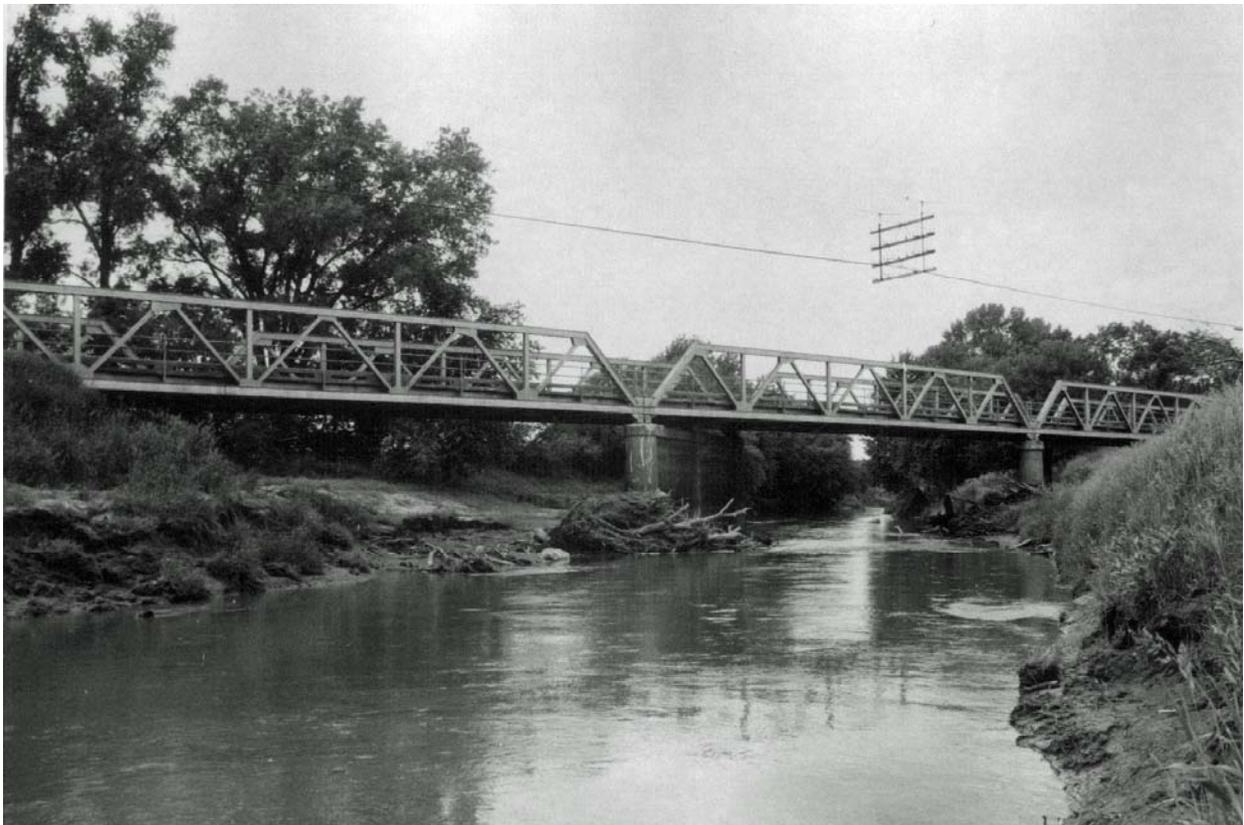


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# Documentation of the Historic East Fork Tarkio Creek Bridge

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Bridge No. J-176  
Atchison County, Route 136



June 1997



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## Historical Narrative

Bridge No. J-176 over the East Fork Tarkio Creek in central Atchison County was designed and constructed by the Missouri State Highway Department as a part of State Route 18 (later designated State Route 4; present U.S. Route 136), an east-west highway connecting the towns of Tarkio, Atchison County, and Maryville, Nodaway County, Missouri. Erected in 1929-30, the bridge consists of five 90'-0" rigid-connected Warren pony truss spans carried on a skew by reinforced concrete bents and piers. The bridge is significant as a skewed example of an otherwise commonplace Warren pony truss structural type.<sup>1</sup>

For the eleven miles from Tarkio east to the Atchison County line, Route 18 was laid out on a straight east-west course along the section line boundaries, paralleling an existing county road which had been subsumed as the initial state route. Bridge No. J-176 over the East Fork Tarkio Creek was included within the westernmost 2.05-mile stretch of Route 18, designated as Section 1. This segment encompassed both the east and west forks of Tarkio Creek and the broad, level, active floodplain surrounding the two creeks. Bridge engineers of the Missouri State Highway Department surveyed the location in the spring of 1929. They determined that a skewed design was necessary here because of the oblique angle of the highway with the stream which flowed in a southwesterly direction (a square design risked substructure scouring), and that a series of 90' spans would suffice to fit the channel and provide an outlet for overflow. In drawing up the detailed plans later in July 1929, highway department bridge designers advanced the two end abutments and four central piers left (north) of the highway centerline, thus aligning them nearly parallel with the current of the channelized East Fork Tarkio Creek. The acute and obtuse angles of the piers with the highway placed the five Warren pony truss spans on a 58-degree skew, or a two-panel (36'-0") length. The Section 1 project was contracted to the George W. Condon Construction Company of Omaha, Nebraska, on September 17, 1929, for \$180,354; the construction bid for Bridge No. J-176 amounted to \$58,989. Two other bridges--one over the West Fork Tarkio Creek (placed on a half-panel skew), and the other an overflow structure spanning the streams' floodplain--plus the construction of the roadway itself were also included in the Section 1 project.<sup>2</sup>

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<sup>1</sup> Clay Fraser, Tarkio Creek Bridge (J-176), "Historic Bridge Inventory Data Sheet," Missouri Historic Bridge Inventory, Missouri Highway and Transportation Department, Project No. NBIH (6), Loveland, Colorado: Fraserdesign, Inc., 1996.

<sup>2</sup> "Tabulation of Bids Recieved," Atchison County, Route 18, Section 1, September 1929, Bid Tabulations, Plans and Records Office, Design Division, Missouri Department of Transportation; Missouri State Highway Commission (MSHC), "Plan and Profile of Proposed State Road, Atchison County," Route 18, Sections 1, 1929, Plans and Records Office, Design Division, Missouri Department of Transportation, Jefferson City; Missouri State Highway Department (MSHD), "Bridge Over East Fork of Tarkio Creek," Bridge No. J-176, plan sheets, July 1929, Bridge Division, Missouri Department of Transportation, Jefferson City; Missouri; "Inspection Report", March 5, 1930, Bridge No.

The George W. Condon Construction Company based in Omaha included three principal men at the time of the East Fork Tarkio Creek Bridge project. George W. Condon held a half interest in the company, with the other half interest equally divided between Wilbur Cole and C. W. Cunningham. The company already had some experience with bridge construction in Missouri. One of their earliest projects, in fact, was another skewed bridge in neighboring Holt County. The structure there which the company erected in 1926 was a 120' Pratt through truss over Little Tarkio Ditch. The company had also erected two other Pratt through trusses in 1927 and 1928, one over the Mussel River in Chariton County, and the other over the 102 River in Nodaway County. They may well have had other road construction projects as well.<sup>3</sup> The company's work crews began the Route 18 project in the early winter of 1929, starting with the bridge pier excavations. Meanwhile, the state highway department improved the adjacent dirt road leading east from Tarkio to Burlington Junction, Nodaway County. Having been practically impassable, the road received an oiled gravel surface, giving motorists (and the Condon Construction crews) a much-needed connection with Route 71. "The construction of an all-weather highway to Savannah means a great deal to the people of this county," declared the *Tarkio Avalanche*. "During rainy weather it is almost impossible to get out of the county in any direction."<sup>4</sup> The bridge pier construction proceeded with a force of about twenty to thirty men under foreman T. J. Baucher. E. A. Shirley directly oversaw the work on behalf of the highway department. After excavating the pier locations with a three-quarter cubic yard clamshell steam shovel, a dragline crane equipped with a pile driver hammered in 35'-long timber pilings as support beds for the pier footings.<sup>5</sup>

The two end bents or open abutments were built from an identical design, each having three rectangular footings measuring 12' x 6' x 2'-6". The footings support three front-battered columns, 8'-5" x 4' at the base, which rise 25'-2" to top dimensions of 3'-9" x 4'-1". The centers of the columns are spaced 21'-1-3/4" apart. Between the three columns, a connecting cap beam 2'-9" wide distributes the load upon the columns while supporting the spans' end floor beams. The abutments' backwalls and wings are 7'-3-1/2" high x 1' wide x 62'-4" long. Between the outer abutments, the four central piers, all of similar dimensions, are three-column piers with web wall bracing. The two outer columns of each pier rest on footings measuring 9' x 9' x 5'; smaller footings for the central columns are 6'-5" x 6'-5" x 5'. The battered cylindrical outer columns have

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J-176 File, Bridge Division, Missouri Department of Transportation, Jefferson City.

