

Freezing and Thawing Testing of Field and Lab Concretes with the Same Aggregates

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Introduction

Concrete and aggregates sampled on 20 field visits to Kansas Department of Transportation concrete paving projects constructed between 2010 and 2012 were tested to compare the KTMR-22 freeze-thaw durability of field-cast specimens with standard lab-cast specimens made with the same aggregates.

Project Description

The goal of this study was to determine whether the differences in aggregate gradations, material proportions, and cementitious materials between standard KTMR-22 concretes mixed in the lab and field concretes made with the same aggregates would result in significant differences in freeze-thaw durability as measured by KTMR-22. Sampling concrete as delivered to the job site for freezing and thawing evaluation would provide assurance that the KTMR-22 test results reflect the performance of the aggregate used in the pavement.

Project Results

No consistent differences were found between the results of field and lab specimens containing the same aggregates. Differences in aggregate gradations and proportions, cement content, and the presence of supplementary cementitious materials did not affect the agreement of the lab and field test results. The similarities in performance between the lab and field concretes indicate that the results of the KTMR-22 Freezing and Thawing test are determined primarily by the durability of the coarse aggregate.

On the basis of this research, it is recommended that specimens be cast in the field for KTMR-22 testing to verify the durability of aggregates as actually used in pavements. A petrographic evaluation of the prism specimens should be performed any time the RDME results contradict the expansion results to determine the failure mechanism.

Project Information

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