Research in Progress

Post-Fire Damage Inspection of Concrete Structures Phase III – In-Situ Experimental Phase

Research Need

MassDOT has experienced several recent tunnel fires, as reported in recent MassDOT reports. Post event evaluation of damage has been difficult due to insufficient information and protocols. A better understanding of post-event condition is needed.

Goals/Objectives

The current project will complement efforts which are underway in the second phase of this research program. In short, Phase I provided a thorough literature review, development of a draft inspection protocol checklist, and evaluation of a heat system for physical testing, while Phase II provides results from a laboratory experimental program where concrete panels (and some tunnel non-structural components) are tested.
Phase III will modify the heating set up developed in Phase II for in-situ heating and field verification of existing structural elements being removed from service. This will allow for field results that include in-situ moisture content and thermal conductivity to verify results from the laboratory tests, as well as proof of concept for using the heating set up in field testing. Testing will only be completed on components that are scheduled for demolition or removal, and are expected to include both tunnel (wall or panel elements) and bridge components (deck, abutment or pier).

Project Information

This project is being conducted as part of the Massachusetts Department of Transportation (MassDOT) Research Program with funding from Federal Highway Administration (FHWA) State Planning and Research (SPR) funds.

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Project Champion:
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Project Start Date:
April 22, 2022

Expected Project Completion Date:
February 28, 2024

Methodology

- Field verification of the response of tunnel and bridge elements under heat, which will complement the experimental laboratory results Phase II.
- Evaluate concrete/mortar patch repair performance under heat (possibly using some of the damaged specimens of Phase II and/or in-situ bridge components).
- Testing of new mitigation materials recommended for use in new MassDOT tunnel construction (fire proofing material).

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