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NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

Workshop

Nebraska
Asphalt Paving Conference

Asphalt Paving

Learning Objectives

- Discuss how an asphalt paver operates
- Identify the five forces on a paver screed
- Explain how asphalt mixture is compacted in the field
- Identify the importance of a “balanced” paving operation

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Planning is Essential

An essential for consistent and high quality hot mix asphalt pavement is to use a continuous operation.

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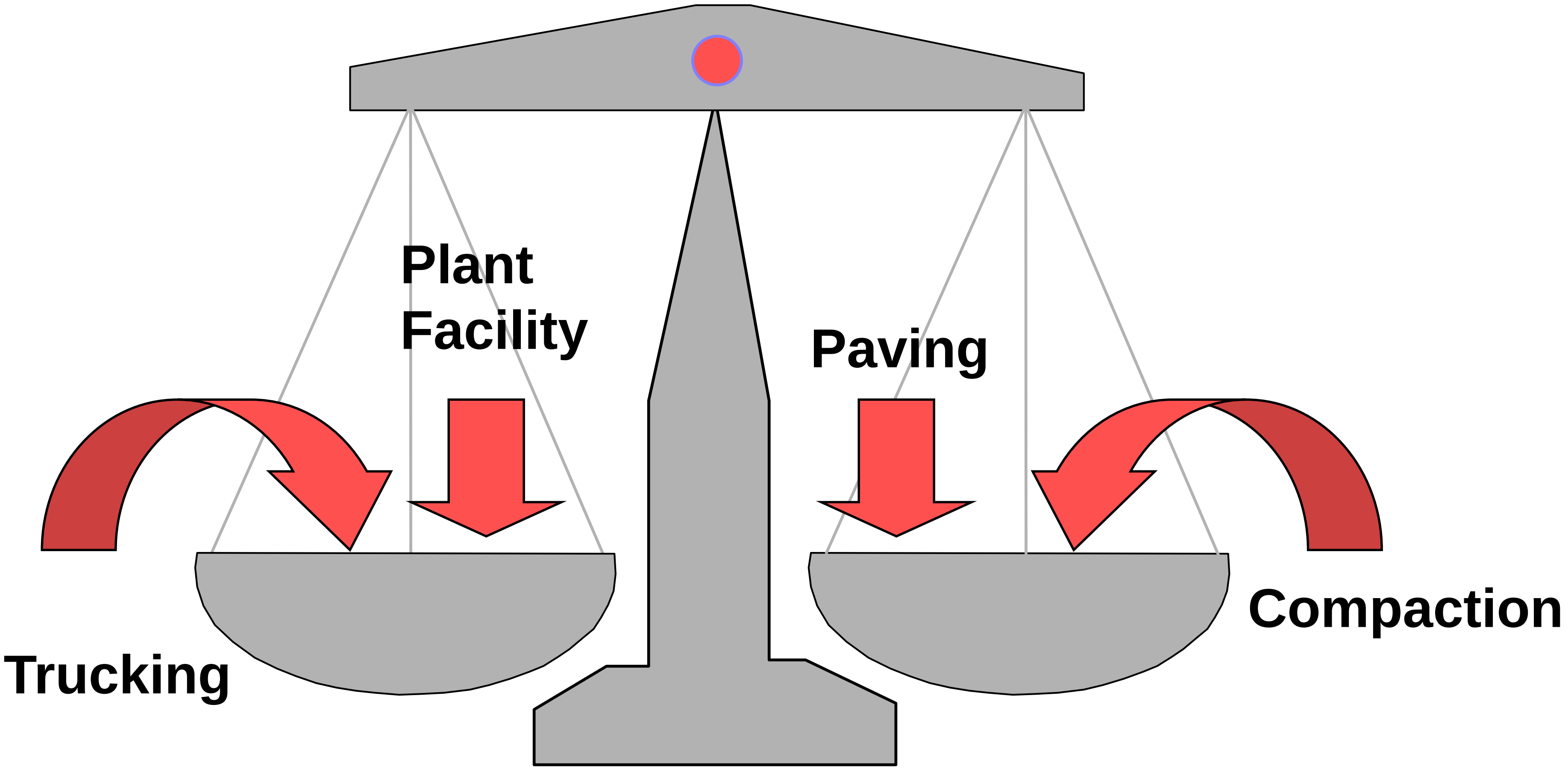
Balancing Production



Mix Delivery Sequence

- Contractor’s responsibility is to:
  - Provide proper sized and amount of equipment….
  - …that will produce, deliver…..spread, and compact….
  - …the plant mixed material in sufficient quantities….
  - …for the continuous movement of spreader…

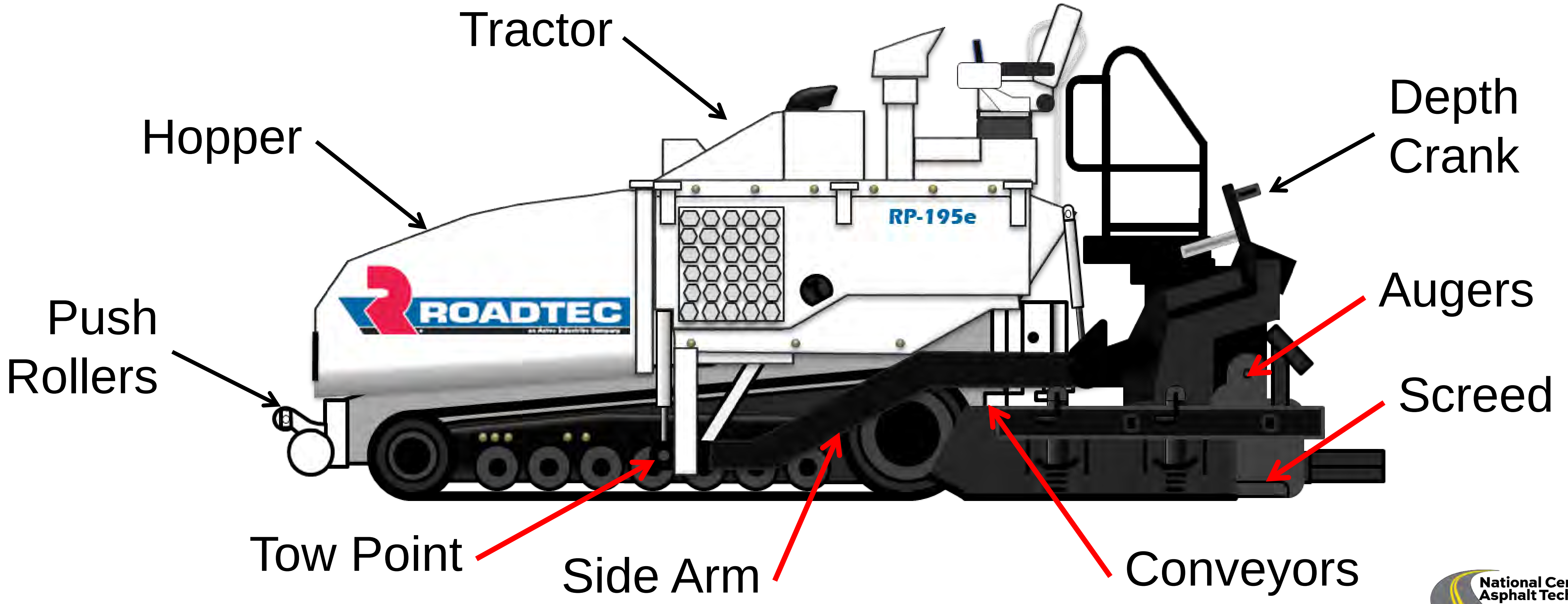
Why Use a Tack Coat?
When Should a Tack Coat be Used?

From a nationwide survey, 17% of agencies indicated they do nothing to correct poor tack shots, and 56% did not vary application rate due to any factors.


BLAW-KNOX
INGERSOLL-RAND

Asphalt Paver

Courtesy of:

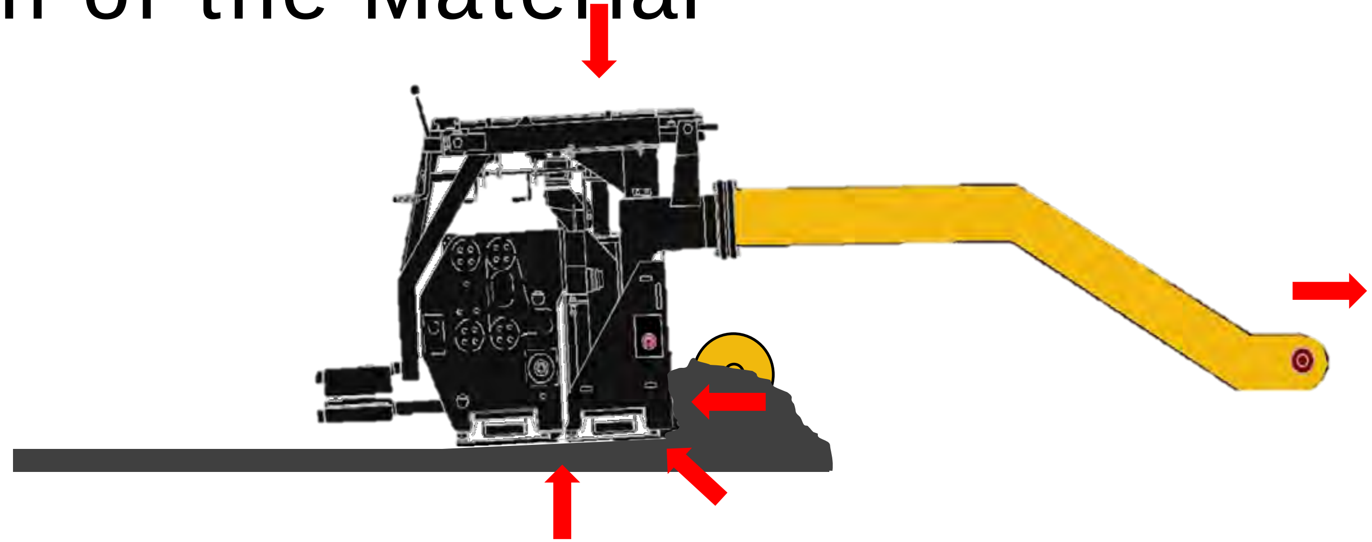


The Paver Utilizes a Free Floating Screed Principle

The Screed is Free to Float Up or Down In Relation to the Forces Applied.

