Paver Segregation

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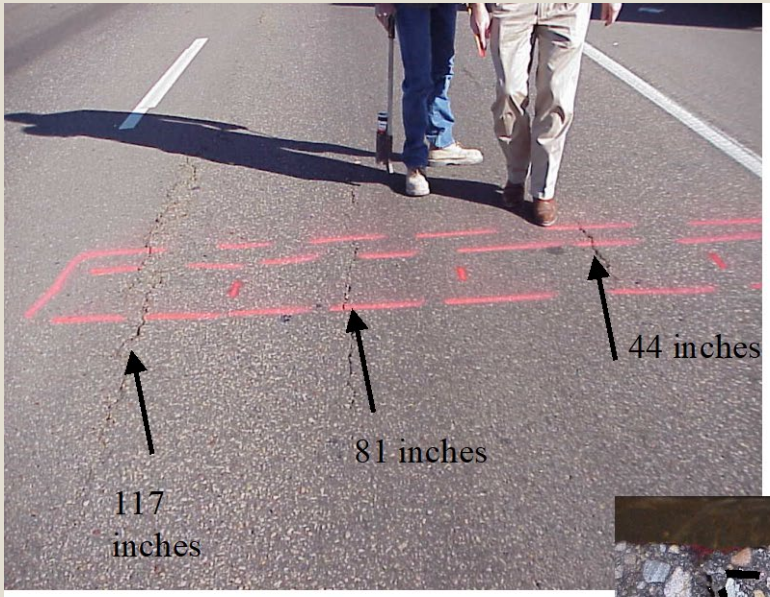
- All photos and schematics courtesy of Colorado DOT

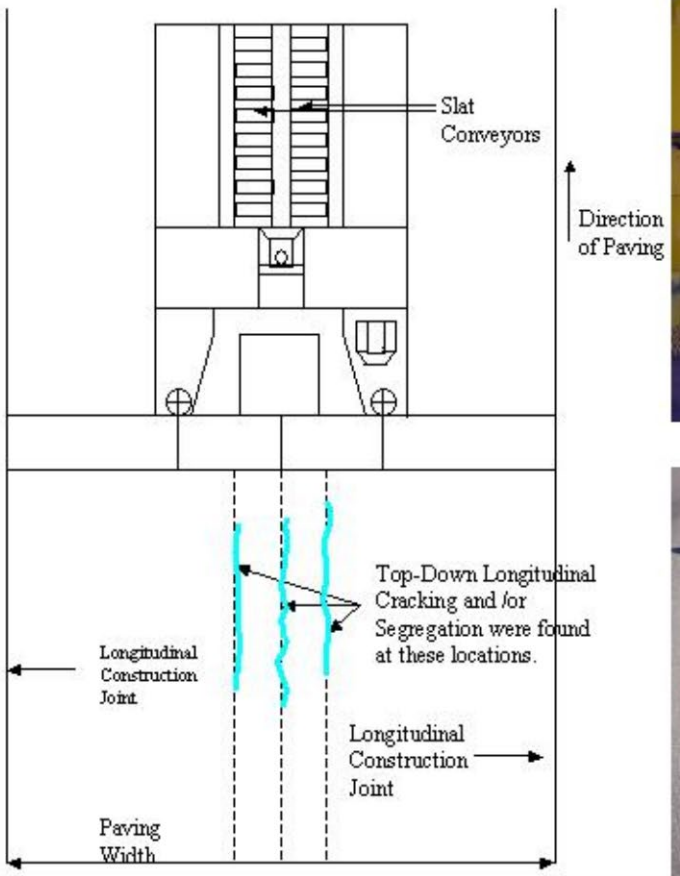
Presentation Overview

- **I-25 Forensic Investigation**
- 2003 Top-Down Cracking Study
- CDOT's 2004 Direction

I-25 Distress



Asphalt Paver



I-25 Forensic Study Conclusions

Cracking was:

- Predominantly top-down
- Segregation related
- Induced by paver

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- **2003 Top-Down Cracking Study**
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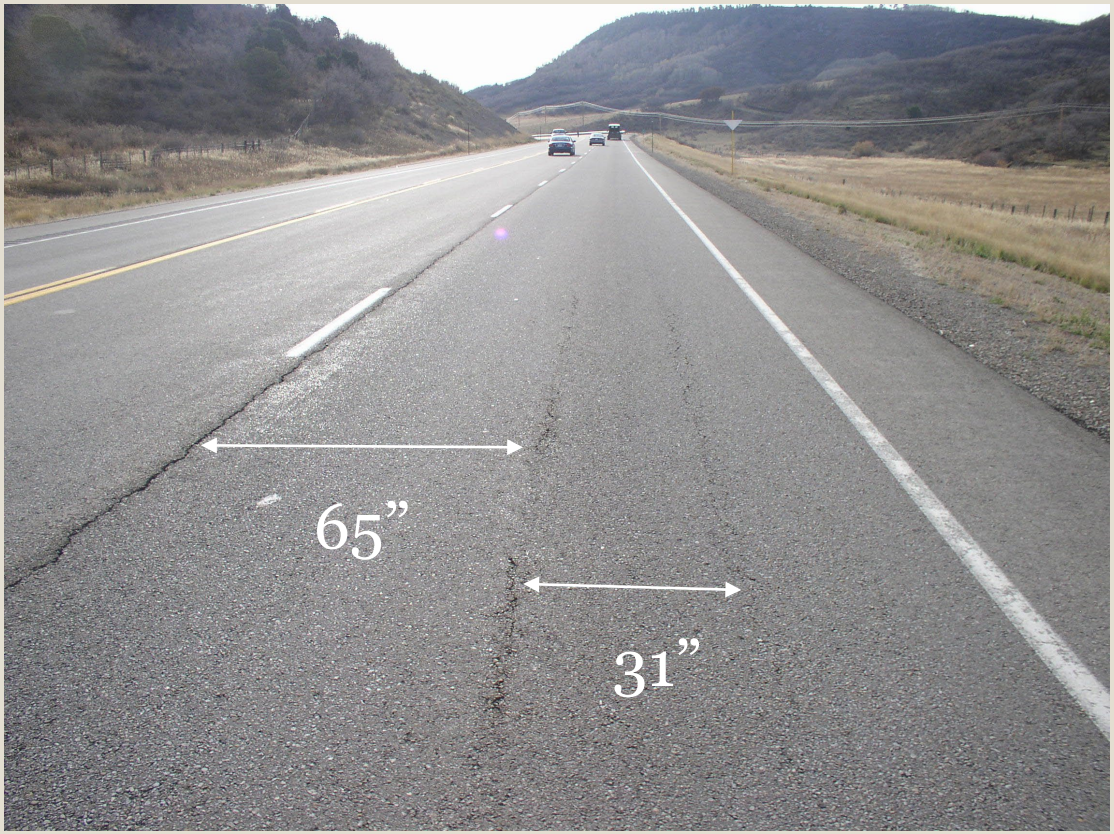
2003 Top-Down Cracking Study

- Identify Extent and Cause



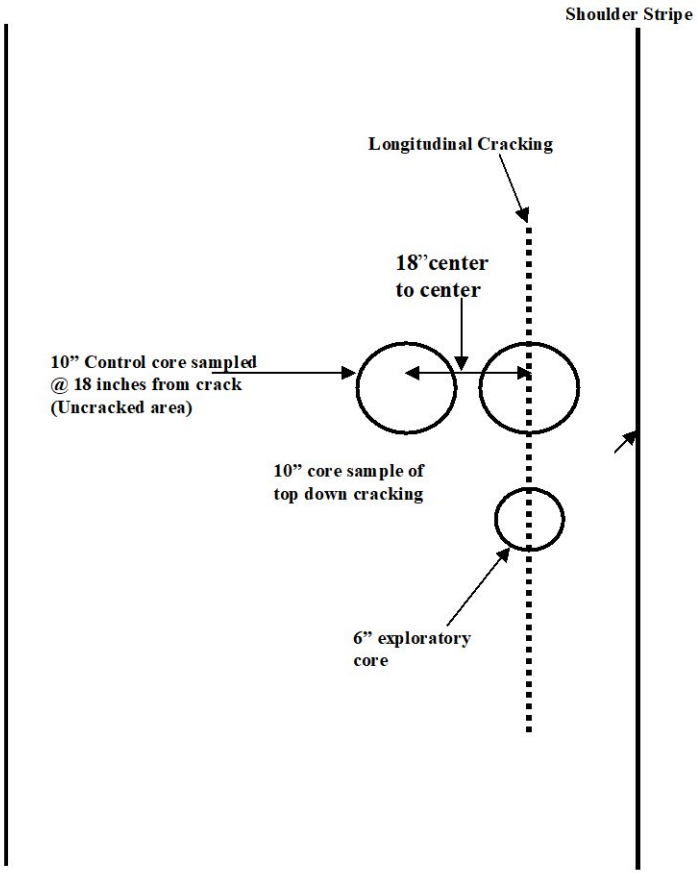
2003 Top-Down Cracking Study

First Question

Reflective Crack or

Top-Down Crack?

