



# Paver Segregation

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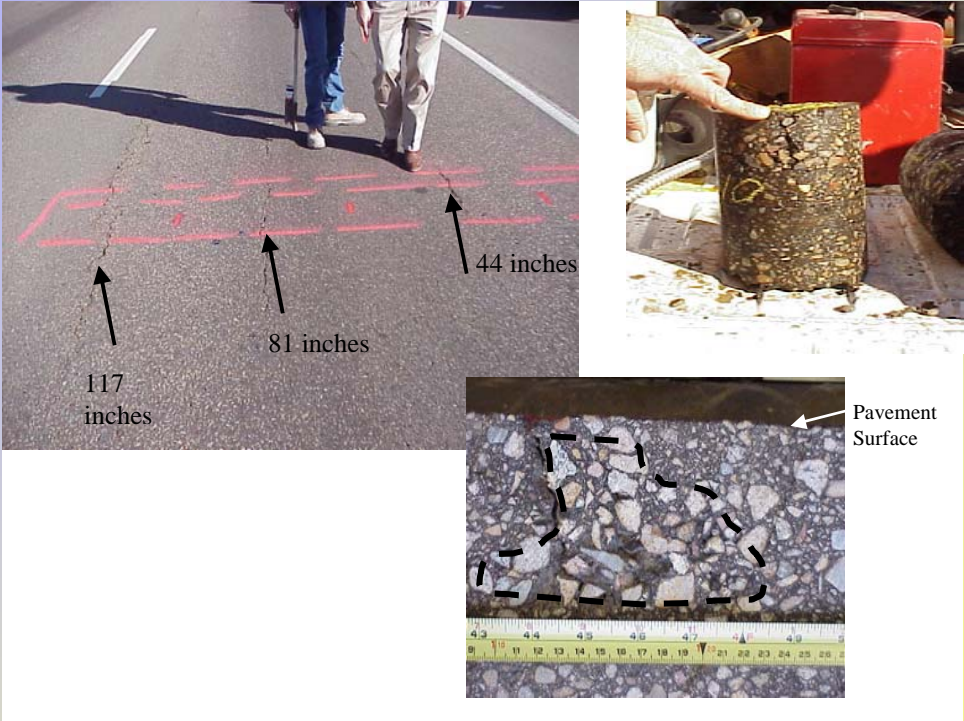


