



Automation

How to effectively run Grade and Slope Control 2017

Clean up



Having a good surface to reference from is the key.

Take the time to look over what you are about to pave. **If the surface is questionable then expect your results to be the same.**

A clean surface even during paving. **Spillage...**



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TOPCON P-32

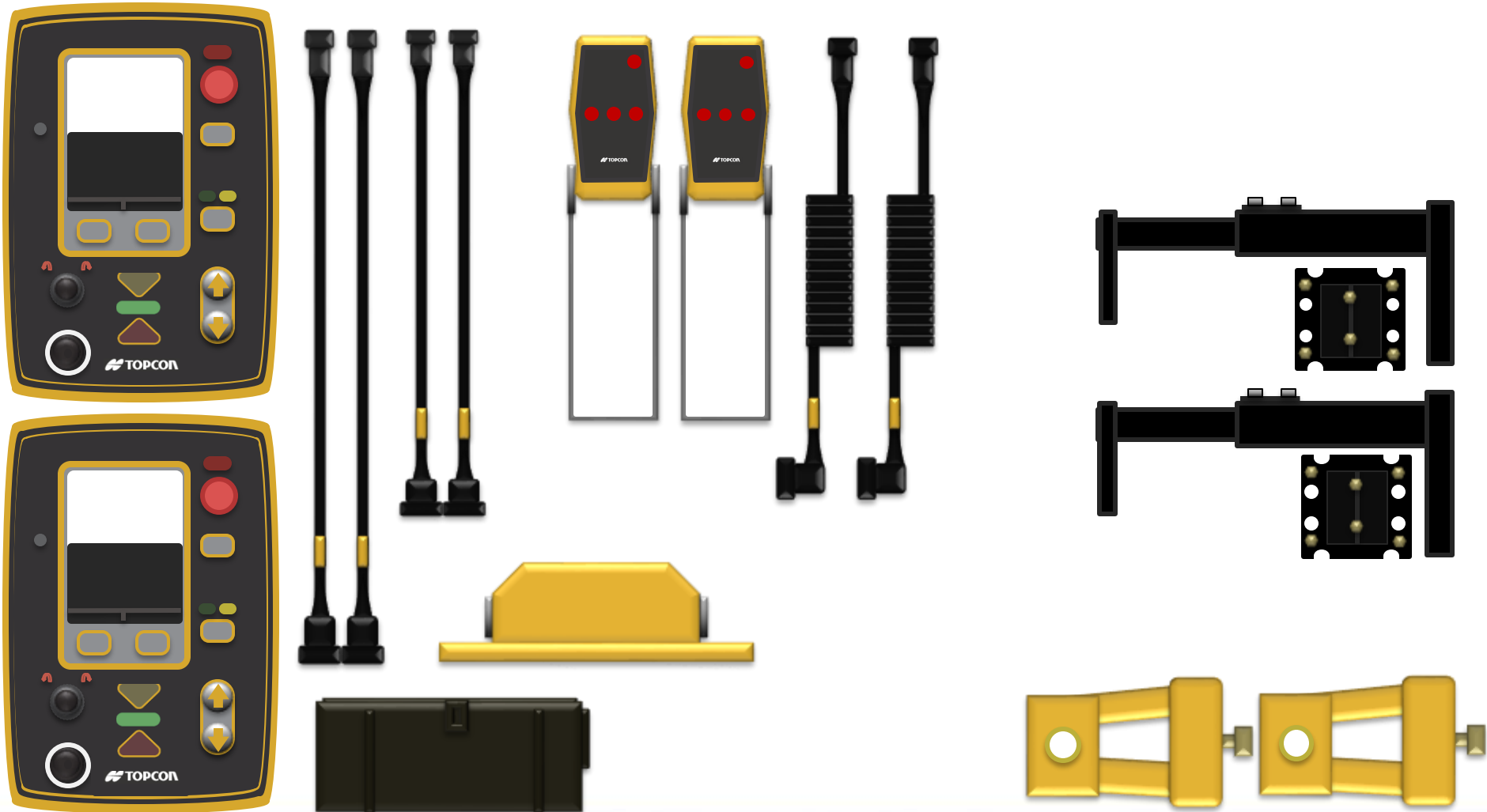


