

Project Capsule

25-1C



November 2024

Evaluation of the T-FAST (TFHRC ASR Test) Test Method for Aggregate Acceptance

PROBLEM

A new test method developed by researchers at the Turner-Fairbank Highway Research Center promises accurate ASR aggregate source testing after as little as 21 days of aging. This test, which is named T-FAST, has been accepted by AASHTO as provisional specification TP144.

OBJECTIVE

The objectives of this study are to:

1. Review the state of the practice for using T-FAST for alkali-silica reactivity (ASR) evaluation.
2. Perform a series of laboratory tests to evaluate the feasibility of using T-FAST for ASR testing.
3. Determine the level of implementation and/or continued research required to adopt the T-FAST test method.

METHODOLOGY

To fulfill the objectives of this study, the research team will begin with a comprehensive literature review to determine the state of the practice and current research endeavors regarding the application of the T-FAST test method. Laboratory testing will include a suite of 12 coarse aggregates and 12 fine aggregates selected from DOTD's approved materials list (AML). Aggregates will be selected based on the accelerated mortar bar test (AMBT, ASTM C1260) results to cover a wide range of reactivity. A schematic of the T-FAST test tube is shown in Figure 1 (top right).

Selected aggregates will also be tested using the concrete prism test (CPT, ASTM C1293) and miniature concrete prism test (MCPT, AASHTO T380) to assist in comparing and correlating the results between differing test methods.

The proposed concrete mixtures for this study are shown in the table on the following page.

Results from the different test methods will be compared, and data analysis will be performed to evaluate the feasibility of the T-FAST method for ASR testing.

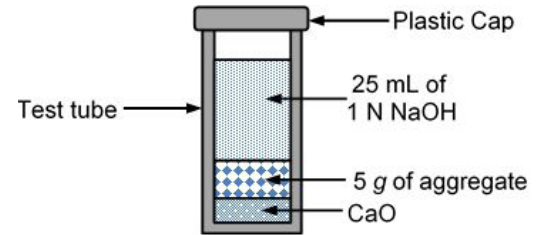


Figure 1. Schematic of the T-FAST Test Tube

Start Date

October 15, 2024

Duration

24 months

Funding

SPR: TT-Fed/TT-Reg-5

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Factor	Description	
	AASHTO T380	ASTM C1293
Cementitious content	708 lb/yd ³ (420 kg/m ³)	708 lb/yd ³ (420 kg/m ³)
Initial cement alkali C=content (% Na ₂ O _{eq})	0.90 ± 0.10	0.90 ± 0.10
Target cement alkali content (% Na ₂ O _{eq})	1.25	1.25
w/cm	0.45	0.45
Fine aggregate types	12 known reactive or potentially reactive; 1 control	12 known reactive or potentially reactive; 1 control
Coarse aggregate types	12 known reactive or potentially reactive; 1 control	12 known reactive or potentially reactive; 1 control
Coarse aggregate volume fraction (per unit volume)	0.65	0.65
Maximum aggregate size	0.50 in. (12.5 mm)	0.75 in. (19.0 mm)
Temperature conditioning	60 °C	38 °C

Table 1. Proposed concrete mixtures for evaluation

IMPLEMENTATION POTENTIAL

If the results of the above testing and analysis are promising, the T-FAST test method could significantly shorten the time needed to complete the acceptance procedure for aggregates onto DOTD's approved materials list (AML). Time would be reduced from a maximum of one year (using CPT) and a minimum of approximately 56 days (using MCPT) to approximately one month.