Historical & Photographic Documentation of the Lamine River Bridge

Bridge No. K0236
Cooper County, Route 41

Missouri Department of Transportation

Historic Documentation
Bridge K0236, Highway 41 across the Lamine River
Cooper County, Missouri
MoDOT Job Number J5S2197

Location: Across the Lamine River, Cooper County, Highway 41

Construction Dates: 1933

Present Owner: Missouri Department of Transportation, Jefferson City, Missouri

Present Use: Highway Bridge carrying Highway 41, to be replaced by a new bridge on the same alignment

Significance: The Lamine River Bridge (K0236) is a well preserved long-span example of the Parker through truss. With a 200' main span, there are only seven other bridges that equal it in length and two with a longer Parker through truss.[1]

Historian: Karen L. Daniels, Historic Preservation Section, Design, Missouri Department of Transportation, Jefferson City, Missouri, December 2013

[1] Fraser, Clayton, "Missouri Historic Bridge Inventory, Lamine River Bridge, COOP03 HAER Inventory," Loveland, Colorado: FraserDesign, 1996; Historic Preservation Section, Missouri Department of Transportation, Jefferson City, Missouri.

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Introduction

The Missouri Department of Transportation (MoDOT) plans to replace the Lamine River Bridge (K0236) on Highway 41 in Cooper County with a new bridge in 2014 (MoDOT project number J5S2197). The bridge is eligible for listing on the National Register of Historic Places (NRHP) as a good example of a long-truss design. The bridge replacement will have an adverse effect on the bridge. This documentation and accompanying archival photographs are prepared to mitigate this adverse effect.

Figure 1 below shows the location of the Lamine River Bridge and Highway 41 in 1931, before the current bridge was constructed. Highway 40 is the east/west highway shown at the bottom of the figure.

Figure 1: Location of Lamine River Bridge, Cooper County, Highway 41[2]

Previous River Crossings at This Location

1885-1905

In 1883 J. S. Murdock and others petitioned the Cooper County Court for an iron bridge across the Lamine River on the Boonville-Arrow Rock Road.[3] The county studied the request and determined that there was not sufficient money in the road fund for the bridge to be constructed at that time.[4] In May 1885 the County determined that it would build an iron bridge at the crossing known as Turley's Ferry. It would be iron with stone piers. The sum of $16,000 was budgeted for construction of the bridge.[5]

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[2] Missouri State Highway Commission, *Official State Highway Map*, Jefferson City, Missouri, 1931.

[3] Cooper County Court. County Court Record, February 12, 1883. Book P, p. 395. Microfilm, Missouri State Archives, Jefferson City, Missouri.

[4] Cooper County Court. County Court Record, May 11, 1883, Book P, p. 487. Microfilm, Missouri State Archives, Jefferson City, Missouri.

[5]Cooper County Court. County Court Record, May 5, 1885, Book Q, p. 285. Microfilm, Missouri State Archives, Jefferson City, Missouri.

September 1905 was a very wet month and County streams were swollen. In late September the county received an additional twelve inches of rain over four days, bringing those streams well above flood stage. As a result of this flooding many Cooper County bridges were destroyed. The Turley Bridge was one of those that were washed away. It was described as having "floated" off its supports on the morning of Sunday, September 17.[6] One longtime resident, Mr. C. G. Hull, described cause of the bridge failure in the 1905 flood as drift wood collecting below the bottom chord of the bridge. He said water on the upper side of the bridge was three feet higher than on the lower side of the bridge.[7]

On October 4, 1905 the County Commissioners and the County road engineer visited two of the bridge sites that had been wiped out: Blackwater and Turley. The Turley Bridge was a complete loss, and it was estimated that only the approach span could be salvaged and reused. The County Commissioners they would replace the Turley Bridge as soon as it could be advertised and a contract let.[8]

1906-1933

In late November it was announced that the county would have sufficient funds on hand to contract for the replacement of the Turley Bridge early in 1906. It was "the most important bridge in the county and will therefore be rebuilt first."[9]

The County road supervisor was ordered to prepare plans and specifications for a steel bridge. Sealed bids were to be accepted until noon on June 6, 1906.[10] The bridge was quickly constructed by the Kansas City Bridge Company and, after little fanfare, the Turley Bridge was opened to traffic in March 1907.[11]

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[6] "Death, Destruction and Ruin," *Boonville Weekly Advertiser*, September 22, 1905, p.1; "Most Damaging Flood in Years," *Central Missouri Republican*, September 21, 1905, p.1; "The Mighty Waters," *The Blackwater News*, September 22, 1905, p.1, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

[7] Remarks by Division. Construction File, Bridge K0236. Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[8] "The County Court Transacts Business*," Central Missouri Republican*, October 5, 1905, p. 1, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

[9] "Bridge." *Blackwater News*. November 24, 1905, p. 3, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

[10] Cooper County Court. County Court Record, May 9, 1906. Book X, pp. 90-91.

[11] Untitled article. *Blackwater News*. March 8, 1907, p. 1, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

In 1928 the bridge survived a major flood, during which the limb of a floating tree got hung up on the guard rail of the bridge. The guard rail was bent, and the bridge was shaken "badly" before the limb was removed.[12]

Planning for Bridge K0236

In 1932 the state highway department announced plans to improve U. S. Highway 41 in Cooper County, the following year. The existing gravel surface between Arrow Rock and the Lamine River would be replaced by an asphalt surface, and the existing oiled dirt surface between the Lamine River and Highway 40 would be replaced with an all-weather rock surface.[13] In November 1932 money for a new river crossing at the Lamine River on Highway 41 became available, which would replace the existing, narrow bridge. An early site inspection was scheduled to identify the best location for the new bridge.[14]

An early concern identified was the height the new bridge would need to be, because of high water on the Lamine River. Efforts were made to identify extreme high water marks and the frequency of extreme high water. Long term local residents were interviewed about flooding and high water marks on the land were examined.[15]

Mr. C. G. Hill, who owned land at the bridge site since 1914, and who had lived in the area since 1868, was interviewed. His information was verified by J. A. Davis and H. A. Hull. High and low water marks were examined in area basements, barns and on the existing bridge piers.[16]

In December 1932 the Bridge Division recommended that a "Prairie Section" be used between the river and the nearby railroad. Since extreme high water had only been reported in 1905, they felt that maintaining a high grade between the bridge and the railroad (about 0.4 miles away) was unnecessary.[17]

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[12] Remarks by Division. Construction File, Bridge K0236. Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[13] "No. 41 Will Be Black Topped," *Boonville Daily News*, 10 September 1932, p. 1, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

[14] Correspondence between S. M. Rudder and T. H. Cutler, 23 November 1932, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[15] Remarks by Division, undated. Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[16] Ibid.

[17] Correspondence between N. R. Sack and Mr. Powers, 12 December 1932. Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

The award for the Lamine River Bridge was approved by the Missouri State Highway Commission at their May 5, 1933 meeting. The winning bid, by Carrothers & Crouch of Kansas City, Missouri was for $43,074.92.[18]

When the contract was announced, the Boonville newspaper, the Boonville Daily News, reported that the contract would include resurfacing 0.890 miles of Highway 41 between the Lamine River and Highway 40. This oiled road section had become "extremely rough", and the new surface treatment would provide an all-weather route to Arrow Rock, "one of Missouri's most historic parks."[19]

The article went on to comment that the contract would follow State Highway Commission policy of requiring unskilled labor to be employed from within the county, at a wage of at least 35 cents per hour and working no more than 30 hours per week. This policy makes it possible to employ as many men as possible while not increasing highway costs.[20]

Construction of Bridge K0236

Carrothers & Crouch started construction in June 1933 and on July 1 had completed pouring concrete for bent 1. They continued working on the substructure throughout the summer, completing the bents 2, 3 and 7 in July and 5 and 6 in August and bent 4 in September.[21] Issues encountered while working on the substructure of the bridge included finding a seam of low grade coal running under the project area. The coal had to be removed to five feet below the footing elevation before the footings could be poured.[22] Under bent 6 a ledge of solid limestone was reached two feet below the plan elevation. This meant that the footing thickness could be adjusted and the web wall was raised to compensate for a shorter column shaft.[23] Figure 2 is a detail of plan sheet 1 showing the pier/bent numbers (a full set of plan sheets are located in Appendix A).

[18] Missouri State Highway Commission, "Minutes of the Meeting of the State Highway Commission, held in Jefferson City, Missouri, Tuesday, May 9, 1933," as held by the Secretary to the Commission, Missouri Department of Transportation, Jefferson City, Missouri.

[19] "To Build New Bridge on Lamine," *Boonville Daily News*, 9 May 1933, p. 1, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

[20] Ibid.

[21] Correspondence between W. F. Boone and N. N. Ropes, 29 January 1934, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[22] Correspondence to file, D. C. Wolfe, 3 August 1933, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[23] Ibid.

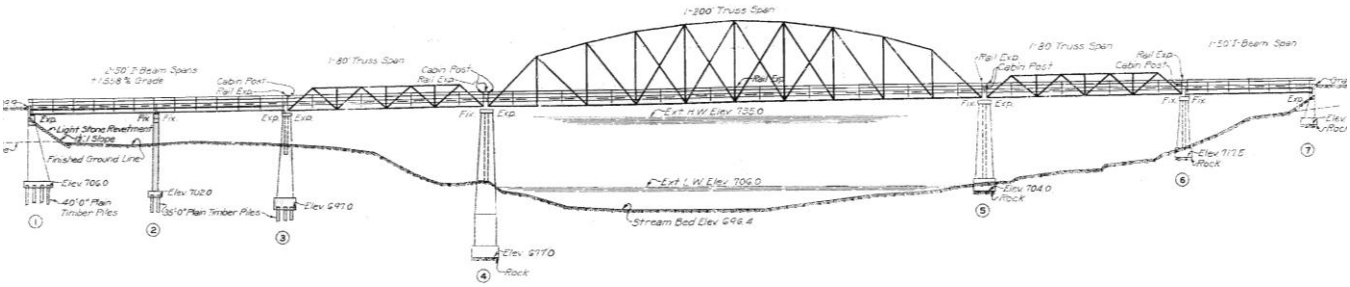

Figure 2: Bridge plan showing pier and bent numbers, spans are numbered from left to right

The biggest issue encountered while constructing the substructure of the bridge happened during the excavation for pier 4 in the river channel. On July 21 the steel truss of the original river crossing (which had been destroyed during the 1905 flood) was encountered. The debris had to be removed before excavation could continue for the pier.[24] There was considerable discussion between the State Highway Department and Carrothers & Crouch about who had responsibility to pay for removal of the old truss. The State Highway Department position was that the truss was not their responsibility, Carrothers & Crouch wanted to be paid for the labor involved in removing the obstruction. It took a week to resolve the differences and the State Highway Department agreed to pay a lump sum of $1000 for removal of the debris, including compensation for future delays caused by the same.[25]

The debris was removed on August12 but there continued to be problems with the excavations for pier 4. The cofferdam for pier 4 was difficult to drive and broke several times, threatening to lose all the excavation work done.[26]

While the excavation was underway in Cooper County, the trusses had been fabricated by the St. Louis Structural Steel Company in Illinois and shipped to the job site. During an on-site inspection in August, it was discovered that the 200 foot truss was not meeting the camber requirements shown on the bridge plans. Company engineers worked with State Highway Department Bridge engineers to develop solutions to solve the problem. The problem was solved by changing the moving the rivet angels up three-quarters of an inch on the bottom chord of the truss.[27]

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[24] Correspondence between D. C. Wolfe and N. R. Sack, 25 August 1933, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[25] Correspondence between W. F. Boone and N. N. Ropes, 29 January 1934 and Correspondence between D. C. Wolfe and N. R. Sack, 25 August 1933, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[26] Correspondence between W. F. Boone and N. N. Ropes, 29 January 1934, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[27] Correspondence between D. C. Wolfe and N. R. Sack, 2 September 1933, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

Similar problems arose with span 3, one of the 80 foot pony truss approach spans. In that case additional false work was added during construction to raise the panel points to achieve an acceptable camber prior to riveting.[28]

Erection of the superstructure began in September when spans 5 and 6 began construction, in October spans 1 and 2 were constructed. Erecting the steel and pouring the curb and deck on these spans progressed quickly. In November cold weather arrived, requiring special efforts to keep concrete warm while curing. The contractors sent to Kansas City for pipe to heat the concrete and used a threshing machine boiler to create steam. Heating was required for all the concrete pours done in November.[29]

The bridge opened to traffic on the first week of December.[30] The Boonville Daily News opined that "not only is the old, narrow bridge eliminated, but the old mile long stretch of narrow, rough roadway from the junction with U. S. No. 40 to Lamine Station has been replaced with a new road which is wider and much shorter."[31]

Although the bridge was open to traffic, it was not completed. The inspection found that the handrail was not satisfactory and needed to be corrected before the bridge could be accepted.[32] In addition, the bridge needed to be painted, but that task would await warmer weather. The final inspection was made on January 4, 1934, and it was accepted by the State Highway Department on January 11, 1934.[33]

After traffic was routed onto the new bridge, the old bridge was turned over to the County Court, which oversaw the dismantling of the bridge, and storage of the parts for use in other areas of the county.[34]

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[28] Correspondence between J. L. Brown and N. N. Ropes, 21 October 1933, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[29] Correspondence between W. F. Boone and N. N. Ropes, 29 January 1934, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[30] There is a slight discrepancy between the local newspapers and MoDOT documents about when the bridge opened: MoDOT documents indicate it opened on December 7, local newspapers indicate December 5; both sources were created at the time. Correspondence between W. F. Boone and N. N. Ropes, 29 January 1934, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri; "New Lamine Bridge May Open Today," *Boonville Daily News*, 5 December 1933, p. 1, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

[31] New Lamine Bridge May Open Today," *Boonville Daily News*, 5 December 1933, p. 1, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

[32] Correspondence between W. W. Crouch and St. Louis Structural Steel, 18 December 1933, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[33] Correspondence between D. B. Levi and N. N. Ropes, 11 January 1934, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[34] "County Judges Superintend Dismantling of Old Bridge," Boonville Daily News, 7 December 1933, Microfilm, State Historical Society of Missouri, Columbia, Missouri.

