

## Paver Principles and Techniques



## Understanding the Paver



### Basic Paver Functions

- Self-leveling
- Material feed

PAVING PRODUCTS



## Understanding the Paver



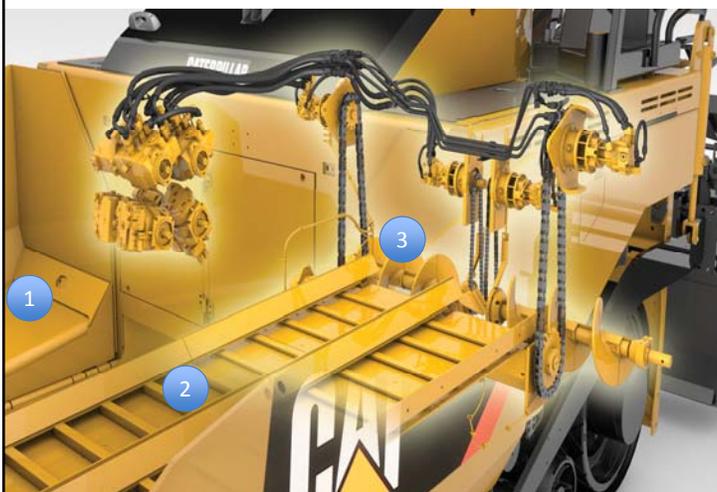
### Tractor Self-Leveling

- Screed is free to rise & fall
- Constant line of pull when set up properly
- Smooth surface over irregular grade

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## Understanding the Paver



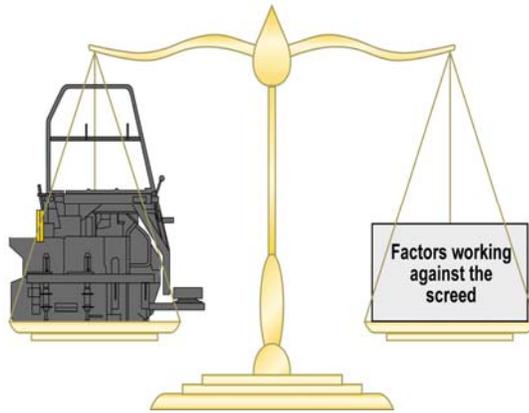
### Material Feed System

1. Hopper
2. Feeder bars
3. Adjustable height augers
4. Feeder sensors (Not Shown)

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## Understanding the Paver



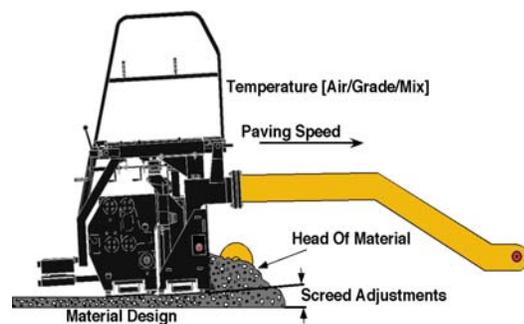
### Free-Floating Screed

- Screed position determines mat thickness
- Screed position is constant as long as all factors remain constant

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## Understanding the Paver



### Factors Affecting the Screed

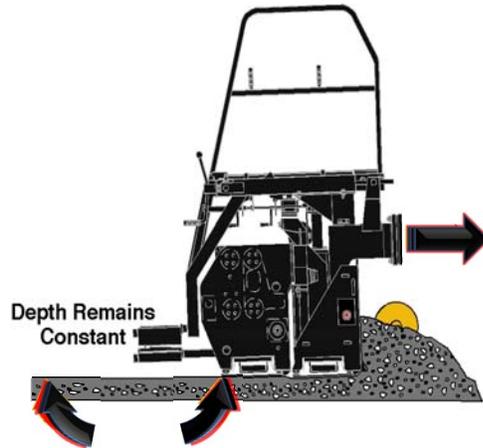
- Paving speed
- Head of material
- Screed adjustments
- Mix design
- Mix temperature
- Air temperature
- Grade temperature

