

E-258G		1933	1	18
FED. DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.
6	ARK.	E-258G	1933	1
				TOTAL SHEETS
				18

STATE OF ARKANSAS  
STATE HIGHWAY COMMISSION

**PLAN OF PROPOSED BRIDGE**  
**OVER ST. FRANCIS RIVER**  
**AT MADISON**  
**ST FRANCIS COUNTY**  
**ROUTE 70 SEC. 19**  
**JOB No 1-1058**  
**FEDERAL AID PROJECT NO. E-258G**

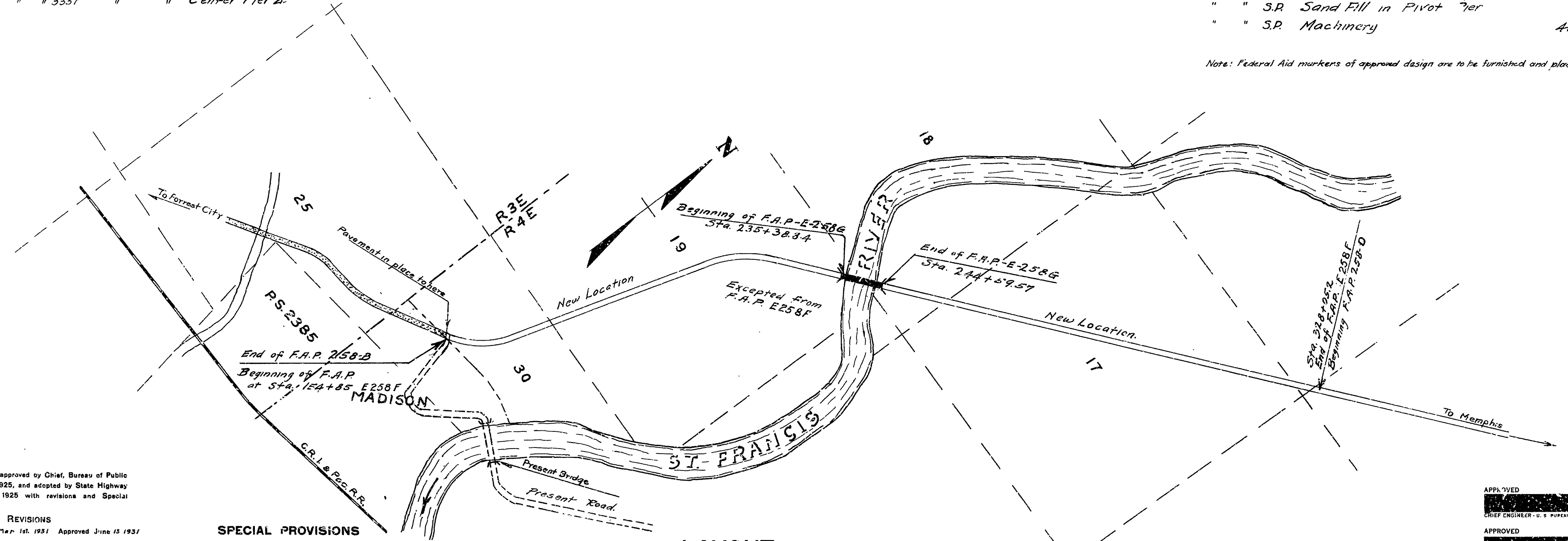
INDEX OF SHEETS

Sheet No.	1	Drawg. No.	3330	Title	Sheet
"	"	2	"	3331	General Layout Bridge No. 1391
"	"	3	"	3332	Hydrograph of St. Francis River
"	"	4	"	3333	Details of 50 Ft. Steel Approach Spans
"	"	5	"	3567	Details of 160 Ft. Steel Span - 24 Ft. Roadway
"	"	6	"	3568	" " 160 Ft. " " " "
"	"	7	"	3310	Design Data 230 Ft. Swing Span - 24 Ft. Roadway
"	"	8	"	3311	Details of 230 Ft. Swing Span
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"	"	11	"	3314	" " 230 Ft. " " " "
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"	"	13	"	3316	Machinery Details of 230 Ft. Swing Span
"	"	14	"	3317	" " " " " " " "
"	"	15	"	3334	Details of Piers 1 & 6
"	"	16	"	3335	" " Pier 2
"	"	17	"	3336	" " Piers 3 & 5
"	"	18	"	3337	" " Center Pier 4

QUANTITIES

ITEM	No.	Description	Quantity	Unit
"	13	Dry Excavation for Structures	757.0	Cu. Yds.
"	13	Wet Excavation for Structures	3823.0	Cu. Yds.
"	91	Class "A" Concrete for Bridges	1373.96	Cu. Yds.
"	91	Class "S" Concrete " "	431.38	" "
"	91	Seal Concrete " "	4264.06	" "
"	92	Reinforcing Steel " "	220181	Pounds
"	93	Concrete Piling	1144	Lin. Ft.
"	96	Structural Steel - Beam Bridges	190793	Pounds
"	96	Structural Steel - Truss Bridges	1158865	" "
"	97	Treated Bridge Timber	3144	M.F.B.M.
"	98	Untreated Timber Piling	14618	Lin. Ft.
"	S.P.	Asphalt Plank Wearing Surface	60712	Sq. Yds.
"	S.P.	Sand Fill in Pivot Tier	1270	Cu. Yds.
"	S.P.	Machinery	41000	Pounds

Note: Federal Aid markers of approved design are to be furnished and placed by the State.



Specifications approved by Chief, Bureau of Public Roads, September 28, 1925, and adopted by State Highway Commission May 30, 1925 with revisions and Special Provisions as follows:

REVISIONS

Pamphlet A Revised Mar. 1st, 1931 Approved June 13, 1931

Item	No. of Sheets	DATE
Requirements of Draw Span	19	Sept. 7, 1932
Asphalt Wearing Surface	1	Oct. 24, 1932
Labor	10	
Partial Payments	1	
Engineer's Field Office	1	Sept. 7, 1932
Time of Completion of Work	1	Nov. 1, 1932

LAYOUT

Scale: 1 inch = 1000 feet

LENGTH OF PROJECT	=	921.23	=	0.174 mile
LENGTH OF BRIDGES	=	921.23	=	0.174 "
LENGTH OF EMBANKMENT	=		=	
LENGTH OF JOB	=	921.23	=	0.174 miles

Nov. 18, 1932 - Quantities  
Class "A" Conc. and Seal Conc. - R.E.H.

APPROVED  
CHIEF ENGINEER - U. S. BUREAU OF PUBLIC ROADS

APPROVED  
DISTRICT ENGINEER - U. S. BUREAU OF PUBLIC ROADS

APPROVED  
CHIEF - U. S. BUREAU OF PUBLIC ROADS

APPROVED  
CHIEF - STATE HIGHWAY COMMISSION

APPROVED  
STATE HIGHWAY ENGINEER

*M.B. Lawler*  
BRIDGE ENGINEER

BRIDGES No. 1391

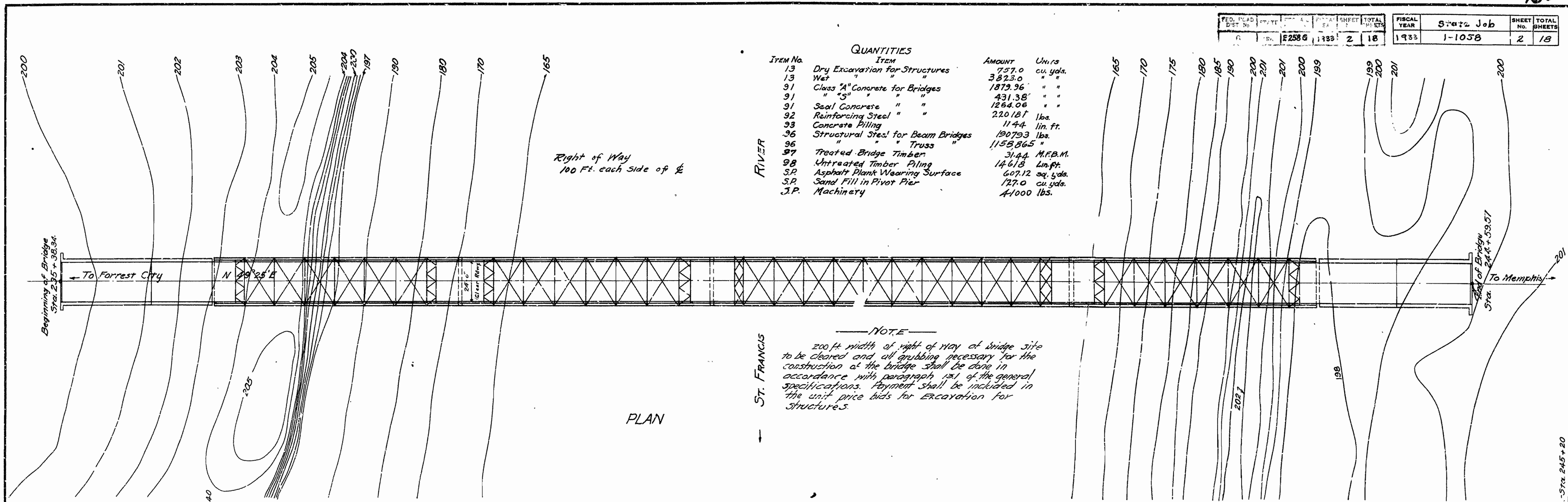
DRAWING No. 3330

" L Revised No. 1st 1931  
" M Revised Mar 1st 1931 Approved June 13 1931  
" N Revised Sept 1st 1932  
" O " " " "  
" P " NOV " "

FED. ROAD DIST. No.	PROJECT	SHEET	TOTAL SHEETS	FISCAL YEAR	STATE JOB	SHEET No.	TOTAL SHEETS
2586	1933	2	18	1933	1-1058	2	18

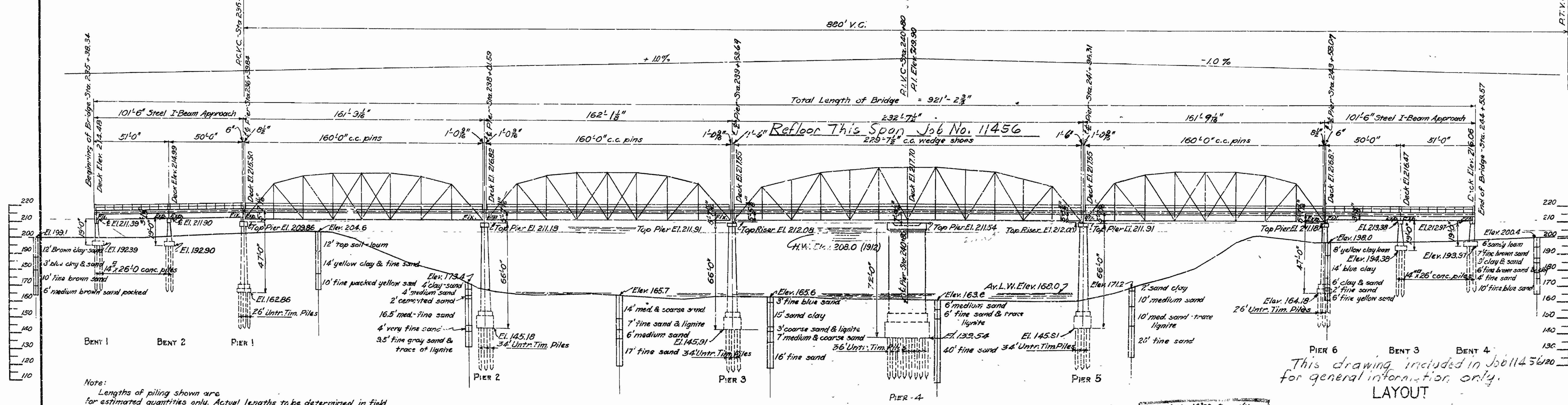
QUANTITIES

ITEM No.	ITEM	AMOUNT	UNITS
13	Dry Excavation for Structures	757.0	cu. yds.
13	Wet	3823.0	"
91	Class "A" Concrete for Bridges	1879.96	"
91	" " " "	431.38	"
91	Seal Concrete " "	1264.06	"
92	Reinforcing Steel " "	220187	lbs.
93	Concrete Piling	1144	lin. ft.
96	Structural Steel for Beam Bridges	190793	lbs.
96	" " Truss	1158865	"
97	Treated Bridge Timber	31.44	M.F.B.M.
98	Untreated Timber Piling	14618	Lin. ft.
S.P.	Asphalt Plank Wearing Surface	607.12	sq. yds.
S.P.	Sand Fill in Pivot Pier	127.0	cu. yds.
J.P.	Machinery	41000	lbs.



PLAN

NOTE  
200 ft. width of right of way at bridge site to be cleared and all grubbing necessary for the construction of the bridge shall be done in accordance with paragraph 131 of the general specifications. Payment shall be included in the unit price bids for excavation for structures.



ELEVATION BR. 1391  
Scale: 1 in. = 30 ft.

Note:  
Lengths of piling shown are for estimated quantities only. Actual lengths to be determined in field.  
Expansion joints to be constructed as shown.  
Specifications: Arkansas Standard Road and Bridge Specifications adopted May 30, 1925 and Revised.

B.M. El. 209.63 M.G.L.  
At Francis (R.R.B.M.) at Madison, St. Francis County, in outlined square on the south end of the west abutment of the Chicago, Rock Island and Pacific Railway bridge over the St. Francis River.

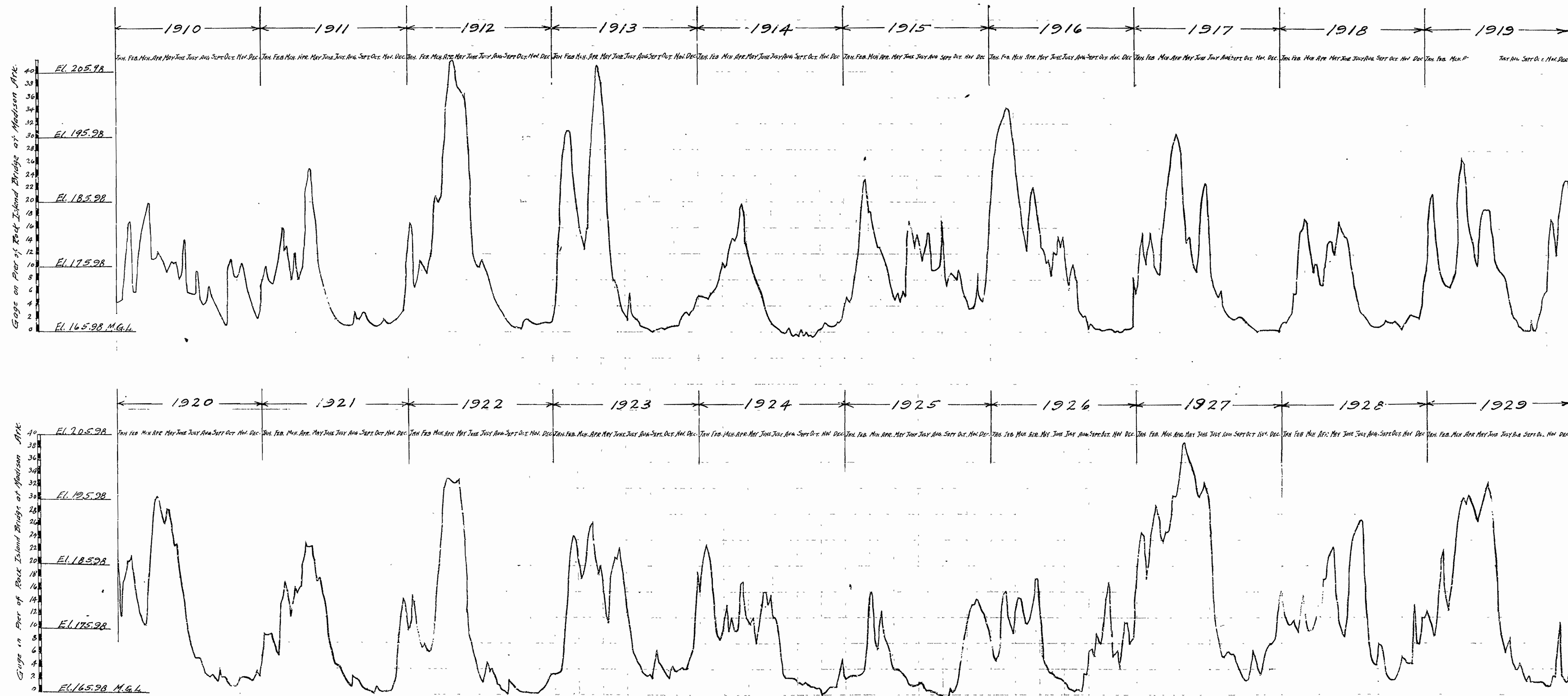
This drawing included in Job 11456 for general information only.  
LAYOUT

BRIDGE OVER ST. FRANCIS RIVER NEAR MADISON  
ST. FRANCIS COUNTY  
ROUTE 70 SEC. 19  
ARKANSAS STATE HIGHWAY COMMISSION  
LITTLE ROCK, ARK.  
Drawn By: L.C.B. Date: 8-1-32  
Tr. By: E.B.A. Date: 8-2-32  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
BRIDGE NO. 1391 DRAWING NO. 3331

Revised Nov. 15, 32 - Quantities  
Class "A" Conc. and Steel - E.B.A.

N.B. Hoover  
BRIDGE ENGINEER

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
6	ARK.	E 258 G	1933	3	18



B.M. Outlined Square on top of South end of West Abutment of C.R.I. & P. Railroad Bridge over St. Francis River at Madison Ark. E. 209.488  
 "O" on Madison Gage - EL. 165.98

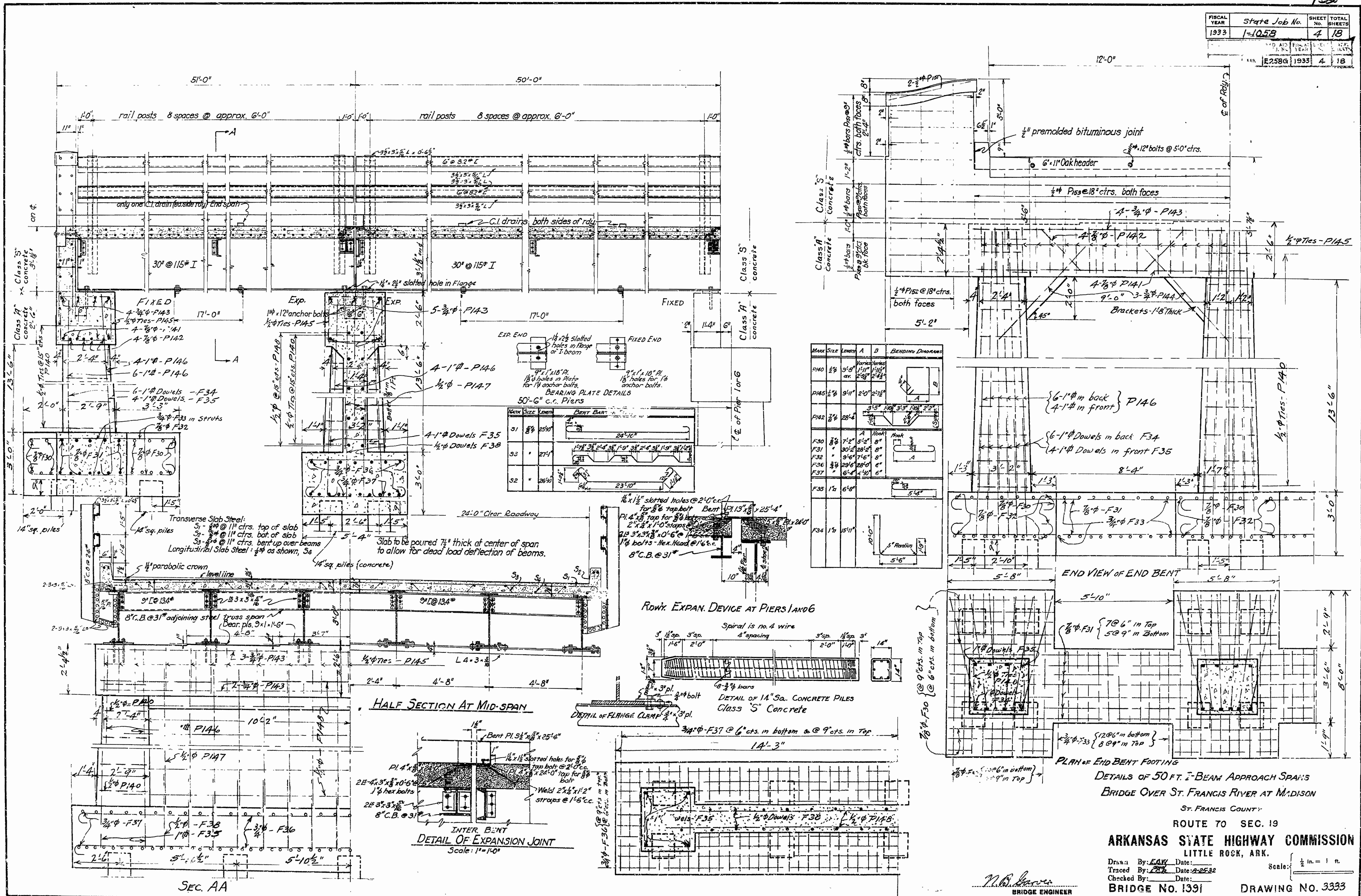
HYDROGRAPH SHOWING STAGES OF ST. FRANCIS RIVER AT MADISON - ST. FRANCIS CO. - ARKANSAS  
 Route 88.70 Sec. 19

M.B. Gower  
 Bridge Engineer

BRIDGE No. 1391

DRAWING No. 3332

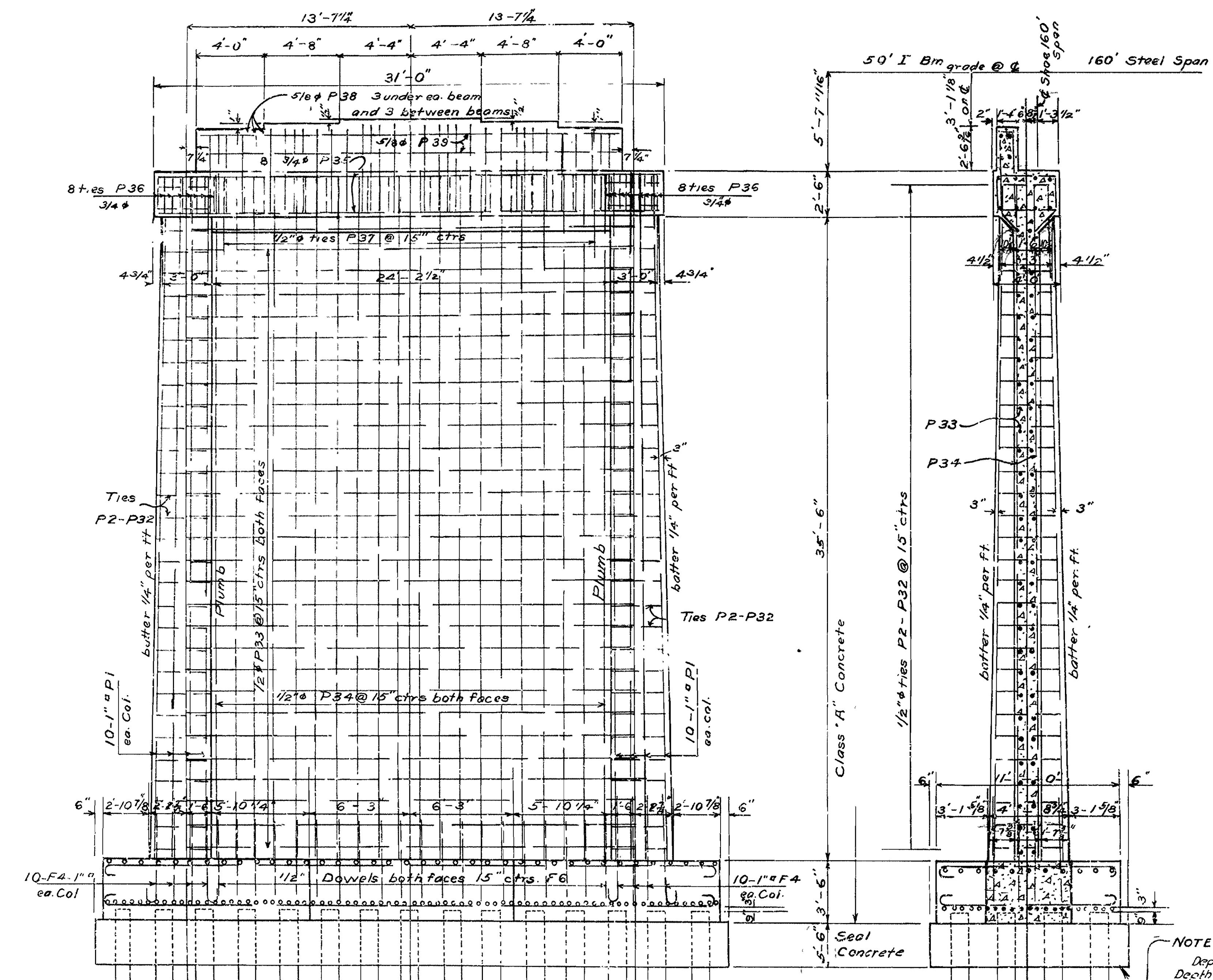
FISCAL YEAR	State Job No.	SHEET NO.	TOTAL SHEETS
1933	1-1058	4	18
E258G 1933		4	18



DETAILS OF 50 FT. I-BEAM APPROACH SPAN'S  
BRIDGE OVER ST. FRANCIS RIVER AT MADISON  
ST. FRANCIS COUNTY  
ROUTE TO SEC. 19  
**ARKANSAS STATE HIGHWAY COMMISSION**  
LITTLE ROCK, ARK.  
Drawn By: EAW Date: \_\_\_\_\_  
Traced By: JTB Date: 2-25-32  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
BRIDGE No. 1391 DRAWING No. 3333  
Scale: 1/2" = 1'

*M.B. Lawrence*  
BRIDGE ENGINEER

FISCAL YEAR	Job No.	SHEET No.	TOTAL SHEETS
1933	1-1058	15	18
FED. ROAD DIST. N.	STAT.	FED. PROJ. N.	FISCAL YEAR
6	ARK.	E258G	1933
		SHEET No.	TOTAL SHEETS
		15	18



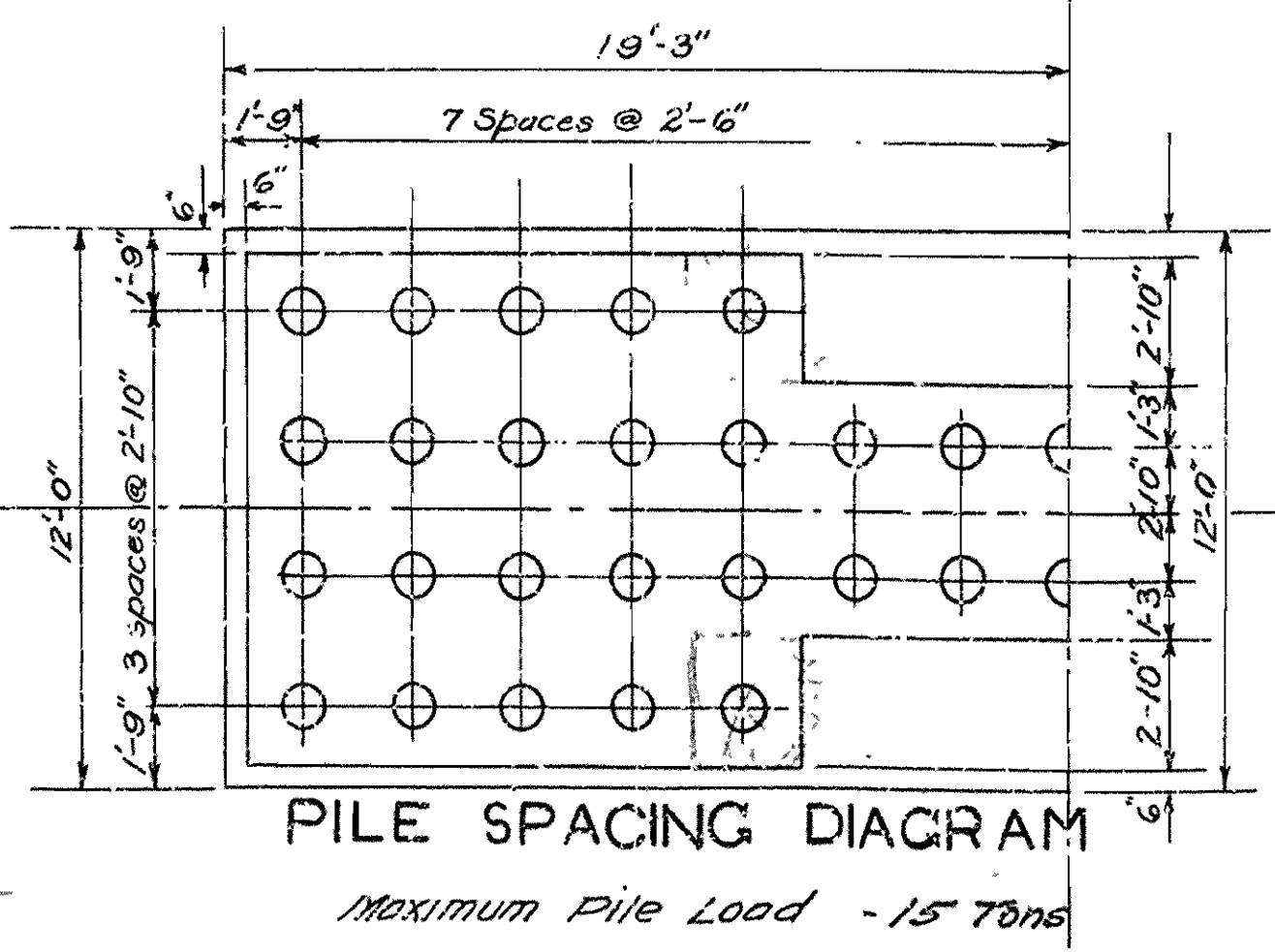
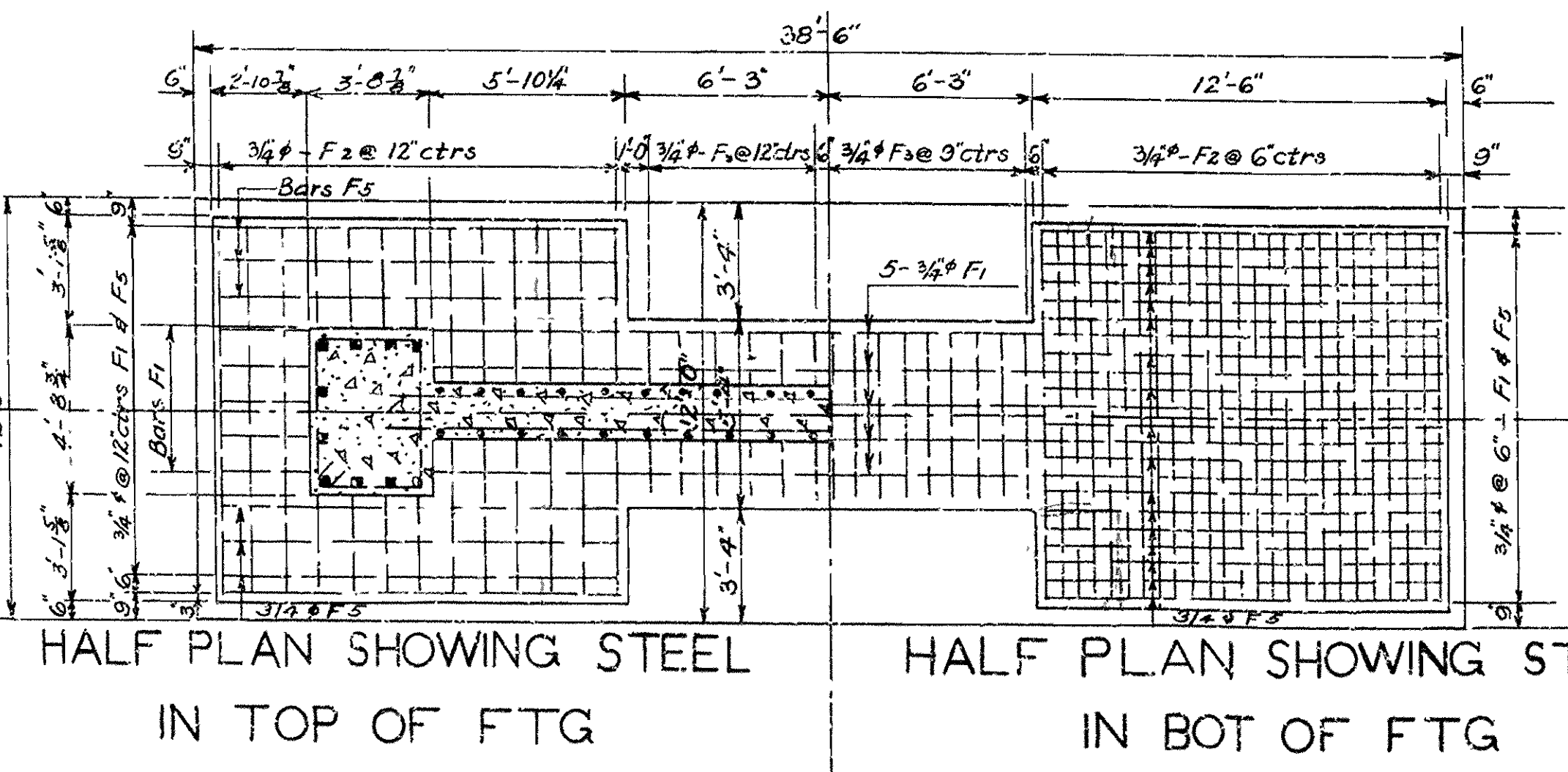
Mark	Size	Length	Diagram		Diagram
			A	B	
F1	1/4"	38'-6"	37'-0"	6"	
F2	3/4"	10'-6"	9'-0"	6"	
F3	3/4"	6'-0"	4'-6"	6"	
F4	1"	7'-0"	6'-0"	8"	
P2-P32	1/2"	13'-10 1/2" Av.	Var by 1/8" 4'-4 3/4"-2'-10"	Var by 1/16" 3'-4 1/2"-2'-7 1/2"	
P-36	3/4"	12'-3"	3'-7 1/2"	2'-1 1/2"	
P-37	1/2"	12'-3"	3'-7 1/2"	2'-1 1/2"	
P-38	5/8"	10'-4"			
F5	3/4"	13'-6"	12'-0"	6"	Same as for F1

NOTE:  
Depth of seal shown is based on water level 185.0  
Depth of seal to be increased or decreased at  
time of construction to meet actual water stage.  
No variation in unit pay for seal concrete will be  
made for variation of seal depth.

