Using MIT Scan-2 for Evaluating Dowel Bar Placement

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MIT Scan-2

- Designed specifically for measuring dowel bar position and alignment
- Offers practical means of evaluating dowel placement accuracy

Three Easy Steps to Testing

Example Output

Signal intensity
Contour plot

Horizontal alignment
Vertical alignment
Key Acceptance Items

- Concrete strength
- Slab thickness
- Air content
- Initial smoothness
- Dowel bar alignment

Dowel Alignment

State Specifications

So what if dowels are misaligned?

- Pavement damage may result
  - Spalling
  - Cracking
- The effectiveness of dowel bars may be compromised
  - Loss of load transfer efficiency (LTE)
  - Premature development of faulting
- How bad is bad? – we don’t know
  - Existing specifications may be too tight
  - Comprehensive study underway (NCHRP 10-69)
Joint Score for IN1 (Basket)

Joint Score for KS4 (DBI)
Joint Score for the GA Section (DBI)

Joint Score for the WA Section (Retrofit)

30-year old GA section with extremely poor dowel alignment
Effects of Embedment Length (Burnham 1999)

Effects of Dowel Misalignment (Prabhu et al. 2006)

Comparison of DBI and Basket

More critical ranges of misalignment
Use of MIT Scan-2 data in optimizing PCC mix for dowel-bar inserter

Dowel Placement Specifications
(CPTP Techbrief FHWA-HIF-07-021)

- Ideally, dowel bars should be placed without any placement error
- There are tolerable levels of placement errors
- Stringent (but constructible) requirements should be specified, but allowance should be made for tolerable errors
Possible Options for Correcting Misaligned Bars

- Cut misaligned bars
- Retrofit additional dowel bars
- Remove and replace slab
- Full-depth repair
Best approach: don’t create problems

Some misalignments are harmless
Questions?