<sup>3</sup> Registration of Fictitious Name, "Geo. W. Condon Co.," May 1926, Plans and Records Office, Design Division, Missouri Department of Transportation, Jefferson City; Clay Fraser, Missouri Historic Bridge Inventory, Draft Inventory Report, April 1996, 5 Vols. Missouri Highway and Transportation Department, Project No. NBIH (6), Loveland, Colorado: Fraserdesign, Inc., 1996.

<sup>4</sup> *Tarkio Avalanche*, September 27, October 4, 11, 1929; *Atchison County Mail* (Rockport), November 29, 1929.

<sup>5</sup> *Tarkio Avalanche*, January 10, 1930; "Inspection Report", March 5, 1930, Bridge File.

basal diameters of 6', while the bases of the smaller central columns are 4'-5" in diameter. As with the end abutments, the pier columns are spaced 21'-1-3/4" apart. The columns of Piers 2 and 5 (those nearest the end abutments) rise 20'-2"; the columns of the center piers on the stream embankments (Nos. 3 and 4) rest on deeper footings and so are slightly higher at 23'-2". The columns are connected with 3'-thick reinforced concrete web walls, and are topped with cap beams 1'-6" high x 3' wide. The center columns also have reinforced concrete blocks above the cap beam to support the center of the bridge floor. In erecting the reinforced concrete abutments and piers during the winter of 1929-30, the construction crew heated the water and sand with steam while mixing in the cement in a small two-bag concrete mixer. They extended steam pipes out to the poured concrete, keeping it heated for an average of five days to prevent it from freezing until it was properly cured. By March 1930, they had finished Piers 2 and 3 and the two end abutments. The highway construction inspector D. C. Wolfe reported, "The lines and workmanship on the piers that have been completed are very good." The excavations for Piers 4 and 5 were then about halfway done, and erection of the first steel truss spans was underway.<sup>6</sup>

Winter had meanwhile taken its toll on Atchison County's highways. In early February 1930, an ice jam had knocked out the existing bridge over the East Fork Tarkio Creek adjacent to the bridge construction site. An insubstantial wood plank structure, it was easily replaced by highway crews within a day's time. Although short sections of Routes 1 and 9 out of Rockport and Tarkio had been paved by then, the roads beyond still remained either graded earth or unimproved dirt roads which had disintegrated in the weather. In February, Oliver Clifton, the president of Tarkio's Chamber of Commerce, offered \$25 to any member of the State Highway Commission or any highway department engineer who could drive to any town in Atchison County without resorting to a tractor or team to pull them out. Later that spring, the *Tarkio Avalanche* reported that the lack of hard-surface roads had begun to shift the area's trade away from St. Joseph to Omaha, more readily accessible using Iowa's good road connections. E. M. Hackett, a cashier at the Farmers Bank of Tarkio, complained, "When we go to St. Joseph, we have a half road to Fairfax, eight miles, then forty-one miles of mud before we reach pavement again."<sup>7</sup>

With the completion of the first abutments and piers, the George W. Condon Construction Company steel crew began erecting the Warren pony truss spans. By early March 1930, Spans 1 and 2 (the westernmost spans) had been erected and the field riveting (with an on-site forge and compressed-air riveters) began on Span 1. Inspector Wolfe reported difficulties in getting the proper camber in these first trusses. "Due to the two panel skew," he wrote, "the spans tend to bear on two corners." Nevertheless, he pronounced the riveting to be "very good" and noted "the top chords of all the trusses [Spans 1 and 2] line up in good shape." Wolfe cautioned, however, "The remainder of the trusses which are to be erected should be watched closely, and all kinks that form in the top chords should be removed before the connections are fitted up." One

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<sup>6</sup> MSHD, Bridge No. J-176, plan sheets; "Inspection Report," March 5, 1930, Bridge File; *Tarkio Avalanche*, January 10, 1930.

<sup>7</sup> *Tarkio Avalanche*, February 14, April 25, 1930.

accident tainted the construction in early March when Charles Langfeldt, one of the steel workers, fell from the bridge to the frozen creek, breaking several bones in his feet and ankles.<sup>8</sup>

Each of the five rigid-connected Warren pony truss spans were built from a standard design developed by the Missouri State Highway Department during the 1920s (Standard Drawing S-807). The components consist of structural steel fabricated by the Inland Steel Company of East Chicago, Indiana. Steel members are connected by 3/4"-diameter rivets. The spans are each 90' long, with five panels of 18' as applied along the lower chords. The 58-degree, two-panel skew provides a total bridge length of 465'-0". Truss height is 9'-6", and the trusses are centered 22'-2" apart. The web system consists of inclined end posts and upper chords constructed of two 10" channels with cover plates and single lacing. The lower chords are built of two 12" channels with end plates and intermediate batten plates. Attached to 1/2" gusset plates, the lower chords are then anchored to the piers and abutments by rocker bearings on bearing plates, with 3-3/4" diameter pins. (The bearings alternate between fixed and expansion). Vertical posts serving as secondary braces against lateral forces caused by the skew are built-up channels (four angles) with continuous plates. Diagonal ties are two angles with batten plates; diagonal braces are four angles with continuous plates. Gusset plates connect the diagonals at the upper and lower chords. The floor system consists of 18" I-beam end floor beams, skewed for a two-panel length on alignment with the piers and abutments. Larger than the end beams, the floor beams at each panel point are 24" I-beams, and run perpendicular with the trusses. The deck is supported by eight 12" I-beam stringers per panel. Bottom lateral bracing, attached to the floor beams with gusset plates and bent plates and to the stringers with hanger bolts, are single angles except at the mid-point of each end beam where two angles are used. The reinforced concrete deck is 7-1/2" thick at the crown of centerline, having a 0 percent grade across the entire structure at an elevation of 920.7'. Concrete curbs 10" high are interspersed with 4'-6"-long weepholes. The roadway width is 20'-0". Inner railings are single angle posts placed at the center of each panel and 2" gas pipe rails, ending with ornamental ball posts. Bridge plates on the end posts read, "MISSOURI HIGHWAY DEPT, BRIDGE No J.176, 1930."<sup>9</sup>

The construction of the East Fork Tarkio Creek Bridge neared completion in mid-July 1930 as painters applied the first of three coats of paint. The Condon Construction Company crews had meanwhile worked simultaneously on the West Fork Tarkio Creek Bridge (a 70' skewed truss with four deck girder spans) and the intervening overflow structure (sixteen concrete deck girder spans). With the bridging nearly finished, the grading crew arrived in July and began building up the new connecting roadway to a height of 3' to 13' above the natural floodplain, working two shifts from dawn to dusk. An elevating grader lifted earth out of an adjacent borrow pit into waiting "power wagons" pulled by caterpillar tractors which then dumped the fill to form the roadway. "No time is lost," reported the *Tarkio Avalanche*, "and the small force of men are moving more dirt than a large crew with horse-power scrapers could move." Curious spectators trekked out to the job site every day to view the earth-moving equipment and the new bridges. On Tuesday, August 26, 1930, G. M. Harrison of the Missouri

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<sup>8</sup> *Tarkio Avalanche*, March 7, 1930; "Inspection Report," March 5, 1930, Bridge File.

<sup>9</sup> MSHD, Bridge No. J-176, plan sheets.