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ROADTEC

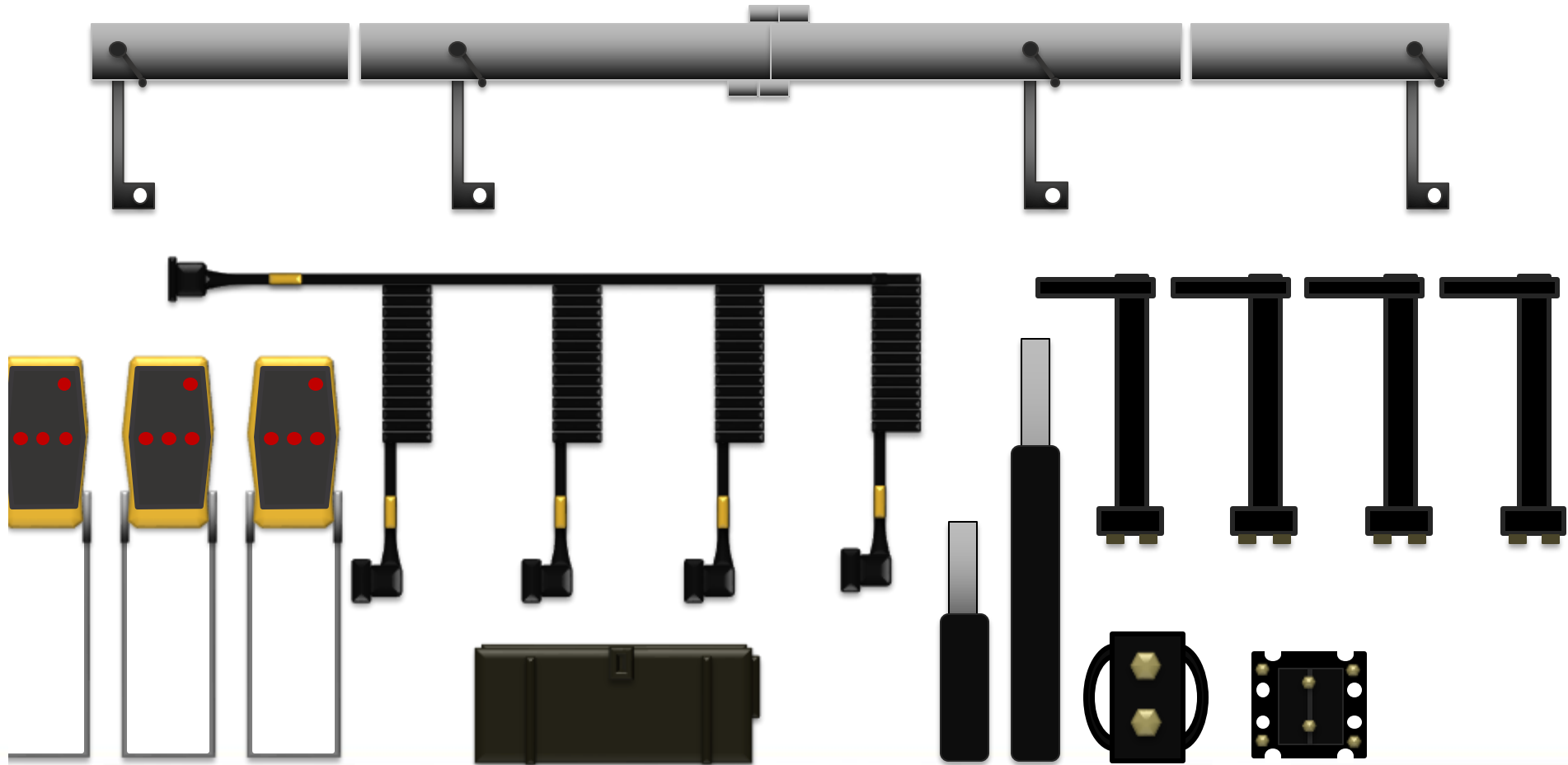
TOPCON Grade and Slope



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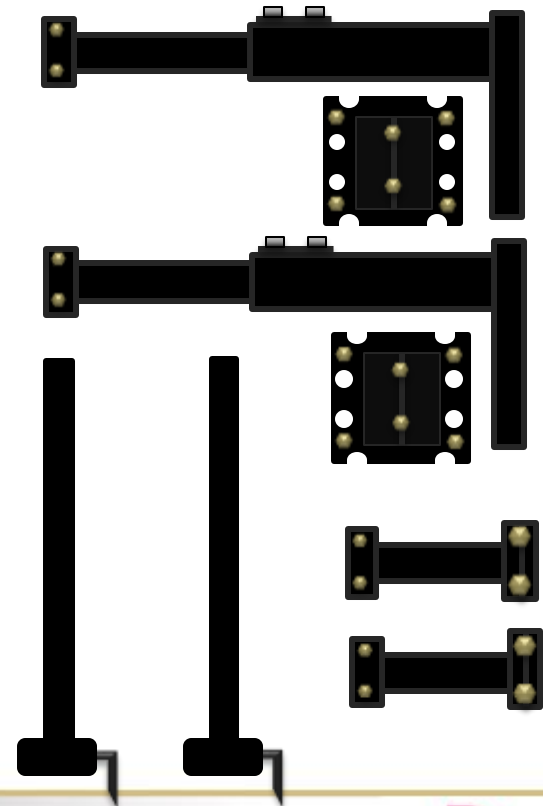
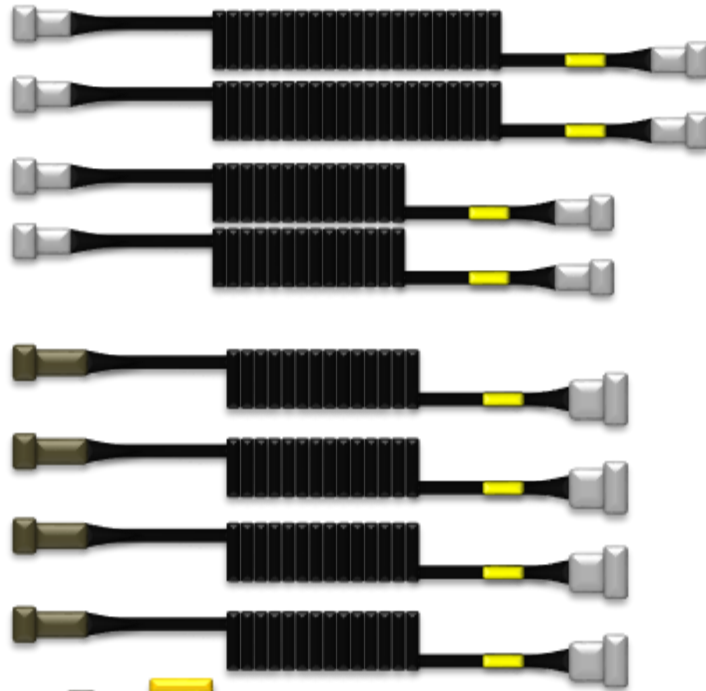
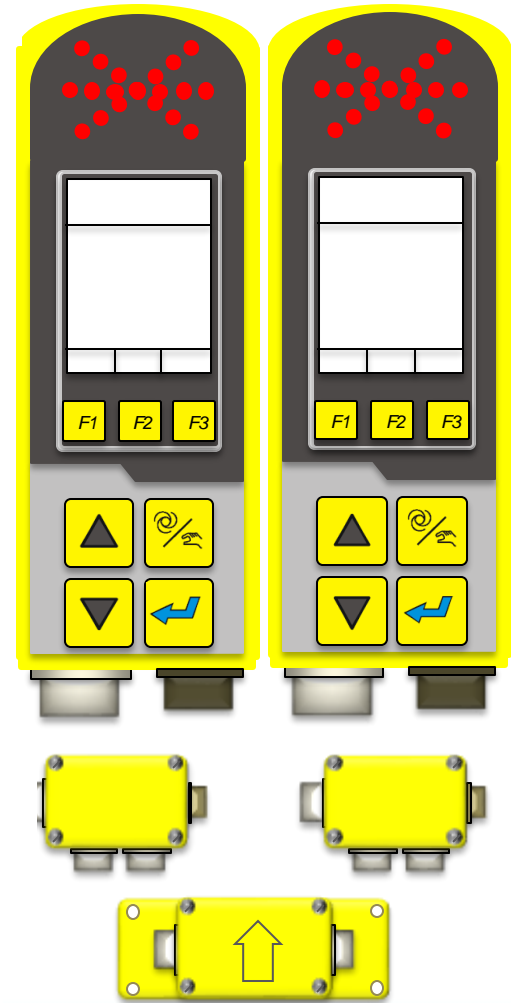
TOPCON SAS WITH Hardware



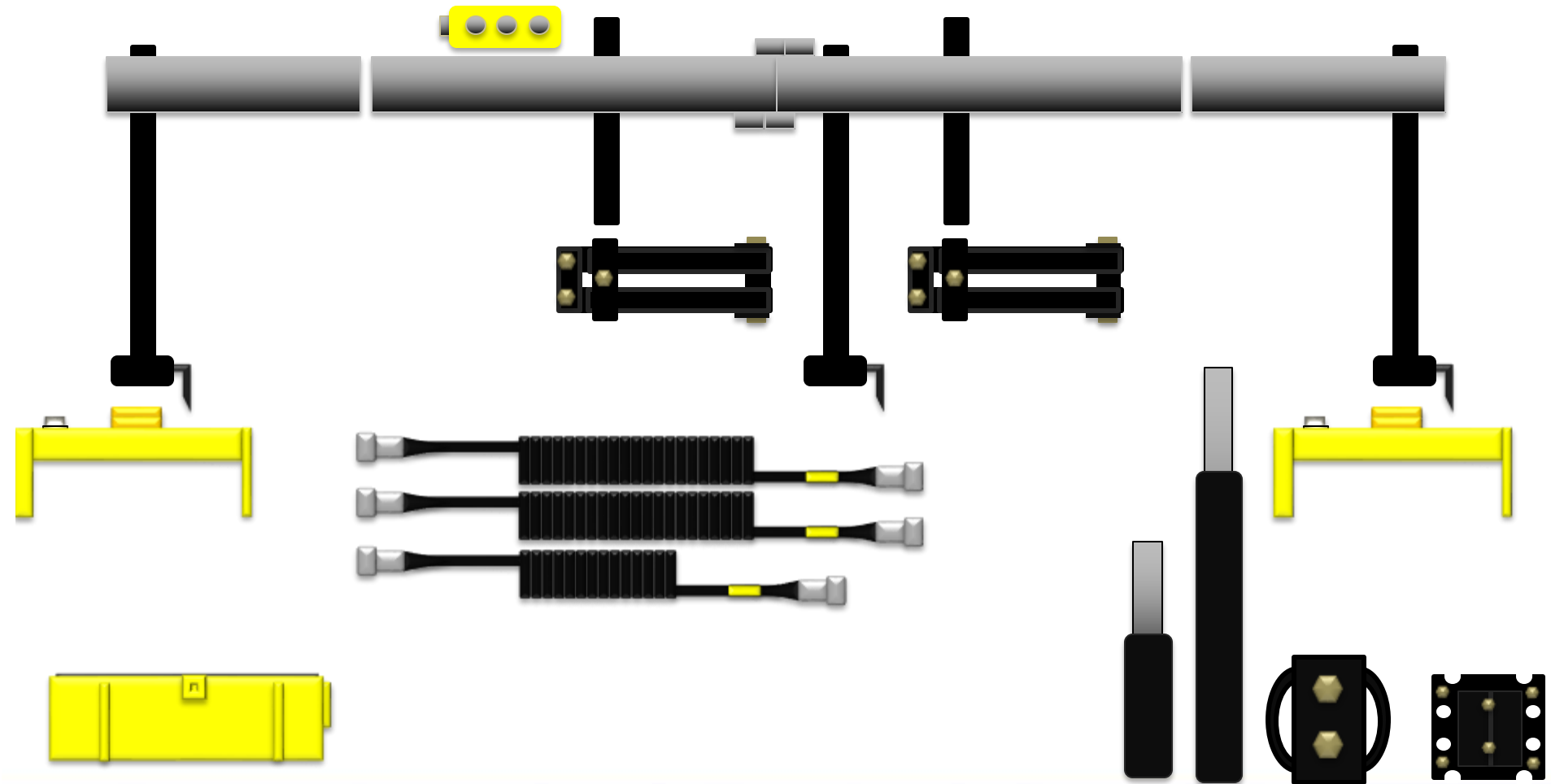
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MOBA Grade and Slope



