Documentation of the Historic Jacks Fork Bridge

Bridge No. J-665
Texas, Route 17

MoDOT

U.S. Department of Transportation
Federal Highway Administration

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Jacks Fork River Bridge
Bridge No. J-665
Texas County, Route 17
MoDOT Job No. J9P0440

David C. Austin, Historian
September 2004

Construction History of the Jacks Fork River Bridge

The Jacks Fork River Bridge (Bridge No. J-665) spans the Jacks Fork River at Route 17 in extreme southeast Texas County, Missouri. Erected in 1931, the bridge consists of two steel, six-panel, rigid-connected Warren pony truss spans each 100'-0" in length, combined with three steel stringer approach spans, and carried on reinforced concrete bents and piers. The total bridge length is 329'-1", and the roadway width is 20'-0". The substructure and superstructure components have a right-advance skew of a one-half panel (10'-0") length, or 24 degrees, relative to the highway centerline. The Jacks Fork River Bridge is significant as a rare, skewed example of an otherwise common structural type, and is also noteworthy for its use of multiple Warren pony truss spans of 100' lengths.[1]

The Missouri State Highway Department began improvements to Route 17 in the 1920s as part of its statewide road construction program. Route 17 was a secondary state highway beginning at U.S. Route 54 in southwest Cole County, and meandering south through the county seats of Miller, Pulaski, and Texas counties before terminating at U.S. Route 60 near Mountain View in northeast Howell County. (The highway would later be extended farther south through West Plains to the Arkansas border). By 1930, Route 17 stood in various stages of completion, some segments having been finished with a gravel surface, and other segments still needing substantial improvements. In Texas County, most of the highway from Raymondville south to the Howell County line--about twenty-five miles--had not seen any major construction. One road project completed in 1926, however, had renovated an existing bridge over the Jacks Fork River, and provided a graded earth road for a distance of approximately one and a half miles north of the bridge. The existing bridge of two 152' truss spans had its wood floor replaced and was repainted, leaving it in good condition; yet the road alignment at either end of the bridge remained excessively crooked.[2]

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[1] Clayton B. Fraser, "Jacks Fork Bridge," Historic Bridge Inventory Data Sheet, Missouri Historic Bridge Inventory, 5 Vols., Missouri Department of Transportation, Project No. NBIH (6) (Loveland, Colorado: Fraserdesign, Inc., 1996).

[2] Missouri State Highway Commission, "Map of Missouri Showing State Road System, Route Numbers, Road Conditions and Points of Interest," (Jefferson City: Botz-Hugh Stephens Press, 1930); Missouri State Highway Commission, "Plan and Profile of Proposed State Road, Federal Aid Project, Texas County," Route 17, Section 43-A, 1926, Design Division, Missouri Department of Transportation, Jefferson City; C. L. Bower, "Preliminary Inspection Report," September 17, 1930, in Bridge No. J-665 Correspondence File, Bridge Division, Missouri Department of Transportation, Jefferson City.

Section 44 of Route 17 entailed the construction of a new bridge over the Jacks Fork River and roughly two-thirds of a mile of gravel highway from the north end of the bridge to the Howell County line. In 1930, engineers of the highway department's Division No. 9 office in Willow Springs completed a survey report of the bridge site. The report proposed a new centerline alignment and recommended a new bridge about 465' in length to be located a short distance upstream from the existing bridge. In September 1930, C. L. Bower, an Assistant Preliminary Estimator and Designer in the department's Bureau of Bridges, followed up on the division's survey report with a personal inspection of the location. The surrounding topography severely restricted the design options for a new crossing. Rock bluffs bordering the river on either side constricted the river valley. The meandering river channel, filled with gravel bars, flowed in a northeast direction at an angle to the highway centerline. Reconfiguring the river channel was not an option. The new highway alignment crossed the mouth of a ravine called Buck Hollow that emptied into the Jacks Fork River on the north side; it would have to be spanned as well. In addition, the hills behind the bluffs would force steep highway grades on both sides of the valley. Because of the earlier road work on the north side, the highway department remained committed to this location.[3]

Bower subsequently considered bridge designs based on the alignment proposed by Division No. 9 ("Line A") as well as an alternative alignment ("Line B"). Both alternates presented difficulties in engineering an effective bridge crossing. A single structure crossing both Jacks Fork and Buck Hollow, while feasible, would necessitate a substructure with its components skewed in opposite directions. The portion over Buck Hollow would be skewed with a left advance of more than 60 degrees, and the portion over Jacks Fork would be skewed with a right advance of 24 degrees. The bent at Buck Hollow would need an extended wing to prevent the roadway fill from spilling out. Excavation for that bent would be as deep as 30' to 40', with one bent leg shorter than the other. Another option would have placed a dike and earth fill between Buck Hollow and Jacks Fork, and built separate bridges over both. However, about 28,000 yards of fill would have to be hauled in, which would not be economically viable. Line A and Line B both offered the same disadvantages relating to an increased skew over Buck Hollow at the north end, an increased roadway grade above 8.5 percent on the south end, and a vertical curve on the bridge itself. Bower concluded, "This leaves practically no difference in the two layouts and it is recommended that the layout using only one structure be used."[4]

Following his own recommendation, Bower configured a preliminary bridge design over 450' in length to cross both Jacks Fork and Buck Hollow. The first three bents at Buck Hollow on the north end had a left advance skew of 45 degrees. A center bent stood perpendicular to centerline. Five bents or piers on the south had a right

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[3] Bower, "Preliminary Inspection Report," Correspondence File.

[4] Ibid.

advance skew of 24 degrees. The proposed superstructure consisted of one 30' I-beam, four 45' I-beams, two 100' trusses, and one 45' I-beam at the south approach.[5] The opposite skews in the design may have proved too complicated when considered in detail. In March 1931, the Assistant Bridge Engineer Vaughn W. Enslow made another inspection of the site, accompanied by three engineers from Division No. 9 and another from the Surveys and Plans office. The men considered shifting the alignment to the east, downstream from the existing bridge. That location would require an equal, or perhaps greater, span length, and a high grade elevation 60' above the existing bridge in order to ascend the hills on the south side. It would also mean abandoning much of the work already done on the north side, and would increase the total costs by about $25,000. Another option--the one decided upon--would remove a section of the north bluff and rechannel Buck Hollow to run alongside the road alignment. That option eliminated the need to bridge Buck Hollow. The rock removed from the bluff would be used as fill to help carry the roadway. The fill would be placed on a 20'-thick gravel bed which had the potential of being scoured out and shifting. However, that problem could be solved by extending the bridge another 25' and putting the fill in front of the north end bent, mitigating any movement of the fill. Furthermore, the overall costs using this scheme would be reduced by as much as $5,000, giving it Enslow's endorsement.[6]

Engineers in the Bureau of Bridges worked on the bridge construction drawings during May and June 1931. They may have incorporated some of the components of Bower's initial design, such as using two 100' truss spans. The Bridge Engineer and the Chief Engineer signed off on the structure on June 15. Construction bids for Route 17, Section 44, were opened on June 26. The Kelly and Underwood Construction Company of Granby, Missouri, submitted the low bid of $55,698, in competition with twelve other firms. Their bid to construct the Jacks Fork River Bridge exclusive of the adjacent roadwork amounted to $30,588. The Missouri State Highway Commission awarded the contract on July 14, 1931.[7]

Immediately after the bid opening, the Kelly and Underwood Construction Company arranged with the St. Louis Structural Steel Company of East St. Louis, Illinois, to fabricate and erect the bridge's steel spans. The steel company, in turn, contacted the highway department for past examples of shop drawings for similar spans. On June 27, only one day after the bid opening, Bridge Engineer N. R. Sack replied to the steel company's request. Referring to the bridge's skewed configuration, Sack wrote, ". . . no similar truss spans have ever been fabricated for us by any shop." Instead, Sack

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[5] C. L. Bower, "Field Check Memoranda," January 5, 1931, Correspondence File.

[6] V. W. Enslow, "Inspection Report," n.d., Correspondence File.

[7] Missouri State Highway Commission, "Plan and Profile of Proposed State Road"; Missouri State Highway Department, "Bridge Over Jacks Fork," June 15, 1931, Bridge No. J-665 [bridge construction drawings, seven sheets], Bridge Division, Missouri Department of Transportation, Jefferson City; "Tabulation of Bids Received," June 26, 1931, Texas County, Route 17, Section 44, Design Division, Missouri Department of Transportation, Jefferson City.

forwarded a set of standard drawings for a 100' pony truss span along with other standard drawings of cast bearings, expansion devices, and end floor beam connections.[8]

Kelly and Underwood wasted no time in getting the project underway. On July 18, only four days after the Commission approved the construction contract, workers poured the two concrete footings for Bent 6 on the south bank. Within a month they had completed Bent 6 up to its cap beam. The other bents and piers also went up rapidly. With a crew of about twenty men, Kelly and Underwood completed the substructure components by mid-September. However, they made adjustments to the planned depths of the footings due to the variable depths of solid bedrock. At Bent 1, for example, the left footing was raised 3'-6", and the right footing 6'-2" above the planned elevation. At Bent 2, ledge rock covered about half the area under the left footing while large boulders imbedded in packed gravel and sand covered the remaining half. They broke up the ledge rock with explosives to provide a uniform base, then poured a spread footing 6'-5" square before building up the footing and column according to plan.[9]

The St. Louis Structural Steel Company meanwhile prepared the shop drawings for the steel spans and submitted them to the highway department's bridge bureau for approval. The drawings required only minor corrections. However, the highway department's approval of the drawings covered only the general features of the truss spans and not the engineering details. The steel company began fabricating the members in mid-August, and after an inspection by a highway department representative, shipped the first of the steel in early September. By September 11, the steel company had pre-assembled the last truss span at their plant prior to its inspection.[10] The steel was shipped by rail to Mountain View in Howell County and hauled overland about four miles to the Jacks Fork River. At the bridge site, the steel crew had erected the southernmost span by September 16. The construction inspector D. C. Wolfe noted, "The equipment for raising the structural steel seems almost inadequate as it consists of gin piles" [i.e., gin poles]. Kelly and Underwood meanwhile had just started excavating the channel change for Buck Hollow. The excavated rock would be used as fill in front of Bent 1.[11]

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[8] N. R. Sack to St. Louis Structural Steel Company, June 27, 1931, Correspondence File.