State Highway Department inspected and approved the east half of the project, including the East Fork Tarkio Creek Bridge. Over the next two weeks the Condon Construction crews speeded up their work on the west half of the project, completing the grading, putting the last coat of paint on the West Fork Tarkio Creek Bridge, and laying 7"-thick blocks of riprap along the bridges' abutments before heading for another job in Cumberland, Iowa. Highway department officials formally accepted the two-mile project on September 11, nearly one year after awarding the contract. The department quickly placed a layer of gravel on the new road to finish the job.<sup>10</sup>

Although miles of Route 18 remained to be improved with modern bridges and grading, this first segment, along with the oiled gravel on the rest of the route, provided motorists with an important connection between Tarkio and Maryville. The *Tarkio Avalanche* gratefully noted the new improvement:

While the width of No. 18 between Tarkio and Burlington Junction is not all that could be desired, the fact remains that Atchison County will have, after some years of agitation, a hard-surface outlet to the remainder of the state highway system, and as the route over No. 18 is as close to St. Joseph as highway No. 1, the county is fortunate in getting the work done and the state highway commission has fulfilled its agreement to bring a part of Northwest Missouri out of the mud this year.<sup>11</sup>

Some sixty-seven years after its completion, the East Fork Tarkio Creek Bridge remains [1997] substantially unaltered, surviving as one of approximately twenty-two skewed bridges identified in the Missouri Historic Bridge Inventory. Atchison County alone has three other skewed bridges within its boundaries. The earliest, built in 1923 by the Missouri State Highway Department, is a 140'-long, rigid-connected Pratt through truss over Big Tarkio River on U.S Route 59. This structure's other components consist of a Pratt pony truss and steel stringer approach spans. Another built by the county in about 1925 is an 84'-long, rigid-connected Camelback pony truss span over the East Fork Little Tarkio Creek, on County Road 481. Flanked by steel stringer approach spans at each end, the trusses are built of two-angle members. The other skewed bridge in Atchison County is on County Road 114 over West Tarkio Creek. Built around 1940, this span is a 100'-long, six-panel Pratt pony truss.<sup>12</sup>

Other skewed bridges within the state include eight using Warren pony truss spans (four with polygonal upper chords). Of these, the earliest example is the Flat Creek Bridge in Benton County, built in 1913 by the Kansas City Bridge Company. It is also the shortest extant example, being a 36'-long, three-panel structure. Only the Doxie Creek Bridge in Chariton County carries five spans (one 100' and four 70') as does the East Fork Tarkio Creek Bridge. It was built in 1929, about one year before the East Fork Tarkio Creek Bridge was completed. The Shoal Creek Bridge in Livingston County, crossing a channelized stream like the East Fork Tarkio Creek Bridge, has one five-panel, 100' Warren pony truss span, flanked by steel stringer approach spans. Constructed in 1933, this structure features timber abutments and piers, and a timber deck. In Phelps County, the Bourbeuse River Bridge has two skewed, 100'-long, six-panel Warren pony

<sup>10</sup> *Tarkio Avalanche*, July 11, 18, August 29, September 12, 1930.

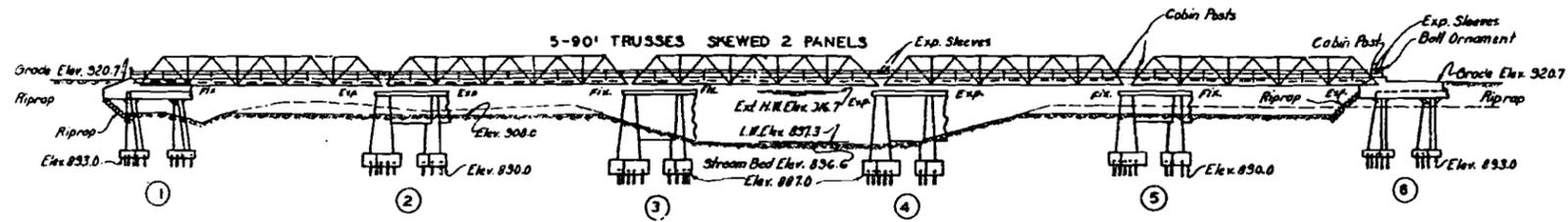
<sup>11</sup> *Tarkio Avalanche*, September 12, 1930.

<sup>12</sup> Clay Fraser, Missouri Historic Bridge Inventory, 1996.

truss spans. This structure was designed and built in 1933-34. Two skewed polygonal Warren pony truss bridges are located on Route 79 in Pike County, one over Calumet Creek and the other crossing Noix Creek. Both are similar in design and components, each being ten-panel, 100-foot spans built in 1935-36. The 102 River Bridge constructed in 1947 on Route E in Andrew County is one of the longer Warren pony truss spans at 120'; its vertical and diagonal web members are built of I-beams. It is coupled with five steel stringer approach spans. The Horse Creek Bridge in Vernon County is the latest skewed polygonal Warren pony truss, built in 1947-48. It is also one of the longer examples, at 110' (ten panels).<sup>13</sup>

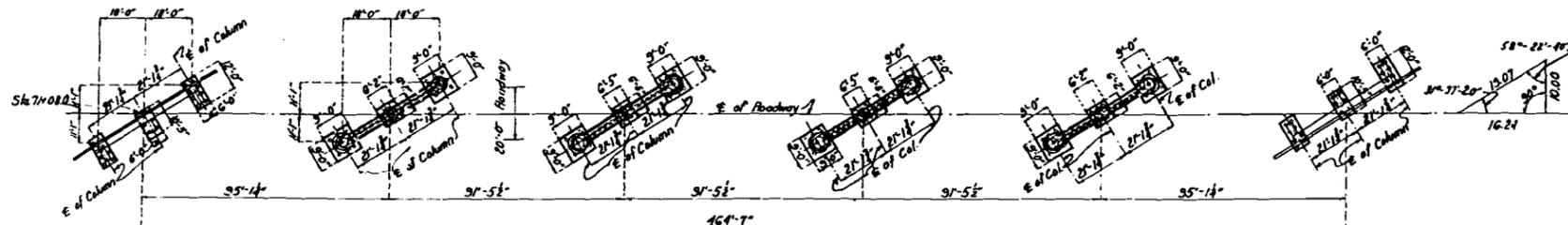
# MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R18-81	19		



GENERAL ELEVATION

Note: All piling to be plain timber piles 35'-0" long. No piling to be ordered until authorized in writing by Engineer.



PLAN

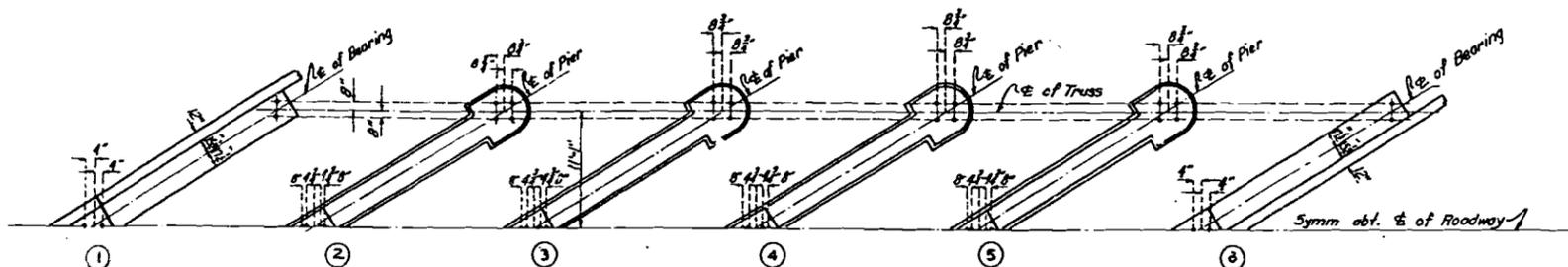
### COMPLETE BILL OF REINFORCING

No.	Size	Length	Mark	Location	Banding Sketches & Cutting Diagrams	No.	Size	Length	Mark	Location	
<b>Superstructure</b>											
257	1/2"	20'-9"	A1	Slab		152	1/2"	5'-5"	V1	Back Wl.	
255	1/2"	22'-9"	A2	"		8	1/2"	7'-0"	V2	Wing	
125	1/2"	22'-9"	A3	"		36	1/2"	11'-5"	V3	"	
52	1/2"	41'-0"	B1	"		8	1/2"	27'-0"	V4	Column	
13	1/2"	48'-9"	B2	"		8	1/2"	15'-9"	V1	Wing	
7	1/2"	45'-0"	B3	"		6	1/2"	17'-3"	T2	"	
28	1/2"	45'-6"	B4	"		58	1/2"	12'-6"	U1	Beam	
205	1/2"	24'-0"	C1	"		24	1/2"	9'-0"	F1	Haunches	
152	1/2"	20'-6"	C2	Curbs		36	1/2"	5'-5"	D1	Footings	
16	1/2"	23'-3"	C3	"		6	1/2"	15'-6"	T3	Wings	
32	1/2"	19'-9"	C4	"		Piers No. 2, 3, 4 & 5					
550	1/2"	12'	C5	"		32	1/2"	22'-6"	H2	Cap.	
135	1/2"	20'-0"	E1	Slab		88	1/2"	23'-3"	H3	Web Wl.	
5	1/2"	21'-0"	E2	"		24	1/2"	24'-3"	H4	"	
4	1/2"	24'-0"	E3	"		80	1/2"	17'-3"	V6	"	
8	1/2"	20'-0"	E4	"		32	1/2"	27'-6"	V7	Columns	
60	1/2"	7'-0"	C6	"		88	1/2"	8'-3"	D2	Footings	
<b>Bents No. 1 &amp; 6</b>											
32	1/2"	25'-0"	H1	Beam		12	1/2"	22'-9"	V5	Columns	
8	1/2"	24'-0"	H2	"		12	1/2"	25'-9"	V6	"	
18	1/2"	17'-3"	H3	Wing	48	1/2"	7'-6"	P1	Cap.		
2	1/2"	32'-9"	H4	"	288	1/2"	7'-0"	P2	"		
24	1/2"	22'-9"	H5	Back Wl.	12	1/2"	11'-6"	U3	"		
8	1/2"	12'-9"	H6	Wings							
2	1/2"	11'-0"	H7	"							
4	1/2"	9'-0"	U1	Haunch							
8	1/2"	3'-6"	V2	"							

