

Using MIT Scan-2 for Evaluating Dowel Bar Placement

Prepared By:

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Prepared For:

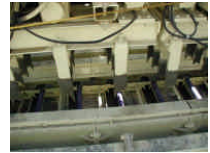
ND ACPA Workshop
Bismarck, ND
12 March 2008



MIT Scan-2



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



Count on Concrete

Three Easy Steps to Testing



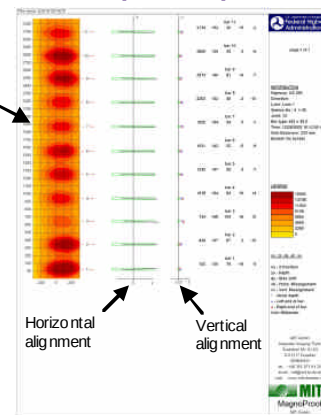
(N) MIT Scan-2 6000000 Str. 61-63 5-8217 Dresden, GBRNA web : www.mit-scan2.de email : m1@mit-scan2.de Federal Highway Administration Office of Pavement Technology sam.tyson@hwa.dot.gov tel : web : www.fhwa.dot.gov Date + Time : 26/08/2004 10:00 File g:\04.98_26\20081009.NIF Highway : US 90 Direction : E Station No. : 1 + 00 Lane : Lane 1 Joint : 1 Bar type : 48 x 38mm Bar spacing : 300 mm Concrete thickness : 200 mm Bar x-Coord Depth Side Misalign. Bar No. km mm mm mm mm mm Shift for vert. Space 1 120 138 54 -15 8 129 2 45 146 25 -7 -6 326 3 76 148 2 -3 -5 311 4 187 143 27 0 -2 385 5 137 151 +3 0 12 388 6 169 151 -30 -1 4 311 7 198 148 -30 -3 6 387 8 218 137 0 2 2 385 9 268 140 9 -2 -8 388 10 218 137 0 -3 9 387 11 323 141 -37 8 -7 384 12 353 144 -36 2 -2 384				
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Example Output



Signal intensity
Contour plot



Horizontal
alignment

Vertical
alignment

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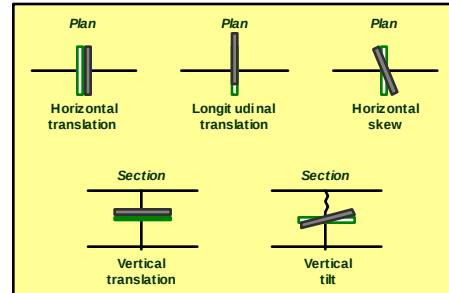
Key Acceptance Items

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



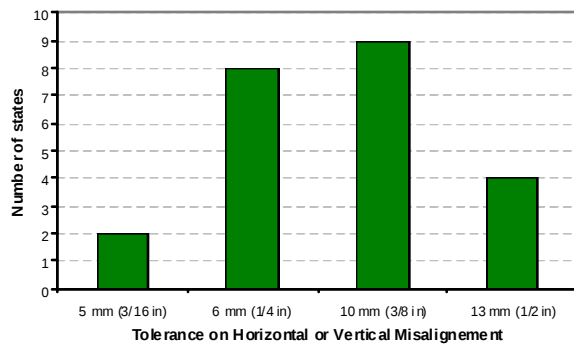
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Dowel Alignment



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State Specifications

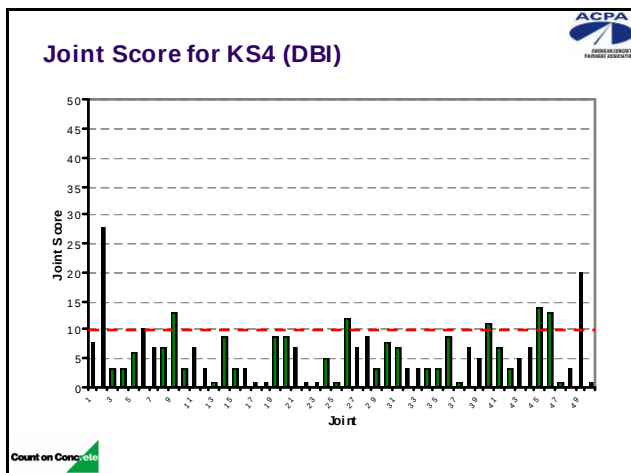
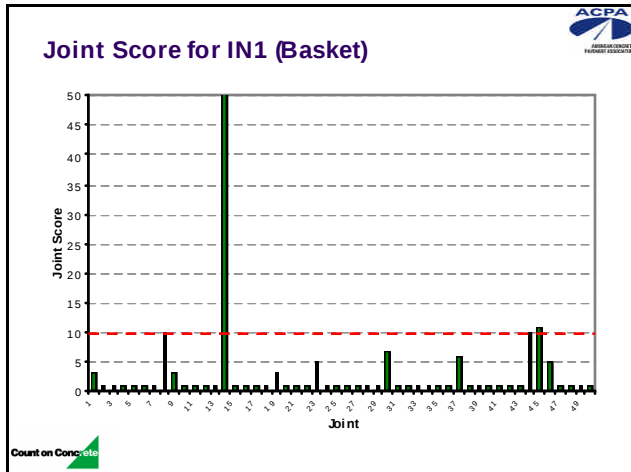