Moba Sonic Ski **WITH** Hardware

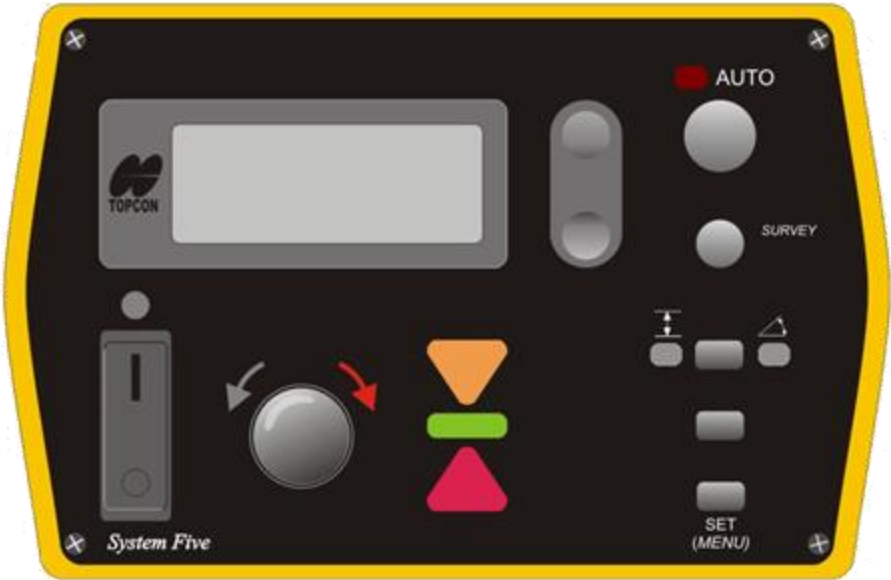


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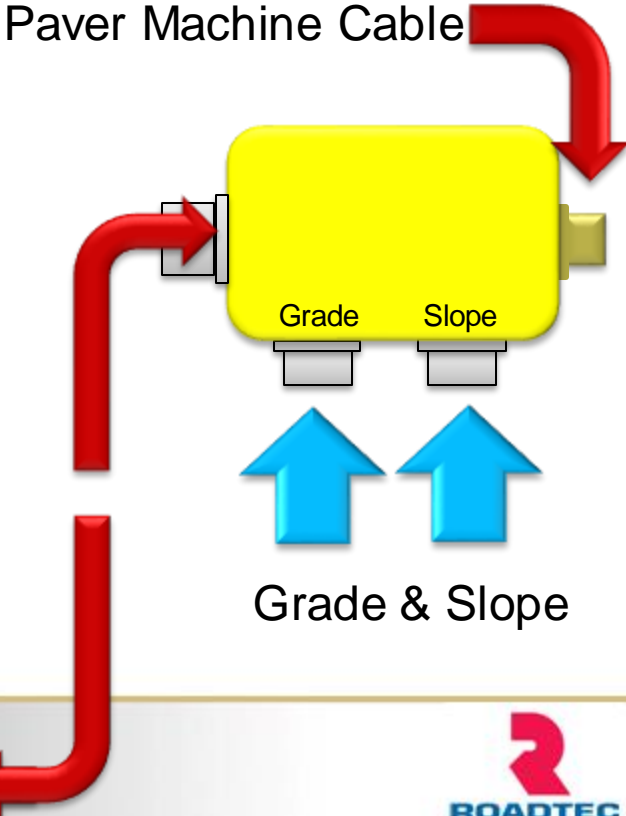
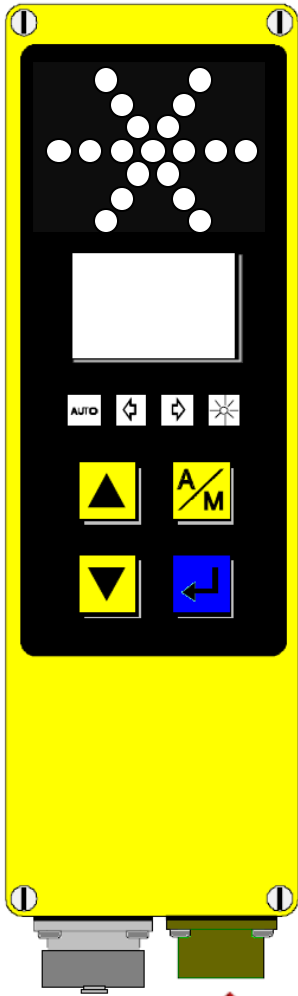


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Hooking up



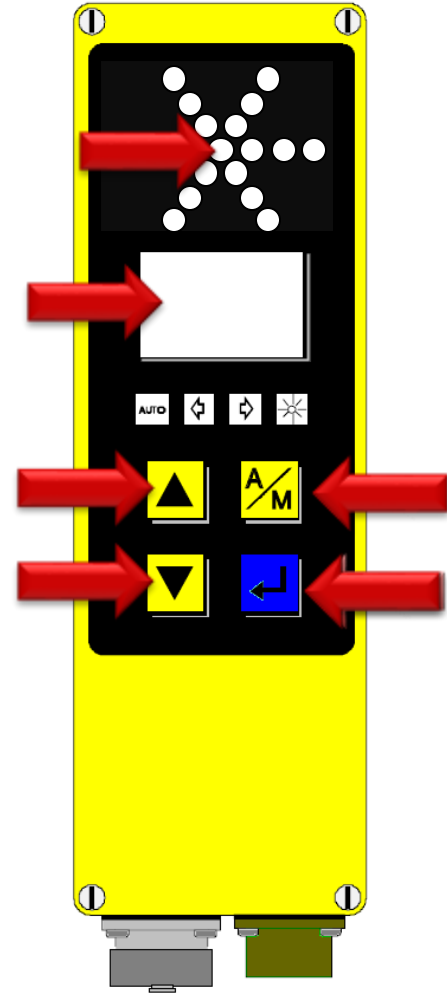
Paver Machine Cable Grade or Slope



Control Box



- LCD Display
- Power LED
- Power switch
- Grade Adjustment
- Grade LED
- Set Button
- Slope / Elevation Button
- Survey Button
- Auto / Manual Button
- Jog Button



Settings

Why is this box important?

Can I use any box?

Each control box should be programmed for a specific machine?

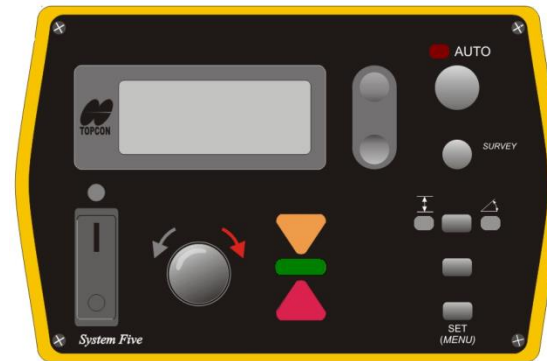
Things are important like, is this a machine with:

On / Off or (Bang Bang) valves.

Proportional valves, and do they Switch hot or ground.

Servo valves.

Valves that use low to high frequency.



Controls 101

Problems with most electronics.

1. Don't trust them to do the job.
2. Don't allow them to do the job.
3. Do not understand them.
4. They never check to see if they work. Powering up, does not mean working.
5. Don't position the sensor in the correct spot for the application.
6. Don't put the sensor at the correct height.
7. Don't know how to turn sensors on correctly.
8. Don't know its not always the controls fault.
9. They are to proud to call for help.
10. To afraid to say I don't know how to use them..



Daily Check

Daily checks should be done as it says... **Daily**.

I don't ever have enough **time** to get them set up...

How long will it take to make sure they are working??

A very conservative estimate is 5 minutes.

Why wait to figure out that the stuff doesn't work when we are at the joint with trucks in front of us.



Screed Control Box

FEED SYSTEM



What about the Joystick and Speed Pot ???

*SCREED
CONTROL*

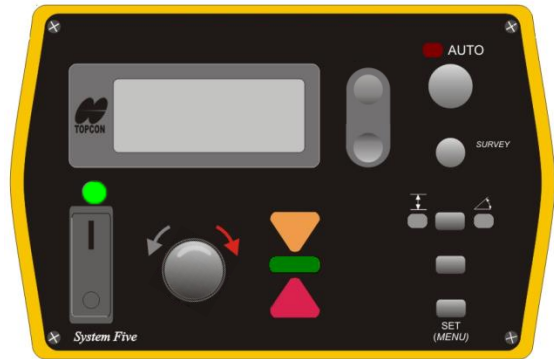


What Happens in this position?

