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SPECIFICATIONS

FOR THE

SUBSTRUCTURE AND SUPERSTRUCTURE

OF A

HIGHWAY BRIDGE

OVER THE

CHOPTANK RIVER AT DOVER BRIDGE

BETWEEN

CAROLINE AND TALBOT COUNTIES

MARYLAND.

P R O P O S A L S .

All bids must be in lump sum for the bridge complete in place Bidders will be required to satisfy the Commissioners as to their ability to do the work on which they submit bids.

Proposals must be accompanied by full and complete strain sheets (the sheets to show for each member the dimensions and area of section, shapes of iron and make up of composite sections; sizes of pins, struts, sways and lateral rods, and of the floor beam connections) with sufficient detail and other drawings to clearly show the character of the structure proposed.

The bridge shall be completed and ready for travel ~~on or before~~ within ninety days from date of Contract by the C. Com & Cawlin & A.D. 1898.

Talbot Co's

The right to reject any or all bids is reserved, as is also the right not to let the contract if the bids tendered are not satisfactory

G E N E R A L D E S C R I P T I O N .

The centre line of bridge to be at an angle of ninety degrees with the face of piers.

The superstructure to consist of ~~four~~ Three spans 108'-0" Each c.to c.of piers, and to have one roadway of 16'-0" Net wide in the clear between trusses. The trusses to be 18'-0" Net high c.to c.of chords, and each truss to be divided into seven panels.

All parts of the structure, except adjustable members, flooring and wheel guards, shall be of steel.

The floor joists will rest on shelf angles between the floor beams, and must be securely fastened to them.

L O A D S .

Each structure shall be designed to carry the following loads;-

1st. The weight of the iron and steel in the structure. If the assumed weight of the bridge varies from the calculated weight 5 % it will be necessary to re-calculate the stresses.

2nd. The weight of the flooring and wheel guards, considering each foot of board measure to weigh four pounds.
These two items taken together shall constitute the dead load

3rd. A live or moving load as follows:- A traction engine of eight tons, arranged as follows;- three tons on the forward axle and five tons on the rear axle. Not more than Axles to be ten feet apart.

No span to be proportioned for a less load than 1600 pounds per lineal foot.

The maximum strain due to all positions of the live load and of the dead load, shall be taken to proportion all the parts of the structure.

The lateral bracing shall be proportioned to resist a lateral pressure of 300 pounds for each foot of span, all counted as live load.

Bridges to be provided with two lines of 1-1/4" inch pipe railing along each side of roadway, placed so as to bring the top line three feet above the floor.

Joists shall consist of ~~four~~ five lines of 6" steel eye beams and two lines of 6" steel channels. Each joist shall have a ~~8" x 12"~~ 3" x 6" ~~yellow pine~~ White oak spiking piece securely fastened to the top to spike plank on.

The different parts of the structure to be so proportioned that the maximum strains produced shall in no case cause a greater tension or compression in pounds per square inch of section for steel than the following;-

For the effect of wind the working strain shall be no more than 15,000 pounds per square inch.

For strains on trusses;- Bottom chords, main diagonals 15,000 # per square inch, counters, long verticals and suspenders 10,000 # per square inch for live and dead loads.

Floor beams to be 15" steel eye beams, having two shelf angles 3" x 3" x 1/2" for supporting the steel joists.

Compression members whose length does not exceed twelve times their diameter may be stretched to 12,000 # per square inch.

In other cases strains not to be over $\frac{12{,}000}{1+\frac{AL}{R}}$ $1+AL$

In which A = 24000 for the horizontal chord counted as one pin and one square bearing. $\frac{A}{4}$ A = 18000 for all posts and balance of chords counted as two pin ends.

L representing the length of the post in inches, and R the least radius of the section in inches.

~~Wrought iron~~ Steel or steel floor beams to be used; no beam to be proportioned to carry a less distributed live load than fifteen tons. Floor beams shall not be hung from the lower chord pins. All bridges to be anchored down at both ends, with one end free to move by change of temperature.

Bed plates and bolsters to be of wrought iron. Bed and sole plates in no case to be less than 1/2" in thickness.