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## Factors Affecting Screed

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Constant Speed

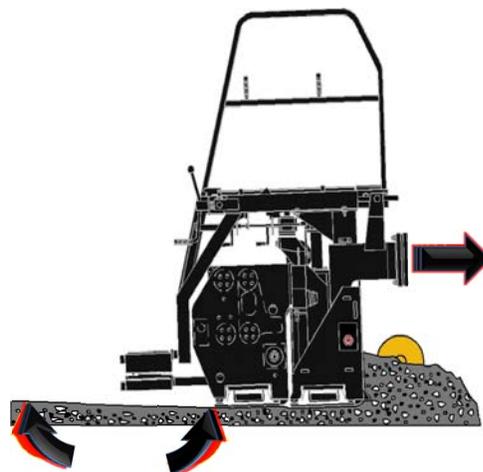
- Shear factor is constant
- Depth remains constant

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## Factors Affecting Screed

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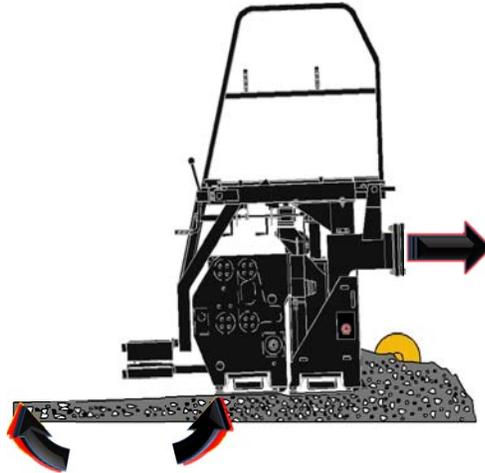
Increased Speed

- Shear factor decreases
- Depth decreases

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## Factors Affecting Screed



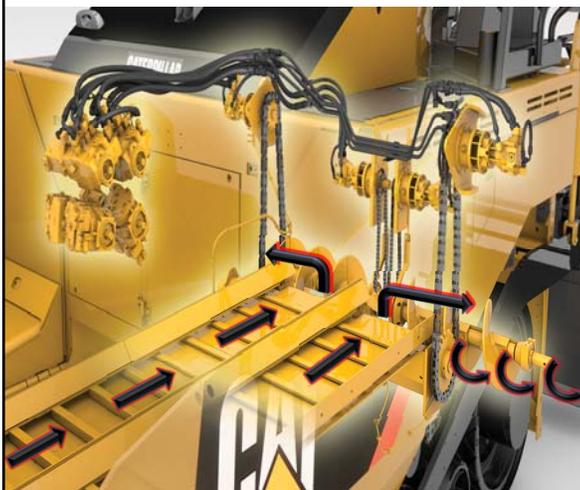
### Decreased Speed

- Shear factor increases
- Depth increases
- Amount of depth change varies with amount of speed change
- Mix design also affects shear factor

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## Factors Affecting Screed



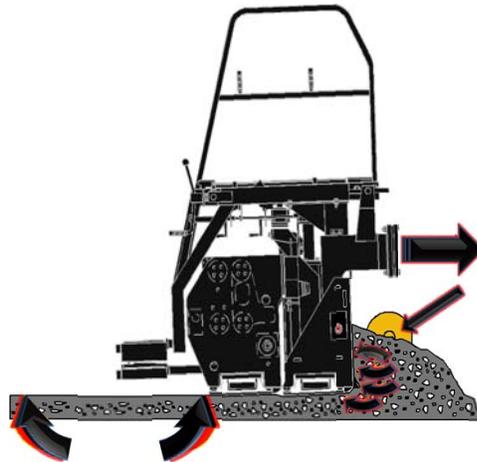
### Head of Material

- Smooth, continuous movement from hopper to area in front of screed
- Uniform force against face of screed