What Happens in this position?



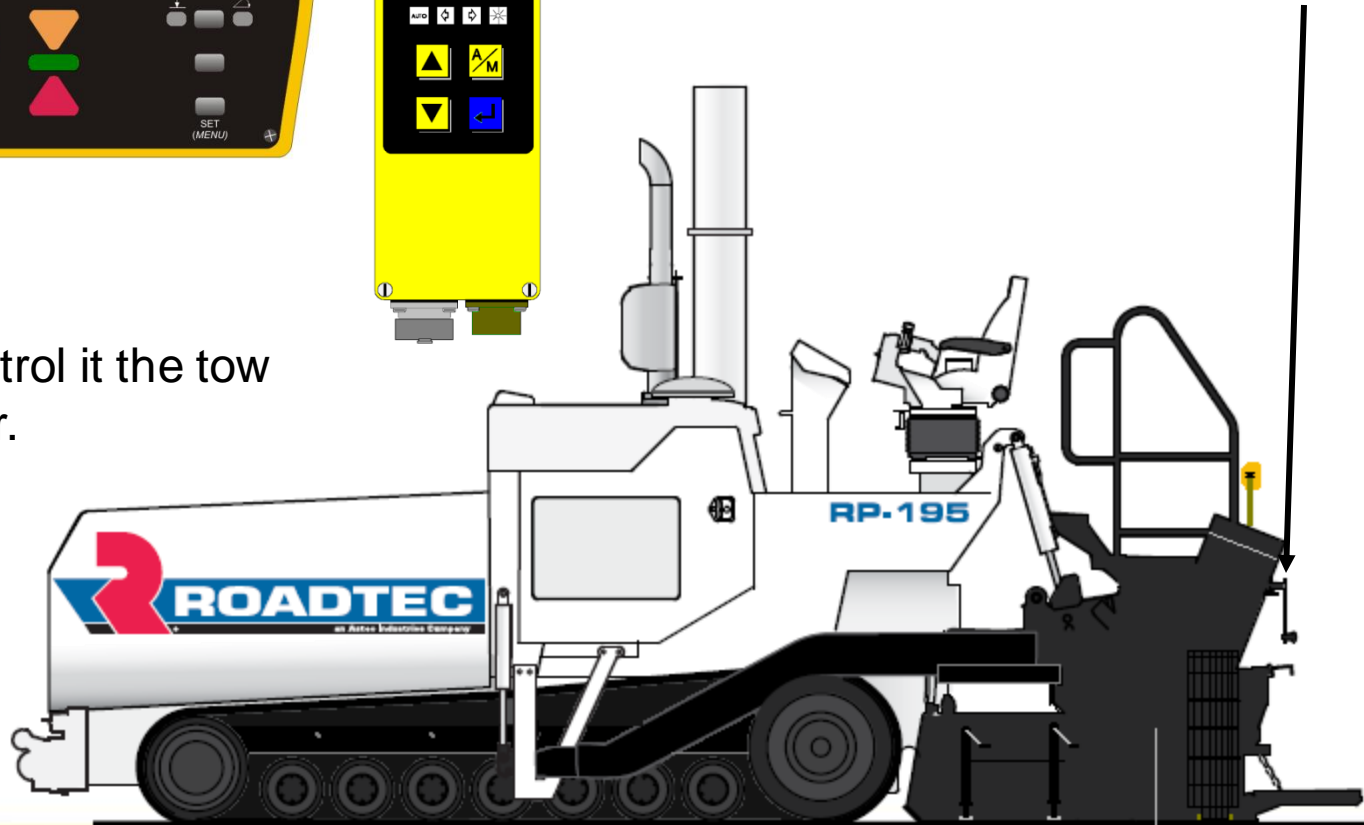
What do we control



The Depth Crank handles are locked, when the paver is running AUTO.

WHY??

What we control it the tow point cylinder.