Forces Acting on Screed

- Speed of paver (Tow Force)
- Head of Material
- Shear Force (Angle of Attack)
- Screed Weight
- Reaction of the Material



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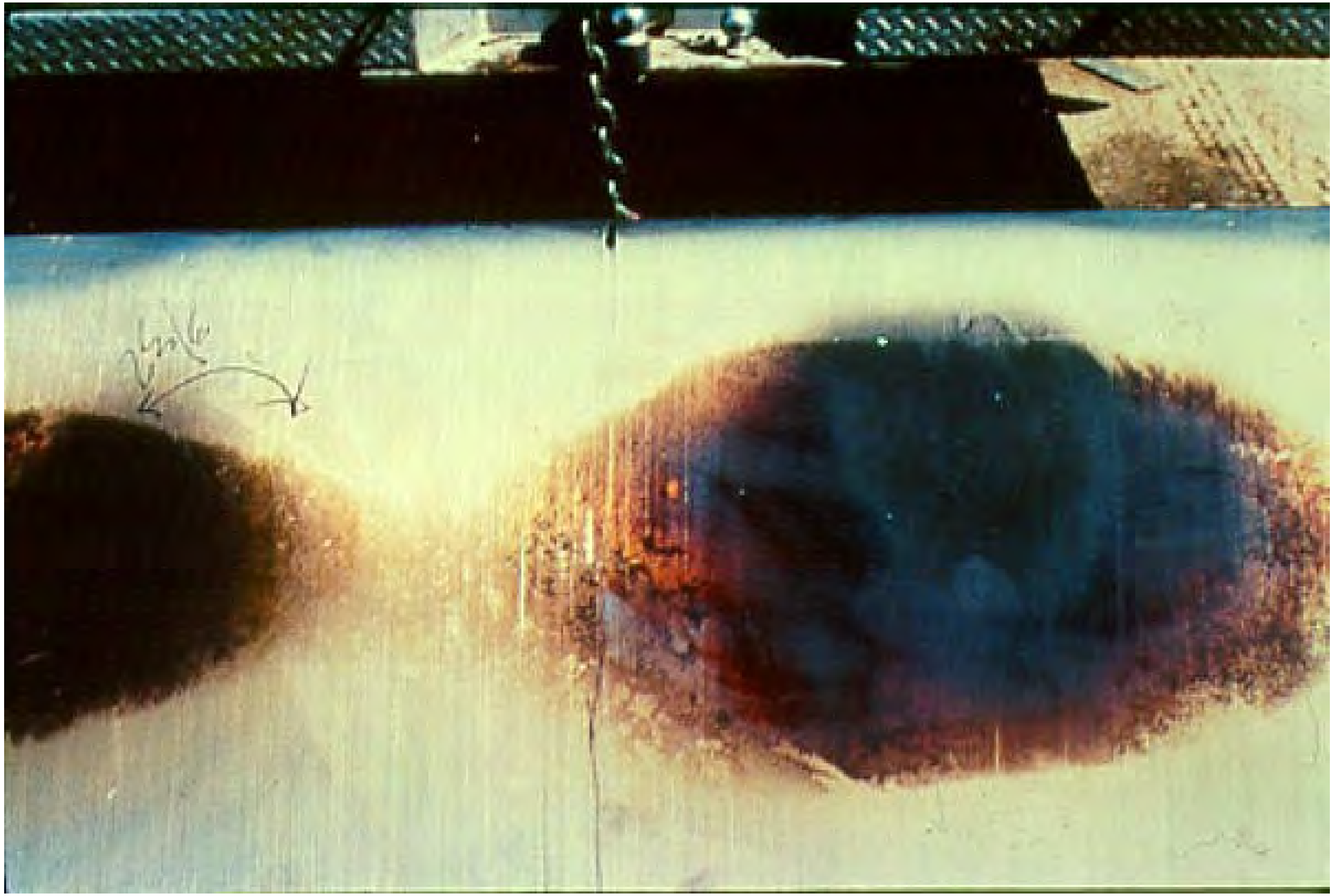
Setting Up the Paver

- Heat the screed
- Center the tow points
- Set the paving width
- Set the main screed crown
- Set Extensions (match or sloped?)
- Lower the screed to the starting blocks

Heat the Screed



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Center the Tow Point

Tow Point

Set the Paving Width

Set the Main Screed Crown

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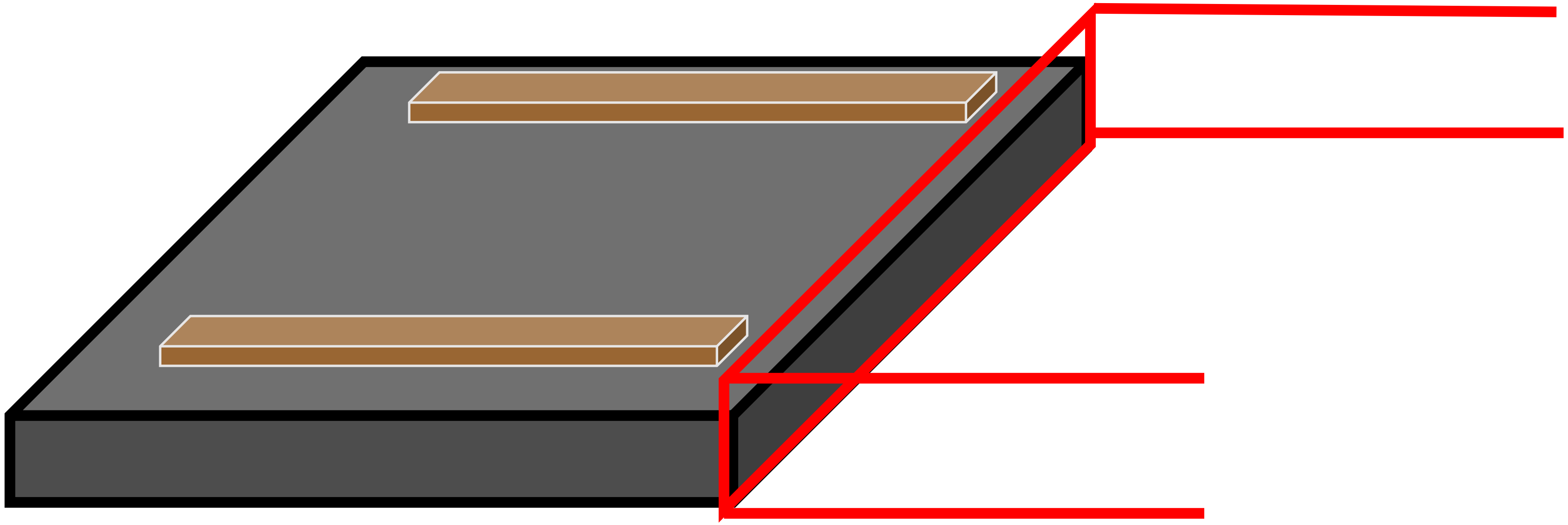
Match Extensions

- Match or Sloped

Lower to Starting Blocks

A good rule of thumb is to raise the screed 20-25 percent more than the compacted thickness.



