

ITEM 10599.01 M - CONCRETE BALANCING BLOCKS
ITEM 10599.1109 M - BASCULE SPAN BALANCE

DESCRIPTION

This work will consist of modifying the existing counterweights to balance the bascule spans to compensate for the replacement of railings, sidewalk and barriers on the bascule spans, the addition of the temporary steel safety barrier during the different construction stages and the rehabilitation of the span locks.

The item "Concrete Balancing Blocks" shall consist of furnishing new concrete blocks which are to be installed in the existing counterweight pockets to balance the bascule spans when necessary.

The item "Bascule Span Balance" includes taking an inventory of the existing placement and type of counterweight blocks that are presently in the pockets. The work shall also include performing the operations necessary to achieve final balance of the bascule spans by adding or removing balance blocks in the counterweight pockets and performing balance tests. This item includes performing the calculations throughout construction necessary to determine the required counterweight block placement. This item also includes maintaining a daily log of any changes of weight made to the span. Final Span Balance shall be performed by the drift test method as described herein.

Removed blocks shall be stored at the bridge at a location as directed by the Engineer.

MATERIALS

Concrete balancing blocks shall conform to the requirements of Subsection 501 for Class A concrete.

CONSTRUCTION DETAILS

The concrete balancing block dimensions are shown on the Plans. The Contractor shall furnish additional concrete balancing blocks only at the determination of the Engineer upon his review of the Contractors balance calculations and inventory of existing balance blocks that additional concrete balancing blocks are required.

Maintaining Span Balance During Construction - Based on the actual changes of mass added or removed on the bascule spans, the Contractor shall calculate the size and placement locations for the concrete balancing blocks. The balancing blocks shall be evenly distributed across the counterweight pit.

The span shall never be in a counterweight heavy condition. It shall be the Contractor's responsibility to coordinate the sidewalk, railing and barrier reconstruction, the placement of the temporary steel safety barrier used for Maintenance and Protection of Traffic and span lock work such that the bascule spans are never in an unbalanced span heavy condition that may be detrimental in any way to the structure, traveling public or operating personnel. The acceptable range of span balance is described in the Drift Test Procedure section of this specification.

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The Contractor shall perform balance calculations as hereinafter specified. The balance calculations shall be performed by a Professional Engineer licensed in the State of New York. The calculations shall account for the detailed mass of all materials removed and added as part of this project and their location from the center of the trunnion. The mass shall be extremely accurate and account for all material, machinery, electrical equipment, fill plates, weld fillets, bolt heads, washers, nuts and any other components either removed or replaced as part of this project including minor machinery components such as grease fittings, covers, etc.

Calculations shall be submitted on spreadsheets showing the material call out, weight, moment arms in the horizontal and vertical directions and the resulting horizontal and vertical moments. Mass removed shall be accounted on separate sheets from mass added. A summary balance table shall be developed as shown on the Plans. The summary tables shall show the staging of the balance and the proposed imbalances. The calculations shall also account for the placement of new concrete blocks, and repositioning of existing concrete balance blocks. A narrative shall be included with the outline of the proposed construction staging, the duration of the imbalance and all other aspects of the work. This information shall be coordinated with the Contractor's scheduling requirements and shall be submitted to the Engineer for approval. The mass for new work shall be developed on the shop drawings for each component. The calculations and spreadsheet shall be updated daily by the Contractor throughout construction and be submitted to the Engineer daily.