Sampling Plan



Top-Down or Reflective?

Distress	Percent (of 25 Sites)
Reflective Cracking	28%
Top-Down Cracking (Segregation)	48%
Top-Down Cracking (No Segregation)	24%

For Sites with Paver Segregation

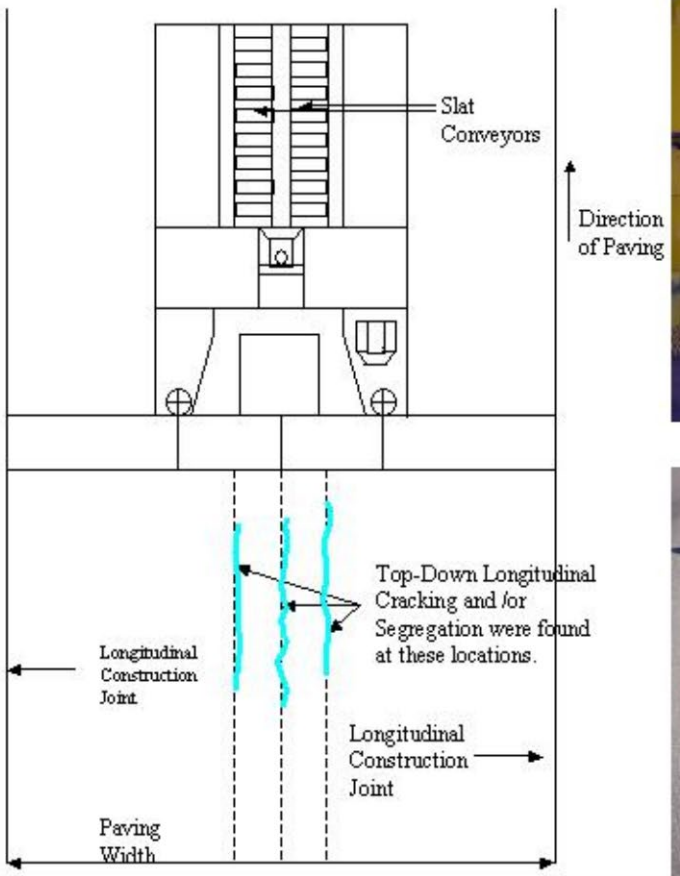
- Measuring distance from the joint to the crack

Crack Location

Site No.	Paver Manufacturer/ Model	First Crack*	Second Crack*	Third Crack*
3	1 / A	38”	73”	No Crack
6	1 / B	18”	No Crack	102”
13	2 / E	37”	No Crack	97”
17	1 / C	46”	No Crack	109”
19	1 / D	69”	No Crack	128”
20	3 / ?	58”	87”	No Crack
23	2 / ?	41”	70”	99”

*Distance from longitudinal construction joint

Asphalt Paver



2003 Top-Down Study Conclusions

- Need to Core
- Segregation not always apparent during construction
- More than one paver manufacturer/model

- CDOT Research Report CDOT-DTD-R-2003-7

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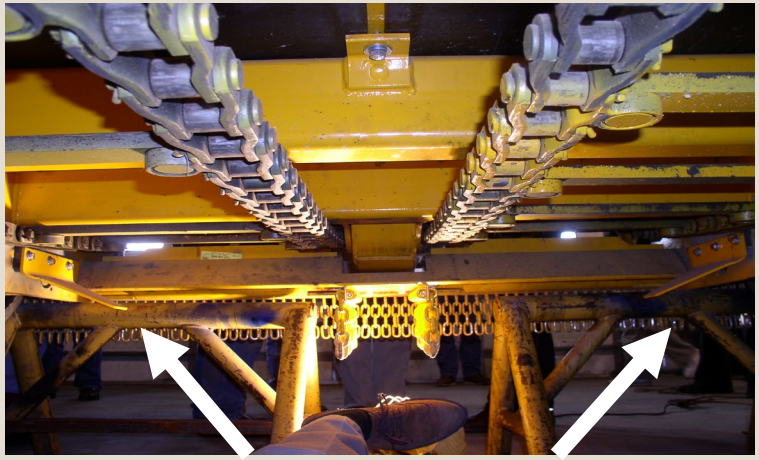
Peer Review Meeting

- Jim Scherocman moderated
- Caterpillar
- Cedarapids/Terex
- Ingersoll-Rand/Blaw-Knox
- Roadtec

