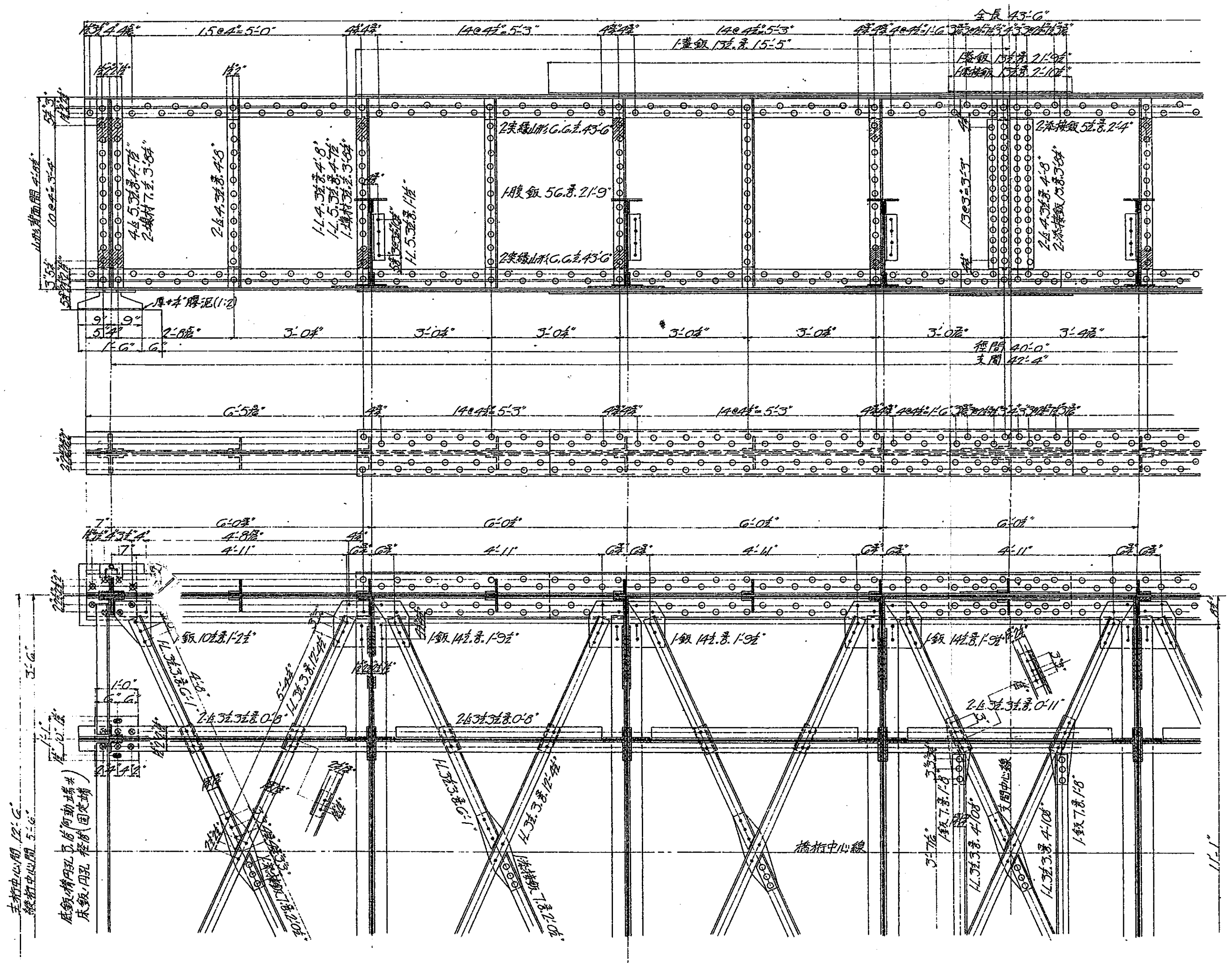
List of Materials

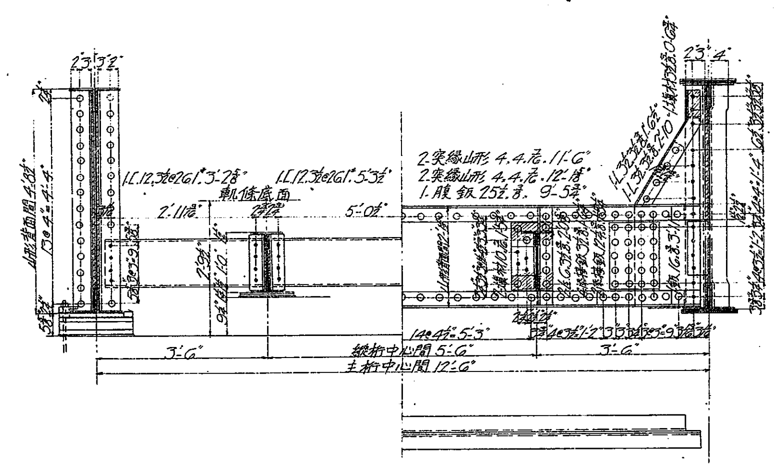
No.	Description	Dimension		Weight (lbs)	Remarks
		Main Girder			
8	Plate	12½ . 3/8	9'-6"	1 211	Cover Plate
4	do.	do.	22'-0"	1 403	do.
4	do.	do.	15'-2¾"	968	do.
4	do.	52 . 3/8	22'-0"	5 834	Web Plate
16	Angle	6 . 4 . 7/16	22'-0"	5 034	Flange Angle
24	do.	5 . 3½ . 3/8	4'-3 5/8"	1 074	Stiffener
24	do.	3½ . 3½ . 3/8	4'-3 5/8"	878	do.
4	do.	do.	4'-2 5/8"	143	do.
8	do.	5 . 3½ . 3/8	1'-0"	83	Connecting Angle
8	do.	5 7/8 . 3 7/16 . ½	2'-7"	303	Splice Angle (cut from 6.4.7/16 L)
4	Plate	12½ . 3/8	3'-1½"	199	Splice Plate
4	do.	do.	6'-2"	393	do.
8	do.	10 . 3/8	2'-1"	212	do.
4	do.	13 . 3/8	2'-0"	133	do.
8	do.	7 . 7/16	3'-8¼"	307	Filler
32	do.	3½ . 7/16	3'-8¼"	615	do.
4	do.	3½ . 5/16	3'-8¼"	99	do.
4	do.	19 . ½	1'-8"	215	Sole Plate
				19 103 lbs.	
		Floor Beam			
8	Angle	6 . 4 . ½	11'-7¾"	1 509	Flange Angle
8	do.	do.	11'-0"	1 426	do.
4	Plate	21 . 3/8	8'-7¾"	926	Web Plate
8	do.	18 . 3/8	4'-2"	580	do.
16	do.	12½ . 3/8	1'-0¾"	267	Splice Plate
16	Angle	6 . 3½ . 3/8	1'-8"	312	Stiffener
8	do.	3½ . 3½ . 3/8	2'-9¼"	188	Knee Angle
8	do.	do.	1'-10¾"	129	do.
16	Plate	10½ . ½	1'-0¾"	296	Filler
				5 633 lbs.	
		Stringer			
4	I-Beam	12 . 6 @ 54#	9'-2¾"	1 994	B.S.B.
6	do.	do.	8'-3 3/8"	2 683	do.
2	Channel	9 . 3 @ 19.37#	4'-10½"	189	Strut (B.S.C.)
4	do.	do.	3'-3½"	253	do.
16	Angle	3½ . 3½ . 3/8	0'-10¼"	122	Stiffener
16	do.	6 . 6 . 7/16	0'-9"	206	Connecting Angle
4	Plate	12 . ½	1'-0½"	85	Sole Plate
				5 532 lbs.	
		Lateral Bracing			
5	Angle	3½ . 3½ . 3/8	12'-11½"	551	Lateral Bracing
10	do.	do.	6'-4"	538	do.
20	do.	do.	0'-7"	99	Connecting Angle
5	Plate	7 . 3/8	1'-11"	86	Splice Plate
4	do.	12¾ . 3/8	1'-2"	76	Gusset Plate
4	do.	13 . 3/8	2'-4"	155	do.
4	do.	do.	2'-4½"	158	do.
				1 663 lbs.	

No.	Description	Dimension		Weight (lbs)	Remarks
		Bed Plate			
4	Plate	19 . 5/8	1'-8"	377	for Girder
4	do.	12 . ½	1'-0½"	85	for Stringer
				462 lbs.	
		Rivet Head			
4170	Rivet Head	7/8" φ		802	Shop Rivet
1830	do.	do.		353	Field Rivet
80	do.	¾" φ		10	do.
				1 165 lbs.	
		Anchor Bolt			
8	Anchor Bolt	1¼" φ	1'-3"	49	for Girder
8	do.	1" φ	1'-0"	25	for Stringer
				74 lbs.	
		Total Weight		33 632 lbs. = 15.014 t	

ペイント塗面坪……62.1

第十七圖　　F40 下路鋼鈑桁



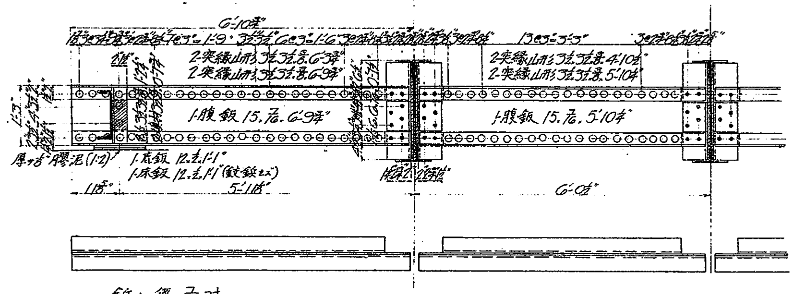


材料表

數量	種別	寸法		重量(封)	摘要
		主桁			
8	鈑	15, 3/8	15'-5"	2,123	蓋鈑
4	仝	仝	21'-9 1/2"	1,500	仝
4	仝	仝	2'-10 1/2"	198	添接鈑
8	山形	6, 6, 1/2	43'-6"	6,821	突縁山形
4	鈑	56, 3/8	21'-9"	6,212	腹鈑
8	仝	5 1/2, 3/8	2'-4"	131	添接鈑
4	仝	13, 3/8	3'-8 1/4"	245	仝
28	山形	5, 3 1/2, 3/8	4'-7 1/2"	1,347	補剛材
40	仝	4, 3 1/2, 3/8	4'-8"	1,699	仝
8	鈑	7, 1/2	3'-8 1/4"	351	填材
12	仝	3 1/2, 1/2	3'-8 1/4"	263	仝
2	仝	14, 5/8	1'-4"	102	底鈑, 3/8=削成
2	仝	仝	1'-1"	89	仝, 3/8. 1'-0 3/8=削成
3412	鋲頭	徑 3/8"		658	工場鋲メ
208	仝	仝		40	現場鋲メ
				21,779	
		床桁			
12	山形	4, 4, 1/2	11'-6"	1,559	突縁山形
12	仝	仝	12'-1 5/8"	1,646	仝
6	鈑	25 1/2, 3/8	9'-5 3/4"	1,850	腹鈑
12	仝	16, 3/8	3'-11"	782	仝
48	仝	3 1/2, 3/8	1'-6 3/4"	326	添接鈑
24	仝	12 1/2, 3/8	1'-5 3/4"	539	仝
24	仝	10, 1/2	1'-5 3/4"	513	填材
24	山形	6, 3 1/2, 3/8	2'-0 3/8"	576	補剛材
12	仝	3 1/2, 3 1/2, 3/8	1'-6 1/2"	157	隅束
12	仝	仝	2'-10"	289	仝
12	仝	5, 3 1/2, 3/8	1'-1 1/2"	140	連結山形
12	鈑	3 1/2, 3/8	0'-6 3/8"	30	填材
1656	鋲頭	徑 3/8"		319	工場鋲メ
432	仝	仝		83	現場鋲メ
				8,809	
		縦桁			
8	山形	3 1/2, 3 1/2, 3/8	6'-3 3/4"	429	突縁山形

數量	種別	寸法		重量(封)	摘要
8	山形	3 1/2, 3 1/2, 3/8	6'-9 3/4"	463	突縁山形
20	仝	仝	4'-10 1/2"	829	仝
20	仝	仝	5'-10 1/2"	995	仝
4	鈑	15, 1/2	6'-9 3/4"	608	腹鈑
10	仝	仝	5'-10 1/4"	1,306	仝
8	山形	3 1/2, 3 1/2, 3/8	1'-2 1/4"	81	補剛材
8	鈑	3 1/2, 3/8	0'-7 3/4"	23	填材
24	山形	6, 6, 1/2	0'-7 1/2"	258	連結山形
4	鈑	12, 1/2	1'-1"	86	底鈑
4	仝	仝	1'-1"	88	床鈑
8	アンカーボールト	徑 1"	1'-0"	25	
1240	鋲頭	徑 3/8"		239	工場鋲メ
384	仝	仝		74	現場鋲メ
				5,506	
		綾構			
7	山形	3 1/2, 3, 3/8	12'-4 1/2"	684	横綾材
14	仝	仝	6'-1"	673	仝
2	仝	仝	4'-10 3/8"	77	
24	仝	3 1/2, 3 1/2, 3/8	0'-8"	136	
4	仝	仝	0'-11"	31	
7	鈑	7, 3/8	2'-0 1/2"	128	添接鈑
4	仝	仝	1'-8"	60	繋鈑
4	仝	10 1/2, 3/8	1'-2 1/2"	65	仝
12	仝	14 1/2, 3/8	1'-9 1/2"	398	仝
4	溝形	12, 3 1/2 @ 26.1	3'-2 3/8"	336	支材
2	仝	仝	5'-3 1/2"	276	仝
66	鋲頭	徑 3/8"		13	工場鋲メ
670	仝	仝		129	現場鋲メ
				3,006	
		鑄鐵沓			
4	鑄鐵沓			1,116	
4	座金			31	
4	アンカーボールト	徑 1 5/8	2'-0"	37	
				1,184	
		總重量 40,284封度 17.984噸			

ペイント塗面積----76坪



鋲：徑⅜吋

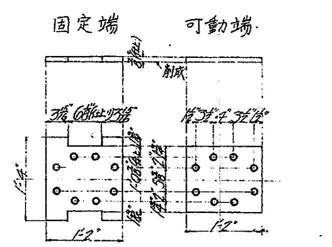
符號
- ◦ 工場鋲メ 普通鋲
- ◎ 仝 裏側皿鋲 削均シ
- ○ 鋲孔
- • 現場鋲メ 普通鋲
- ∗ 仝 裏側皿鋲 削均シ

注意

鋲孔ノ中心ヨリ剪断緣ニ至ル距離ハ1吋以上タルベシ

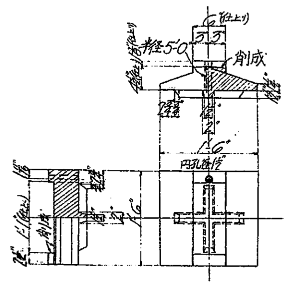
主桁底鈑

固定端　可動端

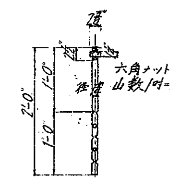


1鈑 14.⅝.1'-4"(⅜=削成)　1鈑 14.⅝.1'-1"(⅜.1'-0⅜=削成)

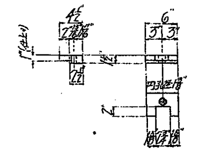
鑄鐵沓



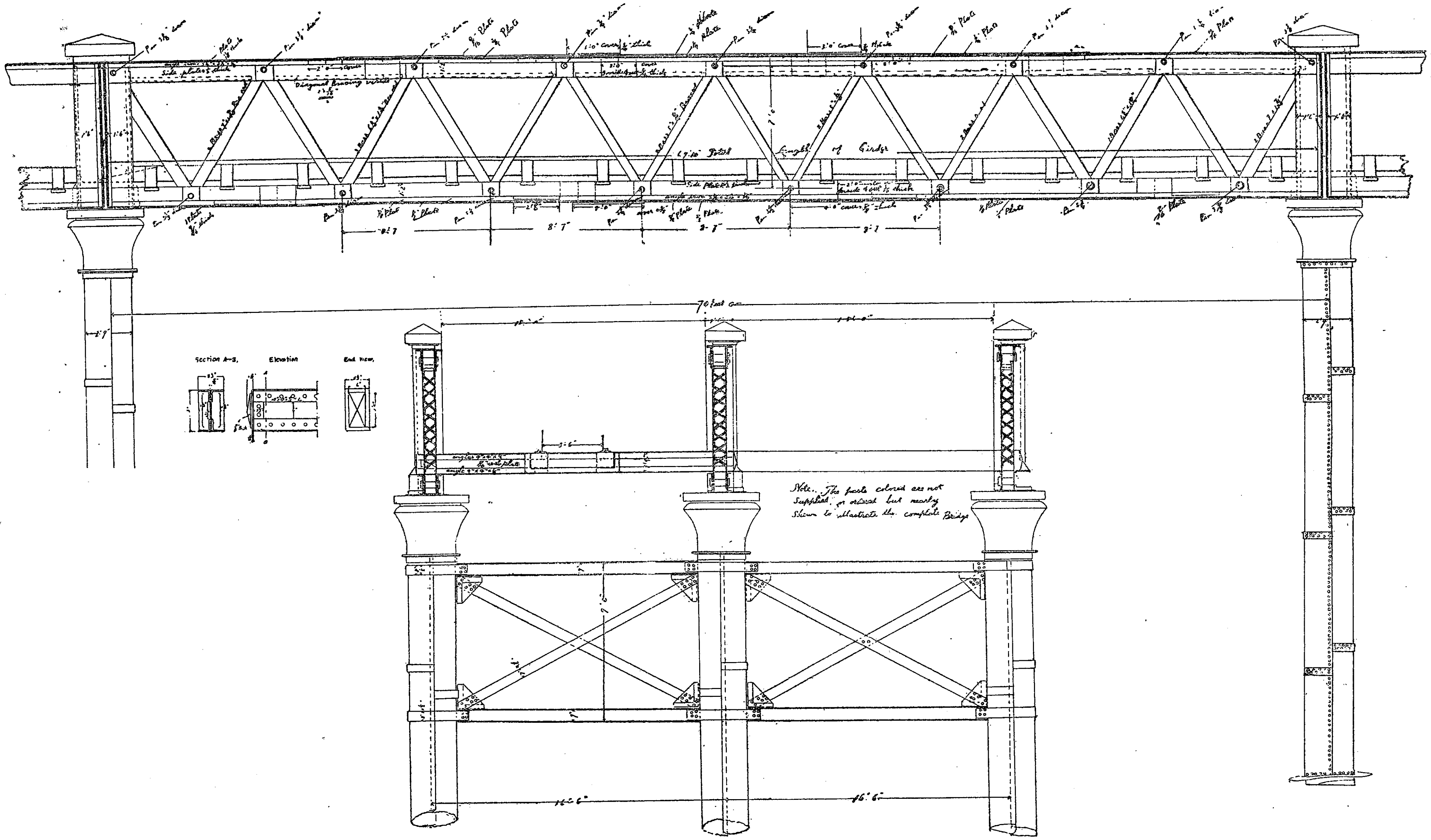
アンカーボールト



座金



第十八圖　武庫川橋梁


Section A-B.
Elevation
End View
Note. The parts colored are not supplied or detailed but merely shown to illustrate the complete Bridge