On January 20, 1934 Carrothers & Crouch sent a letter to the State Highway Department requesting additional payment because of the issues with Pier 4, the issues with the long span and delays needed to heat the concrete. They requested an additional $2,137.02 in payment (a 5.3% budget overrun).[35]

The State Highway Department refused to pay most of the additional claim, indicating that there had already been payment for the obstruction with Pier 4, and that with a December 15 contract completion date, the need to heat concrete should have been factored into the bid.[36] The Department did allow additional funds for correcting the camber for the main span, allowing $271.40 billed by the fabricators to drill test holes and for the plates needed to correct an error in the plans.[37]

Construction Contractors

Contractor—Carrothers & Crouch

The principals in the Carrothers & Crouch Construction Company were H. H. Carrothers and W. W. Crouch, Junior. H. H. Carrothers had formed the Carrothers Construction Company with John Carrothers and Stella Butterworth in 1927.[38] H. H. Carrothers had formed an earlier business by the same name registering it in 1925.[39] In 1924 the company was awarded a contract with the Missouri State Highway Department for work on Route 2 in Jackson County.[40]

In 1939 the company was awarded the contract to construct a viaduct carrying Highway 5 over the MKT rail yard in New Franklin.[41] In 1941 the company won two highway contracts—one for

[35] Correspondence between Carrothers & Crouch and Missouri State Highway Commission, 20 January 1934, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[36] Correspondence between N. N. Ropes and T. H. Cutler, 16 July 1934, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[37] Correspondence between D. C. Wolfe and N. R. Sack, 13 February 1934, Microfiche, Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

[38] Carrothers Construction Company, "Articles of Agreement for the Incorporation of the Carrothers Construction Company," Charter 46797, Business Division, Secretary of State, Jefferson City, Missouri.

[39] Carrothers Construction Company, "Registration of Fictitious Name," Charter 3380, Business Division, Secretary of State, Jefferson City, Missouri.

[40] Missouri State Highway Commission, "Minutes of the Meeting of the State Highway Commission Held in Jefferson City, Missouri, December 4, 1924," As held by the Secretary to the Missouri State Highway Commission, Missouri Department of Transportation, Jefferson City, MO, 12.

[41] Daniels, Karen L. *New Franklin Viaduct, Bridge K744, Historical and Photographic Documentation, Howard County, Missouri, Route 5, MoDOT Job Number J2P0428*. Historic Preservation Section, Missouri Department of Transportation, Jefferson City, Missouri.

an underpass in Bolivar, Polk County, and a second for highway work in Ozark County.[42] Due to material shortages caused by U. S. participation in World War II, they requested to be released from the project in Bolivar.[43]

Fabricator—St. Louis Structural Steel Company

The St. Louis Structural Steel Company, based in St. Clair County, Illinois, had been formed in 1929 by consolidation of the St. Louis Structural Steel Company and the Ferrous Metals Company.[44]

The purposes of the business was to manufacture, buy, sell and deal in all things consisting of partly consisting of iron, steel, manganese, copper, zinc, lead and kindred metals and all products and by-products.[45] They would also engage in stamping, pressing, drawing and spinning of metals and metallic compounds.[46]

The Board of Directors of the merged corporation consisted of: George B. Curtis and E. A. Curtis of East St. Louis, Illinois, Joseph W. Lewis, Harry Stenbreder, Herman T. Pott, Oscar C. Stupp, George Stupp and Charles Morrill of St. Louis, Missouri and W. Ferguson Barnes of University City, Missouri.[47]

The company regularly filed papers with the Missouri Secretary of State's office through the 1930s, but none after 1937.[48] It was declared inactive in 1982.[49]

Description of Bridge K0236

The Lamine River Bridge (K0236) has six total spans, and a total length of 522 feet, 8 inches. The bridge is composed of three steel girder approach spans, two pony truss approach spans and a 200' Parker through truss main span. Table 1 below identifies the spans from north to south, by type and length. Original plans for the bridge are located in Appendix A, photo plates of the

[42]Missouri State Highway Commission, "Minutes of the Meeting of the State Highway Commission Held in Jefferson City, Missouri, October 25, 1941," As held by the Secretary to the Missouri State Highway Commission, Missouri Department of Transportation, Jefferson City, MO, 18.

[43]Missouri State Highway Commission, "Minutes of the Meeting of the State Highway Commission Held in Jefferson City, Missouri, May 11-12, 1942," As held by the Secretary to the Missouri State Highway Commission, Jefferson City, MO, 3.

[44] St. Louis Structural Steel Company, "Agreement of Merger and Consolidation," Charter F6106, no page. Corporations Division, Missouri Secretary of State Office, Jefferson City, Missouri.

[45] Ibid, p. 4.

[46] Ibid, p. 5.

[47] Ibid, p. 9.

[48] Missouri Secretary of State, Charter F6106 search conducted 16 July 2013.

[49] Missouri Secretary of State, notice of inactivity, Charter F6106, 1982.

mitigation photographs are located in Appendix B; all references to plates are references to the mitigation photo plates. Overall views of the bridge are found on plates 1 and 24.

Table 1. Span Configuration and Length

Span	Span Type	Span Configuration	Length
1	Approach	Steel girder	52’
2	Approach	Steel girder	53’
3	Approach	Pony truss	81’
4	Main	Through truss	201’
5	Approach	Pony truss	81’
6	Approach	Steel girder	53’

The piers, bents and abutments are plain reinforced concrete columns with solid webs. There are three bents and two piers in the river. Plates 3, 4 and 5 illustrate the bents and piers.

The two pony truss approach spans are each 81 feet long and have four, twenty-foot panels. They are a Warren web with verticals. The pony truss panels are nine feet high from the bottom chord. The pony truss spans are illustrated on sheet 9 of the accompanying plans and on plates 3, 4, 11, 14 and 17.

The main span is a ten panel Parker through truss, each panel is 20 feet wide (plates 2 and 23). The polygonal top chord arches from 20 feet high at the portals to 33 feet 4 inches high at the center point. The inclined end posts are built up members of plates and channels with lattice on the bottom, the verticals are laced short bars and the diagonals are angles with small plates. The portal bracing is a simple built up member of plate and channels; the sway bracing is subdivided rhombus lattice strut (portals plates 10, 11 and 13, sway bracing plates 12 and 20).

The bottom chord is formed of channels and plates. The floor system has four stringers with diagonal cross bracing. The bottom chord and floor system are shown on plates 6 and 7.

The bridge is riveted, with gusset plate connections. Typical connections are shown on sheet 10 of the plans and plates 21 and 22.

The bridge deck is a 22 foot wide concrete slab with curb and gutters that has been overlain with asphalt.

A two piece channel handrail runs the length of the bridge on both sides, and wraps on itself on the ends. The handrail is shown on sheet 10 of the plans and plates 9, 16, 17 and 19.

Photographic Methods & Processing

The archival photographs accompanying this documentation were taken and processed according to the standards for photographs accompanying National Register of Historic Places (NRHP) documentation.[50]

[50] National Park Service, “National Register Photo Policy Factsheet Updated 5/15/2013,” Downloaded 1 August 2013 from: www.nps.gov/history/nr/publications/bulletins/photopolicy/Photo_Policy_update_2013_05_15.pdf.

Karen Daniels took photographs on December 11, 2012 and February 6, 2013 using a Canon G10 digital camera. Images were captured in a raw (cr2) format, which was manipulated for light contrast before being converted to a .tiff and printed. This is identified as a "best" practice in the NRHP photo policy.[51]

Prints were made on Epson Premium Glossy Photo Paper and used Epson Matte Black Ultra Chrome K3 Ink, both identified as "best" practices by the NRHP photo policy[52], and which Epson identifies as having 85-year permanence under glass.[53] Kept in archival conditions the materials will exceed the 75 year permanence standard for the NRHP, which is the standard being used for this project.

All images were numbered according to the NRHP Photo Policy[54] and burned onto a Delkin Archival Gold compact disc, which was provided to the State Historic Preservation Office along with this report. A copy of the photographs and .tiff images on an archival compact disc will also be maintained by the MoDOT Historic Preservation Section.

[51] *ibid.*

[52] *ibid.*

[53] Epson, "Permanence ratings from Wilhelm Imaging Research," Downloaded 30 April 2009 from www.epson.com/pdf/LightfastCPD_15334R2.pdf.

[54] National Park Service.

Sources

Blackwater News (weekly), Microfilm, State Historical Society of Missouri, Columbia, Missouri.

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Boonville Weekly Advertiser (weekly), Microfilm, State Historical Society of Missouri, Columbia, Missouri.

Carrothers Construction Company. Charter 3380. Corporation's Division, Secretary of State's Office, Jefferson City, Missouri.

Carrothers Construction Company. Charter 46797. Corporation's Division, Secretary of State's Office, Jefferson City, Missouri.

Central Missouri Republican [Boonville] (weekly), Microfilm, State Historical Society of Missouri, Columbia, Missouri.

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Correspondence File. Bridge W0304. Microfiche. Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

Daniels, Karen L. *New Franklin Viaduct, Bridge K744, Historical and Photographic Documentation, Howard County, Missouri, Route 5, MoDOT Job Number J2P0428*. Historic Preservation Section, Missouri Department of Transportation, Jefferson City, Missouri.

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Missouri State Highway Commission. "Minutes." As held by the Secretary to the Commission. Missouri Department of Transportation, Jefferson City, Missouri.

Missouri State Highway Commission. “Plan and Profile of Proposed State Road, Federal Aid Project 41-13A, Cooper County, Missouri.” Design Division, Missouri Department of Transportation, Jefferson City, Missouri.

Missouri State Highway Department. “Bridge Over Lamine River, Cooper County, K-236.” Bridge Division, Missouri Department of Transportation, Jefferson City, Missouri.

National Park Service. “National Register Photo Policy Factsheet updated 5/15/2013,” downloaded 1 August 2013 from: http://www.nps.gov/history/nr/publications/bulletins/photopolicy/Photo_Policy_update_2013_05_15.pdf.

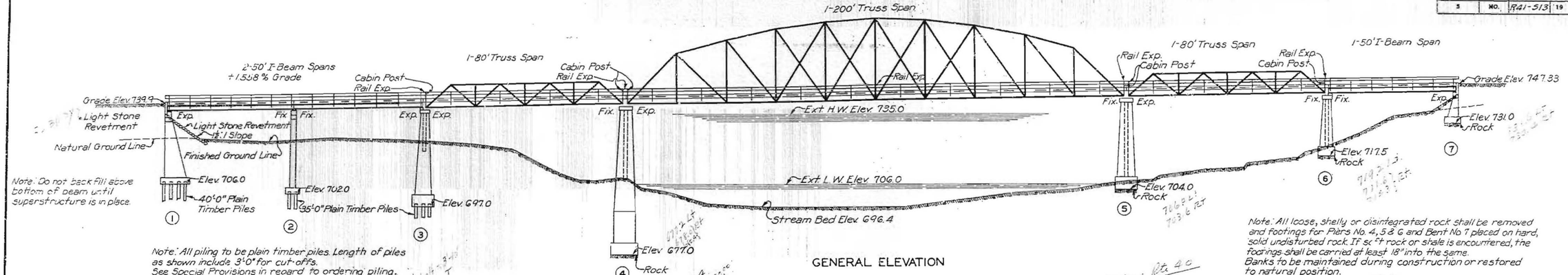
St. Louis Structural Steel Company. Charter F3464. Corporation’s Division, Secretary of State’s Office, Jefferson City, Missouri.