[9] Regularly filed reports gave the specifics of each concrete pouring. The project engineer R. F. Cozine also routinely summited concrete samples to the highway department's Materials Laboratory for strength testing. Untitled concrete report forms, July 18, 1931, ff., and Report[s] of Tests on Concrete Cylinders, September 14, 1931, ff; D. C. Wolfe, "Inspection Report," September 16, 1931, Correspondence File.

[10] Joseph A. Schmidt, Chief Draftsman, St. Louis Structural Steel Company, to N. R. Sack, July 21, 1931; N. R. Sack to St. Louis Structural Steel Company, July 25, 1931; Joseph A. Schmidt to N. R. Sack, August 11, 1931; N. R. Sack to J. A. Schmidt, August 14, 1931; R. C. Bradshaw, Purchasing Agent, St. Louis Structural Steel Company, to N. R. Sack, August 29, 1931; A. O. Utterback, "Bridge Steel Inspection Report," September 3-5, 1931; R. C. Bradshaw to N. R. Sack, September 11, 1931; A. O. Utterback, "Bridge Steel Inspection Report," September 14, 1931, Correspondence File.

[11] D. C. Wolfe, "Inspection Report," September 16, 1931, Correspondence File.

Few other details are known about the erection of the Jacks Fork River Bridge. The St. Louis Structural Steel Company took less than two months to erect the remaining four spans. Reports of concrete pourings indicate that the south span, Span 5, had its floor poured on October 28, followed by the floor slab of Span 4 on October 30. The floor of Span 2 was poured on November 16; Span 1 on November 17; and Span 3 on November 19.[12] Kelly and Underwood apparently finished the adjacent roadway work sometime in mid or late December. Division No. 9 engineers made a final inspection and accepted the project on December 24, 1931.[13]

Physical Description of the Jacks Fork River Bridge

Designed and erected in 1931, the Jacks Fork River Bridge (Bridge No. J-665) at Route 17 in southeast Texas County consists of two steel, six-panel, rigid-connected Warren pony truss spans each 100'-0" in length, combined with three steel stringer approach spans of 35'-0" and 45'-0". Reinforced concrete bents and piers are skewed 24 degrees relative to the highway centerline. The degree of skew is equivalent to a one-half panel length, or 10'-0". The total bridge length is 329'-1", and the roadway width is 20'-0". It has a level grade across the entire structure. The length and configuration of the bridge were governed by its setting in the very rugged terrain of the Jacks Fork River valley.

The reinforced concrete substructure components include three bents and three dumbbell piers. All substructure footings were to be set at least 6" into solid rock. Changes to the planned depths of the footings were made during construction when elevations of bedrock differed from those shown on the plans. Bent No. 1 on the north bank is an open abutment with two front-battered columns, a connecting cap beam, and back wingwalls. Two rectangular footings measure 16'-8" long x 4'-6" wide x 2'-6" high, and are centered 16'-10" apart. Two columns measuring 14'-8" x 2'-6" at the base have a front batter of 3" per foot, and rise 48'-7" to the cap beam. The columns are connected with a middle tie beam 2'-0" square. The cap beam is 22'-4" x 2'-6" x 2'-3"; a backwall 12" thick leaves a bridge seat 1'-6" wide. The backwall and wings are 5'-10" high and 39'-10" long. Bent No. 1 is backfilled with rock fill, leaving it exposed only above the bridge seat.

Bent No. 2 is a column bent with two square columns, a middle tie beam, and cap beam. Its has 4'-6"-square footings 2'-6" thick. The two columns are 2'-6" square, and 48'-7" high to the bottom of the cap beam. A connecting tie beam is 2'-0" square, with flared ends at the column connections. The cap beam is 22'-6" x 2'-6" x 2'-3". The portion of Bent No. 2 beneath its middle tie beam is covered with rock fill.

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[12] Untitled concrete report forms, Correspondence File.

[13] T. H. Cutler to C. W. Francisco, January 5, 1932, Correspondence File.

Pier Nos. 3, 4, and 5 are dumbbell piers with paired cylindrical column shafts, connecting webwalls, and cap beams. Pier No. 3 is set on square footings 8’-0” x 8’-0” x 5’-0”. Its two cylindrical columns are 6’-0” in diameter at the base, and are battered 1/2” per foot. The total height of each column is 41’-7”. Centered 24’-5” apart, the columns are connected by a webwall 1’-3” thick. The cap beam has a backwall 1’-2-1/2” high, 1’-2” wide and 20’-1” long that supports the I-beam span.

Pier No. 4 has slightly larger footings 8’-6” square and 5’-0” thick. Its cylindrical columns are 6’-6” in diameter at the base, and are battered 1/2” per foot. The columns of Pier No. 4 are 40’-1-1/2" high and are centered 24’-5” apart. Its webwall is also 1’-3” thick.

Pier No. 5 has 7’-10”-square footings that are 5’-0” thick. Its cylindrical columns are shorter than the other piers, at 24’-7” high. As with Pier No. 3, it has a backwall that supports the I-beam span.

Bent No. 6 on the south bank is an open abutment with two front-battered columns, a connecting cap beam, and back wingwalls. Its rectangular footings measure 4’-6” x 9’-7” x 2’-6”. Its two columns measure 2’-6” x 7’-7” at the base and are 20’-4” high, with a front batter of 3” per foot. The columns are centered 16’-10” apart. The cap beam is 22’-4” x 2’-6” x 2’-5”. The bent has a backwall and wings 6’-2” high and 39’-10” long. The face of the bent is buried under a stone revetment.

Spans 1 and 2 on the north end are 35’ I-beam spans built of four 24” I-beam stringers spaced 6’-0” apart. The end floor beams at each span are 12” channel separators attached to the stringers with angle plates. Lateral bracing is provided by 8” channel separators.

Span 5 at the south end is a 45’ I-beam span composed of four 27” I-beam stringers centered 6’-0” apart. The end floor beams are 12” channels. Bracing between the stringers is again provided by 8” channel separators.

On this bridge, a “new type” of bearing plate consisting of 1/8”-thick lead plates were used on the three I-beam spans in lieu of grout to alleviate minor irregularities in the concrete surfaces. The surfaces of the bents and piers underneath the bearing plates were first ground down with a carborundum brick just prior to the placing of the plates.[14] The bearings at each of the stringers are 2-3/4”-thick cast steel plates secured with 1-1/4” x 3/4" hexagonal bolts. Both fixed and expansion bearings are used.

The two Warren pony truss spans were based in general on a standard design developed earlier by the Missouri State Highway Department (Standard Drawing S-818). The spans are 100’-0” long as measured between the bearings, or just over 101’ as measured between the midpoints of the piers. The trusses of each span are asymmetrical. The trusses on the west or upstream side consist of five 20’-0” panels. The trusses on the

[14] D. C. Wolfe, “Inspection Report,” September 16, 1931, Correspondence File.

east or downstream side have end panels of 10’-0” and four 20’-0” interior panels. Therefore, opposing diagonal web members are either built of two angles or four angles. The trusses are centered 22’-4” apart and are 10’-0” high. The members are connected with 3/4”-diameter rivets. The inclined end posts and upper chords are constructed of two 10’ channels with 16”-wide cover plates, single lacing and end tie plates. The lower chords consist of two 12” channels with lacing and batten plates. Diagonal members alternate between two angles with batten plates, and four angles with 8” cover plates. Vertical members are four angles with 8” cover plates.

The trusses are carried on fixed and expansion bearings at Pier No. 3, expansion bearings at Pier No. 4, and fixed bearings at Pier No. 5. The floor system consists of 20” I-beam end floor beams skewed for a one-half panel, 10’-0” length on alignment with the piers. Larger than the end beams, the floor beams at each panel point are 24” I-beams and run perpendicular to the trusses. Eight 12” I-beam stringers are spaced 2’-8-1/2” apart. (The bridge construction drawings allowed for substitutions for the interior floor beams, end floor beams, and stringers). Lateral cross-braces of single angles are attached to the lower chords and floor beams with gusset plates and bent plates, and to the stringers with hanger bolts. The reinforced concrete bridge deck is 7-1/2" thick at the roadway centerline and 20’-0” wide between reinforced concrete curbs. The curbs are 10” high and 6” wide, and are interspersed with 4’-6”-long drainage weepholes. The concrete curbs and outer edges of the deck have significantly deteriorated, and sections of the curbs and railing at the north end have been rebuilt. Inner railings are gaspipe rails and posts, ending with ornamental ball posts. Bridge name plates on the end posts read, “MISSOURI HIGHWAY DEPT, BRIDGE No. J.665, 1931.”

The Jacks Fork River Bridge is a rare example of a skewed, multiple-span Warren pony truss bridge. The Missouri State Highway Department frequently used Warren pony trusses for spans of 100’ or less. Generally, Warren pony truss bridges incorporated a single span, although sometimes two or three spans were utilized.[15] Skewed Warren pony truss spans are infrequent but not unknown. In 1927, the highway department designed a structure for Route 5 at Doxie Creek in Chariton County. The structure incorporated five Warren pony truss spans--one central span of 100’ flanked at each end by two spans of 70’. The spans had an extreme skew of 69 degrees, a three-panel, 60’ length, that forced a slight bowing of the top chords.[16] In 1929, the department designed a bridge for Route 136 at East Fork Tarkio Creek in Atchison County. It had five 90’ Warren pony truss spans on a skew of 58 degrees, a two-panel, 36’ length. During its construction, workers had difficulties in getting a proper camber in the trusses as kinks tended to form in the top chords. The skew also forced the spans to bear on two corners.[17] Similar problems in the erection of the Jacks Fork River Bridge may have

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[15] Fraser, “Warren Trusses,” Missouri Historic Bridge Inventory, I: 118-120.

[16] David C. Austin, “Doxie Creek Bridge Spanning Doxie Creek at Missouri State Route 5, Forest Green vicinity, Chariton County, Missouri, HAER No. MO-105,” (Washington, D.C.: Historic American Engineering Record, National Park Service, 1997).

[17] David C. Austin, “Atchison County, Route 136, Bridge No. J-176 over East Fork Tarkio Creek, MoDOT Job No. J1P0381,” Cultural Resources Section, Design Division, Missouri Department of Transportation,

occurred, although none are documented in surviving records. Its relatively minor skew of 24 degrees likely produced few complexities during its construction.