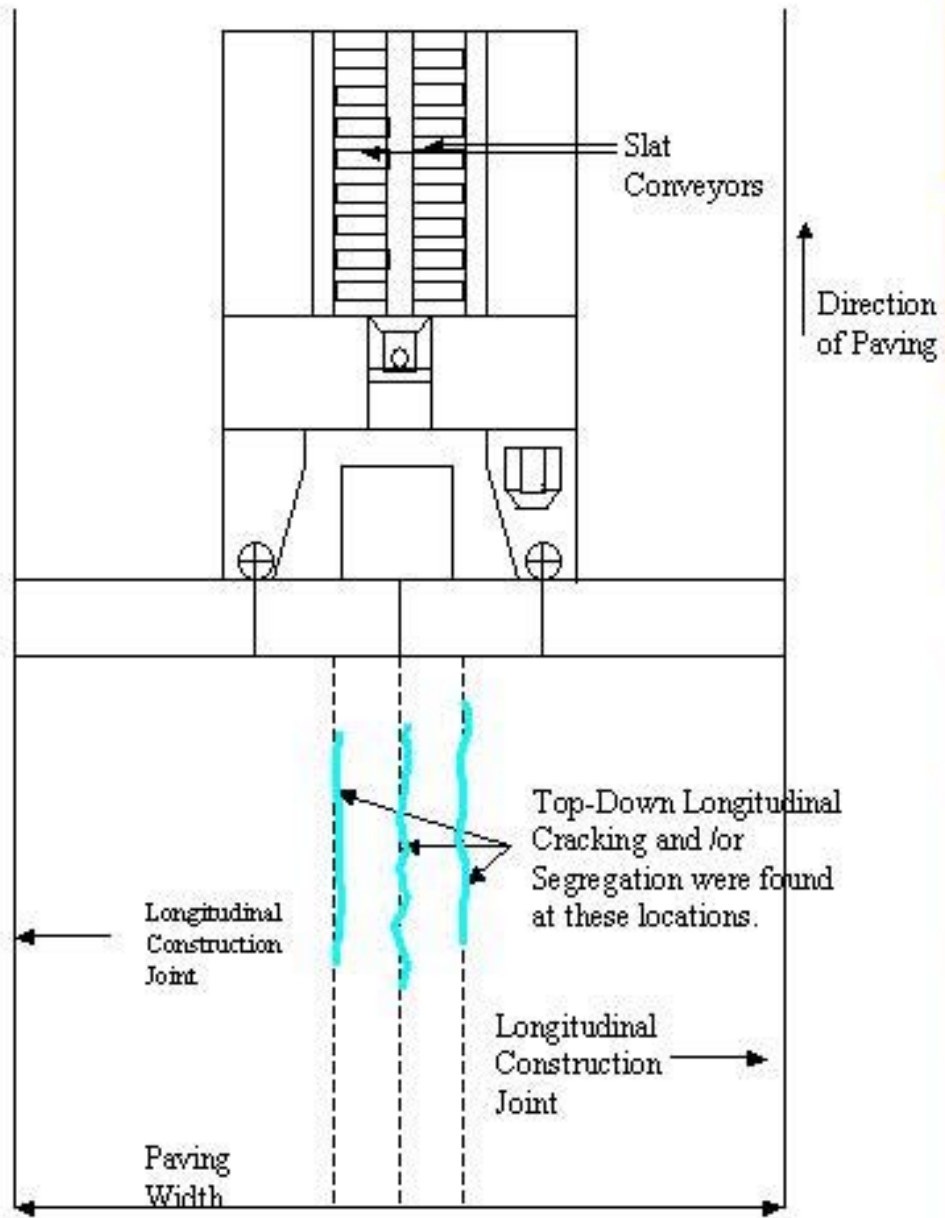
# Presentation Overview

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



# I-25 Distresses







# I-25 Forensic Study Conclusions

Cracking was:

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



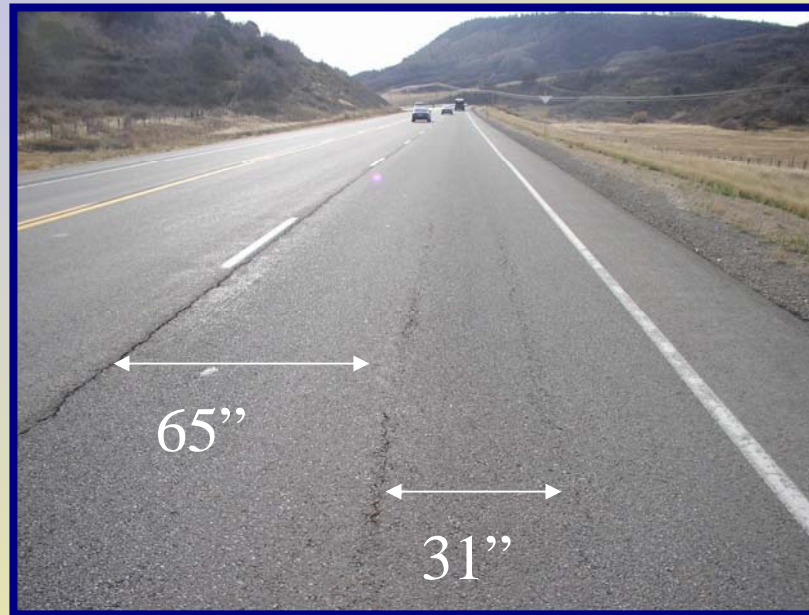
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# 2003 Top-Down Cracking Study

- Identify extent and cause









# First Question

Reflective Crack or



Top-Down Crack?