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## Factors Affecting Screed



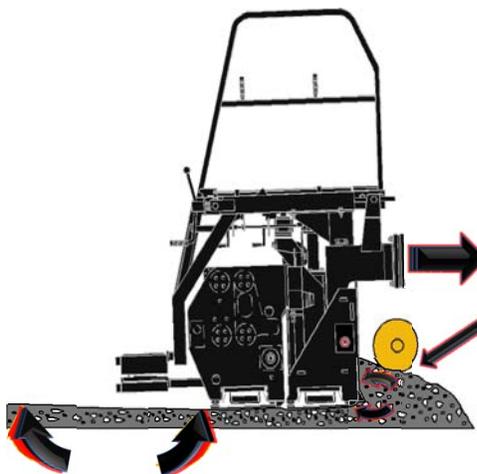
Correct Head of Material

- Half auger level
- Constant resistance
- Constant depth

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## Factors Affecting Screed



Head of Material Decreased

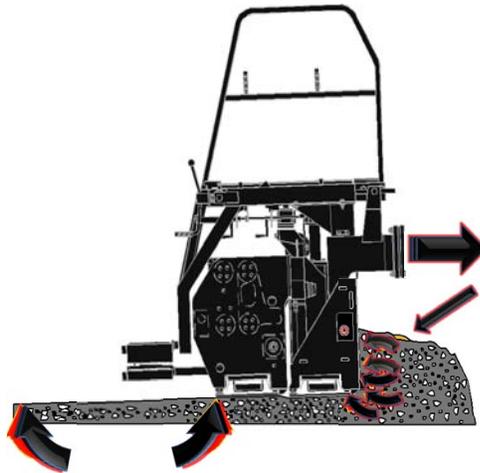
- Resistance decreased
- Depth decreases

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## Factors Affecting Screed

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Head of Material Increased

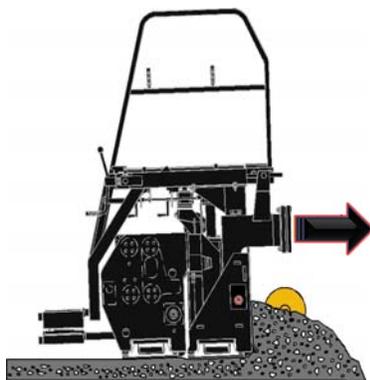
- Resistance increased
- Depth increases

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## Factors Affecting Screed

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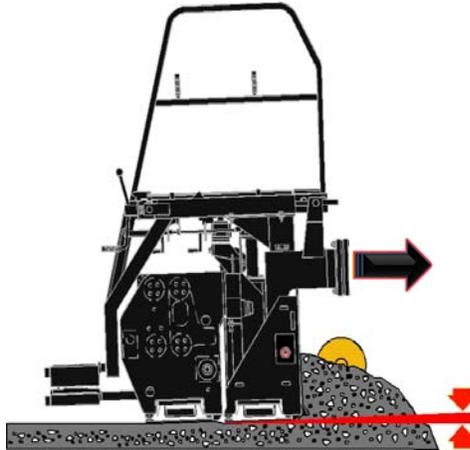
Auger Speed

- Auger speed uniform
- 20-40 rpm
- Auger speed too high or too low can cause segregation stripes in the mat

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## Screed Adjustments



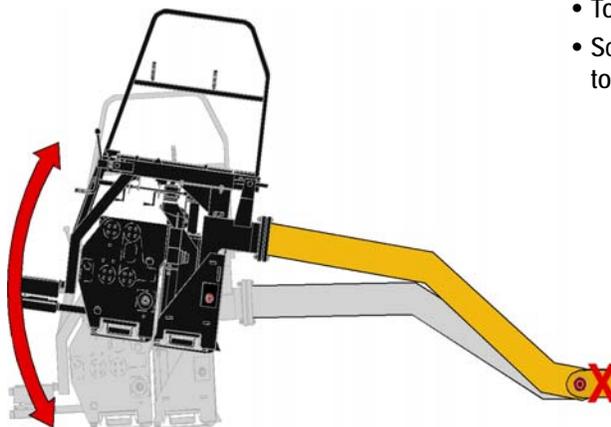
### Angle of Attack

- Angle of attack is the relationship between the nose of the screed & the trailing edge of the screed
- Nose up attitude
- Screed reaches equilibrium