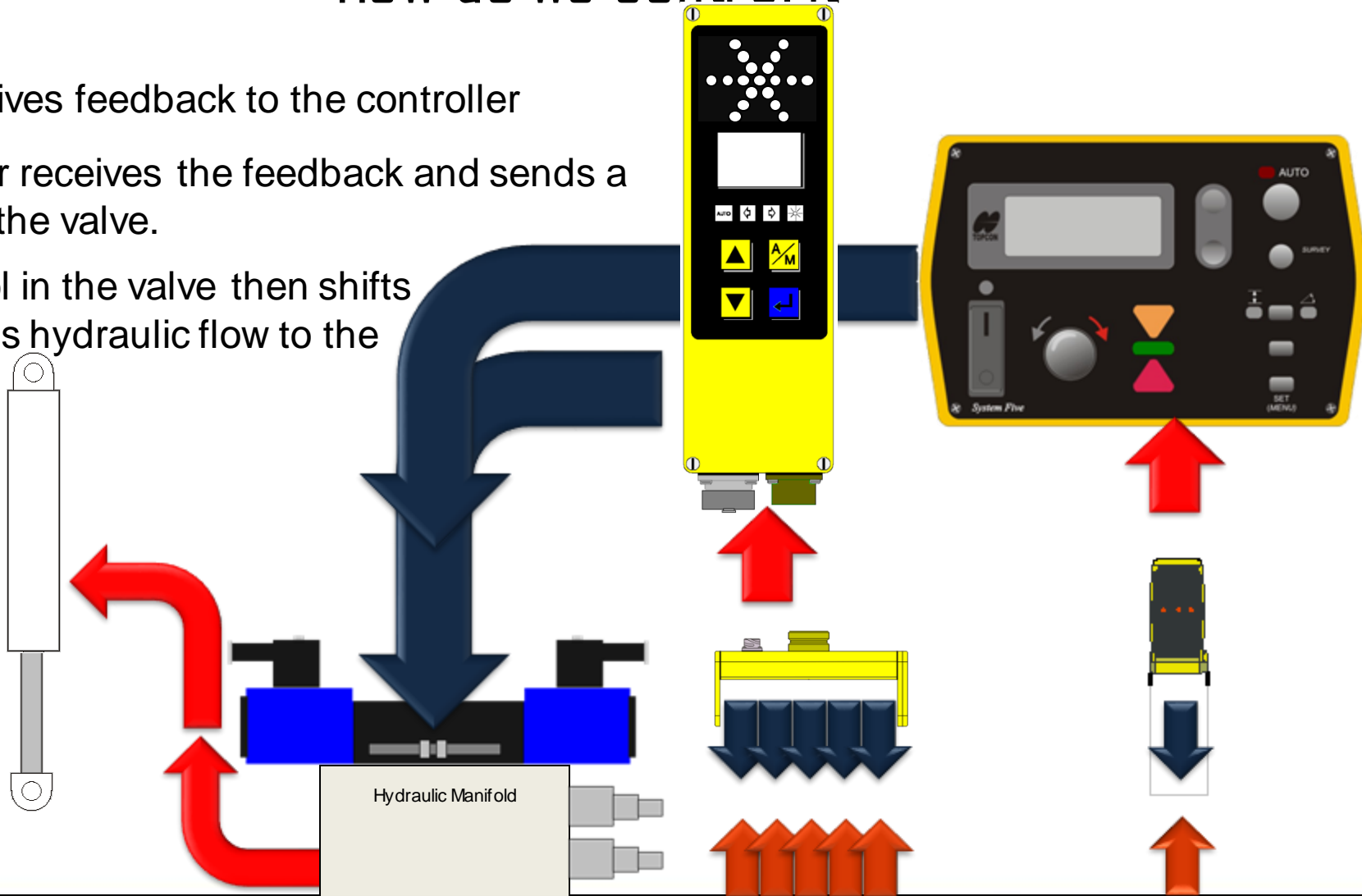


How do we control it

Sensor gives feedback to the controller

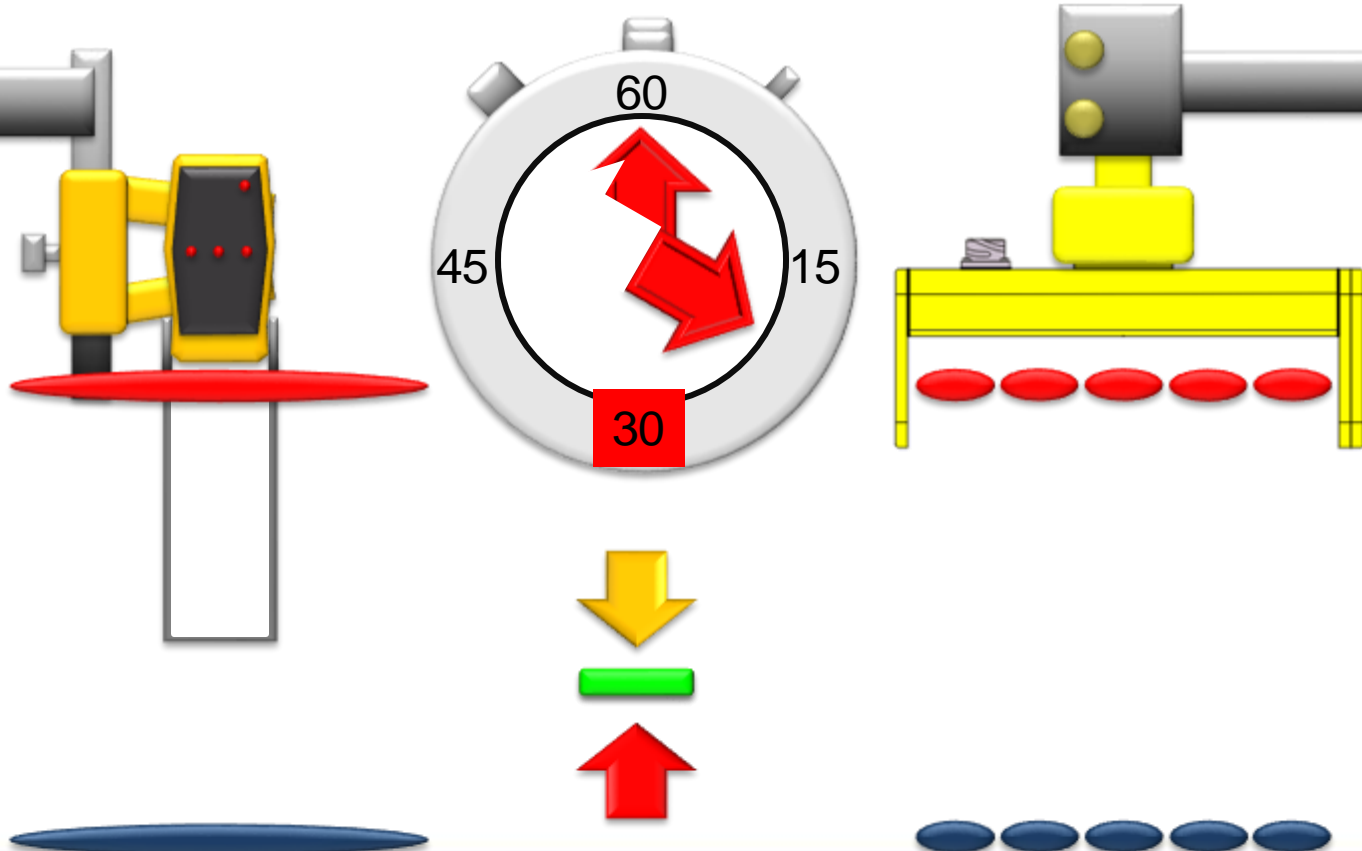
Controller receives the feedback and sends a signal to the valve.

The spool in the valve then shifts and sends hydraulic flow to the cylinder.



Sonics

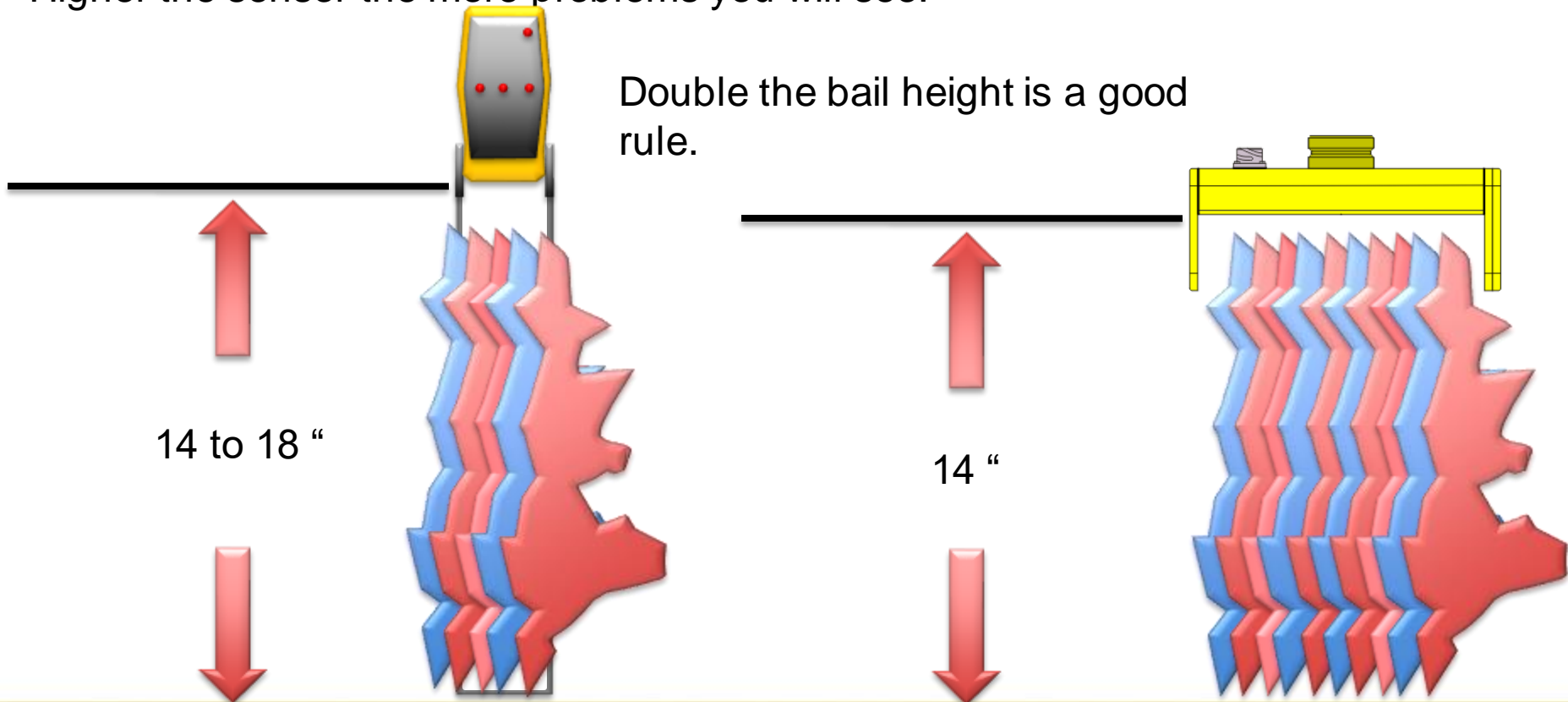
Sonics work like a stopwatch. When the signal leaves the transducer the time starts. As it reflects off the surface and returns to the transducer the time stops and becomes your on grade mark.



Temperature and sensor height

Air is more stable closer to the ground.

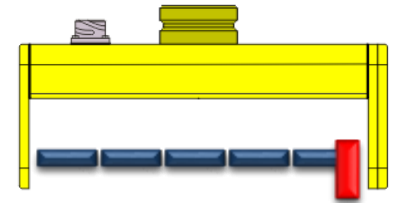
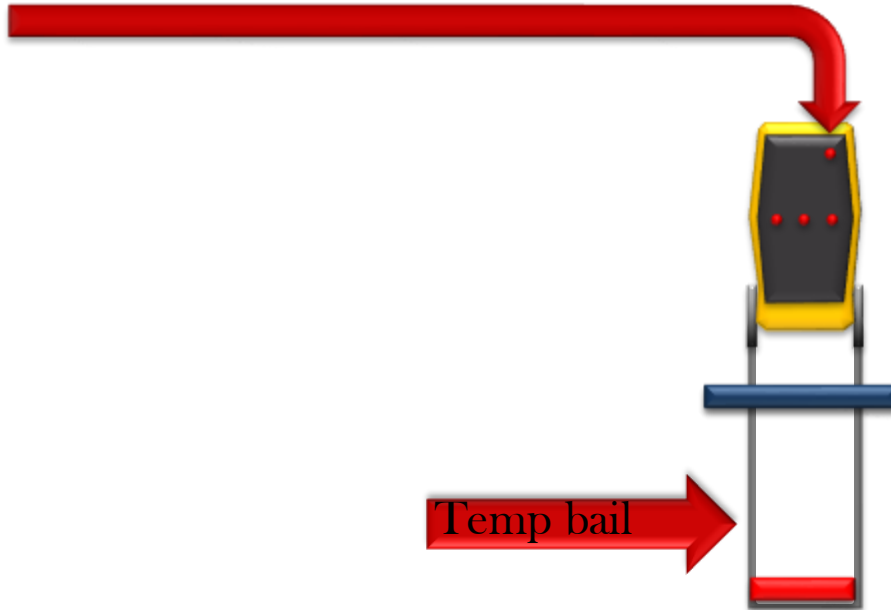
Higher the sensor the more problems you will see.