DETAILS OF  
PIERS No. 18 & 6  
ST. FRANCIS RIVER BRIDGE  
NEAR MADISON ARKANSAS  
ST. FRANCIS COUNTY

HALF ELEVATION STREAM SIDE HALF ELEVATION BANK SIDE

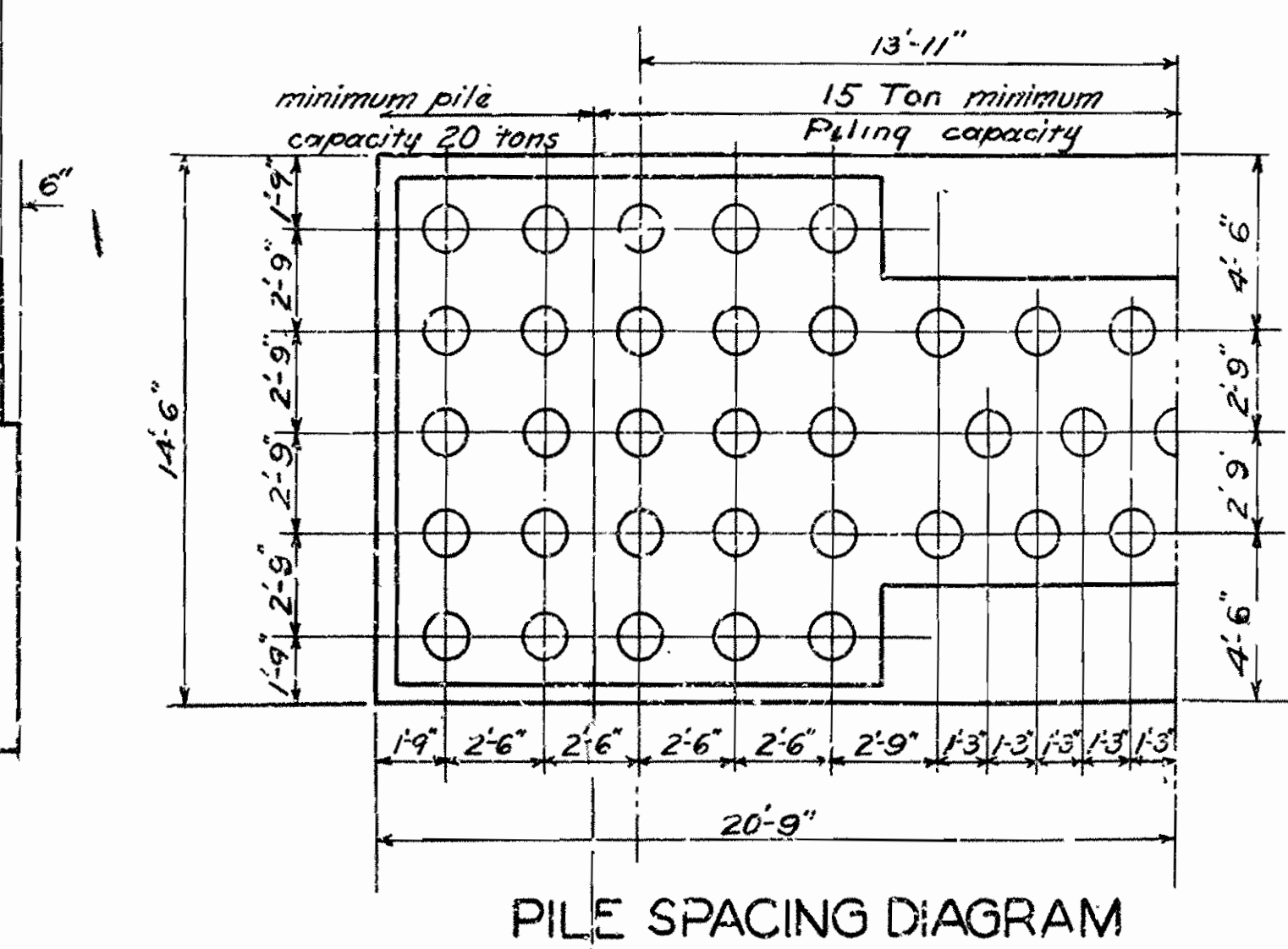
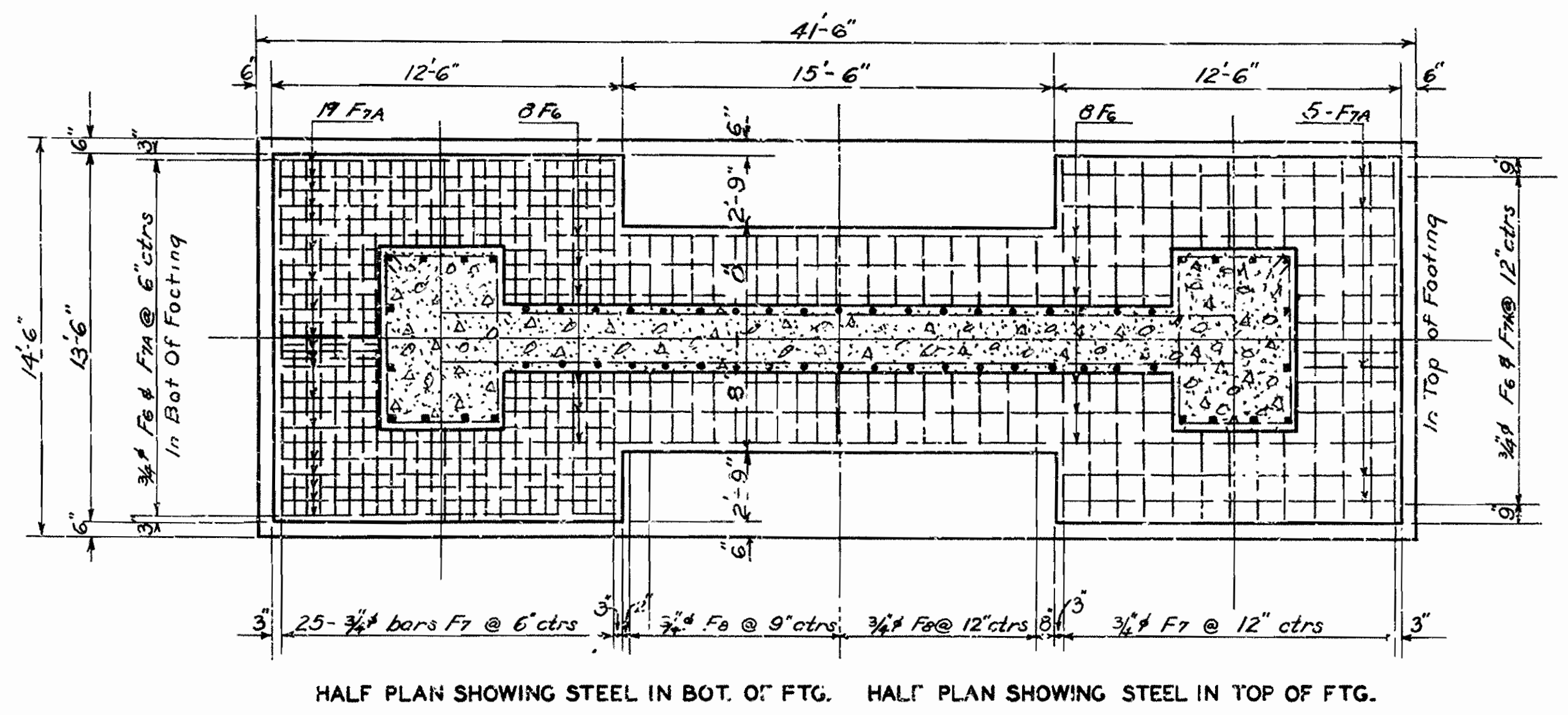
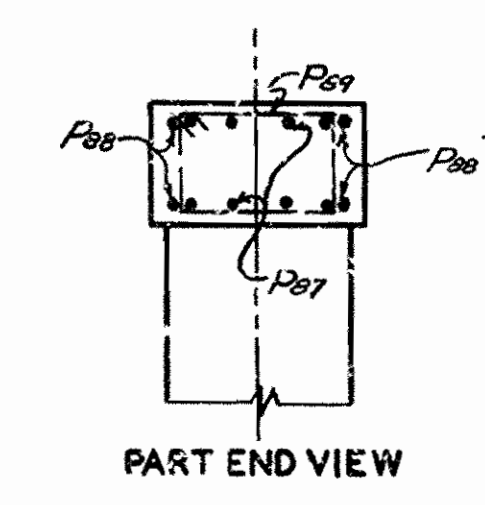
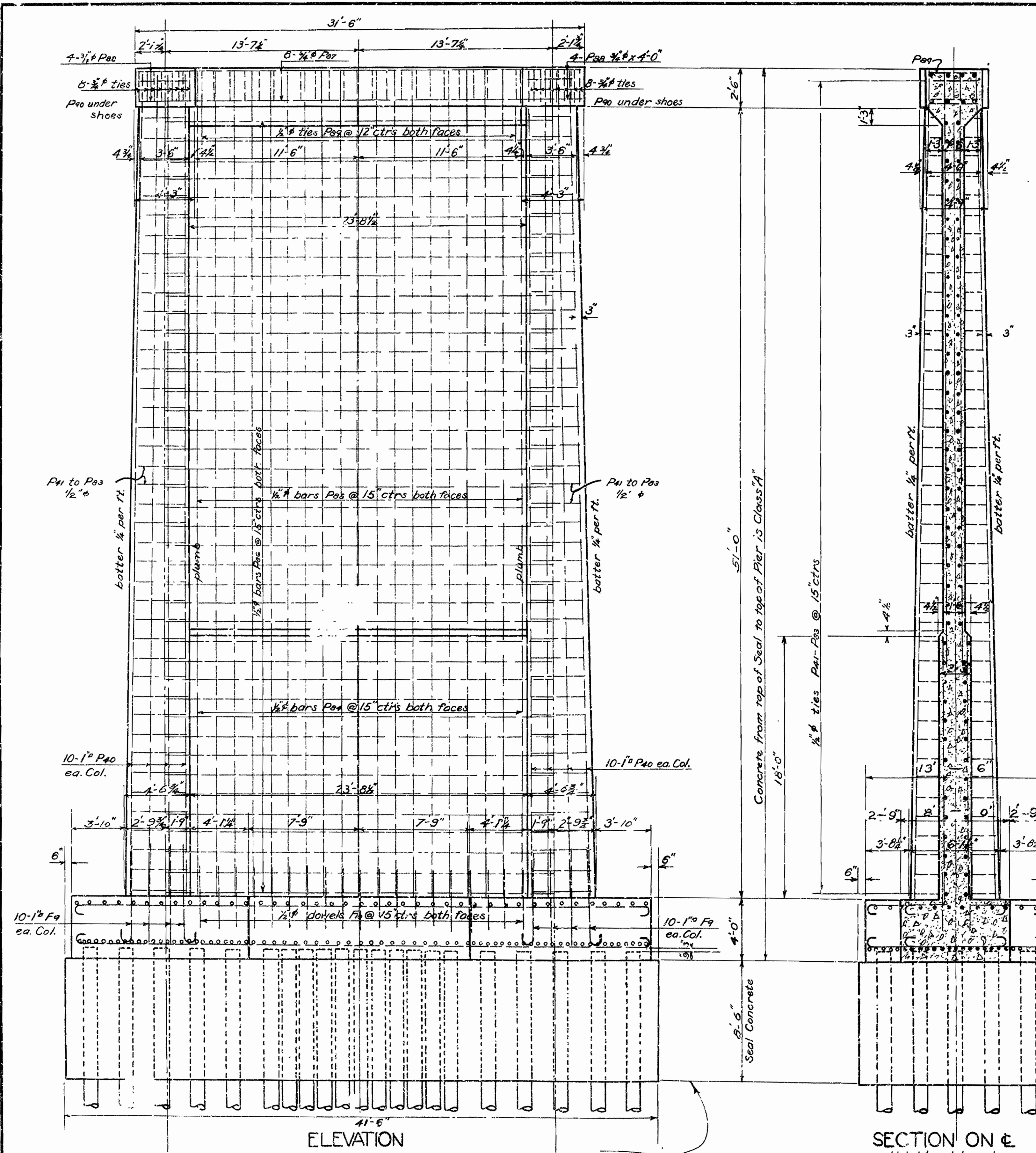
SECTION ON  $\Phi$



ROUTE 70 SEC. 19  
ARKANSAS STATE HIGHWAY COMMISSION  
LITTLE ROCK, ARK.  
Drawn By: E.A.M. Date: 3/30/32  
Traced By: H.J.E. Date: 6/13/32  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
Scale: 1/4" = 1 ft.  
BRIDGE NO. 1331 DRAWING NO. 3334

M.B. Sawyer  
BRIDGE ENGINEER

FISCAL YEAR	1933	1-1058	SHEET No.	16	TOTAL SHEETS	18
FED. AID DIST. No.	6	ARK	FISCAL YEAR	1933	SHEET No.	16



LOCATION	MARK	SIZE	LENGTH	A	B	DIAGRAM
Footing	F6	3/4"	41'-6"	40'-0"	6"	Diagram showing bar layout in footing
"	F7	"	14'-6"	13'-0"	6"	
"	F8	"	9'-0"	7'-6"	6"	
Col. dowels	F9	1"	8'-3"	7'-3"	8"	Diagram showing bar layout in column
Col. Hoops	P40-P40	1/2"	17'-4" Av.	Varies by 5/8" to 1-1/4"	Varies by 3/8" to 1-1/8"	
Capties Pier #2	P88	"	12'-3"	3'-7 1/2"	2'-1 1/2"	Diagram showing bar layout in captie
" " " "	P89	3/4"	13'-9"	4'-4 1/2"	2'-1 1/2"	
Footing	FTA	3/4"	13'-6"	12'-0"	6"	Bent as F7

DETAILS OF  
**PIER NO. 2**  
**ST. FRANCIS RIVER BRIDGE**  
 NEAR MADISON  
 ST. FRANCIS COUNTY  
 ROUTE 70 SEC. 19

ARKANSAS STATE HIGHWAY COMMISSION  
 LITTLE ROCK, ARK.  
 Drawn By: E.A.W. Date: 4-1-32  
 Traced By: J.H.H. Date: 8-22-32  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 Scale: 1/4" = 1'-0"  
 Except as noted  
 BRIDGE NO. 1391 DRAWING NO. 3335

M.B. Lauer  
 BRIDGE ENGINEER

NOTE:  
 Depth of seal shown is based on water elev. 185.0  
 Depth of seal to be increased or decreased at time of  
 construction to meet actual water stage. No variation  
 in unit pay for seal concrete will be made for variation  
 of seal depth.

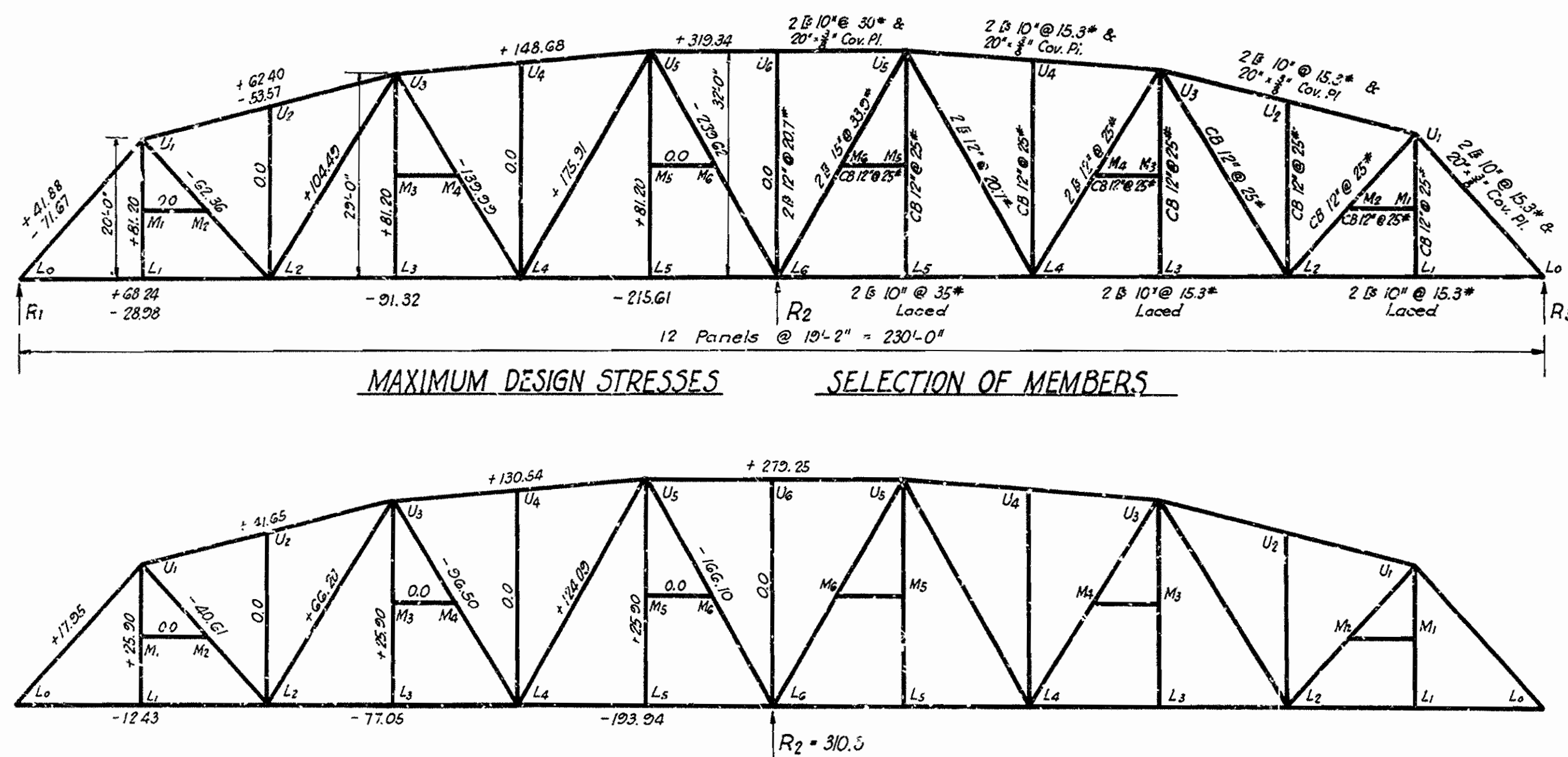






CAMBER IN SWING SPAN

With the span swinging free and total dead load applied, the points, Lo, shall be 3/8" below normal, that is, the end wedges shall lift the ends of the span 3/8" to bring them to grade. This condition will be satisfied by arranging the shop camber so that points, Lo, will be 1/8" above normal. Camber shall be introduced into the truss by lengthening or shortening the diagonals only.



CASE I DEAD LOAD - SPAN OPEN

CASE II DEAD LOAD - PARTIAL END REACTIONS

CASE III LIVE LOAD SIMPLE SPAN

CASE IV LIVE LOAD CONTINUOUS SPAN

TABULATION OF UNIT STRESSES CASE II

Table with 16 columns: Member, 16 different load cases (R1, R2, R3, etc.), and 4 stress types (Tension, Compression, etc.). It lists unit stresses for various truss members like LoU1, U1U2, etc.

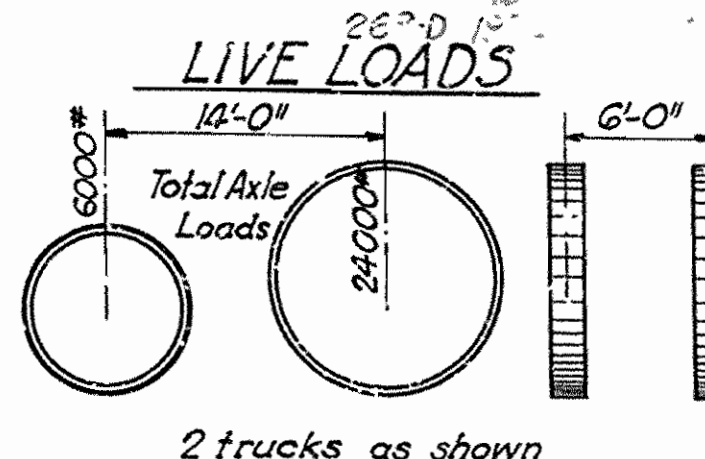
SUMMARY OF STRESSES

Summary table with 16 columns: Member, Case I, Case II, Case III, Case IV, Case V, Case VI, Case VII, Case VIII, Case IX, Case X, Case XI, Case XII, Case XIII, Case XIV, Case XV, Case XVI, Max. +, Max. -. It summarizes the maximum stresses for each member across all cases.

TABLE OF COMPUTATIONS FOR END POINT DEFLECTION

Table with 12 columns: Member, Length, Area, Stress, P, PL+A, U=1/af Lo, PUL+A, PL+EA, Stress, P, PL+A, PUL+A, PL+EA. It provides detailed calculations for end point deflection for various members.

Small table with columns: FISCAL YEAR, SHEET No., TOTAL SHEETS. Values: 1933, 10-123, 11.



Uniform load of 450 lbs. per lineal foot of traffic lane with Concentrated load of 21000 lbs. per lane. NOTE: Each traffic lane is 20'-0" wide.

STRESSES IN SWING SPANS

The stresses in trusses of Swing bridges continuous on three supports shall be calculated for the bridge in following positions: Condition 1 - Bridge open, or closed with ends just touching. Condition 2 - Bridge closed with ends lifted.

Computation of stresses shall be divided into the following cases: Case I - Condition 1, dead load. Case II - Condition 2, dead load, ends lifted to give positive reaction equal to the maximum negative reaction of the live load and impact plus not less than 50% of their sum.

Case III - Condition 1, live load on one arm as a simple span. Case IV - Condition 2, live load on Bridge as a continuous girder.

The following combinations of these cases shall be used in determining the maximum design stresses: Stress A - Case I alone. Stress B - Case I with Case III. Stress C - Case I with Case IV. Stress D - Case II with Case III.

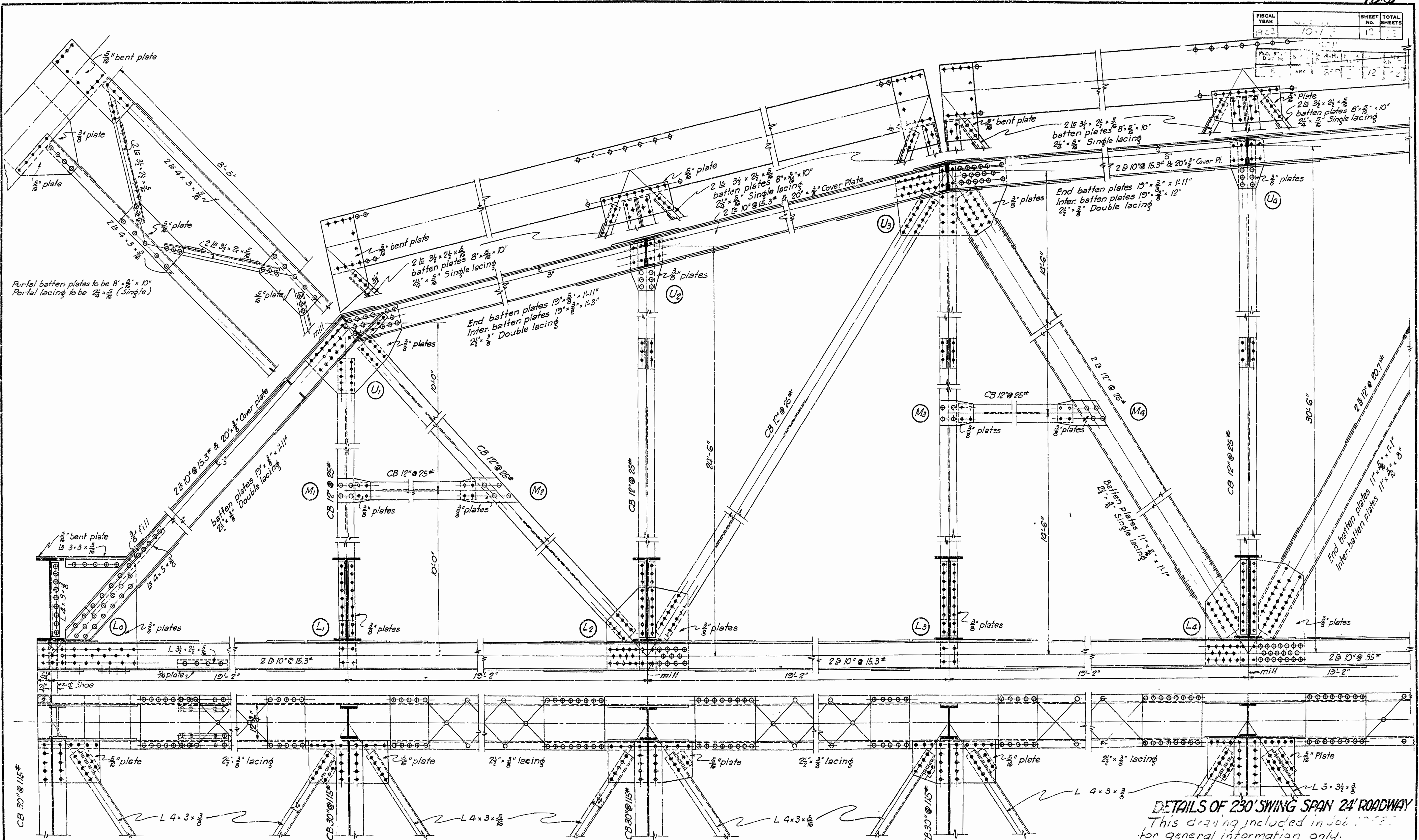
In computing the live load stresses, the live load shall be considered as applied, either continuously or in detached parts, in such a manner as to produce the maximum stresses. Impact and reversal of stress to be computed in the manner shown in the General Specifications.

This drawing includes in 3/4" 1145' for general information only.

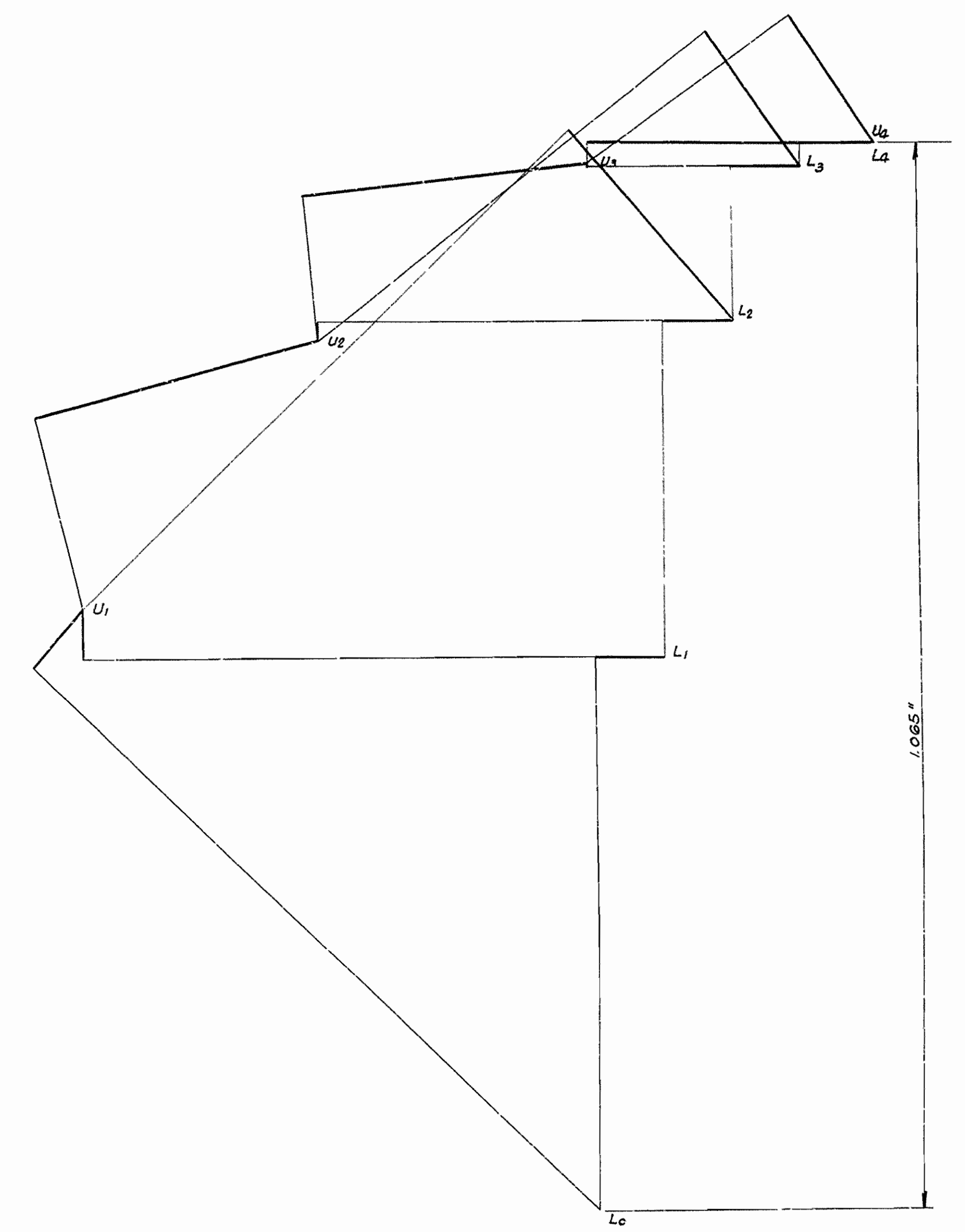
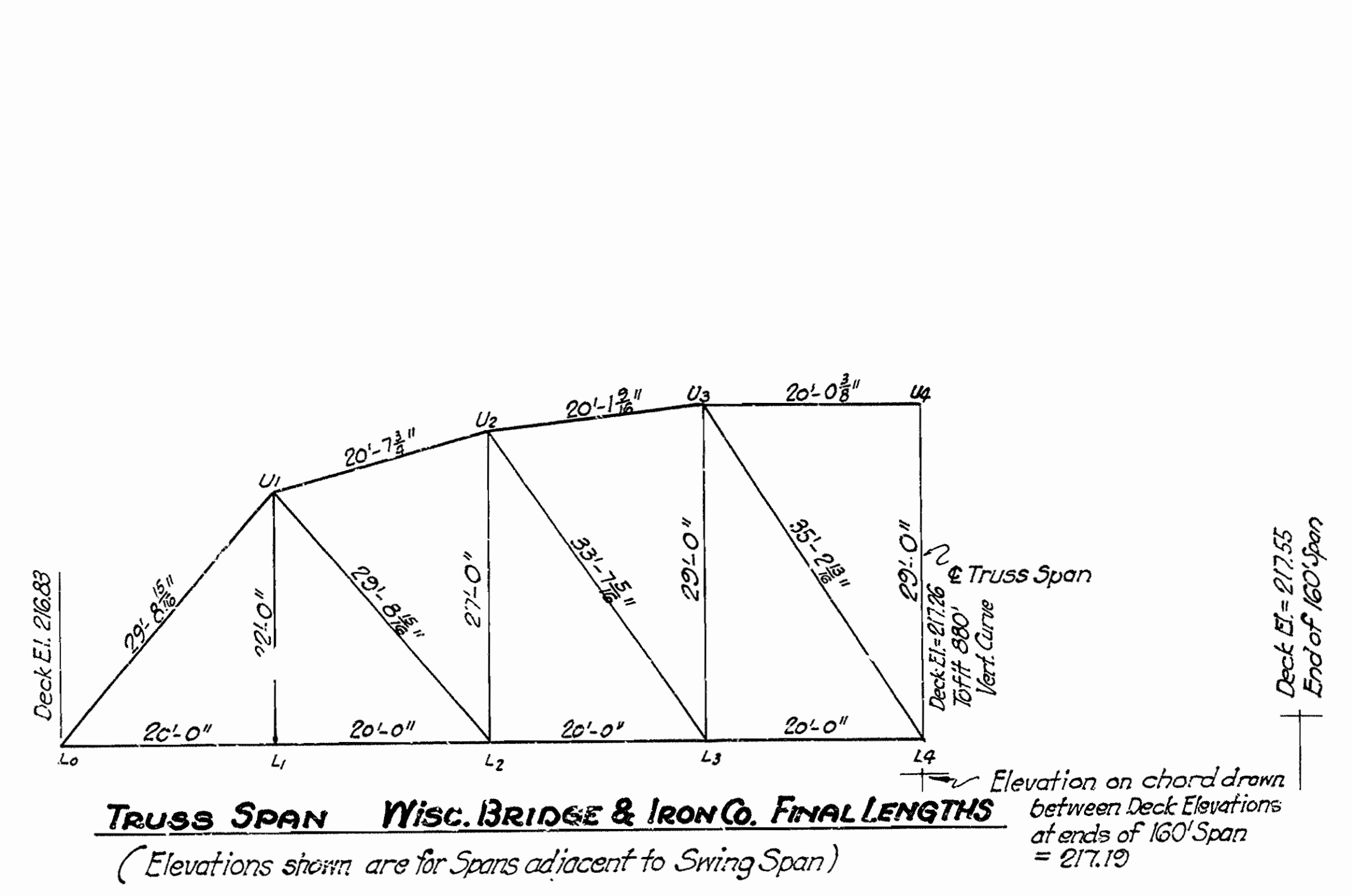
DESIGN DATA 230' SWING SPAN