Shoulder Stripe

Longitudinal Cracking

18" center  
to center

10" Control core sampled  
@ 18 inches from crack  
(Uncracked area)

10" core sample of  
top down cracking

6" exploratory  
core



# Top- Down or Reflective?

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





# Measuring Distance from the Joint to the Crack

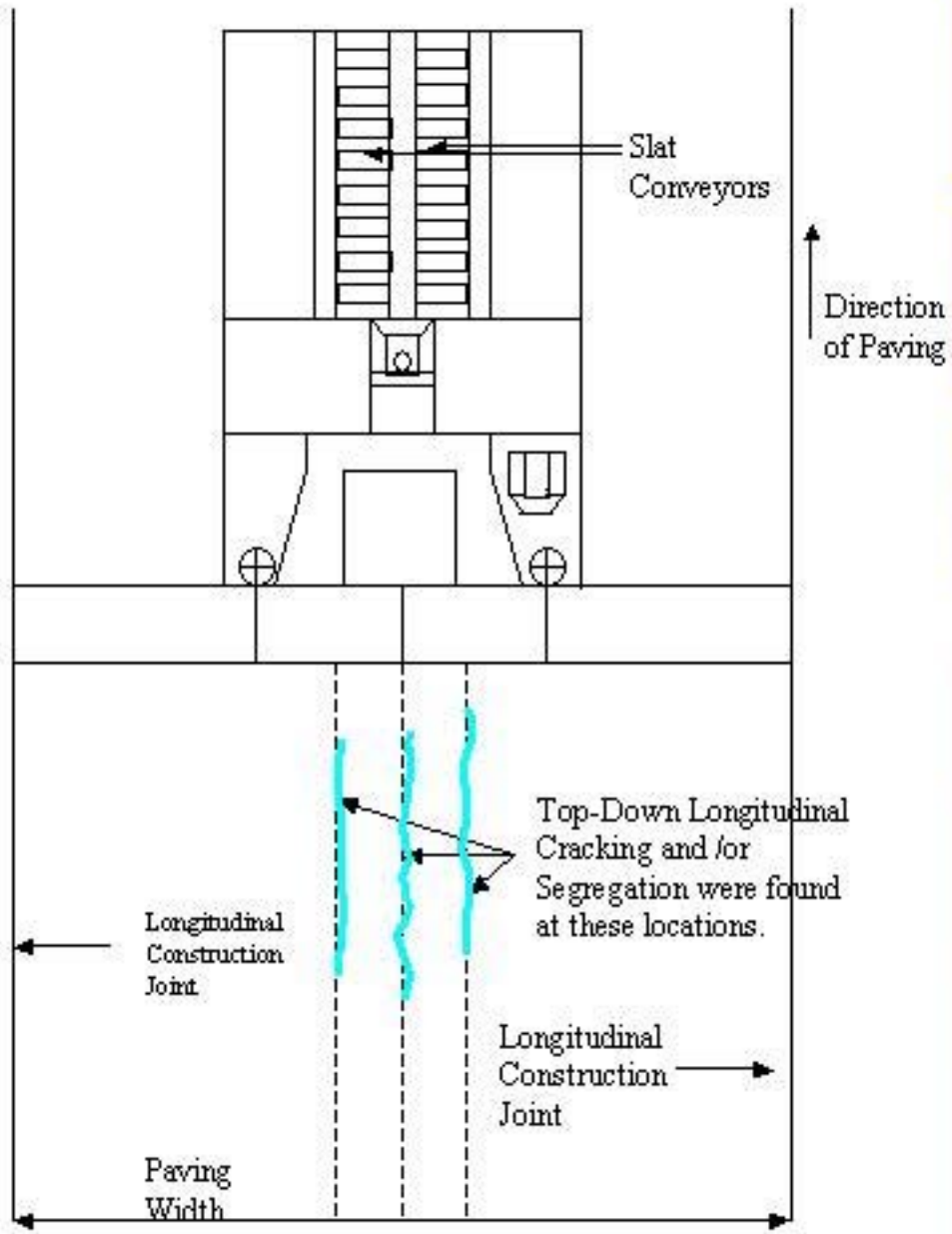




## Distance from longitudinal Construction Joint

Site No.	Paver Manufacturer/ Model	First Longitudinal crack	Second Longitudinal crack	Third Longitudinal 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"





# 2003 Top-Down Study Conclusions

- CDOT Research Report CDOT-DTD-R-2003-7
  - Need to Core
  - Segregation not always apparent during construction
  - More than one paver manufacturer/model



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Outside Edges of Both Conveyors