Kelly and Underwood Construction Company

The Kelly and Underwood Construction Company, general contractors for the Jacks Fork River Bridge project, was based in Granby, Newton County, Missouri. Charles Curtis Kelly and Jerry R. Underwood founded the firm in about 1915. The company remained unincorporated. Their first project involved improving a county road from Granby to Neosho, the Newton County seat.[18] The company operated for over twenty years, but is credited with constructing only three other bridges in Missouri. Most of their work may have involved road grading and paving. In 1924-1925, Kelly and Underwood built the substructure components for the South Greenfield Overpass in Dade County.[19] During their involvement with the Texas County project in 1931, their company stationery labeled them as "Builders of Roads and Bridges." However, the company chose to subcontract the erection of the Jacks Fork River Bridge superstructure.[20] In 1933, the company completed a 300' polygonal Warren pony truss bridge over Osage Fork in Laclede County. In 1936, the contractors built a 300' steel plate through girder span over Whitewater River in Bollinger County.[21]

Charles Kelly and Jerry Underwood each had other enterprises, and were also involved in local politics. Underwood served several terms as Granby's mayor in the 1910s and 1920s, and was reelected in 1941. At one time he owned the Mascot Mine near Granby, and operated the Oregon Mill along with partners named Jenkins and the Kelly brothers.[22] Charles Kelly served as a Newton County Court judge, but was better known for raising fine horses and mules on his Kelly and Sons Farm east of Granby. The farm supplied the work teams used in Kelly and Underwood's construction business, but also offered saddle horses and other livestock. Kelly died in 1945, two years after retiring from business. His former partner Underwood died the following year.[23]

Jefferson City, 1997. Documentation submitted to Missouri Cultural Resource Inventory, State Historic Preservation Office, Missouri Department of Natural Resources, Jefferson City.

[18] Dixie Haase, comp., *Granby, Missouri: Oldest Mining Town in the Southwest* (Cassville: Litho Printers, 1984), 81.

[19] David C. Austin, "South Greenfield Overpass Spanning the Burlington Northern Railroad at Missouri State Route 39, South Greenfield, Dade County, Missouri, HAER No. MO-96," (Washington, D.C.: Historic American Engineering Record, National Park Service, 1997).

[20] Kelly and Underwood to N. R. Sack, November 18, 1931, Correspondence File.

[21] Fraser, "Historic Bridge Inventory Data Sheets," Missouri Historic Bridge Inventory, n.p.

[22] Haase, *Granby*, 41, 47, 157; *Neosho Daily Democrat*, May 14, 1946.

[23] Haase, *Granby*, 141; *Neosho Daily Democrat*, August 22, 1945, May 14, 1946.

St. Louis Structural Steel Company

The St. Louis Structural Steel Company fabricated and erected the superstructure of the Jacks Fork River Bridge. The company first incorporated in February 1920 in Wilmington, Delaware. In March 1920, E. A. Curtis and George B. Curtis, the company's president and secretary, respectively, applied for a license to operate in Missouri, their main business being the manufacturing of steel and iron products. George Stupp became the company's chief agent in Missouri. Stupp was a principle member of the Stupp Brothers Bridge and Iron Company of St. Louis. The company started with $505,000 of capital stock divided into 10,000 shares of preferred and common stock. Their capital stock of over $208,000 included real estate in the Washington Park Subdivision in St. Clair County, Illinois, and over $106,000 in iron and steel materials.[24]

By 1929, W. Ferguson Barnes had become the company's president. In August 1929, the St. Louis Structural Steel Company merged with the Ferrous Metals Corporation, another Delaware corporation. Among others, the St. Louis Structural Steel Company's nine-member board of directors included George and E. A. Curtis, and George and Oscar C. Stupp. The Curtises resided in East St. Louis, Illinois, and may have been been in control of the steel company's day-to-day operations. The other members of the board lived in St. Louis, Missouri, except for president Barnes who resided in University City, Missouri. The main business purposes of the newly-expanded firm included the manufacture and fabrication of iron, steel and manganese; the manufacture of "all kinds of machines and machinery, engines, boilers, tanks, barges, caissons, vessels, dynamos, generators, pumps, rolling stock, hardware . . ."; metal stamping and pressing; the general businesses of machine shops, blacksmith shops, foundries, carpenter shops and pattern shops; and the ownership of mills, smelters, factories, furnaces, etc., as well as mines and mineral lands. Thus the company was involved in fabricating and manufacturing a wide array of iron and steel products.[25]

The company's stationery at the time of the construction of the Jacks Fork River Bridge in 1931 indicated the company fabricated steel for buildings, bridges, caissons, tanks, barges, conveyors, towers, and other industrial uses. They had a general address in East St. Louis, Illinois. W. F. Barnes continued as its president.[26] Affidavits filed with the Missouri Secretary of State in 1932 showed the company's total amount of property and business transacted for 1931 amounted to over $712,000. The proportion of capital stock represented by the company's property and business transacted in Missouri alone totaled over $379,000. An affidavit filed in 1933 at the height of the Great Depression

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[24] "Articles of Incorporation of St. Louis Structural Steel Company," March 8, 1920, in St. Louis Structural Steel Company Papers, Corporations Division, Missouri Secretary of State, Missouri State Information Center, Jefferson City.

[25] "Agreement of Merger and Consolidation," July 12, 1929, St. Louis Steel Company Papers.

[26] W. F. Barnes to N. R. Sack, June 29, 1931, Correspondence File.

showed the company's property and business transacted for 1932 had fallen to $503,000. It declared no value of business transacted in Missouri for that year.[27] In 1937, the company's president O. L. Curtis and secretary H. M. Kreischer moved their Missouri office from 1212 Federal Commerce Trust Building in St. Louis to 506 Olive Street.[28] The company might have dissolved shortly after that time as no other company records were filed with the Missouri Secretary of State beyond 1937. There are no other bridges in Missouri besides the Jacks Fork River Bridge that are known to have been erected by the St. Louis Structural Steel Company.[29]

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[27] "Affidavit of Principal Agent or Officer," April 9, 1932; "Affidavit of Principal Agent or Officer," August 29, 1933, St. Louis Structural Steel Company Papers.

[28] "Affudavit Changing Location of Principal Office," July 2, 1937; "Change of Agent," July 2, 1937, St. Louis Structural Steel Company Papers.

[29] Fraser, Missouri Historic Bridge Inventory, I: 83-143, passim.

Jacks Fork River Bridge
Bridge No. J-665
Texas County, Route 17
MoDOT Job No. J9P0440

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Randall Dawdy, Photographer
March 2003

1. View of Jacks Fork River Bridge, looking northeast (downstream).

2. View of Jacks Fork River Bridge, looking southwest (upstream).

3. View of Jacks Fork River Bridge, looking north.

4. South entrance of Jacks Fork River Bridge, looking north.

5. View of Warren pony truss spans and bridge deck with curbs and railings, looking north.

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8. View of north I-beam spans (Spans 1 and 2) and north pony truss span (Span 3) at Pier Nos. 3 and 4, looking northeast.

9. View of north pony truss (Span 3) at Pier Nos. 3 and 4, looking west-southwest.

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11. Close-up view of typical Warren pony truss interior panels.

12. View of north I-beam approach spans (Spans 1 and 2) at Bent No. 2 and Pier No. 3, looking northwest.

13. View of north I-beam approach spans (Spans 1 and 2) at Bent No. 2 and Pier No. 3, looking south.

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15. View of Pier No. 4.

16. View of Pier No.4 and underside of pony truss span.

17. View of Pier No. 5.

18. I-beam span (Span 2) and pony truss span (Span 3) at Pier No. 3.

19. I-beam span (Span 5) and pony truss span (Span 4) at Pier No. 5.

20. Close-up view of I-beam span (Span 5) and pony truss span (Span 4) at Pier No. 5.

View of Jacks Fork River Bridge, looking northeast (downstream)

View of Jacks Fork River Bridge, looking southwest (upstream)

View of Jacks Fork River Bridge, looking north

South entrance of Jacks Fork River Bridge, looking north

View of Warren pony truss spans and bridge deck with curbs and railings, looking north

North entrance of Jacks Fork River Bridge, looking south

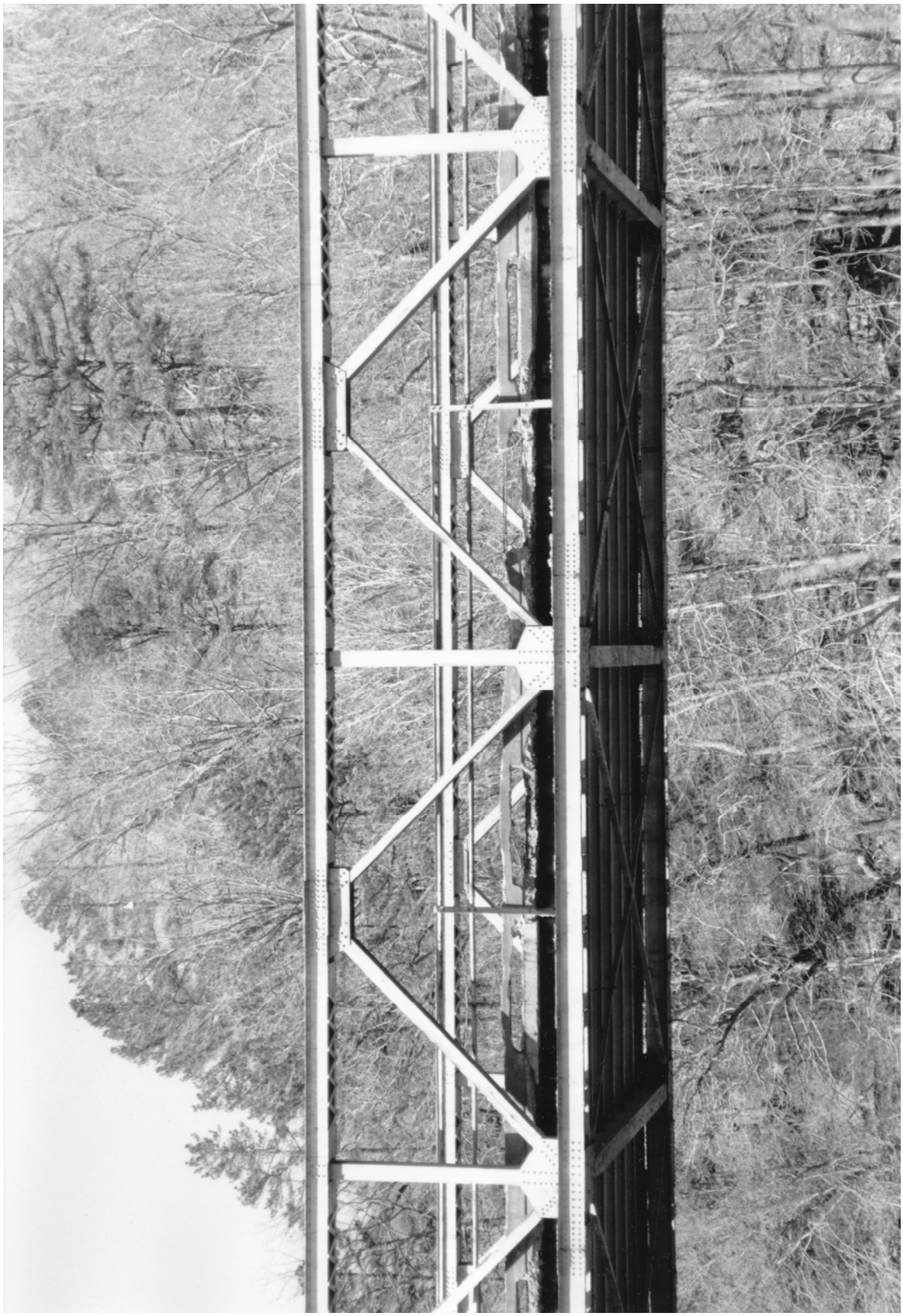
Close-up view of bridge name plate on inclined end post