ROUTE SEC. ARKANSAS STATE HIGHWAY COMMISSION LITTLE ROCK, ARK. Drawn By: Noe Date: 8-5-31 Traced By: E.A.H. Date: 11-2-31 Checked By: Date: BRIDGE ENGINEER BRIDGE No. DRAWING NO. 3310

FISCAL YEAR	10-1	SHEET NO.	12	TOTAL SHEETS	13
DESIGNED BY	A.H.	CHECKED BY		DATE	12-1-22



FISCAL YEAR		SHEET No.	TOTAL SHEETS



**DEFORMATION SCHEDULE DEAD LOAD**

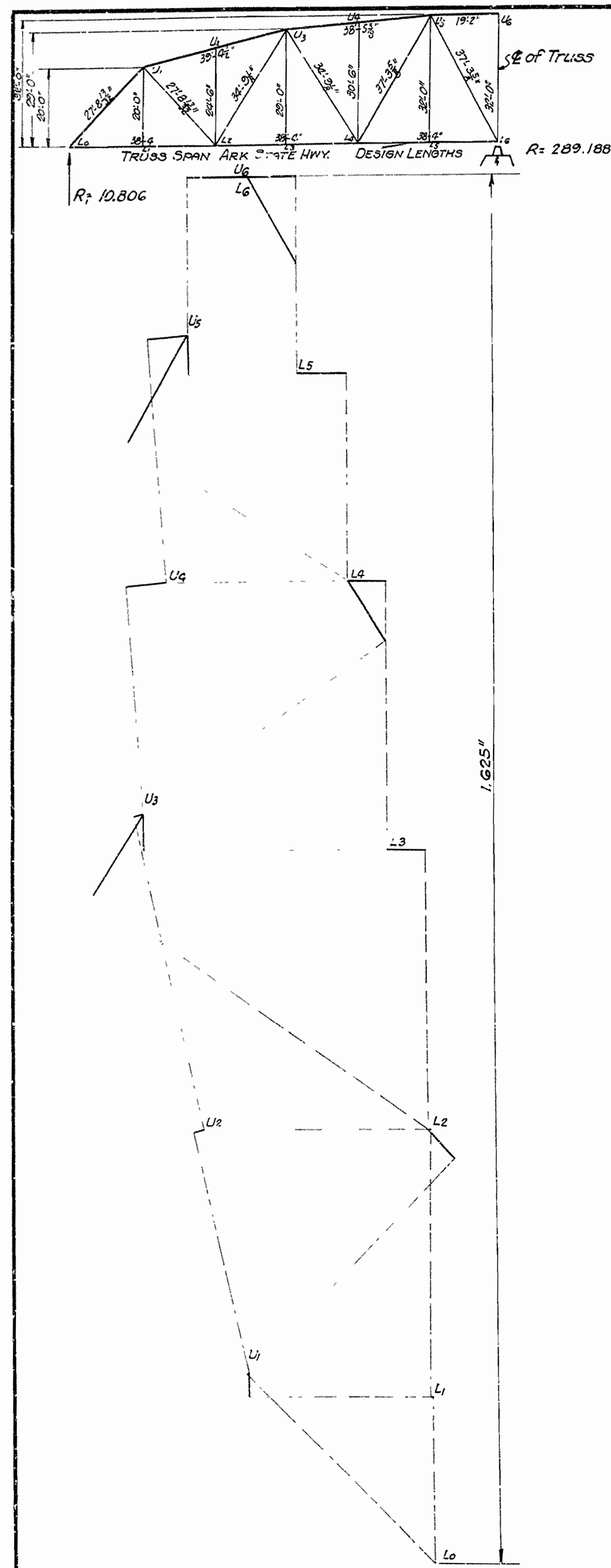
Member	Ark. Hwy. Dept. Design Length	D.L. Deformation $\frac{PL}{AE}$	Wisc. Br. & I. Co. Variations in Length	Wisc. Br. & I. Co. Final Length	Final Total Deformation
L <sub>0</sub> U <sub>1</sub>	29'- 8 $\frac{15}{32}$ "	-.078	+ $\frac{5}{32}$ "	29'- 8 $\frac{15}{32}$ "	+.078
U <sub>1</sub> U <sub>2</sub>	20'- 7 $\frac{3}{8}$ "	-.065	+ $\frac{3}{8}$ "	20'- 7 $\frac{3}{8}$ "	+.310
U <sub>2</sub> U <sub>3</sub>	20'- 1 $\frac{9}{16}$ "	-.071	+ $\frac{3}{8}$ "	20'- 1 $\frac{9}{16}$ "	+.304
U <sub>3</sub> U <sub>4</sub>	20'- 0"	-.070	+ $\frac{3}{8}$ "	20'- 0 $\frac{3}{8}$ "	+.305
U <sub>1</sub> L <sub>2</sub>	29'- 8 $\frac{25}{32}$ "	+.100	+ $\frac{5}{32}$ "	29'- 8 $\frac{15}{32}$ "	+.256
U <sub>2</sub> L <sub>3</sub>	33'- 7 $\frac{7}{32}$ "	+.074	+ $\frac{3}{32}$ "	33'- 7 $\frac{5}{16}$ "	+.168
U <sub>3</sub> L <sub>4</sub>	35'- 2 $\frac{23}{32}$ "	+.060	+ $\frac{3}{32}$ "	35'- 2 $\frac{13}{32}$ "	+.154
L <sub>0</sub> L <sub>1</sub>	20'- 0"	+.075	0	20'- 0"	+.075
L <sub>1</sub> L <sub>2</sub>	20'- 0"	+.075	0	20'- 0"	+.075
L <sub>2</sub> L <sub>3</sub>	20'- 0"	+.075	0	20'- 0"	+.075
L <sub>3</sub> L <sub>4</sub>	20'- 0"	+.077	0	20'- 0"	+.077
U <sub>1</sub> L <sub>1</sub>	22'- 0"	+.049	0	22'- 0"	+.049
U <sub>2</sub> L <sub>2</sub>	27'- 0"	-.019	0	27'- 0"	-.019
U <sub>3</sub> L <sub>3</sub>	29'- 0"	+.001	0	29'- 0"	+.001
U <sub>4</sub> L <sub>4</sub>	29'- 0"	0	0	29'- 0"	0

**DEFLECTION DIAGRAMS FOR 160'-0" TRUSS SPAN ST. FRANCIS RIVER BRIDGE NEAR MADISON ST. FRANCIS COUNTY**

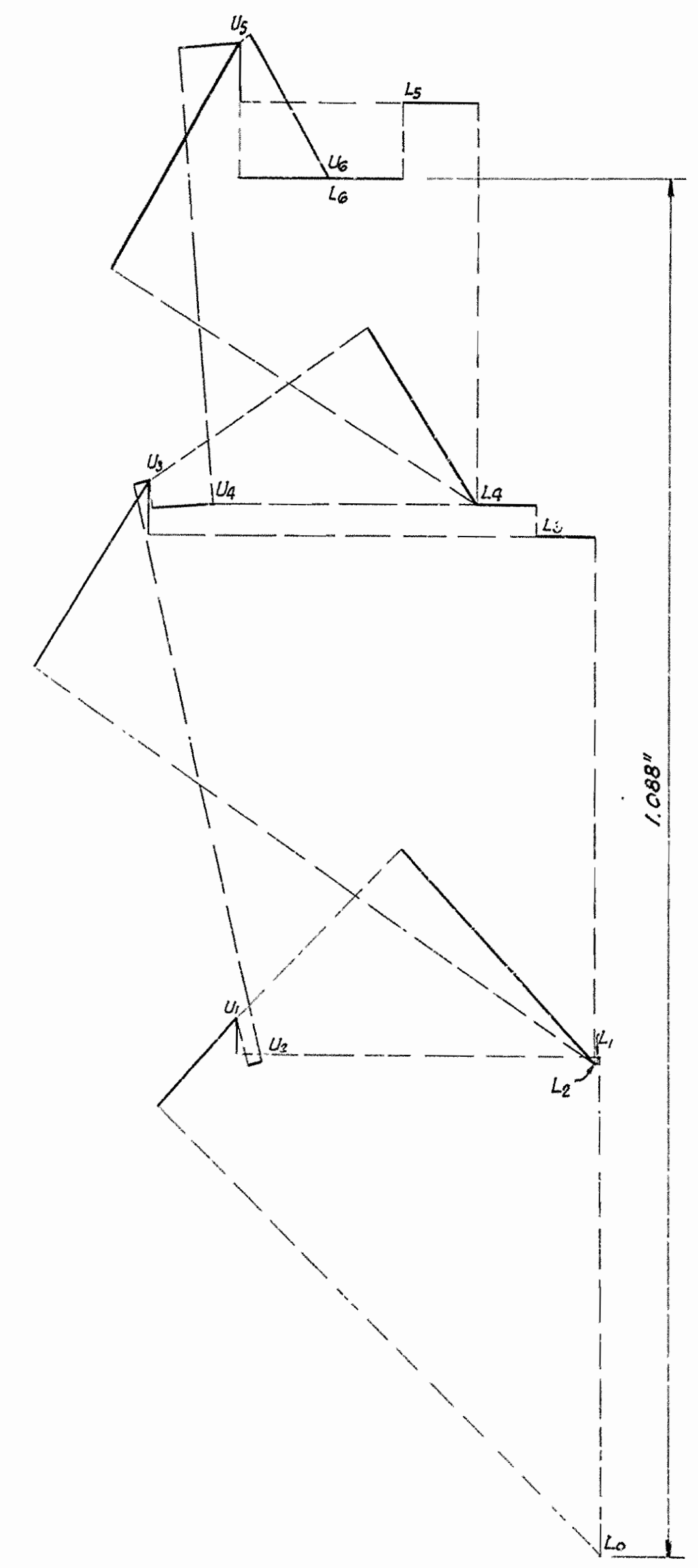
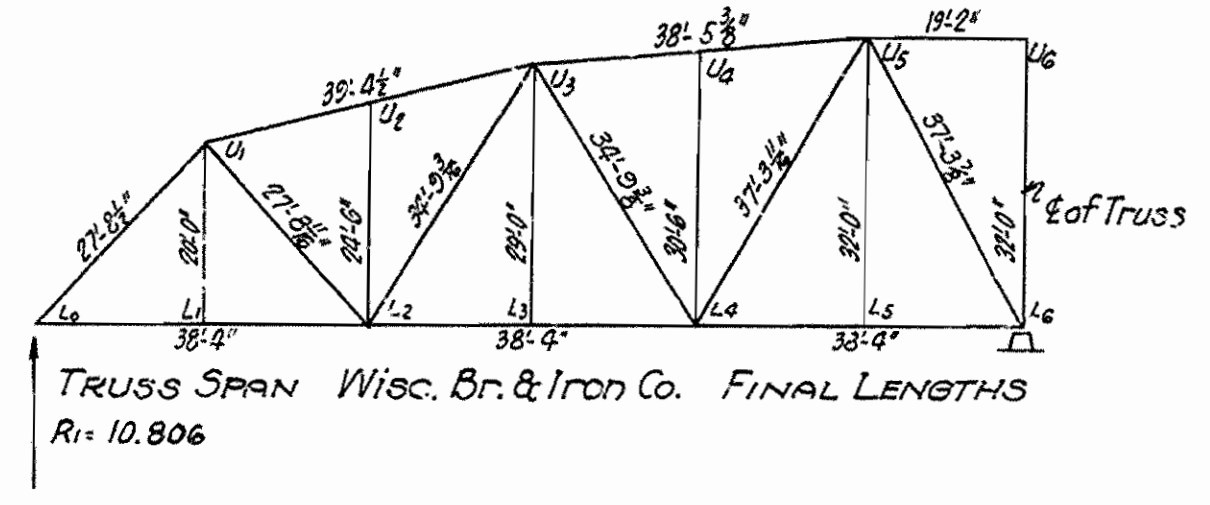
ROUTE 70 SEC. 19  
 ARKANSAS STATE HIGHWAY COMMISSION  
 LITTLE ROCK, ARK.  
 Drawn By: HLB Date: 12-20-32  
 Traced By: EAW Date: 12-20-32  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 BRIDGE NO. 1391 DRAWING NO. 3311-4

BRIDGE ENGINEER

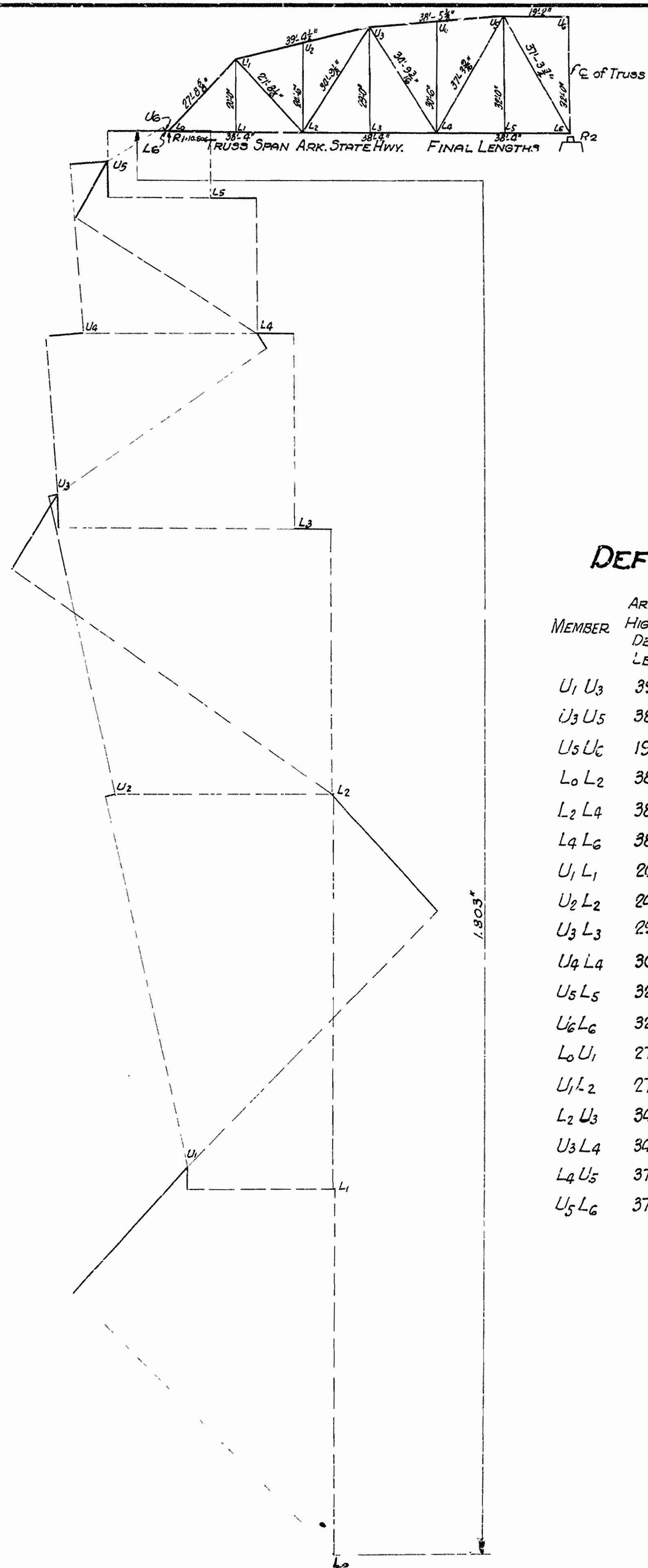
FISCAL YEAR		SHEET NO.	TOTAL SHEETS



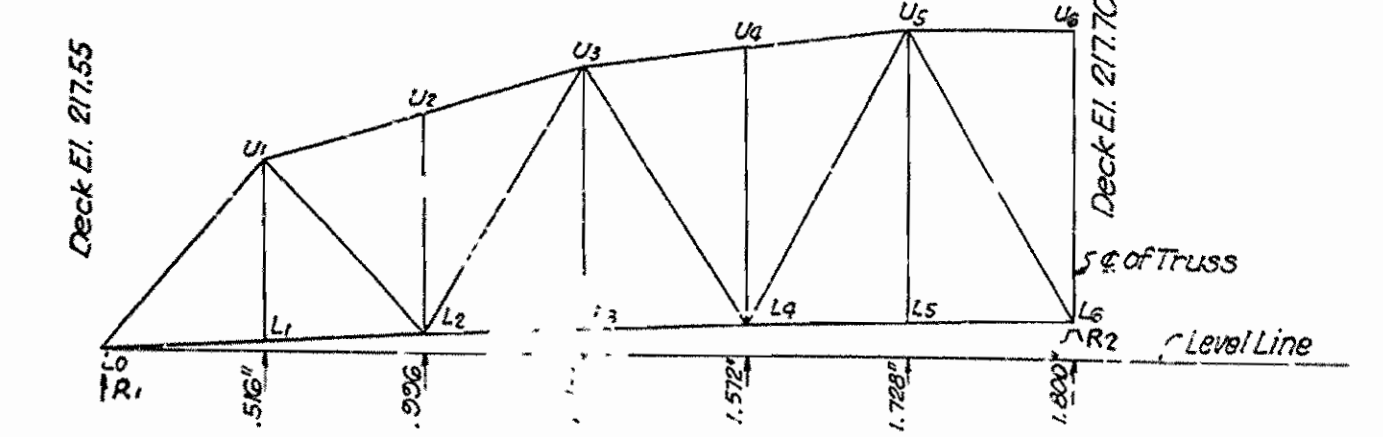
**DEFLECTION DIAGRAM**  
Case II - Dead Load, Partial End Reactions.



**FINAL DEFLECTION DIAGRAM**  
Wisc. Br. & Iron Co. Length Variations With Case II - Dead Load, Partial End Reactions



**FINAL DEFLECTION DIAGRAM**  
Ark. State Hwy. Dept. Length Variations With Case II - Dead Loads, Partial End Reactions



**REQUIRED FINISHED CAMBER DIAGRAM**  
(Designed To Fit 880' Vertical Curve)

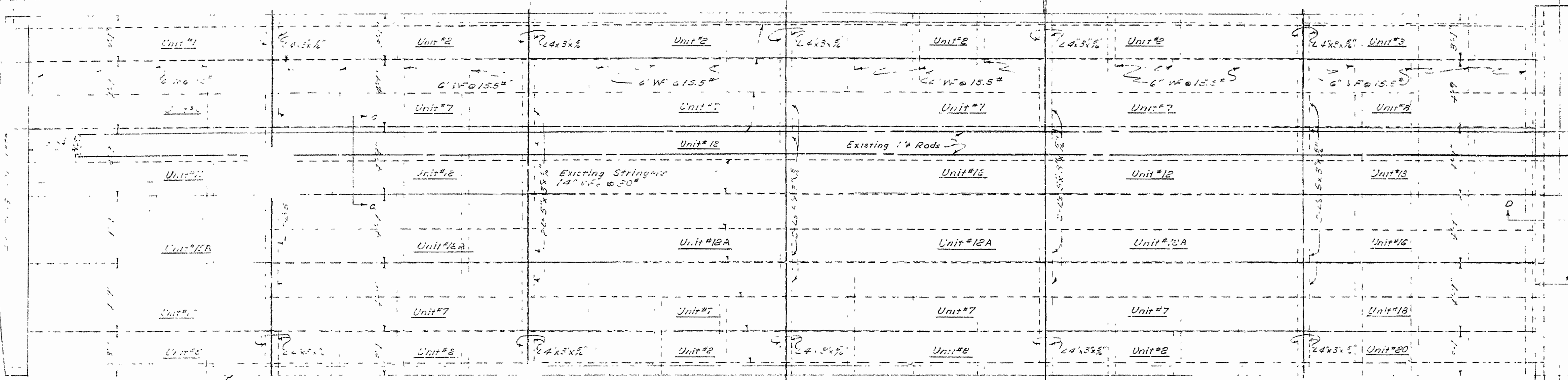
**DEFORMATION SCHEDULE CASE II**

MEMBER	ARK. STATE HIGHWAY DESIGN LENGTH	D.L. DEFORMATION PL/AE	WIS. B&I CO. VARIATIONS IN LENGTH	WIS. B&I CO. FINAL LENGTH	FINAL TOTAL DEFORMATION WITH WIS. B&I CO. VARIATION IN LENGTH	FINAL DEFORMATION WITH WIS. B&I CO. VARIATION IN LENGTH	FINAL TOTAL DEFORMATION WITH WIS. B&I CO. VARIATION IN LENGTH
U <sub>1</sub> U <sub>3</sub>	39'- 4 1/2"	+ .0240	0	39'- 4 1/2"	+ .0240	0	39'- 4 1/2" + .0240
U <sub>3</sub> U <sub>5</sub>	38'- 5 3/8"	+ .1000	0	38'- 5 3/8"	+ .1000	0	38'- 5 3/8" + .1000
U <sub>5</sub> U <sub>6</sub>	19'- 2"	+ .0759	0	19'- 2"	+ .0759	0	19'- 2" + .0759
L <sub>0</sub> L <sub>2</sub>	38'- 4"	- .0037	0	38'- 4"	+ .0037	0	38'- 4" + .0037
L <sub>2</sub> L <sub>4</sub>	38'- 4"	- .0987	0	38'- 4"	- .0987	0	38'- 4" - .0987
L <sub>4</sub> L <sub>6</sub>	38'- 4"	- .1249	0	38'- 4"	- .1249	0	38'- 4" - .1249
U <sub>1</sub> L <sub>1</sub>	20'- 0"	+ .0292	0	20'- 0"	+ .0292	0	20'- 0" + .0292
U <sub>2</sub> L <sub>2</sub>	24'- 6"	0	0	24'- 6"	0	0	24'- 6" 0
U <sub>3</sub> L <sub>3</sub>	29'- 0"	+ .0423	0	29'- 0"	+ .0423	0	29'- 0" + .0423
U <sub>4</sub> L <sub>4</sub>	30'- 6"	0	0	30'- 6"	0	0	30'- 6" 0
U <sub>5</sub> L <sub>5</sub>	32'- 0"	+ .0466	0	32'- 0"	+ .0466	0	32'- 0" + .0466
U <sub>6</sub> L <sub>6</sub>	32'- 0"	0	0	32'- 0"	0	0	32'- 0" 0
L <sub>0</sub> U <sub>1</sub>	27'- 8 3/8"	+ .0021	+ 3/32"	27'- 8 1/2"	+ .0959	+ 3/32"	27'- 8 5/8" + .2208
U <sub>1</sub> L <sub>2</sub>	27'- 8 3/8"	- .0483	+ 3/32"	27'- 8 1/2"	+ .2530	- 5/32"	27'- 8 1/2" - .2046
L <sub>2</sub> U <sub>3</sub>	34'- 9 3/8"	+ .1135	+ 1/16"	34'- 9 3/8"	+ .1760	0	34'- 9 3/8" + .1135
U <sub>3</sub> L <sub>4</sub>	34'- 9 3/8"	- .0845	+ 1/4"	34'- 9 3/8"	+ .1655	+ 1/16"	34'- 9 3/8" - .0220
L <sub>4</sub> U <sub>5</sub>	37'- 3 5/8"	+ .1459	+ 1/16"	37'- 3 1/2"	+ .2094	- 1/16"	37'- 3 3/8" + .0834
U <sub>5</sub> L <sub>6</sub>	37'- 3 5/8"	- .1201	+ 1/4"	37'- 3 3/8"	+ .1299	+ 1/8"	37'- 3 5/8" + .0049

**DEFLECTION DIAGRAMS**  
FOR 230-0 SWING SPAN  
ST. FRANCIS RIVER BRIDGE  
NEAR MADISON  
ST. FRANCIS COUNTY  
ROUTE 70 SEC. 10

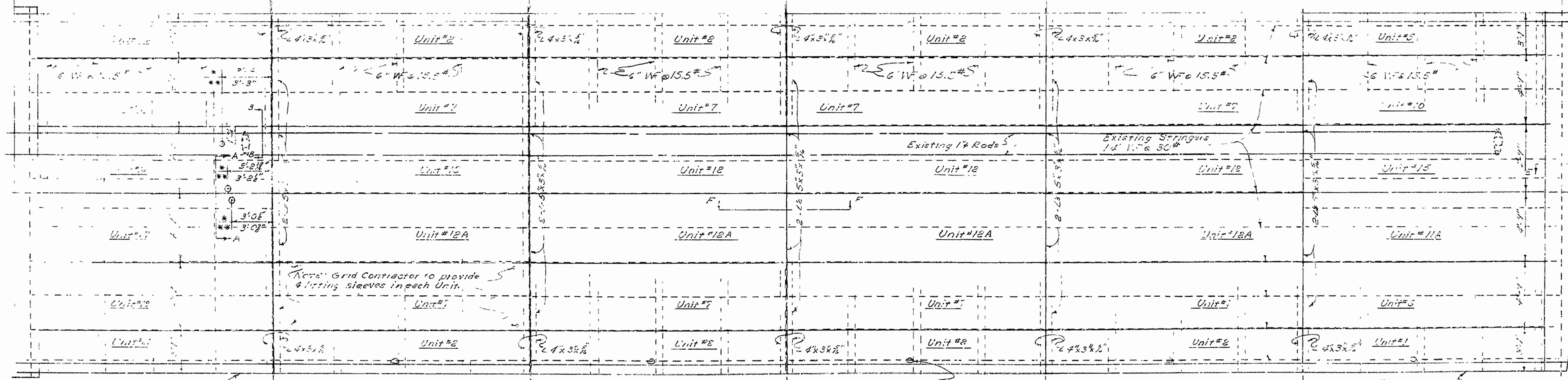
**ARKANSAS STATE HIGHWAY COMMISSION**  
LITTLE ROCK, ARK.  
Drawn By: H.B. Date: 12-17-32  
Traced By: E.A.W. Date: 12-21-32  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
Scale: 1" = 10'  
BRIDGE NO. 1391 DRAWING NO. 331-B

113'-10" 18'-0" 19'-2" 19'-2" 19'-2" 19'-2" 17'-4" 2 spcs. @ 4'-9 1/2" = 9'-7" 4'-9" 2 spcs. @ 4'-9 1/2" = 9'-7" 4'-9" 2 spcs. @ 4'-9 1/2" = 9'-7" 4'-9" 3 spcs. @ 4'-2 1/2" = 12'-7 1/2" 4'-1 1/2"

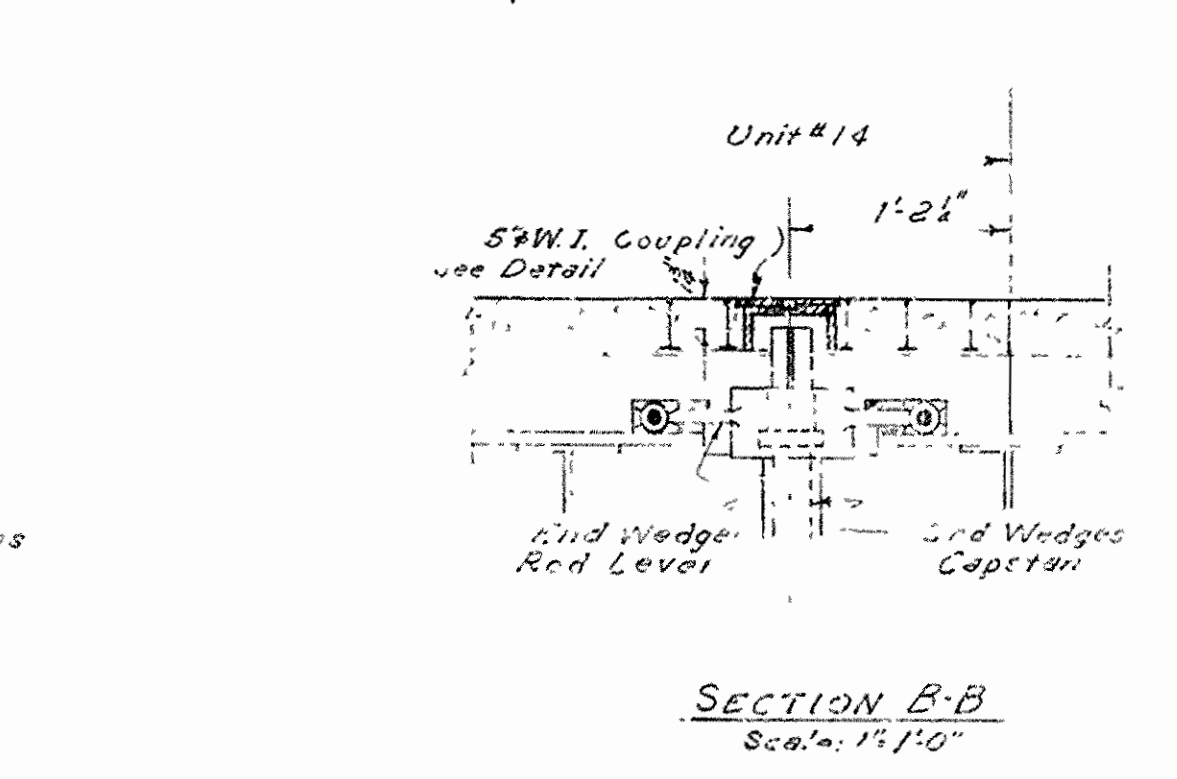
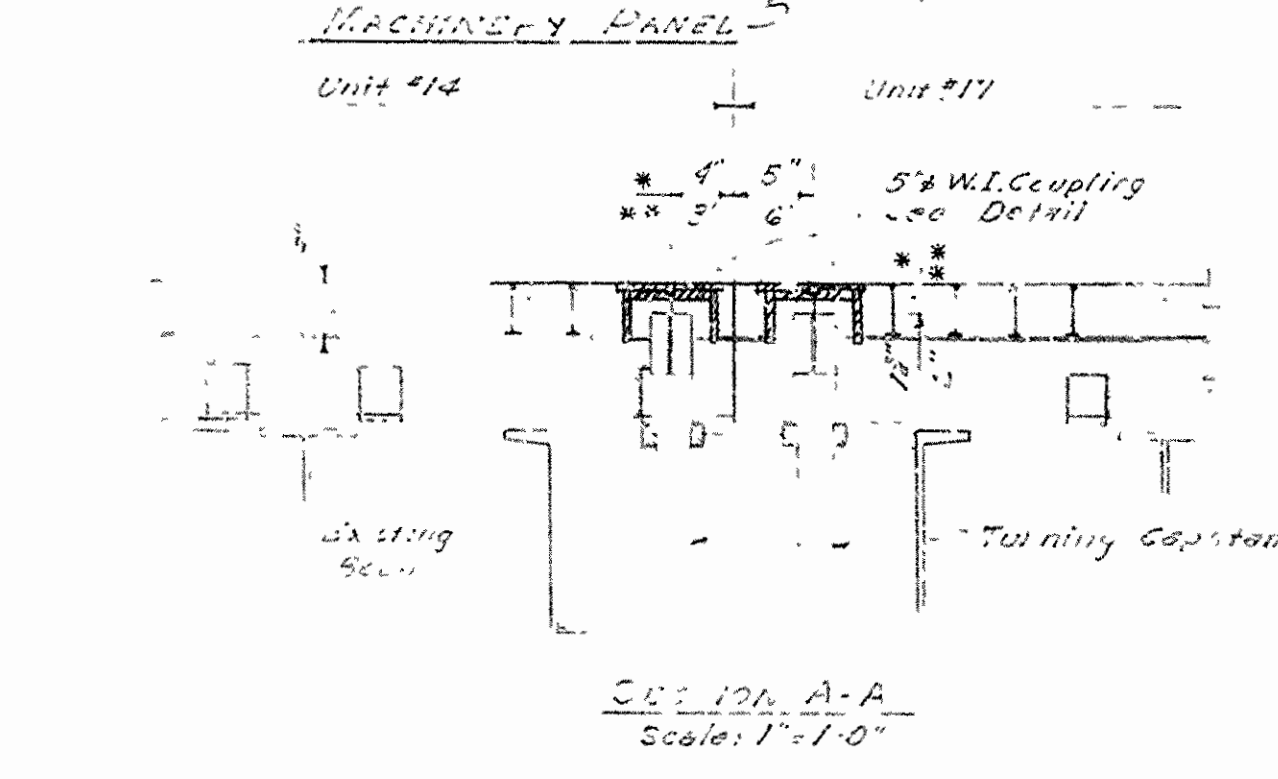