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Setting Up the Paver

- Move the paver forward to pull out slack
- Null the screed
- Lower the end gates
- Set sonic feeders
- Charge the auger chamber
- Pull off

Null the Screed

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Lower the End Gates

End Gate Should Ride on Existing Surface

Effect of Improper End Gate Adjustment

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Set the Sonic Feed Sensors

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Charge the Auger Chamber

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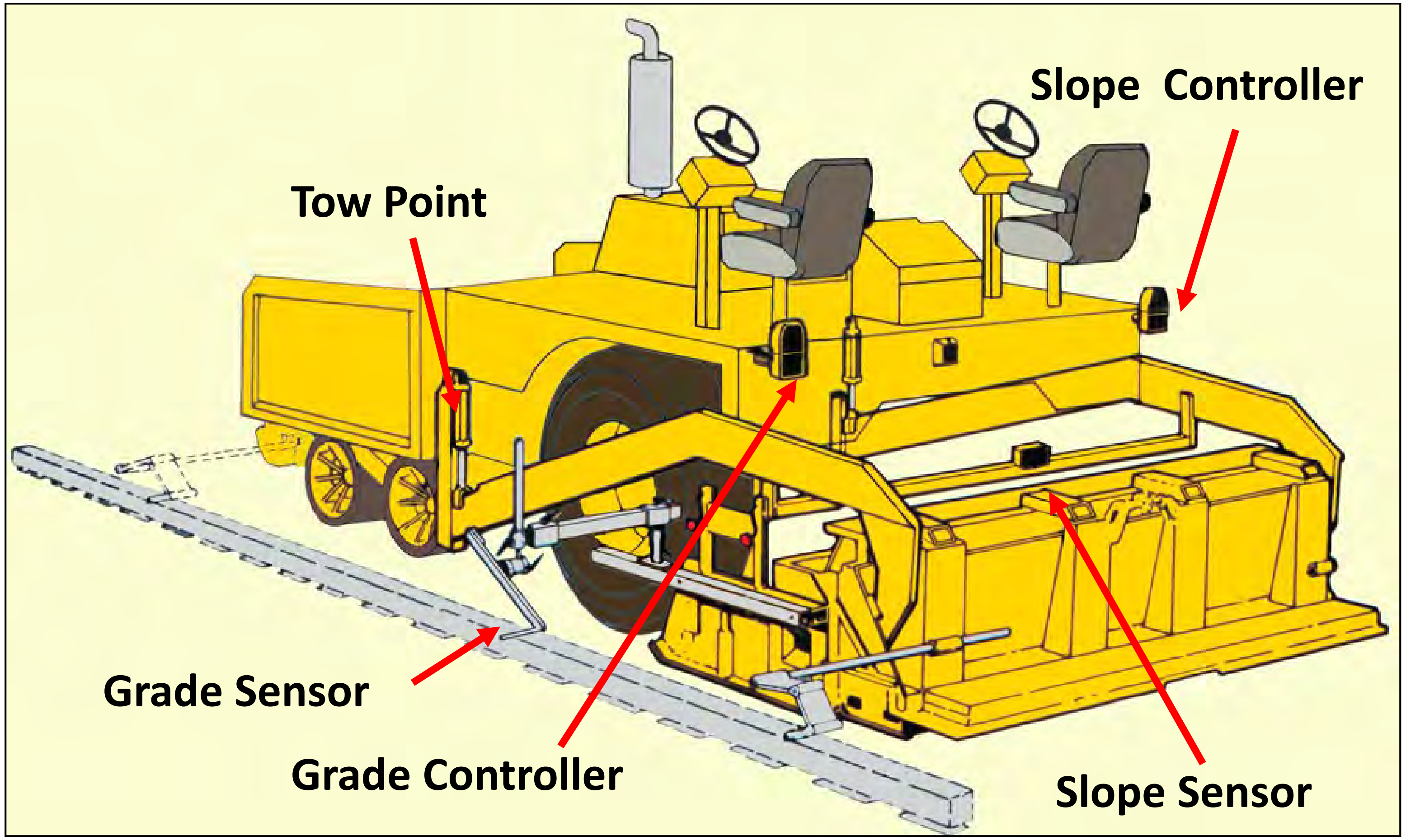
Pull Off


Nathan Yarnell
CATERPILLAR
CAT
15
NASCAR CUP SERIES
GOODYEAR
EAGLE
CHEVROLET
BUMBU
RUM COMPANY
SUNOCO

Grade and Slope Control



Courtesy of Blaw-Knox Ingersoll Rand Paving Products

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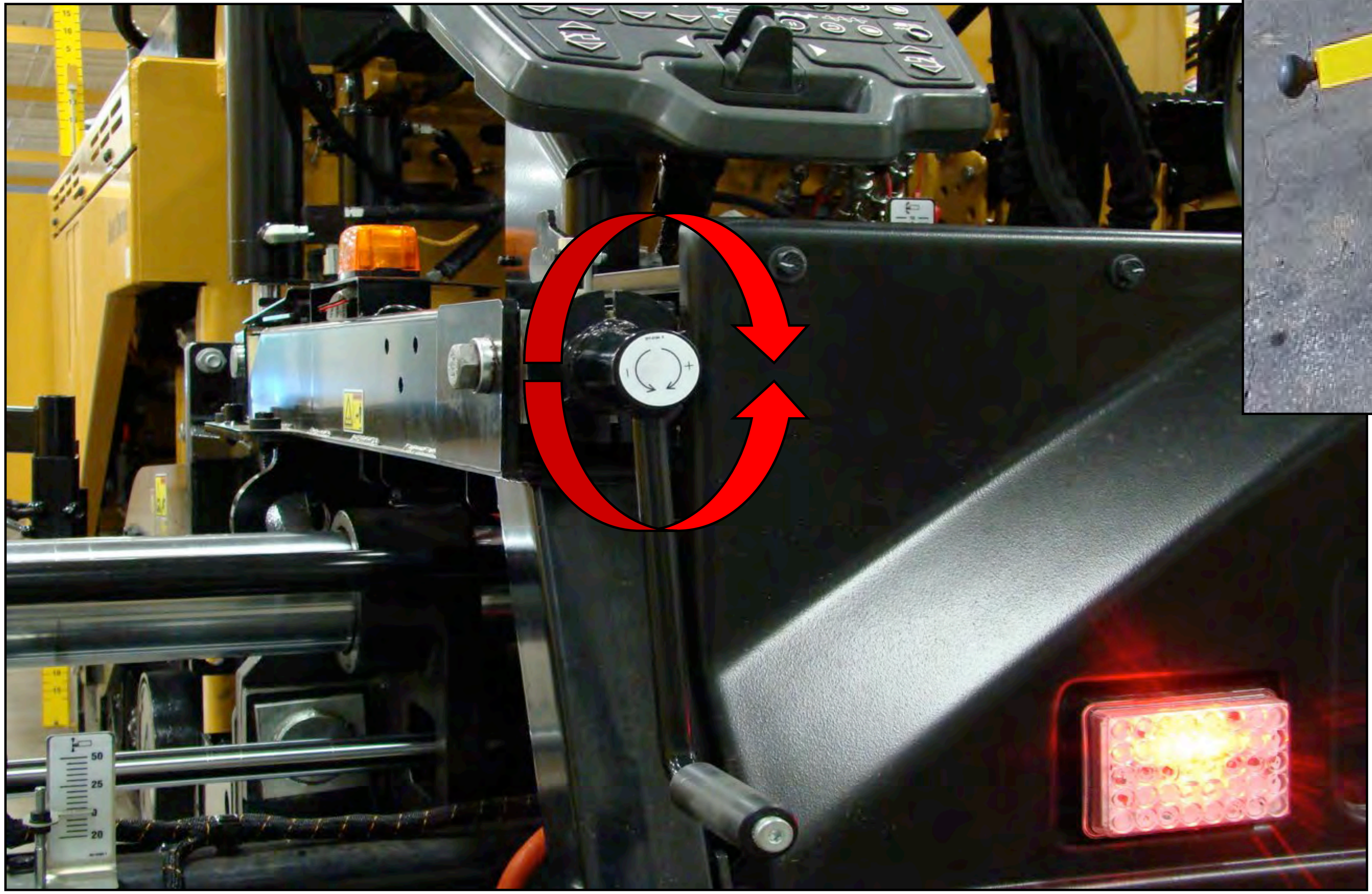
Contact-less Beam with Ultra-Sonic Sensors