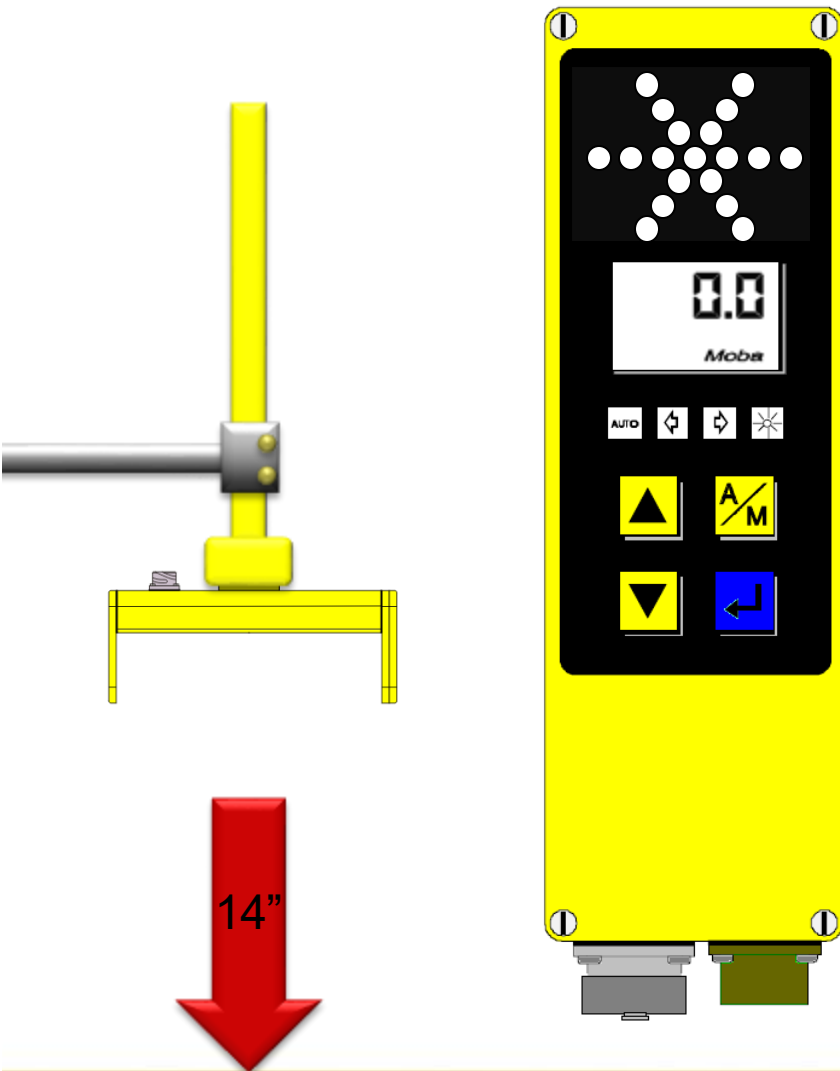
Temp bail

This temp bail is not optional equipment. In order for the system to work properly it must be on.

Symbol will come on when bail is connected.



Sensor height



Measurement is not always needed to ensure proper sensor height.

If the sensor is not at its optimum height the display will blink until the sensor is moved.

Will the sensor still work?

Yes

What can I expect from the wrong height?

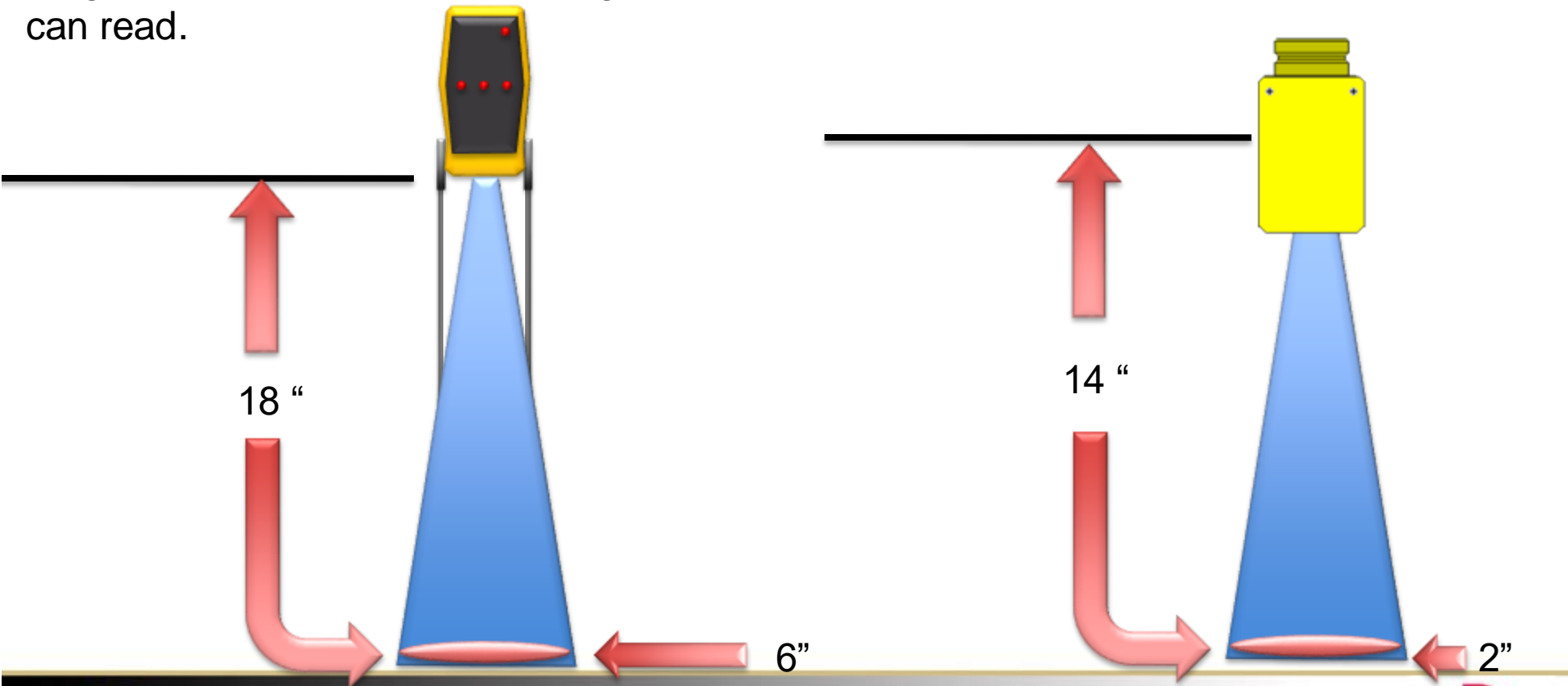
System having a hard time finding grade.



Footprint

As you move the sensor up or down the footprint of it will change.

Larger footprint means more things the sensor can read.