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## Screed Adjustments

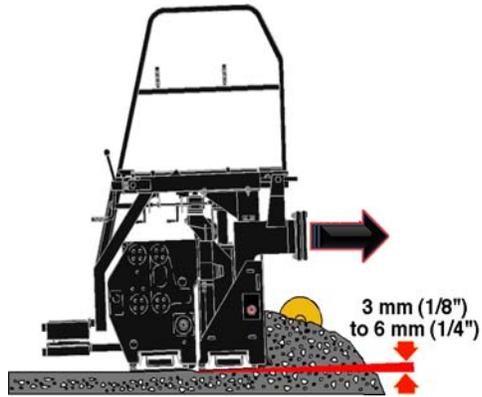


- Tow point fixed
- Screed pivots around fixed tow point

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## Screed Adjustments



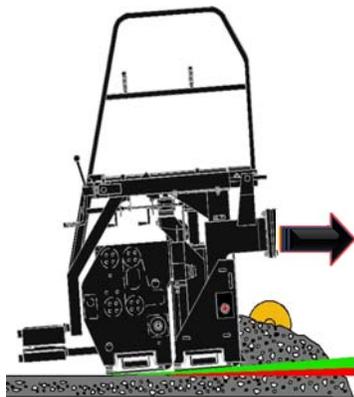
### Angle of Attack

- Normally 3 mm (1/8") to 6 mm (1/4")
- Angle too high, screed compacting with trailing edge
- Angle too low increases shear factor and wear

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## Screed Adjustments



### Increase Angle of Attack

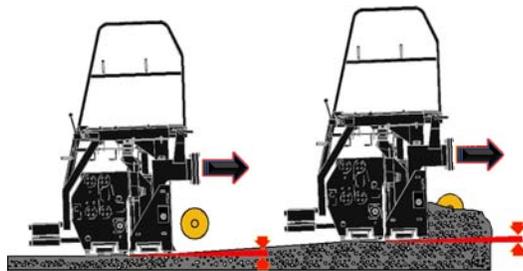
- More material passes under screed
- Screed rises to new level

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## Screed Adjustments

### Screed Reaches New Height



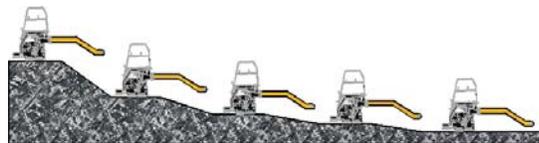
- Achieves equilibrium
- Resumes original angle of attack

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## Screed Adjustments

### Screed Reaction Time

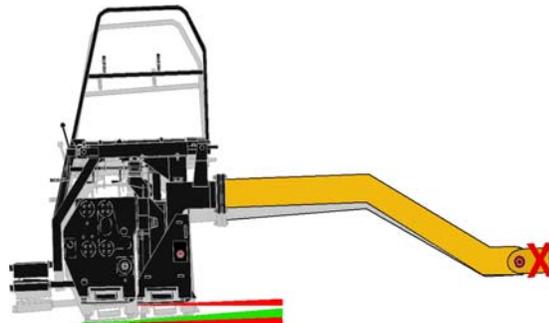


- Screed reacts to change in angle of attack over 5 tow arm lengths
- 65% of change occurs in the first tow arm length
- 35% of change occurs in the last 4 tow arm lengths
- Factor improves rideability

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## Screed Adjustments



Introduce increased Angle of Attack

- Increases lift & more material passes under the screed
- As screed climbs, angle of attack decreases
- Re-establish same angle, but at increased depth

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## TOPCON® SYSTEM 5



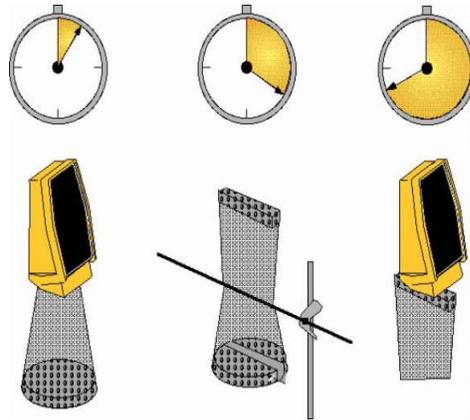
System 5 Components

- Carrying Case
- 2 Control Boxes
- One Slope Sensor
- Non Contacting Sonic Sensors With Temperature Bails, or
- Contacting Grade Control With Skate, Ski, and Stringline wand, or both