St. Louis Structural Steel Company. Charter F6106. Corporation’s Division, Secretary of State’s Office, Jefferson City, Missouri.

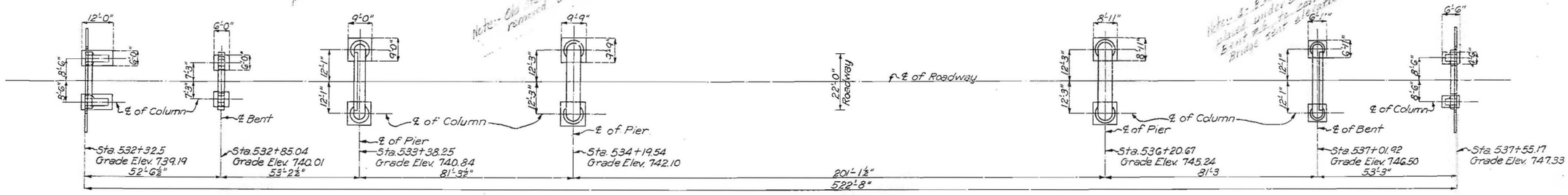
Appendix A
Original Bridge Plans

MISSOURI STATE HIGHWAY DEPARTMENT

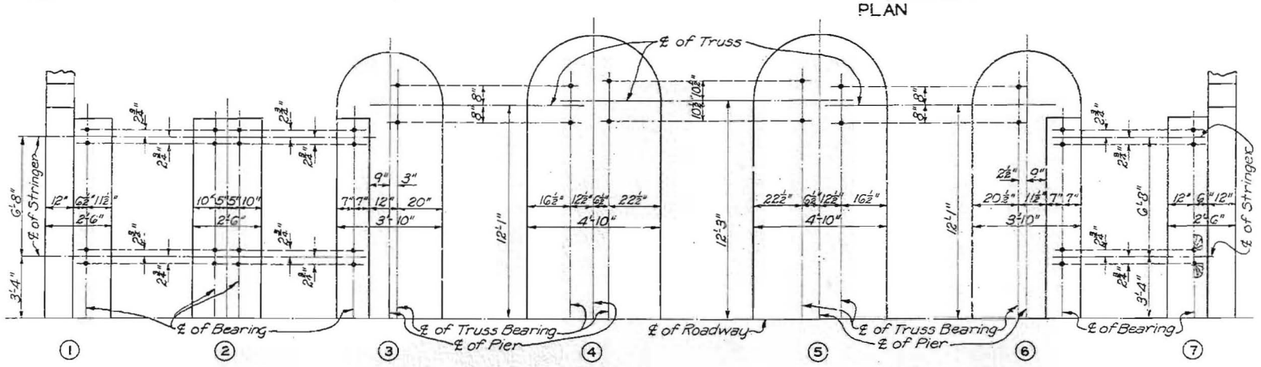
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R41-513	19		



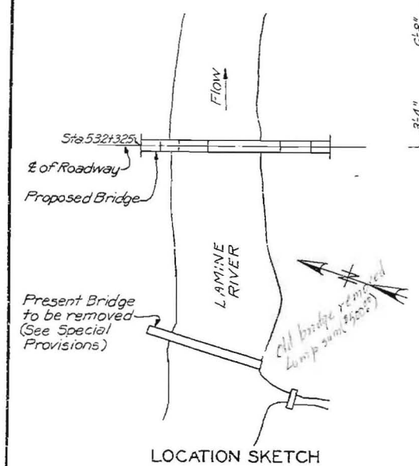
GENERAL ELEVATION



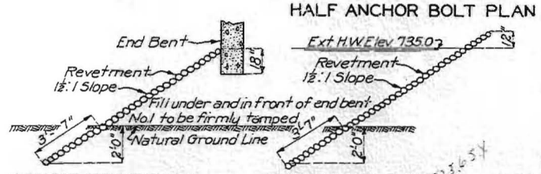
PLAN



HALF ANCHOR BOLT PLAN



LOCATION SKETCH



FRONT OF END BENT NO.1 SIDE SLOPE OF FILL

Light stone revetment shall be placed on fill at North end of bridge as shown in sketches. Approximately 210 sq. yds. of light stone revetment work included in road contract.

LIGHT STONE REVETMENT SKETCHES

ESTIMATED QUANTITIES

Item		Superstr.	Substr.	Total	FINAL QUAN.
Excavation Class 1	Cu.Yds.		570	570	561
Excavation Class 2	Cu.Yds.		541	541	513.2
Concrete 1:2:4 mix Class "B"	Cu.Yds.		515.6	515.6	519.3
Concrete 1:2:3½ mix Class "X"	Cu.Yds.	283.5		283.5	283.5
Fabricated Structural Steel (Truss Spans)	Lbs.	400000		400000	374380.
Fabricated Structural Steel (I-Beam Spans)	Lbs.	98500		98500	99080
Steel Castings (Truss Spans)	Lbs.	3000		3000	3000
Bearing Castings (I-Beam Spans)	Lbs.	1580		1580	1580
Reinforcing Steel	Lbs.	84210	20900	105110	105,240
Plain Timber Piles	Lin. Ft.		1424	1424	1389
Plain Timber Pile Cut-offs	Lin. Ft.		126	126	161
Class 1 Exc. below plans	Cu. Yds.				13.3
					3.2 CLB Exc. below plans
					65.3 Test Holes

Bridge excavation above Elev. 707.0 will be paid for as Class 1 Bridge Excavation.
Bridge excavation below Elev. 707.0 will be paid for as Class 2 Bridge Excavation.

GENERAL NOTES:

Concrete in slab and curbs to be 1:2:3½ mix Class "X". All other concrete to be 1:2:4 mix Class "B".

Exposed edges to be beveled ¾" where no other bevel is noted.

Where rubber compound is specified on plans for use in partition and expansion joints, the premoulded joint shall be securely stitched to one face of concrete with copper wire.

Two name plates type "B" as shown on Std. S-918R to be furnished and placed by contractor. Cost of name plates to be included in price bid for other items.

Shop drawings for all structural steel shall be submitted to the Missouri State Highway Department in duplicate and shall be approved before steel is fabricated.

See Special Provisions in regard to permissible substitutions of beams and basis of payment.

Rivets ⅞"Φ, holes 1 3/16"Φ except as noted. Holes for ⅞"Φ rivets to be 1 1/16"Φ.

Field connections riveted unless otherwise noted.

Expansion Details to be made similar to Std. S-912 over Piers #4, 5 & 3 and Std. S-911 over Pier #6.

Paint: Shop, none; Field, contact surfaces of bolted field connections one coat of red lead and surfaces inaccessible after erection three coats of red lead. No other paint to be applied by contractor. All paint required will be furnished by the Missouri State Highway Department.

Bridge excavation in accordance with Section I of Standard Specifications issued April 1, 1930, except that quantities paid for will be computed from extreme low water Elev. 706.0, where existing ground line is below this elevation.

See Special Provisions for bar supports, admixture and weight proportioning of concrete mixes.

B.M. Elev. 722.35 - Nail & Washer in Base 24" Cottonwood 100' Lt. Sta. 533+45.

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S. 40

ABOUT .5 MILE SOUTH OF LAMINE

PROJECT NO. R41-513 STA. 532+32.5

COOPER COUNTY

SUBMITTED BY M. R. Hart BRIDGE ENGINEER DATE 4/25/33

APPROVED BY T. H. Cutler CHIEF ENGINEER DATE 4/25/33

STD. S-918R

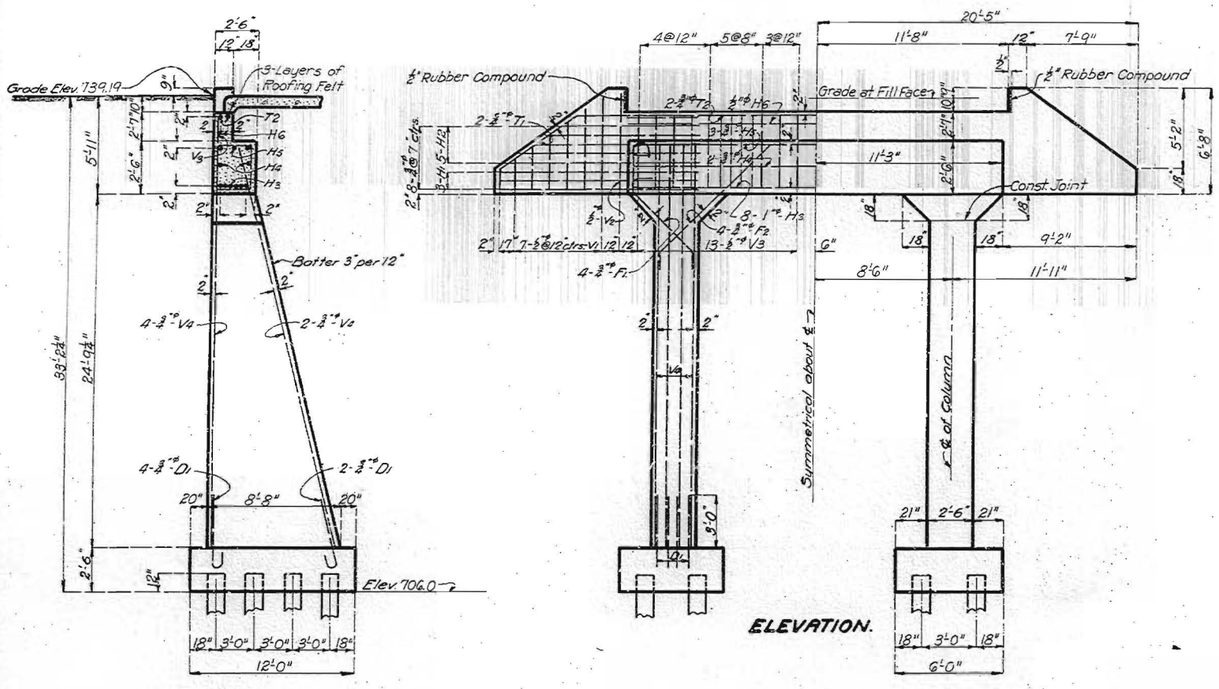
K-236

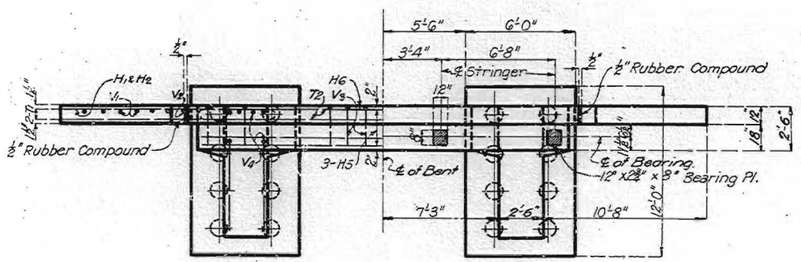
Sheet No. 1 of 10

Drawn April 1933 By I.B
Traced April 1933 By H.W.H.
Checked April 1933 By [illegible]

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R41-S13	19		



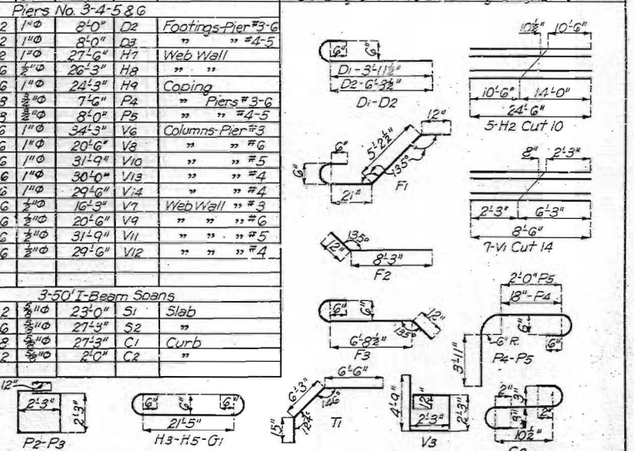


BILL OF REINFORCING STEEL

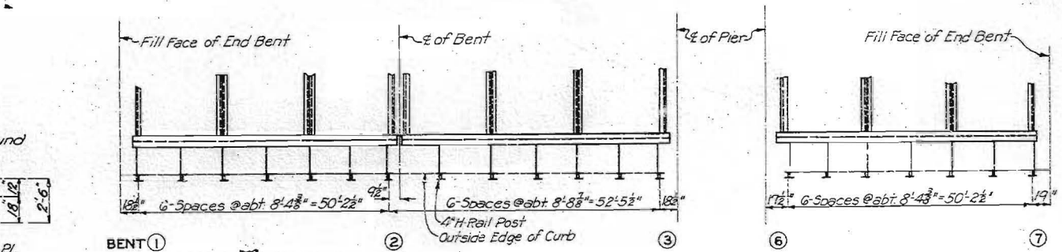
No.	Size	Length	Mark	Location
		End Bents No. 1 & 7		
24	⅞"ø	5'-3"	D1	Footing
16	⅞"ø	9'-3"	F1	Haunch
16	⅞"ø	9'-3"	F2	"
12	⅞"ø	14'-9"	H1	Wing
10	⅞"ø	24'-6"	H2	"
16	1"ø	24'-0"	H3	Beam
4	⅞"ø	22'-0"	H4	"
6	⅞"ø	24'-0"	H5	"
2	⅞"ø	15'-0"	H6	Backwall
8	⅞"ø	14'-0"	T1	Wing
4	⅞"ø	25'-0"	T2	Backwall
14	⅞"ø	8'-6"	V1	Wing
4	⅞"ø	6'-8"	V2	"
52	⅞"ø	12'-6"	V3	Beam
12	⅞"ø	27'-0"	V4	Col-Bt #1
12	⅞"ø	10'-0"	V5	Col-Bt #7
		Int. Bent No. 2		
8	⅝"ø	5'-3"	D1	Footing
8	⅝"ø	9'-3"	F2	Haunch
8	⅝"ø	9'0"	F3	"
16	1"ø	24'-0"	G1	Beam
2	⅝"ø	22'0"	G2	"
8	¾"ø	31'-9"	P1	Column
40	½"ø	10'-0"	P2	"
21	½"ø	10'-0"	P3	Beam

