

# Third Workshop on Innovations and Modeling for Sustainable and Resilient Concrete Pavements

## Summary Remarks

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# Workshop Objectives

- Forum for concrete pavement discussion
  - Current limitations
  - Areas lacking in knowledge
  - Future directions
- **Theme: Sustainable and Resilient Concrete Pavements**
  - **Innovations in Monitoring and Evaluation**
  - **Material Technologies**
  - **Theoretical Advancements**
  - **Innovative Design Technologies**
- Present findings from discussion to 10<sup>th</sup> International Concrete Pavement Conference
- Develop research needs statements



# Sponsors

- International Society Concrete Pavement (ISCP)
- ACI – Quebec and Eastern Ontario Chapter
- University of Illinois Urbana-Champaign
- University of Minnesota
- TRB AFD50 Committee: Rigid Pavements
  - Subcommittee AFD50 (1) Advanced Modeling



# 37 Workshop Participants

11 countries - diverse backgrounds

- USA - 21
- Canada - 4
- Australia - 2
- Belgium - 2
- China - 2
- Brazil - 1
- Chile - 1
- Germany – 1
- Netherlands - 1
- South Africa - 1
- Cyprus – 1
- Academia 17
- Consultants 8
- Government 6
- Concrete Association 4
- Contractor 1
- Material Supplier 1



# Overall Discussion Themes

## ■ Slab-Base Interface

- Erosion / Drainage
  - Pumping
  - Increased moisture curling
  - Cohesion /adhesion
- Friction characterization and modeling
- Overlay design/performance
- Premature failures, e.g., horizontal cracking

# Discussion Themes, con't

## ■ Concrete Joints

- Design criteria/function
  - Bearing stress, differential deflection, LTE, other?
- Crack width measurement/prediction standards
  - Design criteria
- How to accommodate alternative dowel shapes/materials?
- Earlier joint/crack formation especially CRCP



# Discussion Themes, con't (2)

## ■ Materials

- Recycled materials
  - crushed concrete and reclaimed asphalt pavement (RAP)
- Supplementary cementitious materials (SCM)
  - Fly ash / slag / nanosilica
- Fibers
  - Macro vs. microfibers
- Surface property (noise/friction) modifications?

# Discussion Themes, con't (3)

- **Fatigue / Fracture**
  - Recycled materials
  - Beam vs. Slab differences
    - Short jointed slab design
    - Fiber reinforced concrete slabs
  - Flexural capacity vs. S-N fatigue
  - Beam strength results / relevance



# Discussion Themes, con't (4)

- **Monitoring / Evaluation**
  - Ultrasonic measurements
    - Strength/Modulus
    - Bonding
  - Curling
  - Interface friction

# Discussion Themes, con't (5)

- **Properties of Base Materials**
  - Stiffness
  - Interface properties
  - Erodibility
  - Application, traffic, joint types, slab geometry



# Discussion Themes, con't (6)

## ■ Concrete Failures

- Fatigue prediction of beams/slabs
- Flexural beam measurements
- Horizontal cracking in CRCP

# Workshop Summary

- Thanks for your attention!!
- Enjoy Long-Life Concrete Pavement Conference
- Download presentations:

<https://netfiles.uiuc.edu/jroesler/shared/Third-Workshop>