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## Sonic Sensor

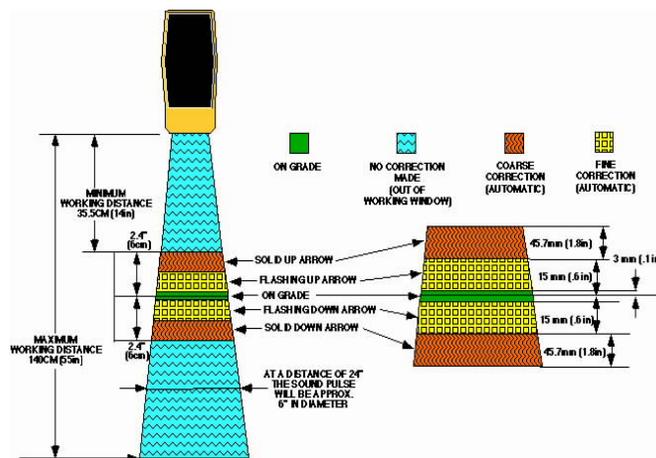


- Measures Elapsed Time For Sound Pulse To Travel To The Reference And Back To The Sensor

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## Sonic Sensor



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## SLOPE SENSOR

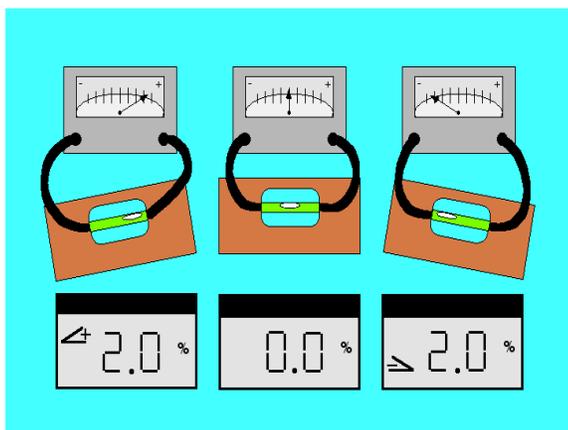


The Slope Sensor is a precision electronic sensor which functions much like a precision carpenter's level.

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## SLOPE SENSOR

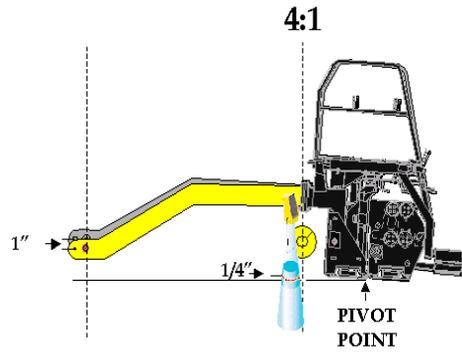


The Slope Sensor reads the inclination (tilt) of the screed and sends the signal to the Control Box.

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## SENSOR PLACEMENT

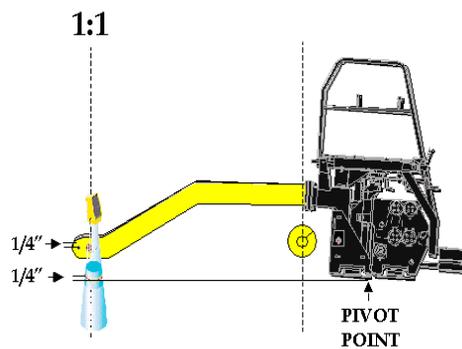


Rearward Mounting  
Used to produce quick  
changes when matching  
existing joints or curb  
lines is desired

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## SENSOR PLACEMENT



Forward Mounting  
Used to produce gradual  
changes when  
smoothness or rideability  
is desired

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## Clean surface



A mill can do great things as long as you have a clean surface. .

If you have this to work with you will never achieve grade.



**ROADTEC**  
Drums

PAVING PRODUCTS workshop

Drums come in all shapes and sizes.



AT

Detailed description: A large stack of metal drums, likely used for road paving, is shown on a pallet in a workshop. The drums are arranged in a grid pattern, and the stack is quite tall. The workshop floor is concrete, and there are other equipment and materials visible in the background.

**ROADTEC**  
Speed

PAVING PRODUCTS workshop

The faster you go the worse the ride.

You will get a poor pattern.

The slower you go the better the pattern



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Detailed description: Two side-by-side photographs showing the results of road paving. The left photo shows a smooth, well-paved road surface. The right photo shows a rough, uneven road surface with a poor pattern. The text above the photos explains that speed affects the quality of the paving.