No.	Size	Length	Mark	Location
		Piers No. 3-4-5 & 6		
32	1"ø	2'-0"	D2	Footings-Pier #3-6
32	1"ø	8'-0"	D3	" " #4-5
12	1"ø	27'-6"	H7	Web Wall
86	⅞"ø	26'-3"	H8	" "
16	1"ø	24'-3"	H9	Coping
88	¾"ø	7'-6"	P4	" Piers #3-6
88	¾"ø	8'-0"	P5	" " #4-5
16	1"ø	34'-3"	V6	Columns-Pier #3
16	1"ø	20'-6"	V8	" " #6
16	1"ø	31'-9"	V10	" " #5
16	1"ø	30'-0"	V13	" " #4
16	1"ø	24'-6"	V14	" " #4
26	¾"ø	16'-3"	V7	Web Wall " #3
26	¾"ø	20'-6"	V9	" " " #6
26	¾"ø	31'-9"	V11	" " " #5
26	¾"ø	29'-6"	V12	" " " #4
		3-50' I-Beam Spans		
752	⅝"ø	23'-0"	S1	Slab
186	⅝"ø	27'-3"	S2	"
48	⅝"ø	27'-3"	C1	Curb
252	⅝"ø	2'0"	C2	"

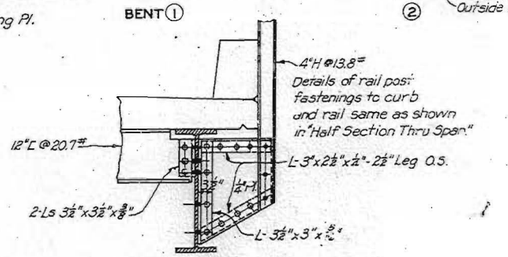
Bending Sketches & Cutting Diagrams



Note: Dimensions given are along centerline of bars and are for computed lengths. Reinforcing bars ⅜" or over in diameter, which are bent to an angle greater than 90°, shall be of structural grade.
For Bill of Reinforcing Steel in Truss Spans see Sheets No. 9 & 10.



RAIL SPACING ON I-BEAM SPANS



RAIL POST BRACKET AT ENDS OF SPAN

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S. 40 FINISHED
ABOUT .5 MILE SOUTH OF LAMINE
PROJECT NO. R41-S13 STA. 532+32.5
COOPER COUNTY FINISHED

Assembled April 1933 By I.B.-H.W.H.
Checked April 1933 By R.C.
Drawn Feb. 1925 By J.J.
Checked Feb. 1925 By R.E.O.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 2 of 16

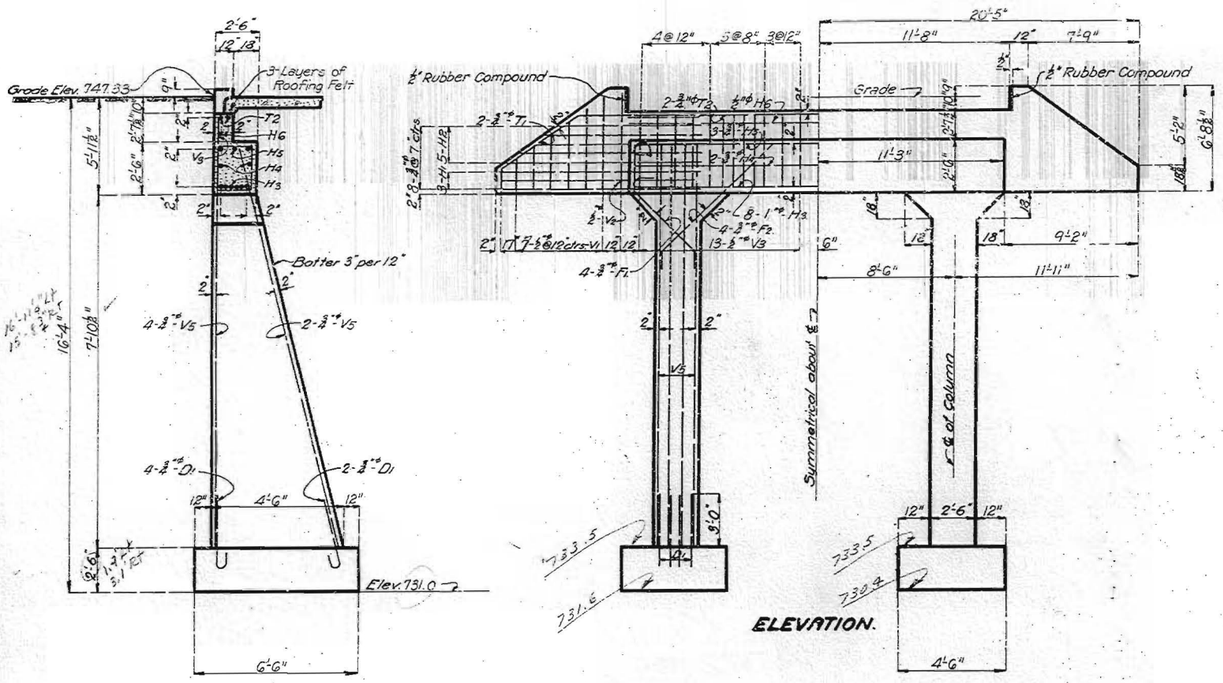
K-236

I-Beams - Steel Spans - Bents 38932

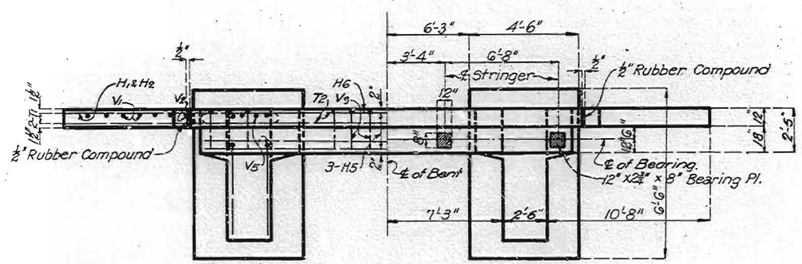
193

MISSOURI STATE HIGHWAY DEPARTMENT.

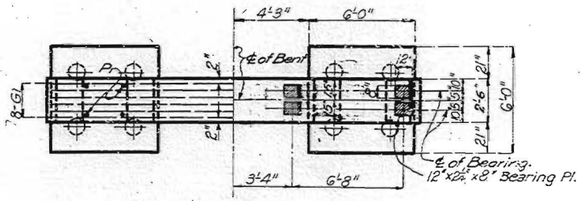
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R-41-S-13	19		



SECTION AT ℄. ELEVATION. ELEVATION. SECTION AT ℄.



PLAN. DETAILS OF BENT NO. 7



PLAN. DETAILS OF BENT NO. 2

470

Assembled April 1933 By I.B.-H.W.H.
Checked 19 By
Drawn Feb. 1925 By J.J.
Checked Feb. 1925 By E.E.O.

Note: This drawing is not to scale. Follow dimensions.

Sheet "3 of 10

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S. 40 FINISHED

ABOUT .5 MILES SOUTH OF LAMINE

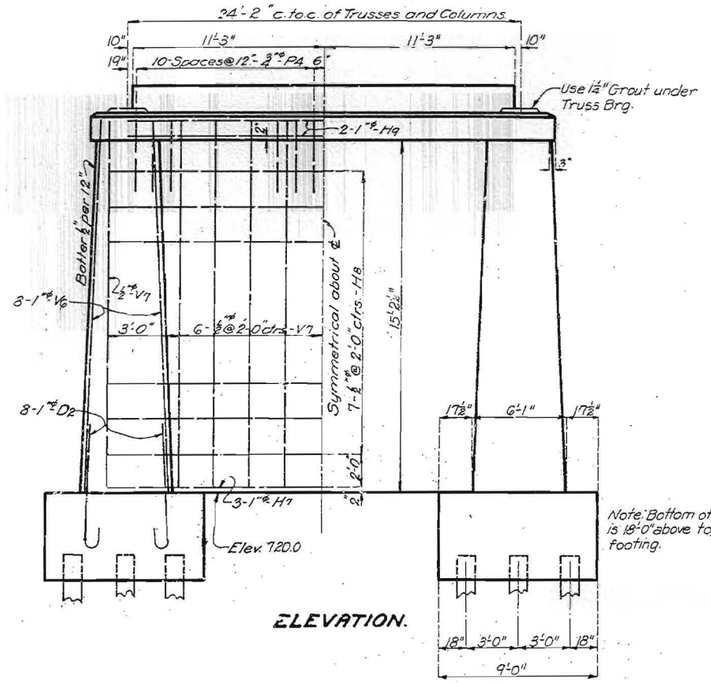
PROJECT NO. R. 41-S.13 STA. 532+32.5

COOPER COUNTY

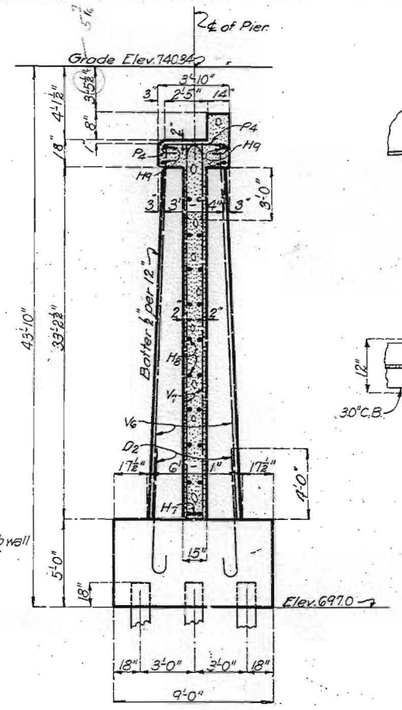
K-236.

MISSOURI STATE HIGHWAY DEPARTMENT

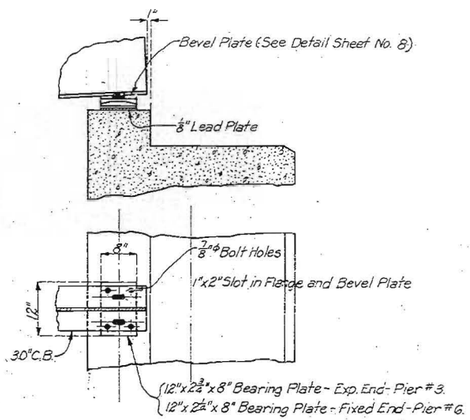
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R41-513	19		



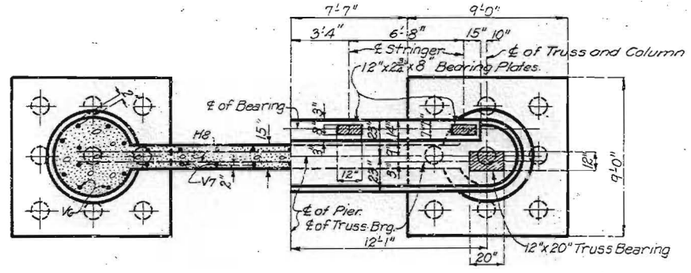
ELEVATION.



SECTION AT ℄.



DETAILS OF BEARING PIERS NO. 3 & 6



HALF HORIZONTAL SECTION. HALF PLAN.
DETAILS OF PIER NO. 3

Note: This drawing is not to scale. Follow dimensions.