Photo courtesy of Caterpillar Paving Products

Manual Adjustment



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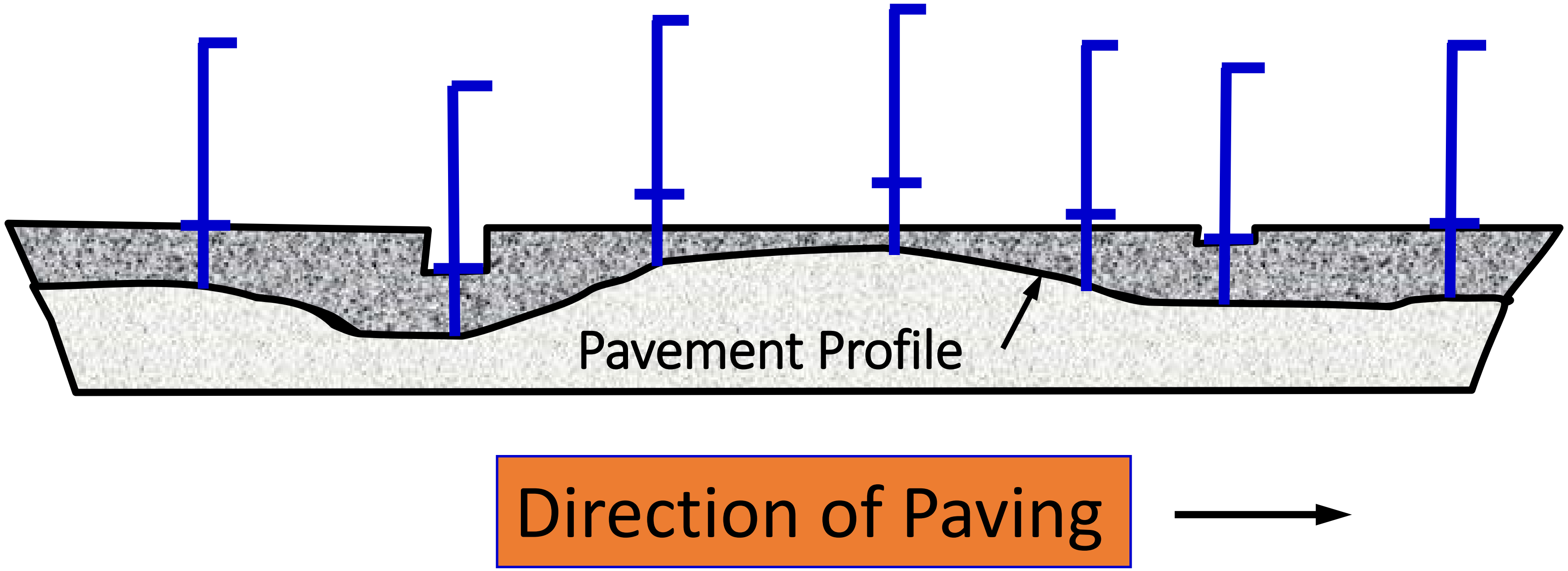
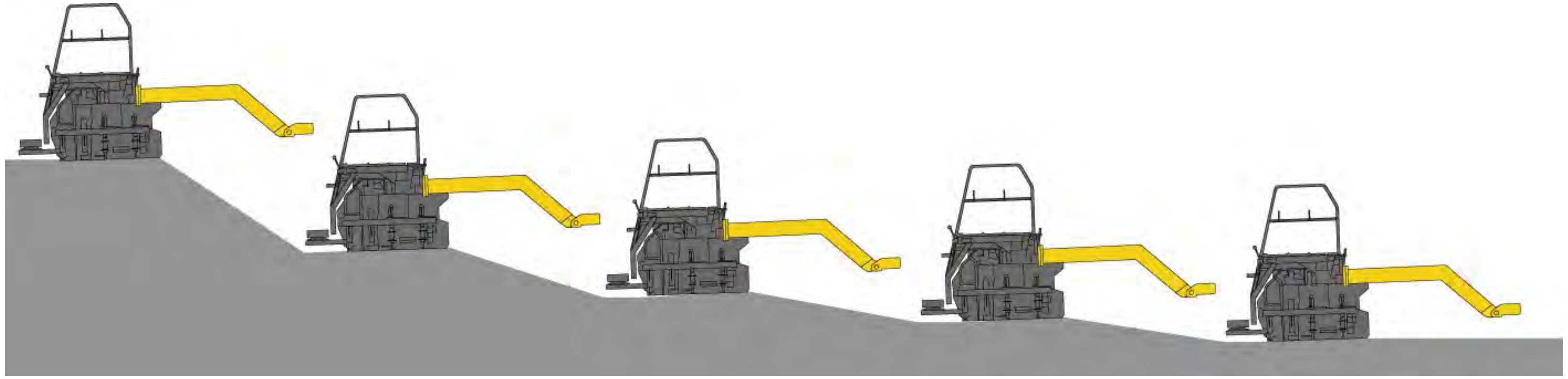
Sticking the Mat?



Screed Reaction Time



Courtesy of Caterpillar Paving Products

- Screed reacts to change in angle of attack over five tow arm lengths
- 65% of change occurs in the first tow arm length
- 35% of change occurs in the last four tow arm lengths

Control Head of Material

Photo courtesy of Blaw-Knox Ingersoll Rand Paving Products

Photo courtesy of Caterpillar Paving Products

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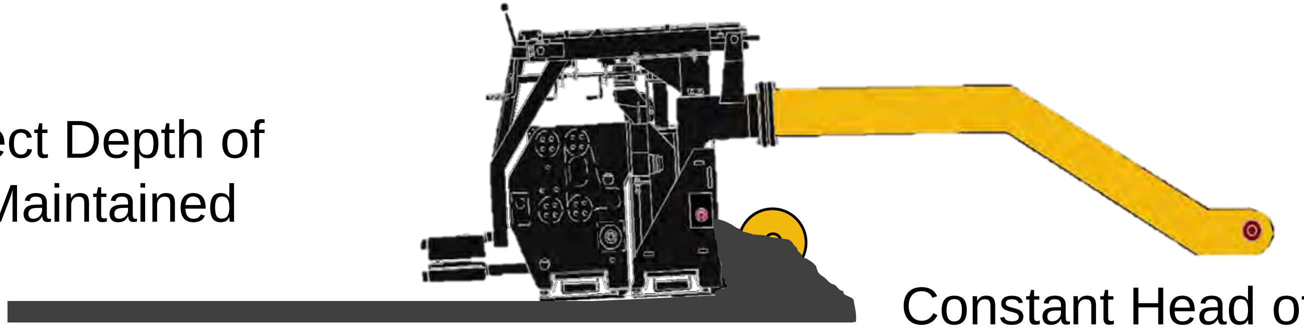
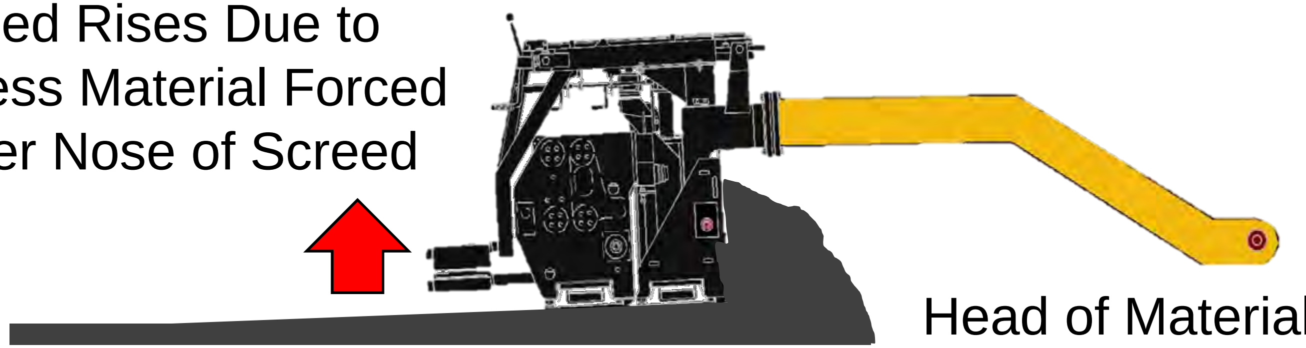
Correct Depth of
Mat Maintained