Center Rear of the Hopper

Rear Outside Edges of Both Hoppers

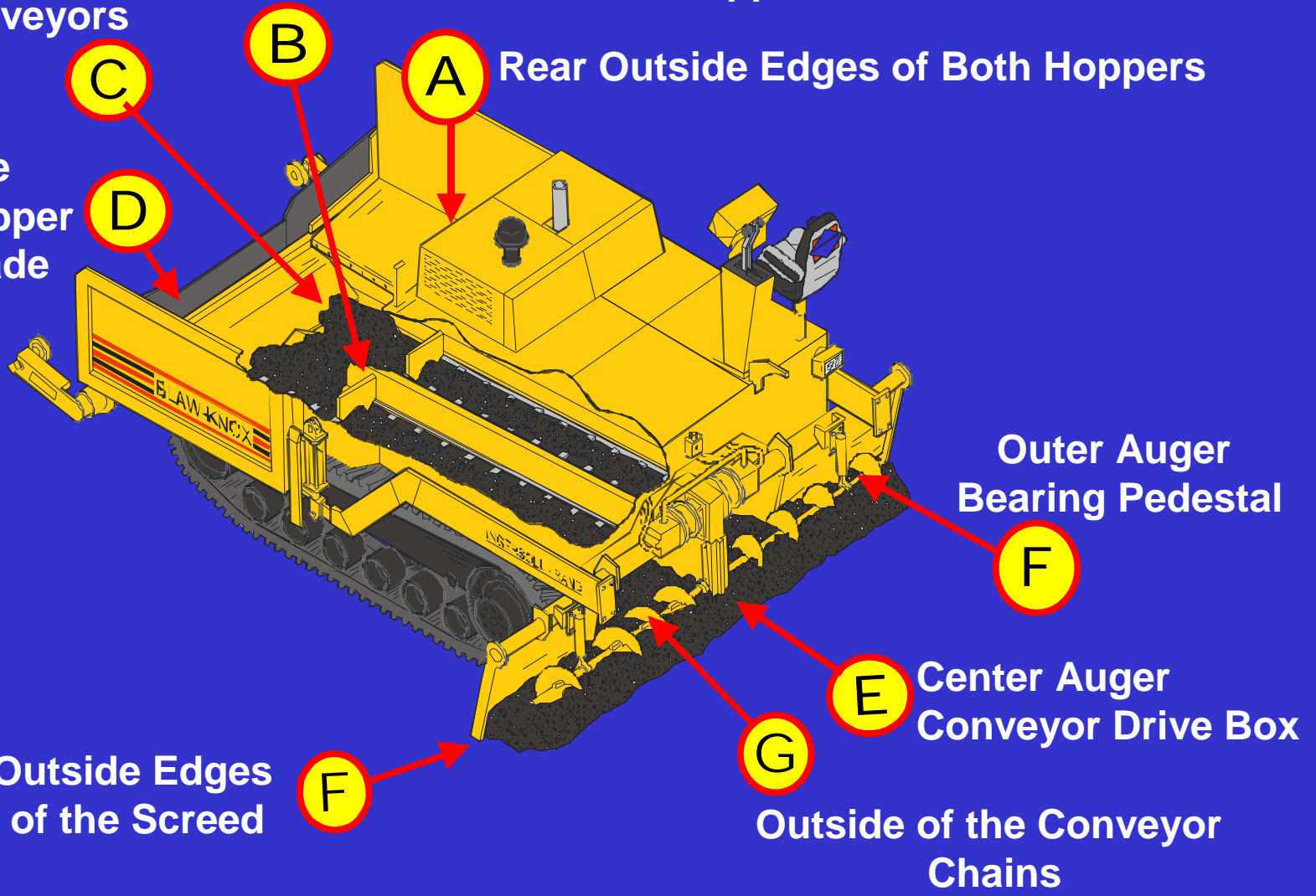
Spillage Out of Hopper Onto Grade

Outer Auger Bearing Pedestal