第十九圖　１００呎　鍊　鐵　單　線　構　桁

100 Foot Warren Girders

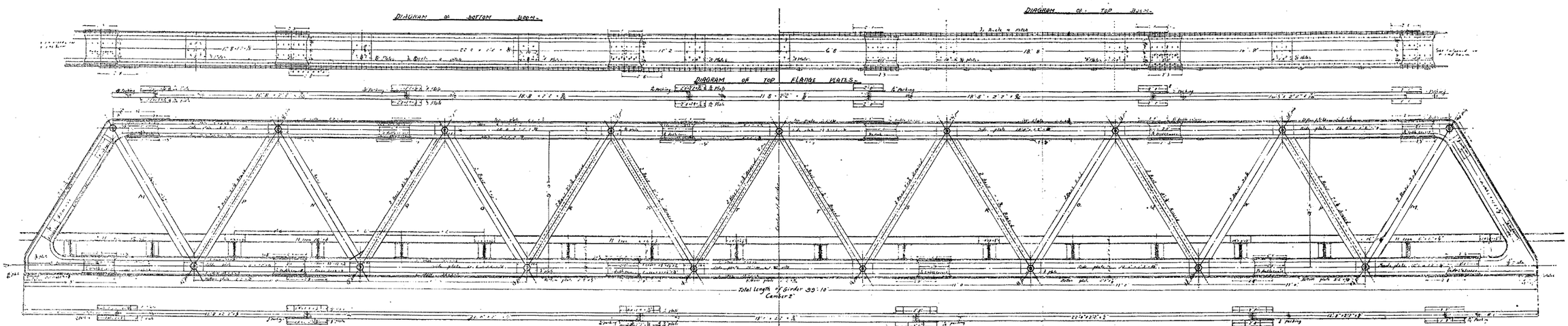
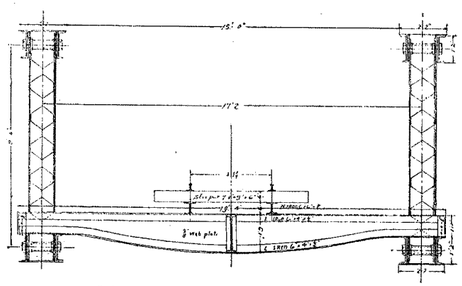
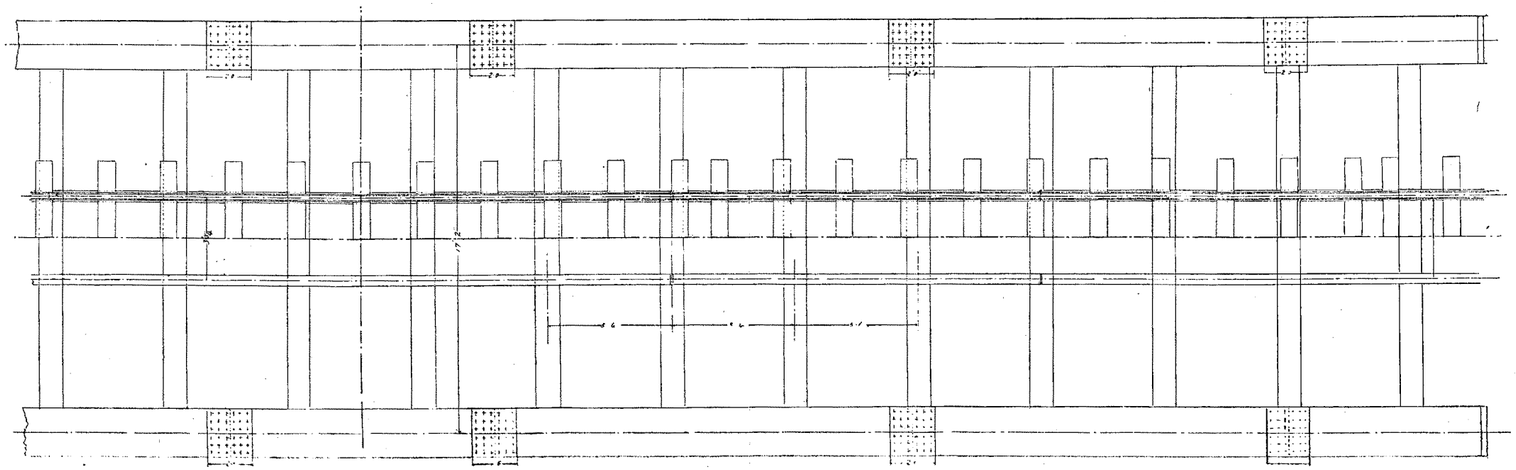


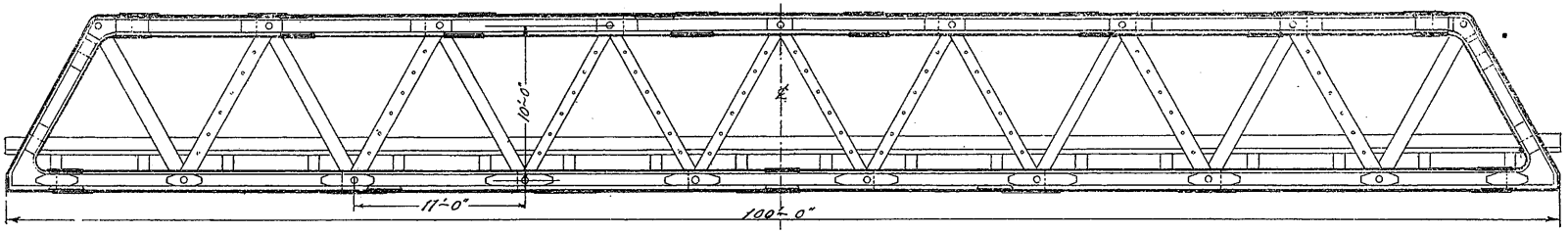
DIAGRAM OF BOTTOM FLANGE PLATES.





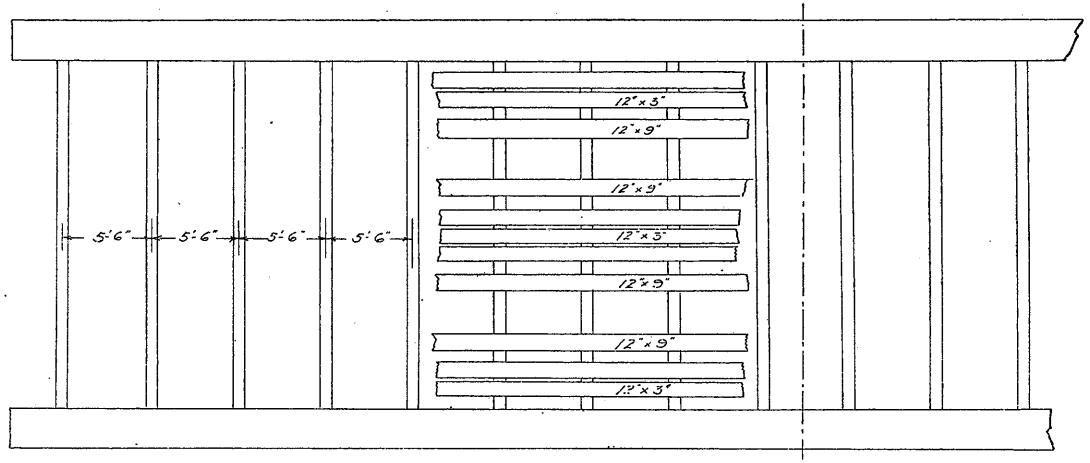
Note　All edges and ends of plates to be planed
Rivets ⅞ dia 4" pitch all through except where otherwise Specified
All rivet holes to be drilled
Rivets to be countersunk in each bottom boom for 1.5" from each end of Main Girders where rest on Cast iron bed plates

第二十圖　六鄉川鍊鐵複線構桁

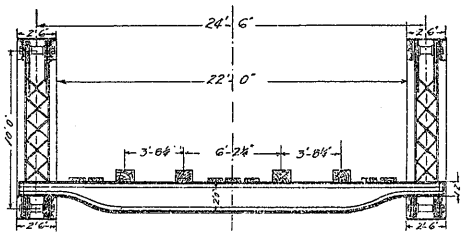


ELEVATION.

Note These Girders to have a Camber of 2 inches.

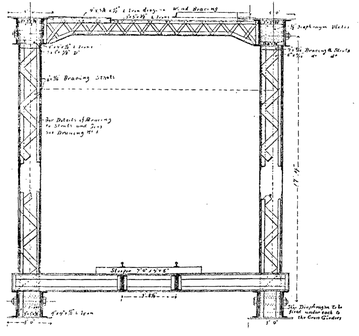


PLAN



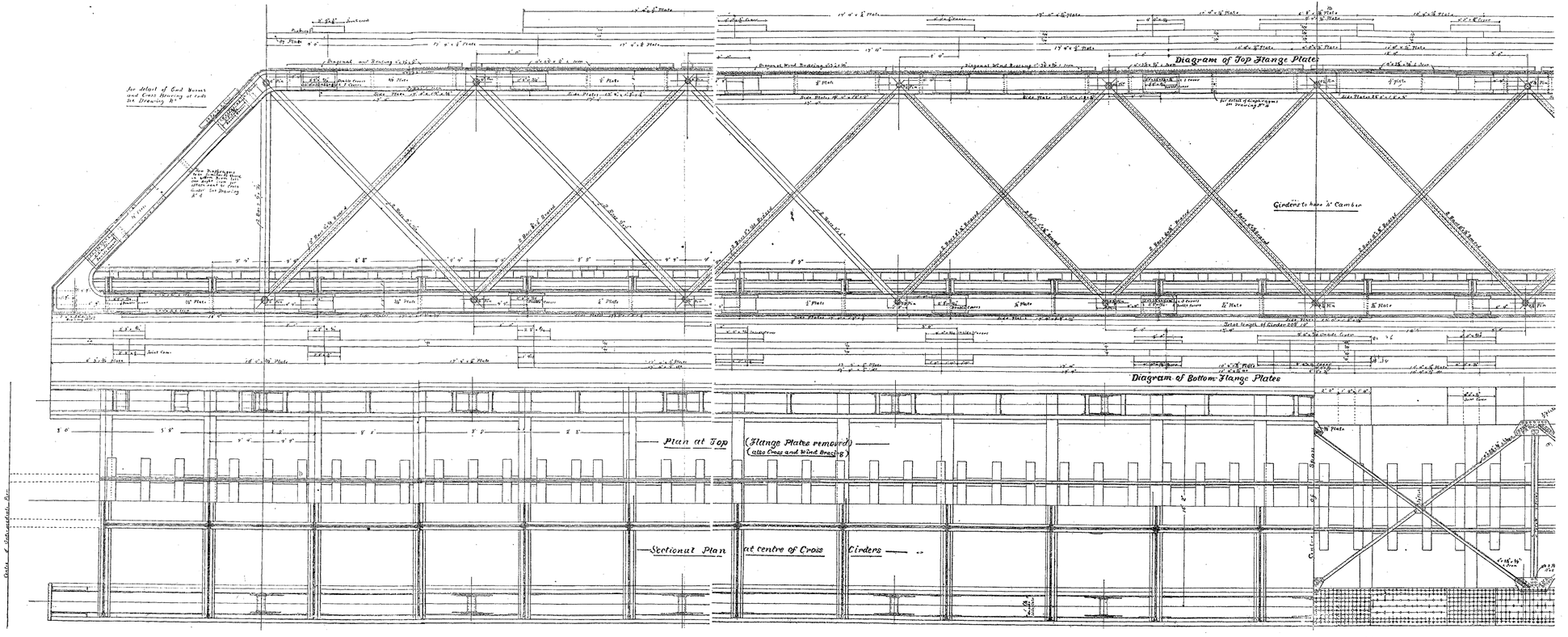
TRANSVERSE SECTION

第二十一圖　200 呎 鍊 鐵 單 線 構 桁



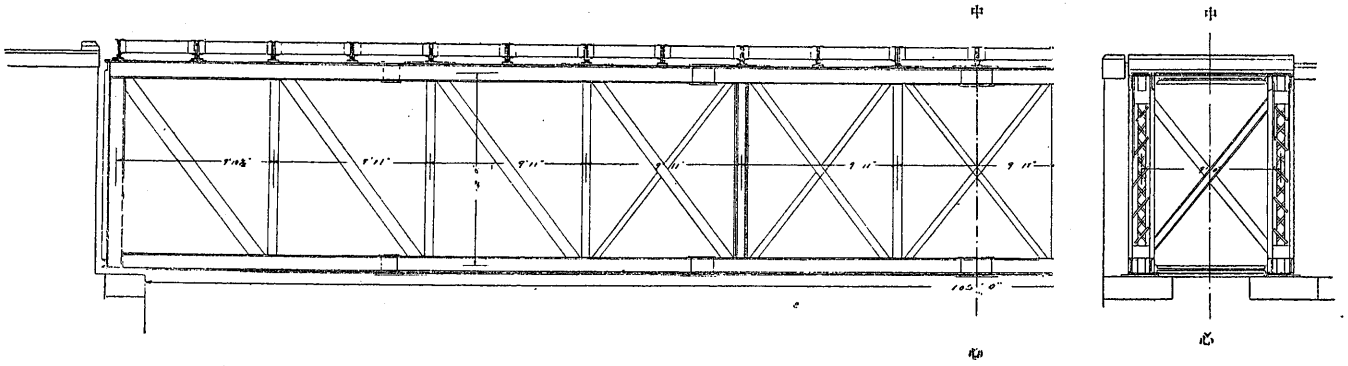
Cross Section

Note All edges and ends of plates to be planed.
Rivets ¾ diam^r path all through.
All rivet holes to be drilled.
Rivets to be countersunk on each bottom boom for ⅜ from each end of Plain Girder where these rest on bearing Girders.