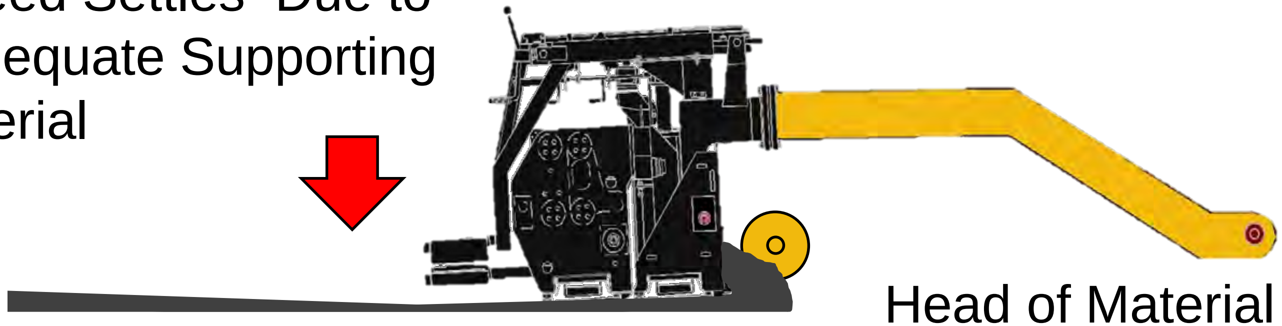
Constant Head of Material Volume

Screed Rises Due to
Excess Material Forced
Under Nose of Screed



Head of Material Volume Too High

Screed Settles Due to
Inadequate Supporting
Material



Head of Material Volume Too Low

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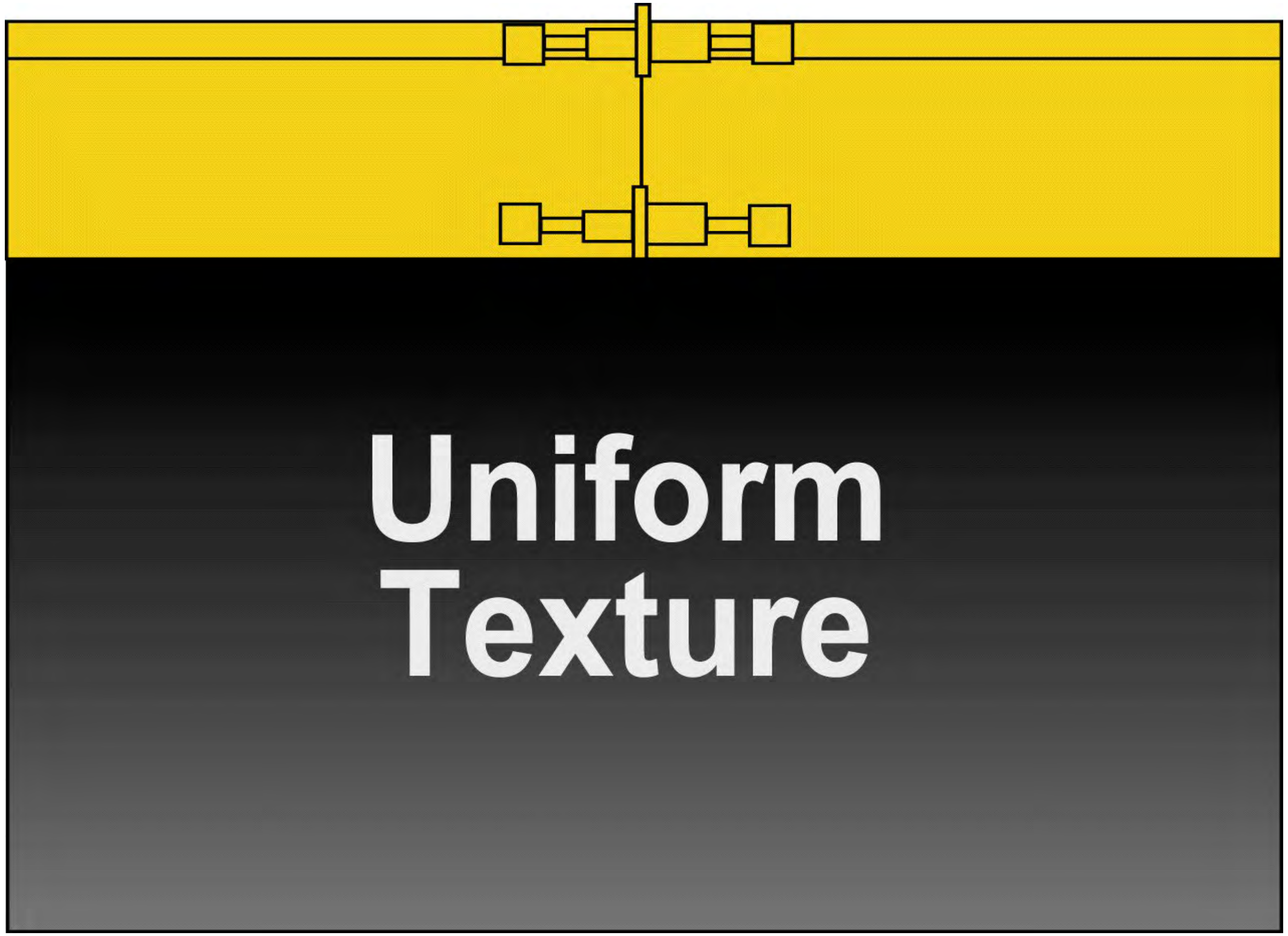
Misaligned Screed Extension

Photo courtesy of Blaw-Knox Ingersoll Rand Paving Products

Check Screed Crown with Stringline

Photo courtesy of Caterpillar Paving Products

Lead Crown: 3 mm (1/8 in) Greater Than Tail Crown



Courtesy of Caterpillar Paving Products

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Improper Screed Crown



WIDE
LOAD

CAT SDX Screed Plate System

- Designed to create smoother surfaces, higher densities, faster screed plate changes and increased wear properties when compared to standard screed plates