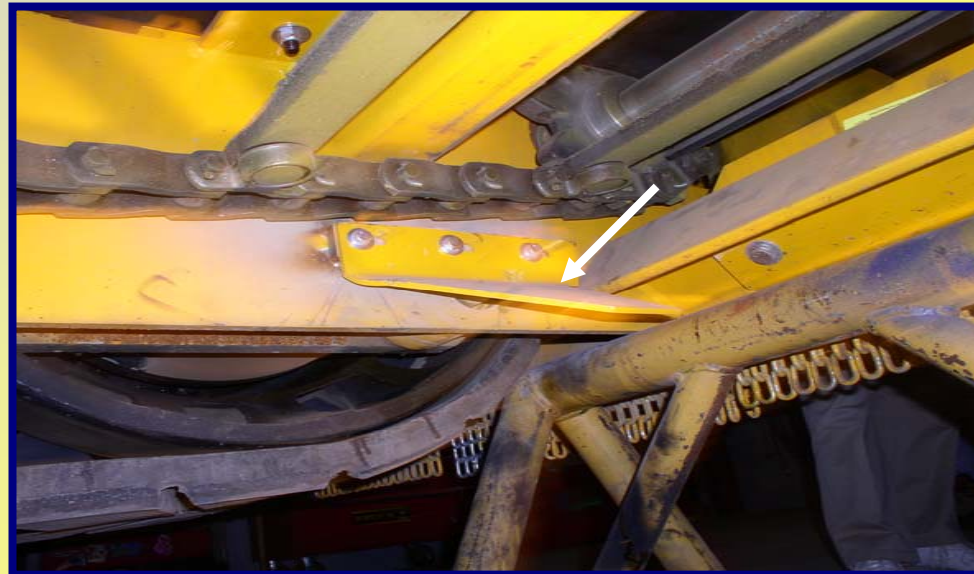
Center Auger Conveyor Drive Box

Outside Edges of the Screed

Outside of the Conveyor Chains