Pin holes must be reinforced by long pin plates well riveted where required.

All rods and hangers with screw ends must be upset at the ends, so that the diameter at the bottom of the threads shall be larger than any part of the body of the bar.

All bolts must be of neat lengths, and shall have washers under the heads and nuts where in contact with wood.

Each span to have a camber of 1/640 of the span.

W O O D W O R K .

Flooring to be ~~3 1/2"~~ 3 inch plank and to be sawed to uniform thickness and laid crosswise.

Plank to be laid with close joints, and to be spiked to spiking pieces with 60d steel nails, one to each plank in each spiking piece. Plank must be ordered long enough to admit of being sawed off to a line.

full thickness in the necks; they shall be perfectly straight and out of wind before being Bored; They must be bored to the exact length;the holes shall be in the centre of the head and on the centre line of the bar,and shall be bored to exact line.

The strains on pins not to exceed 7500 pounds per square inch ~~in~~ ~~on~~ ~~extreme~~ ~~fibers~~.nor the bending moment exceed 15,000 pounds per square inch on extreme fibers. And the pressure on the projected semi-intrados of pin holes must not exceed 12,000 pounds per square inch. The diameter of the pin shall in no case be less than 3/4 the largest dimensions of any tension member attached to it. The several members attached to the pin shall be so packed as to produce the least bending moment on the pin.

QUALITY OF MATERIAL.

All wrought iron and steel must be tough,fibrous and uniform in character,free from buckles,flaws,blisters and injurious seams,and shall have a workmanlike finish,and shall have a limit of elasticity of not less than 24,000 pounds per square inch.

Finished bars must be thoroughly welded during the rolling, and free from injurious seams,blisters,buckles,cinder spots or imperfect edges.

For tension members the muck bars shall be rolled into flats and again piled,reheated and rolled into finished sizes.

The iron shall stand the following tests:-

Full sized pieces of flat,round or square iron,not over 3" in sectional area,shall have an ultimate strength of 49,000# per square inch,and stretch 10% in their whole length.

When tested in specimens of uniform sectional area of at least 1/2" square inch,of 8" in length,taken from tension members which have been rolled to a section of not more than 3 square inches,the iron shall show an elasticity limit of 25,000#,and an ultimate strength of 50,000# per square inch, and stretch 15% in a length of 8 inches.

The same sized specimens taken from soft steel of tension members shall have an ultimate strength of from 54,000 to 62,000 pounds per square inch,and elongate 26% in eight inches and bend,cold,flat on itself without fracture.

The reduction of area in breaking point shall be 50% in minimum.

Specimens from angle plate and shaped steel must stand bending cold through 90 degrees,and to a curve whose diameter is not over three times its thickness without cracking; when nicked and bent its fracture must be mostly fibrous.

The Contractor shall furnish all facilities for inspecting material and workmanship; he shall also furnish,without charge,such specimens (prepared) of the several kinds of iron or steel to be used as may be required to determine their character.

Full sized parts of the structure may be tested at the option of the Commissioners; if tested to destruction, such material shall be paid for at cost, less scrap value, if it proves satisfactory.

If the material does not stand the tests it will be considered rejected, and be solely at the expense of the Contractor. Flaws or surface imperfections, irregular shapes or corrosion will be sufficient ground for rejection of material.

D E T A I L S .

All the details of the several parts of the structure shall be of such strength that, upon testing, rupture shall occur in the body of the ~~xxx~~ members, rather than any of their details or connections.

The heads of eye bars must be so proportioned and made that the bar will break in the body rather than in the head or neck.

Bars which run in different directions in parallel planes must be sufficiently separated to prevent contact where they cross each other to avoid wear and rattling; or if allowed to come in contact must be properly clamped.

The rivets when driven must completely fill the holes, and rivet heads must be full and neatly made and concentric to the rivet holes.

Riveted connections between the trusses and floor beams will have the preference.

Preference will be given to those designs in which all parts are accessible to inspection.

All parts of the work to be so designed that water cannot find lodgment. No closed section will be allowed in the work.