View of north I-beam spans (Spans 1 and 2) and north pony truss span (Span 3) at Pier Nos. 3 and 4, looking northeast

View of north pony truss (Span 3) at Pier Nos. 3 and 4, looking west-southwest

View of south pony truss (Span 4) at Pier Nos. 4 and 5, looking southwest

Close-up view of typical Warren pony truss interior panels



View of north I-beam approach spans (Spans 1 and 2) at Bent No. 2 and Pier No. 3, looking northwest

View of north I-beam approach spans (Spans 1 and 2) at Bent No. 2 and Pier No. 3, looking south

View of Pier No. 3

View of Pier No. 4

View of Pier No.4 and underside of pony truss span

View of Pier No. 5

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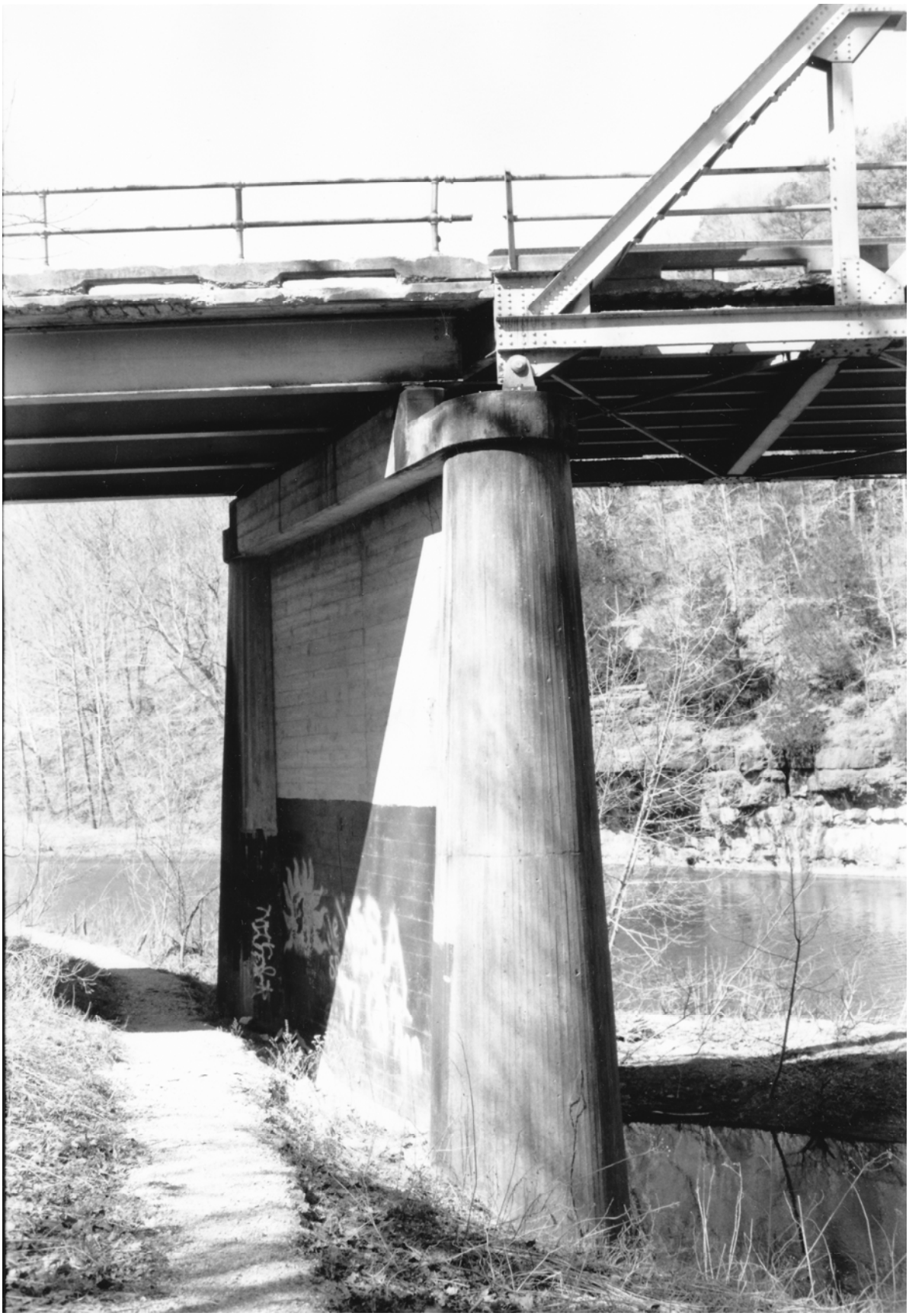
I-beam span (Span 2) and pony truss span (Span 3) at Pier No. 3

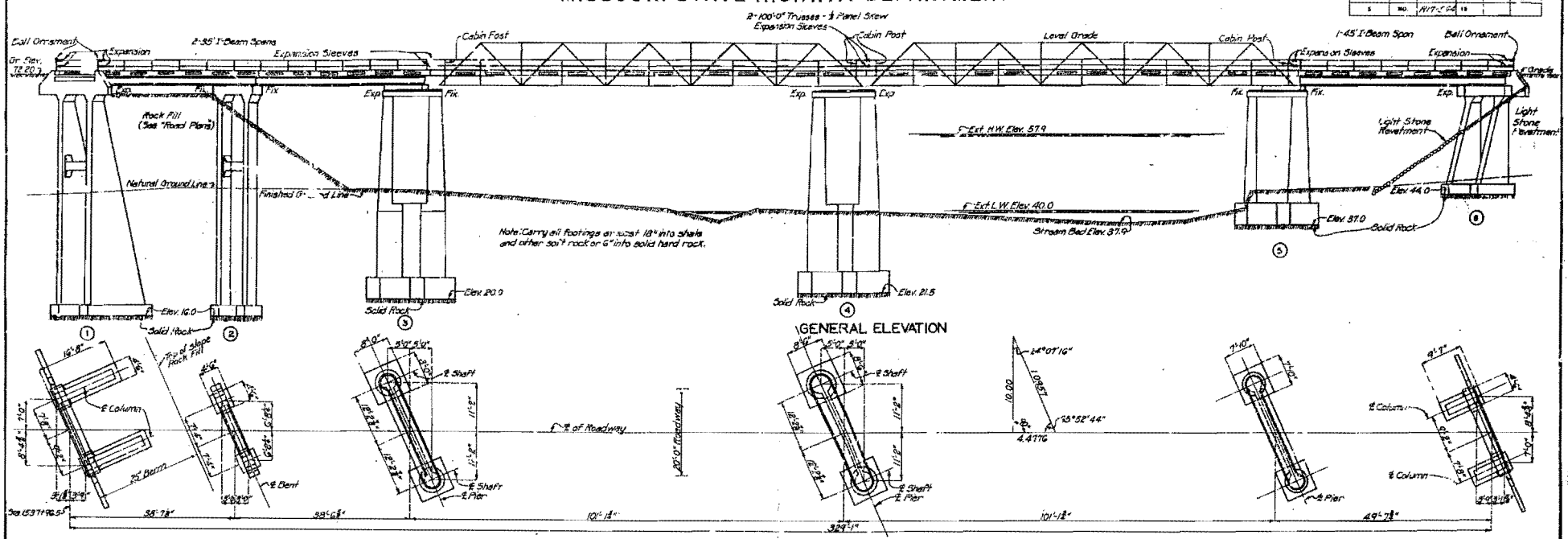
I-beam span (Span 5) and pony truss span (Span 4) at Pier No. 5

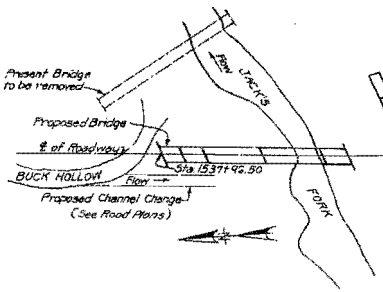


Close-up view of I-beam span (Span 5) and pony truss span (Span 4) at Pier No. 5

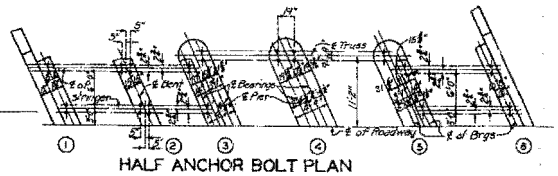
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R17-544	19		

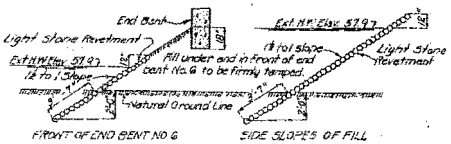




LOCATION SKETCH



HALF ANCHOR BOLT PLAN



FRONT OF END BENT NO. 6 — SIDE SLOPES OF FILL

Light stone revetment shall be placed on fill at South end of bridge as shown in sketches. Approximately 450 sq. yds. of light stone revetment work included in road contract.