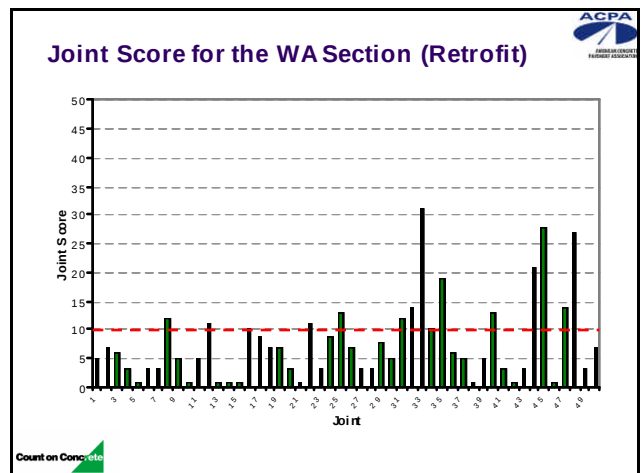
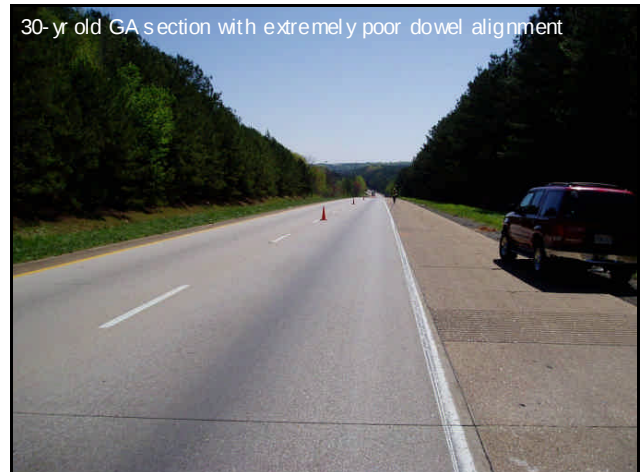
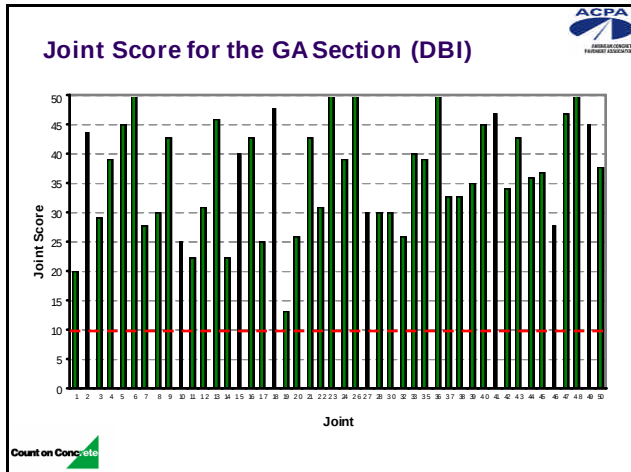
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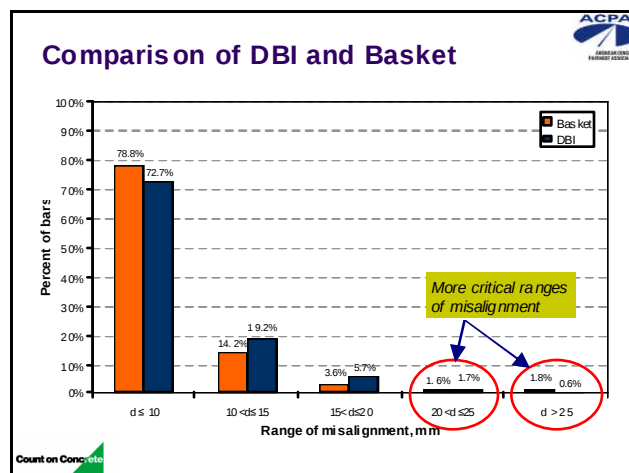
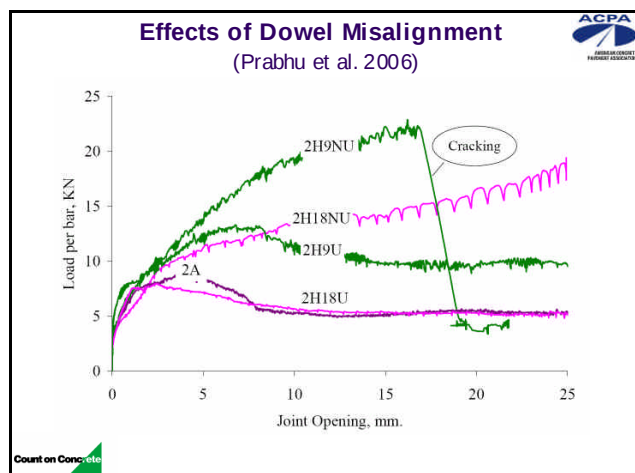
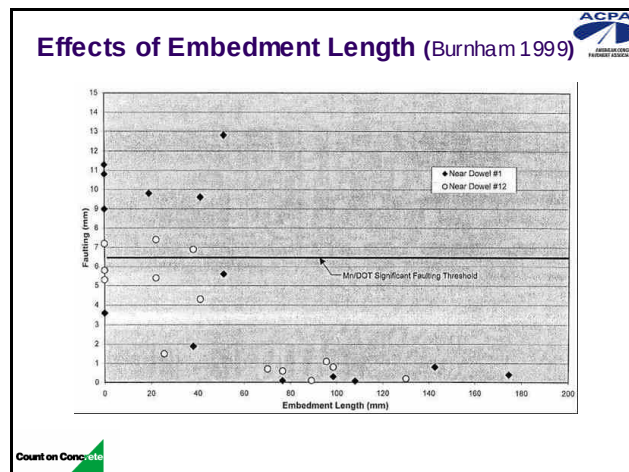
So what if dowels are misaligned?