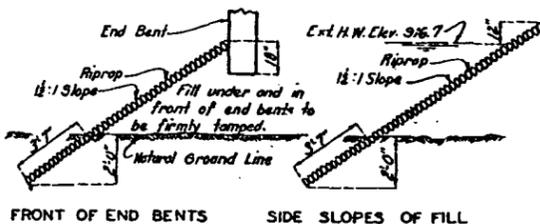
Note: Dimensions given are along  $\frac{1}{2}$  of bars and are for computed lengths.

### GENERAL NOTES:

Concrete in superstructure to be 1:2:3 1/2 mix.  
 All other concrete to be 1:2:4 mix.  
 Exposed edges shall be beveled  $\frac{1}{4}$ " where no other bevel is noted.  
 Two name plates type "B" as shown on Std. S-818 to be furnished and placed by contractor.  
 Cost of name plates to be included in price bid for other items.  
 Where bituminous felt is used in expansion or partition joints in concrete slabs, felt to be secured to one face of concrete with copper wire.  
 Structural steel to be sub-punched, matchmarked and reamed. See Specifications.  
 Truss spans to be assembled complete in shop for inspection. See Special Provisions.  
 Detail shop drawings for the steel spans shall be submitted to the State Highway Department in duplicate and shall be approved before steel is fabricated.  
 Point: Shop: Contact surfaces one coat of red lead.  
 Field: Surfaces inaccessible after erection three coats of red lead.  
 All other surfaces three coats of paint.  
 All paint will be furnished by the Missouri State Highway Department.  
 For details of Pedastals and Rockers see Std. S-807.  
 Rivets:  $\frac{3}{4}$ " Diam. Holes  $\frac{1}{2}$ " Diam. unless otherwise specified.  
 Piles to be driven to sustain a load of 20 tons per pile.  
 Excavation in accordance with specification XLIX of Standard Specifications issued November 1, 1926 except that quantities paid for will be computed from extreme L.M. Elev. 831.3 where existing ground line is below this elevation.

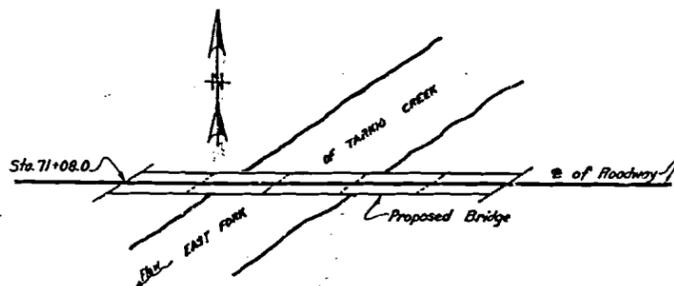


HALF ANCHOR BOLT PLAN



RIPRAP SKETCHES

Riprap fills at ends of bridge as shown in sketches. Approximately 570 Sq. Yds of riprap work included in road contract.



LOCATION SKETCH

### ESTIMATED QUANTITIES

Item	Superstr.	Substr.	Total
Excavation Cu Yds.		1028.0	1028.0
Concrete 1:2:3 1/2 mix. Cu Yds.	218.0		218.0
Concrete 1:2:4 mix. Cu Yds.		576.4	576.4
Plain Timber Piling Lin. Ft.		4620.0	4620.0
Plain Timber Pile Cut Offs Lin. Ft.		396.0	396.0
Reinforcing Steel Lbs.	43650	21080	64730
Structural Steel Lbs.	402680		402680
Cast Steel Lbs.	4300		4300
Cast Pipe Rail Lin. Ft.	1869.0		1869.0

B.M. Elev. 913.71 Top of N.W. Bolt of N.W. Coisson 100' Rt. of Sta. 71+00.  
**BRIDGE OVER EAST FORK OF TARKIO CREEK**

STATE ROAD FROM TARKIO TO BURLINGTON JUNCTION  
 ABOUT 1 MILE EAST OF TARKIO  
 PROJECT NO. R18-51 STA. 71+08.0

ATCHISON COUNTY

DESIGNED BY *[Signature]* DATE 8/14/29  
 APPROVED BY *[Signature]* DATE 8/14/29  
 CHIEF ENGINEER

STD. S-807

STD. S-818

J-176

Drawn July 1929 by J.O.  
 Traced July 1929 by L.M.V.  
 Checked July 1929 by P.B.R.

