

SECTION 465 MOVABLE BRIDGES

465-1 Description.

Construct bascule bridges.

465-2 Alternate Design for Bascule.

Refer to the plans for details of the bascule span. With the written approval of the Engineer, the Contractor may use riveted or bolted construction in lieu of welded construction.

Submit proposed alternate designs with complete plans, Technical Special Provisions, and design calculations. Ensure that the design is in accordance with the AASHTO Standard Specifications for Moveable Highway Bridges hereafter referred to in this Section as the AASHTO Specifications and to the satisfaction of the Department.

For riveted or bolted alternates, comply with the following:

- (a) Use structural steel complying with ASTM A 36 [ASTM A 36M].
- (b) Design members for the stresses shown on the Contract Documents.
- (c) Use the same general arrangement of members shown on the plans.
- (d) Use all members except girder flanges and girder stiffeners that are the same size as shown in the plans.
- (e) Design the girder flange for the allowable stresses for ASTM A 36 [ASTM A 36M] steel.
- (f) Use angle stiffeners in lieu of plates and of the thickness and width shown in the plans.

465-3 Materials.

Meet the requirements specified in the applicable Sections for the items which constitute the complete structure.

465-4 Construction Methods.

Construct in accordance with the requirements of Sections 346, 460, and 508, and of any other applicable Sections, and with the following additional requirement.

Satisfactorily operate the movable spans, and provide materials, workmanship, and erection along with necessary extra work which are not covered by the plans.

465-5 Drawings.

Provide the plans in accordance with 460-3, including detail and assembly drawings for all operating machinery and parts, together with an outline drawing containing all information necessary for computing the strength of the machinery parts. Complete these drawings with sufficient detail to permit the duplication of the machinery parts without reference to patterns, other drawings, or individual shop practice. Show the estimated weights of individual parts and the total weights of all parts furnished under this item.

Furnish permanent reproducibles of the detailed shop drawings for the bascule leaves and machinery, including centerlock mechanisms, to the Department upon request.

465-6 Machinery Requirements.

465-6.1 General: Refer to the plans for requirements for machinery for each movable bridge.

465-6.2 Design Specifications: Design machinery and proportion operating parts in accordance with the AASHTO Specifications.

465-6.3 Requirements for Contractor's Working Drawings:

465-6.3.1 General Machinery Layout by Department: The plans for all movable bridges will show general details of the machinery, in keeping with the detail requirements and with parts proportioned in accordance with the AASHTO Specifications. Machinery plans are not intended to be complete in all details. The Contractor may vary the ratios of teeth between individual pairs of gears, and the layout and arrangement of parts to permit maximum use of his standard patterns and shop procedures. However, maintain the overall ratios and times of operation for manual and motor power, as specified. Proportion the sizes and strengths of all machinery parts to meet the requirements of the AASHTO Specifications. Maintain the standard of quality in details as shown by the plans.

465-6.3.2 Detailed Layout by the Contractor: Detail structural support for machinery, and exact positions of parts, after determining the final machinery layout. Detail minor parts that are required but not shown in detail in the plans in accordance with best standard practice.

Gear each leaf to fully open from the closed position with approximately 900 revolutions of the driving motors.

Provide two racks and main pinions and an equalizer for each leaf.

Provide a shear lock of the bar-and-socket type in each line of the main girders between leaves. Use locks that are pulled or driven in not more than ten seconds. Provide detachable manual operation for the locks.

Refer to the plans for a layout of machinery in general accordance with the above requirements. The Contractor may rearrange and vary parts to permit the use of standard patterns or alternate schemes of operation, subject to the limitations and requirements given herein.

For any substitution, use the general details shown in the plans as a standard of quality, and ensure that any alternate types or parts provide performance and quality equivalent in all respects, as determined by the Engineer, to machinery construction in accordance with the plans.

465-6.4 Lubrication: Lubricate all moving parts in accordance with the AASHTO Specifications. In addition, provide pressure grease fittings for all journal bearings.

For bascule spans, make provisions for lubricating all mechanisms. Provide a lubrication system that generally consists of small pipes or flexible lubrication hose attached to the parts, with pressure grease fittings at their tops, extending and connected to the deck near the curbs where they will be accessible out of the roadway lanes. Lubricate all mechanisms at the time the Department accepts the structure for maintenance.

465-6.5 Equipment for Limit Switches: For electrically controlled installations, ensure that the machinery manufacturer supplies the necessary gearing and couplings for limit switches to be operated by the bridge machinery.

465-6.6 Teeth for Racks: Cut the teeth for the racks for the bascule leaves.

465-6.7 Pitch Lines: Scribe a pitch line on each side of each gear.

465-7 Counterweights.

Determine the weight and, where necessary, the location of the center of gravity of the movable span and of the counterweights, and furnish details of the counterweight shop plans. Base determinations on weights computed from shop plans. Make provision for movable blocks equal to 3.5% under and 5% over the calculated weight. Furnish blocks equal to 5% of the calculated weight.

Drain all counterweight pockets. After erection, make any necessary adjustments in the counterweight to properly balance the leaf.

465-8 Operating Instructions.

Provide a complete set of operating instructions, including the following:

1. Complete directions for every operation from the stoppage of traffic through the opening and closing of the span to the final release of traffic.
2. Directions for bypassing current when necessary and for shifting from regular operation to the auxiliary operation provided.

3. Lubrication and maintenance charts or instructions that give the manufacturer's recommendations for the frequency of lubrication of all parts requiring lubrication and that show the type of lubricant to be used. Frame all such instructions and charts under glass, and mount them in a conspicuous place in the control house.

465-9 Conditional Acceptance and Contractor's Warranty of Movable Bridges.

The Engineer will make a conditional acceptance upon completion of the project with the condition of acceptance being that the Contractor maintain and operate the movable portions of the bridge for a period of 60 days. Open the bridge a minimum of four times daily during the 60 day period. During the last 15 days of this 60-day period, train the Department in the maintenance and operation of the bridge.

Repair or replace, at no expense to the Department, any mechanical or electrical component of the bridge which becomes inoperative during the 60-day period.

The Department will not charge Contract Time for this 60-day period.

After the 60-day operation and training period, and as a condition precedent to final acceptance of all work under the Contract in accordance with 5-11, provide a Maintenance Bond for the repair or replacement of any defective mechanical or electrical components of the movable portions of the bridge which shall be in effect for a one year period after final acceptance in accordance with 5-11. Include the costs of the bond in the costs of other bid items.

In addition to satisfying the provisions of Section 287.0935, Florida Statutes, the bonding company is required to have a A.M. Best rating of "A" or better. If the bonding company drops below the "A" rating during the one year Maintenance Bond period, provide a new Maintenance Bond for the balance of the one year period from a bonding company with an "A" or better rating. In such event, all costs of the premium for the new Maintenance Bond will be at the Contractor's expense.

The Maintenance Bond shall be written and issued in the amount of the total sums bid for the mechanical and electrical components of the movable portions of the bridge.

At the end of the one year warranty period, the Contractor will be released by the Engineer from further warranty work and responsibility, provided all previous warranty work and remedial work, if any, has been completed satisfactorily.

465-10 Method of Measurement.

The work described and specified in this Section will be measured and paid for as provided in the applicable Sections for the various items making up the complete structure, as follows:

Structural Concrete	Section 400
Reinforcing Steel	Section 415
Structural Steel and Miscellaneous Metals	Section 460
Steel Grid Floors	Section 504
Electrical Equipment.....	Section 508
Control House	Section 512

465-11 Basis of Payment.

Price and payment will constitute full compensation for all work specified in this Section.