



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO



2021 RESEARCH PROJECT STATEMENT

Research Topic:

Revised Load Rating Procedures for Deteriorated Prestressed Concrete Beams

Research Budget and Timeline:

- \$160,000-\$200,000
- 21-27 months (of which final 3 months are for review)

Problem Statement and Objectives

MassDOT has a substantial inventory of deteriorating precast, prestressed concrete structures, many of which have exposed and broken stirrups and strands. The current methodology for determining the load rating for these structures provided in the MassDOT Bridge Manual is based on research and guidance provided by other DOTs, which appears to be overly conservative.

MassDOT needs to develop an approach to, realistically and reliably, determine a safe working capacity for existing precast, prestressed concrete bridges which exhibit deterioration to avoid unnecessary bridge closures while also keeping the public safe.

This project is envisioned to have several major tasks: (1) in-depth literature review, (2) data collection of existing bridges and identification of candidates for laboratory testing, (3) preliminary analyses and simulations, (4) full-scale testing of actual deteriorated beams, (5) validation of analyses based on laboratory testing, and (6) development of bridge rating procedures for precast, prestressed concrete structures.

Anticipated Outcomes and Deliverables

The anticipated result of the proposed research is revised methods for determining the safe load carrying capacity of deteriorated precast, prestressed concrete beam bridges. The results could also be used as a basis for justification of preserving an existing bridge by repair and rehabilitation as opposed to complete replacement.

The revised methods for determining safe load carrying capacity of deteriorated precast, prestressed concrete beam bridges will be implemented through revisions to the MassDOT Bridge Manual, in Chapter 7, Bridge Load Rating Guidelines, specifically. The implementations will be made by the MassDOT, Highway, Bridge Section. These methods may include revised equations, guidelines regarding assumed losses for elements that cannot be measured, and/or adjustments to analysis approaches.



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Final Deliverables:

1. Final Report
2. Final Presentation