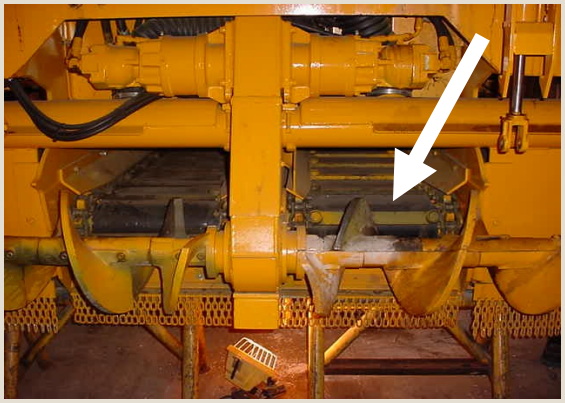
Recommendations

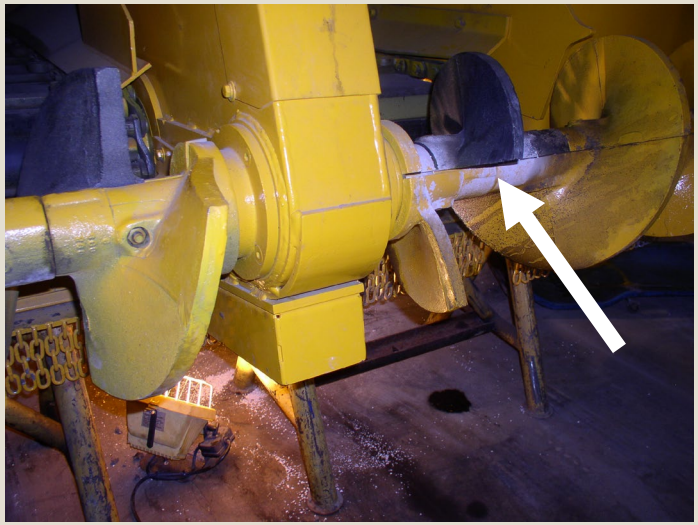
- Asphalt Mixture Design
- Asphalt Paver Operation
- Asphalt Paver
  - Chain curtain
  - Deflector plates
  - Scraper plates
  - Reverse auger
  - Smaller diameter auger (first flight)

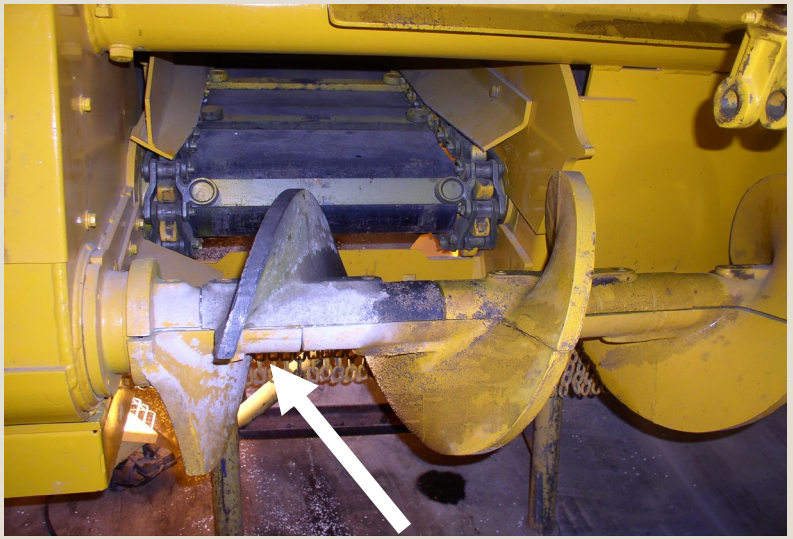
Paver Modifications – Man. 1



Paver Modifications – Man. 1







Paver Modifications – Man. 2

Method Specification

- Method Specification
  - Standard Specification 401.10
- Construction Bulletin
  - Dated March 22, 2004

End-Result Specification

- Follow-up Research
  - Density profiling
  - Paver-mounted thermal profiler

References

- Extent of Top-Down Cracking in Colorado
  - CDOT Research Report CDOT-DTD-R-2003-7
- Forensic Investigation of Early Cracking on I-25 in Denver, Colorado
  - CDOT Research Report CDOT-DTD-R-2001-10
- Longitudinal Thermal Cracking Related to Asphalt Concrete Pavement Construction
  - TRB Paper No. 18-00159

Thank You

Questions/Comments:

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