



Speaker

Chandrakant Desai Memorial Webinar Series*

Integrating Sensor Data into Mechanistic Pavement Analysis and Unbound Aggregate Layer Modeling

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To register, scan the QR code or visit: <https://bit.ly/4Ay5ffJ>

Hosted via TEAMS

ABSTRACT

An innovative bender element (BE) shear wave transducer was recently developed at the University of Illinois as a field sensor for assessing in situ modulus characteristics of constructed unbound aggregate base/subbase layers through elastic wave velocities. This webinar presentation will discuss field instrumentation process with the BE field sensor as an intelligent construction and layer modulus characterization tool during the construction and trafficking of full-scale pavement test sections. The full-scale test sections BE field sensors installed in the field include both unbound aggregate base/subbase layers and geosynthetic stabilization applications primarily targeted for soft subgrade stabilization in unpaved roads and for unbound aggregate stabilization in paved roads. The development and the instrumentation procedure with BE sensors will be discussed in field testing environments. Successful BE sensor data measurements have provided valuable insights into the layer modulus behavior trends from different stages of pavement layer construction, including confinement effects quantified with locked-in residual stress buildup in the aggregate layer during the construction process and the lateral restraint mechanism responsible for local stiffness enhancement in the vicinity of geosynthetic inclusion. A sublayer-based modeling approach will be introduced to characterize the stress-dependent modulus behavior of pavement unbound aggregate layers and those mechanically stabilized with geosynthetics. The methodology provides a mechanistic and field-calibrated pathway for incorporating geosynthetic stabilization into mechanistic-empirical (ME) pavement design. A broader adoption of testing and field sensor data-informed ME frameworks linked to digital twins will enable accurate and sustainable pavement foundation designs.

BIO

Dr. Erol Tutumluer is Abel Bliss Professor specializing in Transportation Geotechnics in the Department of Civil and Environmental Engineering at the University of Illinois Urbana-Champaign. He has research interests and expertise in characterization of pavement and railroad track geomaterials, i.e., subgrade soils and base/ballast unbound aggregates, soil/aggregate stabilization, geosynthetics, structural health monitoring of transportation facilities using sensors, modeling granular foundation systems and mechanistic analysis and design. Dr. Tutumluer is a Founding Editor-in-Chief of the Transportation Geotechnics Elsevier journal and a Distinguished Member of the American Society of Civil Engineers (ASCE). Dr. Tutumluer is a Council Member of the International Geosynthetics Society (IGS) and recently served as Chair of the IGS Technical Committee on Roads, Railways and Airfields (TC-RRA). He currently serves as a member of Transportation Research Board's AKN16 Pavement Foundations Committee. Dr. Tutumluer's recent awards and recognitions include ASCE T&D's James Laurie Prize and Francis C. Turner Award, ASCE Geo-Institute's Carl L. Monismith Lecture Award, IGS Achievement Award, and ISSMGE's Ralph R. Proctor Named Lecture award.

***This webinar series is intended to retain the legacy of Prof. Chandrakant Desai for his original and seminal contributions to Geomechanics.**