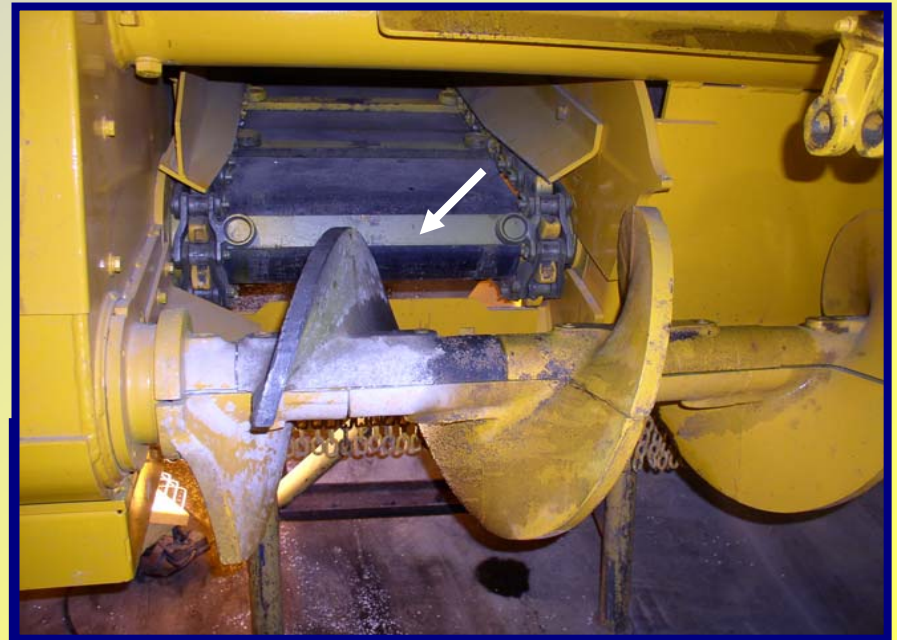
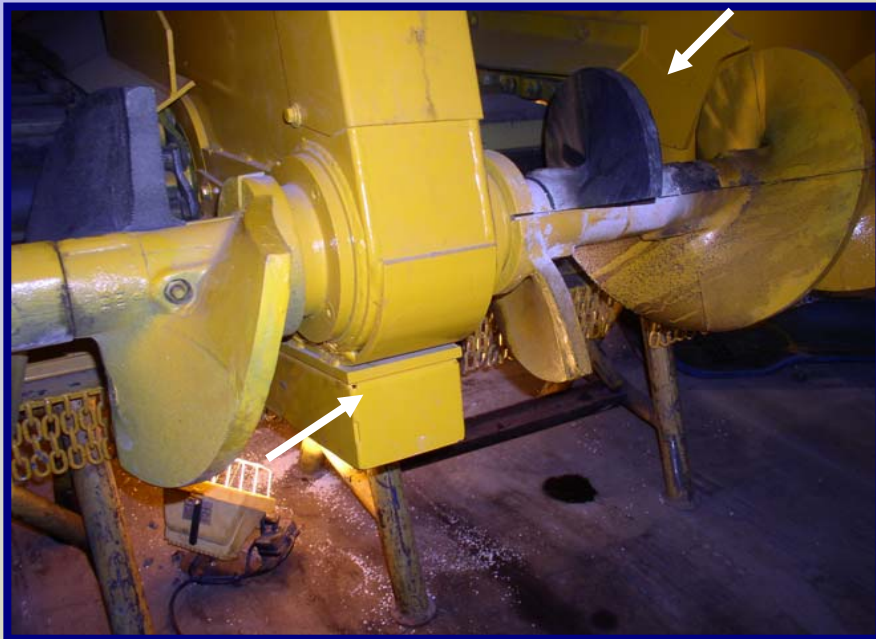
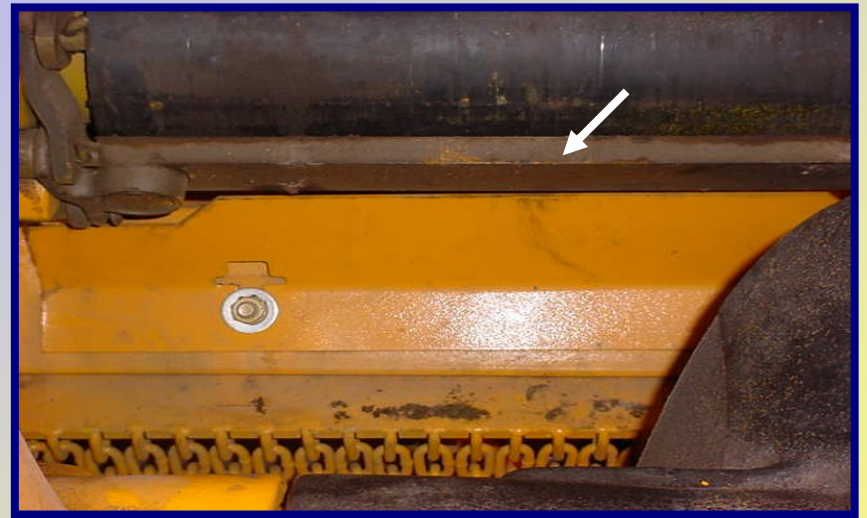
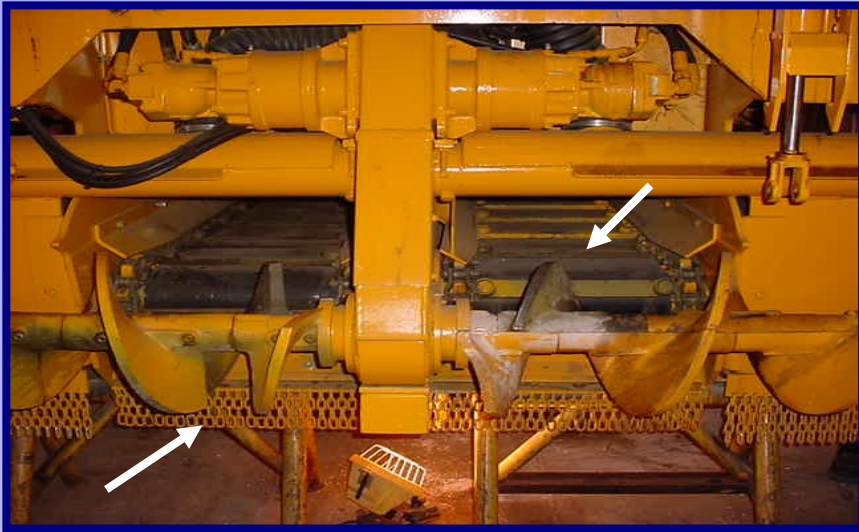


