

Aggregate Freeze-Thaw Testing and D-Cracking Field Performance: 30 Years Later

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Introduction

Premature deterioration of concrete pavement due to D-cracking has been a problem in Kansas since the 1930s. The Kansas Department of Transportation (KDOT) has made significant efforts, including five extensive studies into the phenomenon of D-Cracking, to mitigate the problem.

Kansas geology includes mineable limestone coarse aggregates with variable durability in the eastern portion of the state. Due to this variability and historically poor D-cracking field performance, KDOT initiated intensive identification and tracking of individual mined beds, as well as frequent durability testing during production in the 1980s.

Past changes in quarry production observation and QA/QC programs appear to have had some effect on the quality of pavements produced; however KDOT recognized that with the desire for longer lasting pavements, modifications to past testing of aggregate freeze-thaw durability are required to assess aggregate sources and achieve a longer exhibited pavement lives.



D-Cracking in Kansas

Project Description

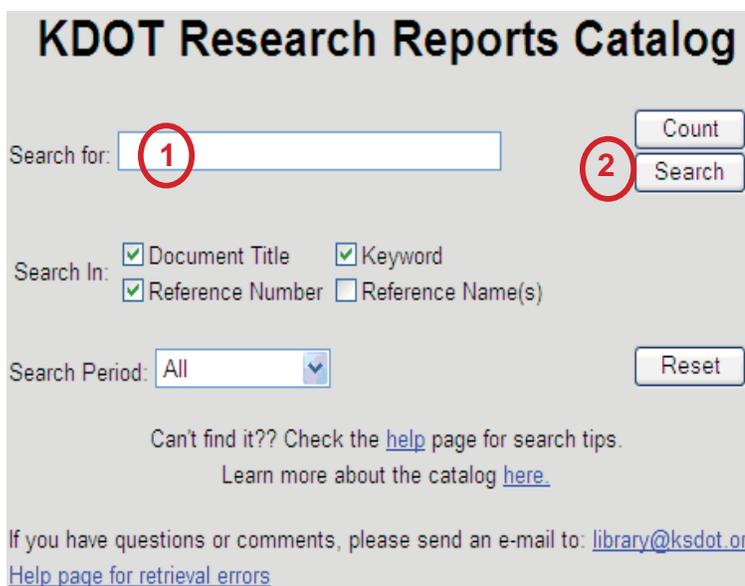
D-cracking field performance of concrete pavements containing limestone coarse aggregates was investigated in 2010-2012. Results of this investigation indicate that the rate of D-cracking decreased, but the minimum rate of D-cracking presence in concrete pavements is more than 30%.

Project Results

In reaction to the results of the 2010-2012 study, KDOT implemented changes aimed at mitigating the risk of D-cracking. Implementation actions included increasing the number of freeze-thaw cycles for aggregate in concrete prisms from 300 to 660 cycles, freeze-thaw testing of all aggregate types (not just limestone) in concrete, focusing aggregate sampling at the point of concrete production, and including an “acceptable field-performance history” criterion for concrete aggregates. Ongoing research is being conducted to develop new methods to identify durable aggregates and faster testing techniques.

Project Information Contact

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