REVETMENT SKETCHES

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 bituminous felt is used in expansion or partition joints in concrete, stitch felt in vertical joints securely to one face of concrete with copper wire.

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

Rivets ¾"ø, Holes ⅞"ø; Turned bolts ¾"ø, holes reamed to a driving fit. Field connections riveted except as noted on plans.

Paint: Shop: None - Field: - Surfaces inaccessible after erection four coats of red lead. No other paint to be applied by contractor. All paint required will be furnished by the Missouri State Highway Department.

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.

Bridge excavation in accordance with Section I of Standard Specifications issued April 1, 1930, except that quantities paid for will be computed from Extreme L.W. Elev. 40.0 where existing ground line is below this elevation, and except that bridge excavation will be allowed for Bent No. 2 within horizontal limits shown and noted on Sheet No. 4. See Special Provisions.

For details of expansion devices see Std. S-815R.

ESTIMATED QUANTITIES

Item		Superstr.	Substr.	Total
Excavation Class 1	Cu. Yds.		200	200
Excavation Class 2	Cu. Yds.		840	840
Fab. Structural Steel-I-Beam Spans	Lbs.	50000		50000
Concrete 1:2:3½ mix Class "X"	Cu. Yds.	161.8		161.8
Concrete 1:2:4 mix Class "B"	Cu. Yds.		518.8	518.8
Reinforcing Steel	Lbs.	35320	20960	56280
Fabricated Structural Steel-Trusses	Lbs.	186000		186000
Steel Castings	Lbs.	2970		2970
Phosphor Bronze Castings	Lbs.	520		520
Gas Pipe Handrail	Lin. Ft.	1422		1422

Bridge Excavation above Elev. 41.0, will be paid for as Class 1 Bridge Excavation. Bridge Excavation below Elev. 41.0, will be paid for as Class 2 Bridge Excavation.

B.M. Elev. 72.265 - Nail in side of 16" W.O. 10' Rt. Sta. 1536+51.

BRIDGE OVER JACK'S FORK

STATE ROAD FROM SUMMERSVILLE TO MOUNTAIN VIEW

ABOUT 5.5 MILES N.E. OF MOUNTAIN VIEW

PROJECT NO. R17-544 STA. 1537+96.5

TEXAS COUNTY

SUBMITTED BY M. R. Lock DATE 6/15/21 BRIDGE ENGINEER

APPROVED BY T. H. Cutler DATE 6/15/21 CHIEF ENGINEER

STD. S-815R

STD. S-818

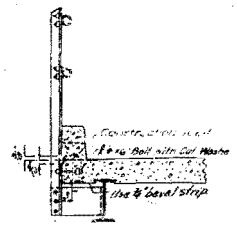
J-665

Drawn May 1931 By J.B.
Traced May 1931 By G.V.T.
Checked Mar. 1932 By T.C.R.

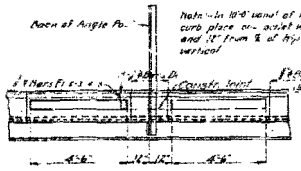
Sheet No. 1 of 7

MISSOURI STATE HIGHWAY DEPARTMENT

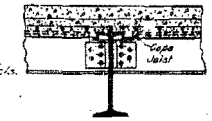
FED. ROAD DIST. NO.	STATE	PUBLIC ROAD NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	MO.	117-S44			



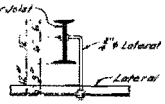
RAIL POST AT CENTER OF EACH 20'-0" PANEL



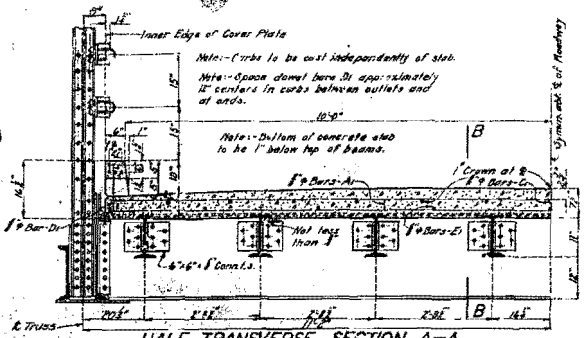
ELEVATION OF RAIL POST AND OUTLETS
TWO OUTLETS IN EACH PANEL



SECTION B-B



LATERAL HANGER



HALF TRANSVERSE SECTION A-A

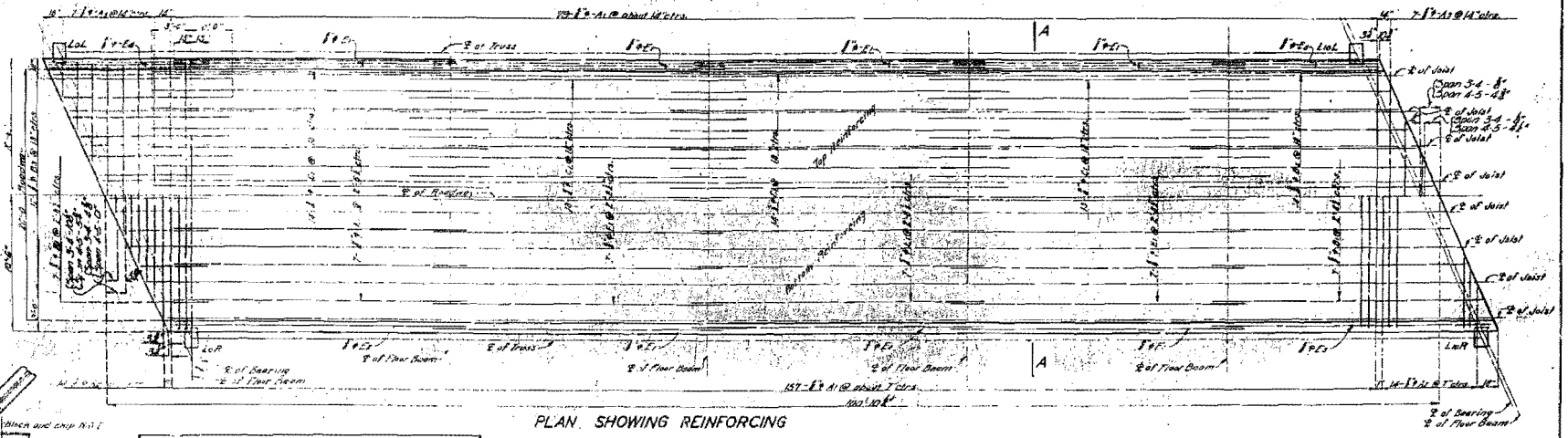
BILL OF REINFORCING STEEL

NO.	SIZE	LENGTH	MARK
296	1/2	24'-9"	A1
14	1/2	22'-6"	A2
7	1/2	21'-3"	A3
7	1/2	23'-6"	B1
7	1/2	36'-6"	B2
6	1/2	15'-0"	B3
34	1/2	26'-0"	C1
133	1/2	12"	D1
63	1/2	22'-6"	E1
5	1/2	22'-3"	E2
5	1/2	21'-3"	E3
5	1/2	11'-0"	E4
5	1/2	12'-0"	E5

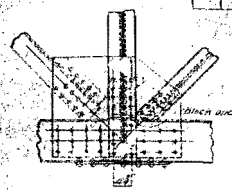
CUTTING DIAGRAMS

14-Bars A2-Cut 14 — 20'-0" 5'-6"
7-Bars A3-Cut 7 — 22'-7" 13'-11" 12'-6" 5'-6"
7-Bars B1 Cut 7 — 12'-6" 10'-7"
7-Bars B2 Cut 7 — 12'-6" 17'-12" 5'-6"
6-Bars B3 Cut 6 — 9'-6" 8'-0"

Note:-Above bill of reinforcing steel is for one 100' Truss Span only.



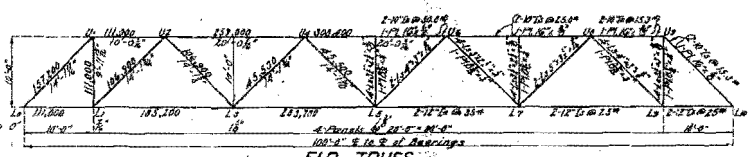
PLAN SHOWING REINFORCING



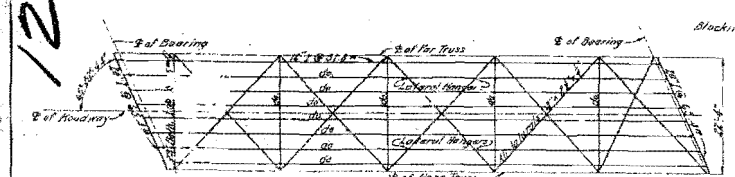
TYPICAL POST DETAIL

BEAM SUBSTITUTIONS		
Interior Floor Beams	24" C.B. @ 85#	24" I @ 100#
End Floor Beams	24" C.B. @ 85#	24" I.T. @ 83.6#
Stringers	18" C.B. @ 70#	14" I.T. @ 80#

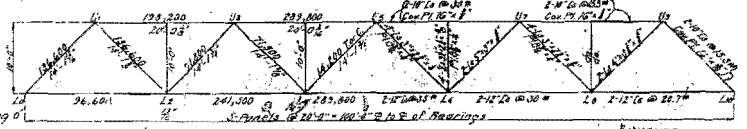
Note: See Special Provisions in regard to permissible substitutions and basis of payment.



