Assessment of Jointed Concrete Pavement Using Continuous Deflection

Jerry Daleiden, P.E.
ARRB Group, Inc.
Evolution of PCC Structural Assessments

Three goals:

1. Review challenges/pitfalls of
   A. Traditional assessments
   B. Original TSD on PCC

2. Share recent findings

3. Review case studies and potential implications
“Rigid Pavements”

• By definition are intended to be VERY stiff.
• Should (by design) have very little deflection.
• We are seeking the exceptions.
  – “The needles in the haystack”
Continuous vs. Sampled

Pavement Assessment historically “Sample" based

Pavement conditions, vary along roadways

- Ride
- Density (Intelligent Compaction, Infrared, GPR)
- Segregation (Texture)
- Structural Integrity (TSD, GPR)
Traditional Strength Measurement
Structural Assessment - Evolved
Continuous Deflection Measurement

Deflection Slope = $V_v/V_H$
Structurally Deficient+ (Case 1)

Significant visible cracking

Filters:
- IRI > 120
- Rutting > 0.3 in
- WP Cracking > 50%
- D0 > 21 mils
Case #2 – Structurally Deficient, but?
Case #2 – Structurally Deficient, but?
Case #2A – Structurally Deficient, but?

High deflection at (assumed) joint location

High deflections near moisture on shoulder
Structurally Deficient But…? (Case 2)

- Availability of Continuous Structural Capacity:
  - Facilitates detection of structural deficiencies,
  - In spite of Good Surface Condition.
- Enables Agencies to be more proactive:
  - Plan for future,
  - Rather than reacting to deterioration.
Structurally Adequate, But? (Case 3)
Structurally Adequate, But? (Case 3)
All Good (Case 4 …Celebration 😊)

No visible cracking

Filters:
- IRI < 120
- Rutting < 0.3 in
- WP Cracking < 25%
- D0 < 6 mils
Net Result

Collecting Continuous Structural Capacity Data, as part of an overall assessment provides:
• Better understanding of overall pavement condition
• Less traffic disruption
• Opportunity for better project and treatment selection
• More Cost Effective
Comprehensive Assessment Opportunities

Network Level Evaluations:
Which roads require treatment.
What treatments should be planned.
More Comprehensive Assessment of Network.

Project Level Evaluations
Localized areas requiring unique treatment.
Additional Structure Needed.
Questions

Is load transfer efficiency still the best metric for evaluating JCP structural capacity?

What metric(s) are needed?

What are the perceived limitations and/or potential approaches for mitigation?

What additional applications merit consideration?

Jerry.Daleiden@arrbgroup.net