Multi-Scale Characterization and Modeling of Asphalt Materials

Why?
New challenges: increasing axle load and tire pressure resulting in overloading.

Implementation of existing design procedures
- Extensive calibration and validation needed.
- Inaccurate pavement distress prediction

Discrepancies in test results: field and laboratory
- Need for improved mix design.

Development of a fundamental analytical technique to establish important material properties and determine right response to load and temperature.

What?
Better understanding of the state of stress in the material i.e., strength and deformation mechanism.

Better mixture specifications

Improved prediction of pavement performance and condition

Maximum pavement utilization and minimization of cost.

How?
X-Ray Computed Tomography (CT)
- Acquisition of internal structure non-destructively.

Digital Image Processing and Analysis
- Improvement and enhancement
- Quantification and analysis
- Surface and Mesh generation

Numerical Simulation Tool - Finite Element, Discrete Element Method etc.
- Material characterization

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