Assembled Apr. 1933 By I.B.-H.V.H.
Checked Apr. 1933 By [illegible]
Drawn Mar. 1925 By J.I.
Checked April 1925 By C.B.V.

BRIDGE OVER LAMINE RIVER

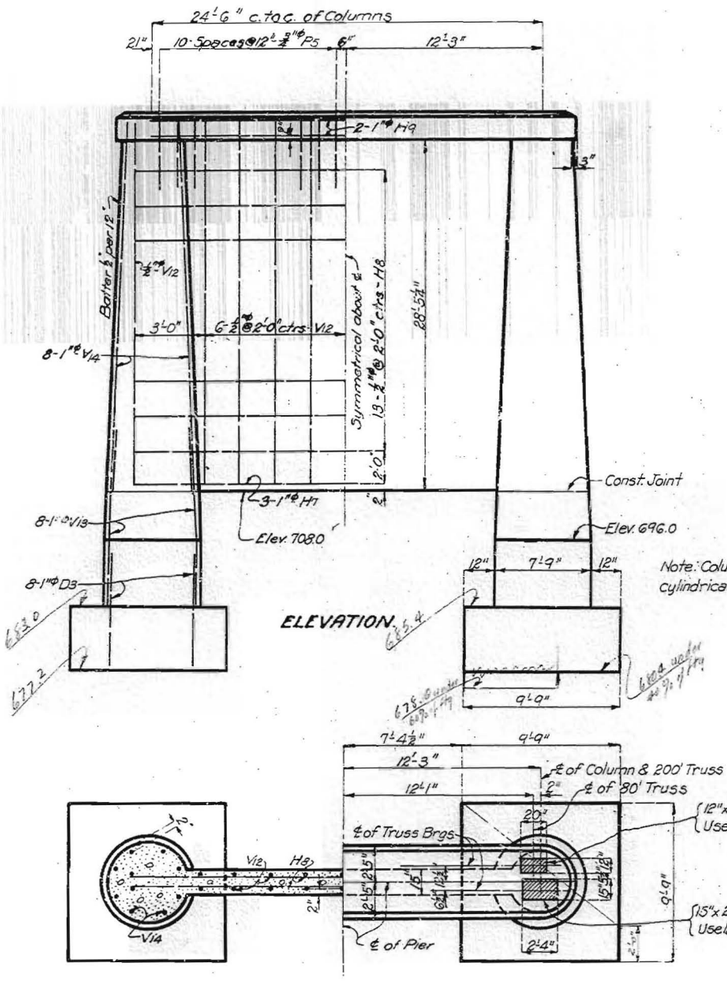
STATE ROAD FROM LAMINE TO U.S. 40
ABOUT .5 MILE SOUTH OF LAMINE FINISHED
PROJECT NO. R41-513 STA. 532+32.5
COOPER COUNTY
FINISHED

K-236

Sheet "4 of 10

MISSOURI STATE HIGHWAY DEPARTMENT

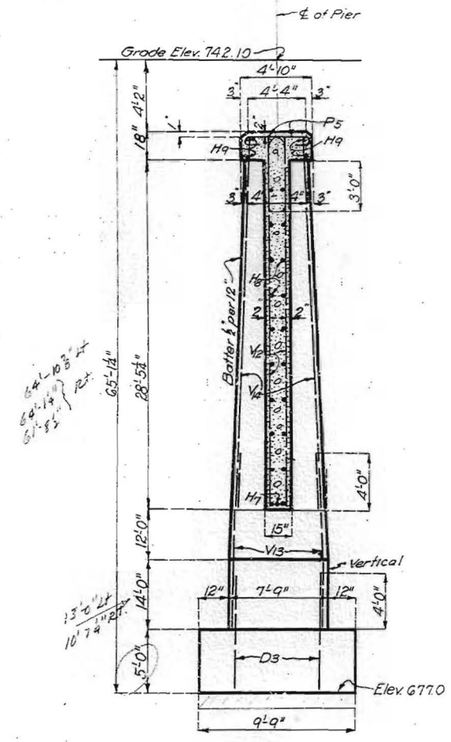
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO	R41-S13	19		



Note: Columns to be built cylindrical below Elev. 696.0.

HALF HORIZONTAL SECTION. HALF PLAN.

DETAILS OF PIER NO 4



SECTION AT ℄

Note: This drawing is not to scale. Follow dimensions.

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S.40 FINISHED

ABOUT .5 MILES SOUTH OF LAMINE

PROJECT NO. R.41-S13 STA. 532+32.5

COOPER COUNTY FINISHED

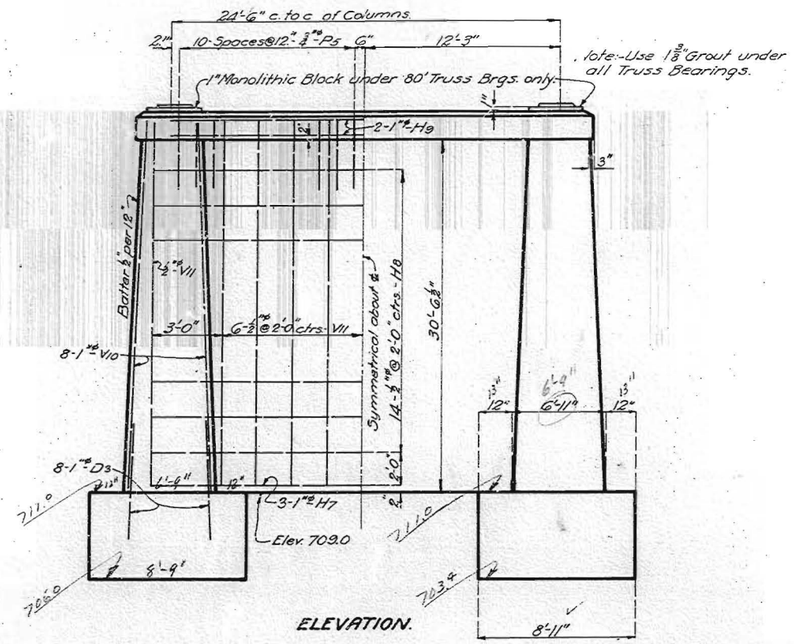
472

Assembled Apr. 1933 By I.B-H.W.H.
Checked Apr. 1933 By L.H.
Drawn Mar. 1925 By J.I.
Checked Mar. 1925 By B.J.O.

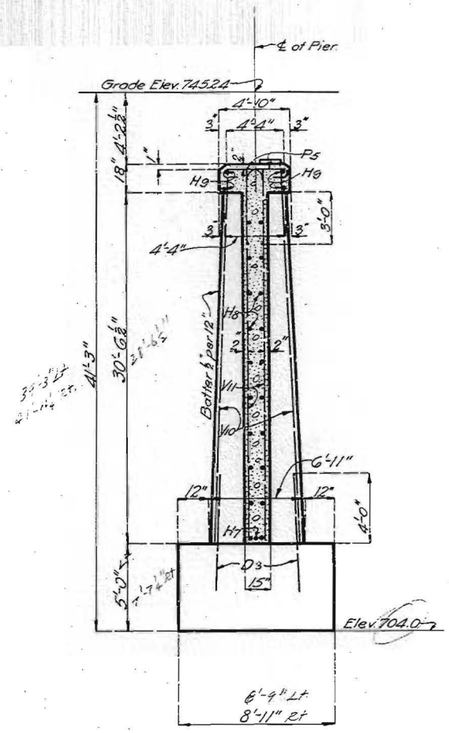
K-236

MISSOURI STATE HIGHWAY DEPARTMENT

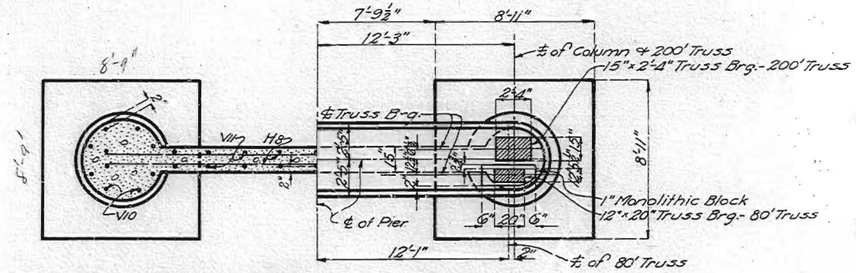
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO	R-41-513	19		



ELEVATION.



SECTION AT ℄.



HALF HORIZONTAL SECTION. HALF PLAN.
DETAILS OF PIER NO. 5

473

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S. 40 FINISHED

ABOUT 5 MILES SOUTH OF LAMINE

PROJECT NO. R.41-513 STA. 532+32.5

COOPER FINISHED COUNTY

K-236

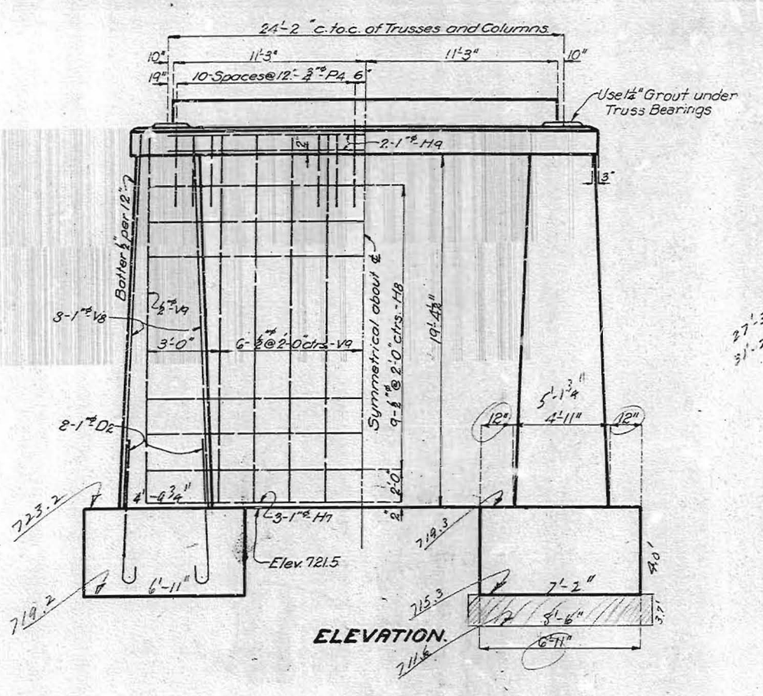
Assembled Apr. 1933 By I.B.& C.A.F.
Checked Apr. 1933 By XXX.
Drawn Mar. 1925 By J.I.
Checked Mar. 1925 By A.J.O.

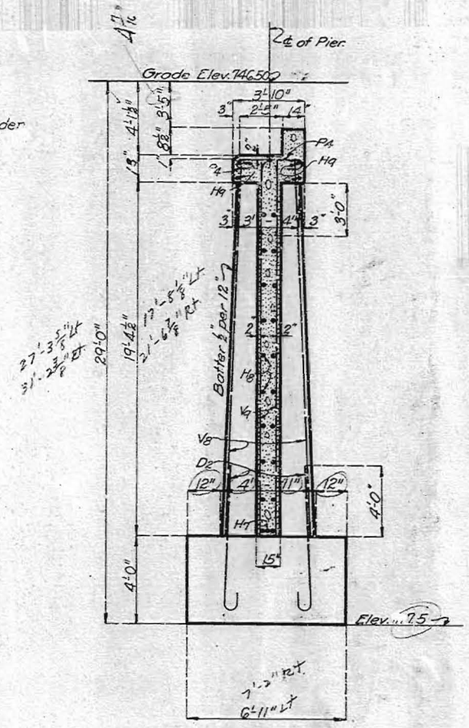
Note:-This drawing is not to scale. Follow dimensions.

Steel Spans - Piers - S.803

MISSOURI STATE HIGHWAY DEPARTMENT

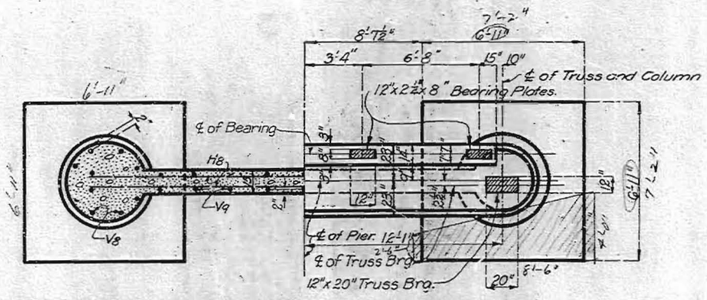
ROAD SYST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	RA1-513	19		





SECTION AT ℄.

Note: This drawing is not to scale.
Follow dimensions.



