



Joint Deterioration in Concrete Pavement and Potential Methods for Improving Service Life

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**Materials
Engineering
Fall 2014
Seminar Series**

**Friday, Nov. 7th
3:30 pm Coffee
3:45 pm Seminar
ARMS 1010**

Concrete pavements represent a large portion of the transportation infrastructure. While the vast majority of concrete pavements provide excellent long-term performance, a portion of these pavements have recently shown premature joint deterioration. Substantial interest has developed in understanding why premature joint deterioration is being observed in jointed portland cement concrete pavements (PCCP). While some have attributed this damage to insufficient air void systems, poor mixture design, or pavement design; it is the central hypothesis of this presentation that a large component of this damage can be attributed to fluid absorption and chemical reaction between the paste and salt at the joints. This presentation begins by discussing the importance of the level of concrete saturation on freeze-thaw damage. Second, the influence of deicing salt solutions on drying and wetting, potential chemical reactions, and phase changes is discussed. Finally, the use of soy methyl esters polystyrene blends (SME-PS) is discussed as a potential method to extend the service life of concrete pavements by limiting the ingress of salt solutions. The aim of this presentation is to provide background on some factors that can lead to joint deterioration and to provide the pavement community with alternatives on how sealers and deicers may be able to be used more efficiently to reduce joint damage.

Jason Weiss is the Jack and Kay Hockema Professor of Civil Engineering and Director of the Pankow Materials Laboratory at Purdue University. He earned a B.A.E. from the Pennsylvania State University in Architectural Engineering and a MS and PhD from Northwestern University in Civil Engineering in 1997 and 1999 respectively. He is actively involved in research on cement and concrete materials specifically focused on early age property development, cracking, transport in concrete, freeze-thaw, and concrete durability. Dr. Weiss has taught courses in civil engineering materials, concrete materials, service life, repair and non-destructive testing. Dr. Weiss is a fellow of the American Concrete Institute, a member of RILEM, Transportation Research Board, and American Society for Testing and Materials. He is editor in chief of the RILEM Materials and Structures Journal. Dr. Weiss has authored over 240 publications with over 120 peer-reviewed journal articles. He is recipient of the NSF Career Award, the RILEM L'Hermite Medal, the ACI W. P. Moore, ACI Young Member, and ACI Wason Awards, the ESCSI Erskine Award, the TRB Burgraff and Mather Awards for outstanding research and publications, and the ASCE Huber Award. He is the recipient of the Wansik, Munson, Buck, and Burke awards for outstanding teaching/advising in the school of civil engineering, the Potter award for outstanding teaching in the college of engineering, the Murphy award for outstanding teaching at Purdue University, and has been inducted into the Purdue Teaching Academy.