



AIR CONTENT OF CONCRETE PAVEMENTS PRODUCED IN CONVENTIONAL VERSUS 30-SECOND MIXERS

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By

Barbara J. Smith, P.G., Kansas Department of Transportation

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Project Objective

Evaluate full depth pavement cores constructed by different mixers and mix designs to determine whether mixer times produce similar uniformity of air content.

Project Description

Cores were obtained from eight undamaged locations with conventional and short mixing times in equal number. These cores were divided crosswise of the length into thirds, as top, middle and lower portions. The pieces were further divided lengthwise removing the vertical, middle $\frac{3}{4}$ to 1-inch piece for polishing. The polished pieces were analyzed by linear traverse using ASTM C-457 protocol, and by image analysis giving air content based on areas. All nine pieces of each core were then observed for petrographic information on aggregates used, condition of the paste, relation of fine and coarse aggregates in the paste, and air content distribution and its relation to the other components of the concrete.

Project Results

The pavement concrete used for this question proved to be marginal for entrained air content. While the percent entrained air averaged about 4 percent for the sites in general, this is minimal for durable concrete in this climate. This is evidenced by the longitudinal cracking on centerlines where backer rod has trapped moisture allowing saturation and freeze/thaw damage to occur. The site designated as performing poorly had less entrained air content than the others indicating that the lower limit of protective air content had been found. There is excessive entrapped air incorporated in most of the pavement samples. Those being evident, can enough information be found in the study data to indicate whether 30 second or 45 second mixer time is the better choice? The separation of averages based on vibrator locations produces indications that the short mixer time provides some little more entrained air than the regular mixer time. Even this can be suspect since the standard deviations for the data indicate there are only slight differences in the two processes in terms of entrained air.

Report Information

For technical information on this report, please contact: Barbara J. Smith, Research Geologist, Kansas Department of Transportation, Bureau of Materials and Research, 2300 Southwest Van Buren Street, Topeka, Kansas 66611-1195; Phone: 785-291-3037; Fax: 785-296-2526; e-mail: Barbara.Smith@ksdot.org.

For a copy of the full report, please contact: For a copy of the full report, please contact: KDOT Library; 2300 SW Van Buren Street, Topeka, Kansas 66611-1195; Phone: 785-291-3854; Fax: 785-296-2526; e-mail: library@ksdot.org.