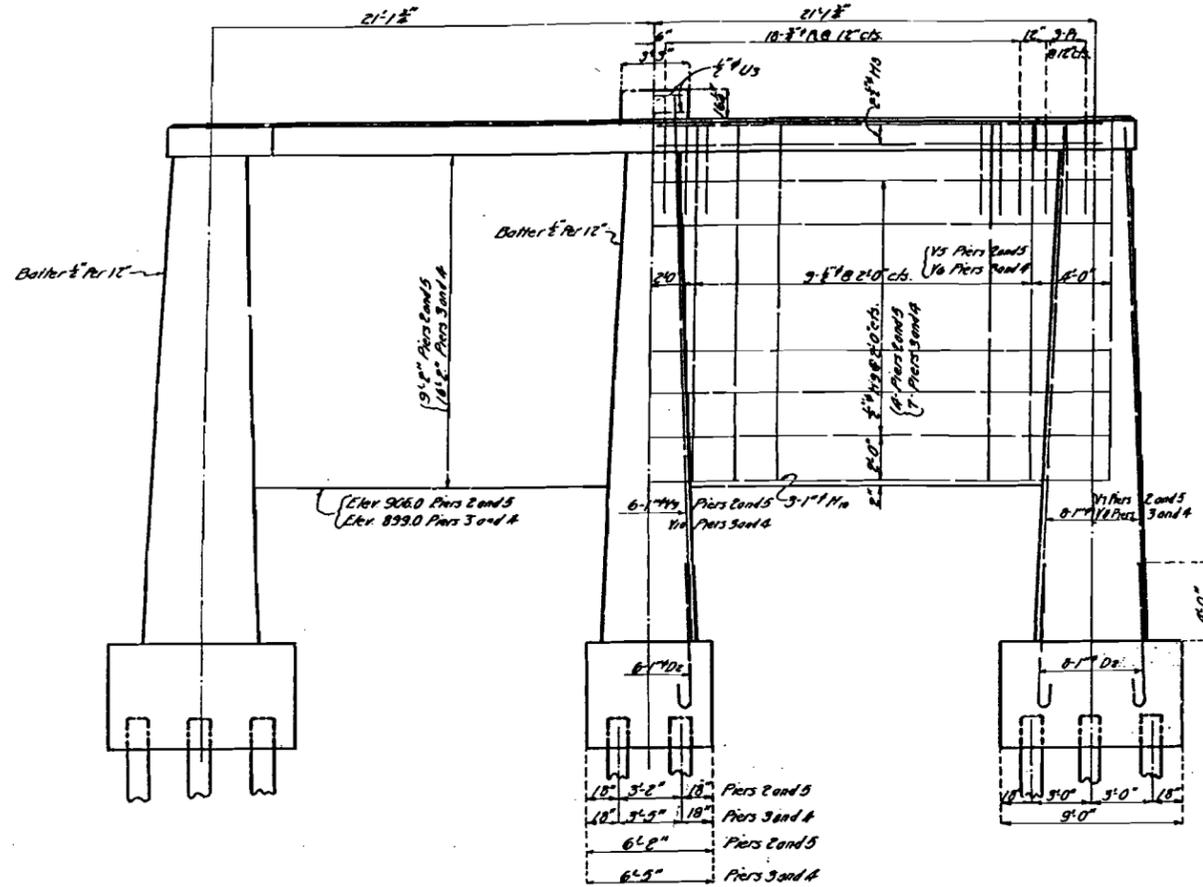




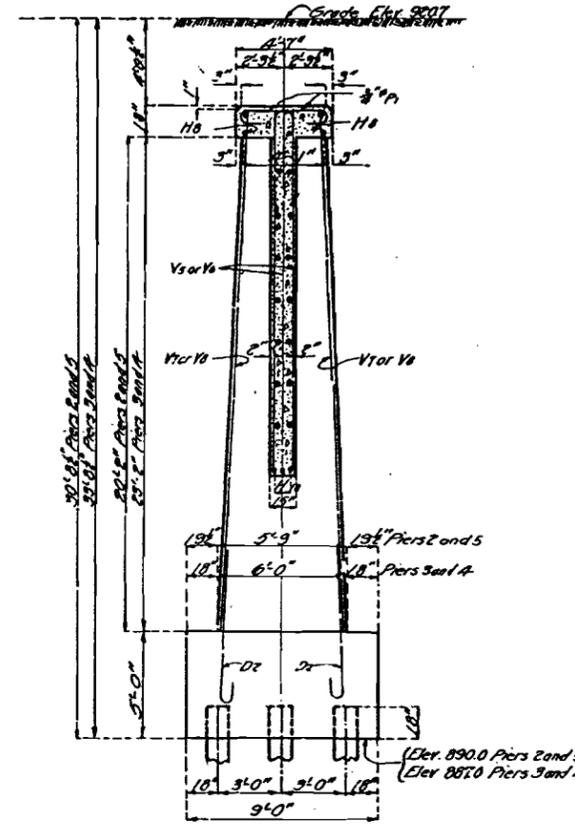


MISSOURI STATE HIGHWAY DEPARTMENT

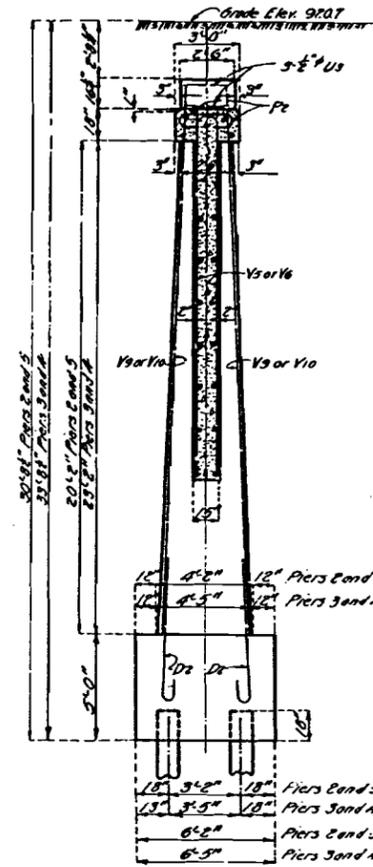
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5	MO.	R.18-31	19		



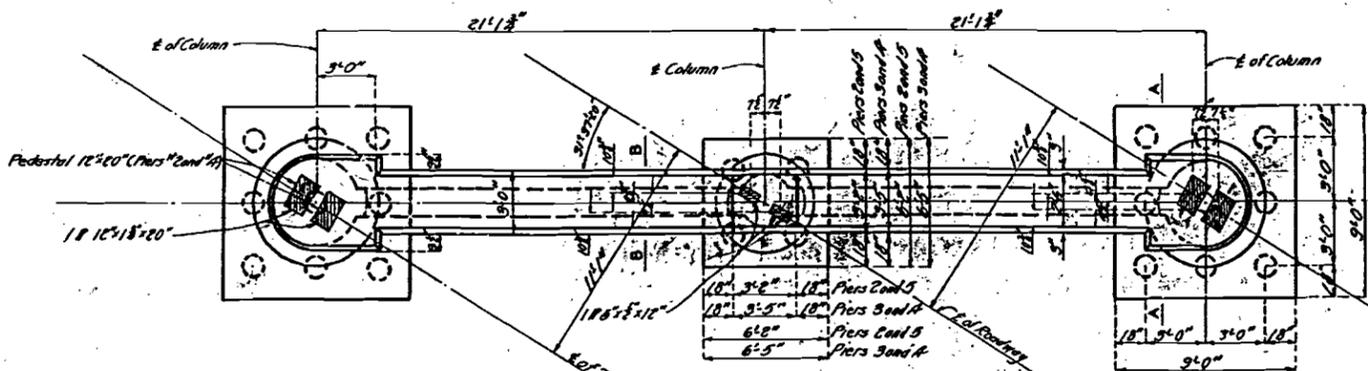
ELEVATION



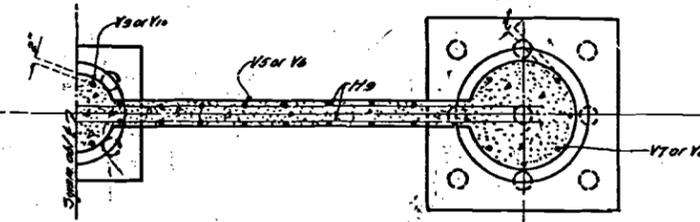
SECTION A-A



SECTION B-B



PLAN



HALF HORIZONTAL SECTION

DETAILS OF PIERS 2,3,4 & 5

BRIDGE OVER EAST FORK OF TARKIO CREEK

STATE ROAD FROM TARKIO TO BURLINGTON JUNCTION  
ABOUT 1 MILE EAST OF TARKIO

PROJECT NO. R.18-31 STA 71+08

ATCHISON COUNTY

SUBMITTED BY: *J. McQuinn* DATE: 9/14/29  
APPROVED BY: *J.A. Cullen* DATE: 9/14/29  
BRIDGE ENGINEER CHIEF ENGINEER

STD. 5807

STD. S 818

J-176

Drawn July 1929 by U.B.  
Traced July 1929 by U.B.  
Checked July 1929 by P.B.R.

