A Mobile Concrete Laboratory to Support Quality Concrete, Technology Transfer, and Training

Introduction

This report is a summary of work performed by the Mobile Infrastructure Materials Testing Laboratory (MIMTL) as a part of the Joint Transportation Research Program (JTRP) through SPR-3858 and details its use for field testing concrete bridges and concrete and asphalt pavements. The project was intended to support the engineering investigations of other projects as identified in this report.

The MIMTL was designed as a 14-foot trailer to be towed to plants and jobsites using a pickup truck and has essential equipment for performing a wide range of tests on fresh and hardening concrete as well as asphalt. It has been used for three main applications: internally cured (IC) concrete, high early strength (HES) concrete patching, and asphalt tack coats (chip seal).

Findings

- Multiple graduate students and INDOT research projects with zero workplace accidents and zero near misses while attending different types of jobsites during forty-six operational days.
- Help ready-mix suppliers successfully implement field-produced internally cured concrete as part of SPR-3708. This concrete was tested at the plant and in the field, and results indicate that the supplied internally cured concrete represents a high-quality product. One of the biggest challenges is in the control and testing of aggregate moistures.
- Evaluate high early strength patching materials used as part of SPR-3905. It was found that the temperatures observed in the field were high and significant dosages of admixtures were used, resulting in

The Mobile Infrastructure Materials Testing Laboratory pictured at the Center for Aging Infrastructure in 2014.
potential sulfate balance issues that limited flexural strength.

- Conduct site visits related to concrete pavement performance as part of SPR-3708. Information gathered was used to investigate aging for measures of strength and durability and provided typical levels of variation associated with test methods, with particular focus on concrete pavement construction.
- Evaluate a new test for chip sealing as part of SPR-3801. The results demonstrated that electrical measurements show promise in applicability to determining chip seal curing times.

**Implementation**

The Mobile Infrastructure Materials Testing Laboratory (MIMTL) has been used successfully to verify the value obtained from concrete purchased by the Indiana Department of Transportation (INDOT) for use in bridge decks, pavements, patches, and curbs. Additionally, its implementation has provided the opportunity for hands-on training of INDOT personnel and contractors in how to improve concreting practices and increase service life. With the implementation of the MIMTL, new technologies can be rolled out that provide opportunities to fine-tune specifications and best practices.

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*Interior pictures of the Mobile Infrastructure Materials Laboratory pictured early in its operation in 2014.*