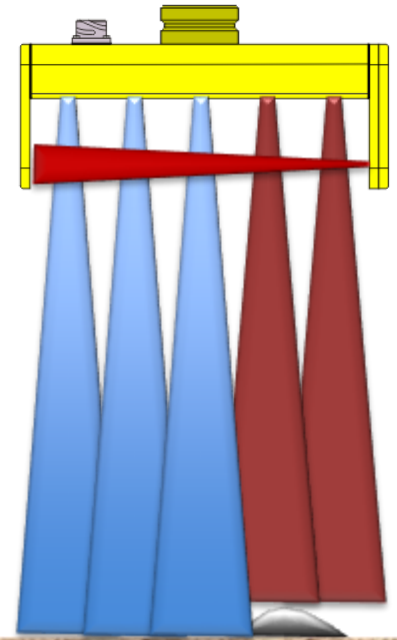


Single sensors and Multi



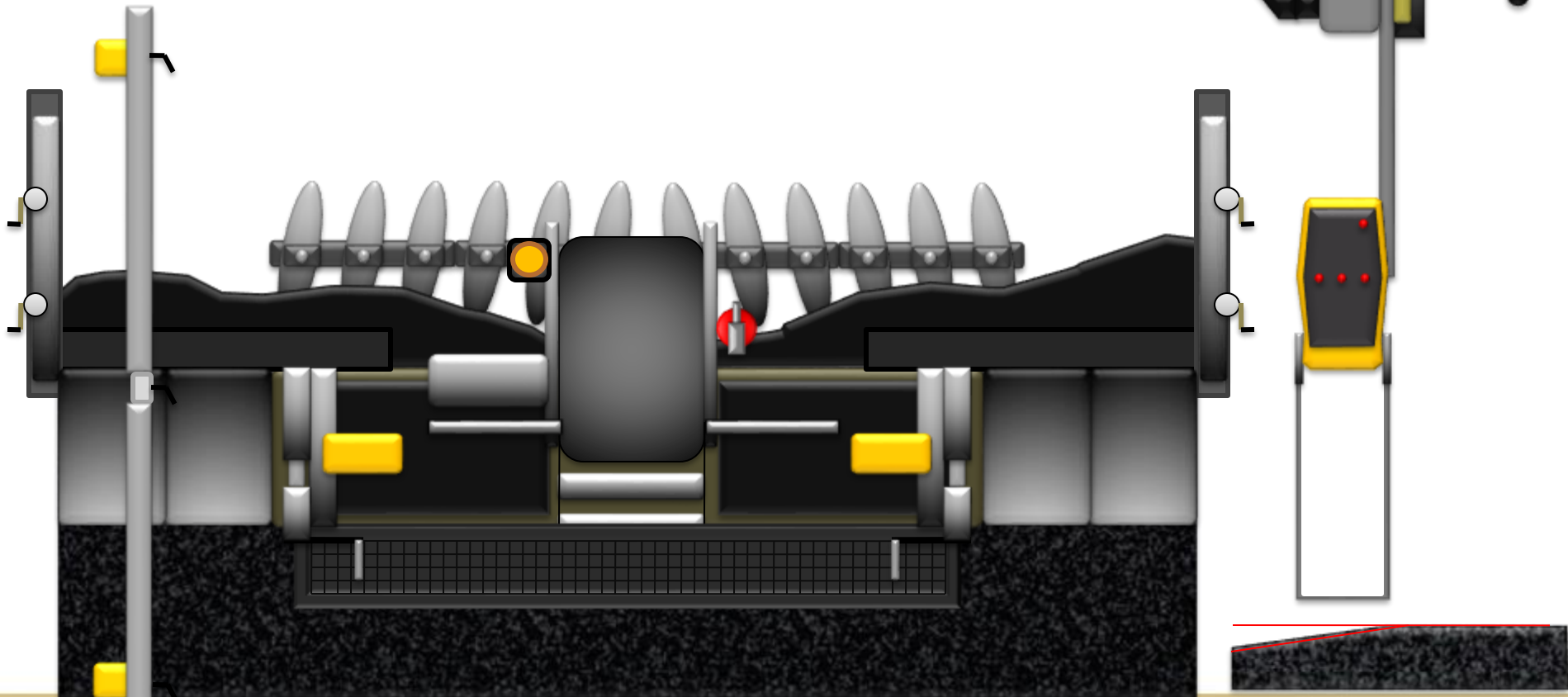
Single transducers will paint a picture of the surface.

Multi Sonics will take the best 3 out of 5 readings and give an output.



Sensor Position

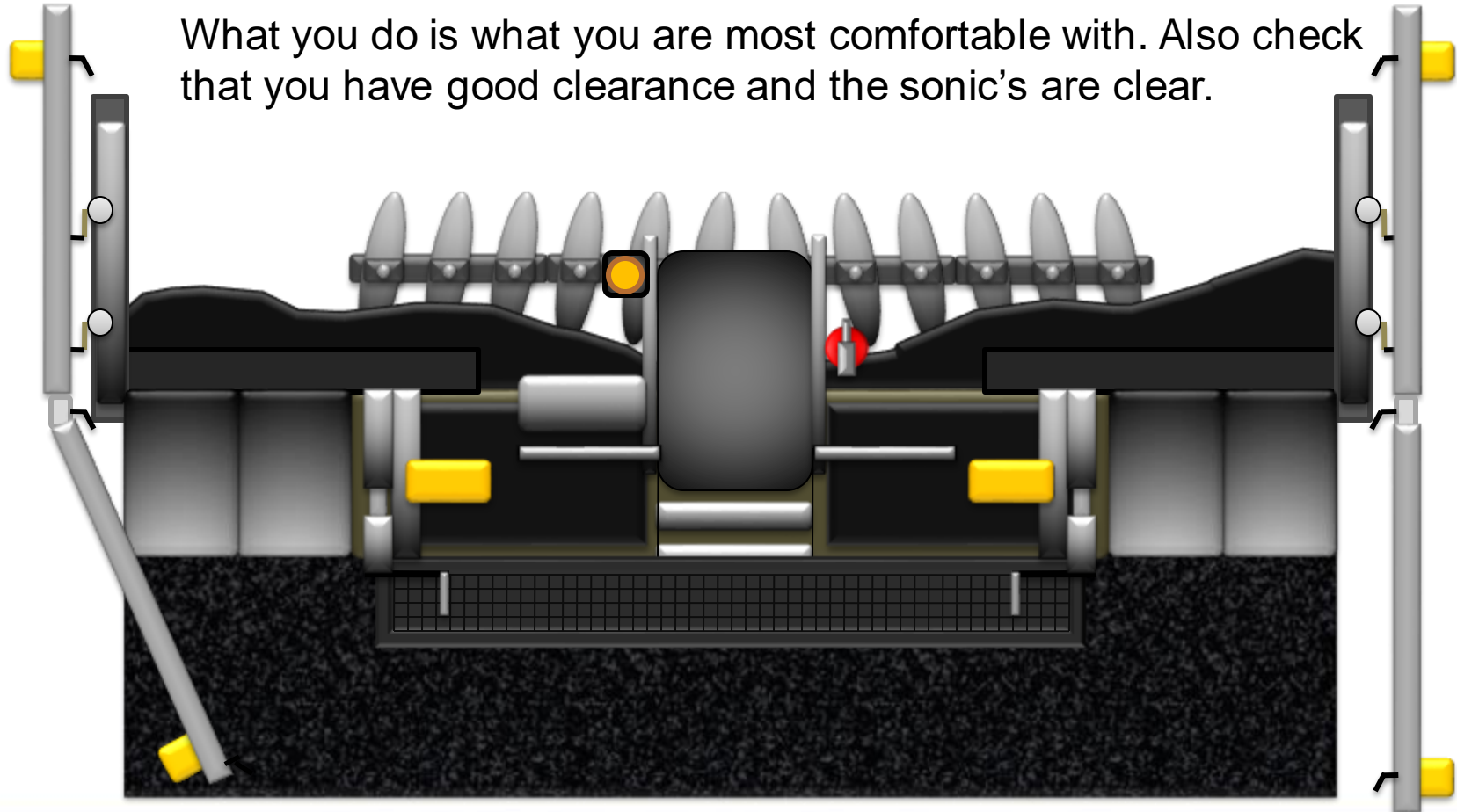
When you are running your system over an existing surface, be careful of how far your sonic's are over the other surface.