Sheet No. 5 of 5

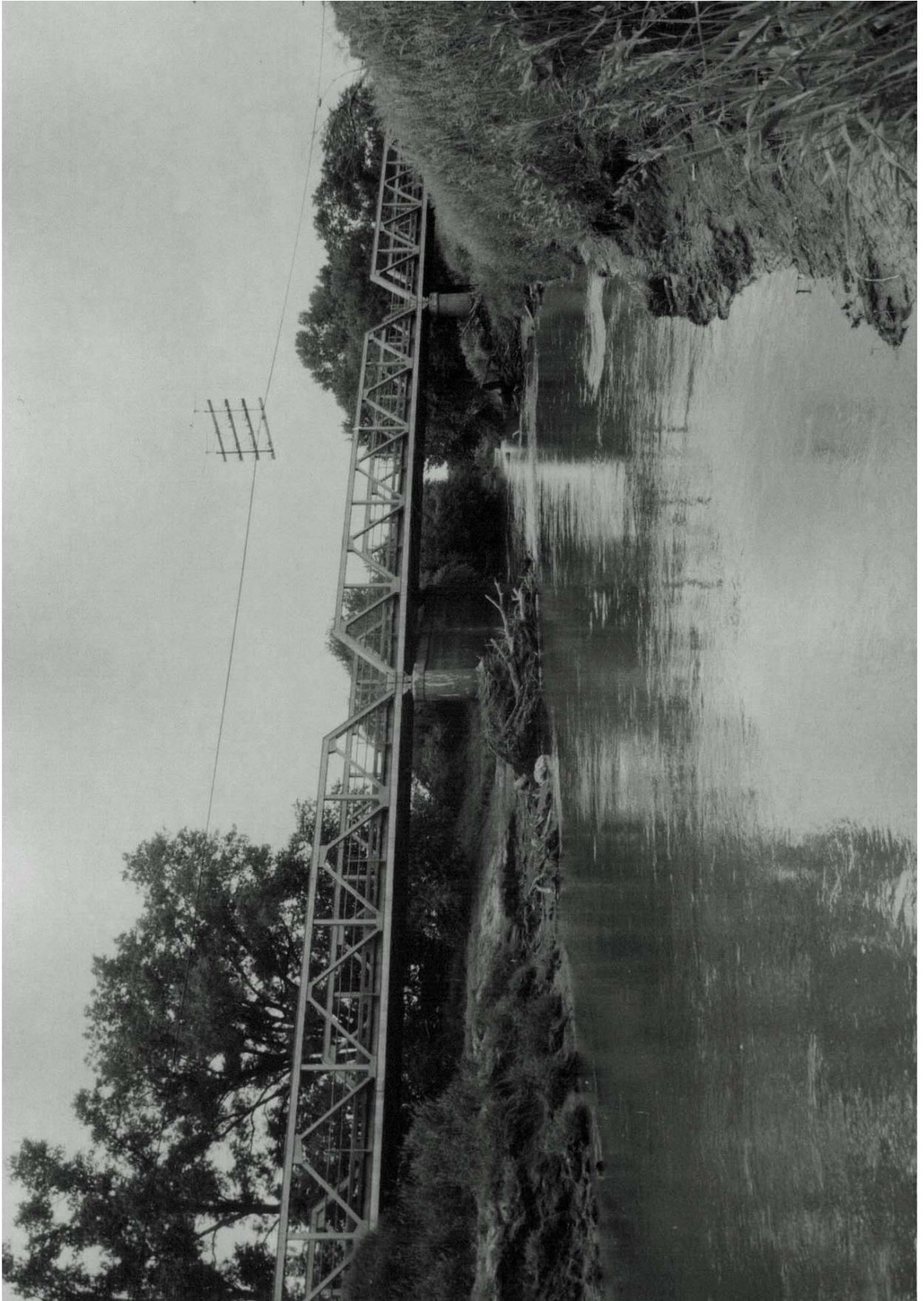
445

## INDEX TO PHOTOGRAPHS

Bridge No. J-176, East Fork Little Tarkio Creek, Route 136, Atchison County

1. East Fork Tarkio Creek Bridge, view to the southwest (downstream).
2. East Fork Tarkio Creek Bridge, view to the northeast.
3. East Fork Tarkio Creek Bridge, view to the northwest
4. Typical span (Span No. 4) over East Fork Tarkio Creek, view to the southwest (downstream).
5. East Fork Tarkio Creek Bridge, view to the west.
6. East Fork Tarkio Creek Bridge, view to the east.
7. View of typical pier (Pier No. 3).
8. Typical view of bridge floor connections at pier.
9. View of inclined end post (note ornamental end rail post).
10. Close-up view of typical hip joint.
11. View of typical connection of upper chord and diagonals.
12. View of typical connection of lower chord, diagonals, and vertical post.
13. Close-up view of end panel connections and pinned rocker bearings.
14. Close-up view of lower chord/inclined end post connection on end abutment bearing seat.
15. Close-up view of rocker bearing and lower chord/end floor beam connections.
16. View of underside of floor system.
17. Close-up view of Bridge plate.