# Paver Modifications – Man. 1

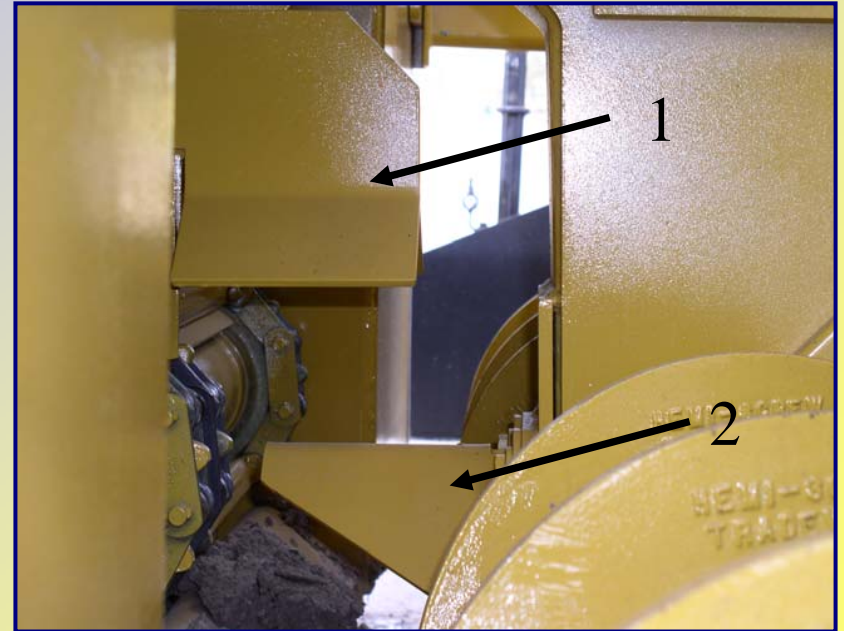
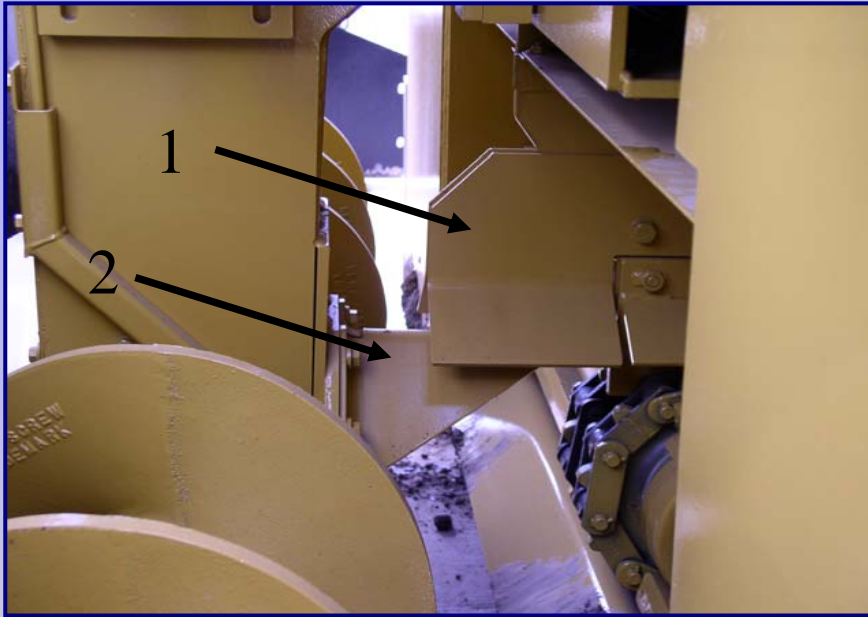




# Paver Modifications – Man. 1



# Paver Modifications – Man. 2





# CDOT's 2004 Direction

- Peer Review Meeting
- Method Specification Issued
- Pursuing End-Result



# Peer Review Meeting

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



# Method Specification

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



# Follow-Up Research

- End Result Specification
- Research Report CDOT-DTD-R-2005-16
  - Density Profiling
  - Thermal Camera





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Questions?