In riveted work all joints must be machine dressed, square out of wind, and when together must be in contact throughout

Loose or badly fitting rivets must be cut out and replaced, no caulking allowed.

The riveted field connections of floor beams, struts, &c. to be accurately matched before leaving the shop, and all unmatched holes reamed to fit.

Abutting joints must be in contact throughout.

All material must be carefully straightened before being laid off.

In pieces not adjustable for length no variation of more than 1/32 of an inch will be allowed in the length between centres of pin holes.

P A I N T I N G .

All iron work must be coated at the shop with one good coat of Carbonizing Coating, well worked into all joints and open spaces. All iron to be scraped clean and free from scale before painting. In riveted work all surfaces coming in contact shall be painted with a good coat of Carbonizing Coating before being riveted together; all parts not accessible for painting after erection shall have an additional coat of paint before leaving the shop.

SPECIFICATIONS FOR SUBSTRUCTURE.

The bridge will be located on the Caroline County side of the Choptank river, extending from the ~~present draw~~ Swing Span ~~to the shore~~ toward the draw. There must be ~~four~~ eight piles at each ~~bent~~, to be not less than 14" square. Where the depth is so great, it will require built up piles to be spliced according to the directions given by the County Commissioners, to be of sound ~~yellow pine~~ Heart Spruce timbers. Where the depth is from 30 to 50 feet the piles can be round, not less than eight inches in diameter at the small end and 12 inches ~~at the top~~ 3ft from the Log mark the bark. The piles to be enclosed in the iron cylinder. The cylinders to be sunk ~~to a firm bearing, say 10 feet below the bottom of the river.~~ to a depth Satisfactory to the Engr Not Exceeding 20ft below the bed of the river. and The piles ~~must extend to the top of the cylinders but~~ shall be cut off 8ft from the top of the Cylinders must be enclosed with concrete from the bottom to the top of cylinders so as to protect the piles from sea worms and decay above low water.

The concrete must be made of one part Hydraulic cement two parts of sand and five parts of broken ~~stone~~ Limestone or Hard Igneous granite about 2" to 2-1/2" in diameter, thoroughly placed around the piles. The mixing and placing of the concrete to be done as directed by the County Commissioners.

The made up piles must be pointed with wrought iron shoes. They must be all driven to hard bottom or the hard pan bottom which is said to be from 75 to 90 feet below the surface of the water in the river. The piles are to be driven with a hammer which weighs not less than 2,000 pounds and driven until they do not sink more than 4 inches under the last three blows of the hammer falling 20 feet.

A heavier hammer and a shorter fall is preferred. If piles are injured in driving they shall be cut off or withdrawn, as the Commissioners may direct. The piles and the cylinders to be painted with Carbonizing Coating.

Cylinders to be 1/4" shell and 48 inches diameter.

The details of bracing between the cylinders and bracing the longitudinal girders and all other details of the bridge to be submitted to the County Commissioners for approval and must be done to their satisfaction.

A certified check in the sum of one thousand dollars of Talbot County Co. as a forfeit in case must accompany each bid submitted, endorsed to the order of the County Commissioners, ~~provided~~ the bidder neglects or refuses to enter into contract - if same is awarded him - in accordance with his bid. within ten days from and including the date of the award.

Bids will be received until 12 o'clock M. May 12th, 1898 at the County Commissioners' office in Easton, Maryland. at which time the bids will be opened.

~~CAROLINE COUNTY.~~

~~WILLARD C. TORD,~~

~~WILLIAM E. LORD,~~

~~D. J. ZACHARIAS,~~

~~Commissioners.~~

~~THOMAS H. GREEN,~~

~~Clerk.~~

~~TALBOT COUNTY.~~

~~GEORGE H. TRAX,~~

~~JAMES H. McNEAL,~~

~~FRANK M. WILLIS,~~

Commissioners

~~CHAS. F. STEWART,~~

Clerk.

The company receiving the contract from the aforesaid County Court shall execute a bond with conditions and sureties to be approved by the County Court for the faithful performance of the contract.

THE GLOBE LEGAL WRAPPER. Patented Feb. 11, 1890. FIRST QUALITY.

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