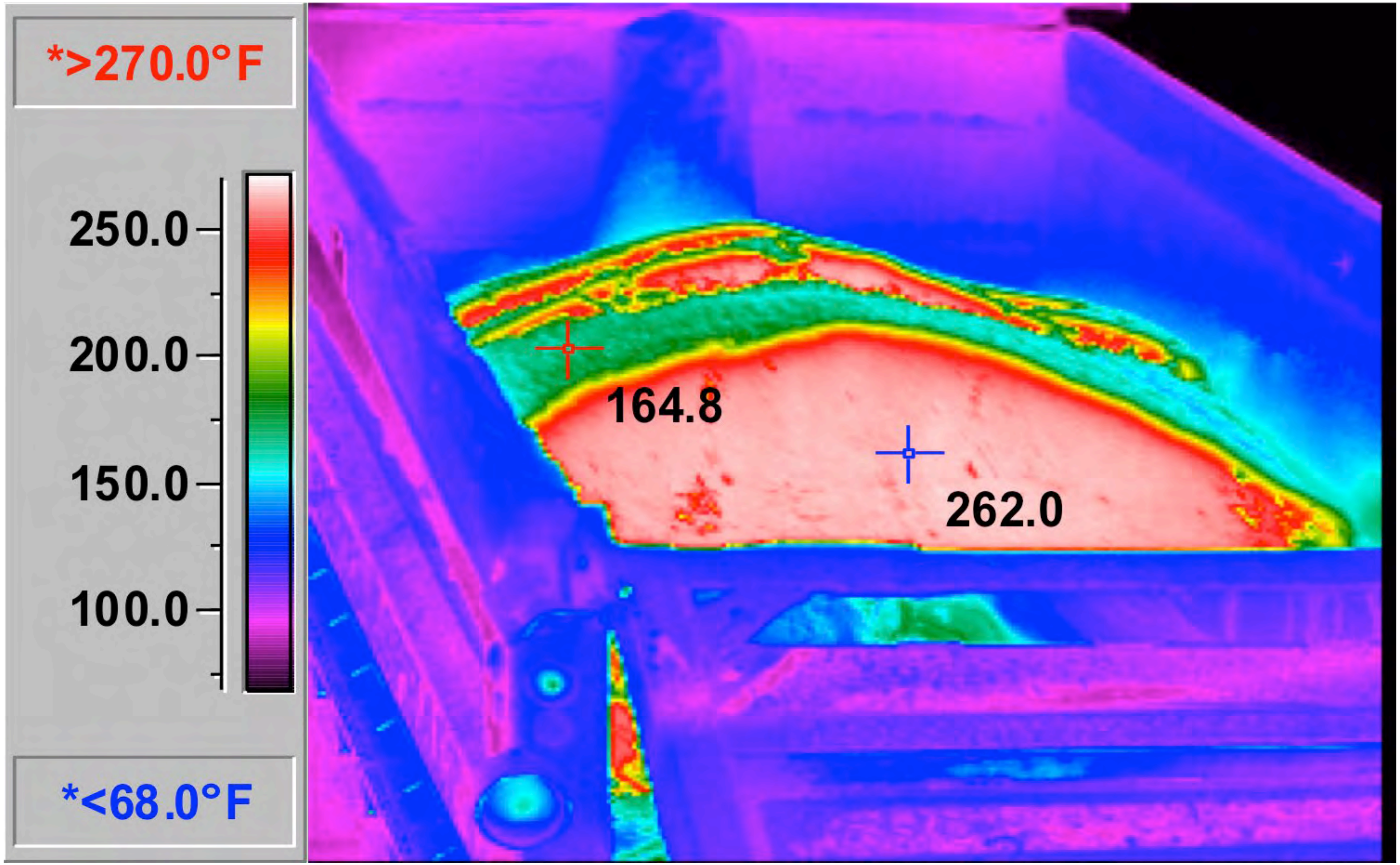
Video 1 Video 2

Longitudinal Joints

Poor Joint Performance

Joint Without Luting

Infrared Photo of End Dump



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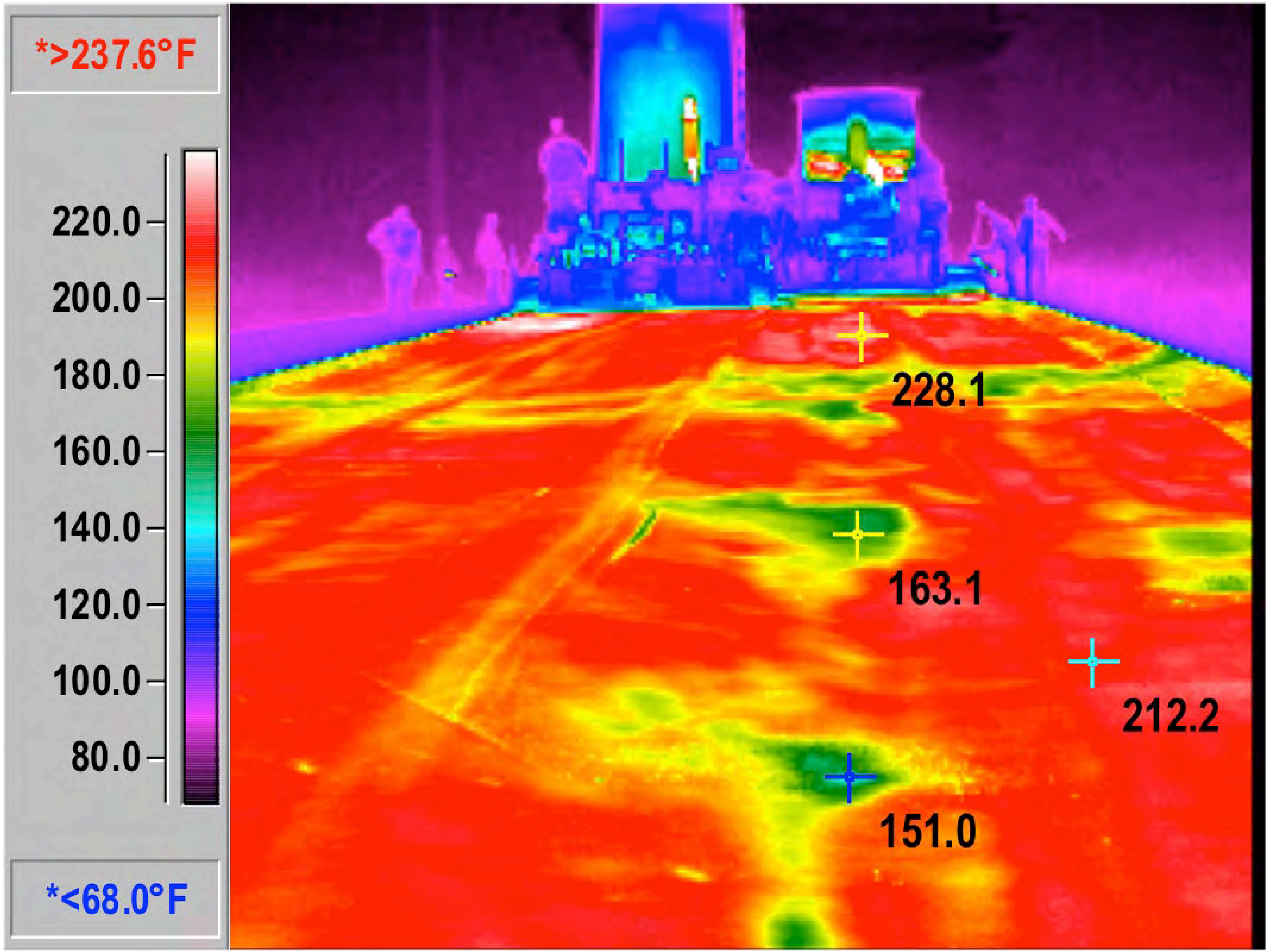
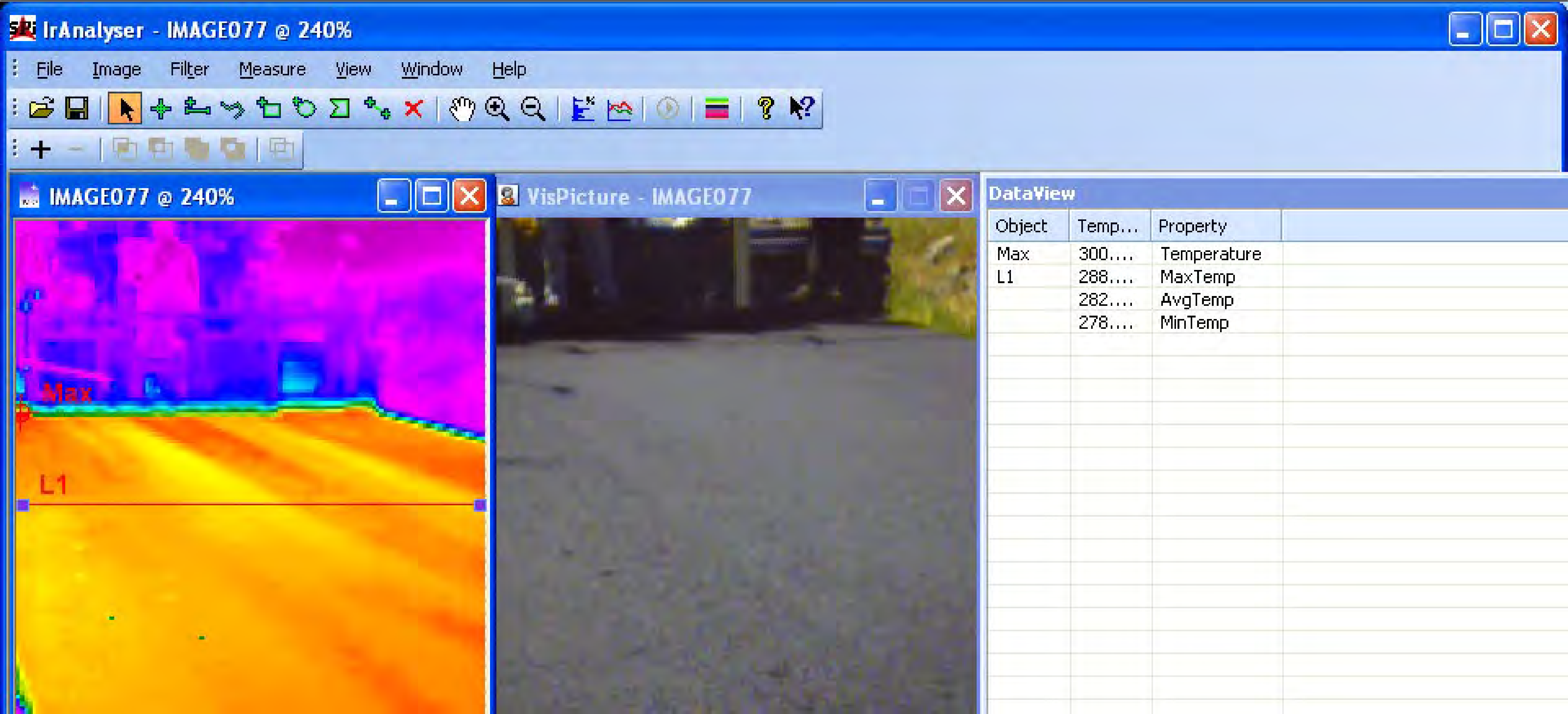
Infrared Photo
(End Dump Mix Behind Paver)




ROADTEC

Materials Transfer Vehicle

Thermal Image of Continuous Paving



Washington Study: 2000

- Temperature differentials > 25°F - 90% of in-place densities failed to meet minimum density criteria
- Temperature differentials < 25°F - 80% of the in-place densities met or exceeded density specification criteria

I-R Sensors

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PMTP Scanner

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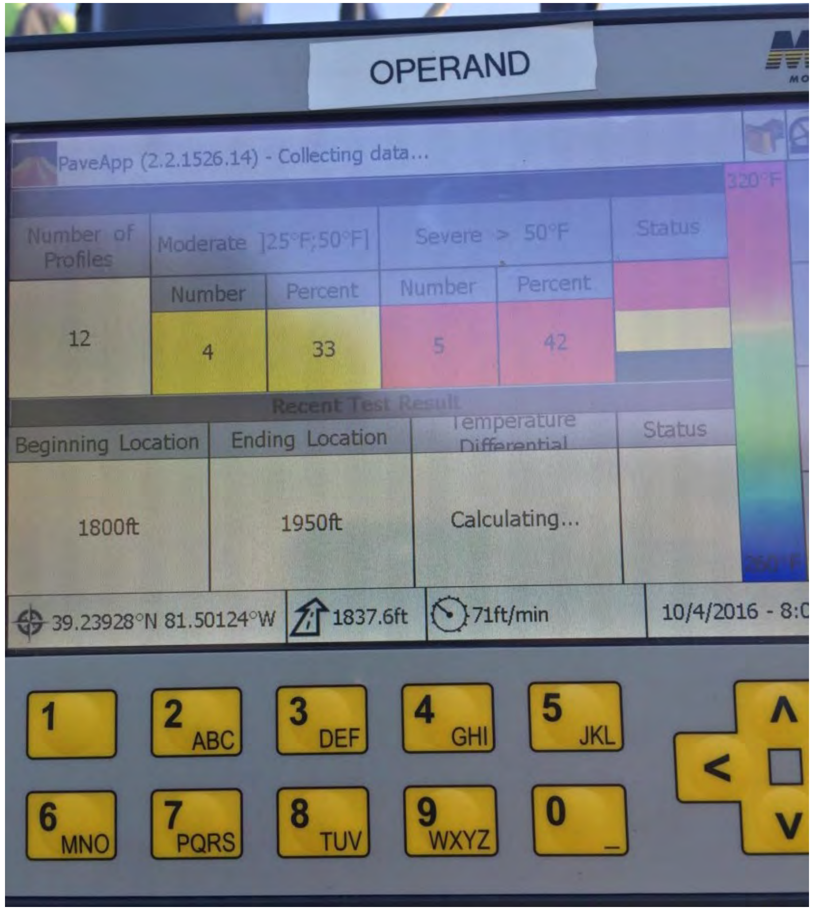
Sample PMTP Output