Photograph 1



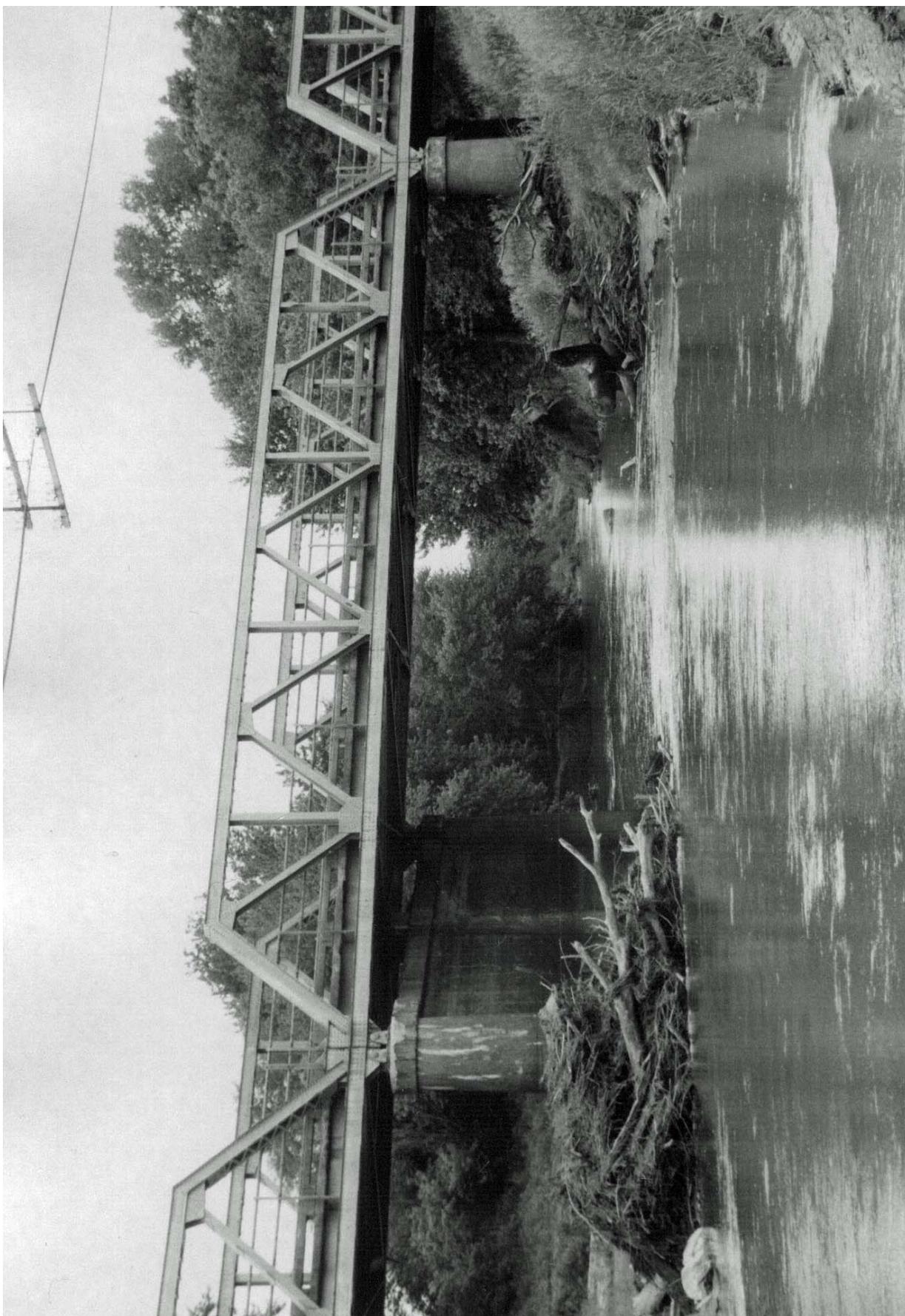
Photograph 2



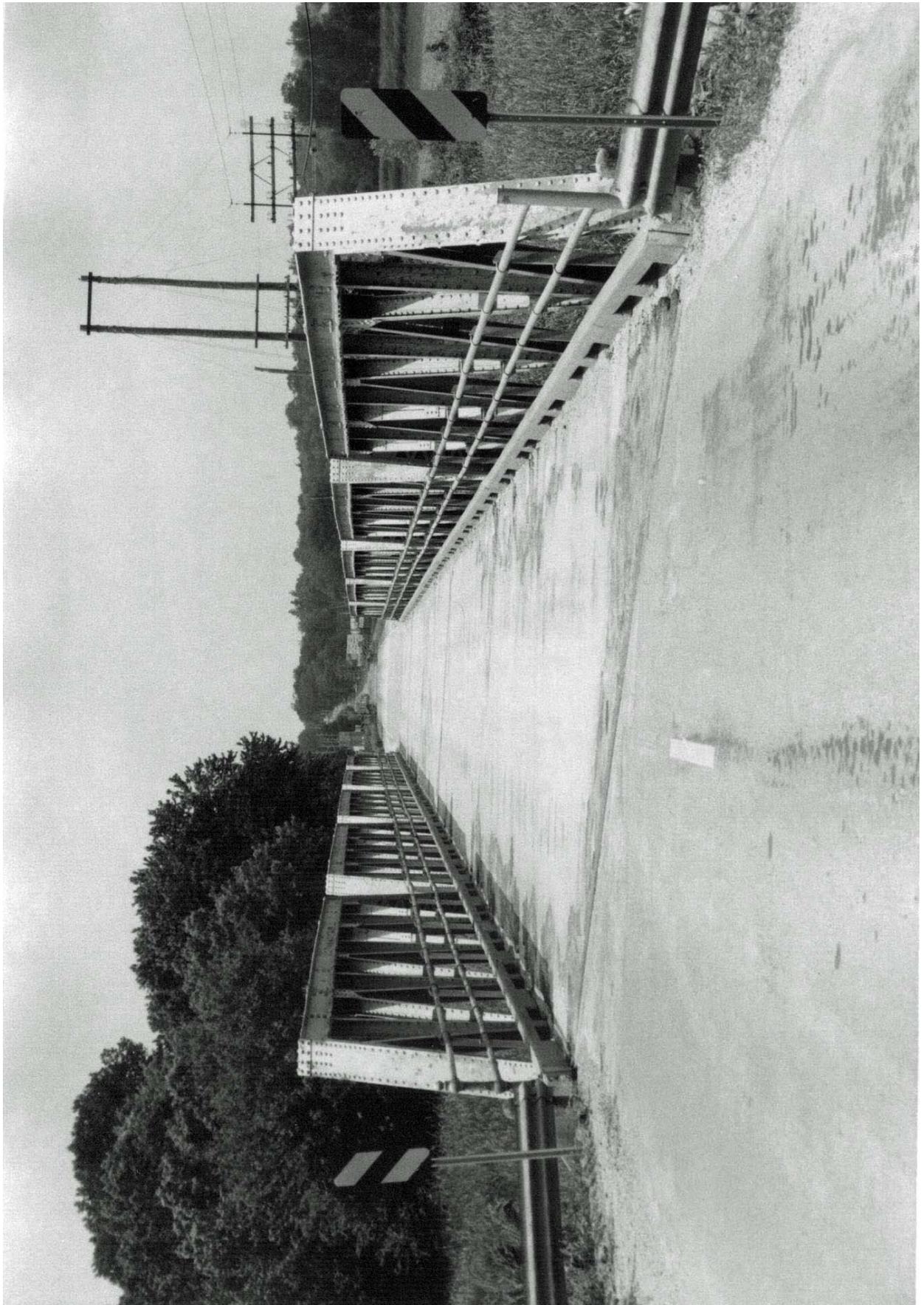
Photograph 3



Photograph 4



Photograph 5



Photograph 6



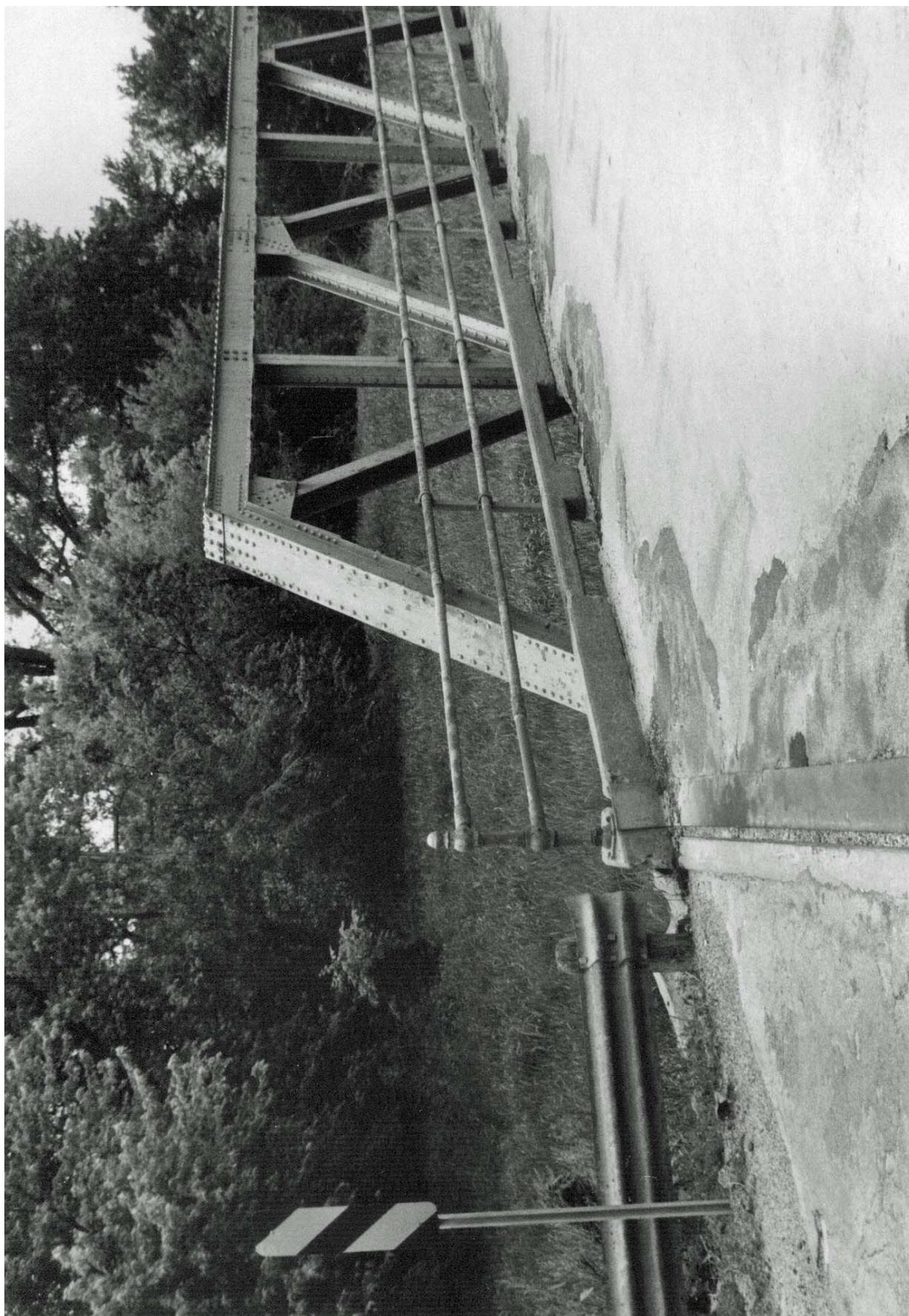
Photograph 7



Photograph 8