FAR TRUSS



FLOOR PLAN



NEAR TRUSS

FINISHED

Sheet No. 2 of 7

BRIDGE OVER JACKS FORK

STATE ROAD FROM SUMMERSVILLE TO MOUNTAIN VIEW

ABOUT 5.5 MILES N.E. OF MOUNTAIN VIEW

PROJECT NO. R17-S44 STA. 1537+96.5

TEXAS COUNTY

SUBMITTED BY M.R. Long 6/15/31 BRIDGE ENGINEER

APPROVED BY T.H. Cutshaw 6/15/31 CHIEF ENGINEER

STD.S 815R
STD.S 816
J-665

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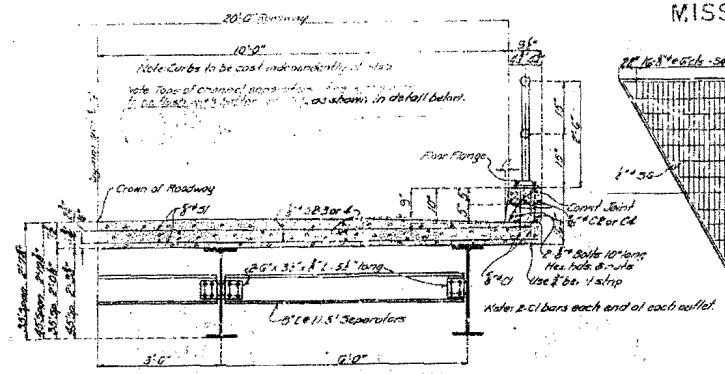
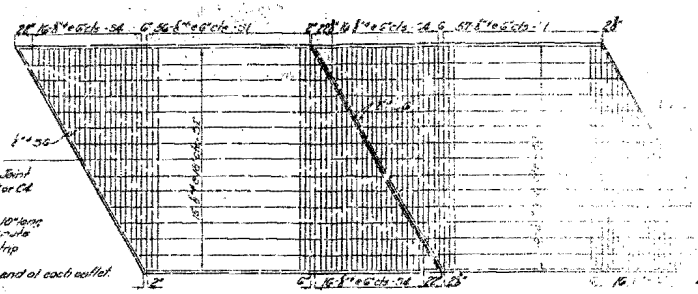
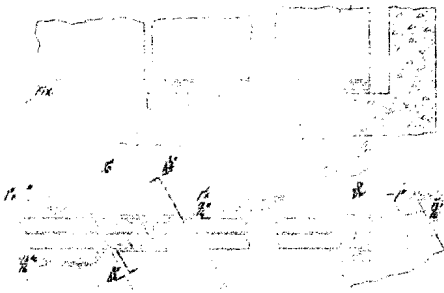
MISSOURI STATE HIGHWAY DEPARTMENT



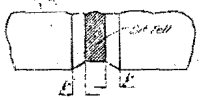
HALF SECTION THRU BEAM SPANS



PLAN OF SLAB SHOWING BOTTOM REINFORCEMENT



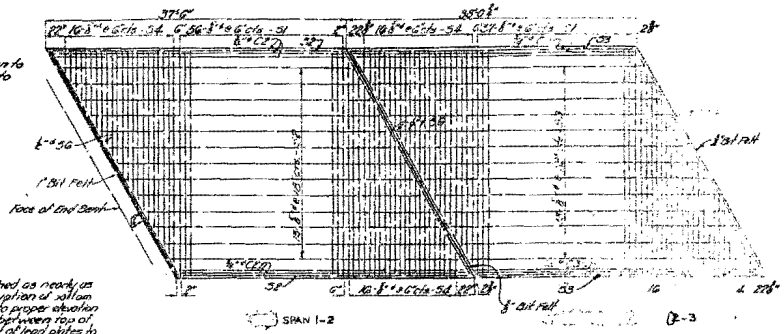
DETAILS OF BEARINGS
SPANS NO. 1 & 6



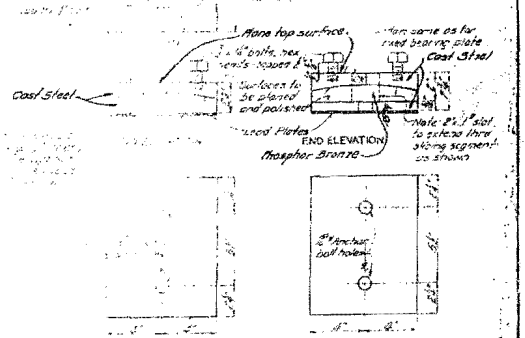
Note: Haunch bottom of slab down to top of outside stringers in order to keep bottom of slab horizontal.

Note: Use bevel as shown for expansion joints of all joints consisting of bituminous felt except at top surface of roadway slab. Use edging tool at top surface of roadway slab each side of felt joints.

DETAIL OF BEVEL FOR BITUMINOUS FELT JOINTS

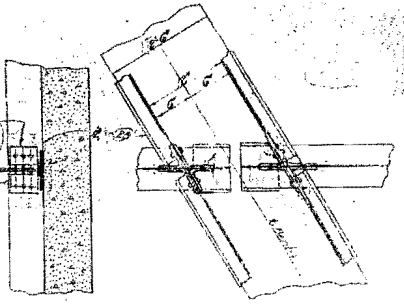


PLAN OF SLAB SHOWING TOP REINFORCEMENT

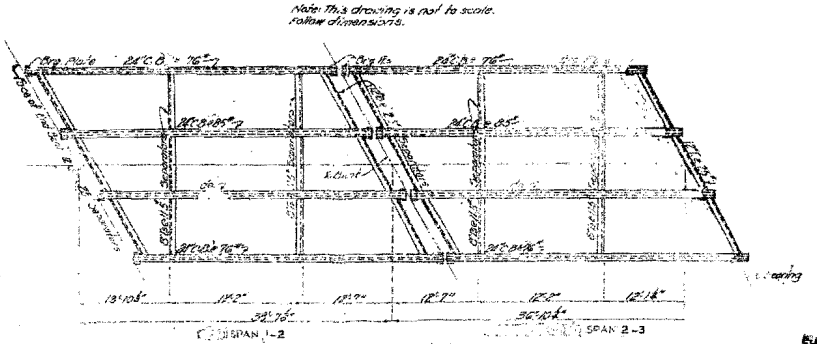


BOTTOM VIEW OF DETAILS FIXED BEARING PLATE
12 Sets Required

BOTTOM VIEW OF DETAILS EXPANSION BEARING PLATE
12 Sets Required



DETAILS OF END CHANNEL SEPARATORS



PLAN OF STRINGERS

BRIDGE OVER JACKS FORK

STATE ROAD FROM SUMMERSVILLE TO MOUNTAIN VIEW

ABOUT 5.5 MILES N.E. OF MOUNTAIN VIEW

PROJECT NO. R17-S44 STA. 1537+96.5

TEXAS COUNTY

Resubd. 6 Day 1931 by T.B.
Checked Civil Bridge B.A.
Drawn Oct. 1930 by H.B.A.
Traced Jan. 1931 by G.W.
Checked 1931 by

Sheet No. 3 of 7

STD. S815R
STD. S818
J-665

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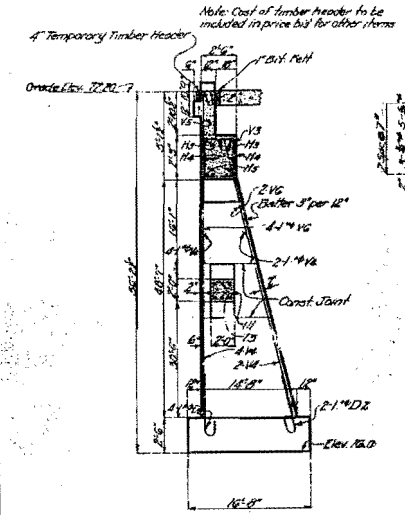
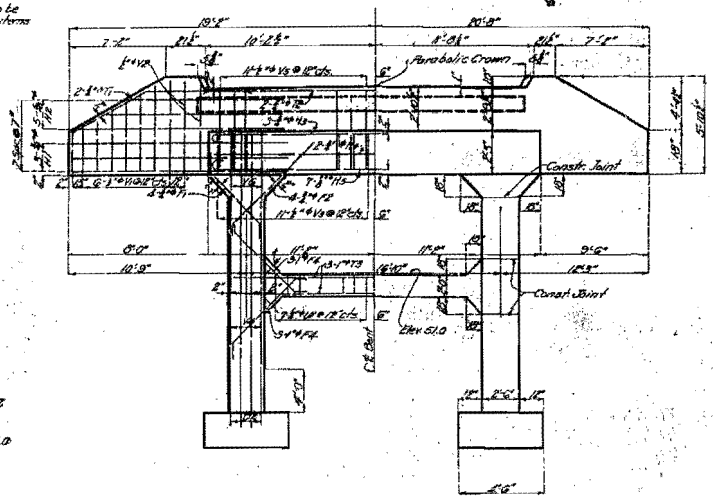
MISSOURI STATE HIGHWAY DEPARTMENT

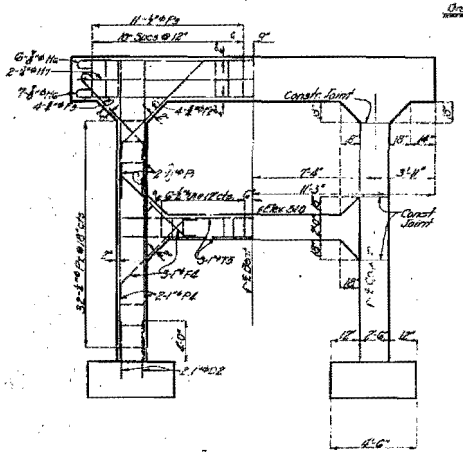
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R17-544	19		



SECTION AT ℄



ELEVATION



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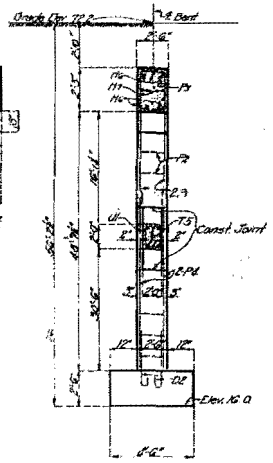

