

ITEM 599.12 10 M – TRUNNIONS AND BEARINGS

DESCRIPTION

Under this item, the Contractor shall furnish, install, adjust, paint, test and place in operation the new Trunnions and Bearings for the eight (8) bascule girders. The components include but are not limited to:

1. Trunnion (8 of each)
2. Trunnion Bearing (16 of each)
3. Hub (8 of each)
4. Hub Ring (8 of each)

Details and arrangements of the Trunnions and Bearings are shown on the Contract Plans or specified herein.

The work shall also include installing and aligning control instrumentation that is to be supplied under the "Bridge Electrical Work". The work under this item shall be in accordance with the requirements specified in "Special Note - General Specification for Bridge Machinery."

The Contractor shall coordinate the installation of the Trunnion and Bearings with all other bridge machinery items, electrical work and structural work, as well as navigational and vehicular traffic closures and restrictions.

MATERIALS

GENERAL

The materials used to fabricate the Trunnions and Bearings shall be in accordance with the requirements specified in "Special Note - General Specifications for Bridge Machinery". Unless shown differently on the Contract Plans, the materials shall be as follows:

Trunnion	Carbon Steel Forging	ASTM A 668M Class D
Hub	Carbon Steel Casting	ASTM A 27M Gr. 485-250
Hub Ring	Carbon Steel Forging	ASTM A 668M Class D
Dowel Pin	Carbon Steel Forging	ASTM A 668M Class D
Cap	Bronze Casting	ASTM B22 UNS No. C91100
Liners	Commercial High Brass	MIL-S-22499
Bushing	Bronze Casting	ASTM B22 UNS No. C91100
Base	Carbon Steel Casting	ASTM A 27M Gr. 485-250

CONSTRUCTION DETAILS

SHOP INSPECTION AND ASSEMBLY

Trunnion hubs and trunnions shall be shop assembled to the bascule girders. Prior to assembly of these parts, the specified interferences shall be verified by accurate measurement of several diameters of each part. The assembly shall be carried out by first shrinking the hub in dry ice and alcohol to reduce its diameter to permit assembly in the girder web. Trunnions will similarly be shrunk for insertion in the hubs after the hubs have returned to room temperature. The use of liquid nitrogen will not be permitted.

The trunnions will be dowelled to the hubs after assembly.

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Trunnion bearings shall be fitted to the trunnions with the bearing caps solidly bolted in place with the cap bolt springs temporarily replaced by solid spacers. The necessary adjustment in shims and honing of the bushings shall be made to provide free turning bearings with the specified clearance. Bearings shall be matchmarked with the trunnions and shipped assembled to the trunnions, held in place by temporary bolts through the trunnions.

SUGGESTED TRUNNION AND BEARING ERECTION PROCEDURE

Prior to erection of the trunnion bearings on the trunnion towers, for the first pair of leaves erected, a complete survey shall be made of the actual relative horizontal and vertical position of the trunnion tower tops. From this survey, the Contractor shall propose a rectangular layout and thickness of shims for the trunnion bearing for review by the Engineer. Upon concurrence by the Engineer that the layout is acceptable, the Contractor shall mark the necessary centerlines on the trunnion towers, install the required thickness of shims on each tower, and then proceed to set the trunnion bearings. Specified clearance shall be left between the trunnion hubs and the trunnion bearings as shown on the Plans, corrected as necessary, for actual temperatures.

Prior to permanently fastening the trunnion bearings to the trunnion towers, for the first pair of leaves erected, the Contractor shall verify that the trunnions are making full contact across the full width of the trunnion bearing bases, that each bearing is set at the proper elevation and that each set of trunnions per leaf are collinear. The Contractor shall make all necessary adjustments for correcting misalignment prior to final acceptance

The second pair of leaves shall be erected in the same manner.

FIELD TESTING

When the mechanical components and electrical equipment are ready for final testing, the Contractor shall submit to the Engineer a testing procedure and schedule in accordance with the requirements specified in "Special Note - General Specification for Bridge Machinery, General Construction Details – Field Testing."

Each test run shall verify that the Trunnions and Bearings are in proper working order and fully meet the requirements of the Plans and Specifications. If any tests show that the Trunnions and Bearings components are defective or inadequate, or function improperly, the Contractor shall make all corrections, adjustments, or replacements required before final acceptance at no additional cost.

METHOD OF MEASUREMENT

Payment of Item "Trunnions and Bearings" shall be made on a lump sum basis.

BASIS OF PAYMENT

The lump sum price bid for Item "Trunnions and Bearings" shall cover the cost of furnishing all material, labor and equipment necessary for the manufacturing, erecting, testing, adjusting, lubricating, painting and all incidental work for a complete installation.

The Contractor shall submit to the Engineer a detailed breakdown of costs under this item. The Engineer shall evaluate this breakdown, and shall have the authority to revise the breakdown as, in his judgement, may be required to make the various components of work conform to their true values.

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The Contractor shall agree that the detailed breakdown shall not become effective until it has been approved by the Engineer.

The approved detailed breakdown shall be used as a basis of payment for the progress payments. The progress payments for Item “Trunnions and Bearings” shall be made in accordance with NYS Standard Specifications, NYSDOT standard payment practices and in the following manner:

1. Upon completion and acceptance by the NYSDOT of Shop Fabrication, Shop Inspection, Shop Testing, Delivery and Storage of materials, the Contractor will be paid 30% of the bid price for the item.
2. Upon completion and acceptance by the NYSDOT of the West Trunnions and Bearings Installation, Alignment, Bolting, and Protection of materials during construction, the Contractor will be paid 10% of the bid price for the item.
3. Upon completion and final acceptance by the NYSDOT of the West Trunnions and Bearings Inspection and Field Testing at the end of construction, the Contractor shall be paid 20% of the bid price for the item.
4. Upon completion and acceptance by the NYSDOT of the East Trunnions and Bearings Installation, Alignment, Bolting, and Protection of materials during construction, the Contractor will be paid 10% of the bid price for the item.
5. Upon completion and final acceptance by the NYSDOT of the East Trunnions and Bearings Inspection and Field Testing at the end of construction, the Contractor shall be paid 20% of the bid price for the item.
6. Upon completion of training and receipt and acceptance of approved Operating and Maintenance Manuals, the Contractor will be paid the remaining 10% of the bid price for the item.