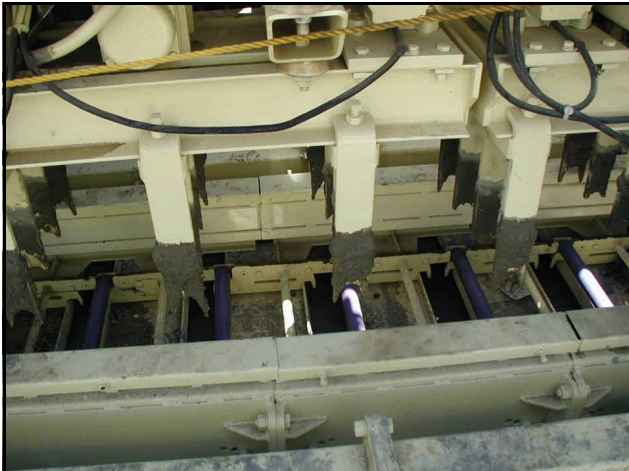
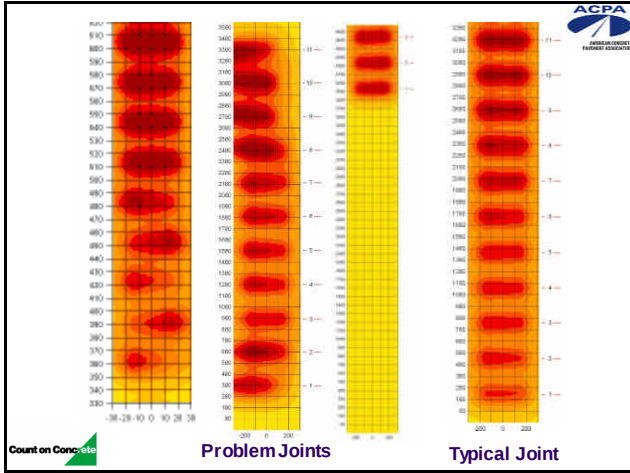
- Pavement damage may result
 - Spalling
 - Cracking
- The effectiveness of dowel bars may be compromised
 - Loss of load transfer efficiency (LTE)
 - Premature development of faulting
- How bad is bad? – **we don't know**
 - Existing specifications may be too tight
 - Comprehensive study under way (NCHRP 10-69)