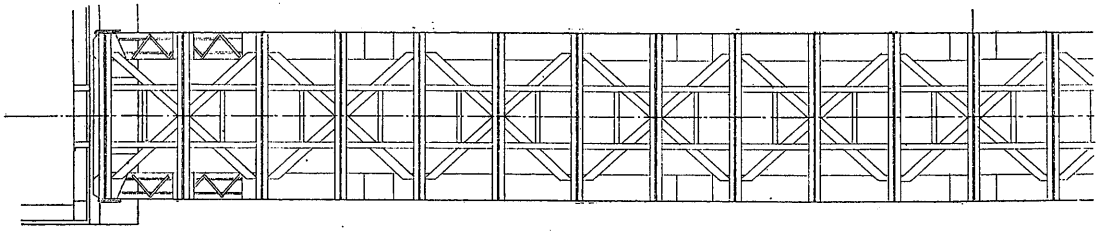


第二十二圖　100 呎 上 路 構 桁

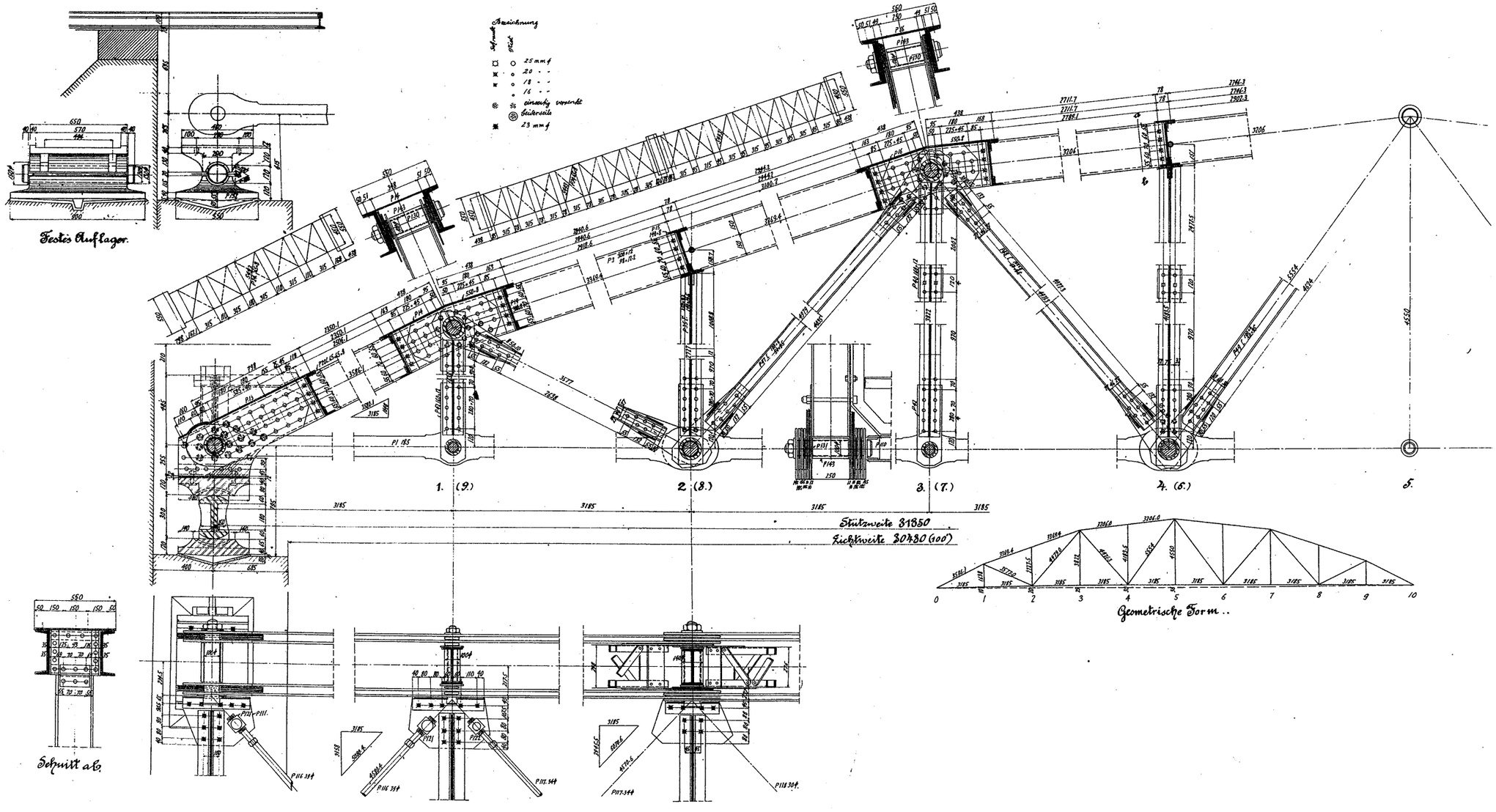
側　　面



平　　面



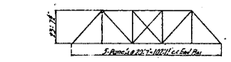
第二十三圖　　百呎ぽーすとりんぐ單線構桁

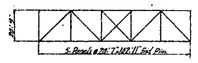


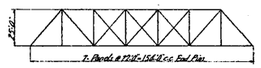
第二十四圖

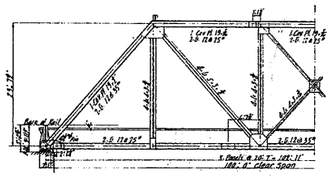
くーぱー氏設計構桁

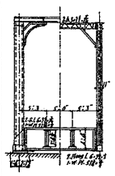
Diagram of Trusses

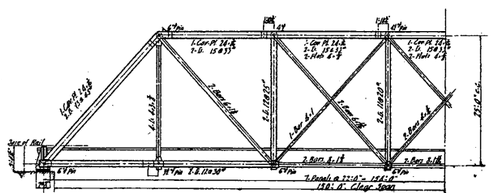


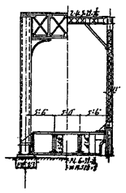


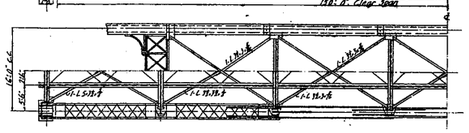


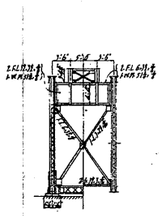


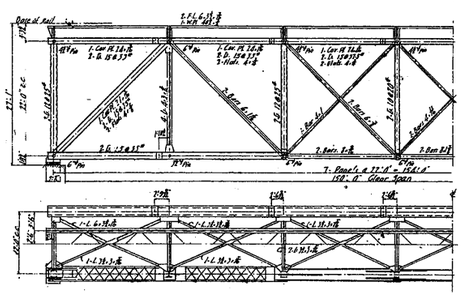


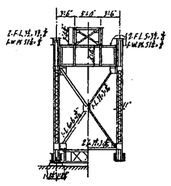


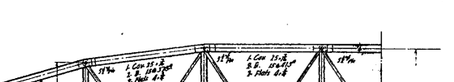


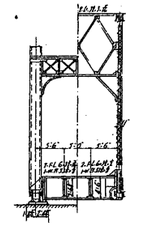


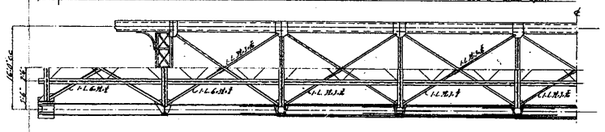


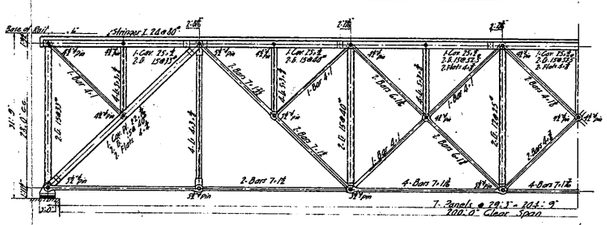


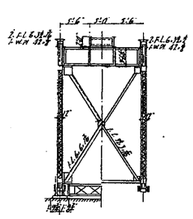


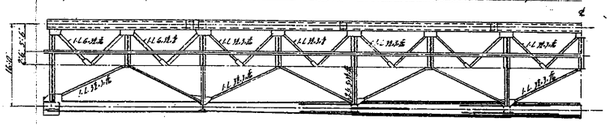




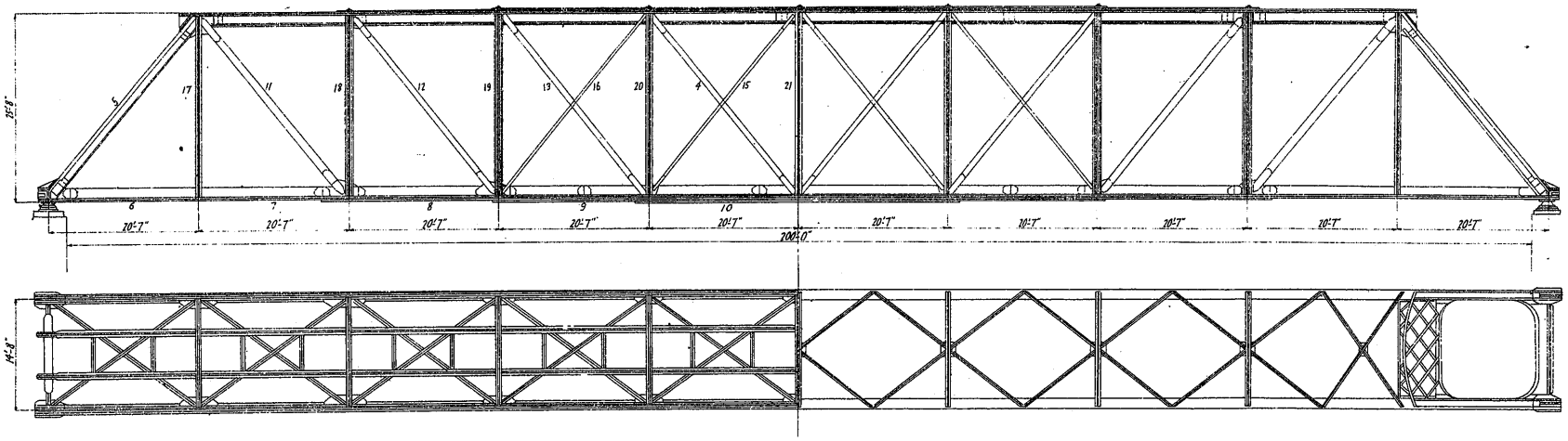


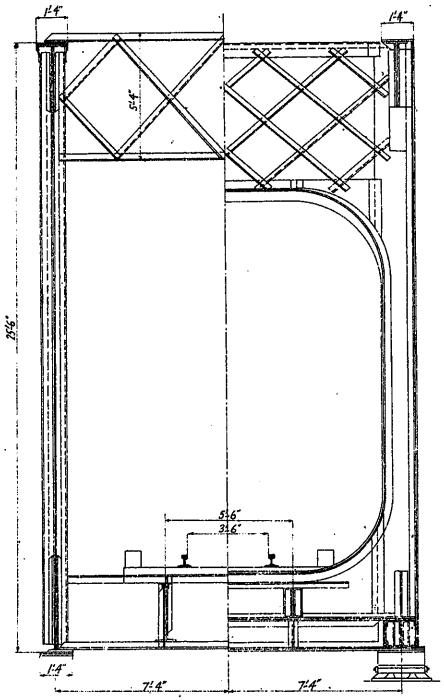


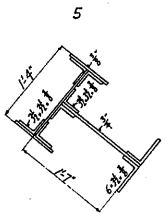


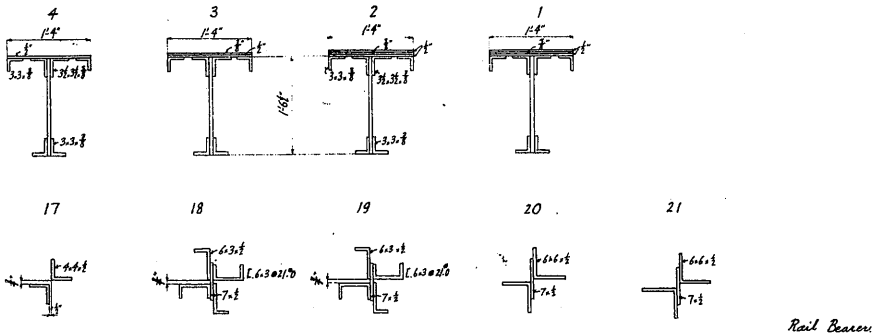


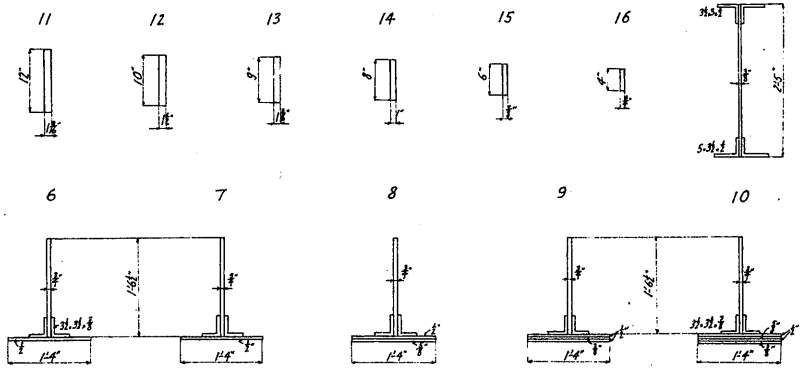
第二十五圖　阿武隈川二百呎單線構桁



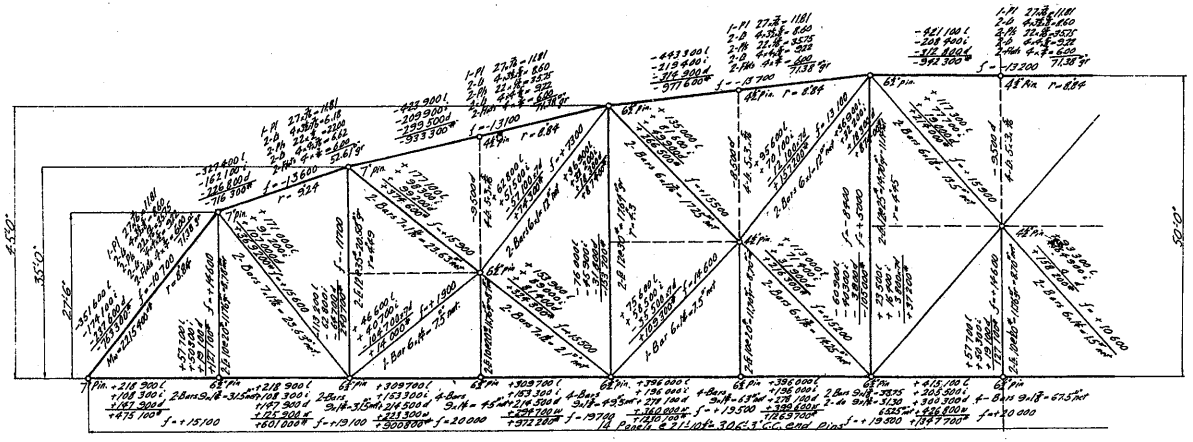


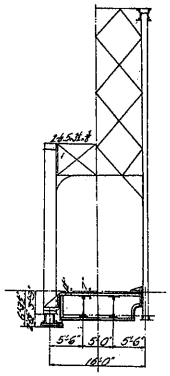


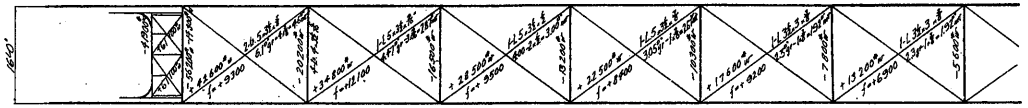


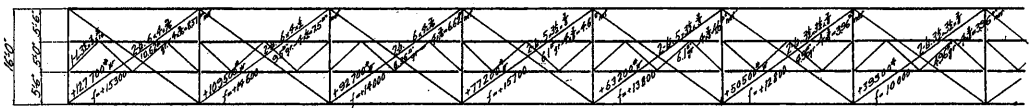


第二十六圖　　E 33 三百呎單線構桁









+ denotes Tension
− . Compression
r . Least Radius of Gyration in inches
d . Dead Load Stress
l . Live Load "
i . Impact Stress
w . Wind Stress
f . Actual Stress in lbs per Sq Inch
I . Moment of Inertia in inches
a . Moment of Area of Flange in inches

Roller
597 200 lbs for Truss
92 300 " " End Floor Beam
690 500 lbs

Diameter of Roller = 5"
Length of Roller = 345"

$f = \frac{690\,500}{345} = 2000$

Masonry
Max Reaction
515 600 #
154 700 "
200 200 "
670 500 lbs.

Bearing Area = 465 × 585 = 253 425

$f = \frac{670\,500}{253\,425} = 270$

Floor Beam

Max Moment	Max Shear
3 805 200 #	57 700 #
3 332 000 "	50 300 "
452 600 "	7 700 "
7 589 200 lbs	115 300 lbs

Used Section
Top Flange 2 ∠ 6 × 3½ × ⅞ = 9.00"
Web 1 PL 42 × ⅜ = 20.63
Bottom Flange 2 ∠ 6 × 3½ × ⅞ = 9.00
38.63 gross
31.63 net

I = 16 586

$f = +\frac{7589200 \times 1622}{16586} = +13600$

$f = -\frac{7589200 \times 1622}{16586} = -12200$

Rivet Connecting Web and Flange at End
Q = 246 Pitch = 3"

Bearing Stress
$f = \frac{115300 \times 246 \times 3}{\frac{7}{8} \times \frac{7}{8} \times 16586} = 1560$

Stringer

Max Moment	Max Shear
2408 800 "#	43 400 #(
2265 000 i.	40 700 i.
198 500 d	3 100 d
4852 300 "#	86 900 #

Used Section
Top Flange 2 ∠ 6 × 3½ × ⅞ = 7.94
Web 1 PL 42 × ⅜ = 15.75
Bottom Flange 2 ∠ 6 × 3½ × ⅞ = 7.94
31.63 gross
24.63 net

I = 7916

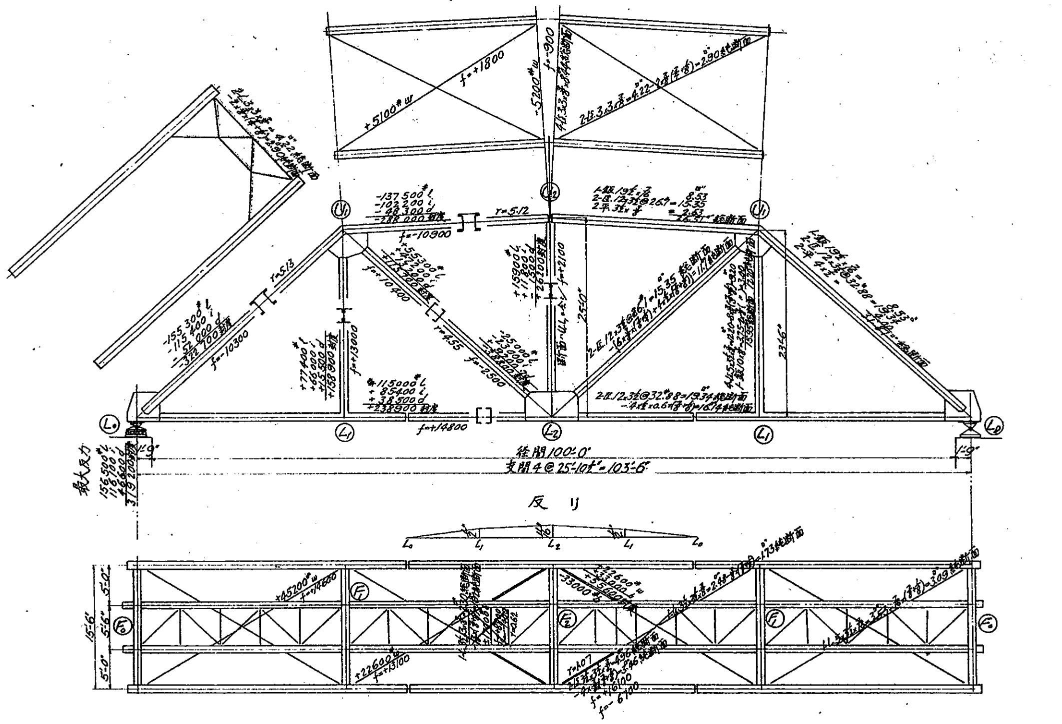
$f = +\frac{4852300 \times 2175}{7916} = +13300$

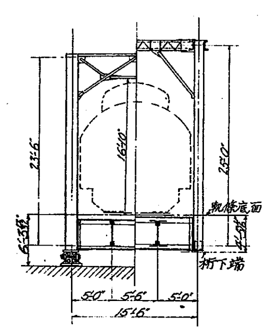
$f = -\frac{4852300 \times 2099}{7916} = -12600$

Rivet Connecting Web and Flange at End
Q = 156 Pitch = 3"

Bearing Stress
$f = \frac{86200 \times 156 \times 3}{\frac{7}{8} \times \frac{7}{8} \times 7916} = 1560$

第二十七圖A　　　　E 40 百呎單線構桁





縦桁

最大彎曲率		最大剪力	
3868000"#	l	57900#	l
3562400	i	53300	i
381600	d	4900	d
7812000 吋封度		116100 封度	

断面

上突縁 2-Ls.6×6×9/16 = 12.86 □" … 12.86 □"
腹鈑 1-鈑39×½ = 19.50 − 2×½(⅞+⅛) = 18.50
下突縁 2-Ls.6×6×9/16 = 12.86 − 4×9/16(〃) = 11.74
45.22 総断面　43.10 純断面

I = 10079

實應力

$$f=+\frac{7812000\times19.89}{10079}=+15400$$

$$f=-\frac{7812000\times19.11}{10079}=-14800$$

桁端ニ於ケル突縁ト腹鈑トノ連結用鋲
鋲距＝3吋　Q＝224　I＝10079

支圧力

$$f=\sqrt{\left(\frac{3\times116100\times224}{\frac{7}{8}\times\frac{1}{2}\times10079}\right)^2+\left(\frac{3\times1000}{\frac{7}{8}\times\frac{1}{2}}\right)^2}=19000$$

端牀桁

最大彎曲率		最大剪力	
3540000"#	l	59000#	l
3249700	i	54200	i
327400	d	6600	d
7117100 吋封度		119800 封度	

断面

上突縁 2-Ls.6×4×7/16 = 10.62 □" … = 10.62 □"
腹鈑 1-鈑43½×⅜ = 16.31 − 11×⅜(⅞+⅛) = 12.19
下突縁 2-Ls.6×4×7/16 = 10.62 − 2×7/16(〃) = 9.50
37.55 総断面　32.31 純断面

I = 10667

實應力

$$f=+\frac{7117100\times22.42}{10667}=+15000$$

$$f=-\frac{7117100\times21.08}{10667}=-14100$$

桁端ニ於ケル腹鈑ト突縁トノ連結用鋲
鋲距＝3吋　I＝10667　Q＝213

支圧力

$$f=\frac{3\times119800\times213}{\frac{7}{8}\times\frac{3}{8}\times10667}=21900$$

中間牀桁

最大彎曲率		最大剪力	
4646600"#	l	77400#	l
3963500	i	66000	i
655100	d	11200	d
9265200 吋封度		154600 封度	

