Cracking Wars: The Fatigue Awakens

Kevin Hall
University of Arkansas

Nam Tran
NCAT
Our Discussion Today...

- Review “Current” Pavement-ME Fatigue Cracking Estimation
  - “Build 2.3” Release
- Overview of NCAT Research Effort
- NCHRP 9-59 Update – Binder and Mixture Cracking Tests
Cracking Models & Transfer Functions

- Bottom-up cracking
- Transverse cracking
- Top-down cracking
- Reflection cracking
## Mixture Properties for Cracking Models

### Pavement-ME Build 2.3

<table>
<thead>
<tr>
<th>Types of Cracks</th>
<th>Mixture Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom-Up</td>
<td>• Fatigue strength from flexural beam fatigue test</td>
</tr>
<tr>
<td>Top-Down</td>
<td></td>
</tr>
<tr>
<td>Transverse (Thermal)</td>
<td>• Indirect tensile strength</td>
</tr>
<tr>
<td>Reflection</td>
<td>• Indirect tensile creep compliance</td>
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</tbody>
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### MEPDG Cracking: Summary

<table>
<thead>
<tr>
<th>Cracking Designation</th>
<th>Status</th>
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<tbody>
<tr>
<td><strong>Bottom-Up</strong></td>
<td>• No changes or enhancements; none planned for the short-term</td>
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<tr>
<td><strong>Top-Down</strong></td>
<td>• No changes to date; changes anticipated (NCHRP 1-52)</td>
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<tr>
<td><strong>Transverse (Low Temp)</strong></td>
<td>• No changes to date; need for changes identified (long-term)</td>
</tr>
<tr>
<td><strong>Reflection</strong></td>
<td>• Major enhancements in Version 2.2 (<em>replaced regression with M-E</em>)</td>
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</tbody>
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NCAT Study
NCAT Study Objectives...

- Identify Gaps
- Identify Overlaps

MEPDG Cracking Models
Other Cracking Models
Laboratory Cracking Tests
Envision:

Pavement System

...to do what?

...material tests
...design models
NCHRP 9-59

Nam Tran & Don Christensen
Questions?

Kevin Hall
(kdhall@uark.edu)

Nam Tran
(nht0002@auburn.edu)