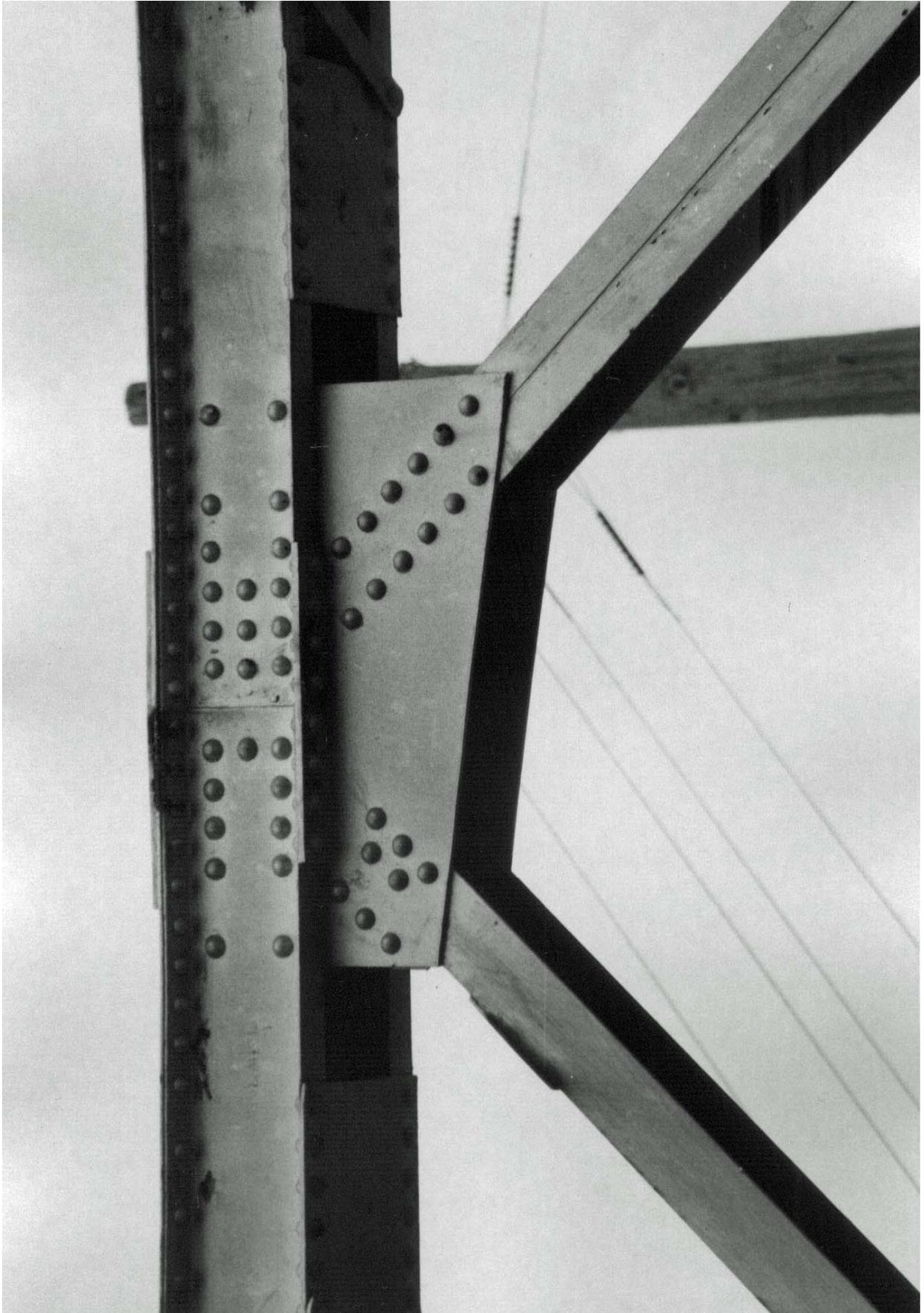
Photograph 9



Photograph 10



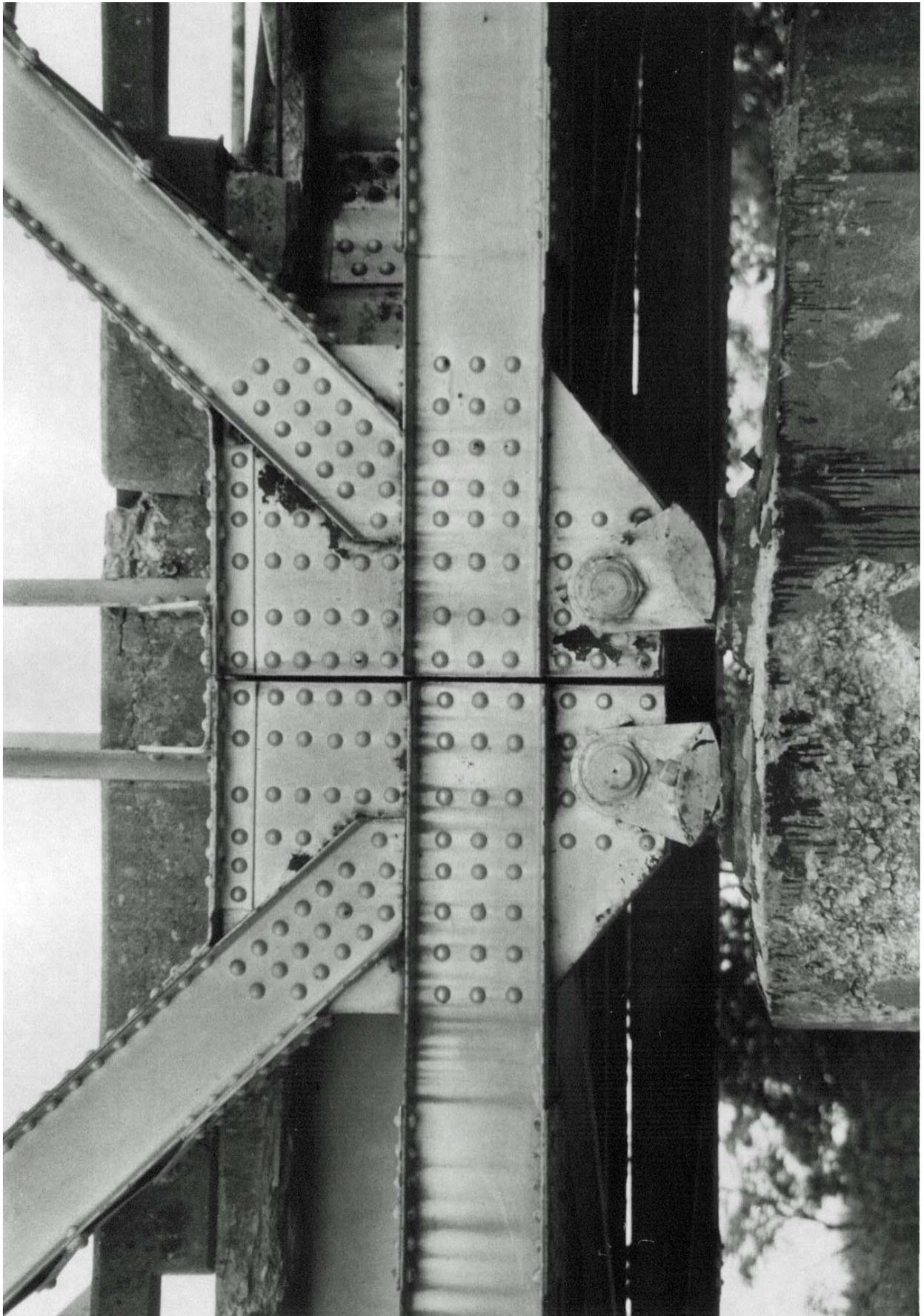
Photograph 11



Photograph 12



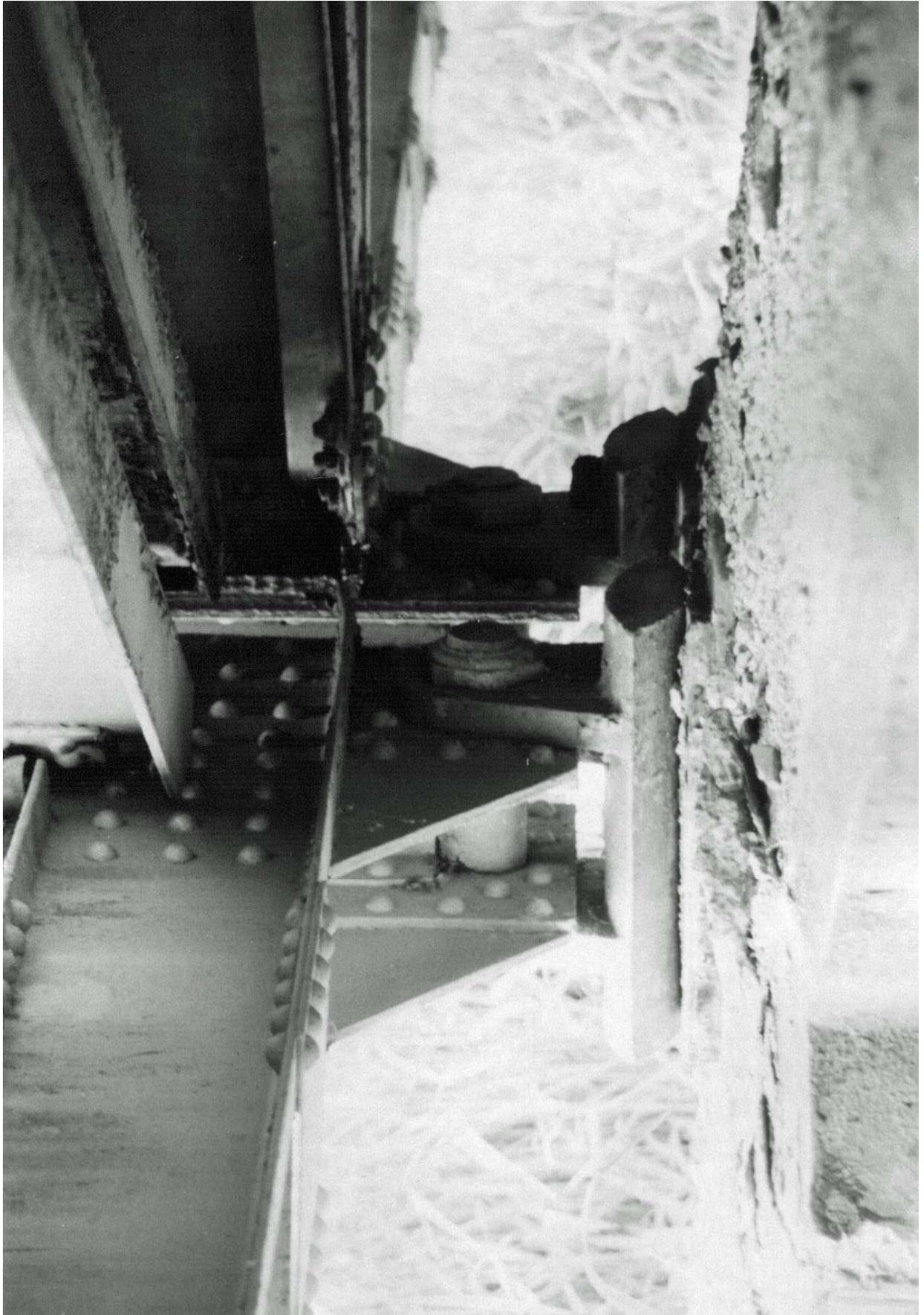
Photograph 13



Photograph 14



Photograph 15



Photograph 16