断面

上突縁 2-Ls.6×6×½ = 11.50 □" … = 11.50 □"
腹鈑 1-鈑50×⅜ = 18.75 − 12×⅜(⅞+⅛) = 14.25
下突縁 2-Ls.6×6×½ = 11.50 − 2×½(〃) = 10.50
41.75 総断面　36.25 純断面

I = 15135

實應力

$$f=+\frac{9265200\times25.62}{15135}=+15700$$

$$f=-\frac{9265200\times24.38}{15135}=-14900$$

桁端ニ於ケル腹鈑ト突縁トノ連結用鋲
鋲距＝2⅝吋　I＝15135　Q＝261

支圧力

$$f=\frac{2\frac{5}{8}\times154600\times261}{\frac{7}{8}\times\frac{3}{8}\times15135}=22300$$

凡例

+…張力
−…圧力
l…活荷重応力
i…衝撃応力
d…死荷重応力
f…実応力(#/□")
I…腹鈑ニ直角ナル中立軸ノ周リノ惰性能率(吋)
Q…腹鈑ニ直角ナル中立軸ノ周リノ突縁ノ断面能率(吋)
r…最小環動半径(吋)
w…横荷重応力
b…制動荷重応力

材料表

種別	寸法		數量	重量(#)	摘要
	端柱				
溝形	12×3½@32#88	33'-1⅛"	8	8930	主材
山形	4×3½×⅜	1'-7½"	8	118	
仝	3½×3½×⅜	1'-4½"	8	94	
鈑	19½×7/16	32'-7"	4	3781	突縁
仝	19¼×⅜	1'-11"	4	188	綴鈑
仝	仝	1'-9"	4	172	仝
仝	19×⅜	1'-7¼"	4	155	仝
仝	19½×7/16	2'-3"	4	261	添接
仝	16×⅜	3'-1½"	8	436	仝 ◇
仝	35½×½	4'-0½"	8	1441	繋鈑 ○
平	4×½	33'-2½"	8	1807	突縁
仝	3½×⅜	2'-5½"	8	88	添接
仝	2½×⅜	2'-1¼"	136	931	綾平
鋲頭	径⅞"		3080	524	工場鋲メ
仝	仝		1480	252	現場鋲メ
				19178	
	上弦材				
溝形	12×3½@26#1	26'-1⅛"	8	5448	主材
鈑	19½×7/16	26'-1⅝"	4	3030	突縁
仝	19¼×⅜	2'-3"	8	442	綴鈑
仝	10×⅜	1'-7½"	8	55	填材
仝	22×½	2'-1½"	4	282	繋鈑 ○
仝	19½×7/16	2'-4¾"	2	139	添接
仝	10¾×⅜	2'-1⅝"	4	117	仝
平	3½×⅜	2'-3½"	4	41	仝
仝	仝	25'-8¾"	8	917	突縁
仝	2½×⅜	2'-1¼"	104	712	綾平
鋲頭	径⅞"		2360	401	工場鋲メ
仝	仝		1056	180	現場鋲メ
				11764	
	斜材				
溝形	12×3½@26#1	32'-2"	8	6716	主材
鈑	10×⅜	1'-3"	16	255	綴鈑
平	2½×⅜	0'-1⅛"	552	1706	綾平
鋲頭	径⅞"		1360	231	工場鋲メ
仝	仝		528	90	現場鋲メ
				8998	
	垂直材				
山形	5×3½×⅜	21'-7½"	16	3598	主材
仝	仝	23'-7½"	8	1966	仝
鈑	10×⅜	21'-6"	4	1097	仝
仝	仝	23'-6"	2	599	仝
仝	20½×½	5'-9"	4	641	繋鈑 ▢
仝	10½×½	2'-5"	2	86	填材
鋲頭	径⅞"		1464	249	工場鋲メ
仝	仝		672	114	現場鋲メ
				8350	
	下弦材				
溝形	12×3½@32#88	34'-8"	8	9119	主材
仝	仝	36'-3"	4	4768	仝
山形	5×4×½	1'-5"	8	164	
仝	5×3½×½	3'-7½"	8	394	補剛材
仝	5×3½×⅜	2'-7"	16	430	隔材
仝	3½×3½×⅜	1'-0"	8	68	
仝	仝	0'-10"	4	28	
仝	仝	1'-11"	8	130	
鈑	10×⅜	2'-6½"	4	130	隔材
仝	12×⅜	1'-6"	4	92	
仝	44×½	3'-11"	8	2225	繋鈑 ▢
仝	31×½	4'-5"	4	931	仝
仝	20½×½	2'-1"	4	256	仝 △
仝	32×½	3'-7"	4	598	底鈑 ⬡
仝	25¾×⅜	4'-6"	4	572	繋鈑 ▢
仝	23½×⅜	4'-8"	2	235	仝 ▢
仝	12×⅜	2'-0¼"	8	250	添接
仝	10×⅜	2'-0¼"	8	208	仝
仝	10½×7/16	2'-9¼"	8	349	仝
仝	10×⅜	2'-0½"	4	104	綴鈑
仝	10¼×⅜	2'-7"	6	203	仝
仝	9×⅜	0'-10⅛"	112	1098	仝
仝	19½×⅜	4'-2"	4	414	
仝	15½×½	3'-3⅜"	4	349	填材
仝	10×½	3'-3⅜"	4	225	仝
仝	3×⅜	0'-3½"	4	4	仝
鋲頭	径⅞"		3448	586	工場鋲メ
仝	仝		1136	193	現場鋲メ
				24123	

種別	寸法		數量	重量(#)	摘要
	橋門構				
山形	3×3×⅜	13'-9½"	4	397	
仝	仝	9'-3"	8	533	
仝	仝	5'-3½"	4	152	
仝	仝	4'-4"	8	250	
鈑	15¾×⅜	1'-6"	4	92	繋鈑 ▢
仝	14¾×⅜	1'-3½"	4	76	仝 ▢
仝	14×⅜	1'-4½"	8	135	仝 ▢
仝	16×⅜	1'-10½"	8	245	仝 ⬡
仝	13¾×⅜	1'-11½"	4	132	仝
仝	12¾×⅜	1'-2½"	22	432	綴鈑
仝	11½×⅜	1'-0¾"	8	125	仝
仝	3×7/16	0'-6"	4	9	填材
仝	仝	1'-3"	4	22	仝
仝	2½×⅜	1'-2⅜"	110	386	綾平
鋲頭	径⅞"		896	152	工場鋲メ
仝	仝		336	57	現場鋲メ
				3195	
	上部横綾構及對傾構				
山形	3×3×⅜	28'-2½"	4	812	綾材
仝	仝	13'-10"	8	797	仝
仝	仝	13'-8½"	4	395	支材
仝	仝	8'-0½"	4	232	対傾材
鈑	8×⅜	1'-6⅜"	4	45	繋鈑 ⬡
仝	11×⅜	1'-0"	4	37	仝 ▢
仝	12¾×⅜	2'-9"	4	179	仝
仝	5½×⅜	1'-1½"	4	55	添接
仝	12¾×⅜	1'-2½"	10	196	綴鈑
仝	11½×⅜	1'-0¾"	4	62	仝
仝	12¾×⅜	1'-1"	2	35	仝
仝	9×⅜	1'-9"	2	40	仝
仝	3×⅜	0'-8½"	2	5	填材
平	2½×⅜	1'-2½"	184	638	綾平
仝	仝	1'-3⅜"	10	38	仝
鈑	径2½×⅜		10	5	環填材
鋲頭	径⅞"		772	131	工場鋲メ
仝	仝		232	39	現場鋲メ
				3741	
	下部横綾構及制動構				
山形	5×3½×7/16	27'-4"	2	656	綾材
仝	仝	13'-3"	4	636	仝
仝	3½×3½×⅜	27'-8"	2	470	仝
仝	仝	13'-6½"	4	460	仝
仝	仝	9'-1⅝"	2	155	仝
仝	3½×3×⅜	4'-5"	2	70	支材
仝	4½×4×⅜	1'-2"	8	97	吊材(5×4 [illegible])
仝	4½×3½×⅜	1'-2"	4	46	仝(5×3½ [illegible])
仝	4×3½×⅜	1'-11"	4	70	仝
仝	仝	0'-8¼"	2	13	仝
仝	仝	0'-8"	2	12	仝
仝	3½×3½×⅜	8'-8⅜"	2	149	綾材
鈑	20×⅜	1'-9½"	2	58	繋鈑 ⬡
仝	17×⅜	1'-9½"	2	54	仝 △
仝	9×⅜	3'-1⅛"	2	91	添接
仝	7×⅜	2'-7"	2	46	仝
鋲頭	径⅞"		156	27	工場鋲メ
仝	仝		504	86	現場鋲メ
				3196	
	縦桁				
山形	6×6×7/16	24'-8½"	16	8658	突縁
仝	仝	25'-1⅞"	4	2204	仝
仝	仝	25'-7⅞"	12	6726	仝
仝	6×6×½	0'-7"	8	91	仝
仝	6×6×7/16	2'-2½"	20	760	連結
仝	3½×3½×⅜	6'-7¼"	20	1123	綾材
仝	仝	5'-0½"	16	686	支材
鈑	39×½	25'-7¾"	8	13,580	腹鈑
仝	12¼×½	3'-3"	4	206	仝 ▢
仝	12½×⅜	2'-7¾"	4	169	
仝	9×⅜	0'-11½"	8	88	繋鈑
仝	仝	0'-9½"	16	145	仝
仝	9½×⅜	1'-10"	16	355	仝
鋲頭	径⅞"		2712	461	工場鋲メ
仝	仝		1260	214	現場鋲メ
				35466	

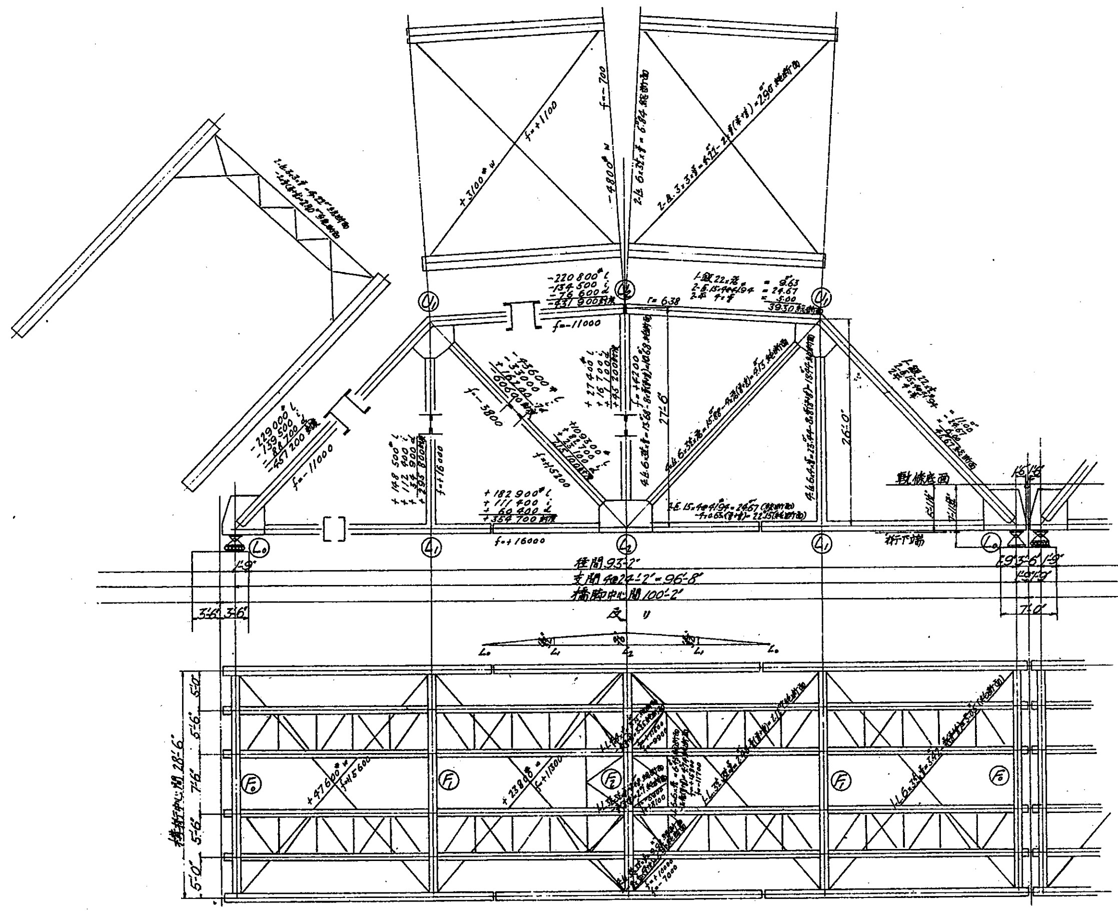
種別	寸法		數量	重量(#)	摘要
	中間牀桁				
山形	6×6×½	14'-5⅜"	12	3406	突縁
仝	6×3½×7/16	4'-1"	12	662	補剛材
仝	6×4×7/16	4'-1"	12	701	連結
鈑	50×⅜	14'-5⅜"	3	2771	腹鈑
仝	10×½	3'-1⅝"	12	642	填材
仝	6×½	3'-1⅝"	12	385	仝
鋲頭	径⅞"		1116	190	工場鋲メ
仝	仝		228	39	現場鋲メ
				8796	
	端牀桁				
山形	6×4×7/16	14'-4⅜"	8	2085	突縁
仝	6×3½×7/16	3'-6⅜"	8	381	補剛材
仝	6×4×7/16	3'-6⅜"	8	404	連結
鈑	43½×⅜	14'-4⅜"	2	1597	腹鈑
仝	10×7/16	2'-11⅛"	8	450	填材
仝	6×7/16	2'-11⅛"	8	270	仝
仝	8×½	1'-0"	4	54	仝
鋲頭	径⅞"		688	117	工場鋲メ
仝	仝		200	34	現場鋲メ
				5392	

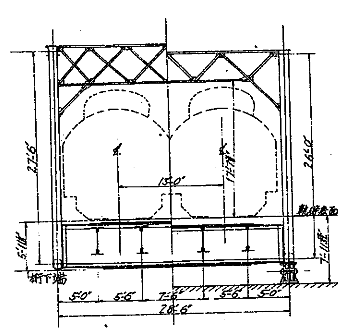
鑄鋼沓及附属品(くつ−1)
2933瓩＝6466封度

総重量＝138665封度＝61.904噸＝62.898瓲
内譯
鋼重量＝134624封度＝60.100噸＝61.065瓲
鑄鋼重量＝4041 〃 ＝1.804 〃 ＝1.835 〃

ペイント塗面積290坪＝959平米

第二十七圖B　　E 40 百呎複線構桁





縱桁

最大彎曲率
3 462 900 吋封 l
3 207 700 i
333 000 d
7 003 600 吋封度

最大剪力
55 700 # l
51 600 i
4 600 d
111 900 封度

断面
上突縁 2-L 6×6×½ = 11.50 = 11.50
腹鈑 1-鈑 39×½ = 19.50 − 2×½(⅞+⅛) = 18.50
下突縁 2-L 6×6×½ = 11.50 − 2×½(⅞+⅛) = 10.50
42.50(総断面)　40.50(純断面)

I = 9270

実応力 $f = +\frac{7003600 \times 19.92}{9270} = +15100$

$f = -\frac{7003600 \times 19.08}{9270} = -14400$

桁端ニ於ケル突縁ト腹鈑トノ連結用鋲
鋲距 = 3½吋　Q = 200　I = 9270

支圧力 $f = \sqrt{\left(\frac{3.5 \times 111900 \times 200}{\frac{7}{8} \times \frac{1}{2} \times 9270}\right)^2 + \left(\frac{3.5 \times 1000}{\frac{7}{8} \times \frac{1}{2}}\right)^2} = 20900$

中間牀桁

最大彎曲率
13 810 500 吋封 l
10 454 500 i
2 076 700 d
26 341 700 吋封度

最大剪力
148 500 # l
112 400 i
22 700 d
283 600 封度

中央断面
上突縁 1-鈑 13½×½ = 6.75 = 6.75
1-鈑 13½×½ = 6.75 = 6.75
2-L 6×6×9/16 = 12.86 = 12.86
腹鈑 1-鈑 66×7/16 = 28.88 − 16×7/16(⅞+⅛) = 21.88
下突縁 2-L 6×6×9/16 = 12.86 − 4×9/16(⅞+⅛) = 10.61
1-鈑 13½×½ = 6.75 − 2×½(〃) = 5.75
1-鈑 13½×½ = 6.75 − 2×½(〃) = 5.75
81.60(総断面)　70.35(純断面)

I = 59810

実応力 $f = +\frac{26341700 \times 36.22}{59810} = +15900$

$f = -\frac{26341700 \times 32.28}{59810} = -14200$

桁端ニ於ケル突縁ト腹鈑トノ連結用鋲
鋲距 = 2⅜吋　Q = 596　I = 45450

支圧力 $f = \frac{2.375 \times 283600 \times 596}{\frac{7}{16} \times \frac{7}{8} \times 45450} = 23000$

端牀桁

最大彎曲率
10 931 200 吋封 l
9 357 100 i
1 295 500 d
21 583 800 吋封度

最大剪力
117 500 # l
100 600 i
14 300 d
232 400 封度

中央断面
上突縁 1-鈑 13½×½ = 6.75 = 6.75
1-鈑 13½×½ = 6.75 = 6.75
2-L 6×6×½ = 11.50 = 11.50
腹鈑 1-鈑 59½×⅜ = 22.32 − 14×⅜(⅞+⅛) = 17.07
下突縁 2-L 6×6×½ = 11.50 − 4×½(〃) = 9.50
1-鈑 13½×½ = 6.75 − 2×½(〃) = 5.75
1-鈑 13½×½ = 6.75 − 2×½(〃) = 5.75
72.32(総断面)　63.07(純断面)

I = 44968

実応力 $f = +\frac{21583800 \times 32.87}{44968} = +15800$

$f = -\frac{21583800 \times 29.13}{44968} = -14600$

桁端ニ於ケル突縁ト腹鈑トノ連結用鋲
鋲距 = 2¼吋　Q = 498　I = 33220

支圧力 $f = \frac{2.25 \times 232400 \times 498}{\frac{3}{8} \times \frac{7}{8} \times 33220} = 24000$

最大反力

292 200 # l
177 900 i
84 300 d
554 400 封度

凡例

+…張力
−…圧力
d…死荷重応力
l…活荷重応力
i…衝撃応力
f…実応力 (#/□")
I…腹鈑ニ直角ナル中立軸ノ周リノ惰性力率(吋)
Q…腹鈑ニ直角ナル中立軸ノ周リノ突縁ノ断面能率(吋)
r…最小環動半径(吋)
w…横荷重応力