HALF HORIZONTAL SECTION. HALF PLAN.
DETAILS OF PIER NO. 6

721.5
719.3
723.2
721.5
1.7
1.8 3/8

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S. 40
ABOUT .5 MILE SOUTH OF LAMINE FINISHED
PROJECT NO. R4:-SI3 STA. 532+32.5
COOPER COUNTY
FINISHED

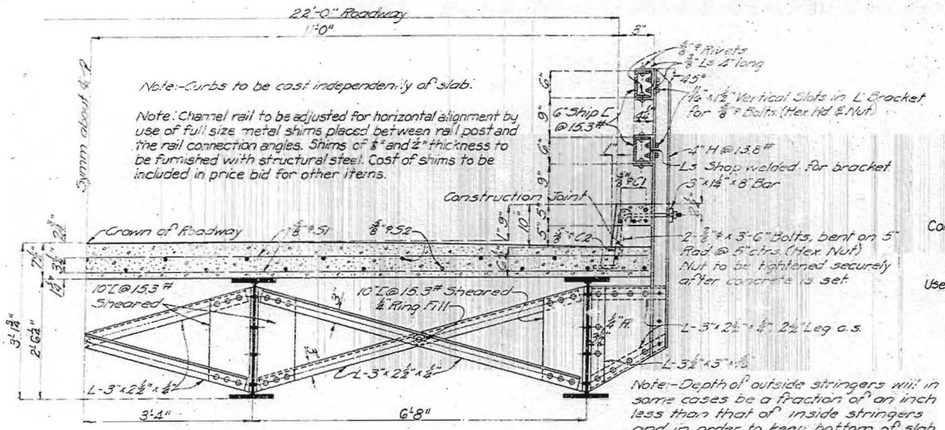
474

Assembled Apr. 1933 By I.B.-H.W.H.
Checked Apr. 1933 By J.C.
Drawn Mar. 1925 By J.I.
Checked April 1925 By C.B.V.

K-236

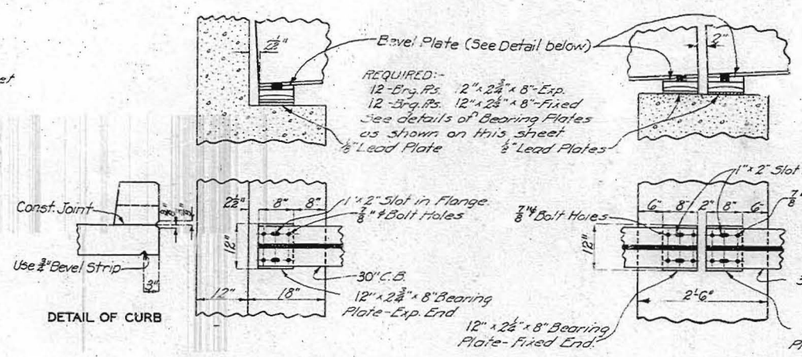
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R41-513	19		

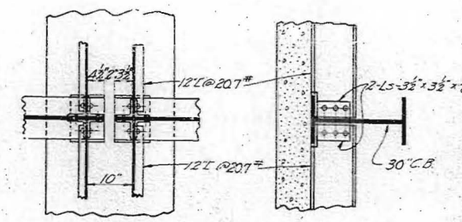


HALF SECTION THRU SPAN

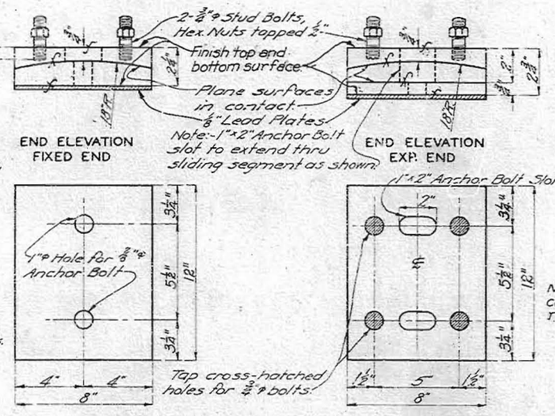
Note:-Depth of outside stringers will in some cases be a fraction of an inch less than that of inside stringers and in order to keep bottom of slab horizontal it will be necessary to haunch slab down to top of outside stringers.



DETAIL OF CURB

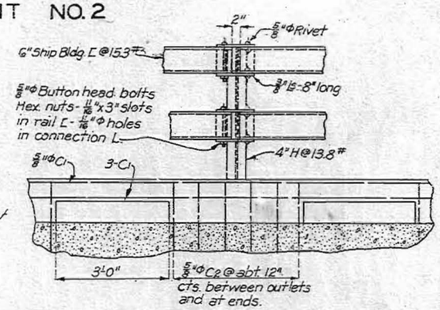


DETAILS OF BEARING BENTS NO. 1 & 7



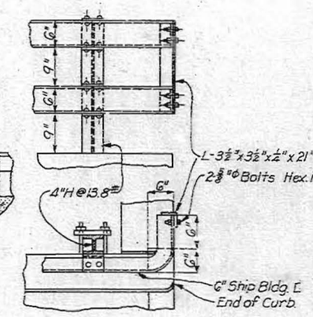
Note:-Tops of bents to be finished as nearly as possible to within ⅛" of final elevation of bottom of plates. Plates to be seated to proper elevation by inserting soft lead plates between top of bent and bottom of plate. Concrete seat under lead plates to be dressed to a uniform level bearing with carborundum brick. Cost of lead plates to be included in price bid for other items.

DETAILS OF BEARING BENT NO. 2



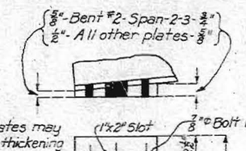
RAIL EXPANSION

DETAILS OF END CHANNEL SEPARATORS



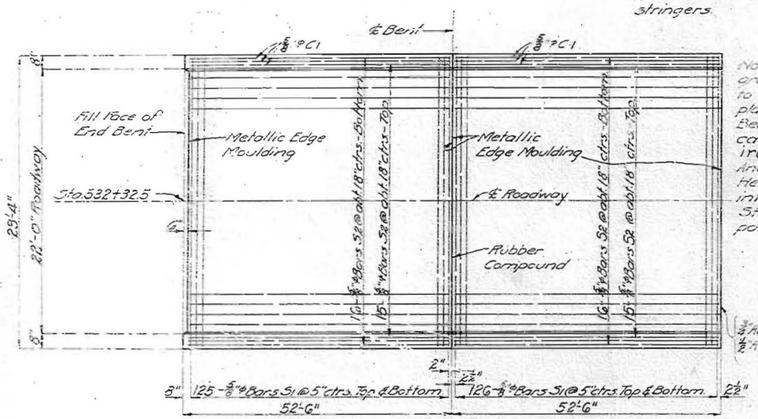
RAIL AT ENDS OF BRIDGE

PART ELEVATION OF CURB



Note: Bevel plates may be omitted by thickening upper casting of bearing plates. This additional cast steel to be paid for as structural steel. Bevel plates to be placed so that all bearings will be horizontal.

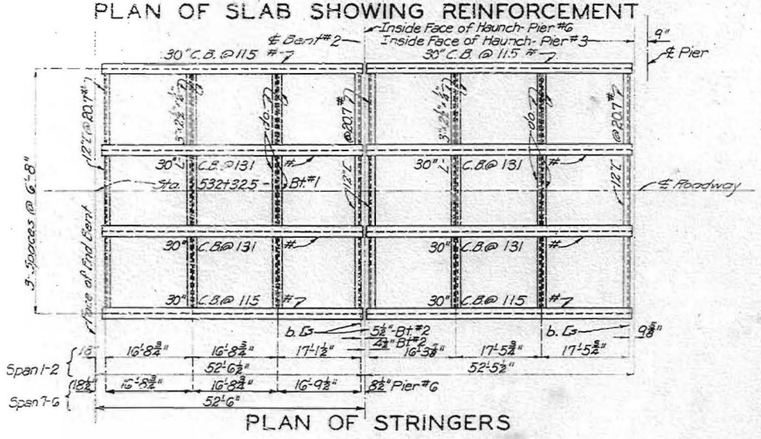
DETAIL OF BEVEL PLATE



PLAN OF SLAB SHOWING REINFORCEMENT

Note:-A mixture of graphite and oil to be applied to surfaces in contact before placing plates in structure. Bearing plates to be either cast steel or gray iron. See Special Provisions. Anchor bolts to be ⅞" ø no heads, Hex. nuts and to extend 8" into concrete. Stud bolts and nuts to be paid for as structural steel.

⅛" Rubber Compound at Exp. Joints.
⅜" Rubber Compound at Fixed Joints.

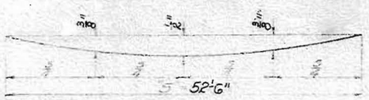


PLAN OF STRINGERS

Note:-Tops of bents to be finished as nearly as possible to within ⅛" of final elevation of bottom of plates. Plates to be seated to proper elevation by inserting soft lead plates between top of bent and bottom of plate. Concrete seat under lead plates to be dressed to a uniform level bearing with carborundum brick. Cost of lead plates to be included in price bid for other items.

DETAILS OF BEARING PLATES

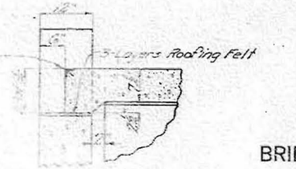
Note:- 4 fixed and 4 expansion plates required for each span.



DEFLECTION DIAGRAM

METALLIC EDGE MOULDING

Note:-Cost of metallic edge moulding will be included in unit price for concrete.



DETAIL OF SLAB AT END BENT

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S. 40

ABOUT .5 MILE SOUTH OF LAMINE

PROJECT NO. R41-513 STA. 532+32.5

COOPER COUNTY

FINISHED

FINISHED

Drawn Aug 1932 by RJG-CAF
Traced Aug 1932 by C.A.F
Checked 1932 by

Assembled April 1933 by I.B-H.W.H.
Checked April 1933 by J.W.

Note-This drawing is not to scale. Follow dimensions

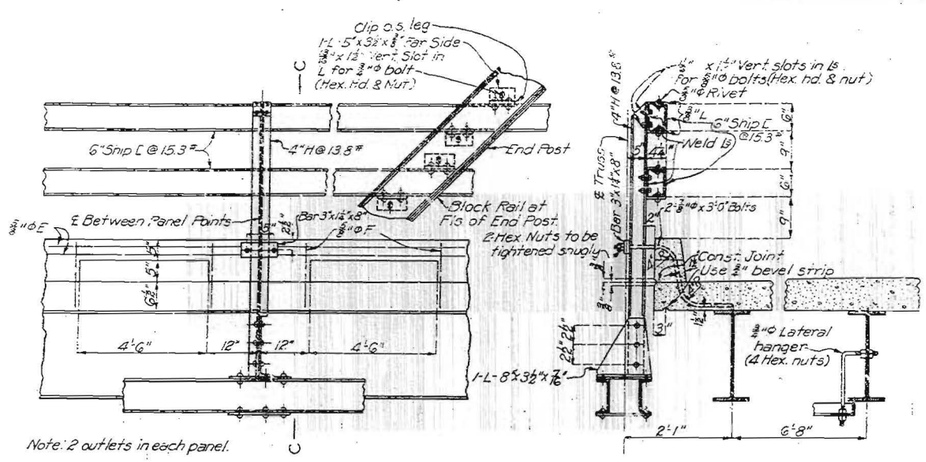
Sheet No. 8 of 10

K-236

47 73

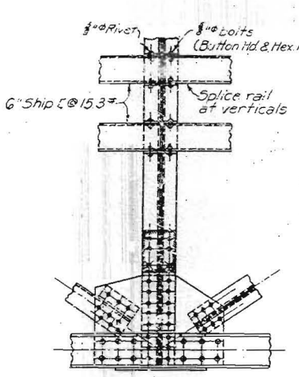
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R41-513	19		