Drift Test Procedure

The Contractor shall perform drift tests on each leaf to demonstrate the balance condition of the bascule spans prior to commencement of construction as well as after all construction stages on the movable leaves. The Contractor is cautioned that anytime during the drift test procedure the leaf drifts more than 10 degrees, the brakes shall be set using the master switch. Drift tests shall be performed, one leaf at a time, as required to meet the acceptance criteria in the presence of the Engineer using the following procedure:

- 1.) Operate the bridge leaf to be drift tested through a complete opening and closing cycle.
- 2.) If traffic conditions permit, raise the leaf at full speed using either the existing master switch controller in the highest power point in the full speed mode.
- 3.) Using the position indicators on the control desk, at 30-degrees allow the leaf to drift upward by quickly setting the master switch to the "Drift" point. This will allow the leaf to travel without power while the brakes are released.
- 4.) Record the amount of drift by reading the position indicator.
- 5.) After the leaf stops drifting upward, restart the motor to continue raising the leaf at full speed.

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- 6.) Using the position indicator on the control desk, at 55-degrees allow the leaf to drift upward by quickly setting the master switch to the "Drift" point. This will allow the leaf to travel without power while the brakes are released.
- 7.) Record the amount of drift by reading the position indicator.
- 8.) After the leaf stops drifting upward, restart the motor to continue raising the leaf to the fully open position.
- 9.) Lower the leaf at full speed using the existing master switch controller in the highest power point in the full speed mode.
- 10.) Using the position indicators on the control desk, at 55-degrees allow the leaf to drift downward by quickly setting the master switch to the "Drift" point. This will allow the leaf to travel without power while the brakes are released.
- 11.) Record the amount of drift by reading the position indicator.
- 12.) After the leaf stops drifting downward, restart the motor to continue lowering the leaf at full speed.
- 13.) Using the position indicators on the control desk, at 30-degrees allow the leaf to drift downward by quickly setting the master switch to the "Drift" point. This will allow the leaf to travel without power while the brakes are released.
- 14.) Record the amount of drift by reading the position indicator.
- 15.) After the leaf stops drifting downward, restart the motor to continue lowering the leaf to the fully seated position.
- 16.) If the leaf drifts more than 10-degrees during drifting, set the brakes using the master switch.
- 17.) Enter the recorded drift measurements into a table and compare the raise versus lower drift readings at each drift point. Submit a copy of the table to the Engineer.

The acceptance criteria for the pay item Bascule Span Balance shall be when the recorded drift readings at the 30-degree drift point are in the ratio of approximately 1.50:1.0, downward drift to upward drift, and the recorded drift readings at the 55-degree drift point indicate a leaf heavy condition not more leaf heavy than at the 30-degree point. The acceptable range of the 30-degree drift point ratio shall be approximately 1.5:1.0.

Based on the drift tests, additional balance blocks shall be added to each counterweight, or removed as necessary until the leaves operate as specified throughout the leaf opening. Removal and/or placement of additional balance blocks shall be included under the pay item Bascule Spans

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Balance. Existing concrete blocks removed and stored at the bridge site under the pay item Bascule Span Balance shall be utilized for final balancing of the bascule spans.

METHOD OF MEASUREMENT

The Item "Concrete Balancing Blocks" will be measured as the number of concrete blocks furnished.

The Item "Bascule Span Balance" will be measured and paid for at the contract Lump Sum price.

BASIS OF PAYMENT

The cost of "Concrete Balancing Blocks" shall include all labor materials and incidentals for fabricating, transportation and initial placement of the blocks in the counterweight pockets.

The cost of "Bascule Span Balance" shall include all labor, materials and incidentals for maintaining the span balance during each stage of construction, performing span balance calculations throughout construction and for providing final proper balance of the spans. The unit price shall include the cost of adjusting the location of balance blocks to achieve final balance. The cost for removing existing concrete blocks from the counterweight pockets and placing them at a location on the bridge as specified by the Engineer shall also be included in this item.

The completed work as measured for the referenced items will be paid for at the contract unit price for the following contract item (pay item):

<u>Item no.</u>	<u>Description</u>	<u>Pay Unit</u>
10599.1108 M	Concrete Balancing Blocks	Each
10599.1109 M	Bascule Span Balance	Lump Sum

Payment for the above items shall be full compensation for all work specified in this Special Specification and as shown on the Plans.