材料表

端柱

種別	寸法		数量	重量(封)	摘要
溝形	15×4@41.94	34'-6¾"	8	11582	主材
山形	5×3½×⅜	1'-11¼"	8	163	
仝	4×3½×⅜	1'-10¾"	8	157	
鈑	22×½	32'-5"	4	4850	突縁
仝	仝	2'-10½"	4	430	添接
仝	21½×⅜	1'-11"	4	210	綴鈑
仝	仝	2'-1⅜"	4	235	仝
仝	15×⅜	1'-9½"	4	137	仝
仝	18¼×⅜	2'-10⅝"	8	406	添接
仝	47½×7/16	5'-4½"	8	3 109	繋鈑
平	4×⅝	33'-4⅜"	8	2 725	突縁
仝	仝	3'-9¼"	8	308	添接
仝	2½×7/16	2'-3⅜"	128	1 094	綾釘
鉄頭	径⅞"		3024	514	工場鋲メ
仝	仝		1872	318	現場鋲メ
				26.218	

上弦材

種別	寸法		数量	重量(封)	摘要
溝形	15×4@41.94	24'-6⅝"	8	8 238	主材
鈑	22×7/16	24'-6⅝"	4	3 217	突縁
平	4×⅝	23'-11"	8	1 626	仝
仝	仝	2'-8⅜"	4	93	添接
鈑	22×7/16	2'-4½"	2	155	仝
仝	14×⅜	2'-1¼"	4	150	仝
仝	21½×⅜	1'-11"	4	210	綴鈑
仝	仝	1'-9½"	4	196	仝
仝	25¼×7/16	2'-4½"	4	459	繋鈑
平	2½×7/16	2'-3⅜"	96	820	綾釘
鉄頭	径⅞"		2176	370	工場鋲メ
仝	仝		1192	203	現場鋲メ
				15 737	

下弦材

種別	寸法		数量	重量(封)	摘要
溝形	15×4@41.94	33'-3"	8	11 156	主材
仝	仝	33'-2"	4	5 564	仝
山形	4½×4½×½	2'-4"	8	271	5.5×½ Lヨリ切取ル
仝	3½×3½×⅜	1'-6"	4	51	
仝	仝	1'-3"	8	85	
仝	仝	2'-3"	8	153	
仝	仝	0'-11"	4	31	
仝	6×3½×⅜	3'-6½"	16	663	隔材
仝	仝	5'-0"	8	468	補剛材
鈑	11¼×⅜	3'-6"	4	201	隔材
仝	9×⅜	0'-10½"	96	941	綴鈑
仝	10×⅜	2'-1½"	4	151	仝
仝	10¼×⅜	2'-11"	6	229	仝
仝	15×7/16	2'-0¼"	8	361	添接
仝	13×⅜	2'-0¼"	8	268	仝
仝	10¼×⅜	3'-3¼"	8	342	仝
仝	57×7/16	5'-0"	8	4 063	繋鈑
仝	19×7/16	2'-4½"	4	345	仝
仝	42×7/16	5'-4"	4	1 714	仝
仝	31¼×⅜	3'-2½"	4	511	仝
仝	25½×⅜	2'-11"	2	190	仝
仝	37×½	3'-4½"	4	649	底鈑
仝	13×½	4'-7"	8	810	塡材
仝	3½×⅜	5'-0"	4	89	仝
仝	仝	0'-4⅜"	4	7	仝
仝	22×⅜	4'-8"	4	524	折曲鈑
仝	15×⅜	1'-8¼"	4	129	
鉄頭	径⅞"		3712	631	工場鋲メ
仝	仝		1520	258	現場鋲メ
				30 855	

垂直材

種別	寸法		数量	重量(封)	摘要
山形	6×4×⅜	23'-8"	16	7 573	主材
仝	6×3½×⅜	25'-11½"	8	2 431	仝
鈑	19×7/16	7'-5½"	4	1 084	繋鈑
仝	12½×7/16	2'-11"	2	139	塡材
仝	10×⅜	2'-7"	4	132	綴鈑
仝	仝	6'-1"	4	310	仝
仝	11×⅜	1'-9"	2	49	仝
仝	仝	1'-3"	4	70	仝
仝	仝	4'-9"	2	133	仝
平	2½×⅜	0'-11⅜"	84	260	綾釘
仝	仝	1'-2⅞"	34	129	仝
鉄頭	径⅞"		1416	241	工場鋲メ
仝	仝		1168	199	現場鋲メ
				12 750	

斜材

種別	寸法		数量	重量(封)	摘要
山形	6×3½×7/16	32'-11"	16	7 110	
鈑	11×⅜	1'-8½"	16	383	
平	2½×⅜	1'-0⅞"	272	899	綾釘
鉄頭	径⅞"		776	132	工場鋲メ
仝	仝		640	109	現場鋲メ
				8 633	

橋門構

種別	寸法		数量	重量(封)	摘要
山形	3×3×⅜	26'-5½"	4	762	
仝	仝	17'-2½"	4	496	
仝	仝	9'-7½"	8	554	
仝	仝	4'-7½"	8	266	
仝	仝	3'-4½"	16	389	
鈑	15¼×⅜	1'-4½"	12	321	綴鈑
仝	仝	1'-8½"	2	66	仝
仝	14½×⅜	1'-3¼"	4	94	仝
仝	13×⅜	1'-3¼"	12	253	仝
仝	11½×⅜	1'-3⅜"	20	373	仝
仝	15¼×⅜	1'-6⅜"	4	118	繋鈑
仝	12×⅜	1'-1¼"	4	68	仝
仝	14×⅜	1'-4½"	8	196	仝
仝	18×⅜	1'-10½"	8	344	仝
仝	10⅜×⅜	1'-7"	20	434	仝
仝	3×½	0'-11½"	4	20	塡材
仝	仝	0'-10"	4	17	仝
仝	3×⅝	0'-11½"	4	29	仝
仝	仝	0'-10"	4	25	仝
平	2½×⅜	1'-5⅞"	178	831	綾釘
鉄頭	径⅞"		1512	169	工場鋲メ
仝	仝		496	56	現場鋲メ
鈑	3×⅝	1'-0½"	4	16	塡材
				5 897	

對傾材及支材

種別	寸法		数量	重量(封)	摘要
山形	6×3½×⅜	26'-7"	2	622	支材
仝	3×3×⅜	26'-11"	2	388	對傾材
仝	仝	6'-4⅜"	12	552	仝
仝	仝	6'-11"	4	199	仝
仝	仝	0'-10½"	4	25	
鈑	16⅜×⅜	2'-4⅜"	4	206	繋鈑
仝	8⅜×⅜	0'-10⅜"	2	20	仝
仝	11×⅜	1'-2"	2	33	仝
仝	14½×⅜	2'-3"	2	83	仝
仝	10⅜×⅜	0'-11"	8	101	仝
仝	3×⅜	0'-10"	2	6	塡材
仝	径2½×⅜		50	26	環塡材
鉄頭	径⅞"		200	22	工場鋲メ
仝	仝		212	24	現場鋲メ
				2 307	

上部横綾構

種別	寸法		数量	重量(封)	摘要
山形	3×3×⅜	34'-10"	2	502	
仝	仝	34'-7"	2	498	
仝	仝	17'-3"	2	248	
仝	仝	17'-6"	2	252	
仝	仝	16'-10½"	4	486	
鈑	6½×⅜	1'-8½"	4	57	添接
仝	11⅜×⅜	1'-1¼"	4	63	繋鈑
仝	11×⅜	1'-2"	4	65	仝
仝	14½×⅜	1'-4¼"	10	250	綴鈑
仝	11½×⅜	1'-4⅜"	4	79	仝
平	2½×⅜	1'-6⅞"	208	1 013	綾釘
鉄頭	径⅞"		696	78	工場鋲メ
仝	仝		136	15	現場鋲メ
鈑	3×7/16	0'-10"	4	6	塡材
				3 612	

下部横綾構及制動構

種別	寸法		数量	重量(封)	摘要
山形	6×3½×⅜	34'-7"	2	809	横綾材
仝	仝	16'-8½"	2	391	仝
仝	仝	17'-0½"	2	399	仝
仝	3½×3½×⅜	35'-1"	2	596	仝
仝	仝	17'-3½"	4	588	仝
仝	仝	3'-10"	8	261	
仝	仝	3'-11½"	8	269	
仝	仝	4'-8"	4	159	
仝	4×4×½	5'-6"	4	282	
仝	6×6×7/16	19'-6½"	2	856	
仝	3½×3½×⅜	1'-9½"	4	61	
仝	仝	1'-0"	4	34	
仝	仝	0'-10½"	8	60	
鈑	10×⅜	3'-10"	2	98	添接
仝	7×⅜	2'-6"	2	45	仝
仝	7½×⅜	4'-10"	4	185	
仝	22×⅜	2'-0½"	4	229	繋鈑
仝	33½×⅜	3'-5"	4	584	仝
仝	19×⅜	3'-0½"	4	295	仝
仝	14×⅜	1'-5½"	2	52	仝
仝	9½×⅜	1'-10½"	4	91	塡材
鉄頭	径⅞"		420	71	工場鋲メ
仝	仝		1152	196	現場鋲メ
鈑	10½×⅜	2'-1⅜"	16	460	折曲鈑
				8 196	

縱桁

種別	寸法		数量	重量(封)	摘要
山形	6×6×½	22'-11"	24	10 780	突縁
仝	仝	23'-4⅜"	16	7 337	仝
山形	6×6×½	23'-10½"	16	7 487	突縁
仝	仝	23'-10⅜"	8	3 745	仝
仝	仝	0'-11"	16	287	仝
仝	6×6×7/16	2'-2"	40	1 491	連結
仝	3½×3½×⅜	1'-8½"	16	232	
仝	仝	6'-4⅜"	40	2 172	横綾材
仝	仝	5'-0½"	32	1 371	支材
鈑	39×½	23'-10⅜"	8	12 674	腹鈑
仝	仝	23'-10½"	8	12 663	仝
仝	16½×½	3'-2"	8	512	
仝	12½×⅜	2'-11½"	8	377	
仝	12½×½	1'-1½"	4	96	塡材
仝	9×⅜	0'-11⅜"	16	172	繋鈑
仝	〃	0'-9½"	32	292	仝
仝	9½×⅜	1'-9½"	32	694	仝
鉄頭	径⅞"		4784	813	工場鋲メ
仝	仝		2392	407	現場鋲メ
				63 602	

中間牀桁

種別	寸法		数量	重量(封)	摘要
山形	6×6×9/16	27'-4½"	12	7 194	突縁
仝	6×3½×7/16	5'-5⅜"	24	1 765	補剛材
仝	6×6×7/16	5'-5⅜"	12	1 124	連結
仝	6×6×½	1'-1"	4	85	仝
仝	3½×3½×⅜	1'-3"	4	43	仝
仝	仝	0'-10"	4	28	仝
鈑	13½×½	15'-11"	6	2 192	突縁
仝	仝	21'-1½"	6	2 909	仝
仝	66×7/16	27'-4½"	3	8 065	腹鈑
仝	10×7/16	4'-6⅜"	24	2 076	塡材
仝	8½×7/16	4'-6¼"	12	882	仝
鉄頭	径⅞"		3680	626	工場鋲メ
仝	仝		352	60	現場鋲メ
				27 049	

端牀桁

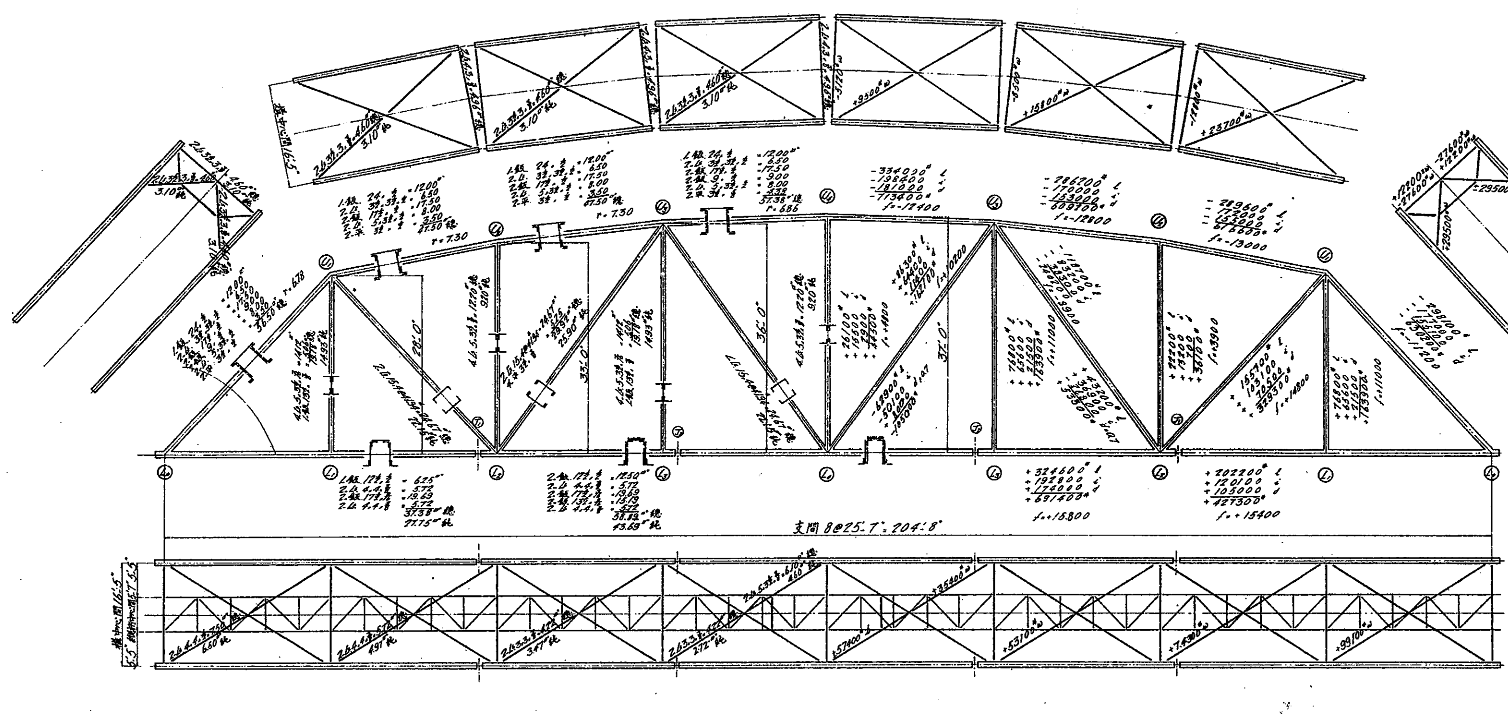
種別	寸法		数量	重量(封)	摘要
山形	6×6×½	27'-3½"	8	4 279	突縁
仝	6×6×7/16	4'-11"	8	677	連結
仝	6×3½×7/16	4'-11"	16	1 062	補剛材
鈑	13½×½	15'-11"	4	1 461	突縁
仝	仝	22'-0½"	4	2 023	仝
仝	59½×⅜	27'-3½"	2	4 140	腹鈑
仝	10×½	3'-11⅜"	16	1 082	塡材
仝	8½×½	3'-11⅜"	8	460	仝
仝	8×½	1'-0"	4	54	仝
鉄頭	径⅞"		2280	388	工場鋲メ
仝	仝		352	60	現場鋲メ
				15 686	

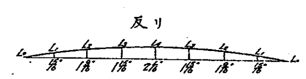
鑄鋼沓　4 532 封

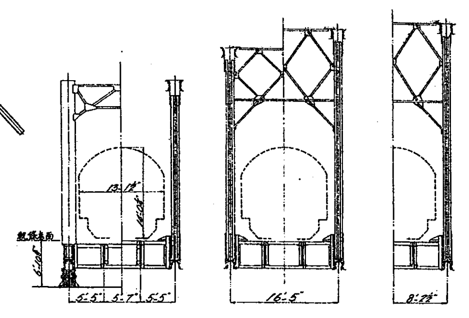
總重量　102.916 噸
＝104.569 瓩

ペイント塗面積　395 坪

第二十八圖　E40二百呎單線構桁







縦桁

最大彎曲率		最大剪力	
3797900''	l	57500''	l
3497900	i	53000	i
359700	d	4700	d
7655500 吋封度		115200 封度	

中央断面

上突縁 2∠s. 6.6.$\frac{7}{8}$ = 12.88'' = 12.88''
腹 1飯 39.$\frac{1}{2}$ = 19.50 − 2.$\frac{7}{8}$($\frac{7}{8}$+$\frac{1}{8}$) = 17.50
下突縁 2∠s 6.6.$\frac{7}{8}$ = 12.86 − 2.$\frac{7}{8}$(〃) = 11.74
(總) 45.22'' (純) 43.10''

I = 10078

實應力

$f = +\frac{7655500 \cdot 19.94}{10078} = +15100$

$f = -\frac{7655500 \cdot 19.06}{10078} = -14500$

桁端ニ於ケル突縁ト腹飯トノ連結用鋲
鋲距 = 3'' Q = 223 I = 10078

支壓力

$f = \frac{3 \cdot 115200 \cdot 223}{\frac{7}{8} \cdot \frac{1}{2} \cdot 10078} = 17500$

端床桁

最大彎曲率		最大剪力	
3733300''	l	57400''	l
3442100	i	52900	i
379200	d	6400	d
7554600 吋封度		116700 封度	

中央断面

上突縁 2∠s. 6.4.$\frac{7}{8}$ = 10.62'' = 10.62
腹 1飯. 45$\frac{1}{2}$.$\frac{3}{8}$ = 17.06 − 12.$\frac{3}{8}$($\frac{7}{8}$+$\frac{1}{8}$) = 12.56
下突縁 2∠s. 6.4.$\frac{7}{8}$ = 10.62 − 2.$\frac{7}{8}$(〃) = 9.50
(總) 38.30'' (純) 32.68''

I = 11755

實應力

$f = +\frac{7554600 \cdot 23.45}{11755} = +15100$

$f = -\frac{7554600 \cdot 22.05}{11755} = -14200$

桁端ニ於ケル突縁ト腹飯トノ連結用鋲
鋲距 3'' Q = 223 I = 11755

支壓力

$f = \frac{3 \cdot 116700 \cdot 223}{\frac{7}{8} \cdot \frac{3}{8} \cdot 11755} = 20200$

中間床桁

最大彎曲率		最大剪力	
4995100	l	76800''	l
4270800	i	65700	i
694300	d	11300	d
9960200 吋封度		153800 封度	

中央断面

上突縁 2∠s. 6.6.$\frac{7}{8}$ = 12.86'' = 12.86''
腹 1飯. 51$\frac{1}{2}$.$\frac{3}{8}$ = 19.31 − 13.$\frac{3}{8}$($\frac{7}{8}$+$\frac{1}{8}$) = 14.44
下突縁 2∠s. 6.6.$\frac{7}{8}$ = 12.86 − 2.$\frac{7}{8}$(〃) = 11.74
(總) 45.03'' (純) 39.04''