NOTE:  
\*For Black River Bridge at Pocahontas  
\*\*For St. Francis River Bridge at Madison.  
For details and notes see Drawing 3311-D

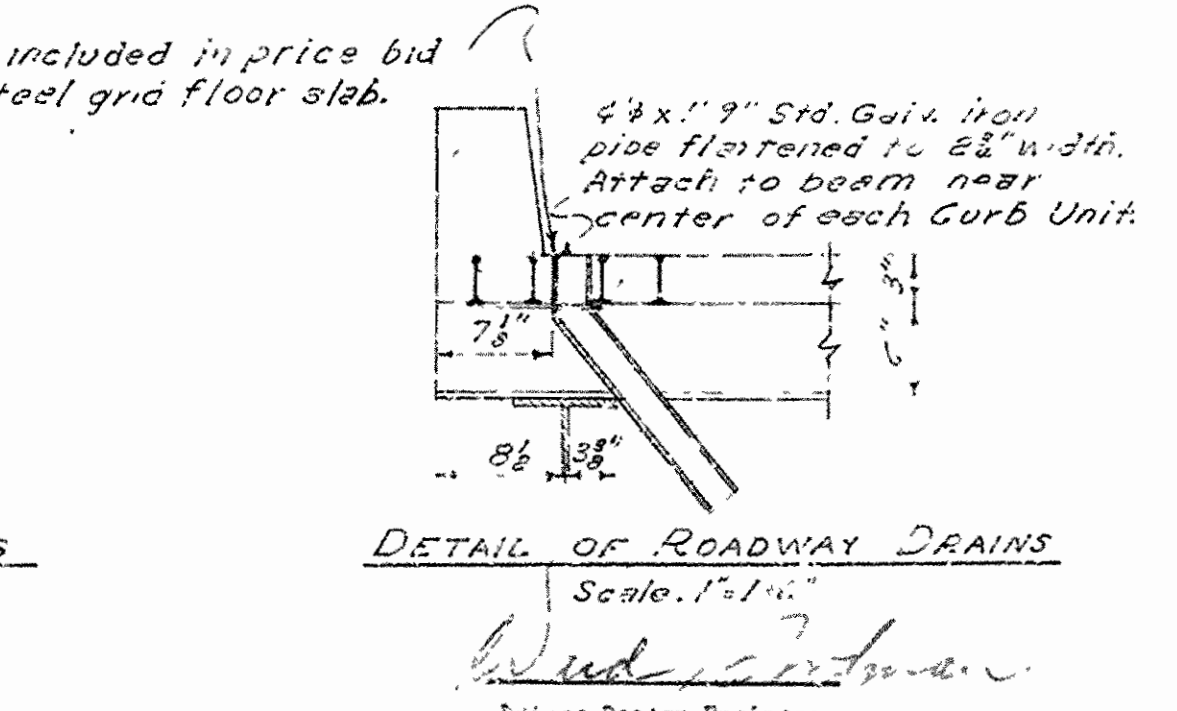
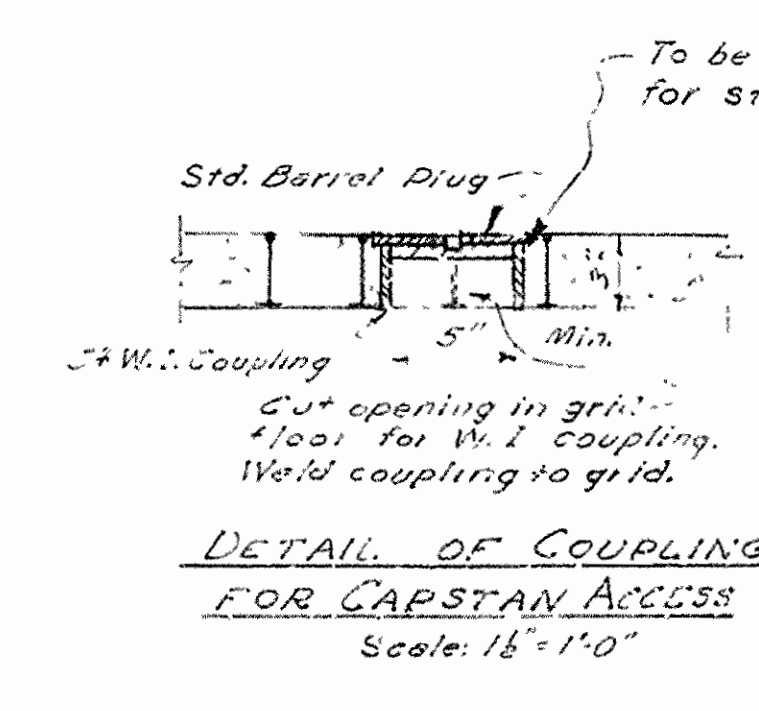
113'-10" 19'-2" 19'-2" 19'-2" 19'-2" 18'-0" 2 spcs. @ 4'-9 1/2" = 9'-7" 4'-9" 2 spcs. @ 4'-9 1/2" = 9'-7" 4'-9" 2 spcs. @ 4'-9 1/2" = 9'-7" 4'-9" 3 spcs. @ 4'-4 1/2" = 13'-1 1/2" 4'-1 1/2"



Void for Black River Bridge 4-11-50



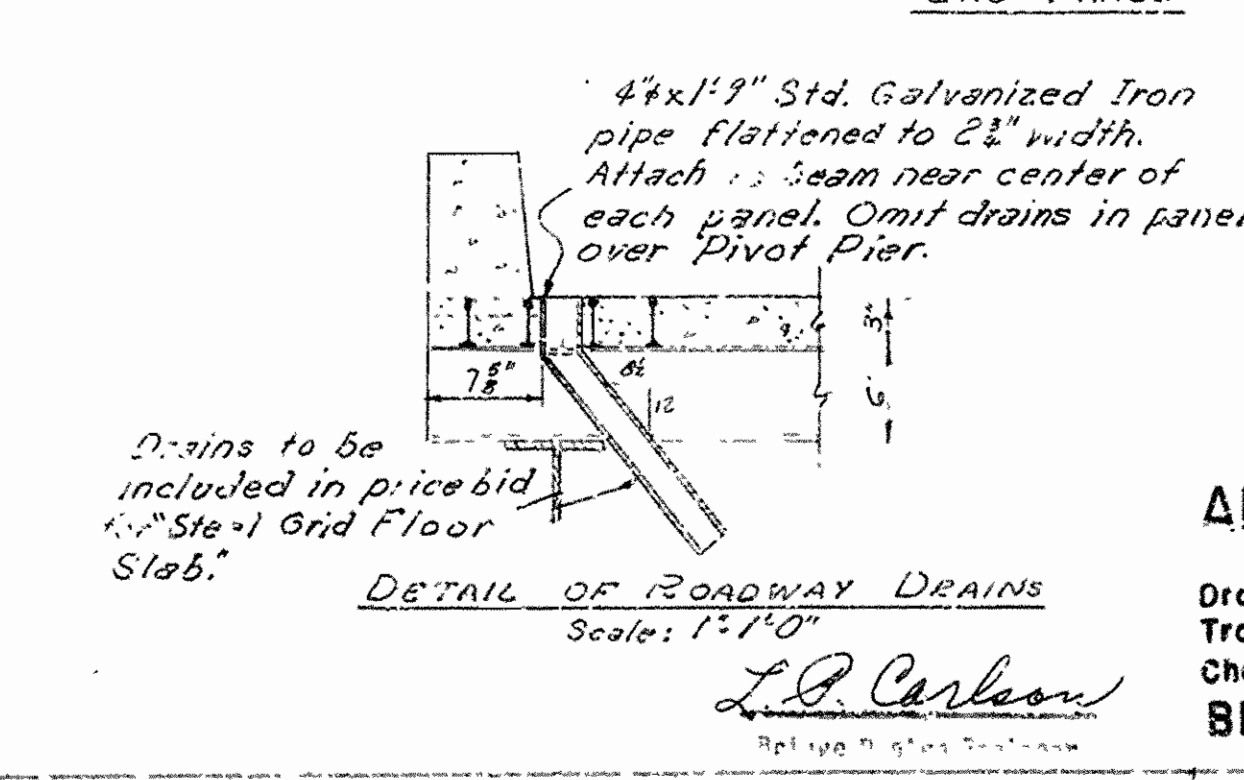
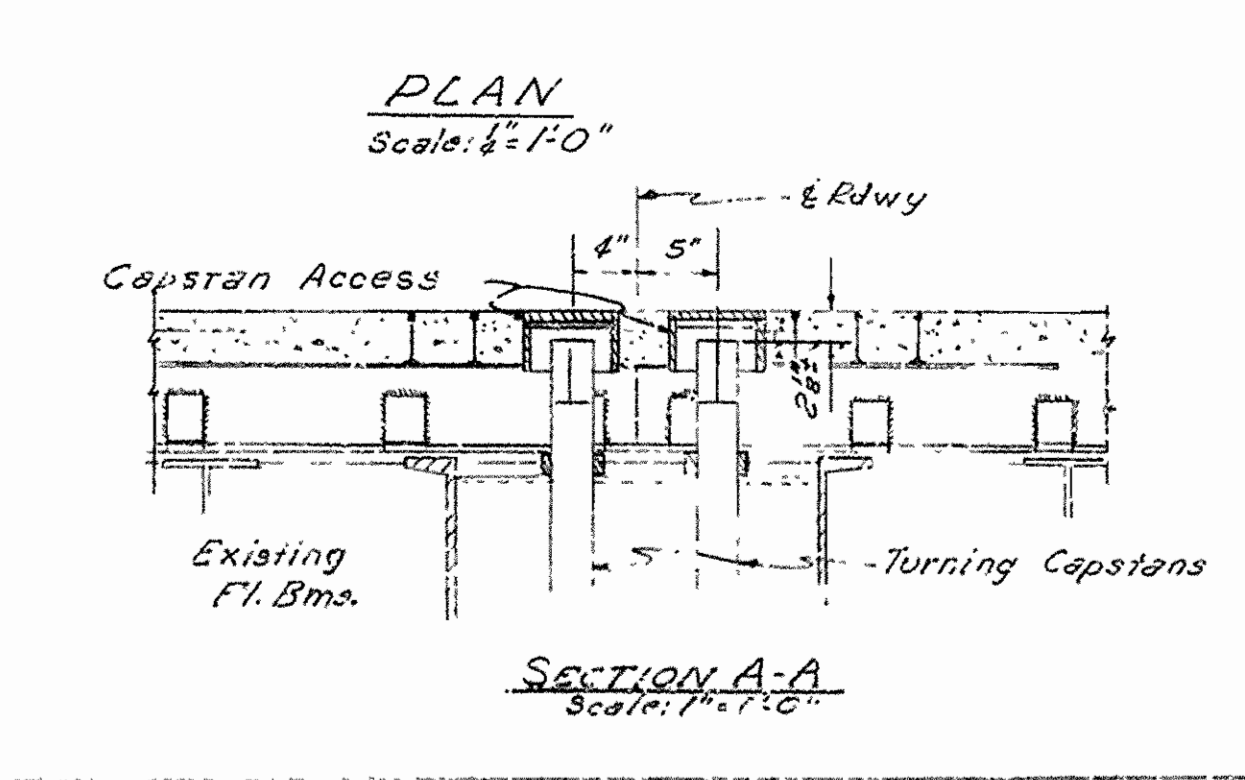
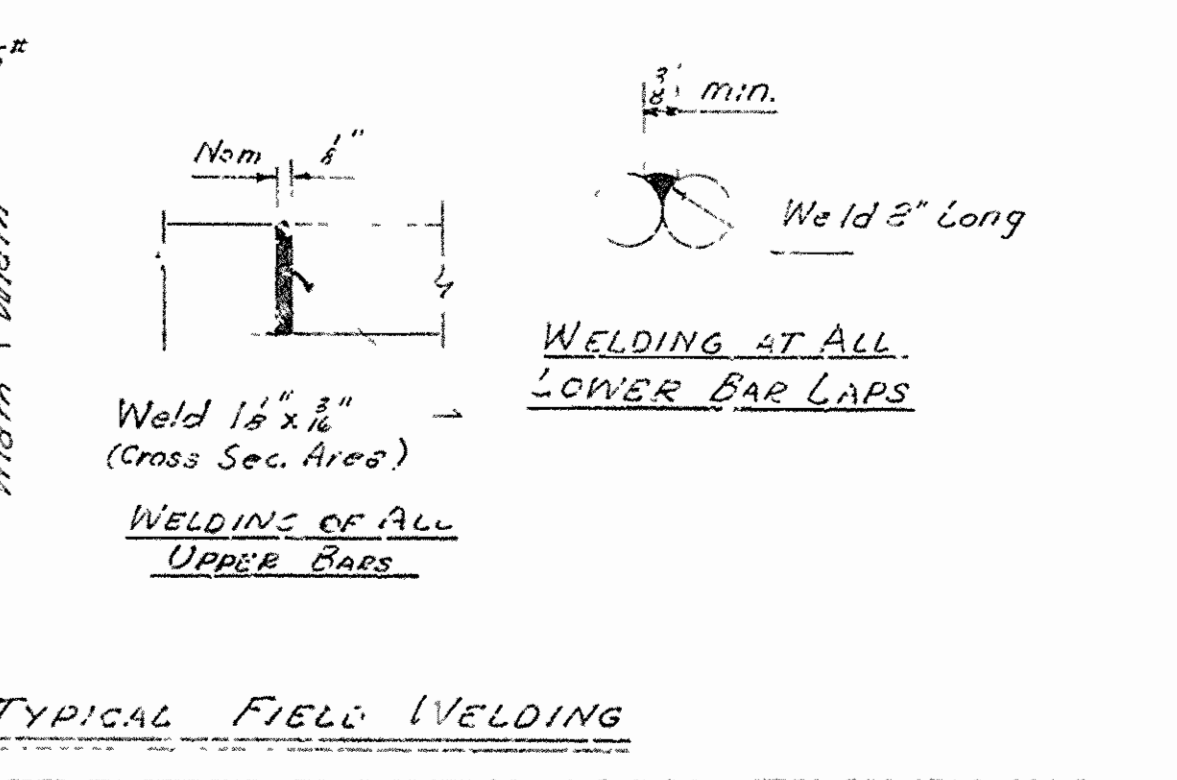
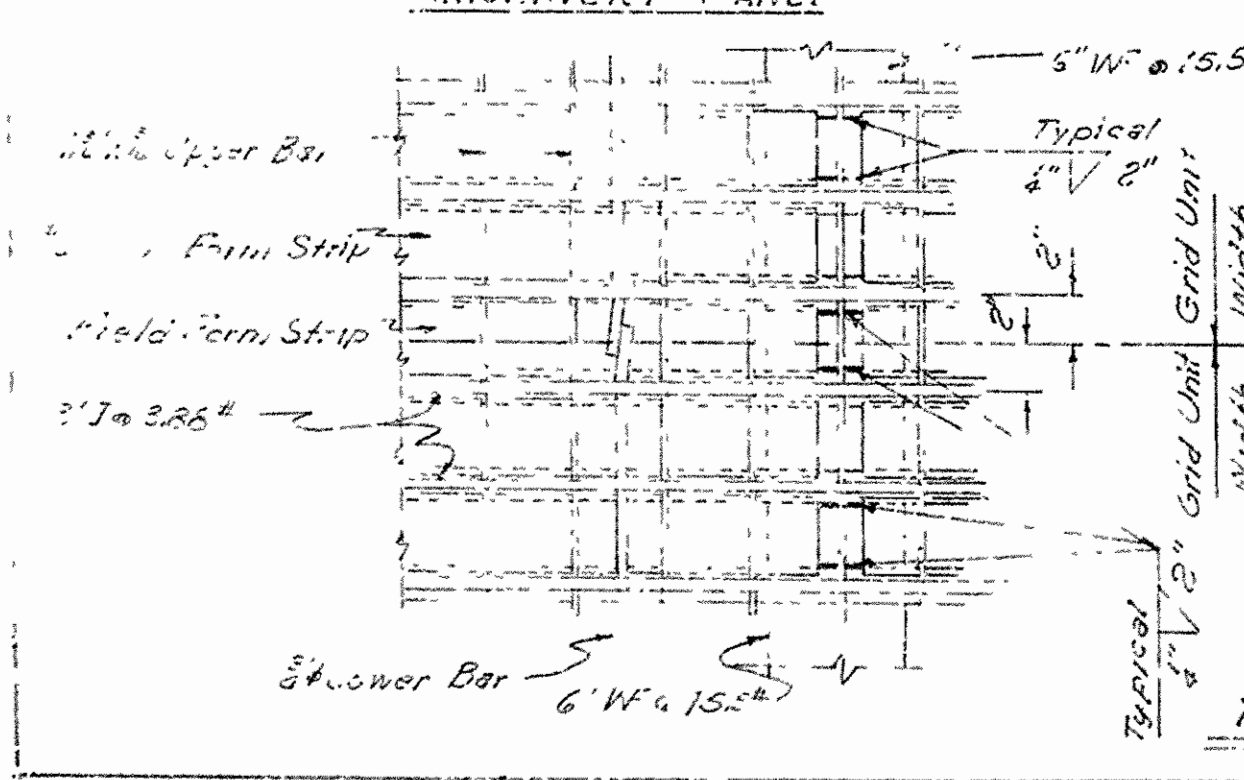
PLAN  
Scale: 1/2" = 1'-0"



DETAILS OF  
REFLOORING 230'-0" SWING SPAN

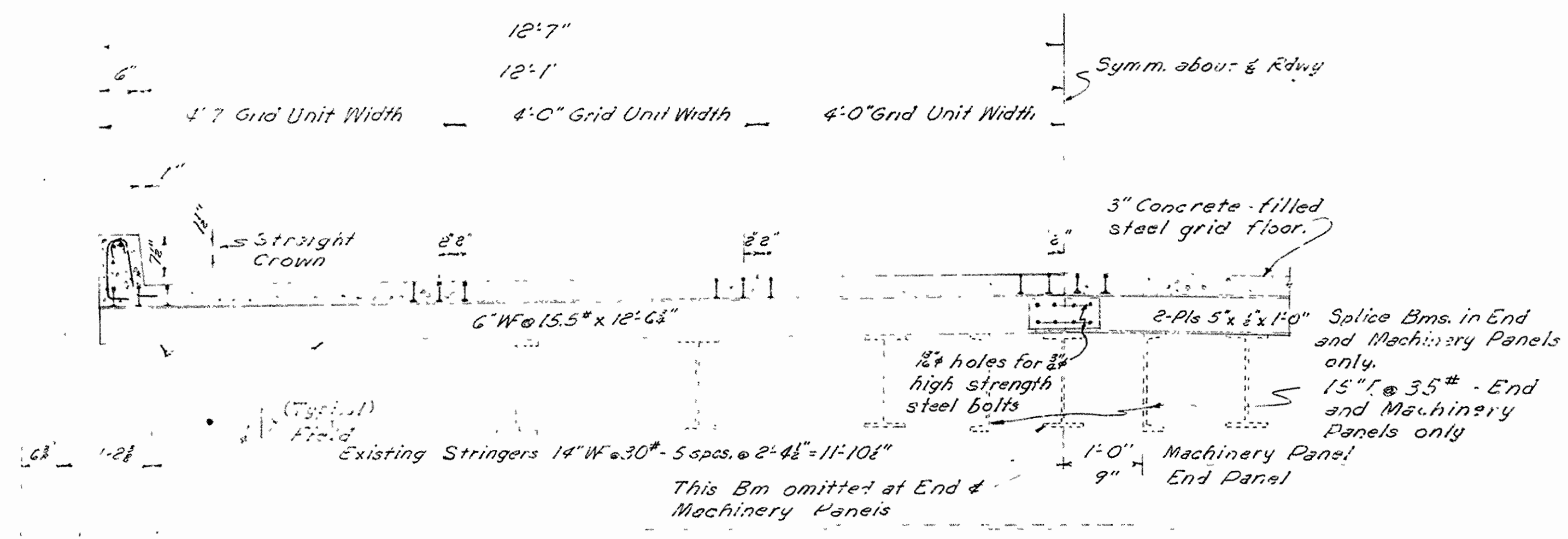
ROUTE SEC.  
ARKANSAS STATE HIGHWAY COMMISSION  
LITTLE ROCK, ARK.  
Scale: as shown  
BRIDGE NO. DRAWING NO. 3311-C



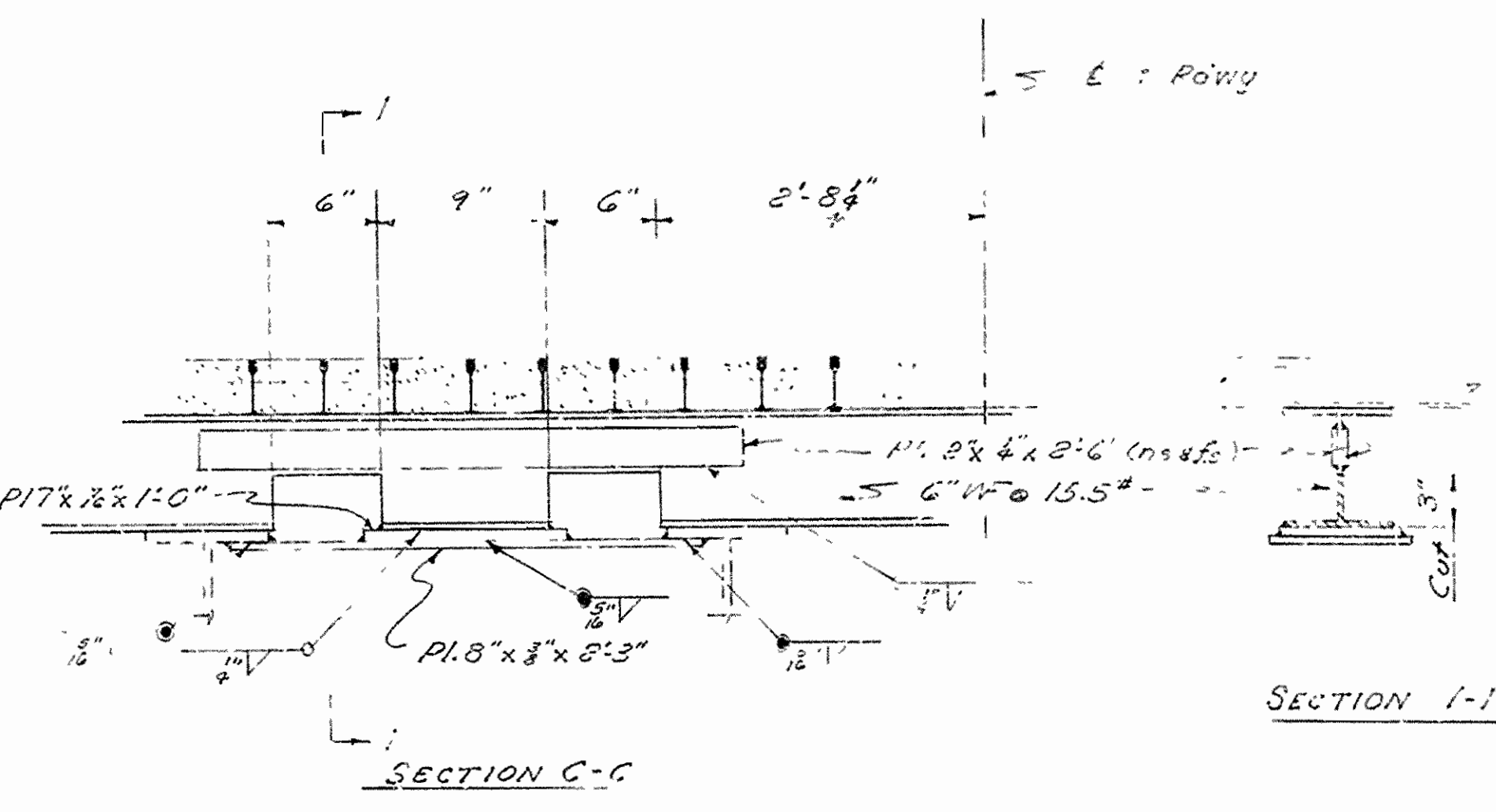


**DETAILS OF  
REFLOORING SWING SPAN  
BLACK RIVER BRIDGE POCAHONTAS  
RANDOLPH COUNTY  
ROUTE 67 SECTION 20  
ARKANSAS STATE HIGHWAY COMMISSION  
LITTLE ROCK, ARK.**

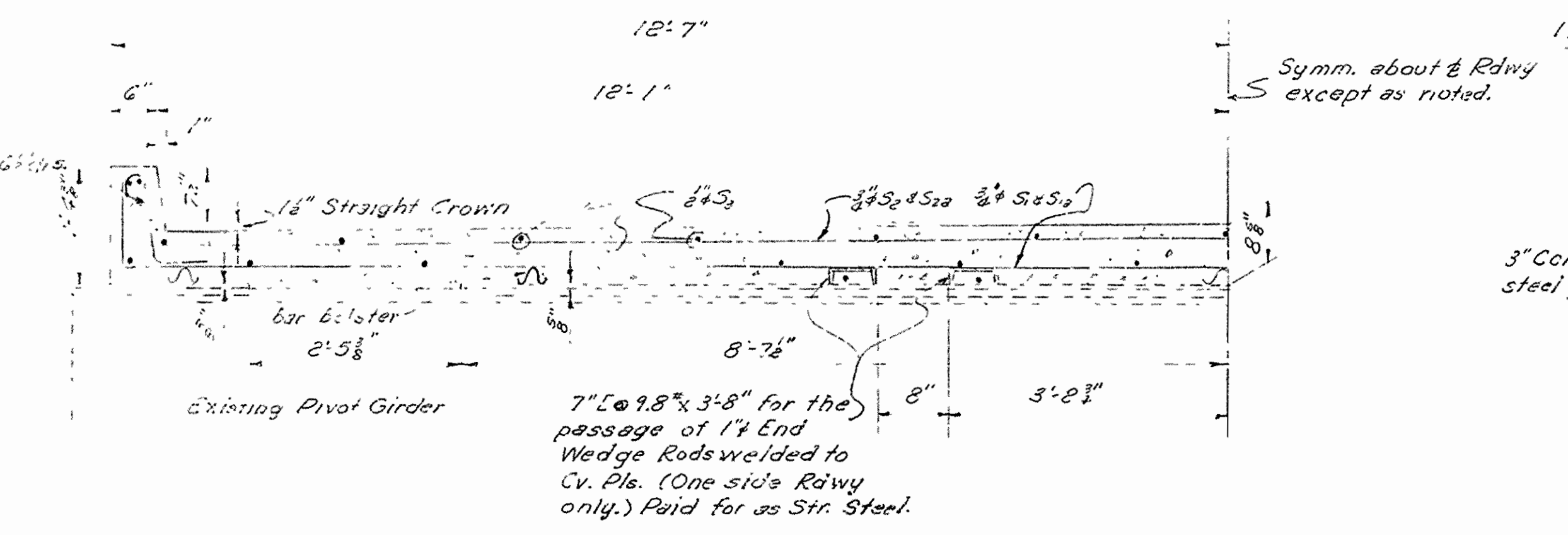
Drawn By F.R.B. Date 3-21-55 Scale:  $\frac{1}{4}$  in. = 1 ft. or as shown  
 Traced By \_\_\_\_\_ Date \_\_\_\_\_  
 Checked By J.W.E. Date 4-2-55  
**BRIDGE NO. 483<sub>2</sub> DRAWING NO. 3311-E**



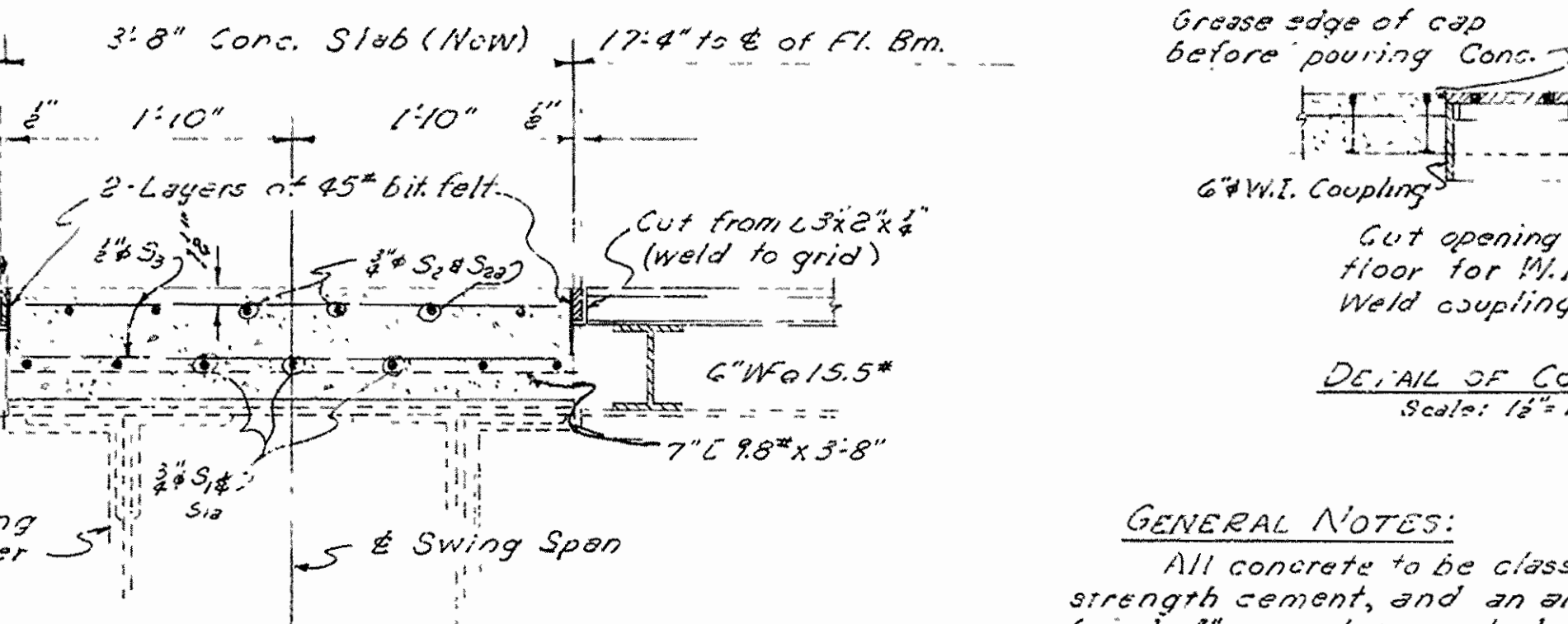
CROSS SECTION THRU ROADWAY



DETAILS OF SLOTS IN NEW BEAMS



SECTION THRU PIVOT GIRDER



GENERAL NOTES:

All concrete to be class "S" using light weight coarse aggregate, high early strength cement, and an air entraining agent. Exposed corners to be chamfered 1/2" except as noted.

Reinforcing steel to be deformed bars of intermediate or hard grade. Bar lists and bending diagrams to be submitted and approval secured before fabrication is begun.

The bridge deck shall consist of a design known by the trade name of "J-Beam Lok" or an equivalent. See Special Provisions. Depth of steel grid to be 3 inches. I-Beams of the grid floor are to be welded to the new supporting beams and splicing of grid units shall be made in accordance with sketches for Typical Field Welding as shown on Drwg 3311-E. Form strips to be 20 gage metal. Payment for metal form strips to be included in price bid for "Concrete Filled Steel Grid Floor Slab." Support beams shall be shimmed by use of plates to give bearing and a straight crown. Roadway is to be built in half widths and supporting beams are to be spliced at & of Roadway in End & Machinery Panels.

All welding to be by the electric arc process in accordance with the current specifications for Electric Welded Highway and Railway Bridges of the American Welding Society.