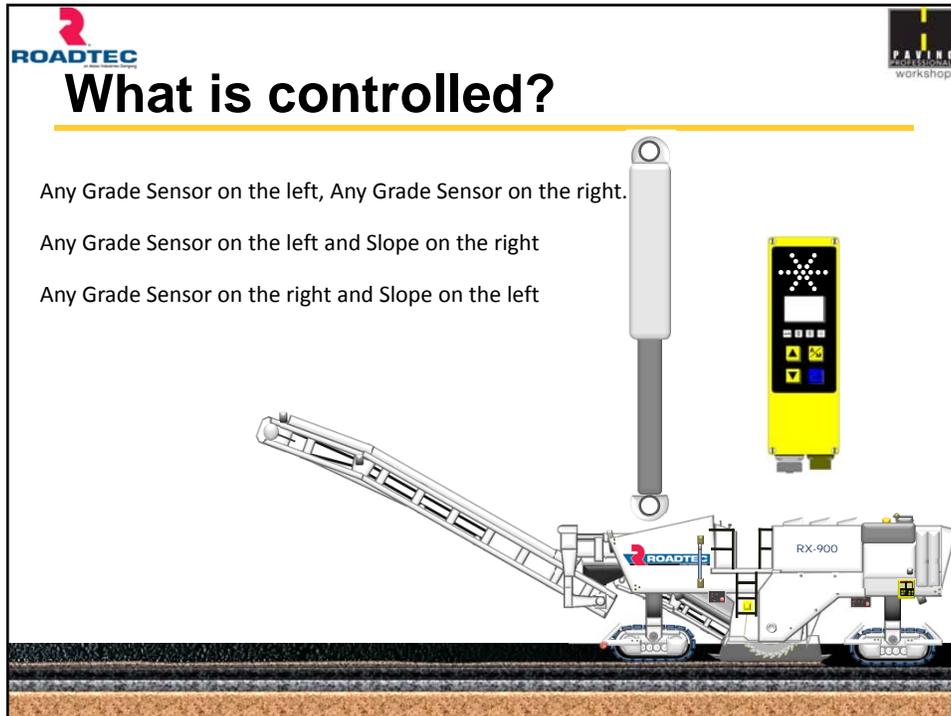
**ROADTEC**

**What is controlled?**

Any Grade Sensor on the left, Any Grade Sensor on the right.

Any Grade Sensor on the left and Slope on the right

Any Grade Sensor on the right and Slope on the left

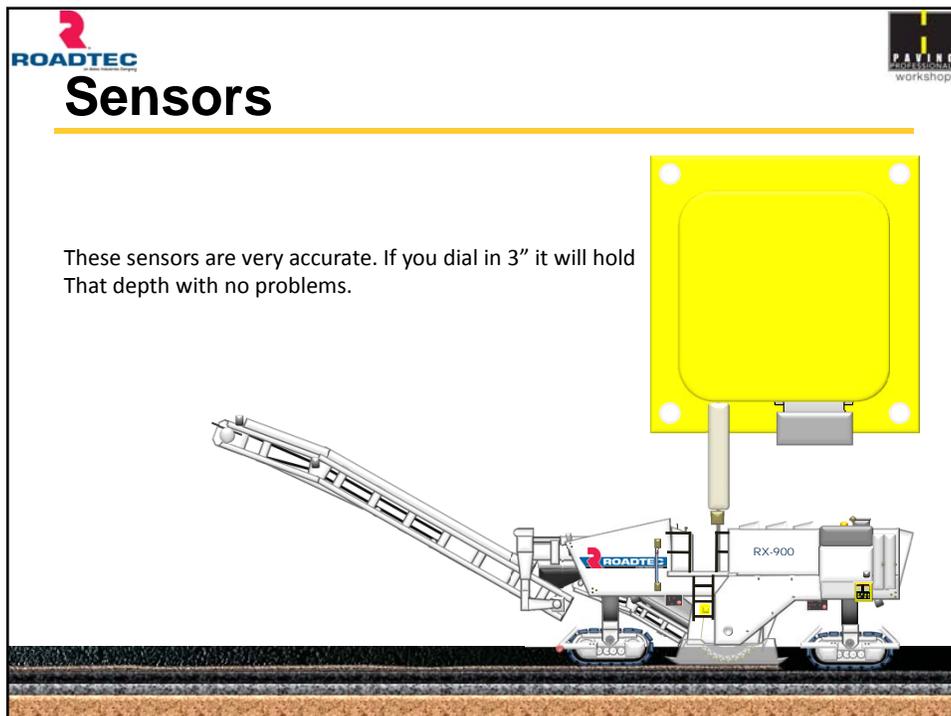


The diagram shows a side view of a ROADTEC RX-900 paver on a road surface. A vertical grey sensor arm is mounted on the machine, connected to a yellow control panel. The control panel features a digital display and several buttons. The paver is shown in profile, with its hopper and conveyor system visible. The ROADTEC logo and model number 'RX-900' are clearly visible on the side of the machine.