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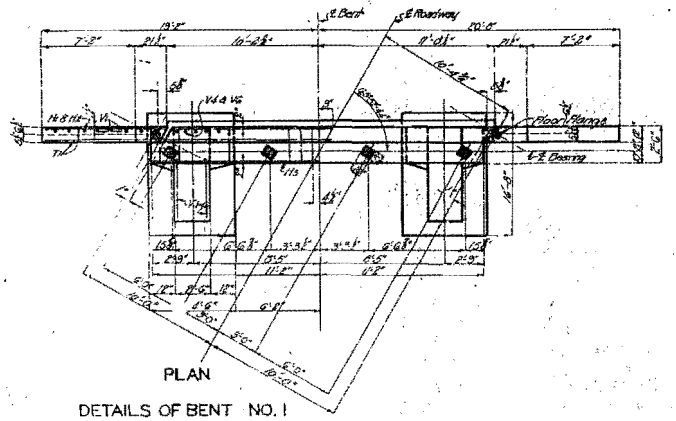
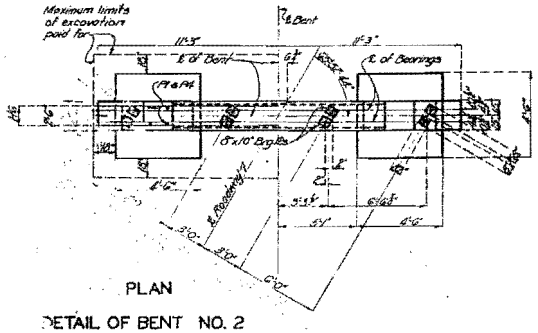


PLAN

DETAILS OF BENT NO. 1



PLAN

DETAIL OF BENT NO. 2

BRIDGE OVER JACKS FORK

STATE ROAD FROM SUMMERSVILLE TO MOUNTAIN VIEW

ABOUT 5.5 MILES N.E. OF MOUNTAIN VIEW

PROJECT NO. R17-544 STA. 1537+96.5

TEXAS COUNTY

SUBMITTED BY M.R. Lark DATE 6/15/31

APPROVED BY T.H. Cutler DATE 6/15/31

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

Assembled May 1931 by T.B.-G.W.
Checked June 1931 By C.F.K.
Drawn Dec. 1930 By H.W.F.

Sheet No. 6 of 7

STD. 581SR
STD. 581B
J-665

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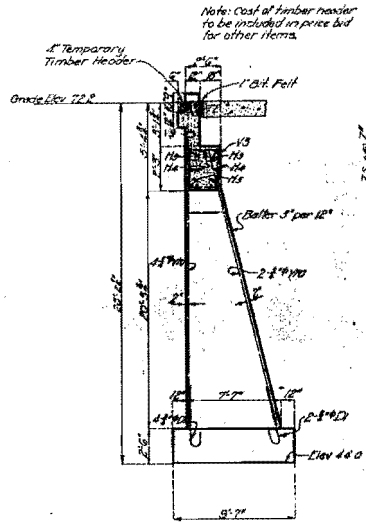
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	RI7-L44	19		



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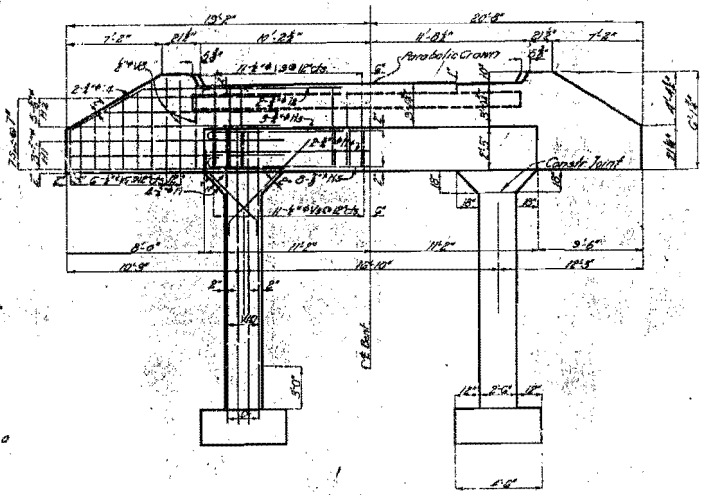

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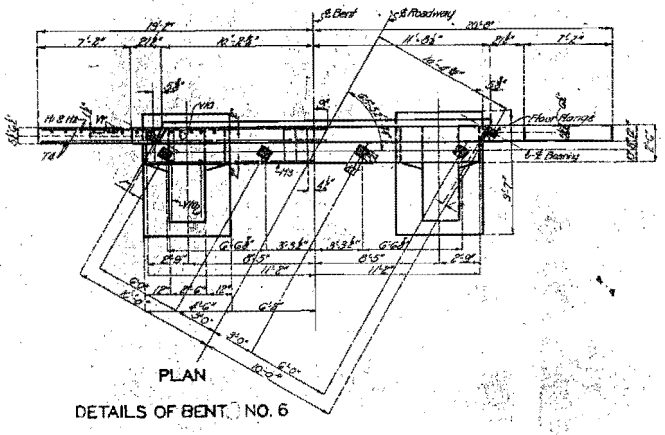


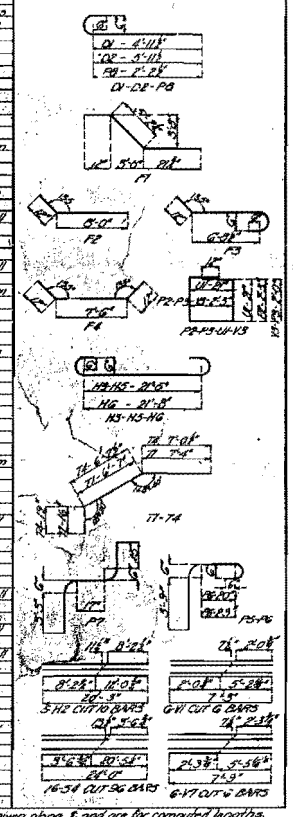
PLAN

DETAILS OF BENT NO. 6

BILL OF REINFORCING STEEL

No.	Size	Length	Mark	Location
		Int. Bents No. 1 & 6		
12	#4	6'-3"	D2	Footings
16	#4	9'-0"	F2	Haunch
16	#4	9'-0"	F3	"
12	#4	9'-6"	F4	"
12	#4	12'-6"	H7	Wing
16	#4	20'-3"	H8	"
6	#4	22'-0"	H9	Beam
8	#4	22'-0"	H9	"
15	#4	24'-0"	H5	"
8	#4	13'-3"	H7	Wing
8	#4	22'-0"	H9	Beam
6	#4	13'-0"	T4	Tie Beam
4	#4	13'-3"	T4	Wing
6	#4	7'-3"	V1	"
8	#4	6'-6"	V2	"
44	#4	3'-0"	V3	Beam
13	#4	37'-9"	V6	Column
22	#4	4'-9"	V5	Backwall
12	#4	16'-6"	V6	Column
6	#4	7'-9"	V7	Wing
4	#4	5'-9"	V8	"
22	#4	5'-0"	V9	Backwall
12	#4	23'-9"	V10	Column
14	#4	8'-0"	U1	Tie Beam
12	#4	7'-3"	D2	Footing
		Int. Bent No. 2		
8	#4	7'-3"	D2	Footing
8	#4	9'-0"	F2	Haunch
8	#4	9'-0"	F3	"
12	#4	9'-6"	F4	"
11	#4	22'-3"	H6	Beam
2	#4	22'-3"	H7	"
8	#4	16'-6"	P1	Column
64	#4	10'-0"	P2	"
22	#4	5'-0"	P3	"
8	#4	33'-0"	P4	"
6	#4	16'-9"	T-3	Tie Beam
12	#4	8'-0"	U1	"
		Piers No. 3-4 & 5		
48	#4	8'-6"	D3	Footing
9	#4	32'-6"	H9	Web Wall
72	#4	26'-3"	H9	" "
12	#4	18'-6"	H10	Coping
44	#4	7'-9"	P5	"
66	#4	7'-6"	P6	"
22	#4	7'-6"	P7	"
22	#4	5'-6"	P8	Backwall
16	#4	19'-6"	V11	Shaft
48	#4	22'-9"	V12	" "
84	#4	25'-9"	V9	Web Wall
16	#4	32'-0"	V11	Shaft
2	#4	21'-0"	V10	Backwall
2-55 & 1-45 I-Beam Spacing				
160	#4	12"	C1	Curb
6	#4	37'-0"	C2	"
6	#4	37'-0"	C3	"
12	#4	13'-6"	C4	"
432	#4	27'-9"	S1	Slab
30	#4	37'-0"	S2	"
30	#4	37'-9"	S3	"
96	#4	24'-0"	S4	"
60	#4	25'-3"	S5	"
12	#4	27'-3"	S6	"

Bending Sketches & Cutting Diagrams



Note: Dimensions of bars are given along ℄ and are for computed lengths. Reinforcing bars over ½" in diameter, which are bent to an angle greater than 90° shall be of structural grade.
For bar bill of truss spans see Sheet No. 2.
Bars in truss span to be billed and tagged separately from bars in above bill of Reinforcing Steel.

BRIDGE OVER JACKS FORK

STATE ROAD FROM SUMMERSVILLE TO MOUNTAIN VIEW

ABOUT 5.5 MILES N.E. OF MOUNTAIN VIEW

PROJECT NO. RI7-L44 STA. 1537 + 96.5

TEXAS COUNTY

FINISHED

SUBMITTED BY M R Lacy, BRIDGE ENGINEER 6/15/31.

APPROVED BY T H Taylor, BRIDGE ENGINEER 6/15/31.

