

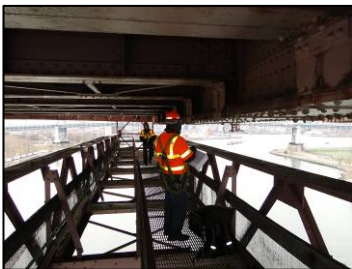
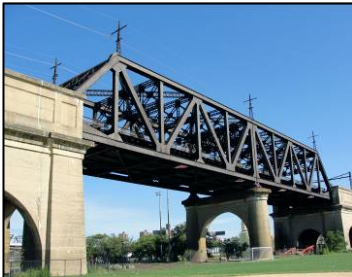
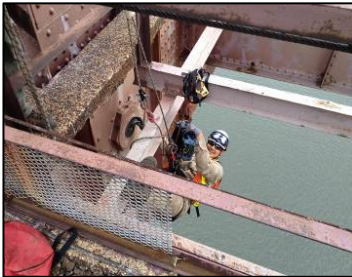


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Hell Gate and Bronx Kill Bridges – Special Detailed Inspection and Rating

Queens, New York

PROJECT NAME

Hell Gate and Bronx Kill Bridges – Special Detailed Inspection and Rating

PROJECT OWNER/CLIENT

National Railroad Passenger
Corp. (AMTRAK)

START/END DATES

2013 – 2014

PROJECT DESCRIPTION

The Hell Gate Arch Bridge, located at Milepost 7.29 on Amtrak's Hell Gate Line in Port Morris, New York, is a 1,017-foot-long, two-hinged, steel arch structure built to carry four tracks at a height of 135 feet over the East River between the Borough of Queens and Wards Island. The Bronx Kill Bridge, located at Milepost 8.54 on the same Amtrak line in Port Morris, New York, is a four span, steel, trunnion bascule, through truss structure built to carry four tracks at a height of 75 feet over the Bronx Kill between Randalls Island and the Borough of The Bronx. Both bridges were constructed in 1917.



KS Engineers, P.C. (KSE) was retained by the National Railroad Passenger Corp. (Amtrak) as Prime Consultant to perform in-depth inspection and load rating of both the Hell Gate Arch Bridge and Bronx Kill Bridge. The project included reporting indications of overload or failure in any part of the bridges; observation of the general behavior of the bridges during the passage of live load, where practical, noting excessive vibrations, deflection, side sway, and movement at pier supports; and close visual inspection of all truss pins at the top and bottom chords of the floorbeam hangers and the net section of eye bar heads (where accessible).

The results of the inspections were documented using photographs, sketches, and detailed commentary. Any conditions discovered which might jeopardize the safe passage of railroad traffic were reported to the Engineer. A written Special Detailed Inspection report was prepared, which included the findings for each structure and recommendations for corrections to the situation. The recommendations were quantified and prioritized in relation to required urgency of actions.

Measurements were taken and sketches made for all primary steel members supporting active tracks. Measurements were also taken to verify cross section information found in the plans and to measure section loss. All measurements were of sufficient amount and detail to allow the Engineer to load rate the bridges. Any cross-sections differing from those indicated on the plans, and any undocumented repairs, were described in detail. Other active track-supporting primary members, such as solid timber decks, concrete slabs, masonry piers, and abutments, and secondary members under active tracks were also inspected, and their conditions were described in detail in the report.

In order to facilitate the rating of the structures, sufficient measurements were taken to determine eccentricity (if any) between the track and bridge centerlines, as well as to determine the depth of ballast (ballast dead load) for ballasted deck bridges. Information was provided about superimposed dead loads such as passenger platforms, access roads, etc., where relevant.

The bridge members were rated based on a Cooper E – loading in accordance with the AREMA *Manual for Railway Engineering*, with and without fatigue, and for both the as-built and as-inspected conditions. The rating results were included as a table in the report, with columns for Span Number; Element; Span Length; Impact at 60 mph; Normal and Maximum Ratings for Bending, Shear, and Axial Tension and Compression, if any; and Fatigue.