I = 17517

實應力

$f = +\frac{9960200 \cdot 26.42}{17517} = +15000$

$f = -\frac{9960200 \cdot 25.08}{17517} = -14300$

桁端ニ於ケル突縁ト腹飯ト連結用鋲
鋲距 2$\frac{3}{4}$'' Q = 301 I = 17517

支壓力

$f = \frac{2\frac{3}{4} \cdot 153800 \cdot 301}{\frac{7}{8} \cdot \frac{3}{8} \cdot 17517} = 22100$

ローラー

最大反力
265900'' l
157900 i
125200 d
549000 封度

ローラー 徑 5$\frac{1}{4}$'' 長 = 185.25''

支壓力

$f = \frac{549000}{185.25} = 3000$

床石

最大反力
549000 封度

支面 1296''

支壓力

$f = \frac{549000}{1296} = 424$

凡例

+ 張力
− 壓力
l 活荷重彎曲率又ハ剪力
i 撃衝彎曲率又ハ剪力
d 死荷重彎曲率又ハ剪力
f 實應力
I 腹飯ニ直角ナル中立軸ノ周リノ物量力率(吋)
Q 腹飯ニ直角ナル中立軸ノ周リノ突縁断面能率(吋)

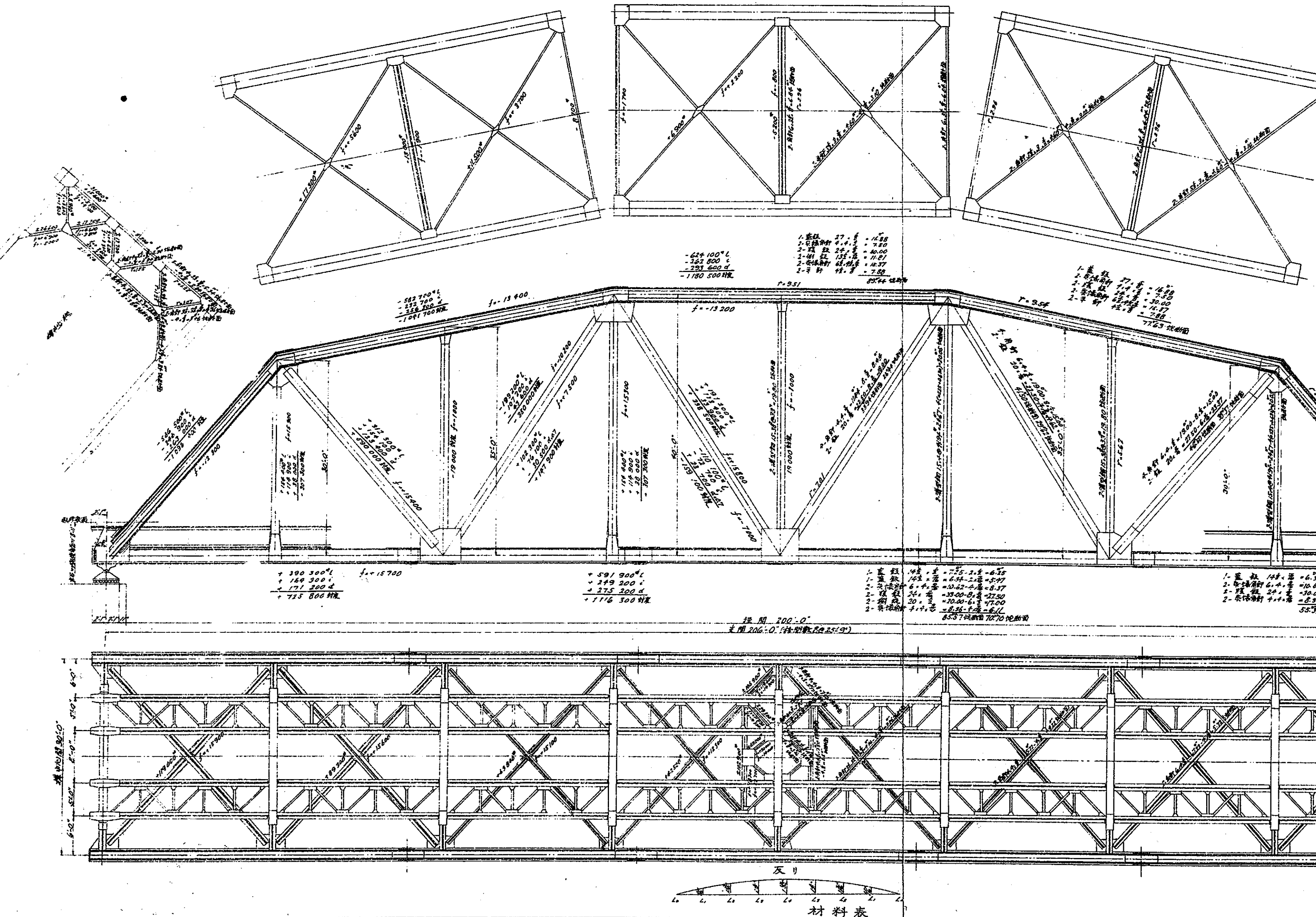
總重量

種別	重量(封)
端柱	36,484
上弦	69,582
下弦	92,229
垂直	27,027
斜材	50,825
橋門構	4,129
鉸構	6,356
上横鉸構	8,655
下横鉸構及制輪構	11,047
縦桁	70,440
端床桁	5,918
中間床桁	25,657
ピンボールト及ローラー	2,886
鑄鋼管	9,930
アンカーボールト及其ノ他	597

鋼總重量 411,830 封度 = 183.853 噸
鑄鋼總重量 9,930 封度 = 4.433 噸
總重量 188.286 噸

ペイント塗面積 689坪

第二十九圖　　　E40二百呎複線構桁



中間床桁

最大彎曲率		最大剪力	
15 747 600"	l	154 400"	l
11 716 200	i	114 900	i
2 429 600	d	24 500	d
29 893 400 吋封度		293 800 封度	

中央斷面

上突緣 1-蓋鈑 13 × 3/8 = 7.31 = 7.31
1-蓋鈑 13 × 3/8 = 7.31 = 7.31
2-突緣角鈑 6.6.3/8 = 12.86 = 12.86
1-腹鈑 69 × 3/8 = 38.81 − 17 × 3/8 = 29.25
下突緣 2-突緣角鈑 6.6.3/8 = 12.86 − 4 × 3/8 = 10.61
1-蓋鈑 13 × 3/8 = 7.31 − 2 × 3/8 = 6.18
1-蓋鈑 13 × 3/8 = 7.31 − 2 × 3/8 = 6.18
93.77 總斷面　79.70 純斷面

$I = 70\,884$

$f = +\frac{29\,893\,400 \times 37.81}{70\,884} = +16\,000$

$f = -\frac{29\,893\,400 \times 33.95}{70\,884} = -14\,300$

腹鈑突緣角鈑連結用鋲

鋲距 = 3.5"　Q = 407　I = 37 422

支壓力

$f = \frac{3.5 \times 293\,800 \times 407}{\frac{7}{8} \times \frac{3}{8} \times 37\,422} = 22\,700$

端床桁

最大彎曲率		最大剪力	
11 784 500"	l	115 500"	l
10 052 200	i	98 600	i
1 574 700	d	16 000	d
23 411 400 吋封度		230 100 封度	

中央斷面

上突緣 1-蓋鈑 13 × 1/2 = 6.50 = 6.50
1-蓋鈑 13 × 1/2 = 6.50 = 6.50
2-突緣角鈑 6.6.1/2 = 11.50 = 11.50
1-腹鈑 63 × 1/2 = 31.50 − 15 × 1/2 = 24.00
下突緣 2-突緣角鈑 6.6.1/2 = 11.50 − 4 × 1/2 = 9.50
1-蓋鈑 13 × 1/2 = 6.50 − 2 × 1/2 = 5.50
1-蓋鈑 13 × 1/2 = 6.50 − 2 × 1/2 = 5.50
80.50 總斷面　69.00 純斷面

$I = 51\,959$

$f = +\frac{23\,411\,400 \times 34.56}{51\,959} = +15\,600$

$f = -\frac{23\,411\,400 \times 30.94}{51\,959} = -14\,000$

腹鈑突緣角鈑連結用鋲

鋲距 = 3.5"　Q = 330　I = 27 141

支壓力

$f = \frac{3.5 \times 230\,100 \times 330}{\frac{7}{8} \times \frac{1}{2} \times 27\,141} = 22\,400$

縱桁

最大彎曲率		最大剪力	
3 842 600"	l	57 800"	l
3 539 000	i	53 200	i
364 800	d	4 800	d
7 746 400 吋封度		115 800 封度	

中央斷面

2-突緣角鈑 6.6.3/8 = 12.86 = 12.86
1-腹鈑 39 × 1/2 = 19.50 − 2 × 1/2 = 18.50
2-突緣角鈑 6.6.3/8 = 12.86 − 2 × 3/8 = 11.73
45.22 總斷面　43.09 純斷面

$I = 10\,077$

$f = +\frac{7\,746\,400 \times 19.94}{10\,077} = +15\,300$

$f = -\frac{7\,746\,400 \times 19.06}{10\,077} = -14\,700$

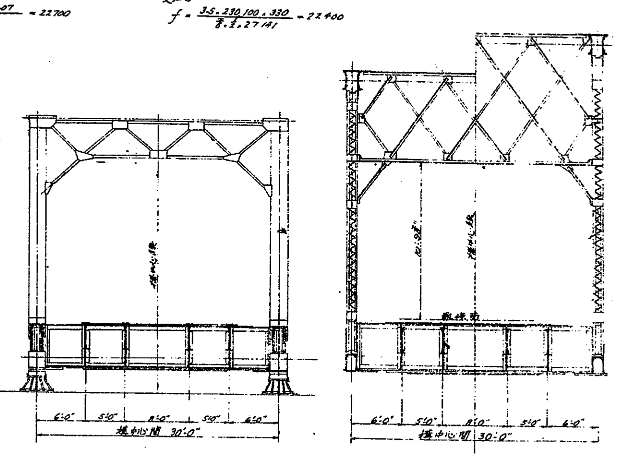
腹鈑突緣角鈑連結用鋲

I = 9631

鋲距 = 3.5"　Q = 216

支壓力

$f = \frac{3.5 \times 115\,800 \times 216}{\frac{7}{8} \times \frac{1}{2} \times 9631} = 20\,800$



鉸

反力
534 700" l
225 100 i
232 400 d
992 200 封度

鉸ノ徑 = 4 吋

支壓力

$f = -\frac{992\,200}{4 \times 25} = -9900$

床石

反力
534 700" l
225 100 i
232 400 d
992 200 封度

支面 = 48 × 50 = 2400"

支壓力

$f = -\frac{992\,200}{2400} = -410$

ローラー

反力
534 700" l
225 100 i
232 400 d
992 200 封度

ローラーノ徑 = 5 吋
ローラーノ總長 = 333 吋

支壓力

$f = -\frac{992\,200}{333} = -3000$

凡例

+ …… 張力
− …… 壓力
d …… 靜荷重應力
l …… 動荷重應力
i …… 衝擊應力
f …… 實應力(吋²)
I …… 腹鈑ニ直角ナル中立軸ニ關スル惰性力率(吋)
Q …… 腹鈑ニ直角ナル中立軸ニ關スル突緣ノ斷面能率(吋)
r …… 最小環動半徑(吋)

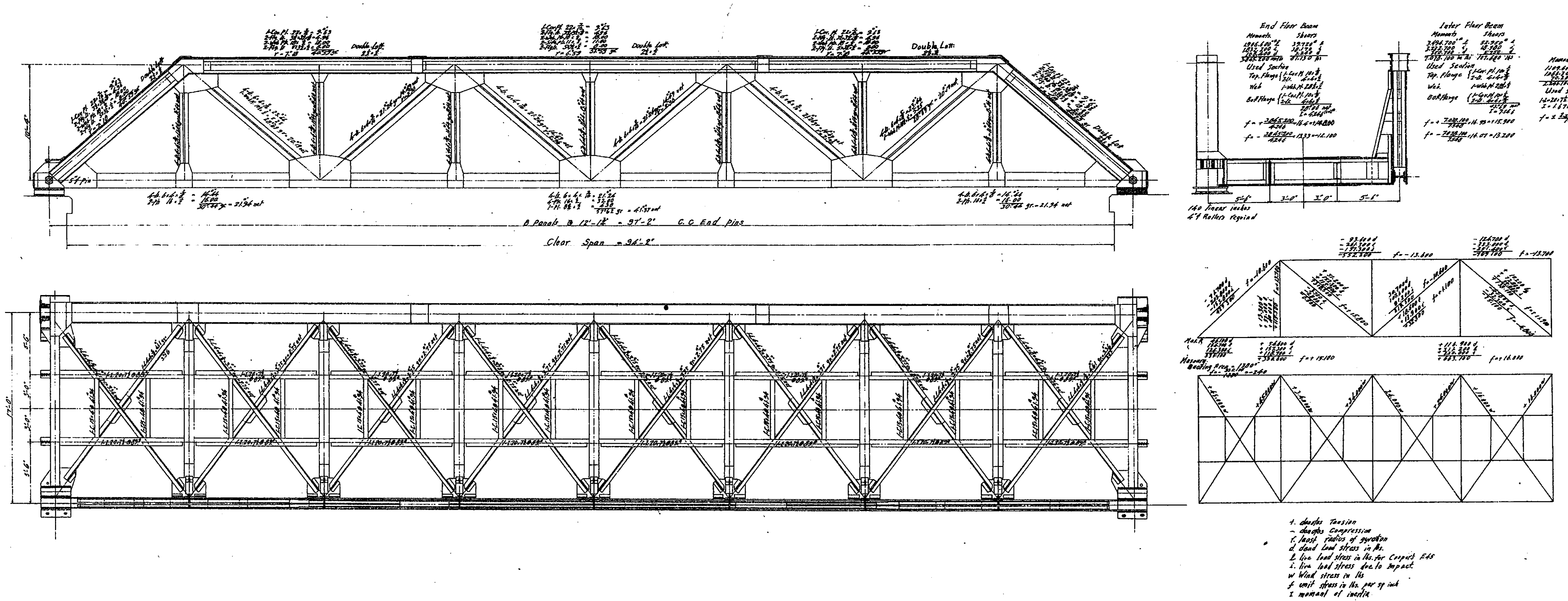
材料表

數量	種別	寸法		重量(封)	摘要
		端柱			
4	鈑	27 × 5/8	35'-7"	8 071	蓋鈑
8	角鈑	4.4.5/8	37'-9 3/4"	3 868	突緣角鈑
8	鈑	24 × 5/8	39'-5"	15 734	腹鈑
8	仝	13 1/2 × 5/8	39'-4 1/2"	6 190	側鈑
8	角鈑	[illegible]	39'-2 1/2"	8 200	突緣角鈑
8	平鈑	[illegible]	37'-9 1/4"	4 046	
8	角鈑	[illegible]	2'-1 1/2"	180	補強
8	仝	仝	2'-10"	240	仝
8	仝	4.4.5/8	2'-10 1/2"	225	仝
8	鈑	4 × 5/8	1'-7"	118	填材
8	仝	55 1/2 × [illegible]	6'-2 1/2"	4 920	繫鈑
8	仝	29 × 5/8	5'-2 1/2"	1 454	添接鈑
8	仝	[illegible]	1'-9 1/2"	64	仝
8	仝	18 1/2 × [illegible]	2'-3 1/2"	276	填材
4	仝	39 1/2 × [illegible]	4'-1 1/2"	1 185	添接鈑
4	仝	17 × [illegible]	4'-10 1/2"	378	仝
4	平鈑	[illegible]	4'-10 1/2"	262	添接平鈑
4	鈑	27 × 5/8	2'-3 1/2"	420	綴鈑
4	仝	27 1/2 × [illegible]	2'-4"	436	仝
4	仝	19 × 1/2	3'-1 1/2"	404	仝
120	平鈑	2 1/2 × [illegible]	2'-9 3/4"	1 622	綾鈑
9424	鋲頭	[illegible]		1 817	工場鋲メ
3312	仝	仝		639	現場鋲メ
				60 749 封度	
		上弦材			
4	鈑	27 × 5/8	52'-1 1/2"	12 160	蓋鈑
2	仝	仝	51'-9 1/2"	5 941	仝
8	角鈑	4.4.5/8	52'-1 1/2"	5 423	突緣角鈑
4	仝	仝	51'-9"	2 650	仝
4	鈑	13 1/2 × [illegible]	51'-8 1/2"	4 152	側鈑
8	仝	24 × 5/8	52'-1 1/2"	21 420	腹鈑
4	仝	仝	51'-9"	10 557	仝
8	角鈑	[illegible]	52'-3 1/2"	10 931	突緣角鈑
4	仝	仝	51'-5 1/2"	5 378	仝
8	平鈑	[illegible]	52'-0 1/2"	5 577	
4	仝	仝	51'-4 1/2"	2 751	

ペイント塗面積 1155 坪

種別	重量(封度)
主構	443 987
床構	237 183
鍰構	55 457
シュー及ローラー	23 356
ピン及ボールト	417
總計 760 400 封度 = 339.464 噸	

第三十圖　　E45 わーれん構桁



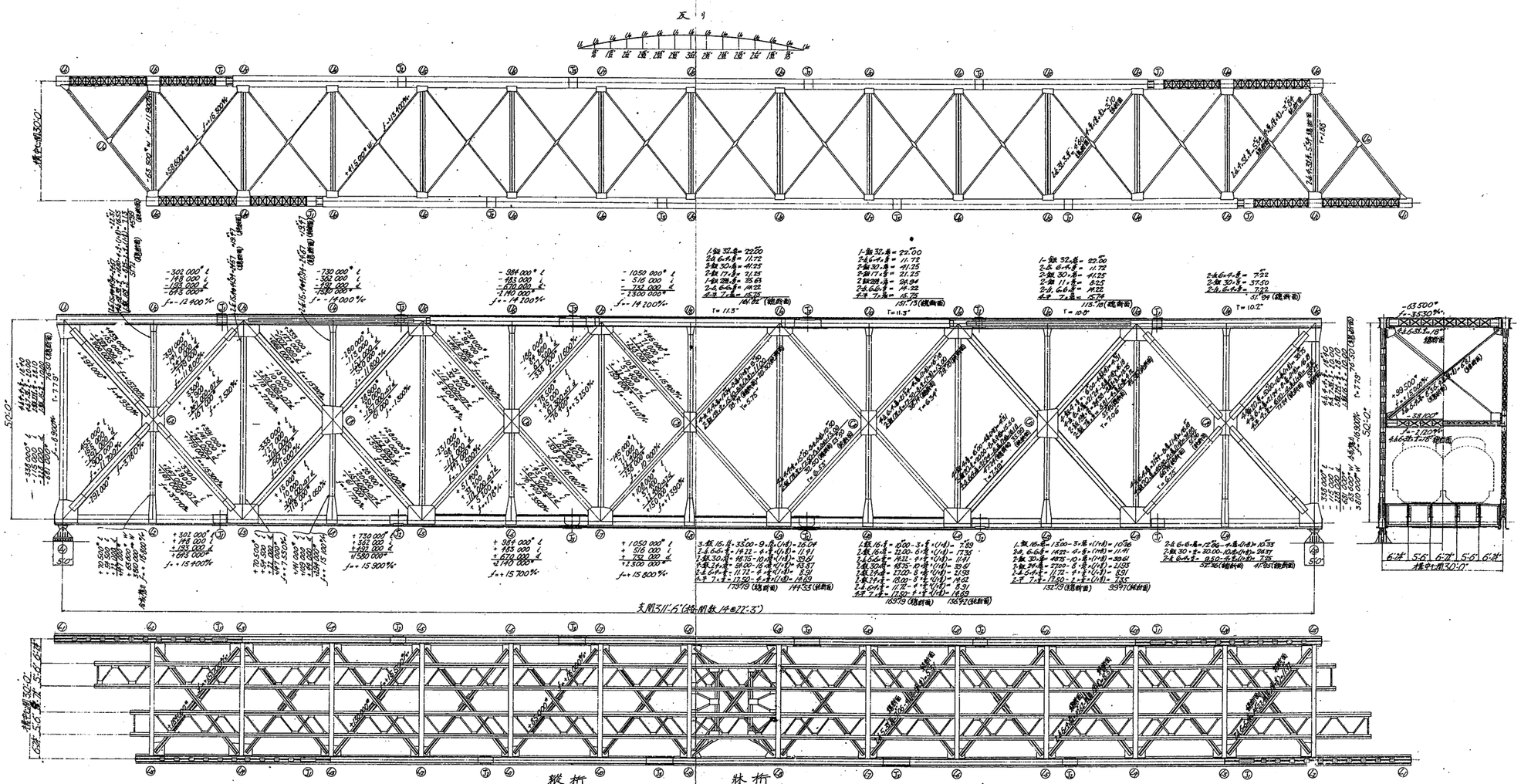
List of Materials.

