



# EFFECTS OF NONUNIFORM SUBGRADE SUPPORT ON CONCRETE SLAB PERFORMANCE

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**February 2, 2012**

**12:30 PM**

**ATREL Classroom**

**1611 Titan Drive, Rantoul, Illinois**

*Pizza and soft drinks will be provided*

**ABSTRACT:**

The ability to spatially map the stiffness of the foundation layers under concrete pavements with intelligent compaction has created a need to define limits on the allowable stiffness variations in a given construction area as well as the maximum size of a non-complaint area which does not require remedial action. In this study a two-dimensional finite element analysis was completed to determine the effects of four nonuniform subgrade support conditions relative to uniform support on the tensile stresses in a concrete slab under tandem axle loading and temperature curling. Field measurements to estimate the spatial stiffness of the soil have also been taken and analyzed with the same 2-D analysis program to determine if the theoretical analysis conclusions are valid. Finally, 3-D finite element analysis were completed on the same nonuniform support conditions with slabs that have pre-existing cracks to determine if there is an interaction between existing flaws in the concrete slab and nonuniform support.

**BIO:**

Dr. Jeffery Roesler is a Professor of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign (UIUC) and holds the Illinois Chapter – American Concrete Pavement Association faculty scholar award. He is the Associate Director of the Advanced Transportation Research and Engineering Laboratory (ATREL). Dr. Roesler has been working on rigid pavement design, analysis, and concrete materials for the past 15 years. He has authored/ coauthored more than 100 publications and has delivered more than 60 presentations at conferences and professional meetings on these topics. A registered professional engineer in the state of California, Dr. Roesler is a member of TRB, ACI, and on the Board of Directors for the International Society of Concrete Pavements. He spent the 2010-2011 as a Visiting Professor at the Catholic University of Chile on a Fulbright Scholarship.