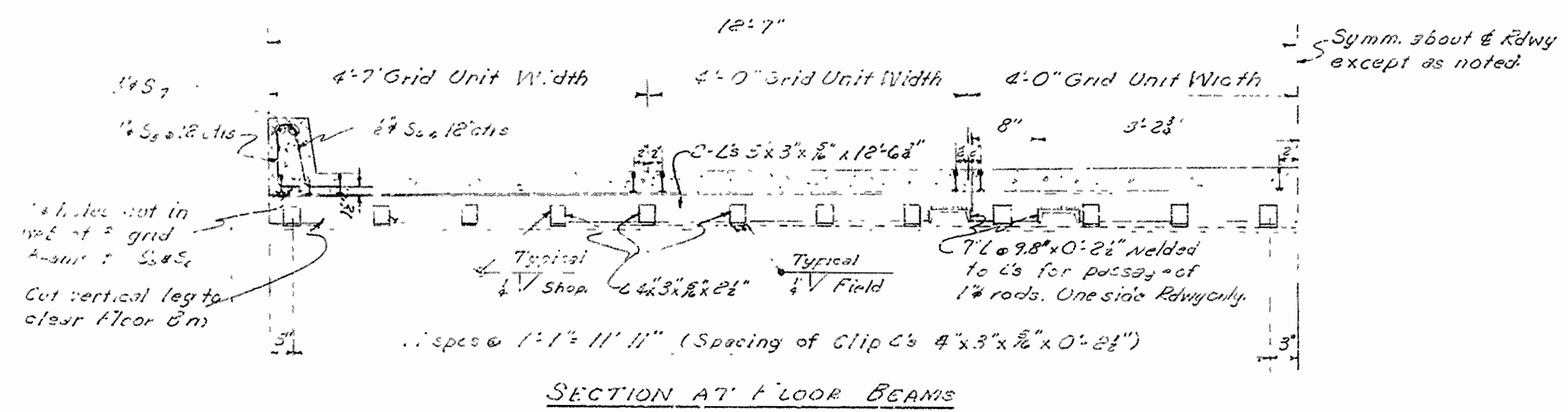
Shop Paint: All structural steel and steel grid, except surfaces in contact with concrete, shall be painted one coat of red lead and raw linseed oil before shipment.

Field Paint: 1st coat, white lead paint tinted with lamp black; 2nd coat Al paint.

Specifications: Arkansas State Highway Commission Standard Specifications for Road and Bridge Construction, adopted March 3, 1940.

For additional details see Drwg. 3311-E.

For details of existing swing span see Drwgs 3311 thru 3311-A.

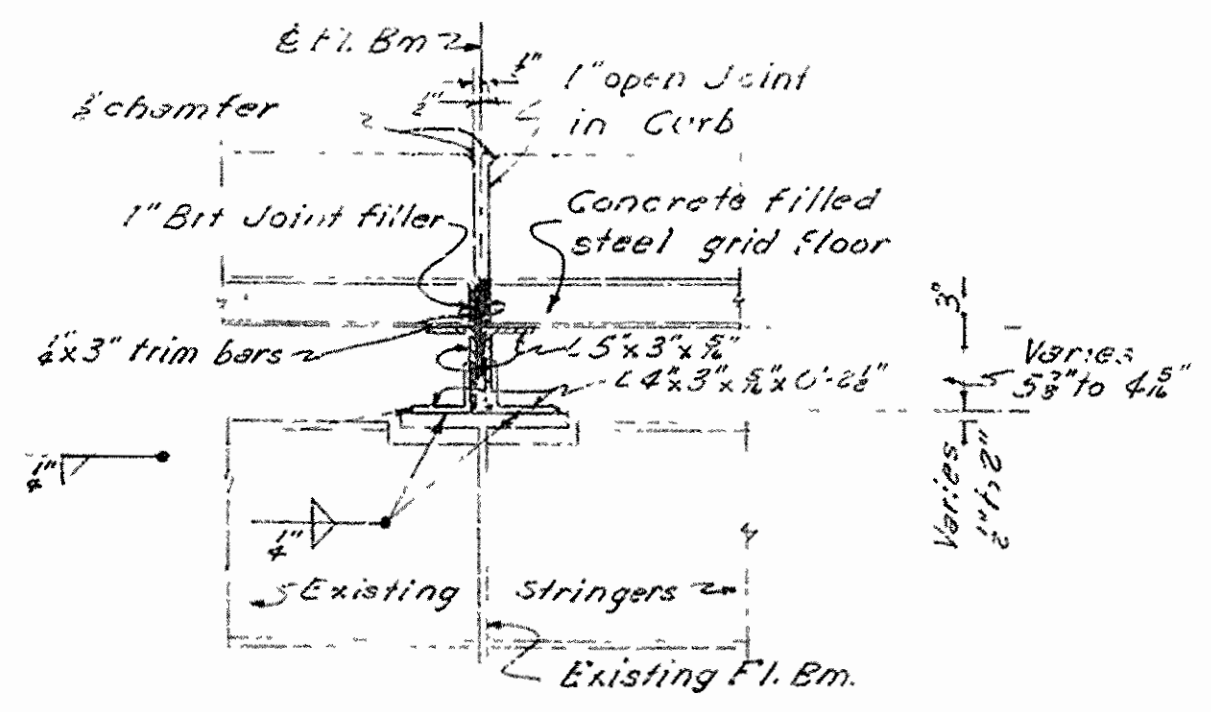
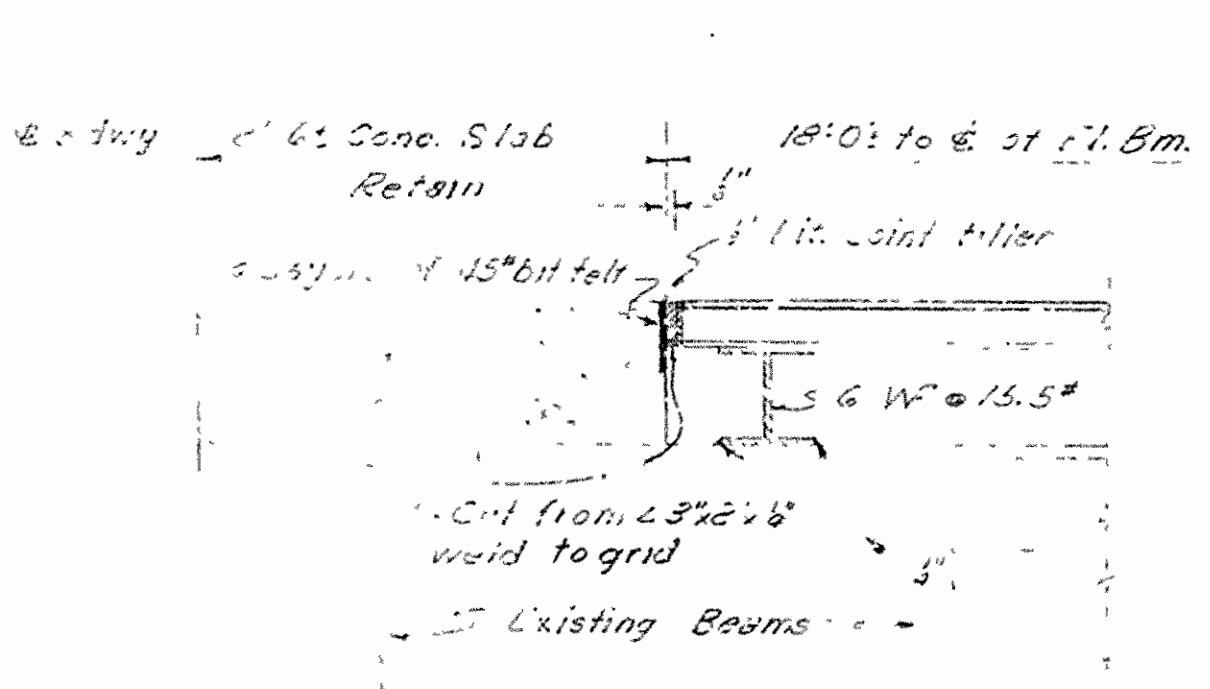


SECTION AT FLOOR BEAMS

MARK	SIZE	No.	LENGTH	BENDING DIAGRAMS	
S <sub>1</sub>	1/2"	7	16'-0"		
S <sub>10</sub>	3/8"	7	13'-5"		
S <sub>2</sub>	3/8"	6	15'-0"		
S <sub>20</sub>	3/8"	6	12'-5"		
S <sub>3</sub>	3/8"	31	3'-4"		
S <sub>4</sub>	3/8"	14	2'-0"		
S <sub>5</sub>	1/2"	444	1'-5"		
S <sub>6</sub>	1/2"	444	1'-5"		
S <sub>7</sub>	1/2"	32	18'-10"		
S <sub>10</sub>	1/2"	8	17'-8"		(18'-0" Panels)
S <sub>16</sub>	1/2"	8	17'-0"		(17'-4" Panels)

Reinforcing steel dimensions are sh. to ctr. of bars  
All reinforcing steel to be included in price bid for "Concrete Filled Steel Grid Floor Slab."

LOADING: A.A.S.H.O. 1953  
UNIT STRESSES:  
Class "S" Concrete (n=10) 1,800 psi.  
Reinforcing Steel 20,000 psi.  
Structural Steel 18,000 psi.



SECTION F-F

DETAILS OF  
REFLOORING SWING SPAN  
BLACK RIVER BRIDGE POCAHONTAS  
RANDOLPH COUNTY  
ROUTE 67 SECTION 20

ARKANSAS STATE HIGHWAY COMMISSION  
LITTLE ROCK, ARK.

Drawn By F.R.B. Date 3-22-55  
Traced By Date 4-9-55  
Checked By W.E.V. Date  
BRIDGE NO. 483 1/2 DRAWING NO. 3311-F

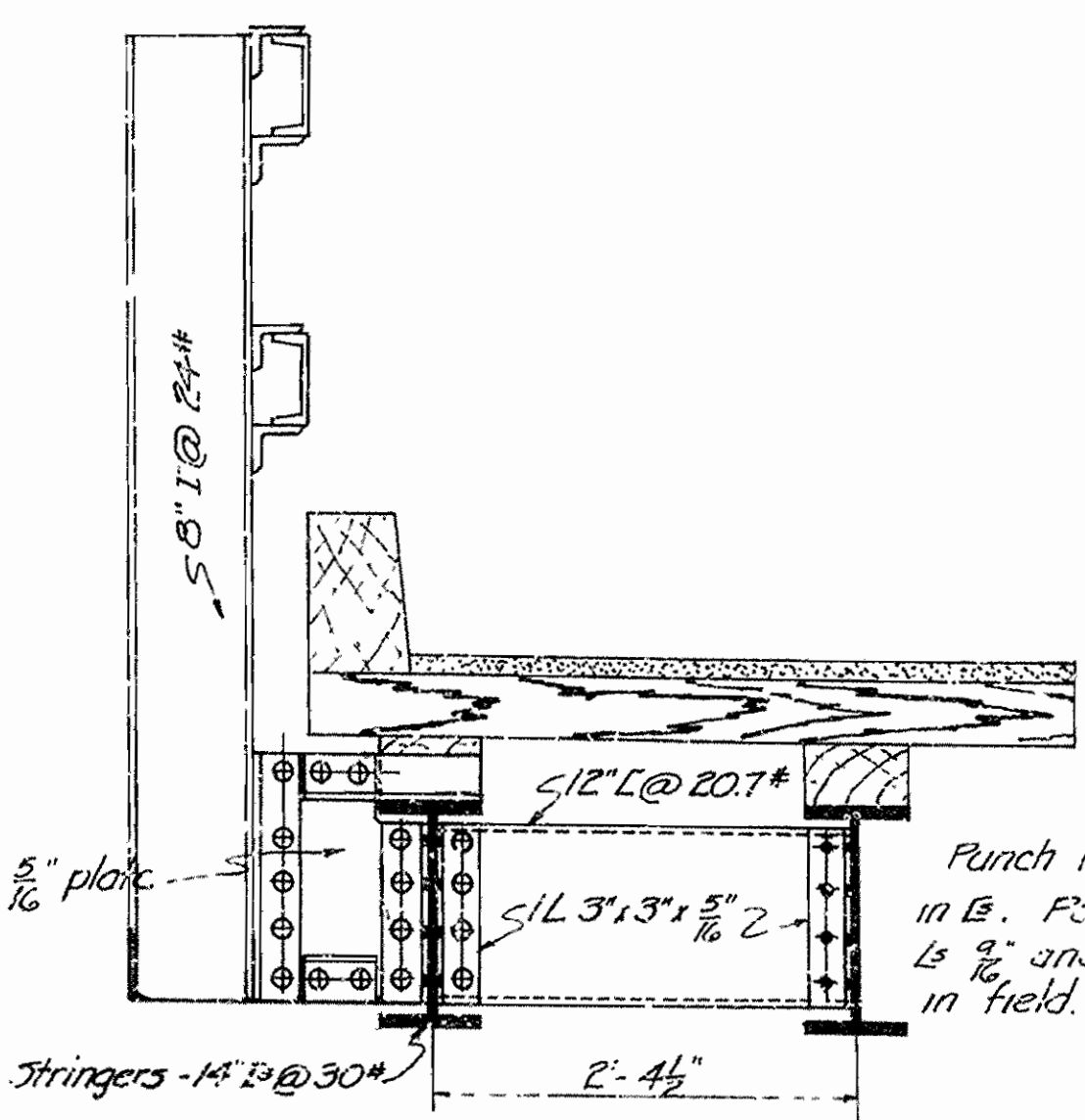
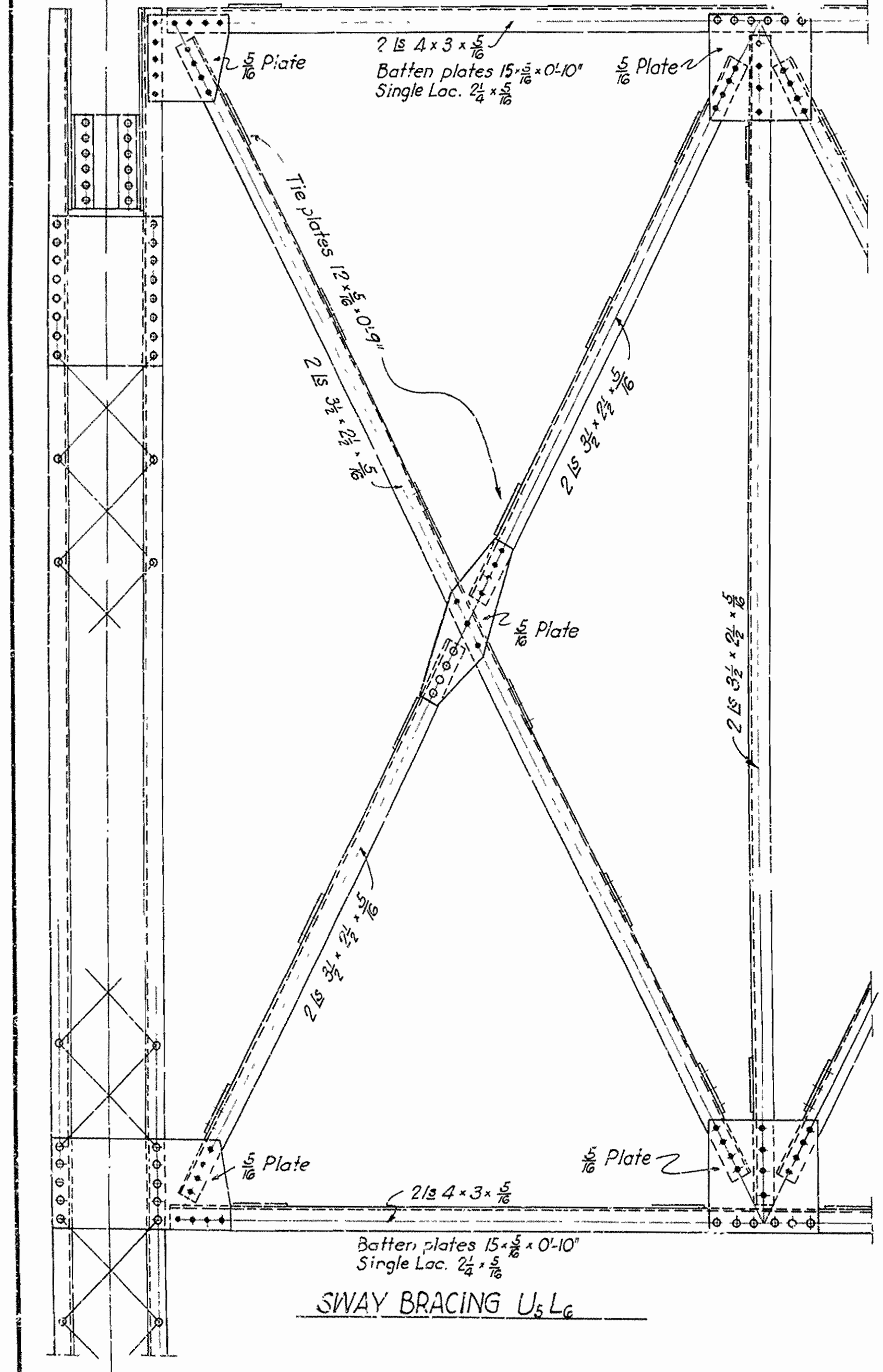
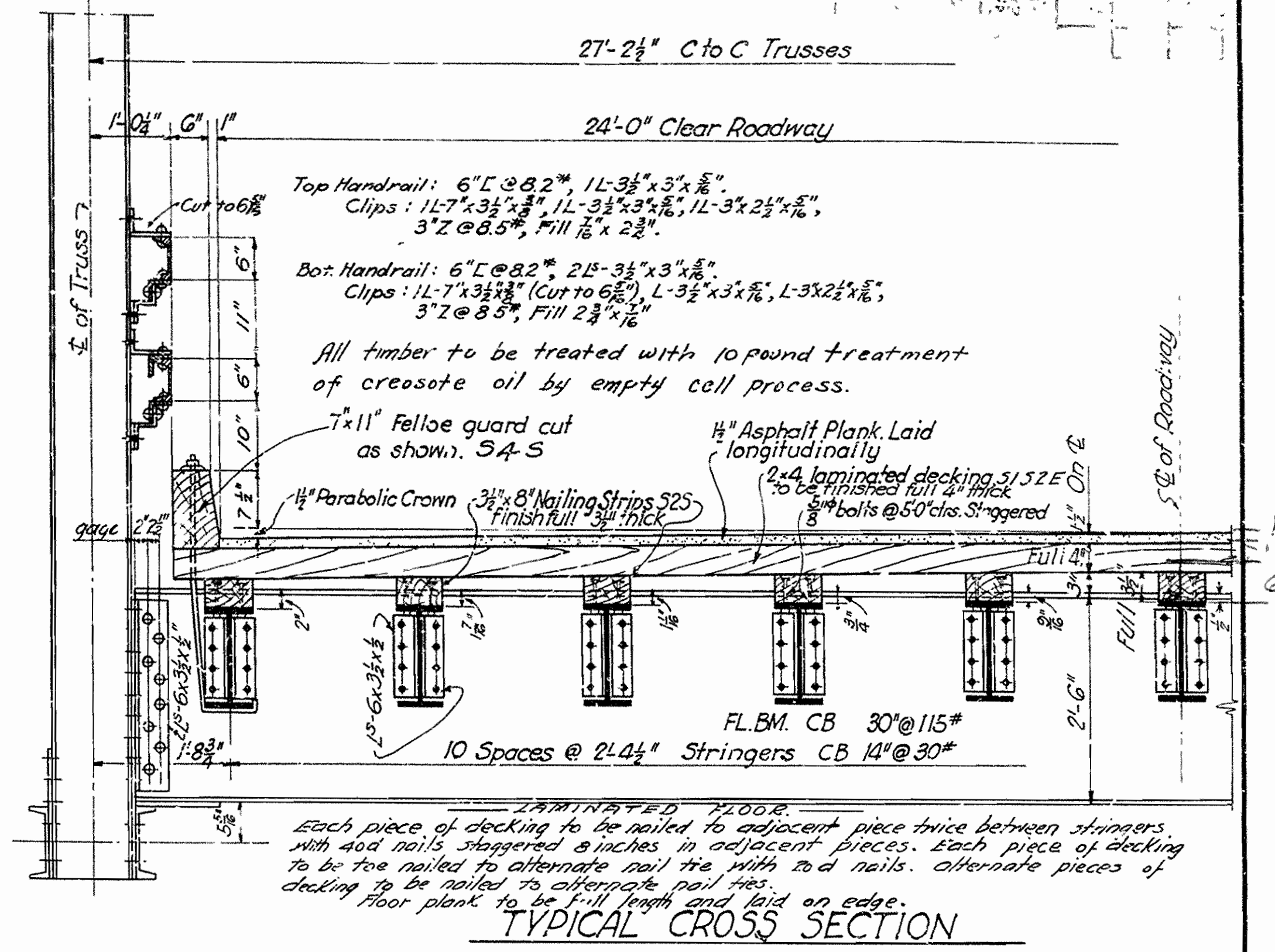
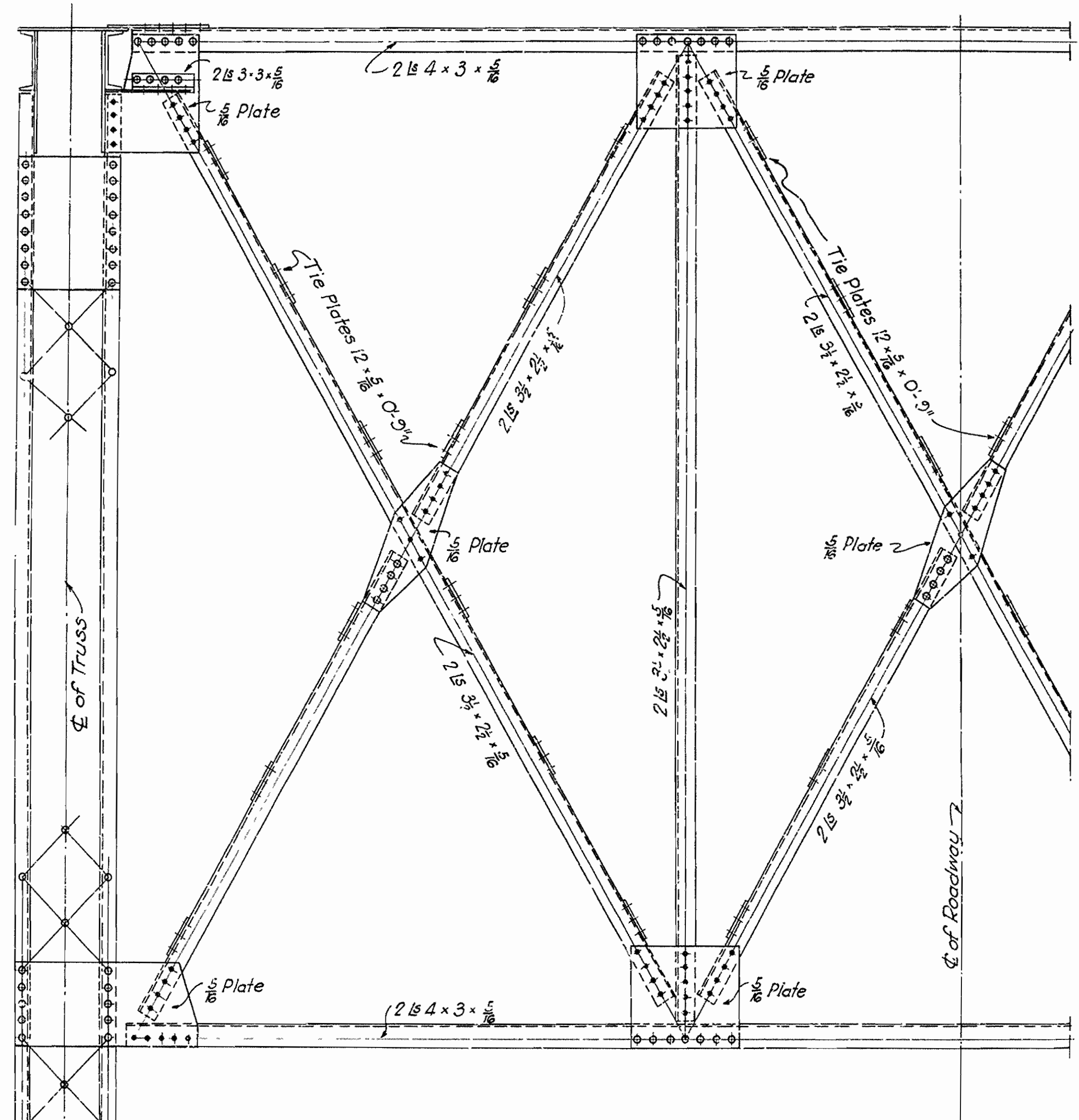
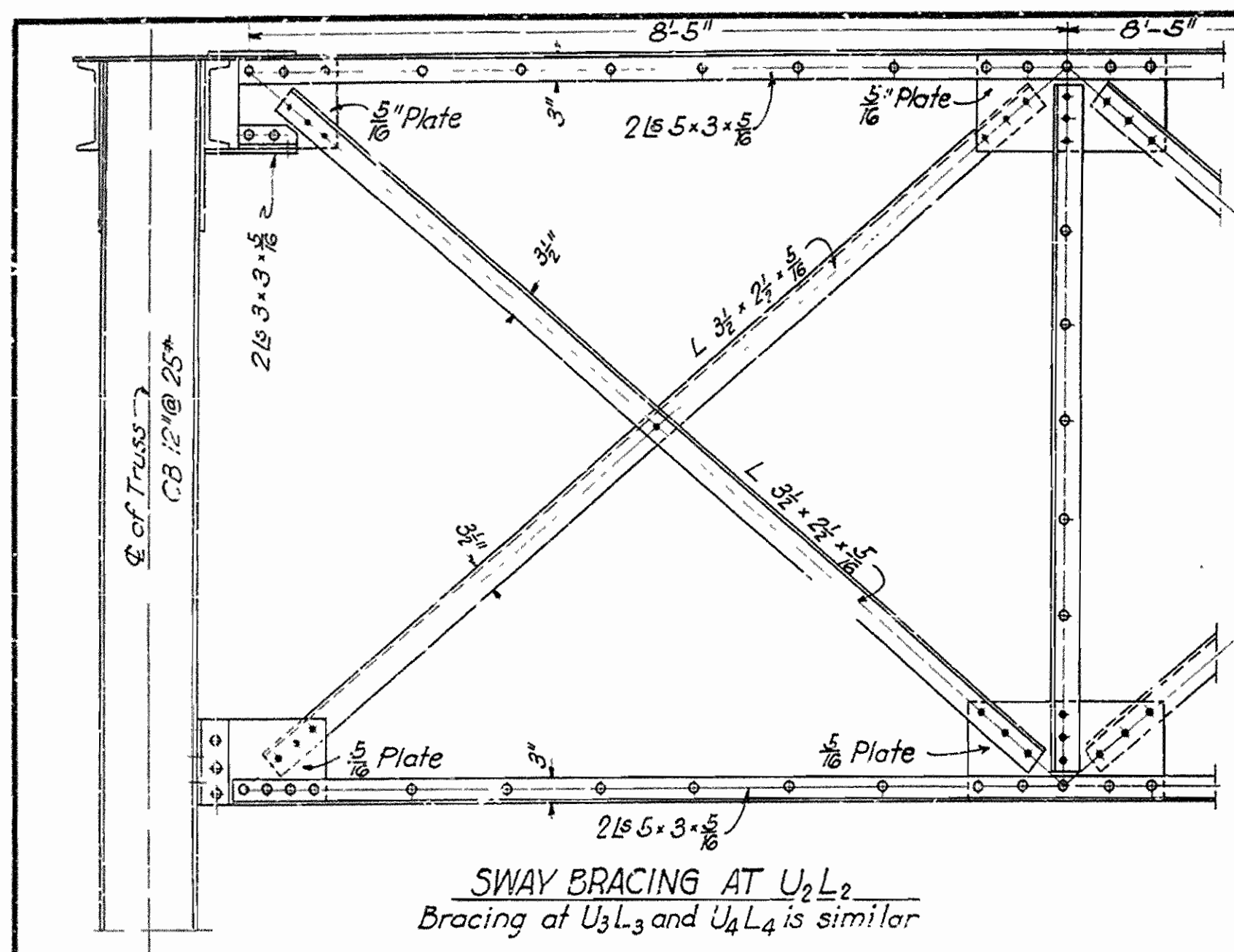
Scale 3/4" in 1 ft. or as shown

L.P. Carlson





FISCAL YEAR	SHEET No	TOTAL SHEETS



**GENERAL NOTES**

3/4" φ rivets, 1/8" holes. All holes in truss connections to be sub-punched 3/16" and reamed to size while truss is assembled; this applies to field as well as shop rivets.

Floor beam and stringer connections to be sub-punched and reamed to size through a metal template.

All field connections shall be riveted.

All floor beams and stringers to be milled to exact length after framing angles have been riveted.

Shapes of equal or greater strength may be substituted for structural shapes shown; payment, however, will be made in accordance with sizes given on this plan.

Shop Paint: After being completely assembled and shop work finished, all pieces shall be given one coat of red lead and raw linseed oil.

Field Paint: Apply two coats of different colors as specified by the Engineer.

This drawing shows general features of design only.

Shop drawings shall be made in compliance with specifications, and shall be submitted and approved before fabrication is begun.

Specifications: Arkansas Standard Road and Bridge Specifications, adopted May 30, 1925, and revised.

DETAIL OF SPLICE IN FELLOE GUARD

DETAIL OF CAST IRON DRAIN

Note: Place one drain center of each panel on both sides of roadway. Drains to be paid for at Unit Price bid for Structural Steel.