No. Pcs	Description	Dimension		Weight (lb)	Remarks
		Top Chords.			
8	Angle	3½×3½×⅜	20'-8 7/16"	1410	Flange Angle
8	do	5×3½×½	20'-3⅜"	2207	do
4	Plate	22×7/16	20'-9"	2,716	Cover plate
8	do	18×½	20'-8¼"	5,006	Web plate
2	do.	22×7/16	31'-10½"	2,000	Cover plate
4	do.	18×½	31'-10½"	3,905	Web plate
4	do.	11×½	30'-1 7/16"	2,252	Side plate
4	Angle	3½×3½×⅜	31'-10½"	1,085	Flange Angle
4	do	5×3½×½	31'-10½"	1,735	do.
8	Sheet	2⅞×⅛	1'-11"	19	Filler
8	Plate	11×½	2'-4⅜"	333	do
8	do	26×½	3'-2⅞"	713	Splice plate
4	do	22×7/16	1'-11¼"	254	Splice Bent Plate
4	do	do	1'-5"	185	Splice plate
16	do.	13½×½	1'-5"	520	do.
8	Sheet	2⅞×⅛	1'-1½"	11	Filler
8	plate	11×½	1'-1½"	168	do.
8	do	10⅞×⅜	1'-5¼"	150	Diaph. plate
16	Angle	3½×3½×⅜	1'-5¼"	196	Diaph. Angle
8	plate	23×7/16	1'-7½"	291	Tie plate
16	do	do.	1'-0½"	936	do.
72	Flat	2½×⅜	2'-6⅞"	768	Lattice Bar
7,040	Rivethead	⅞" ø		1,299	Shop
1,432	do	do.		264	Field
				28,719	
		End Post			
4	plate	22×7/16	16'-3⅜"	1,869	Cover plate
8	do.	18×½	17'-0"	4,082	Web plate
8	Angle	3½×3½×⅜	15'-8"	1,065	Flange Angle
8	do.	5×3½×½	15'-1½"	1,666	do.
8	do.	3½×3½×⅜	3'-3"	221	
8	Plate	11×½	2'-2¼"	302	Filler
8	do.	3½×½	2'-0"	95	do.
8	do.	3½×⅝	2'-0"	119	do.
8	do.	23×7/16	1'-8½"	468	Tie plate
8	Sheet	2⅞×⅛	1'-8¼"	16	Filler
32	Flat	2½×½	2'-6⅞"	341	Lattice Bar
2,688	Rivet head	⅞" ø		496	Shop
760	do.	do.		140	Field
				10,860	
		Bottom Chord			
8	Plate	16×½	30'-5"	6,619	Cover plate
16	Angle	6×4×⅜	20'-0¼"	3,960	Flange Angle
4	plate	8¾×½	12'-6¾"	737	Web plate
8	do.	16×½	11'-6¾"	2,480	Cover plate
16	Angle	6×4×7/16	9'-3½"	2,685	Flange Angle
2	plate	8¾×½	30'-2¼"	898	Web plate
8	do.	16×½	30'-2¼"	6,569	Cover plate
8	Angle	6×4×7/16	27'-11¼"	4,045	Flange Angle
16	do	6×4×½	2'-0"	518	Splice Angle
8	plate	8¾×⅜	1'-0"	89	Filler
16	Sheet	6×⅛	1'-0"	41	do.
8	plate	16×½	4'-6"	1,224	Splice plate
16	do.	6×⅜	4'-6"	827	do.
8	do.	6⅞×⅜	4'-6"	456	do.
24	do.	7¾×7/16	2'-3"	800	Filler
4	plate	8¾×½	2'-0"	119	Tie plate
8	do.	do.	0'-9	89	do
4	do.	do	3'-4¾"	202	do
5,592	Rivet head	⅞" ø		1032	Shop
1880	do.	do.		347	Field
				33,717	
		Sub Vertical.			
16	Angle	4×4×⅜	8'-2½"	1,290	Flange Angle
40	do	do	8'-8½"	3,422	do.
14	plate	10½×½	3'-0"	750	Tie plate
4	do.	do.	1'-3"	89	do.
10	do.	do.	1'-9"	312	do.
16	do.	16¾×½	2'-1½"	1,099	Gusset plate
12	do.	13½×½	1'-11½"	624	do.
712	Rivet head	⅞" ø		131	Shop
1,872	do.	do.		345	Field
				8,062	
		Diagonal.			
16	Angle	6×4×⅜	13'-3"	4240	Flange Angle
32	do	6×4×7/16	13'-3"	7,674	do
4	plate	10½×½	13'-0"	920	Web plate
16	do	do	2'-0"	571	Tie plate
16	do	do	1'-0"	286	do
1,312	Rivet head	⅞" ø		242	Shop
2304	do	do.		425	Field
				16,366	
		Gusset plate			
8	plate	28¾×⅜	5'-5⅜"	2661	A
8	do	28¾×½	4'-3⅞"	7,508	B
8	do	39½×⅜	5'-0⅞"	2,664	C
8	do	36¾×⅜	5'-6¾"	3,167	D
8	do	39½×⅜	5'-6½"	3,298	E
4	do	34½×⅜	4'-11¾"	1,333	F
				14,411	
		Floor Beam			
8	Angle	4×4×½	14'-2¾"	1,455	Flange Angle
4	do.	6×4×7/16	2'-4"	133	Stiffener
4	do.	4×6×½	2'-4"	119	do.
8	do.	3½×3½×7/16	2'-4"	183	do.
16	do.	do	0'-10½"	137	
8	do.	4×4×½	0'-9"	77	
4	do.	6×4×7/16	2'-8"	193	
2	plate	28½×⅜	14'-2¾"	1,033	Web plate
8	do	13½×½	1'-8¾"	317	Filler
2	do.	10×7/16	14'-2¾"	362	Cover plate
2	do.	do	10'-11"	278	do
4	do.	28½×⅜	2'-8"	274	
4	do	27×½	3'-0"	484	
8	do	3½×½	1'-8¾"	76	Filler
8	do.	9×⅜	0'-10½"	80	
16	do	3×½	0'-7½"	51	Filler
28	Angle	4×4×⅜	15'-3"	6,714	Flange Angle
28	do	4×4×7/16	4'-3¾"	1364	Connecting Angle
28	Angle	6×4×7/16	2'-3¾"	926	Stiffener
8	do	4×4×⅜	7'-5"	581	Bent Angle
20	do	do	7'-11"	1552	do
7	plate	28½×⅜	12'-2"	4125	Web plate
7	do	10×½	12'-5"	1,478	Cover plate
7	do.	do.	12'-2	1,448	do.
14	do	do.	9'-11"	2,360	do
14	do	22½×½	6'-3¾"	2,155	Web plate
28	do	13½×⅜	1'-8¾"	1,389	Filler
28	do	12×½	1'-8¾"	980	Web splice plate
8	do	8½×⅜	2'-3"	325	Filler
6	do	do	1'-6"	163	do
6	do.	do.	1'-0"	108	do
4	do	3½×½	1'-3"	32	do
10	do.	do.	1'-9"	112	do.
14	do.	9×½	2'-6"	405	Tie plate
14	do	do	1'-6"	298	do
28	Angle	4×4×½	1'-2"	217	
7,192	Rivet head	⅞" ø		1,327	Shop
1,144	do.	do		211	Field
				33,720	
		Stringer			
8	Angle	4×4×½	1'-2½"	121	Flange Angle
4	do	4×3½×½	2'-0"	95	Cut from [illegible]
4	Plate	14½×⅜	1'-11½"	164	Web Plate
16	I Beam	20×[illegible] 89#	11'-11⅞"	17,058	Stringer (B S.S)
16	Channel	15×[illegible]	5'-11"	3,975	[illegible] (C do)
32	Angle	6×6×7/16	1'-3"	688	Connecting Angle
32	do	3½×3½×⅜	1'-3	340	do
320	Rivet head	⅞" ø		59	Shop
1,040	do	do		192	Field
				22,687	
		Lateral			
2	Angle	4×4×⅜	11'-6"	550	Lateral Angle
2	do.	do.	9'-2"	288	do.
2	do.	do	8'-0½"	253	do
2	do.	do	1'-2½"	37	
2	do	do	1'-3½"	40	
4	do	do	0'-10½"	55	
4	do	do	1'-1½"	71	
6	do.	4×4×½	18'-8½"	1,611	Lateral Angle
6	do	do	9'-2"	704	do
6	do	do	8'-11"	185	do.
24	do	do	1'-1½"	346	
6	do	do	1'-2½"	91	
6	do.	do.	1'-0½"	98	
32	do.	do.	0'-11"	375	Connecting Angle
28	do.	4×4×⅜	1'-0"	274	do
2	plate	8×⅜	2'-9"	36	Splice plate
6	do	8×½	2'-9"	224	do
14	do	21½×⅜	2'-10½"	1,099	Gusset plate
4	do.	24½×⅜	3'-0½"	329	do
12	do	4×⅜	0'-9"	77	Filler
600	Rivet head	⅞" ø		111	Shop
936	do.	do		173	Field
				7,385	

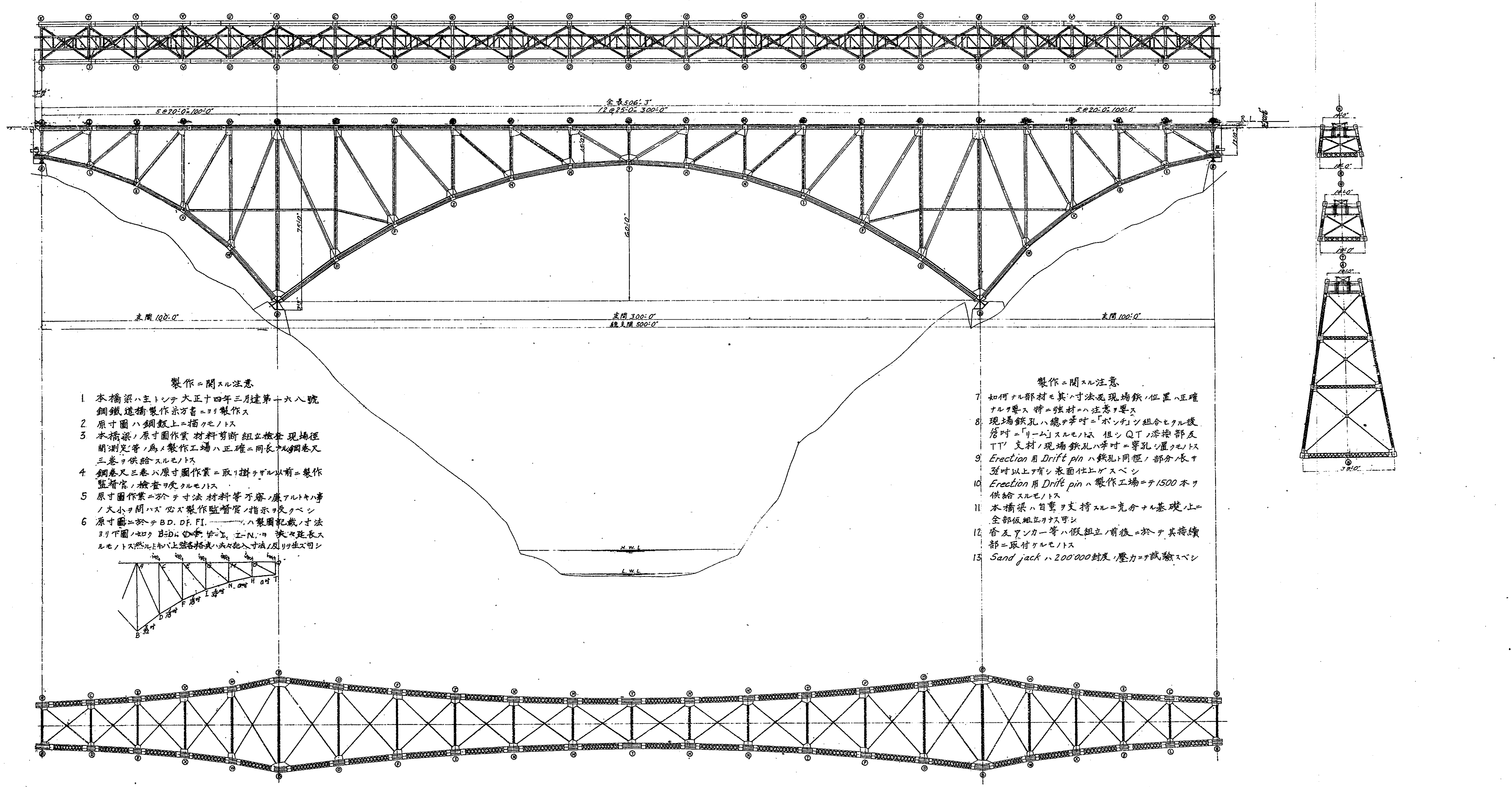
Total Weight.

Description	Weight in lbs.	Weight in tons.
Top Chord	28,719	
End Post	10,860	
Bottom Chord	33,717	
Sub Vertical	8,062	
Diagonal	14,366	
Gusset plate	14,411	
Floor Beam	33,720	
Stringer	22,687	
Lateral	7,385	
Shoe & Roller	9,888	
4-Pin & Nut	508	
8-Anchor Bolt	83	
4-Anchor Bolt	33	
Sum	184,439	= 82.339
4-Sheet Lead	582	