**ROADTEC**

**Sensors**

These sensors are very accurate. If you dial in 3" it will hold that depth with no problems.



The diagram shows a side view of a ROADTEC RX-900 paver on a road surface. A large yellow rectangular sensor panel is mounted on the machine. The panel has four white circular markers at the corners. The paver is shown in profile, with its hopper and conveyor system visible. The ROADTEC logo and model number 'RX-900' are clearly visible on the side of the machine.

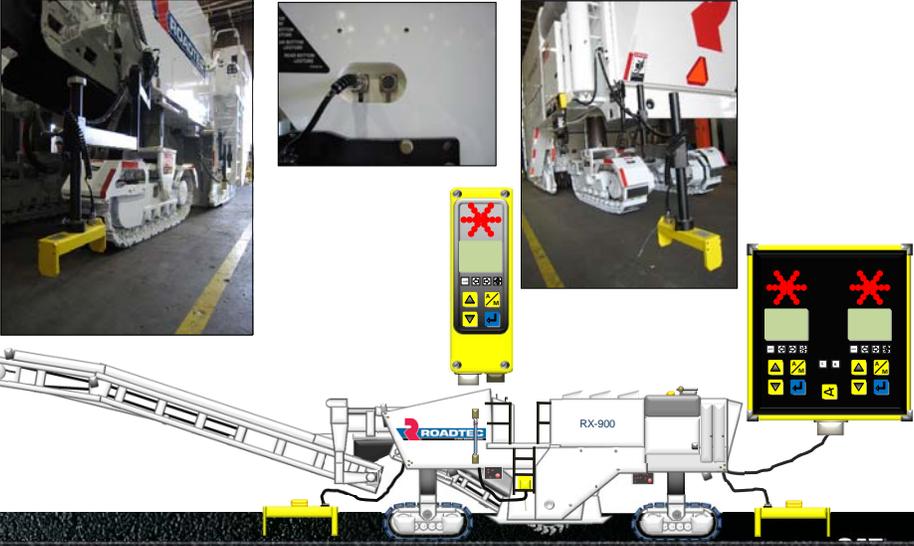
**ROADTEC**  
**Sensors**



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**PAVING**  
workshop

**ROADTEC**  
**Smooth Mill Ski**



Smooth Mill Ski

RX-900

**PAVING**  
workshop

**ROADTEC**

**Slope**

Will it cut 2% and still cut 1.5"?????

**IF** the surface is very close to 2% then yes. **BUT**, if this surface is not then it will not.

Anything over 10° or around 17% is starting to get in the danger zone for a milling machine.



Slope will go to + - 17%

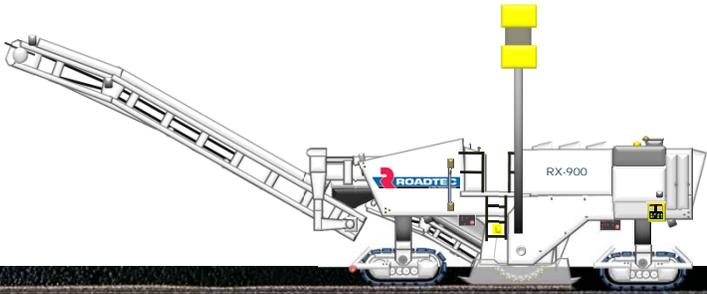
**CAT**

**ROADTEC**

**3D**

Machines can run 3D but, you are only as good as the data given.

Dual 3D receivers or a single and cross slope.



# Cut Depth

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Most Machines today cut at least 14" .

Machines cannot control scabbing. You should go deeper or come up to get to stable material.



# Thank you

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**ROADTEC**  
an Astec Industries Company