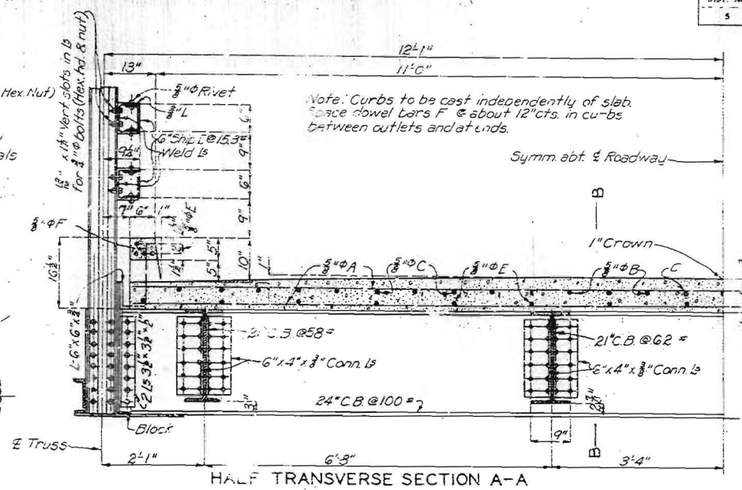


PART ELEVATION OF HANDRAIL & OUTLETS

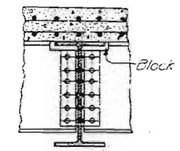
SECTION C-C



TYPICAL JOINT

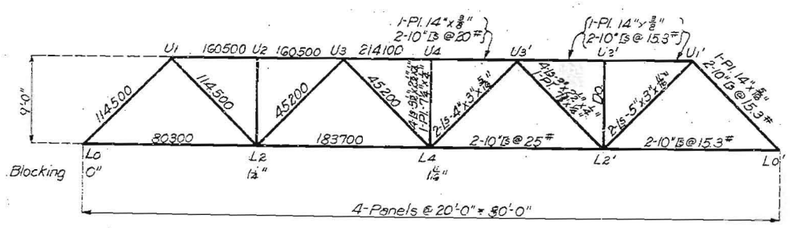


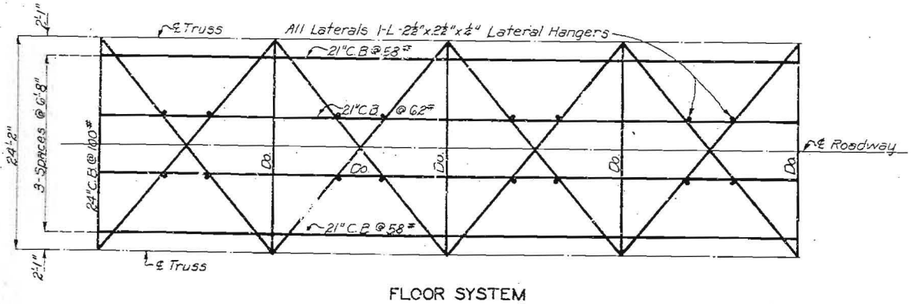
HALF TRANSVERSE SECTION A-A



SECTION B-B

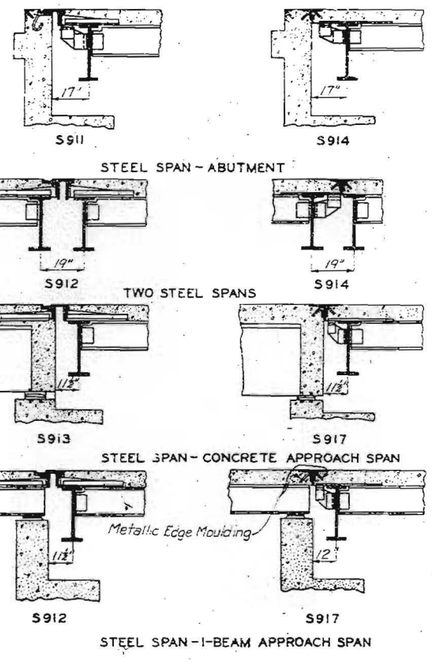
Note: Channel rail to be adjusted for horizontal alignment by use of full size metal shims placed between rail support and the rail connection angles. Shims of ⅜" and ¼" thickness to be furnished with structural steel. Cost of shims to be included in price bid for other items.





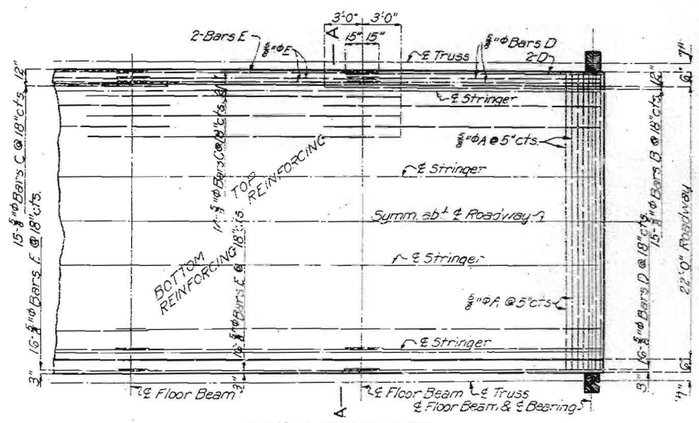
FLOOR SYSTEM

80' TRUSS



EXPANSION ENDS FIXED ENDS

DETAILS OF SLAB ENDS



PART PLAN OF SLAB

BILL OF REINFORCING			
No.	Size	Length	Mark
390	⅝"Φ	22'-9"	A
29	⅝"Φ	23'-9"	B
29	⅝"Φ	26'-0"	C
48	⅝"Φ	22'-0"	D
48	⅝"Φ	22'-6"	E
102	⅝"Φ	12"	F

Note: Reinforcing for one span only.

Note: For General Notes see Sheet No. 1.
Rivets ¾"Φ, Holes ⅞"Φ unless otherwise noted.
For details of shoes see Std. S-807.
Details of truss similar to those shown on Std. S-880.

PERMISSIBLE SUBSTITUTIONS		
Carnegie Bms.	Beth. Bms.	Std. I-Bms.
24"@100#	24"G@100#	24"@120#
21"@58#	20" @ 55#	20"@ 75#
21"@62#	20" @65#	20"@91.4#

Note: See Special Provisions in regard to permissible substitutions and basis of payment.

Note: This drawing is not to scale. Follow dimensions.

Assembled April 1938 By I.B.-H.W.H.
Checked
Drawn Sept. 1932 By L.H.
Traced Sept. 1932 By H.W.H.
Checked Sept. 1932 By F.W.H.

Sheet No. 9 of 10

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S. 40 FINISHED
ABOUT .5 MILES SOUTH OF LAMINE
PROJECT NO. R.41-513 STA. 532+32.5
COOPER COUNTY
FINISHED

K-236

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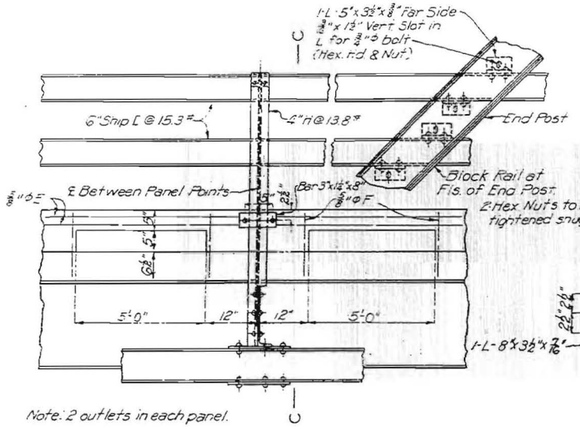
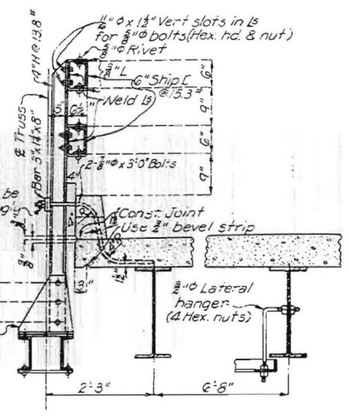
MISSOURI STATE HIGHWAY DEPARTMENT

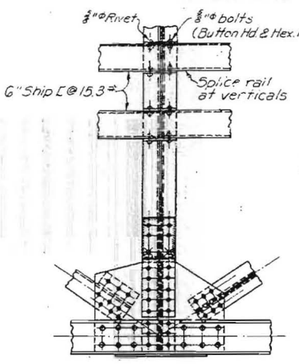
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	P41-513	19		



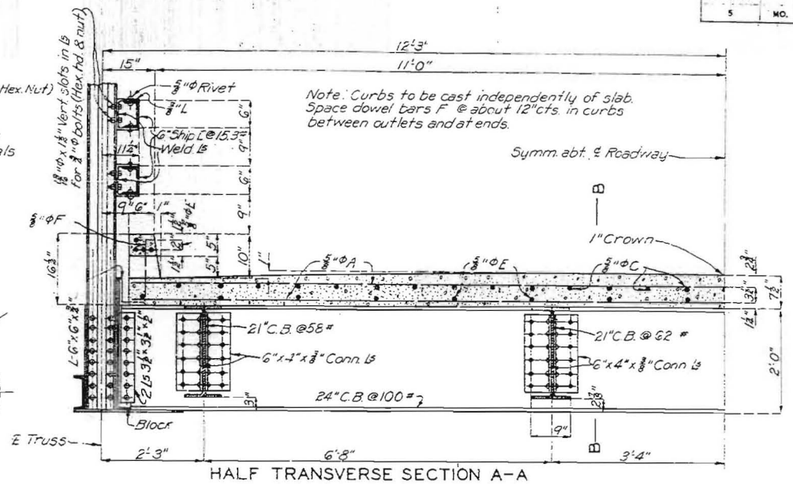
PART ELEVATION OF HANDRAIL & OUTLETS



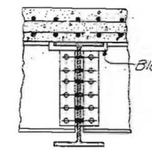
SECTION C-C



TYPICAL JOINT

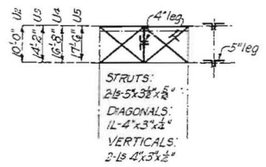


HALF TRANSVERSE SECTION A-A

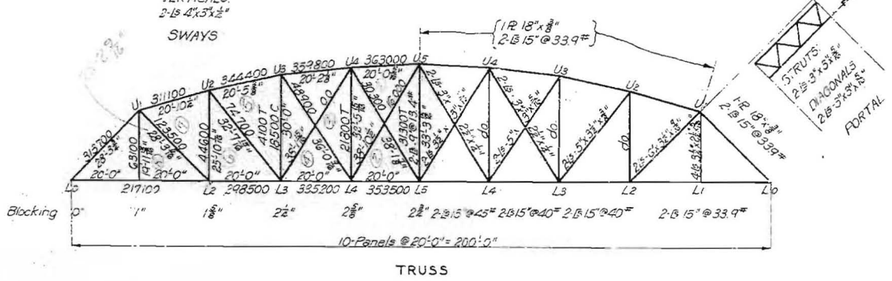


SECTION B-B

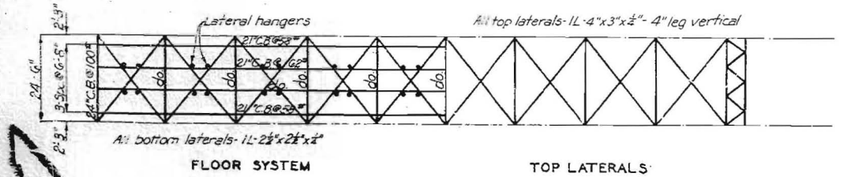
Note: Channel rail to be adjusted for horizontal alignment by use of full size metal shims placed between rail support and the rail connection angles. Shims of ⅛" and ¼" thickness to be furnished with structural steel. Cost of shims to be included in price bid for other items.



Notes:
Lengths of members shown on truss are cambered lengths.
14'-0" Minimum clearance - Crown of roadway to bottom of steel.



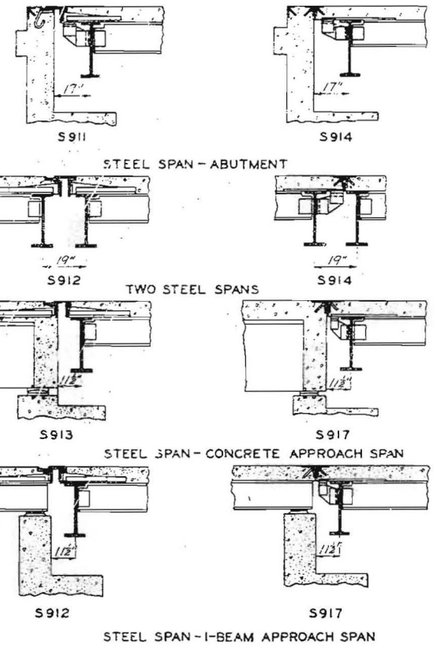
TRUSS



FLOOR SYSTEM

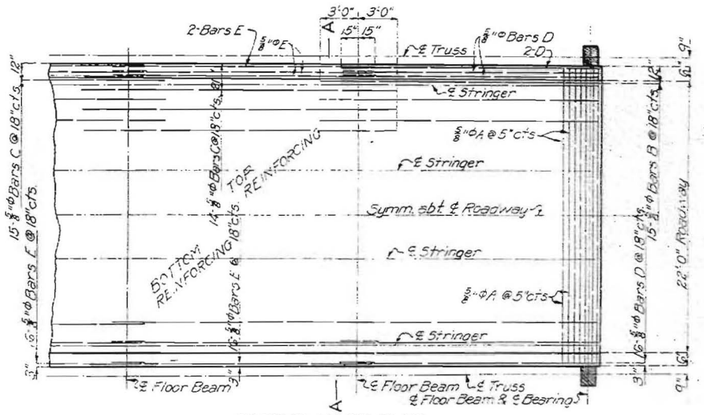
TOP LATERALS

200' TRUSS



EXPANSION ENDS FIXED ENDS

DETAILS OF SLAB ENDS



PART PLAN OF SLAB

BILL OF REINFORCING			
No.	Size	Length	Mark
272	⅞"Φ	22'-9"	A
29	⅞"Φ	24'-0"	B
16	⅞"Φ	26'-0"	C
48	⅞"Φ	22'-0"	D
192	⅞"Φ	22'-6"	E
244	⅞"Φ	12"	F

Note: Reinforcing for one span only

Note: For General Notes see Sheet No 1.
Rivets ⅞"Φ, Holes ⅞"Φ unless otherwise noted.
For details of shoes see Std. 3-B.C.
Details of trusses similar to those shown on Std. 5-B200, except revise L4-L5 to take only 6 holes out for net section.
Camber as shown on this sheet.