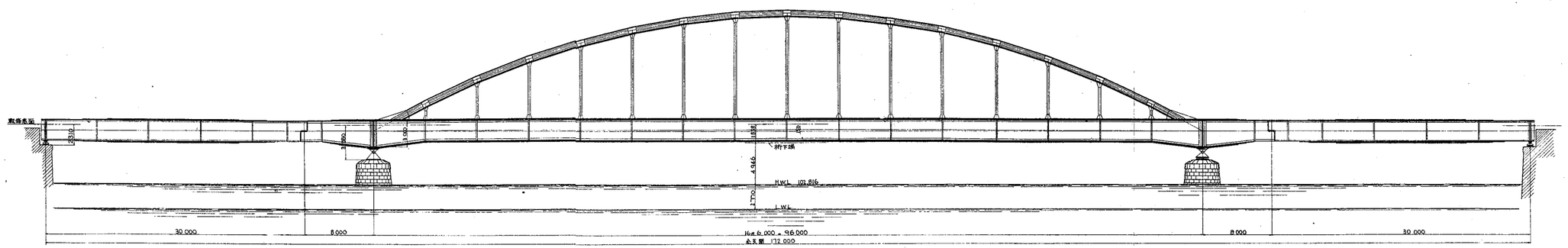
第三十一圖　　E40三百呎複線わーれん構桁



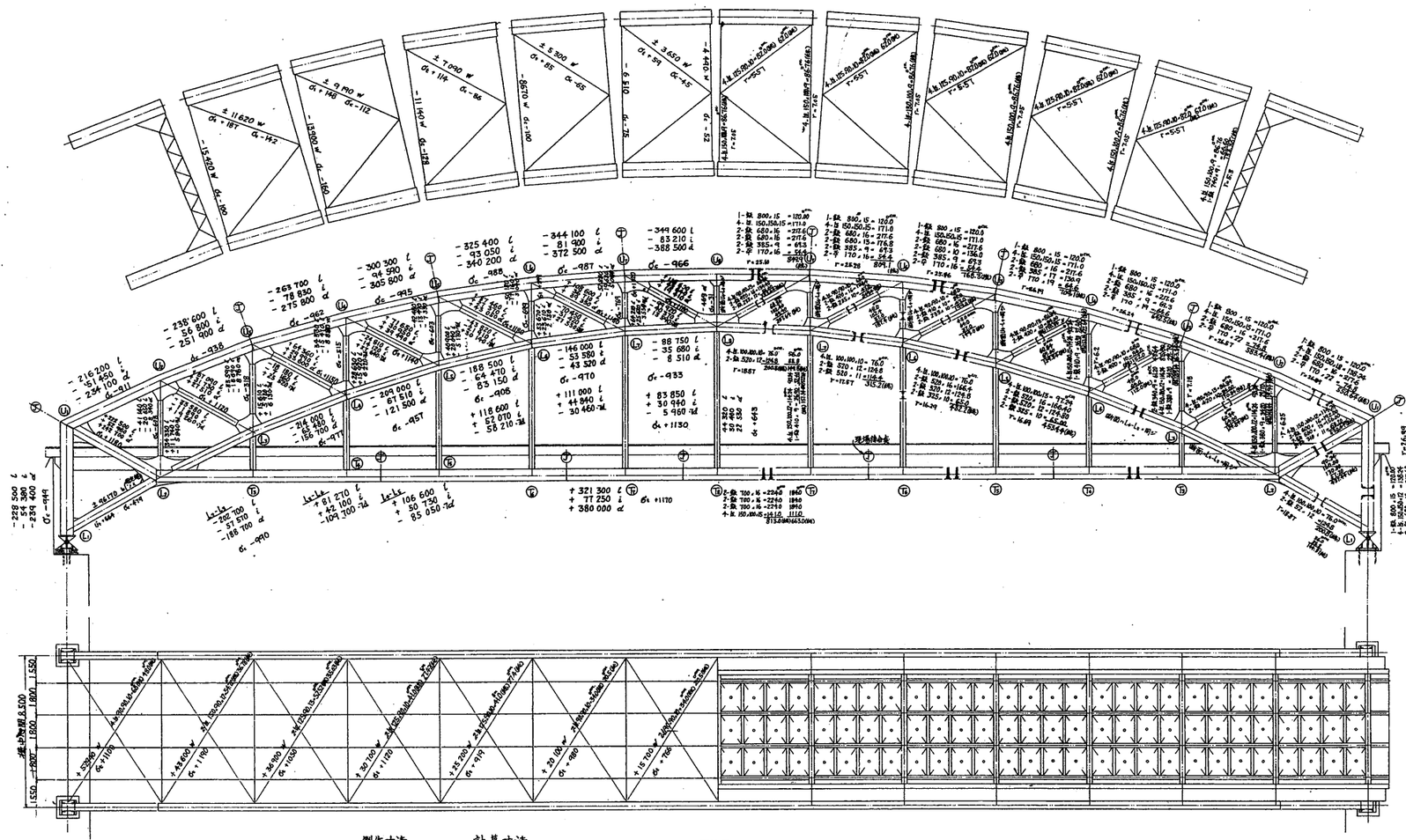
第三十二圖　高森線第一白川橋梁

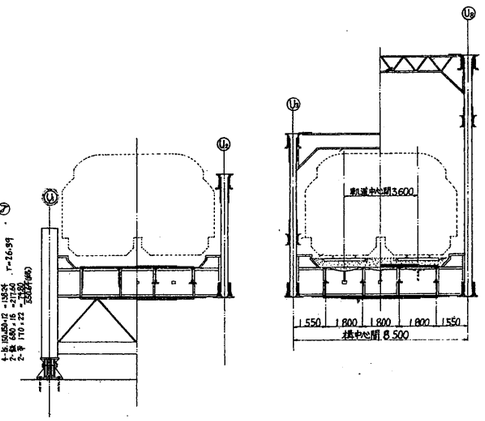


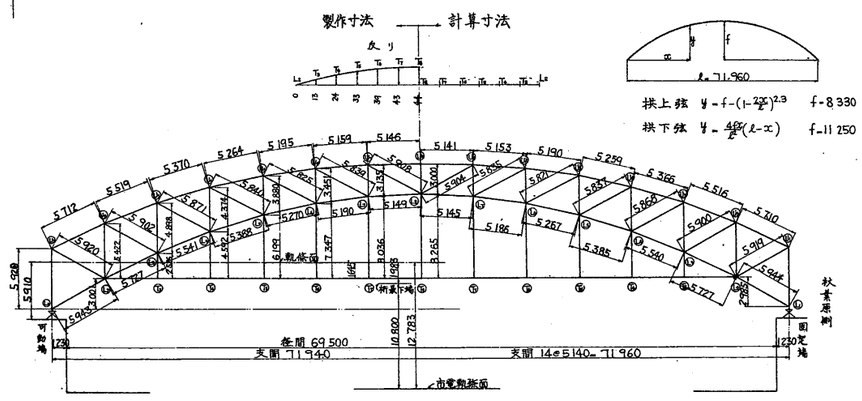
第三十三圖　　總武線隅田川橋梁 (K. S. 15)



第三十四圖　　松住町架道橋 (K. S. 15)







最大反力

−228 500 l
− 54 380 i
−239 400 d

沓支面 125.125 = 15 625 cm²

實應力	許容應力
σ_b −33	−35

ローラー

径 170　長 115

實應力	許容應力
σ_b −650	−680

凡例

l	活荷重應力 (kg)
i	衝撃　〃　〃
d	死荷重應力 〃
I	中立軸に關する總斷面二次率 (cm⁴)
y	中立軸より縁端迄ノ距離 (cm)
σ_t	實應張力 (kg/cm²)
σ_c	實應圧力 〃
σ_b	支壓力 〃
w	橫荷重應力 〃
b	縱荷重應力 〃
r	最小廻動半徑 (cm)

縱桁

最大彎曲率	最大剪力
1 766 000 l	16 840 l
1 584 000 i	15 110 i
571 000 d	4 480 d

中央斷面

I = 157 600
y = 35.4

實應力	許容應力
σ_t +1190	+1200
σ_c −916	1090

橫桁

最大彎曲率	最大剪力
10 860 000 l	44 320 l
7 449 000 i	30 400 i
4 787 000 d	22 530 d

中央斷面

I = 1 646 000
y = 72.2

實應力	許容應力
σ_t +1200	+1200
σ_c −1010	−1100

端橫桁

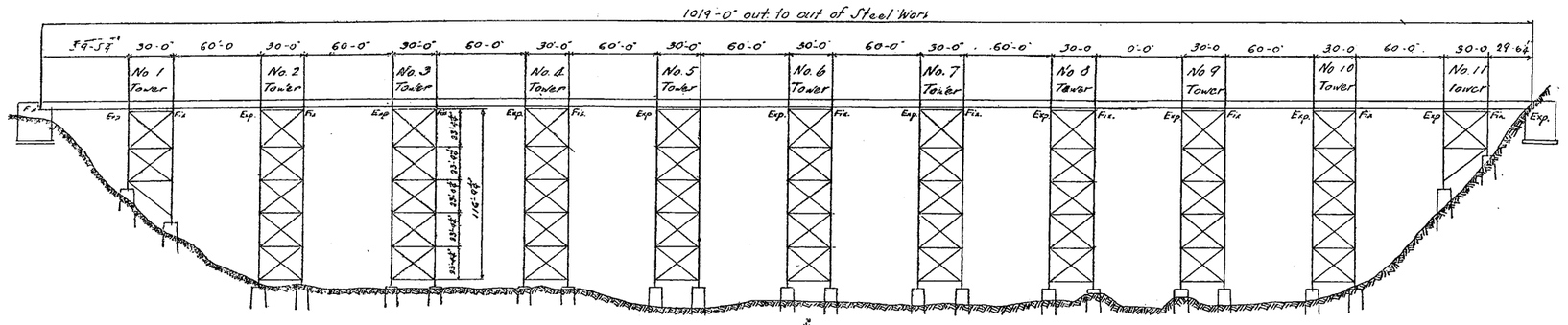
最大彎曲率	最大剪力
8 266 000 l	33 740 l
6 563 000 i	26 790 i
2 181 000 d	13 560 d

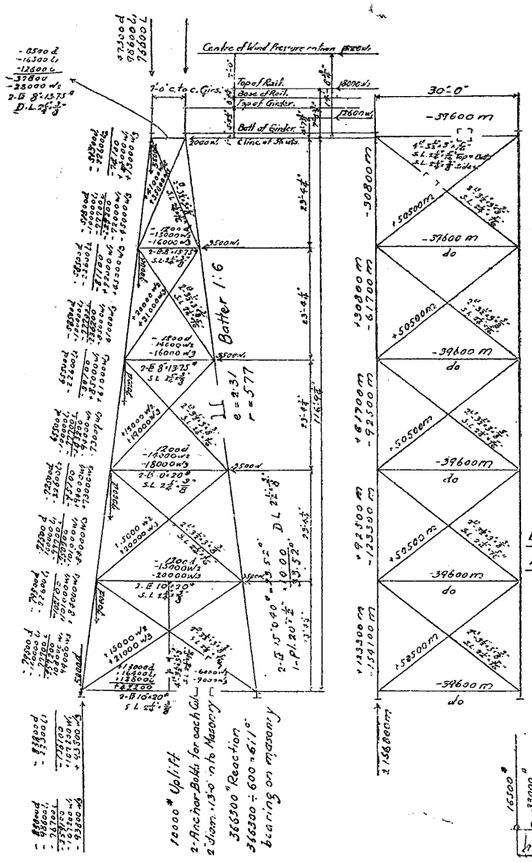
中央斷面

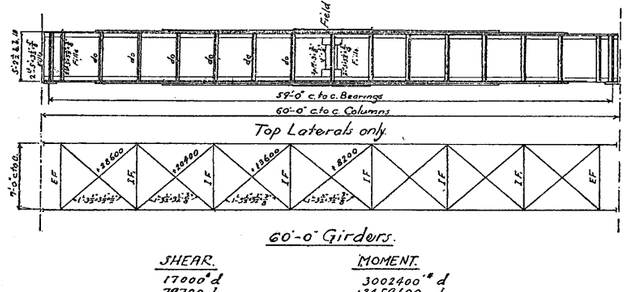
I = 1 349 000
y = 71.3

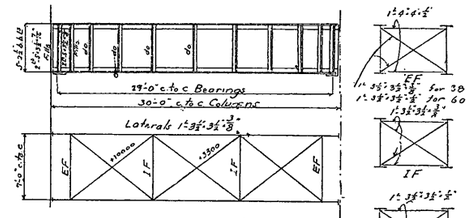
實應力	許容應力
σ_t +1110	+1200
σ_c −936	−1100

第三十五圖　橋梁部餘









SHEAR.

17000# d
79700 l,
66600 i
163300-lbs.

163300 ÷ 10000 = 16.33" req'd.
Web 62-⅜ = 23.25"

MOMENT.

3002400"# d
12459100 l,
10514000 i
25975500-in.lbs

25975500 ÷ 60.44 = 429800# Flange Stress
429800 ÷ 16000 = 26.86" net area req'd.

2 L 6"·4"·⅝" = 11.72" gross — 9.22" Net
49'-0 Top & Bott - 1 - Pl. 14-⅜" = 8.75 " — 7.5 "
36'-0 " " 1 - Pl. 14-⅜" = 8.75 " — 7.5 "
⅜ of Web Section — 2.9
27.12"

SHEAR.

6900# d
50800 l,
46300 i
104000-lbs.

104000 ÷ 10000 = 10.4" req'd
Web Pl. 62-⅜ = 23.25"

MOMENT

599400"# d
3840300 l,
3513700 i
7953400-in.lbs.

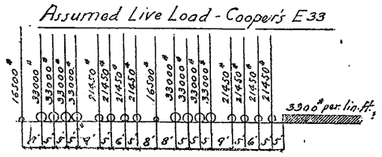
7953400 ÷ 60.5 = 131500# Flange Stress.
131500 ÷ 16000 = 8.22" Net area req'd
2 L 6"·4"·½" = 9.5" gross & 8.5" Net
⅜ of Web Section = 2.9"
11.4"

Specifications.
American Railway Engineering & Maintenance of Way Association - 1906.

Assumed Dead Load

30'-0" Girders		60'-0" Girders	
Steel	600#	Steel	600
Track	350	Track	350
950# per lin. ft. Span = 1130			

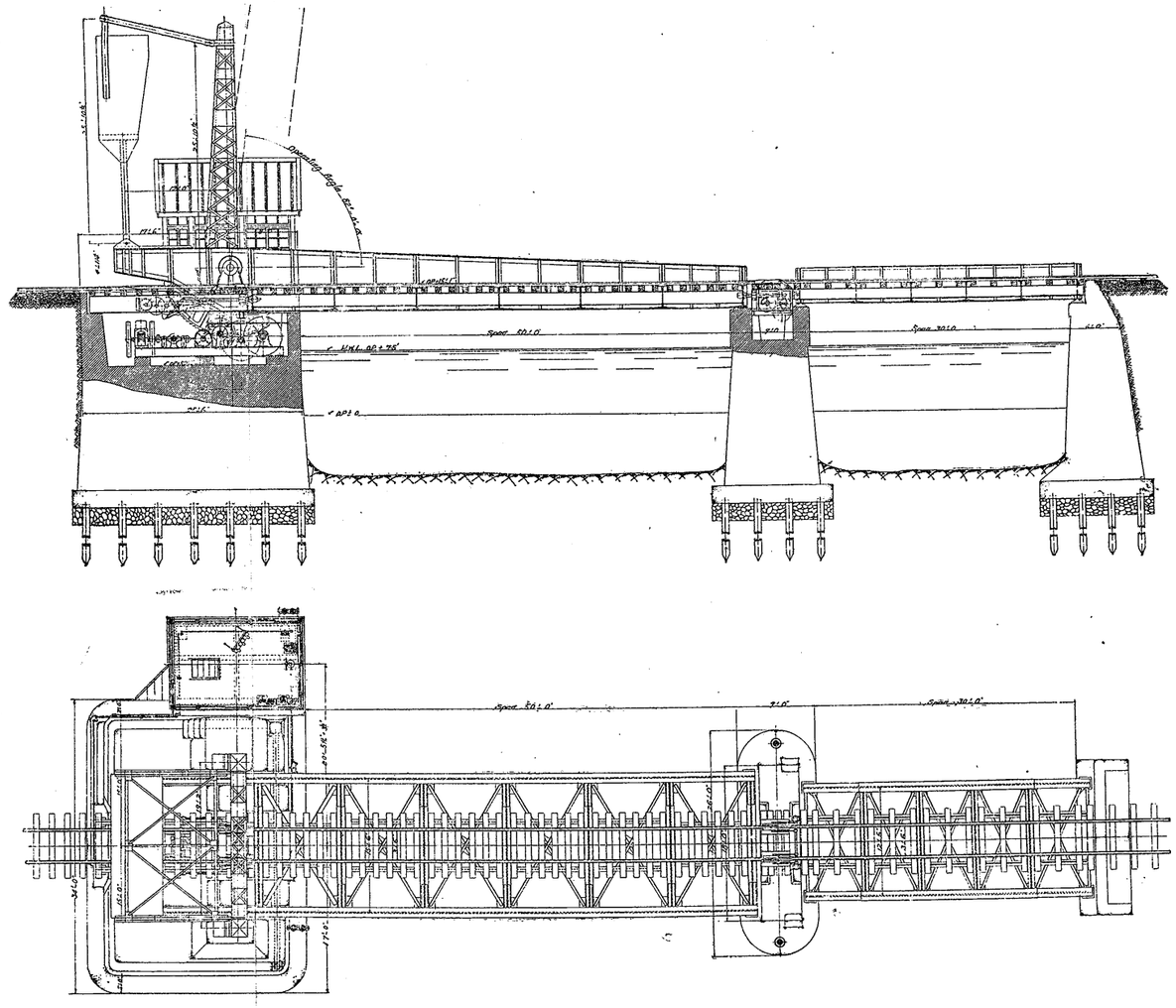
Assumed Live Load - Coopers E 33



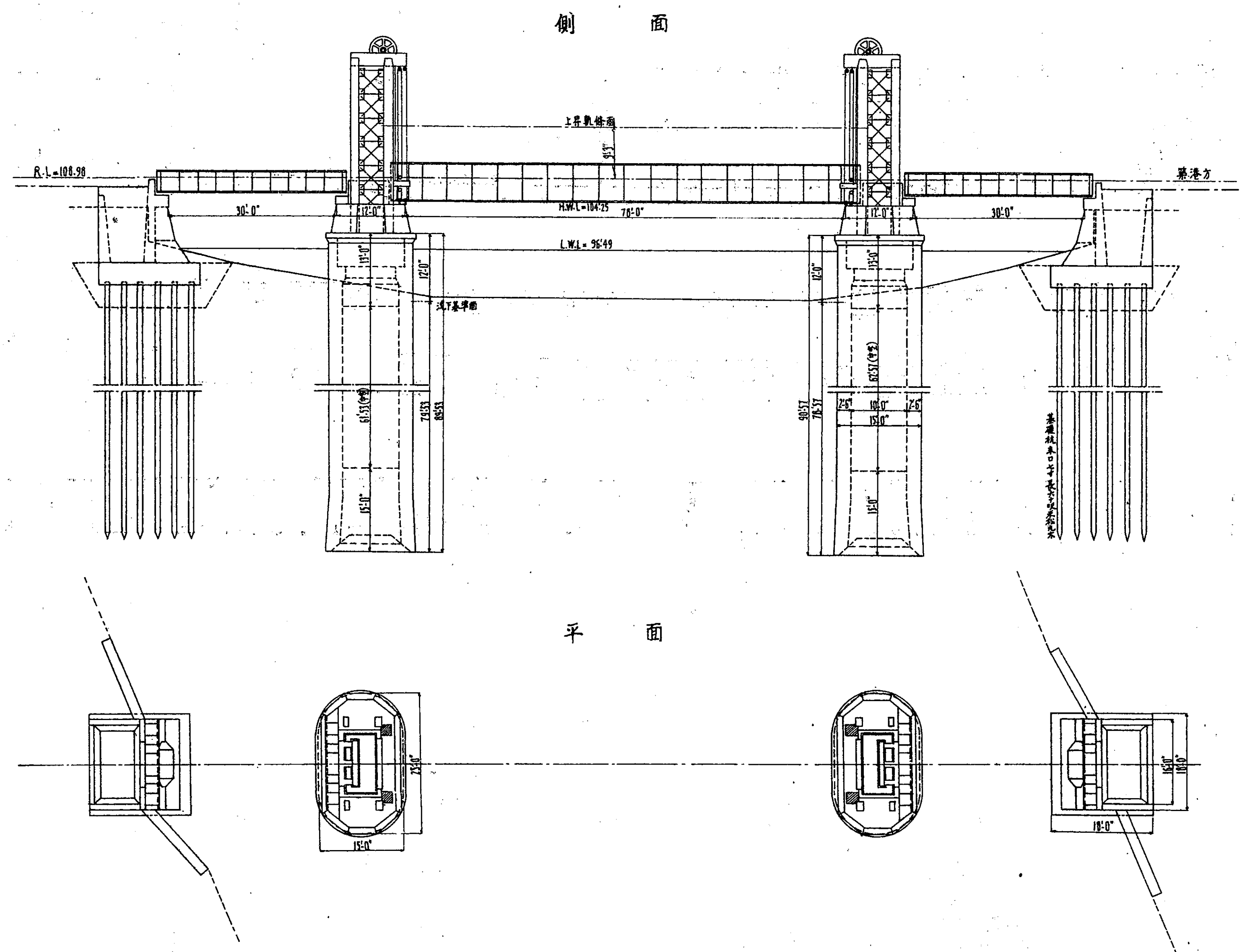
+ denotes Tension.
- denotes Compression
r = least radius of gyration in inches
e = eccentricity in inches
d = dead load stress in lbs.
l1 = live load stress in lbs. for Coopers E33
i = " " " " " due to Impact.
l2 = " " " " " for a train weighing 990# per ft of track
W1 = Wind stress in lbs. for a wind pressure of 30# per sq. ft. on the structure & a train wind load of 400# per lin. ft. applied 7 ft. above top of rail.
W2 = Same as W1, only the train wind load applied at top of rail.
W3 = wind stress in lbs. for a wind pressure of 50# per sq. ft. on the structure only.
m = stress from momentum of train in lbs.

Imperial Govt. Rys. of Japan -
Single Tr. Viaduct 30'-0" & 60'-0" Spans.
STRESS SHEET

第三十六圖　ばすきゅーる橋梁



第三十七圖　　りふと橋梁



第三十八圖　萬世橋曲線鈑桁