**DETAILS OF 230' SWING SPAN**

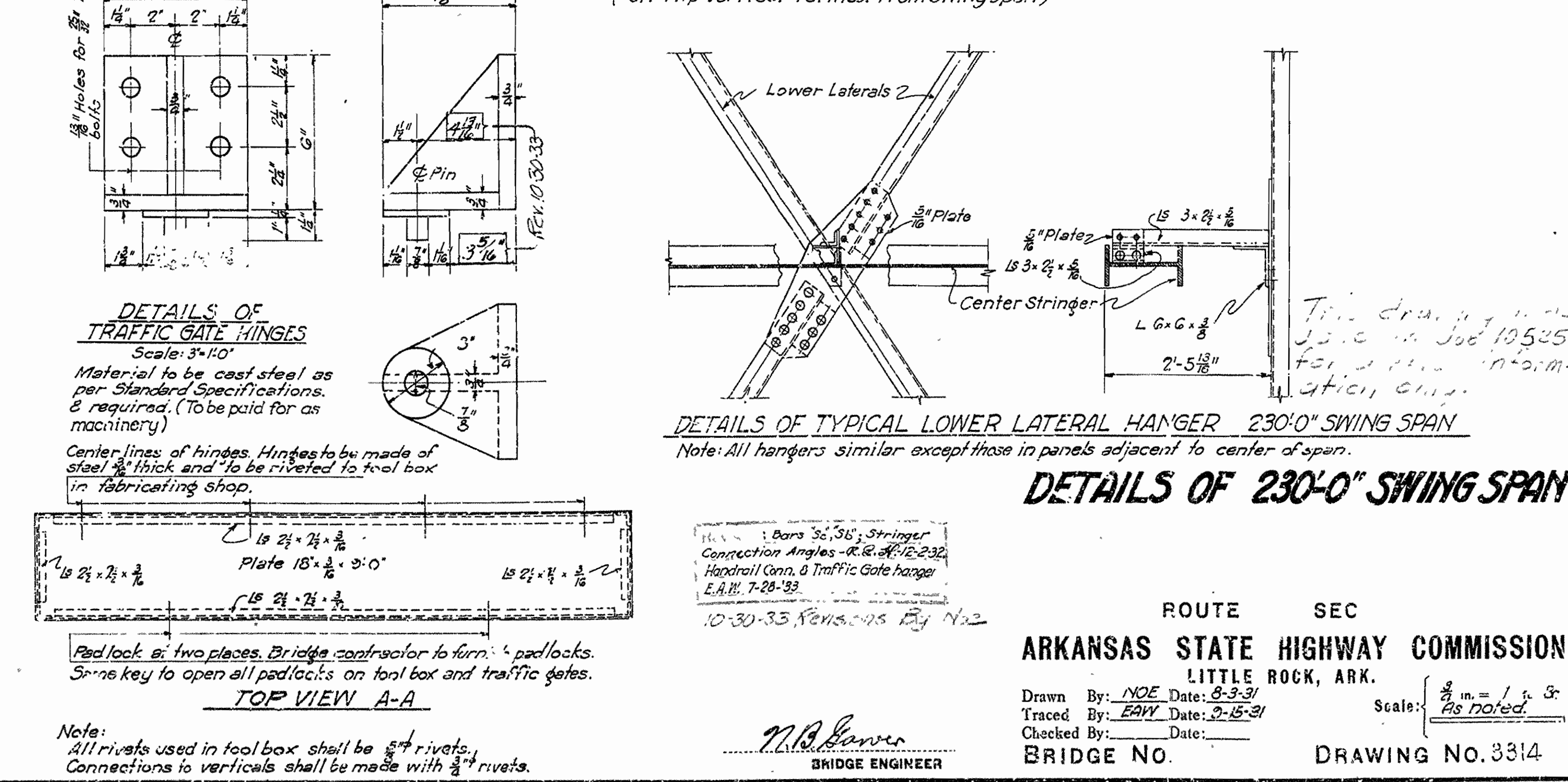
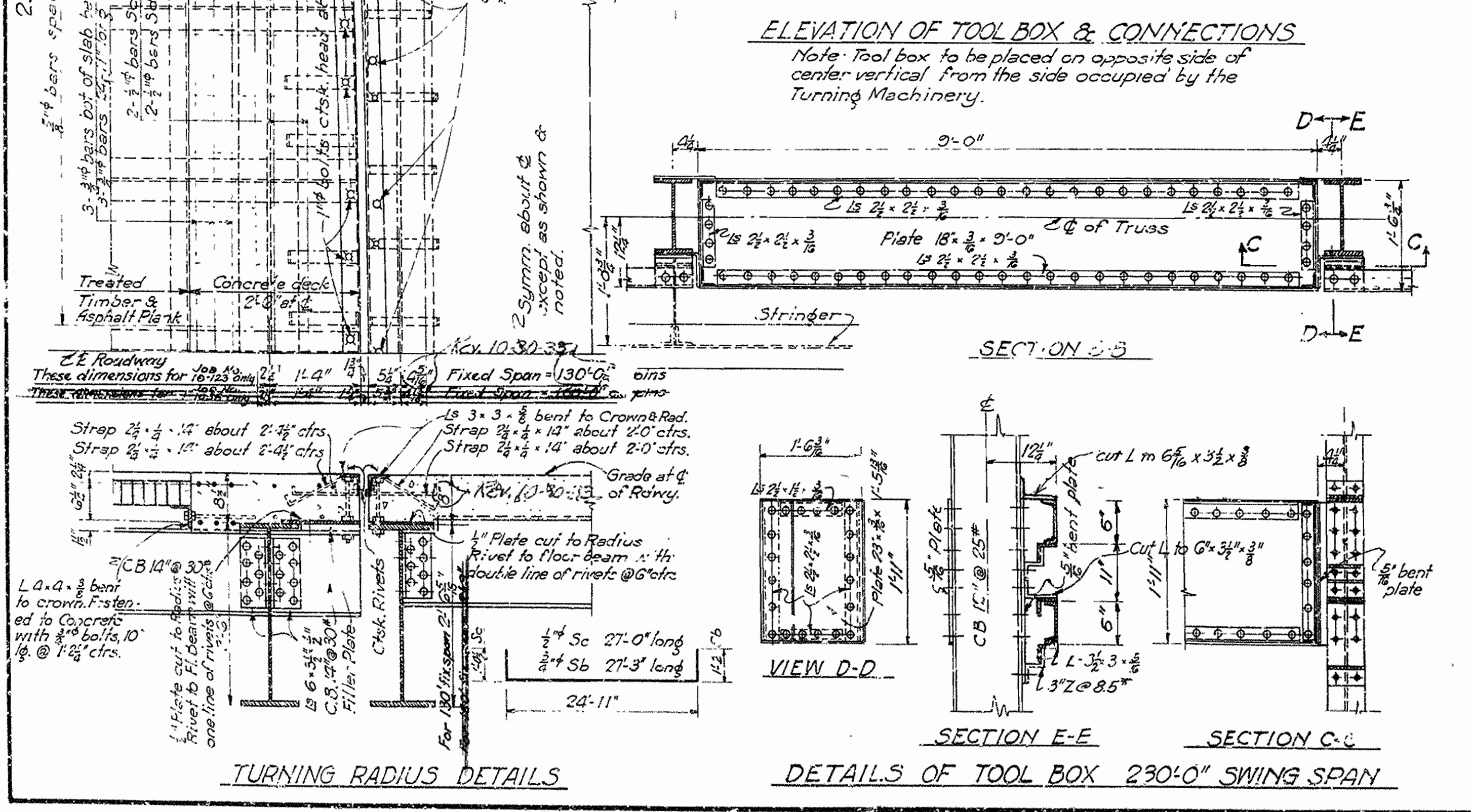
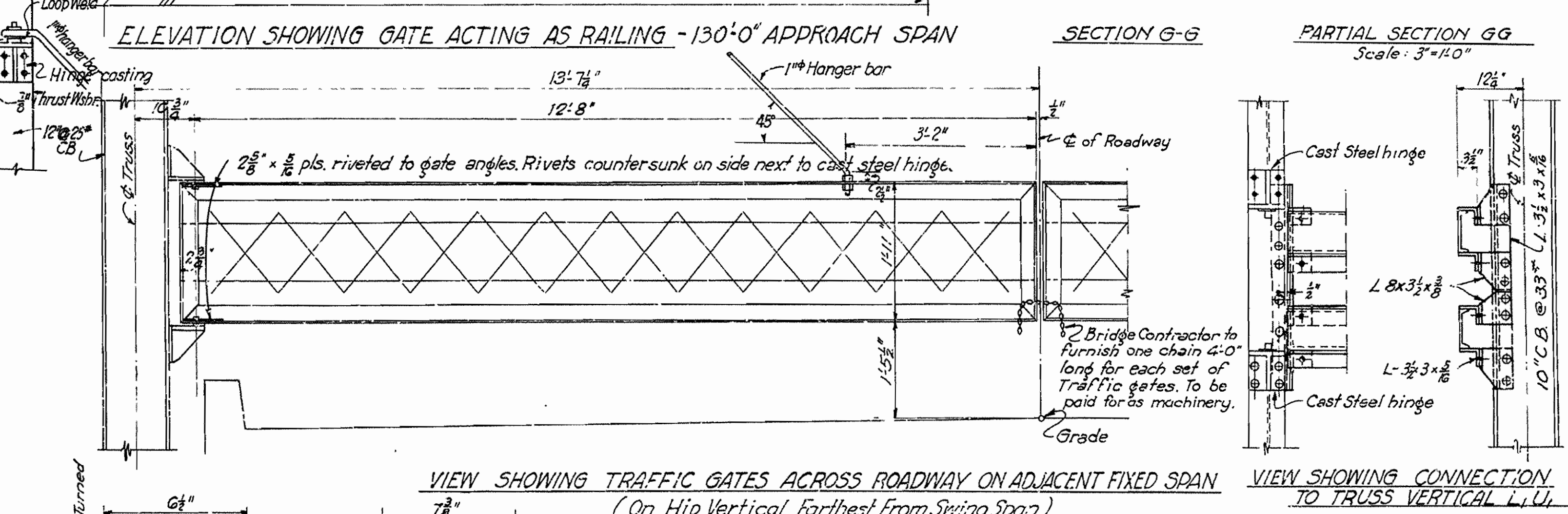
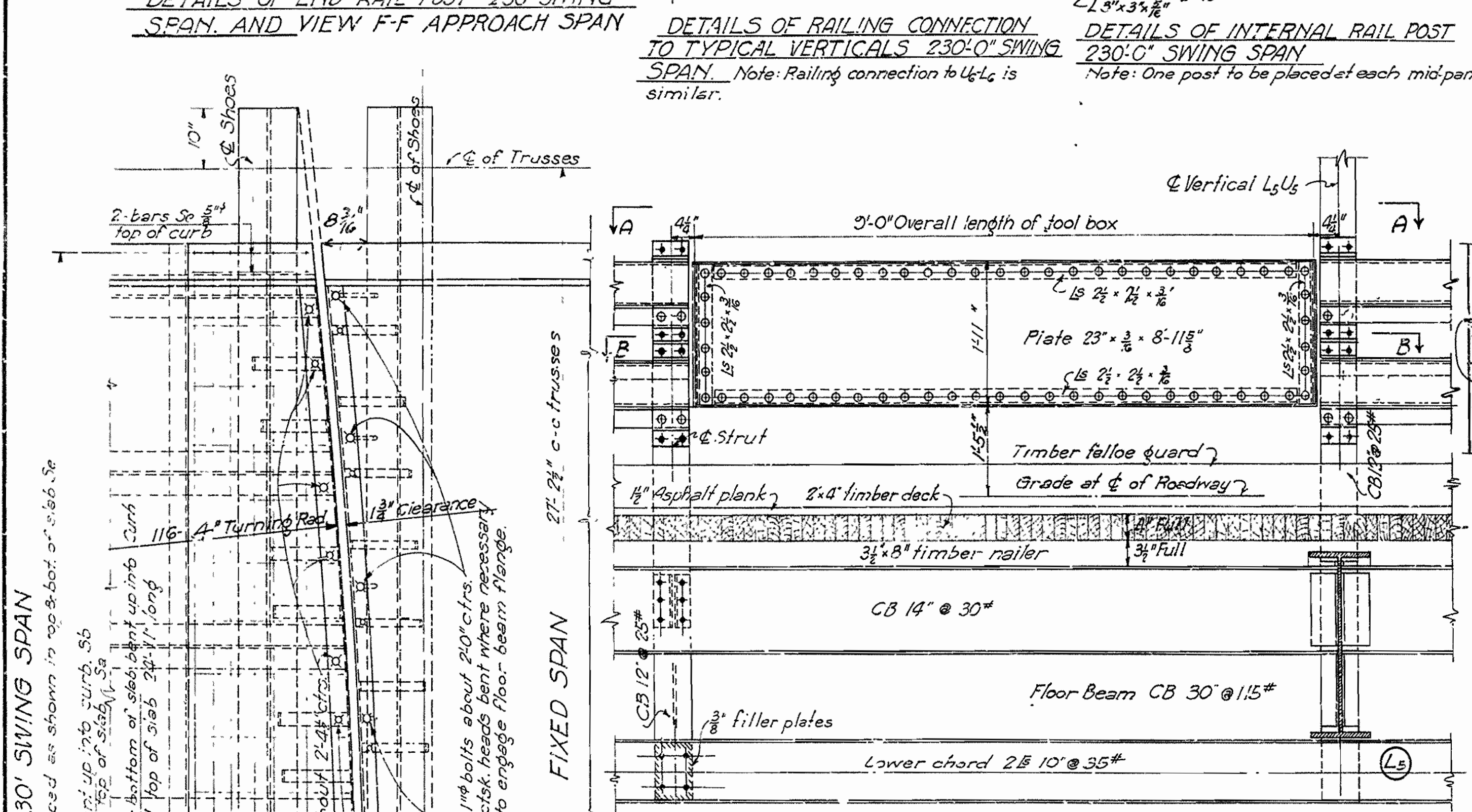
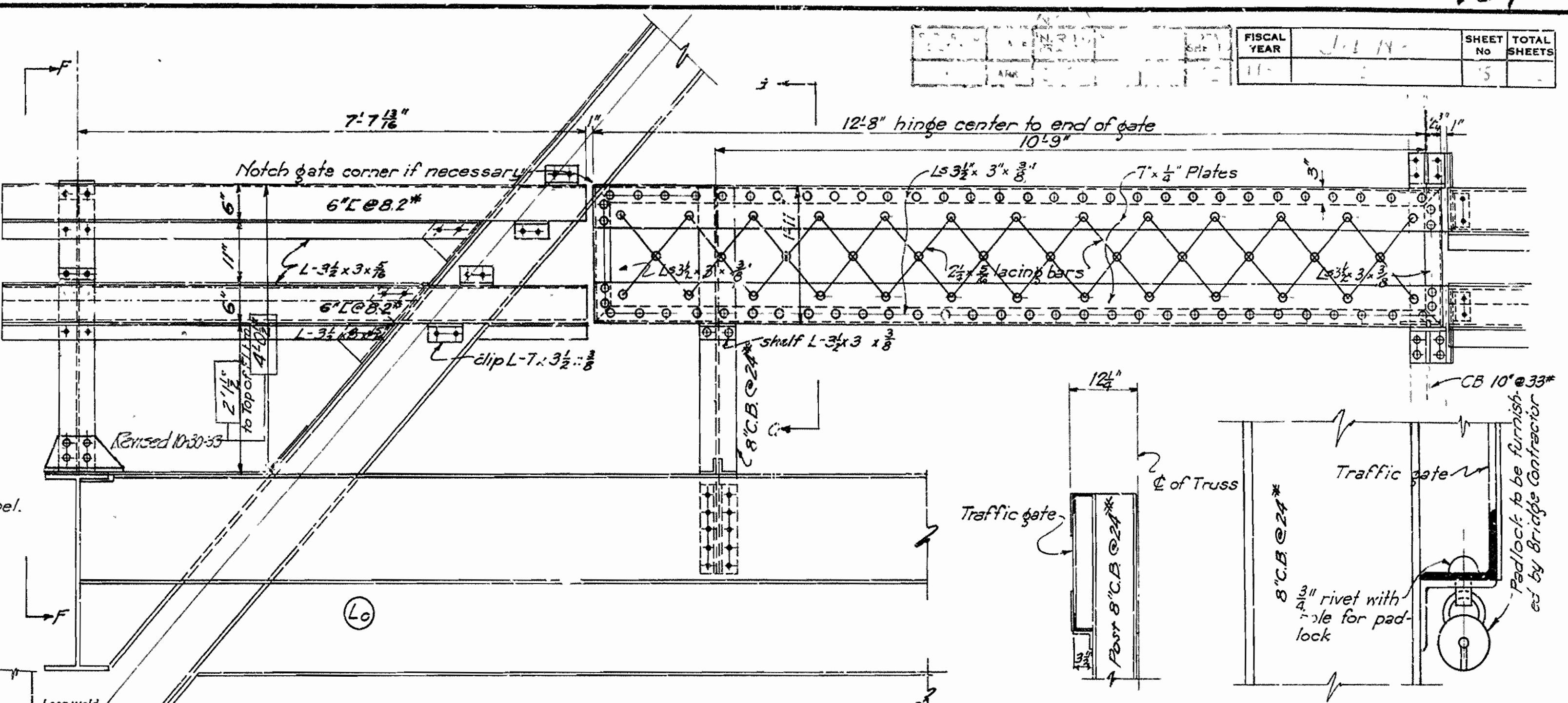
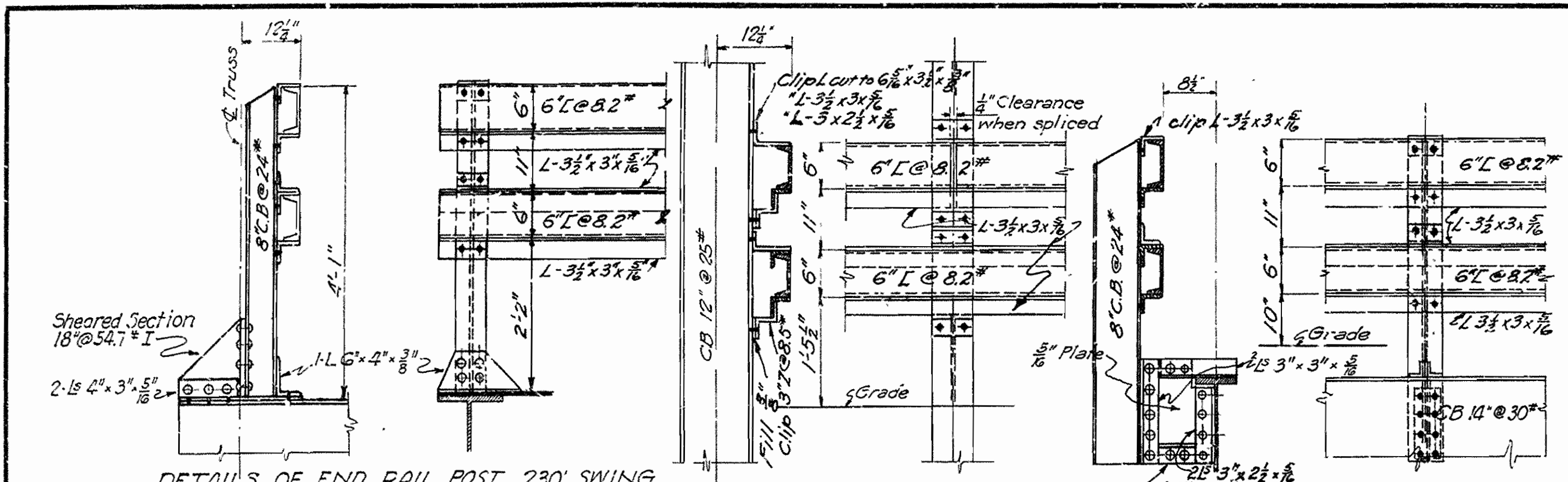
ROUTE SEC.  
**ARKANSAS STATE HIGHWAY COMMISSION**  
 LITTLE ROCK, ARK.  
 Drawn By: Nae Date: 8-15-31  
 Traced By: EAW Date: 11-23-31  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 Scale: 3/4" = 1'  
**BRIDGE NO.** \_\_\_\_\_ **DRAWING NO. 3313**

Non-16, 32-Roadway Drains -  
 R.E.H., Stringer and Floor-  
 Beam Conn. L.S.-R. 12-E-37.  
 FL Beam Conn. Deck & Batten Pls. E.A.W.  
 7-28-33 Floor Drain Thickness 7, 28-33  
 Outside stringer stiffener detail  
 by Nov 12-29-33

*N.B. Banner*  
 BRIDGE ENGINEER

12" C stiffener struts to be placed opposite each rail post on 230'-0" swing span.

FISCAL YEAR	1934	SHEET TOTAL	5
NO.	11	SHEETS	



**DETAILS OF 230'-0" SWING SPAN**

ROUTE 134 SEC 1  
**ARKANSAS STATE HIGHWAY COMMISSION**  
 LITTLE ROCK, ARK.

Drawn By: *NOE* Date: 8-3-31  
 Traced By: *EAW* Date: 2-15-31  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

Scale: 3/8" = 1' & 3/4"  
 As noted.

BRIDGE NO. \_\_\_\_\_ DRAWING NO. 3314

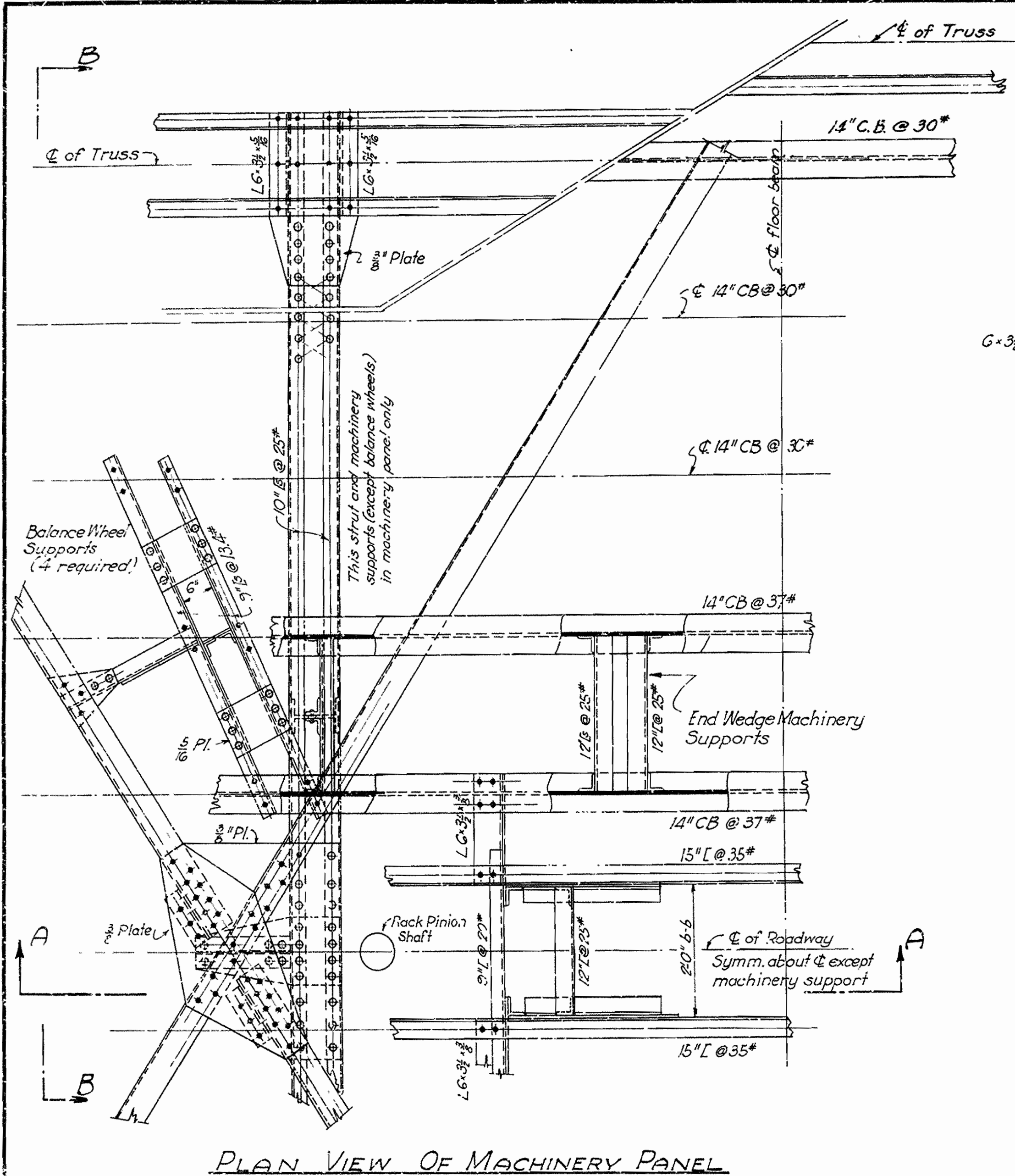
*W.A. Bower*  
 BRIDGE ENGINEER

Note:  
 All rivets used in tool box shall be 3/4" rivets.  
 Connections to verticals shall be made with 3/8" rivets.

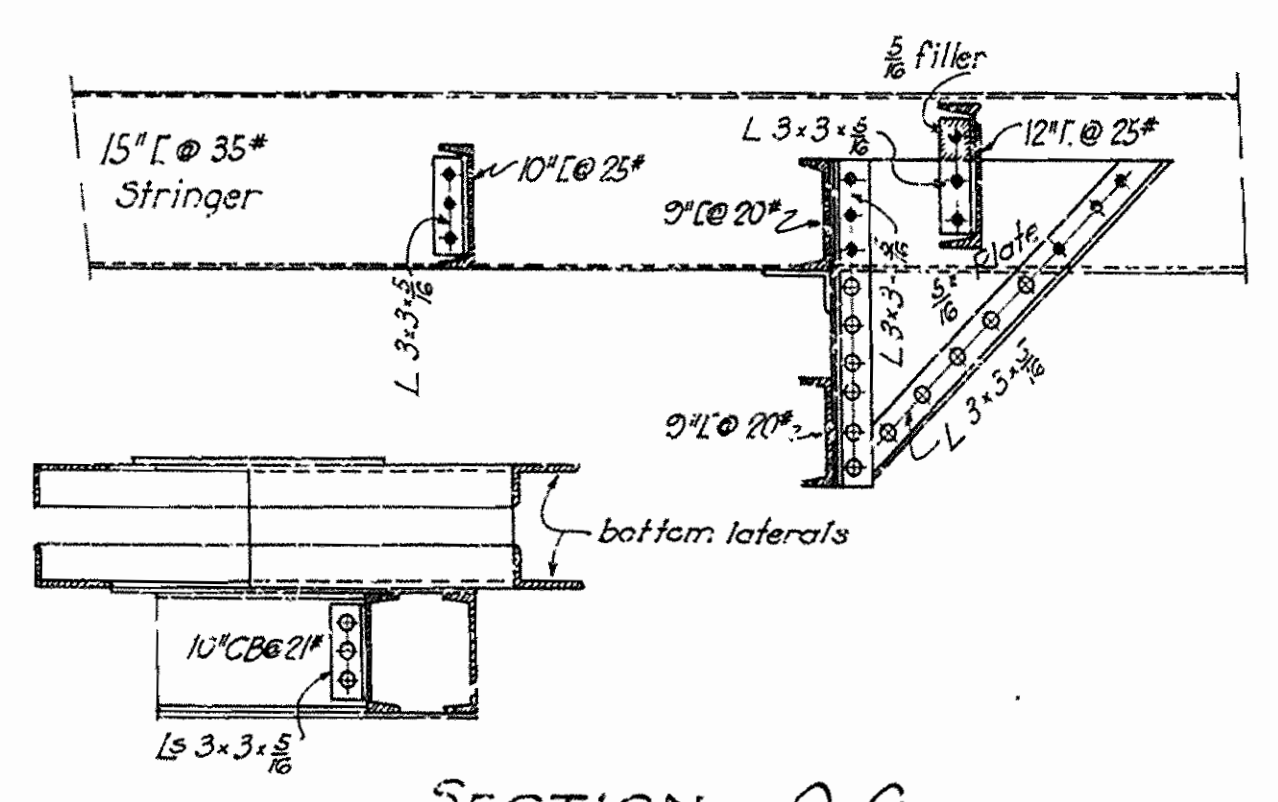
1 Bars 56, 36, Stringer  
 Connection Angles - R.R. & P. 12-232  
 Handrail Conn. & Traffic Gate hanger  
 E.A.H. 7-28-33  
 10-30-33, Revised by N.S.

This drawing is the property of the Arkansas State Highway Commission and is not to be used for any other purpose without the written consent of the Commission.

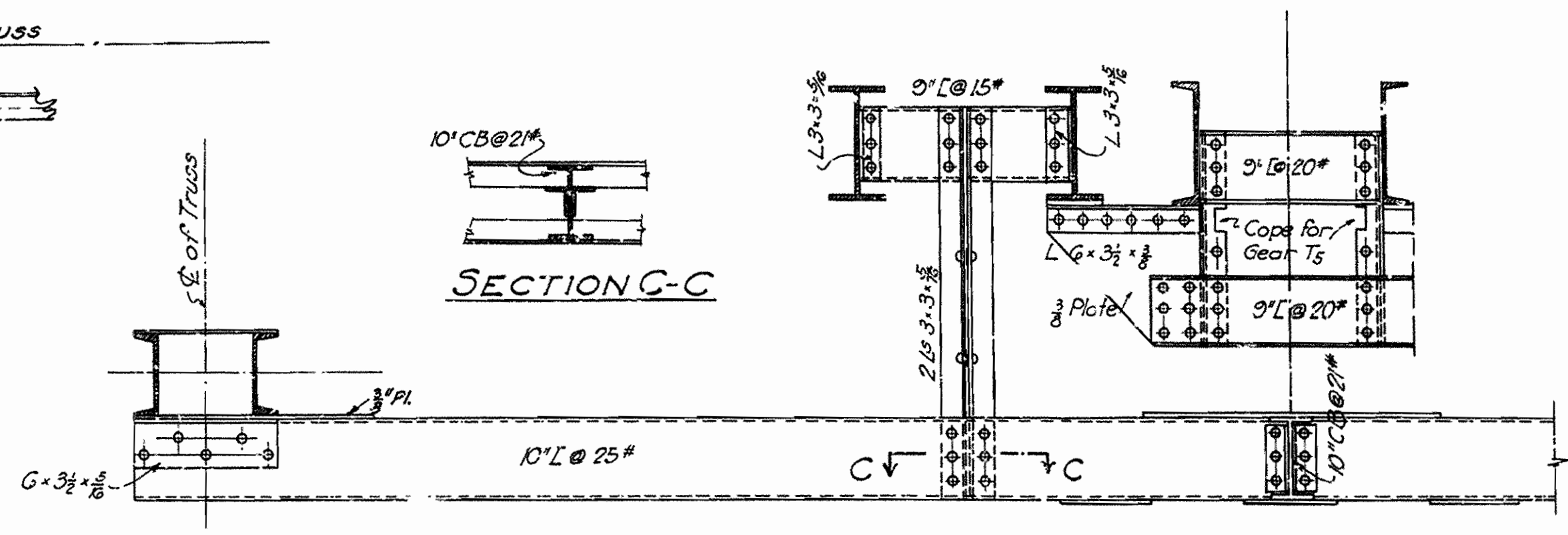
PROJECT	177-N	SHEET NO.	2	TOTAL SHEETS	2
YEAR	1931				