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

FINISHED

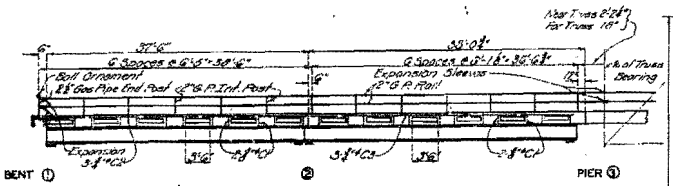
Sheet No. Bd. 7

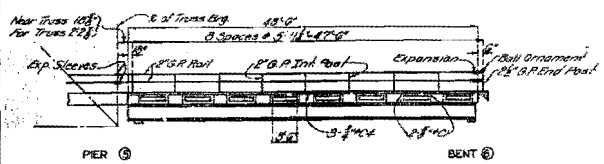
STD. 5815R
STD. 5818
J-665

Assembled May 1931 by I.B.-G.W.
Checked June 1931 by A.T.R.
Drawn Dec. 1930 By H.H.
Checked

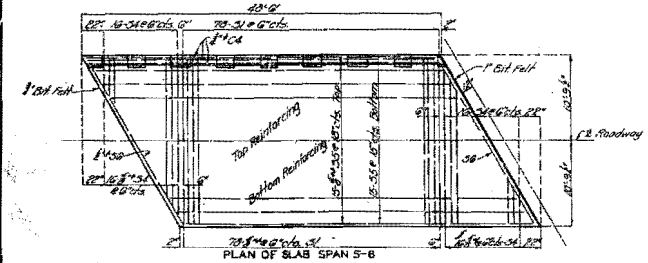
15

MISSOURI STATE HIGHWAY DEPARTMENT

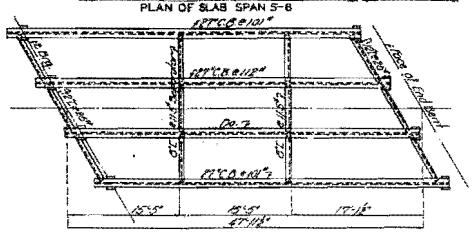




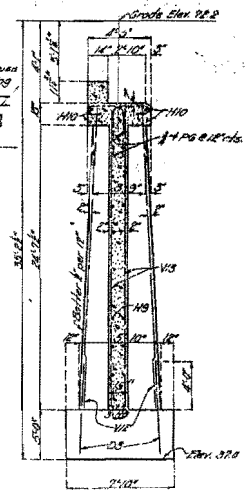
PART ELEVATION OF HANDRAIL AND CURB



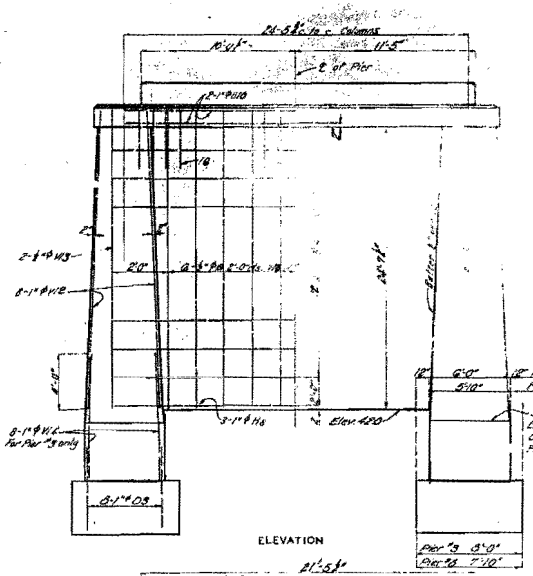
PLAN OF SLAB SPAN 5-6



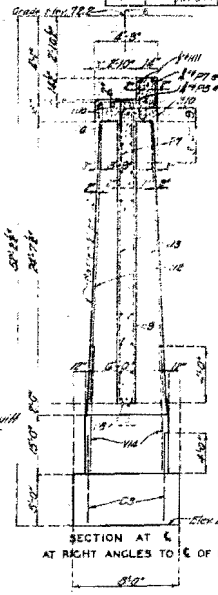
PLAN OF STRINGERS SPAN 5-6



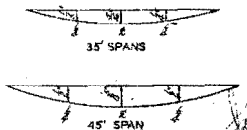
SECTION AT ℄ AT RT. ANGLES TO ℄ OF PIER NO. 5



ELEVATION



SECTION AT ℄ AT RIGHT ANGLES TO ℄ OF PIER NO. 3



35' SPANS

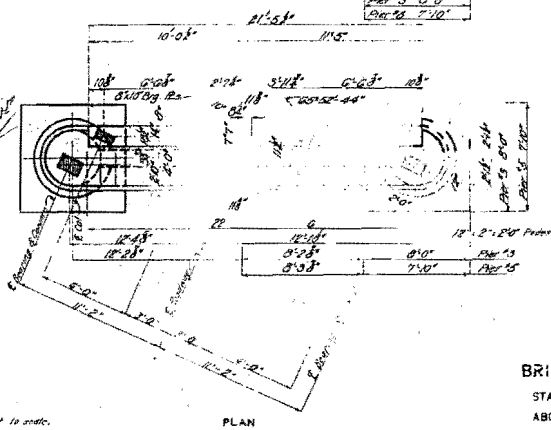
45' SPAN

DEAD LOAD DEFLECTION SKETCHES

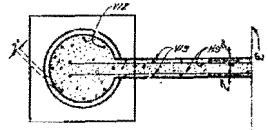
Note: Floor slab to be brought to grade and dead load deflection taken care of by increasing slab thickness. Depth of slab at outside face of curb to be kept uniform and bottom surface of slab warped between curb and outside beam to obtain required thickness of beam. Payment will be allowed for additional concrete required for thickening slab.

STRINGER SUBSTITUTIONS		
Inside Stringer 35' Span	24" B.I. @ 79.5#	24" I @ 95#
Outside " 35' Span	24" B.I. @ 79.5#	24" I @ 79.9#
Inside " 45' Span	28" B.I. @ 100#	
Outside " 45' Span	28" B.I. @ 94#	

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

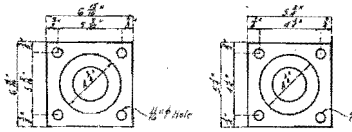


PLAN



HALF HORIZONTAL SECTION

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



DETAILS OF FLOOR FLANGES

DETAILS OF PIERS NO. 3 & 5

BRIDGE OVER JACKS FORK

STATE ROAD FROM SUMMERSVILLE TO MOUNTAIN VIEW

ABOUT 5.5 MILES N.E. OF MOUNTAIN VIEW

PROJECT NO. R17-544 STA. 1537+86.5

TEXAS COUNTY

SUBMITTED BY M. R. [illegible] 1/6/32 BRIDGE ENGINEER

APPROVED BY T. H. [illegible] 1/16/32 CHIEF ENGINEER

STD. 5815R

STD. 5816

J-665

Assembled May 1931 by I.S. Gex
Checked June 1931 by R.P.K.
Detailed Dec. 1927 By E.S.
Traced Dec. 1927 By H.E.C.
Checked Jan 1928 By A.L.G.

FINISHED

Sheet No. 6 of 12

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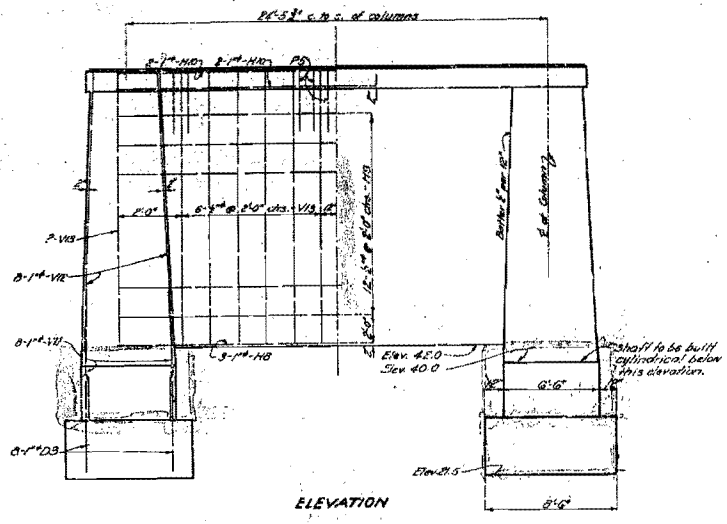
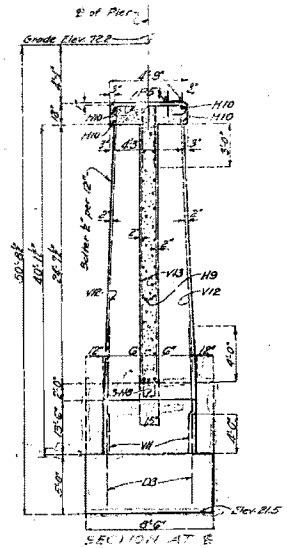
DECK GIRDERS - STEEL SPANS (HALF PANEL SKEW) CS 6809

MISSOURI STATE HIGHWAY DEPARTMENT

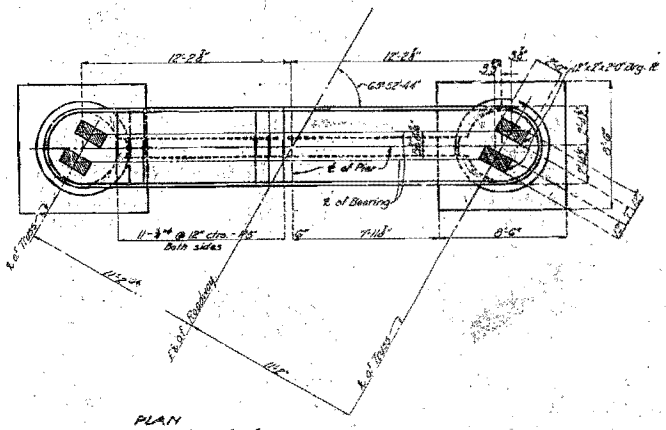
FED. AID DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	Mo.	R17-S44	19		



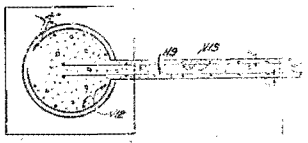
ELEVATION



SECTION AT ℄
AT RIGHT ANGLES TO ℄ OF PIER



PLAN
DETAILS OF PIER NO. 4



HALF HORIZONTAL SECTION

BRIDGE OVER JACKS FORK

STATE ROAD FROM SUMMERSVILLE TO MOUNTAIN VIEW

ABOUT 5.5 MILES N.E. OF MOUNTAIN VIEW

PROJECT NO. R17-S44 STA 1537+98.5

FINISHED

TEXAS COUNTY

DESIGNED BY M.R. Lang DATE 4/15/31

DETAILED BY DATE

CHECKED BY T.H. Cutler DATE 6/15/31

STD. S818R

STD. S818L

J-66

Assembled May 1931 by J.C.-B.W.
Checked June 1931 by W.J.C.
Drawn June 1928 by H.G.P.
Checked June 1932 by J.T.

Sheet 7 of 7

STEEL DRAWS - PIERS 2 - SHOE