PERMISSIBLE SUBSTITUTIONS		
Carnegie Bms.	Beth. Bms.	Std. I-Bms.
24"@100#	24"G@100#	24"@120#
21"@58#	20"@55#	20"@75#
21"@62#	20"@65#	20"@81.4#

Note: See Special Provisions in regard to permissible substitutions and basis of payment.

Note: This drawing is not to scale. Follow dimensions.

BRIDGE OVER LAMINE RIVER

STATE ROAD FROM LAMINE TO U.S. 40 FINISHED
ABOUT .5 MILES SOUTH OF LAMINE
PROJECT NO. R. 41-513 STA. 532+32.5
COOPER FINISHED COUNTY

Assembled April 1932 By L.H.
Checked
Drawn Sept 1932 By L.H.
Traced Sept 1932 By H.W.H.
Checked Sept 1932 By F.W.H.

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Sheet No 10 of 10

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Appendix B
Plates of Archival Photographs

Lamine River Bridge, K0236
Cooper County, Missouri
Photographer: Karen L. Daniels

Location of negatives: digital images, .tiff images provided to the State Historic Preservation Office, Jefferson City, Missouri and retained by the Historic Preservation Section, Missouri Department of Transportation, Jefferson City, Missouri.

Date of Photographs: 11 December 2012: images 1-11, 13-16, 20-22
6 February 2013: images 12, 17-19, 23-24

1 of 24
East side of bridge, general overview, facing west

2 of 24
Main span, east side, facing west

3 of 24
North approach, span 5, east side, facing west

4 of 24
South approach, span 3, east side, facing west

5 of 24
Pier 4, facing southwest

6 of 24
Underside of main span, facing southwest

7 of 24
Detail, underside of main span, facing west

8 of 24
North approach spans and main span, facing south

9 of 24
North approach spans and main span, facing south

10 of 24
North portal of main span, facing south

11 of 24
North portal from inside span, facing north

12 of 24
Main span through truss, facing south

13 of 24
South portal of main span, facing north

14 of 24
South approach span and main span, facing north

15 of 24
South approach spans and main span, facing north

16 of 24
South approach spans and main span, facing northeast

17 of 24
South approach span, west side pony truss, facing northwest

18 of 24
Bottom chord, east side of span, facing north

19 of 24
End of guardrail, southwest quadrant of bridge, facing northwest

20 of 24
Detail of top strut and sway bracing, facing north

21 of 24
Detail of connections of inclined end post, portal bracing and hip vertical, south portal, facing east

22 of 24
Detail of connections of vertical post, diagonals, top chord, top lateral bracing and top struts.

23 of 24
Main span, west side, facing east

24 of 24
West side of bridge, facing east

#1 of 24: East side of bridge, facing west.

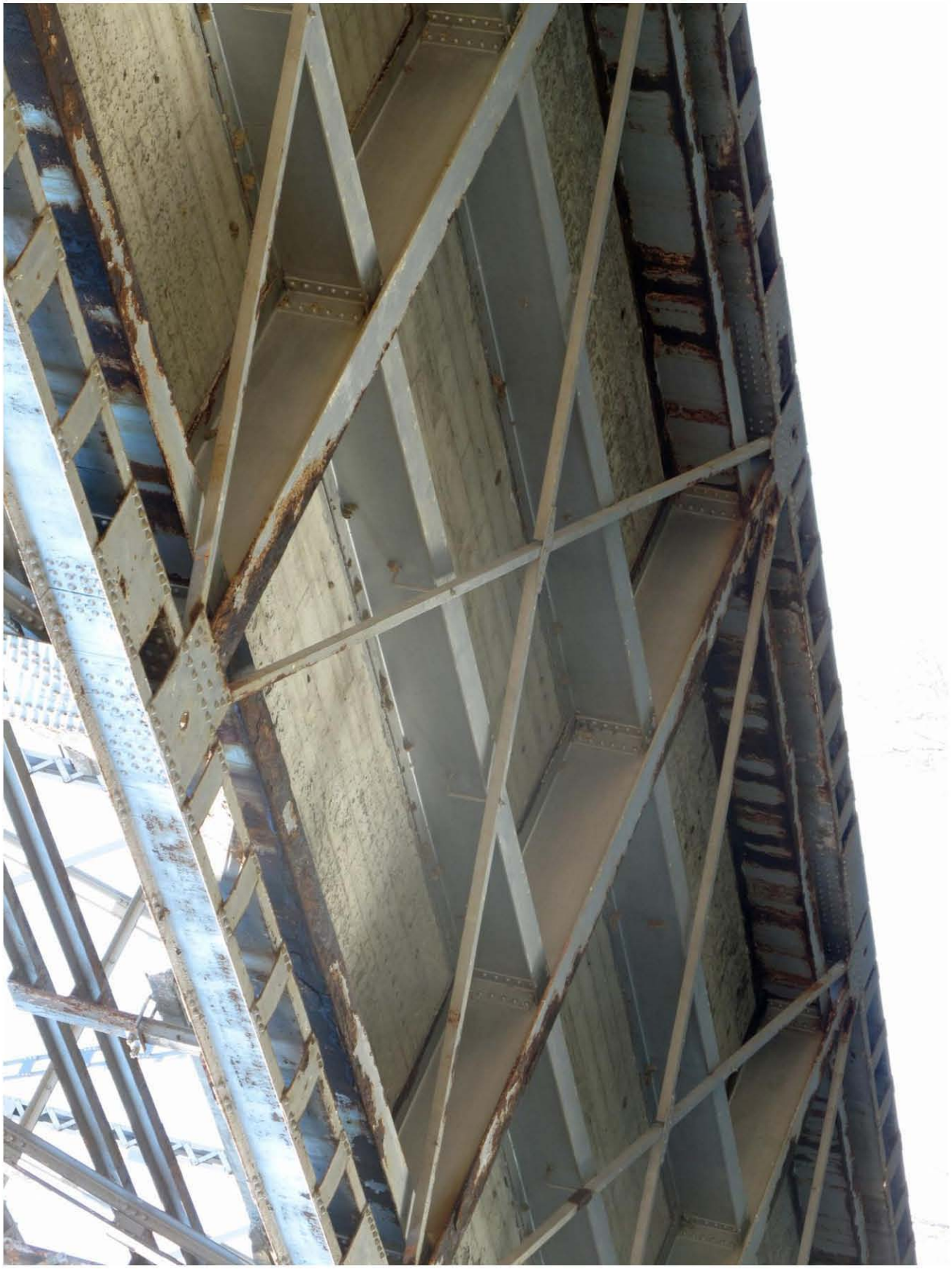
#2 of 24: Main span, east side, facing west.

#3 of 24: North approach, span 5, east side, facing west.

#4 of 24: South approach, span 3, east side, facing west.

#5 of 24: Pier 4, facing southwest.

#6 of 24: Underside of main span, facing southwest.



#7 of 24: Detail, underside of main span, facing west.

#8 of 24: North approach spans and main span, facing south.

#9 of 24: North approach spans and main span, facing south.

#10 of 24: North portal of main span, facing south.

#11 of 24: North portal from inside span, facing north.

#12 of 24: Main span through truss, facing south.

#13 of 24: South portal of main span, facing north.

#14 of 24: South approach span and main span, facing north.

#15 of 24: South approach spans and main span, facing north.

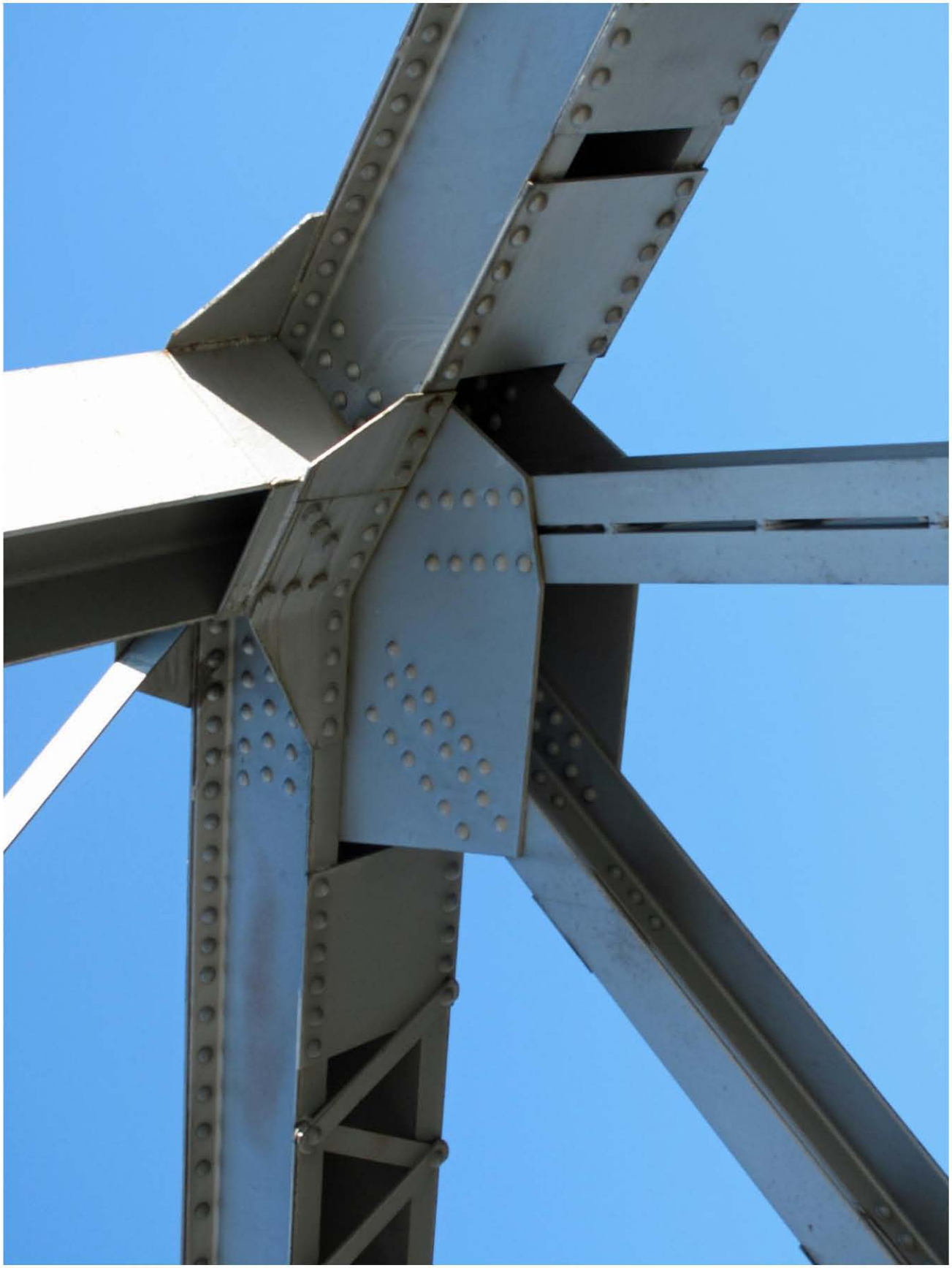
#16 of 24: South approach spans and main span, facing northeast.

#17 of 24: South approach span, west side pony truss, facing northwest.

#18 of 24: Bottom chord, east side of span, facing north.

#19 of 24: End of guardrail, southwest quadrant of bridge, facing northwest.

#20 of 24: Detail of top strut and sway bracing, facing north.



#21 of 24: Detail of connections of inclined end post, portal bracing and hip vertical, south portal, facing east.

#22 of 24: Detail of connections of vertical post, diagonals, top chord, top lateral bracing and top struts.

#23 of 24: Main span, west side, facing east.

#24 of 24: West side of bridge, facing east.