Source: Harold von Quintus



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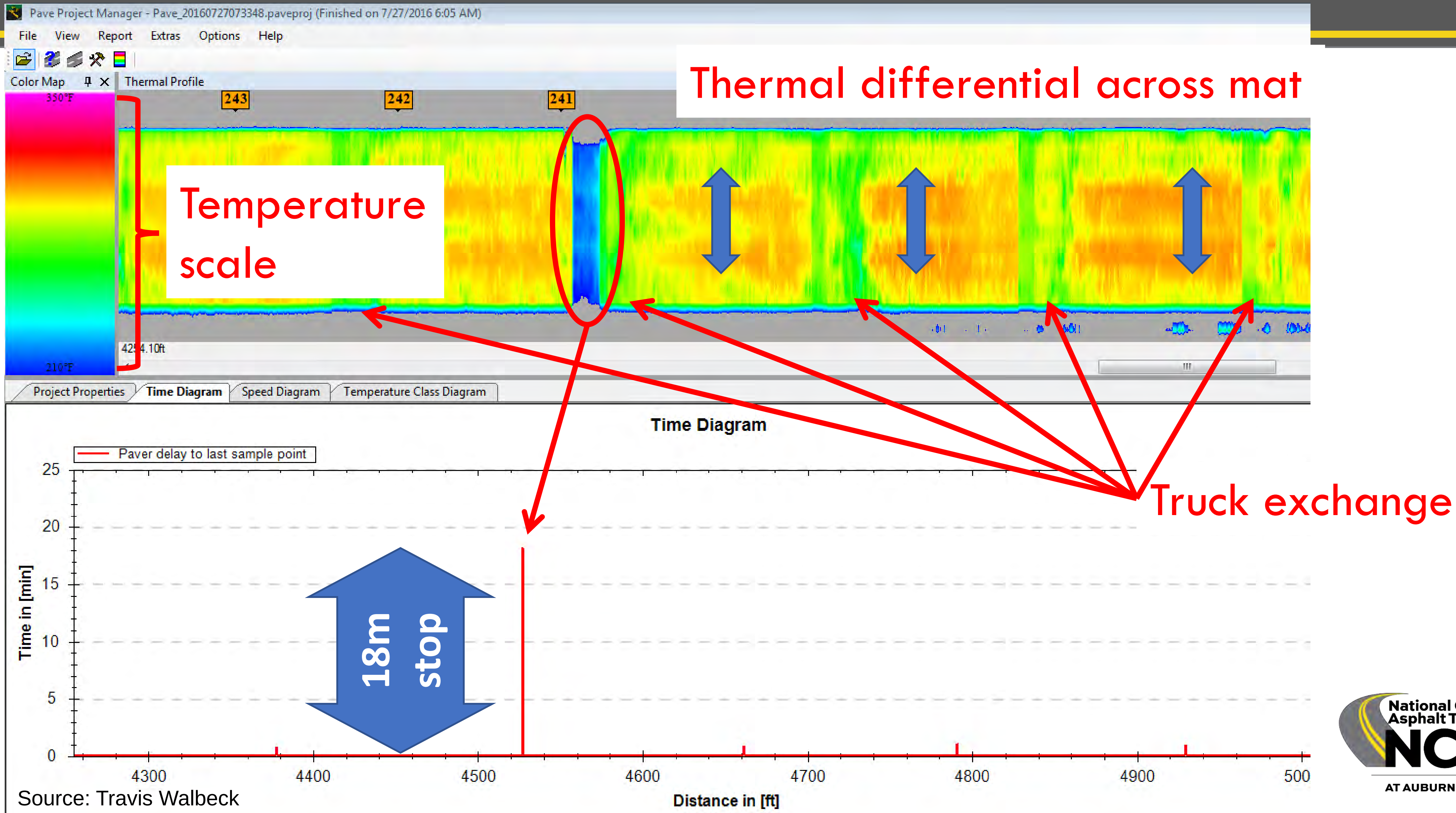
Infrared Temperature Scanning Data



Source: Travis Walbeck

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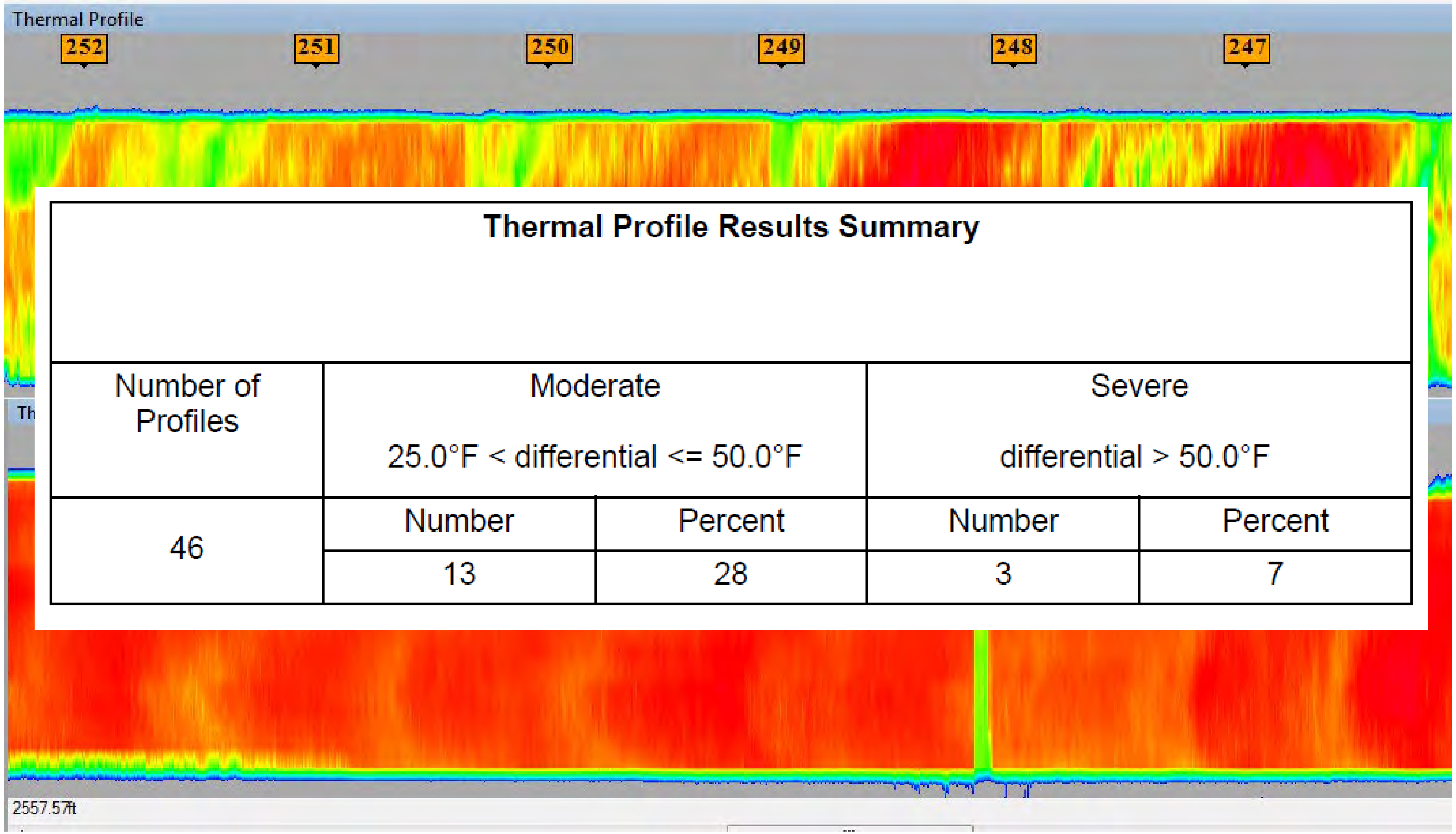
Infrared Temperature Scanning Data

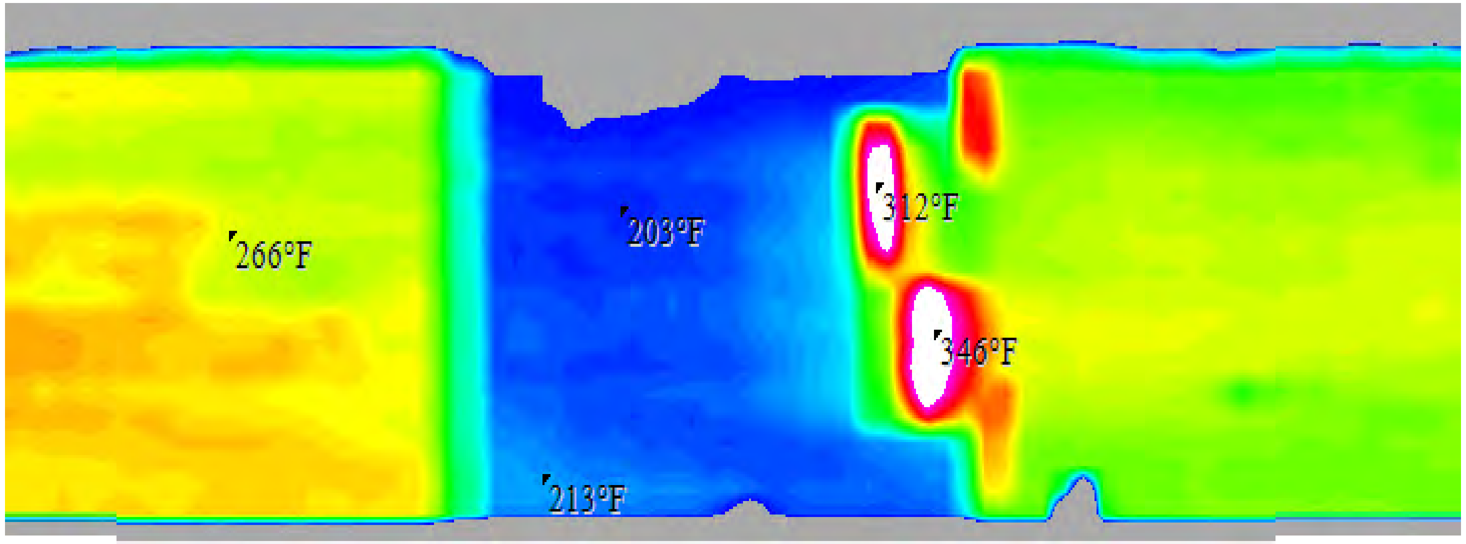


Thermal Profile Results Summary

Number of Profiles	Moderate 25.0°F < differential <= 50.0°F		Severe differential > 50.0°F	
	Number	Percent	Number	Percent
46	13	28	3	7