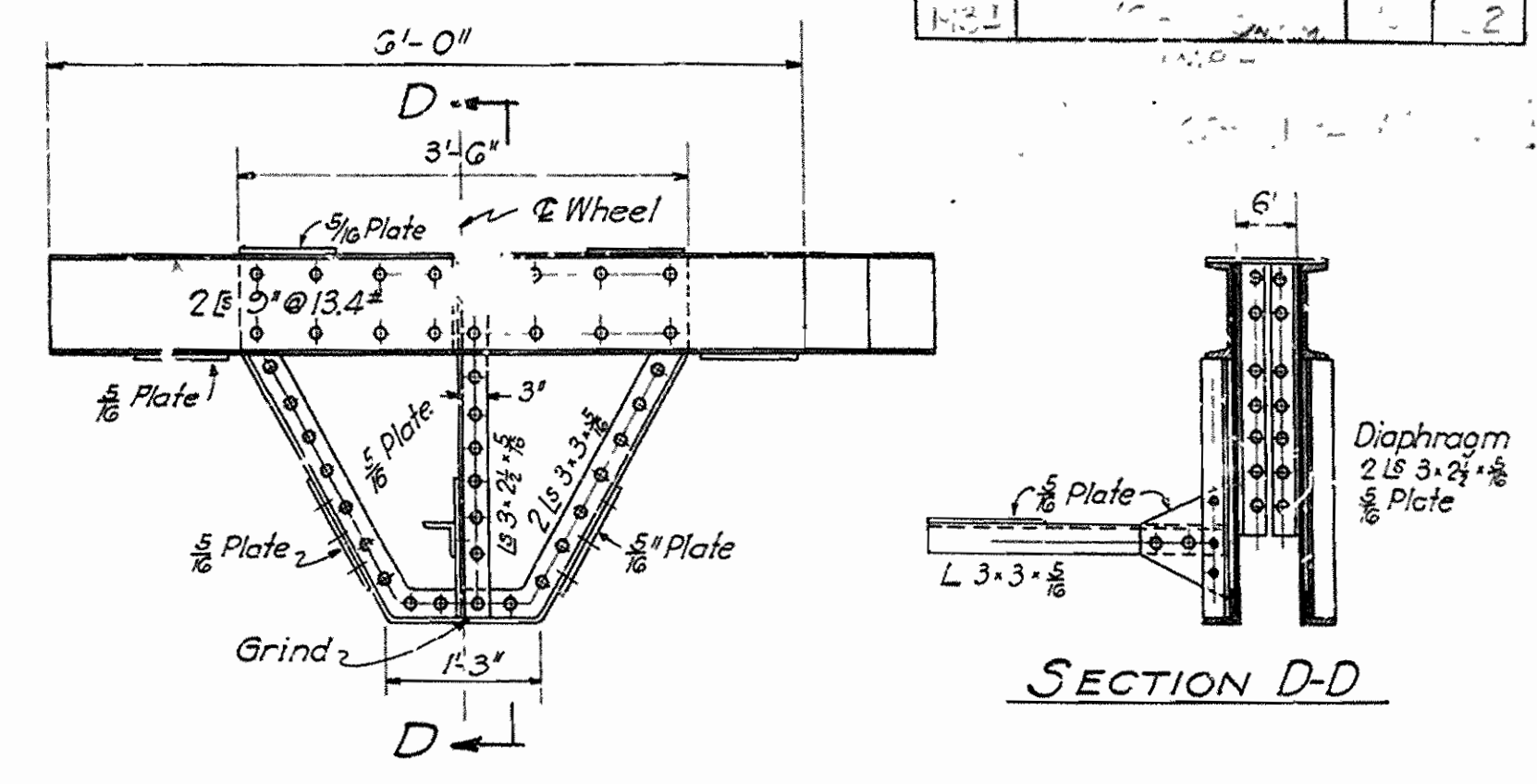
PLAN VIEW OF MACHINERY PANEL



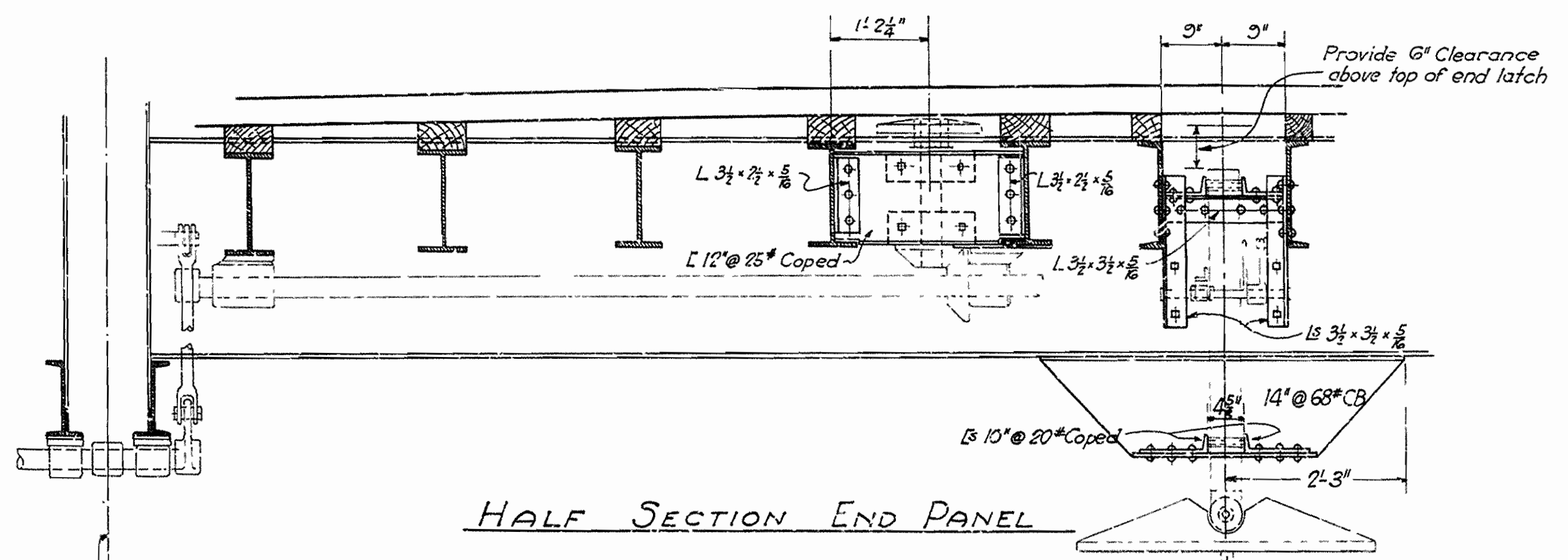
SECTION A-A



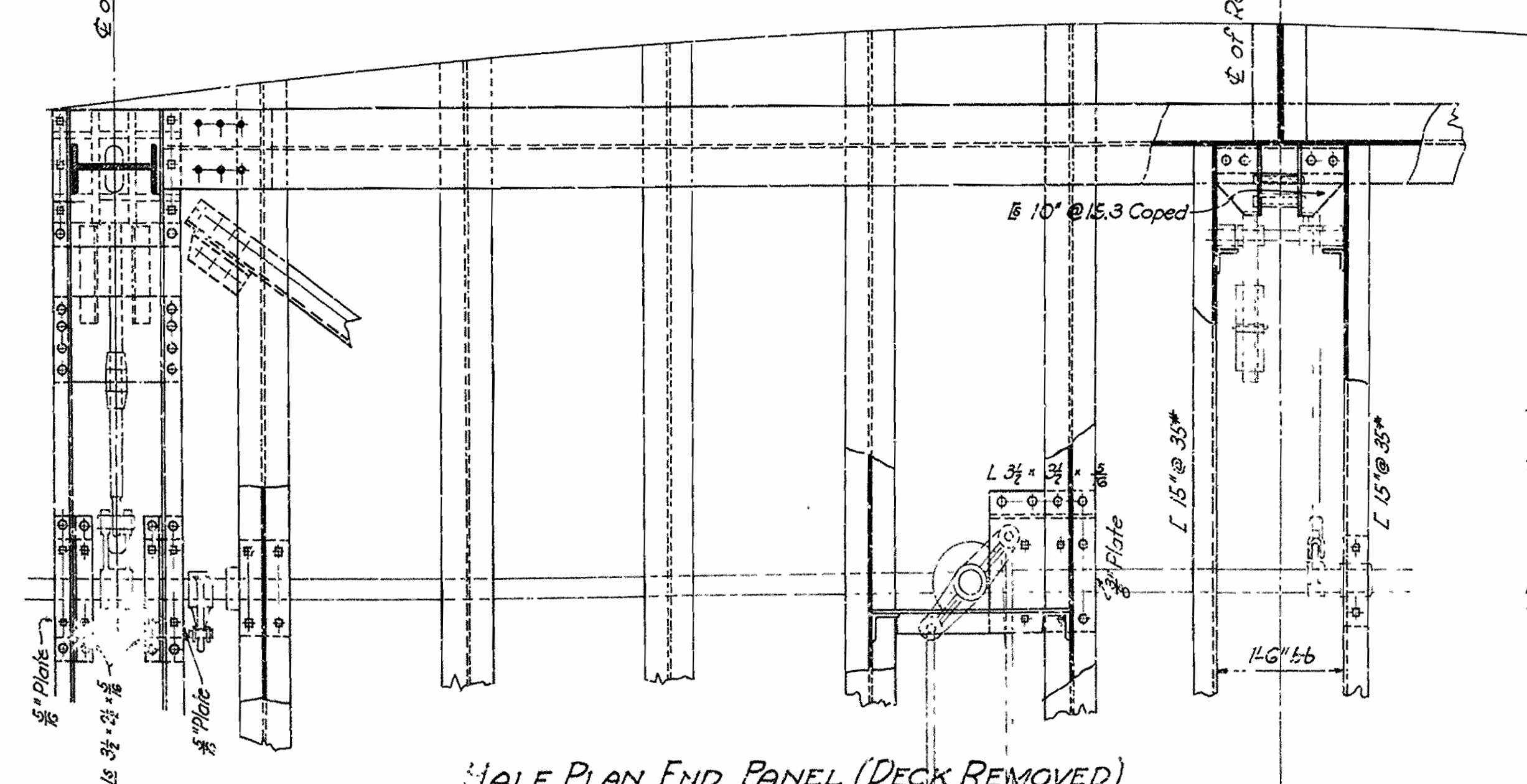
SECTION B-B  
Bottom Laterals and balance wheel supports not shown.



BALANCE WHEEL SUPPORTS



HALF SECTION END PANEL



HALF PLAN END PANEL (DECK REMOVED)

This drawing includes in excess for general information.

### DETAILS OF 230' SWING SPAN

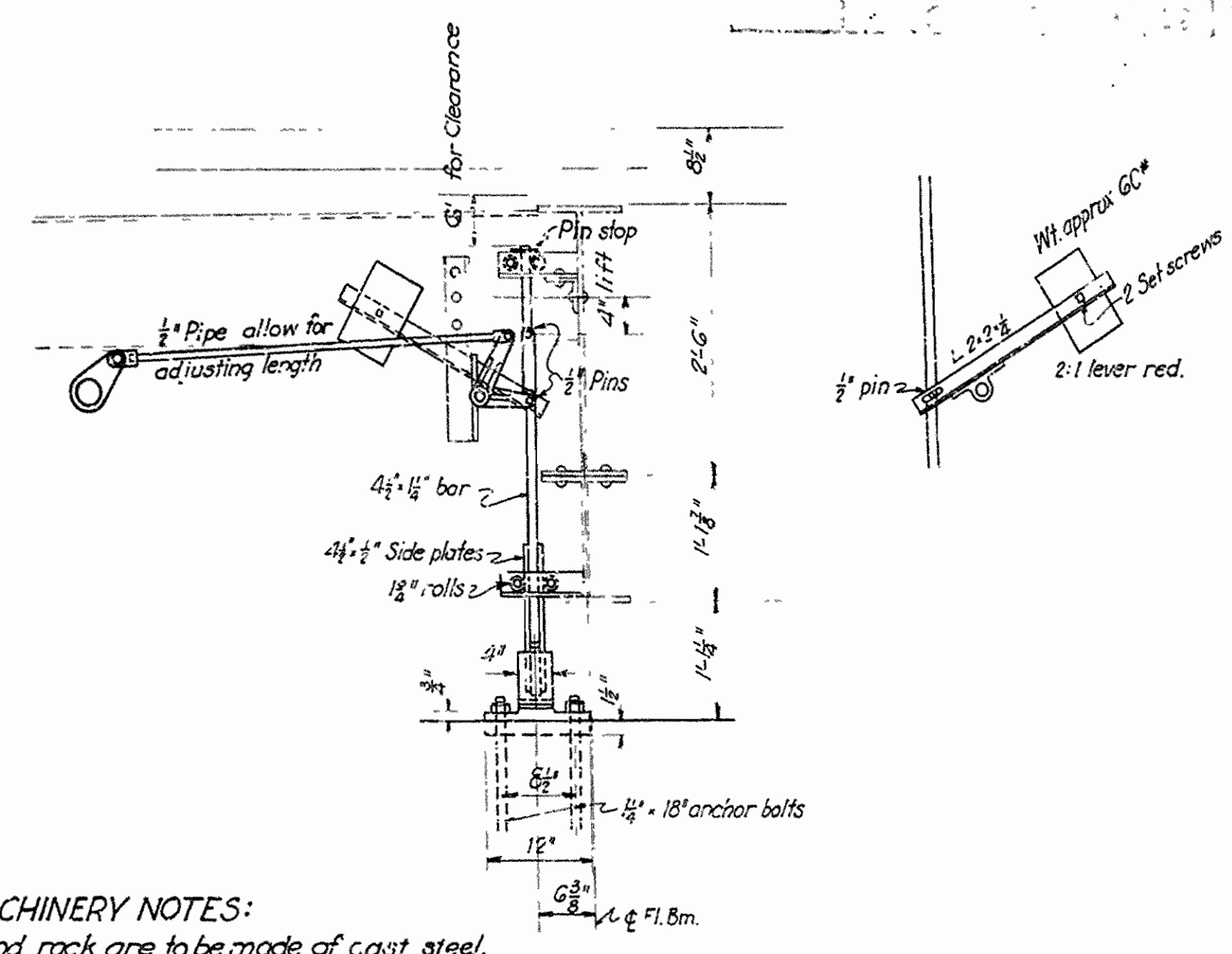
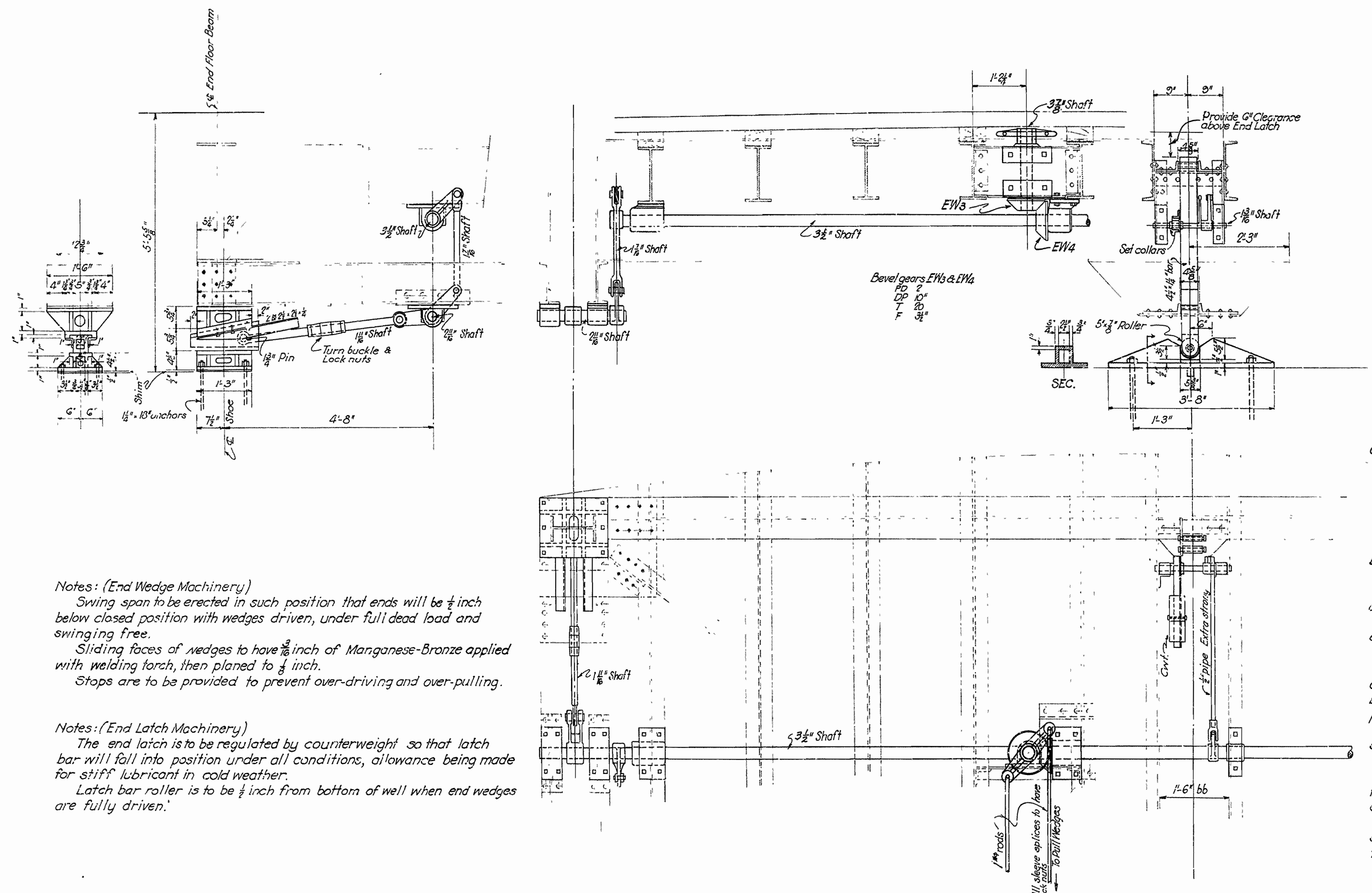
ROUTE SEC.  
**ARKANSAS STATE HIGHWAY COMMISSION**  
 LITTLE ROCK, ARK.  
 Drawn By: RA Date: 10-26-31  
 Traced By: EAW Date: 12-1-31  
 Checked By: Date: \_\_\_\_\_  
 BRIDGE NO. \_\_\_\_\_ DRAWING NO. 3315

*M.B. Larver*  
 BRIDGE ENGINEER

Scale: 1/2" = 1' ft.



FISCAL YEAR	1923	SHEET NO.	137	TOTAL SHEETS	222
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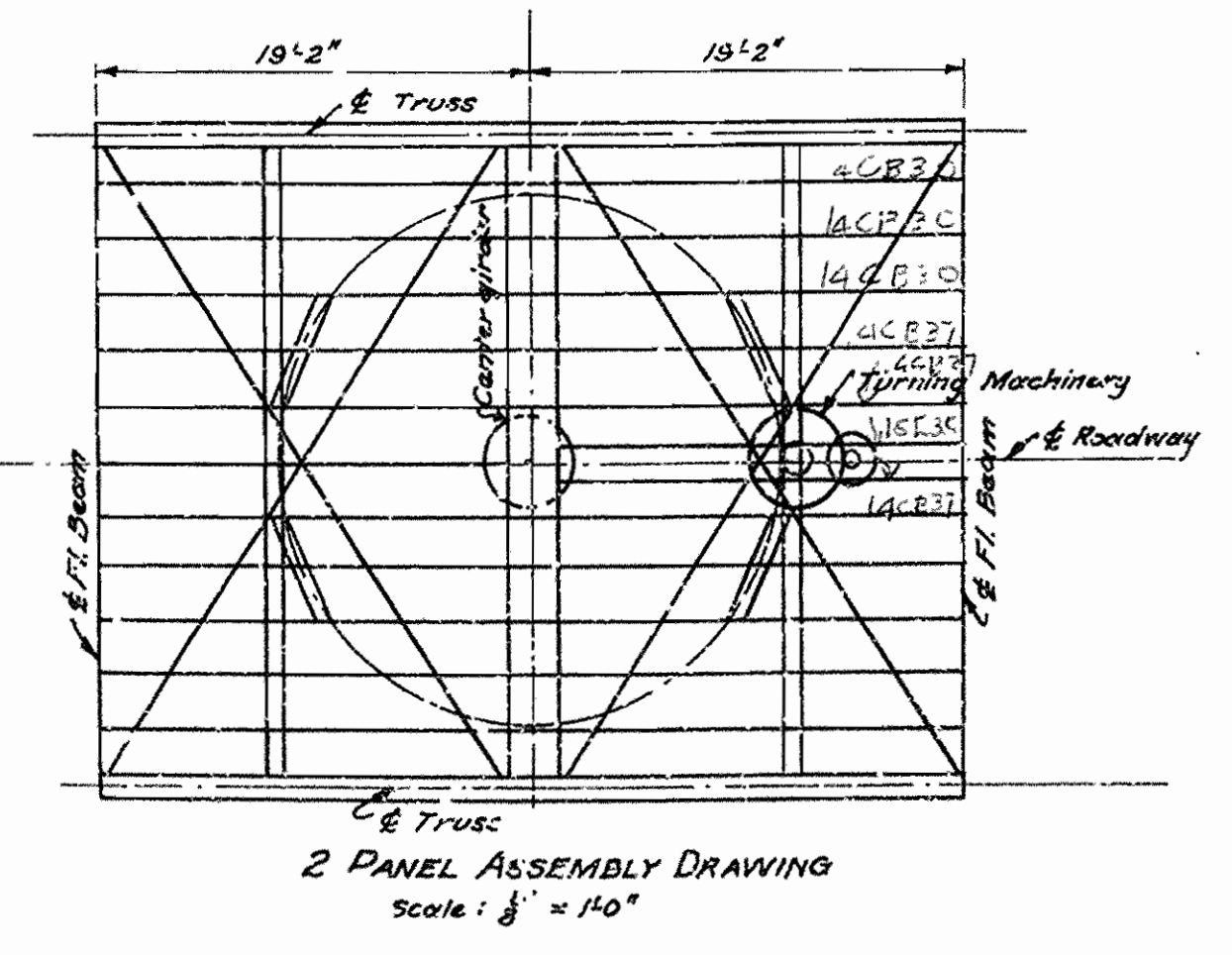


**Notes: (End Wedge Machinery)**  
 Swing span to be erected in such position that ends will be 1/2 inch below closed position with wedges driven, under full dead load and swinging free.  
 Sliding faces of wedges to have 3/16 inch of Manganese-Bronze applied with welding torch, then planed to 1/8 inch.  
 Stops are to be provided to prevent over-driving and over-pulling.

**Notes: (End Latch Machinery)**  
 The end latch is to be regulated by counterweight so that latch bar will fall into position under all conditions, allowance being made for stiff lubricant in cold weather.  
 Latch bar roller is to be 1/2 inch from bottom of well when end wedges are fully driven.

**GENERAL MACHINERY NOTES:**  
 All gears and rack are to be made of cast steel.  
 All gear teeth, except rack teeth, are to be machine cut.  
 All gears are to be secured to shafts with suitable keys.  
 All bevel and mitre gears are to have suitable bronze thrust collars.  
 Pitch lines are to be scribed on both sides of all gears and top of rack.  
 All bearing boxes are to be babbitted except main pinion and bull wheel bearings which are to have phosphor-bronze linings.  
 All bearing boxes to be of split type unless otherwise noted.  
 All bearing boxes and the center pivot are to be provided with grease cups and grooves; where not otherwise accessible they shall be connected with oil pipes.  
 All shafts under 3" diameter are to be cold rolled steel. All shafts over 3" diameter are to be rolled or forged.  
 All castings unless otherwise noted are to be of cast steel.  
 All parts of the operating machinery connected to or supported by structural steel are to be assembled completely in shop together with supporting structural steel, see Sketch.  
 Drill holes for bearings with gears meshing properly and all other parts in correct position. Match mark where necessary.  
 Sub-punching will not be permitted for machinery connections to structural steel supports.  
 Machinery is shown in position with bridge closed and wedges driven.  
 All material to be allowed as machinery, as noted in Special Provisions, is on (or for) movable span only, unless otherwise noted, and does not include shoes and bed plates of fixed spans.  
 These drawings are general only. Contractor shall check same and submit shop drawings, made in compliance with the specifications, which are to be approved before fabrication begins.  
 All turning machinery to be marked with 'T'  
 All end wedge machinery to be marked with 'EW'  
 All center wedge machinery to be marked with 'CW'  
 All end latch machinery to be marked with 'L'  
 Power calculated with two men on capstan at 30# each, no friction losses due to bearings or gears, except center pivot and wedge sliding surfaces.

**Notes: (2 Panel Assembly Drawing)**  
 The two center panels of floor system and lower chord members, together with the center girder, lateral system and machinery supports shall be completely assembled with the center bearing castings, balance wheels, rack and track, and turning machinery at the structural steel fabrication shop. All necessary drilling and reaming shall be done and the structural steel and machinery parts match marked. The complete assembly shall be properly adjusted until the two-panel section may be turned 360 degrees in perfect adjustment.



*This drawing includes use cases for general information only*

**MACHINERY DETAILS  
 230' SWING SPAN**

ROUTE SEC.  
**ARKANSAS STATE HIGHWAY COMMISSION**  
 LITTLE ROCK, ARK.  
 Drawn By: RA Date: 1-5-31  
 Traced By: EAW Date: 12-11-31  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 Scale: 1/8" = 1' n.  
 BRIDGE NO. \_\_\_\_\_ DRAWING NO. 3317

*M.B. Hanna*  
 BRIDGE ENGINEER

FISCAL YEAR	SHEET NO.	TOTAL SHEETS

RODS - S4  
 Torque = 70,035\*\*  
 Plus 5% Fr. = 3,502  
 Total = 73,537\*\*  
 Max. Pull =  $\frac{3}{8} \times 73,537 = 9,192$ \*\*  
 Plus 5% Fr. Loss = 459  
 Total Pull = 9,651\*\*  
 Use 1" rod

SHAFT S6 AT P5  
 Torque = 5549 x 2 = 11098\*\*  
 Fr. @ 5% = 555  
 Total T = 11653\*\*  
 Bending Mom. at P5 = 5549 x 4 = 22,196\*\*  
 Tequiv. =  $\sqrt{(11,653)^2 + (22,196)^2} = 25,100$ \*\*  
 2 keys @ 25% = 6,275  
 Total T = 31,375\*\*  
 Dia. Shaft Req'd,  $d^3 = 31,375 \times 0.000508 = 16.0$   
 $d = 2.52$   
 Use  $d = 2 \frac{5}{8}$ "

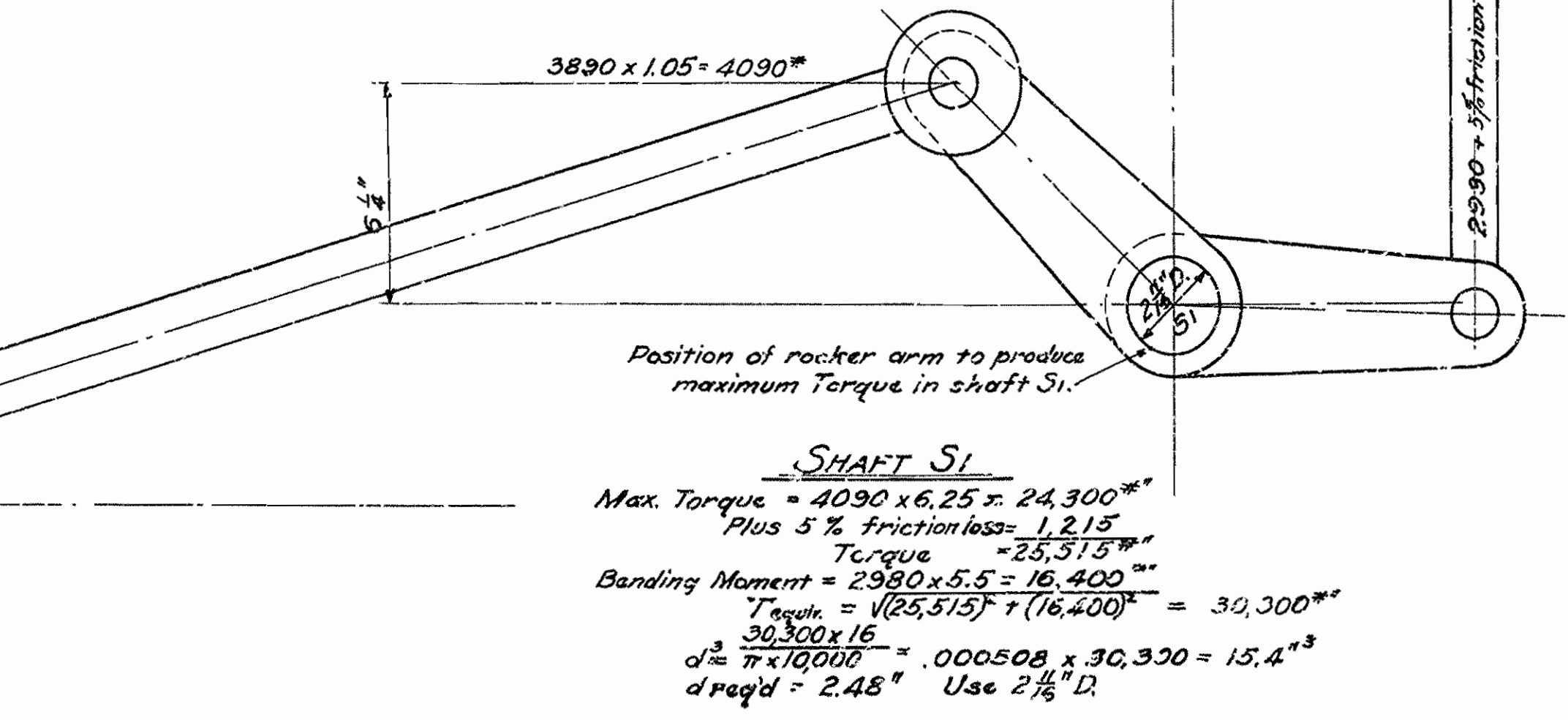
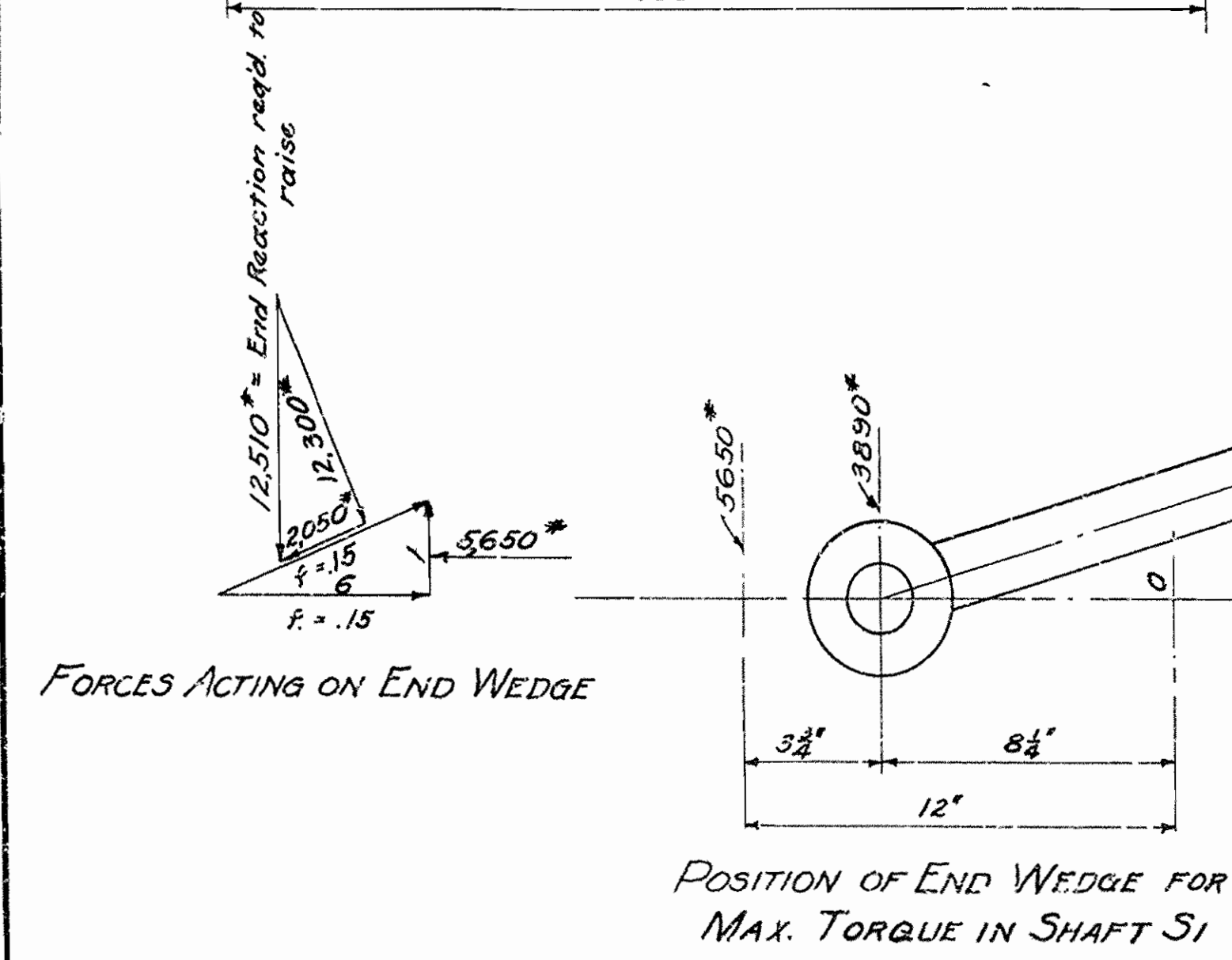
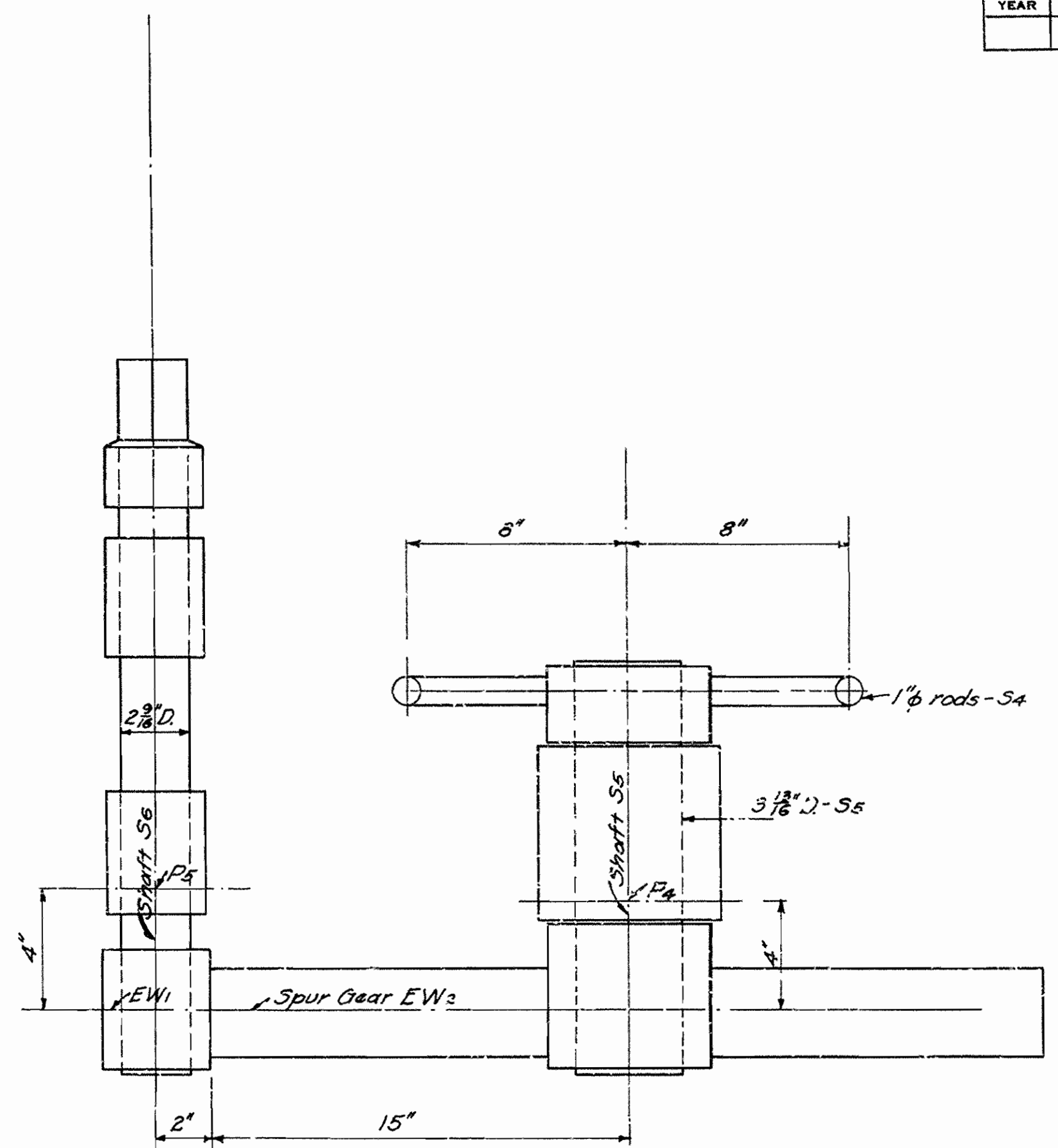
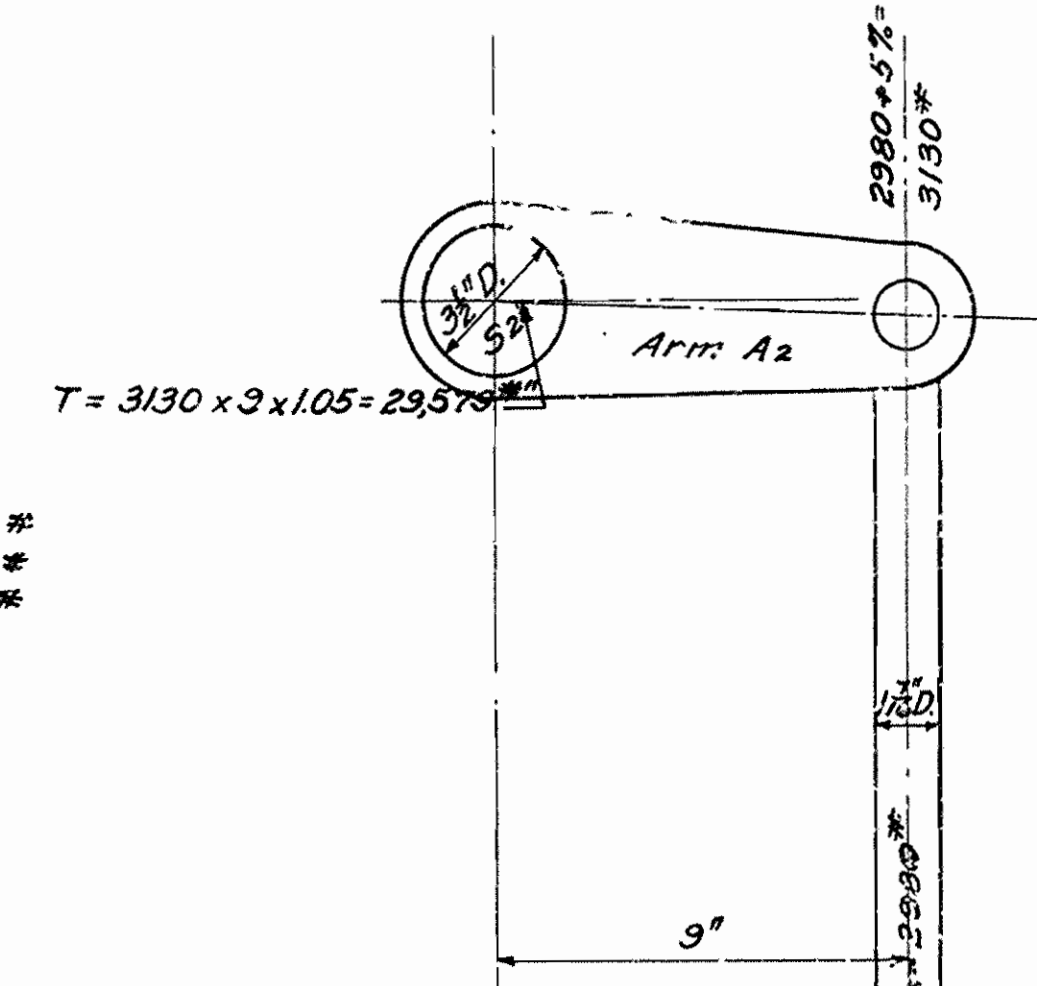
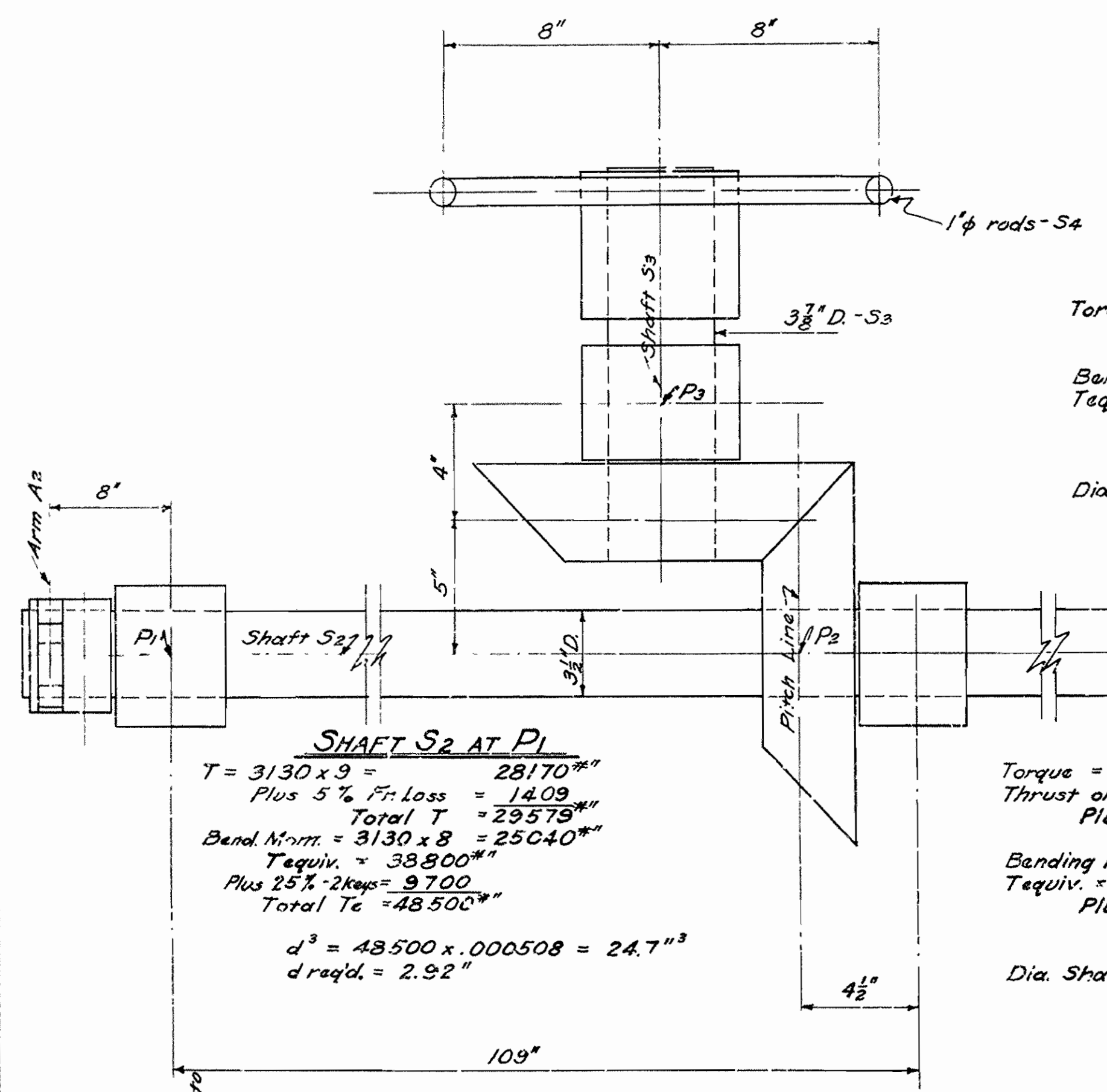
SHAFT S3 AT P3  
 Torque = 13,340 x 5 = 66,700\*\*  
 Fr. Loss @ 5% = 3,335  
 Total = 70,035\*\*  
 Bending Moment = 13,340 x 4 = 53,360\*\*  
 Tequiv. =  $\sqrt{(70,035)^2 + (53,360)^2} = 88,000$ \*\*  
 2 keys @ 25% = 22,000  
 Total T = 110,000\*\*  
 Dia. Shaft Req'd  $d^3 = 110,000 \times 0.000508 = 56.0$   
 $d = 3.82$   
 Use Dia. = 3  $\frac{3}{8}$ "