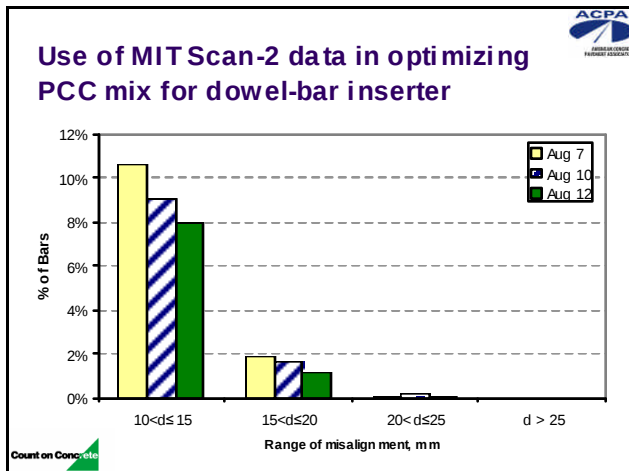
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Dowel Placement Specifications

(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

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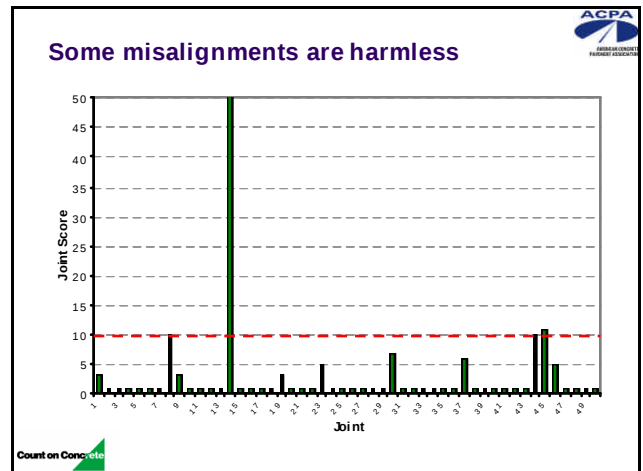
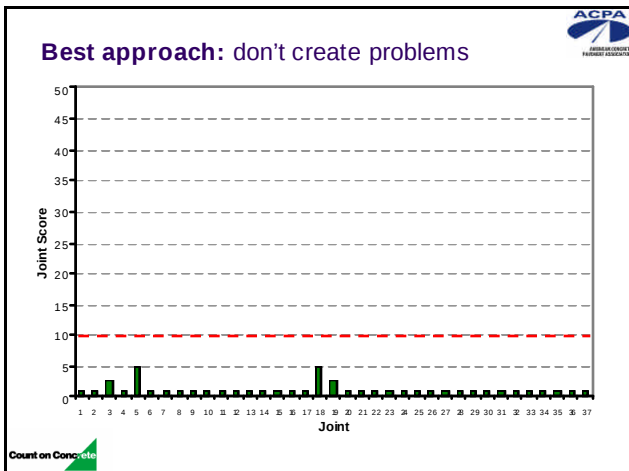
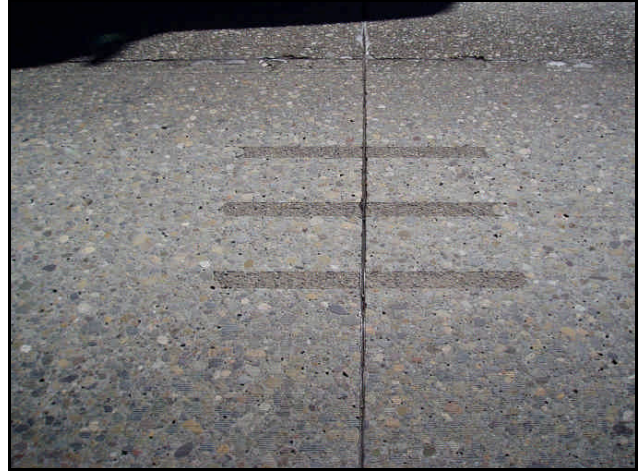
Possible Options for Correcting Misaligned Bars

- Cut misaligned bars
- Retrofit additional dowel bars
- Remove and replace slab
- Full-depth repair



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Questions?