Trouble Shooting with Pave-IR

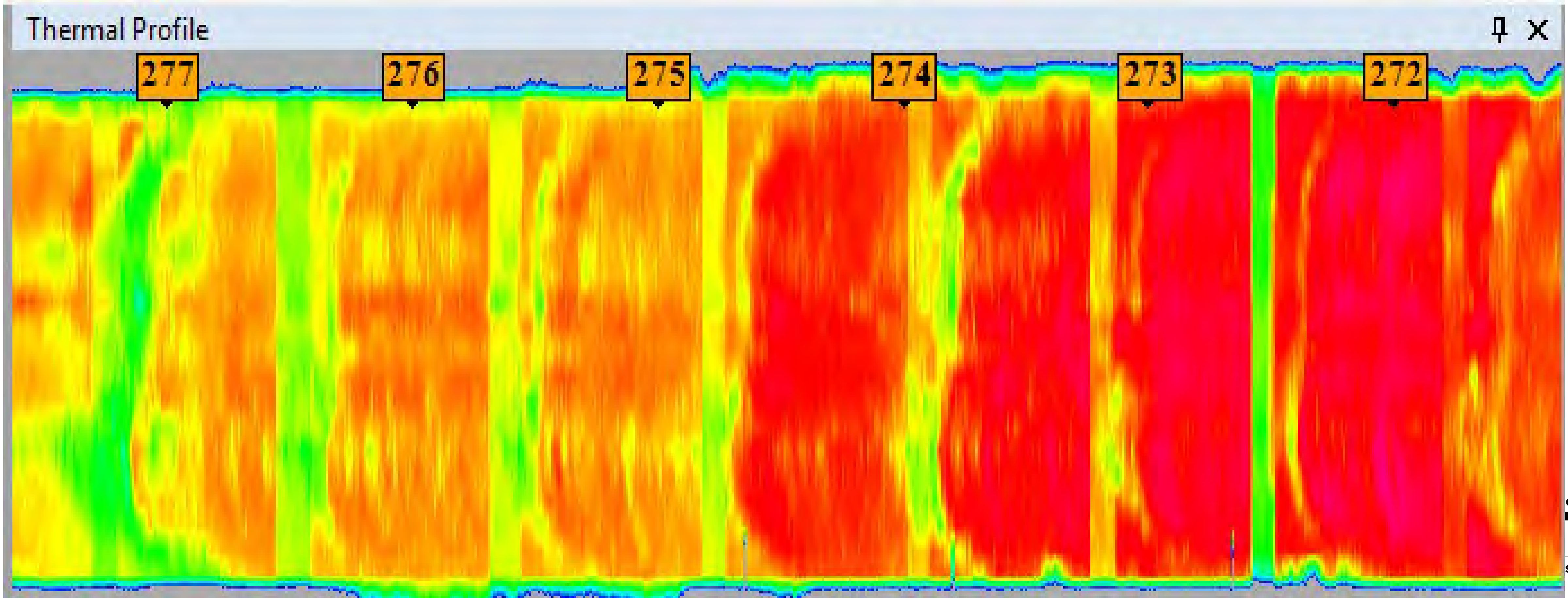
- What caused this temperature scan to look like this?



- Paver stopped
- e stop

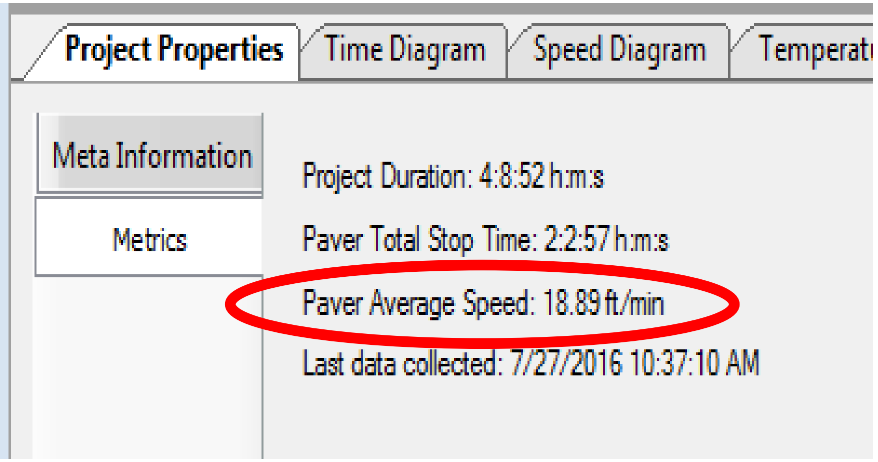
Trouble Shooting with Pave-IR

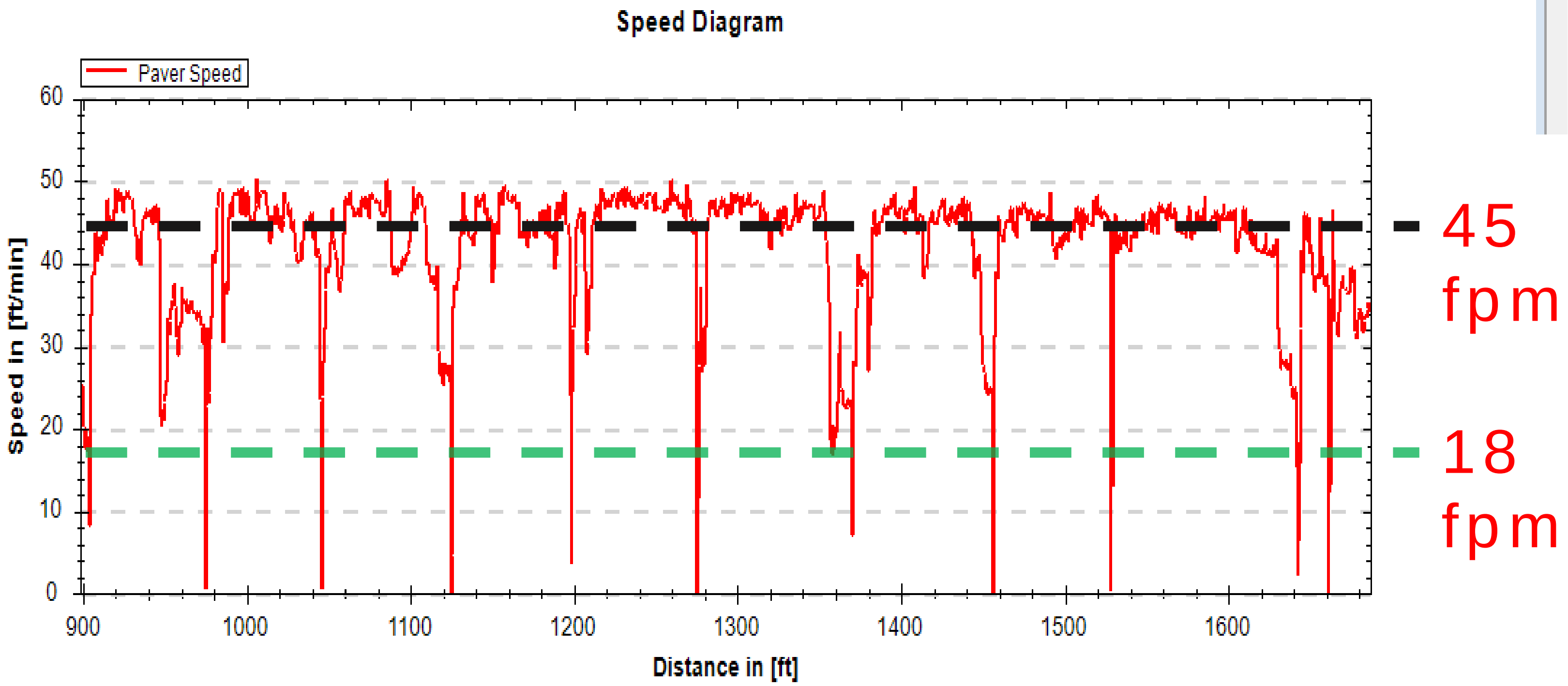
- What caused this temperature scan to look like this?



Monitoring QC with Pave-IR

- This crew was proud of a fast paving rate
- What is their actual rate over the day?





Learning Objectives

- Recognized surface preparation that is needed before paving
- Discuss how an asphalt paver operates
- Identify the five forces on a paver screed
- Explain how asphalt mixture is compacted in the field
- Identify the importance of a “balanced” paving operation

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Questions