SHAFT S2 AT P2  
 Torque = 29,579 + 14,779 (5% loss) = 31,058\*\*  
 Thrust on Bevel Gear =  $\frac{3}{8} (29,579 + 31,058) = 12,127$ \*\*  
 Plus 10% Friction Total = 13,240\*\*  
 Bending Moment = 13,340 x  $\frac{10.5}{12} \times 4.5 = 57,700$ \*\*  
 Tequiv. =  $\sqrt{(57,700)^2 + (13,240)^2} = 65,500$ \*\*  
 Plus 2 key ways @ 25% = 16,380  
 Total T = 81,880  
 Dia. Shaft Req'd  $d^3 = 81,880 \times 0.000508 = 41.7$   
 $d = 3.47$   
 Use  $d = 3 \frac{3}{8}$ "

SHAFT S5 AT P4  
 Torque = 9651 x 8 = 76,208\*\*  
 Fr. Loss @ 5% = 3,810  
 Total T = 80,018\*\*  
 Fr. on Spur Gear @ 2% = 1,600  
 Total T = 81,618\*\*  
 Force on Gear Teeth EW2 =  $\frac{1}{2} \times 81,618 = 54,400$   
 Fr. Loss of EW1 @ 2% = 1,090  
 Force Req'd on Teeth EW1 = 55,490\*\*  
 Bending Moment at P4 = 5440 x 4 = 21,760\*\*  
 Tequiv. =  $\sqrt{(81,618)^2 + (21,760)^2} = 84,600$ \*\*  
 2 keys @ 25% = 21,150  
 Total T = 105,750\*\*  
 Dia. Shaft Req'd,  $d^3 = 105,750 \times 0.000508 = 53.7$   
 $d = 3.78$   
 Use  $d = 3 \frac{7}{8}$ "

SHAFT S2 AT P1  
 T = 3130 x 9 = 28,170\*\*  
 Plus 5% Fr. Loss = 1,409  
 Total T = 29,579\*\*  
 Bend. Mom. = 3130 x 8 = 25,040\*\*  
 Tequiv. = 38,800\*\*  
 Plus 25% 2 keys = 9,700  
 Total T = 48,500\*\*  
 $d^3 = 48,500 \times 0.000508 = 24.7$   
 $d$  req'd. = 2.92"

SHAFT S1  
 Max. Torque = 4090 x 6.25 = 24,300\*\*  
 Plus 5% Frictionless = 1,215  
 Torque = 25,515\*\*  
 Bending Moment = 2990 x 5.5 = 16,400\*\*  
 Tequiv. =  $\sqrt{(25,515)^2 + (16,400)^2} = 30,300$ \*\*  
 $d^3 = \frac{30,300 \times 16}{\pi \times 10,000} = 0.000508 \times 30,300 = 15.4$   
 $d$  req'd. = 2.48" Use 2  $\frac{1}{2}$ " D.



This drawing includes all details for general information only.

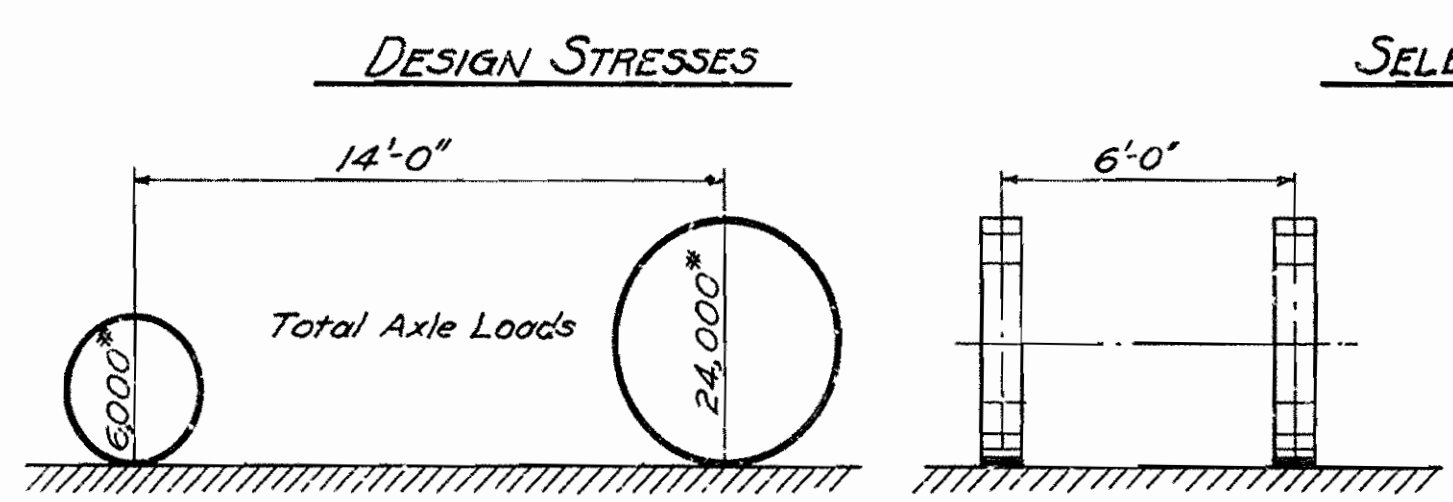
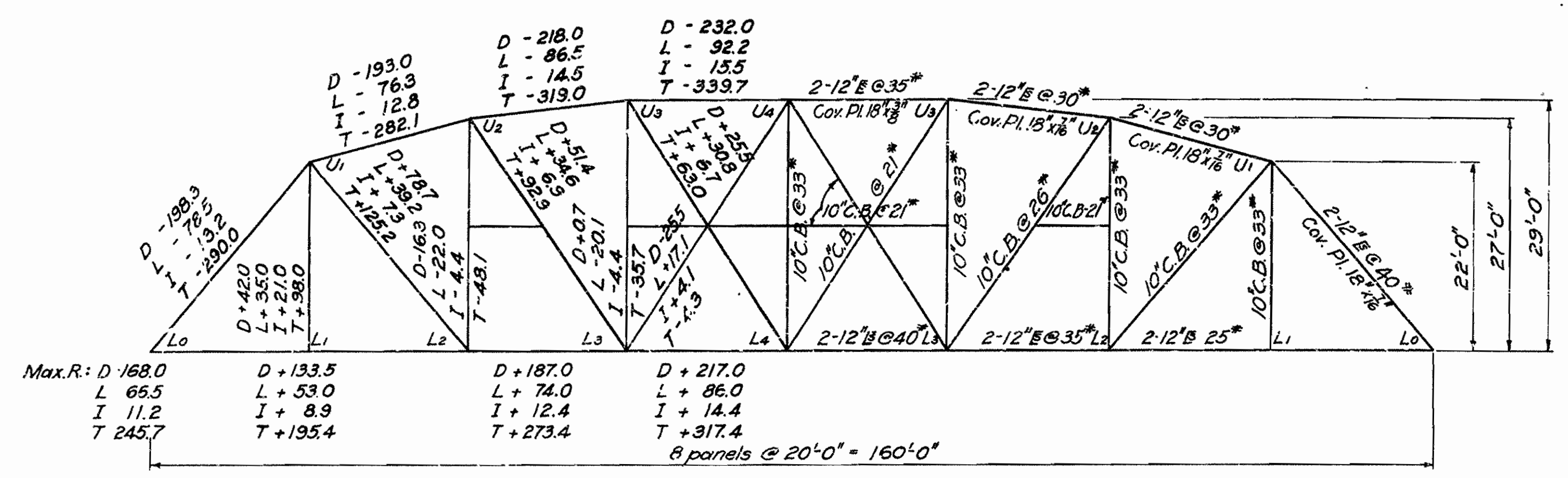
DETAILS OF  
 230 FT. SWING SPAN  
 DESIGN OF SHAFTS OPERATING END WEDGES

ROUTE SEC.  
 ARKANSAS STATE HIGHWAY COMMISSION  
 LITTLE ROCK, ARK.  
 Drawn By: Hiles Date: 11-26-32  
 Traced By: Hiles Date: 12-27-32  
 Checked By: Date:  
 BRIDGE ENGINEER  
 BRIDGE NO. 1931 DRAWING NO. 3317-A  
 Scale: 3 in. = 1 ft.





FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	ARK.	E258G	1933	6	18



ALLOWABLE STRESSES

Reinforced Concrete in Compression 750 lbs./sq.

Reinforcing Steel in Tension 16,000 lbs./sq.

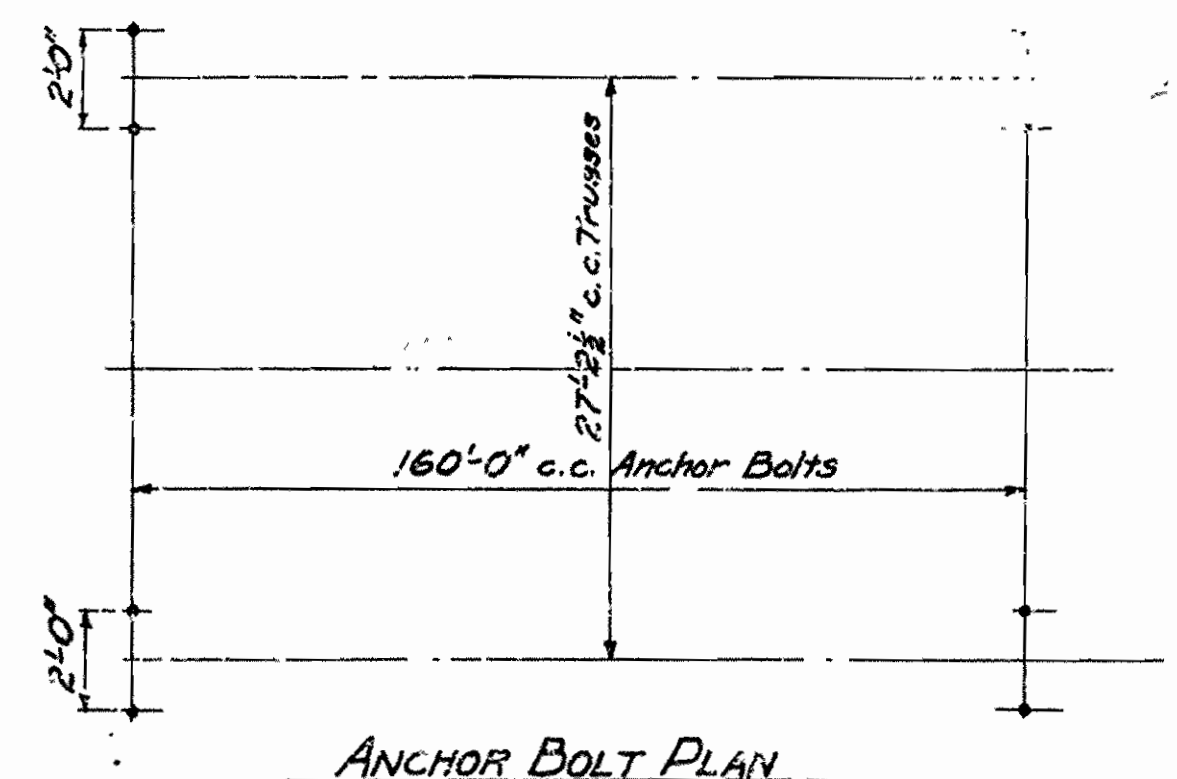
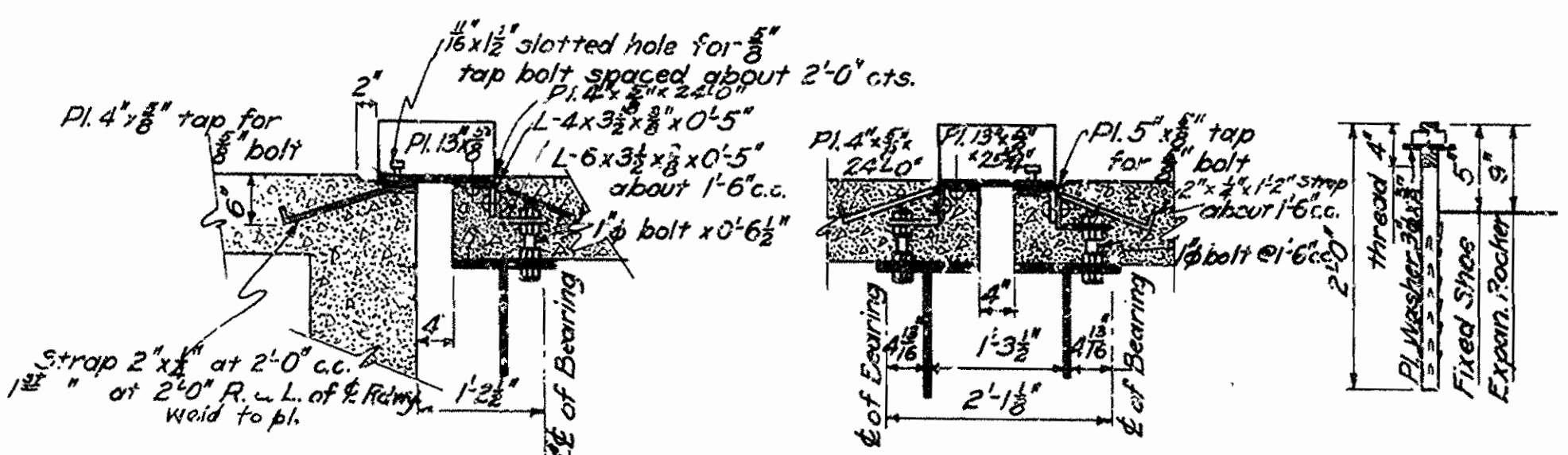
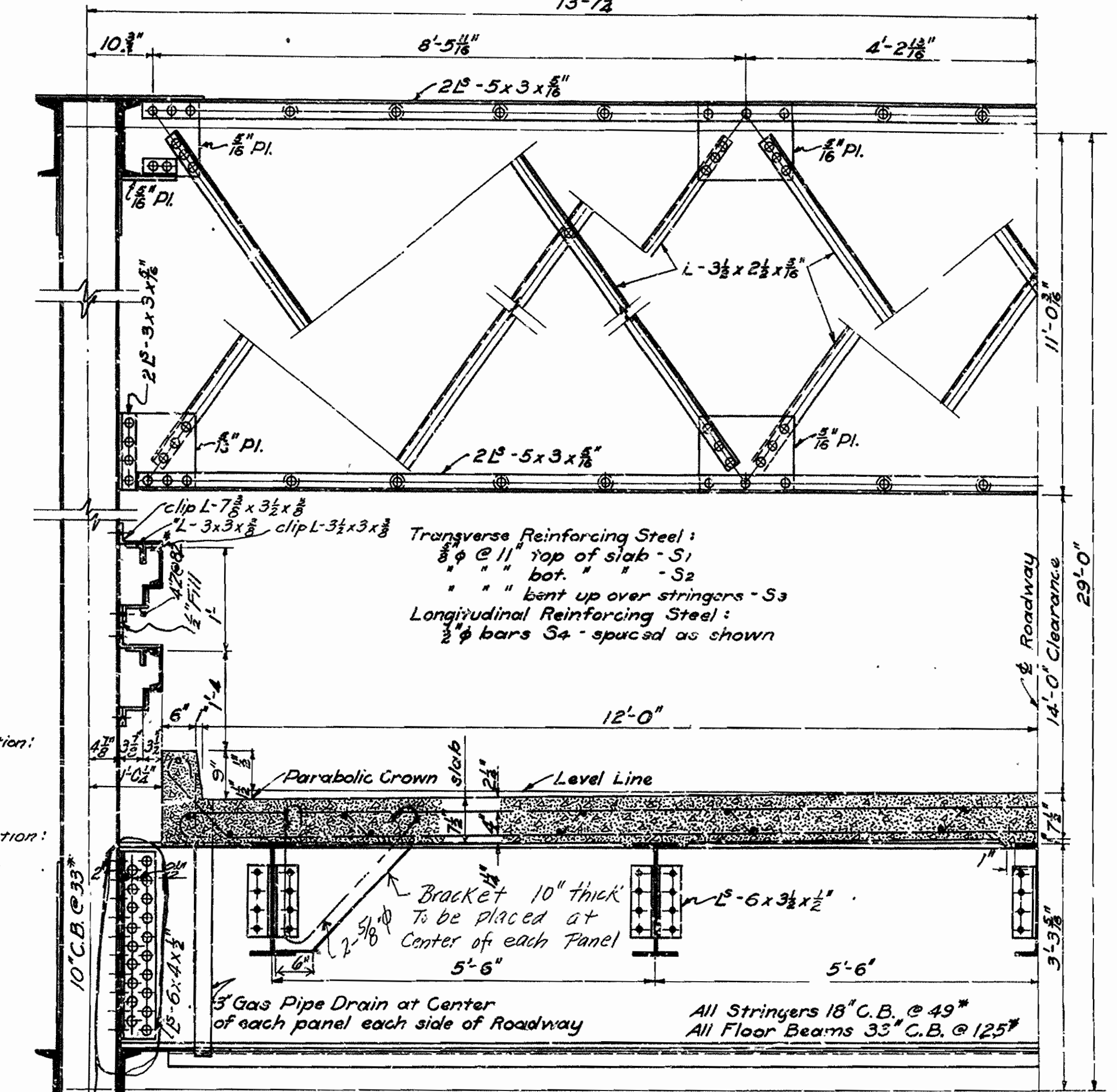
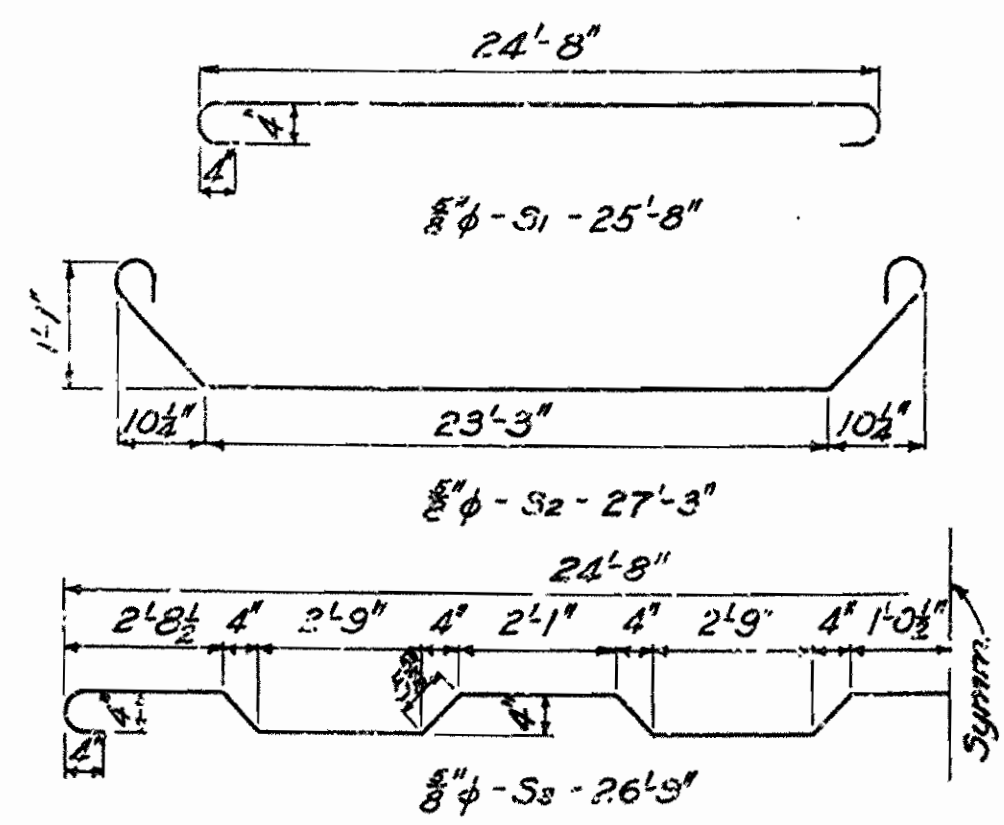
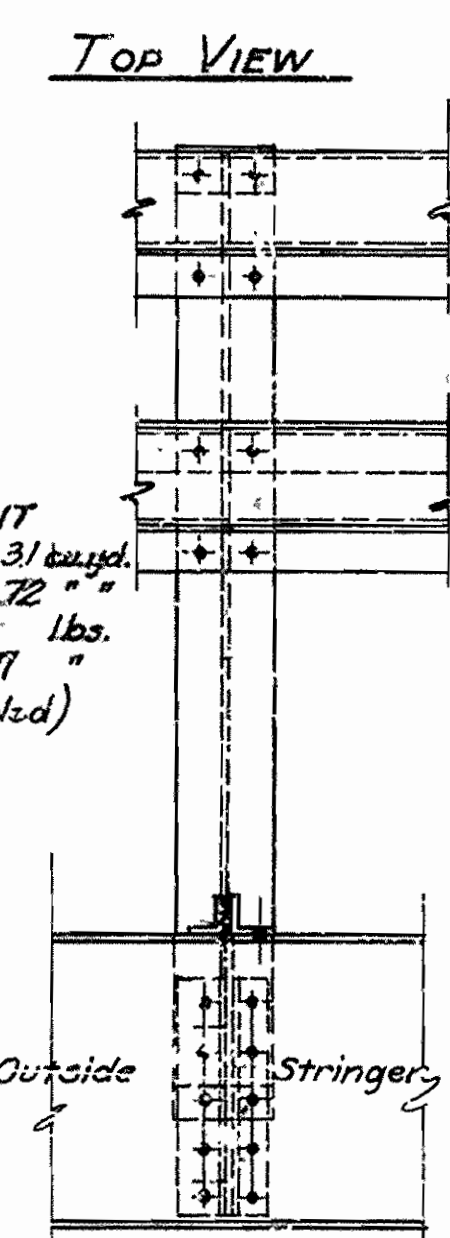
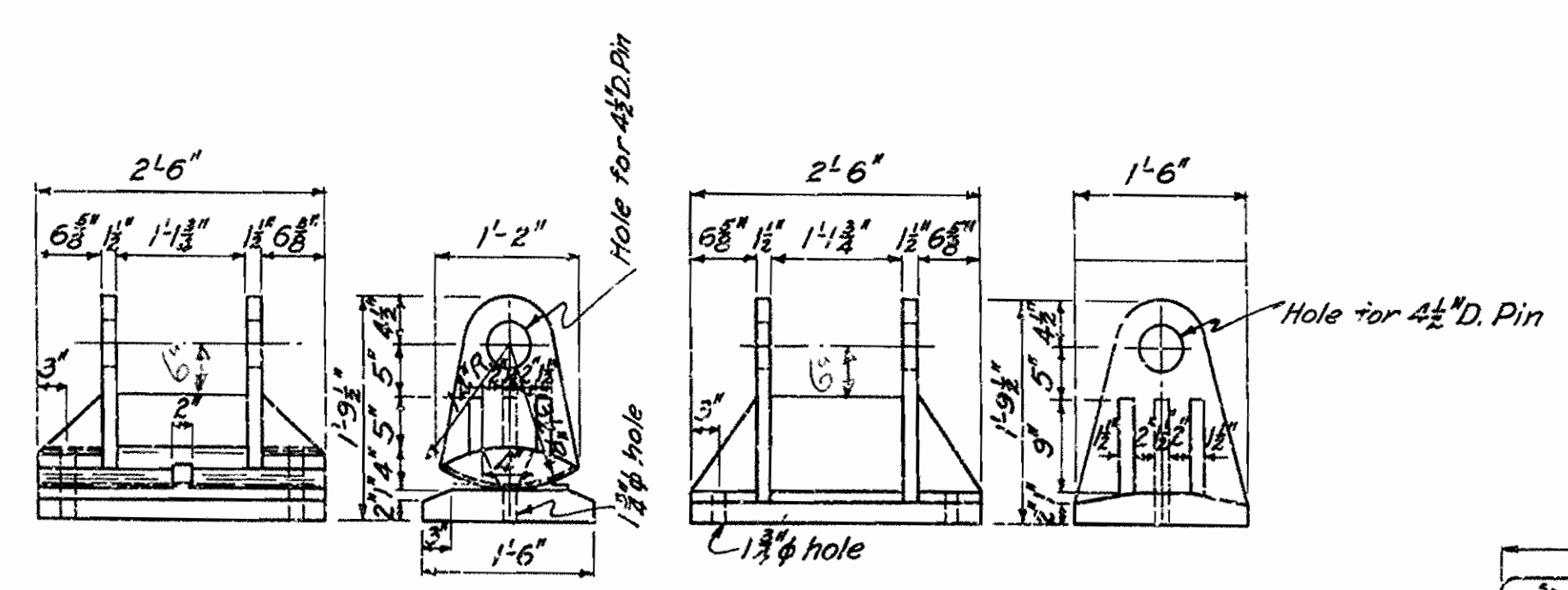
Structural 16,000 lbs./sq.

Modulus Ratio of Steel to Concrete 15

QUANTITIES

ITEM NO.	ITEM	AMOUNT
91	Class "S" Concrete for Bridges-Int. Span	100.31 cuyd.
91	Class "S" Concrete for Bridges-Adj. Conc.	100.72 "
92	Reinforcing Steel for Bridges	16,963 lbs.
96	Structural Steel-Truss Bridges	24,387 "

(Roadway Expan. Devices Have not been included)



Revised Nov. 16, 1932 - Increased length of Gas Pipe Drains-Red. Stringer and Floor Beam Conn. 15-R.S.H.-12-2-32.

**STANDARD PLAN**  
**160'-0" STEEL SPAN**  
 24'-0" CLEAR ROADWAY  
 ARKANSAS STATE HIGHWAY COMMISSION  
 LITTLE ROCK, ARK.

Drawn By: *C.C.C.* Date: 2-29-32  
 Traced By: *C.C.C.* Date: 2-14-33  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

Scale: 3/8" = 1'-0"  
 and as noted

*N.B. Garner*  
 BRIDGE ENGINEER

BRIDGE NO. \_\_\_\_\_ DRAWING NO. 3568