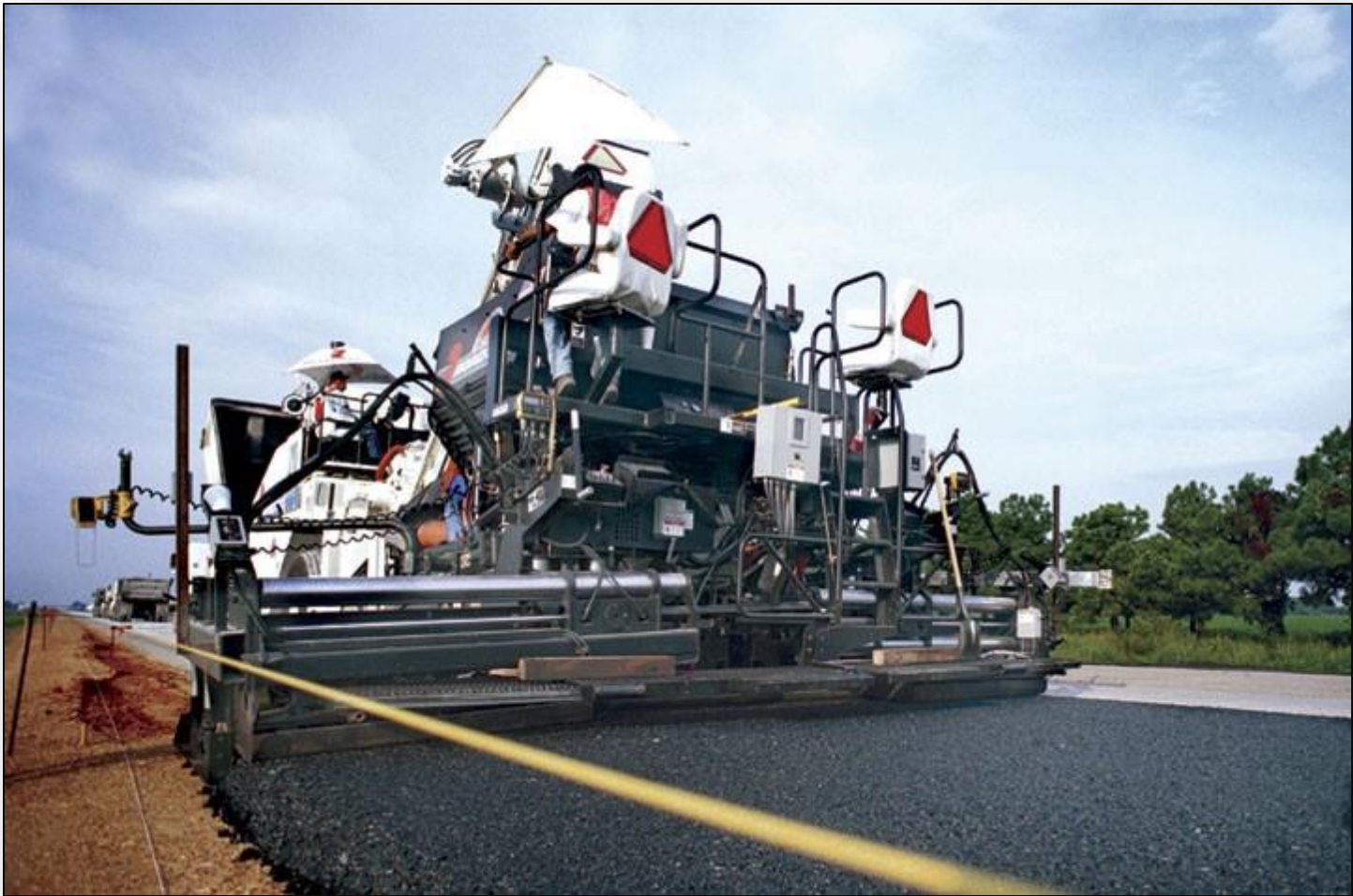
Sensor Position

Where do I put the ski?

What you do is what you are most comfortable with. Also check that you have good clearance and the sonic's are clear.



Using Grade Line



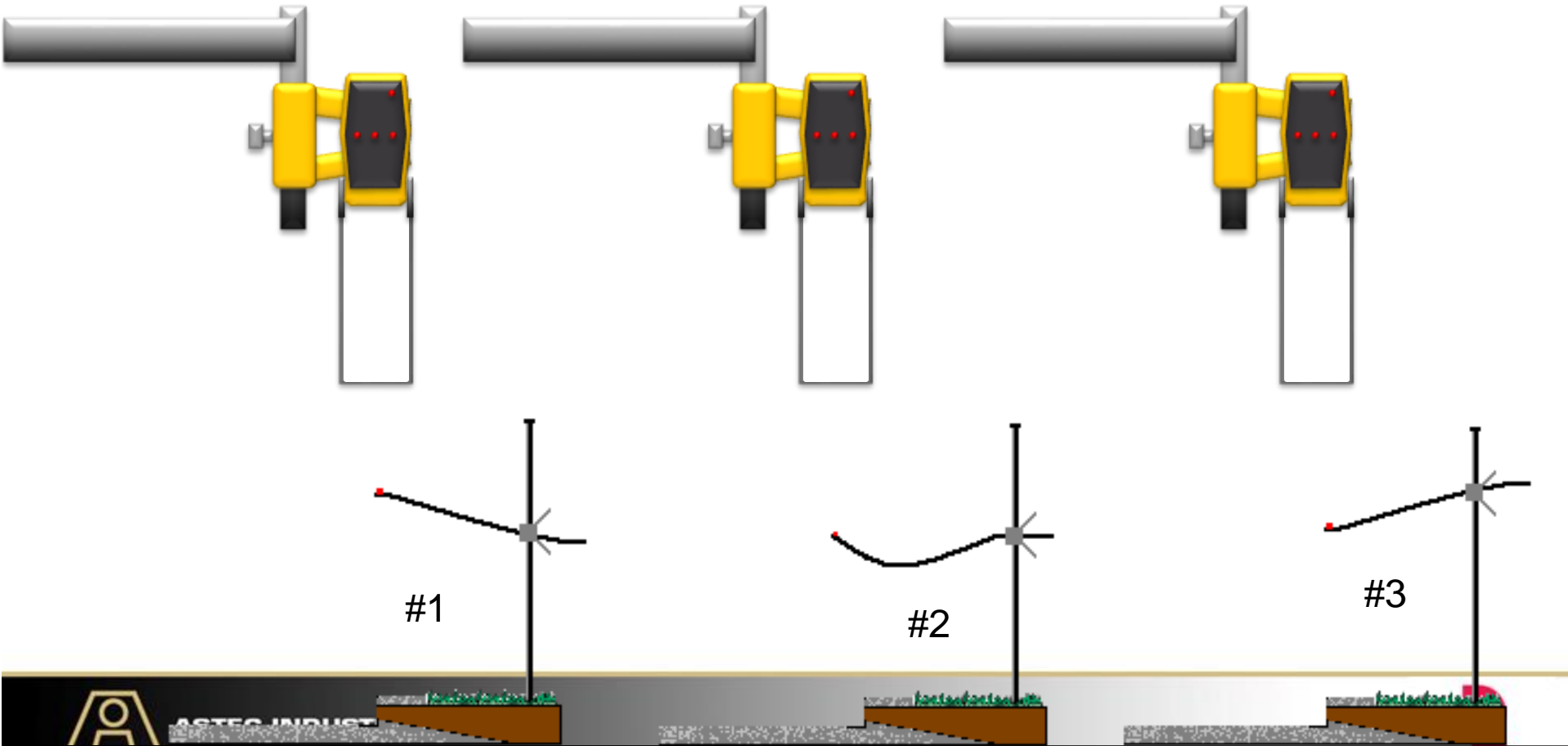
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Using Grade Line

Which one of these setups will give the best results?



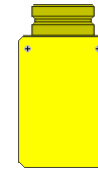
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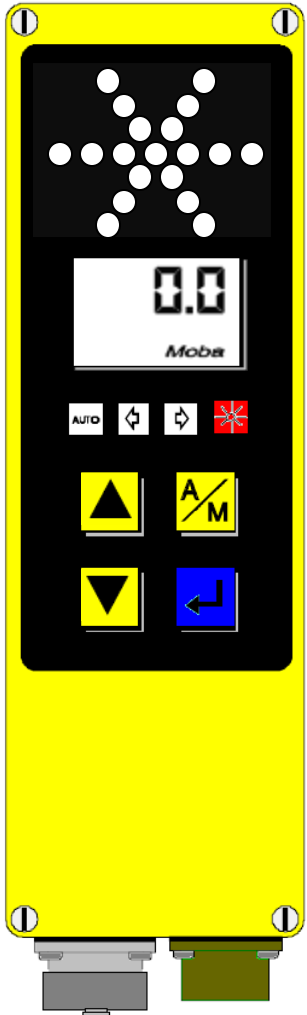
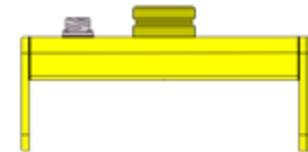
String-Line / Ground

Turning the sensor does not put the sensor in the correct mode of operation.

Press both arrow keys at the same time to put the controller in string-line mode.



Press both arrow keys at the same time to put the controller in ground mode.



String-Line / Ground



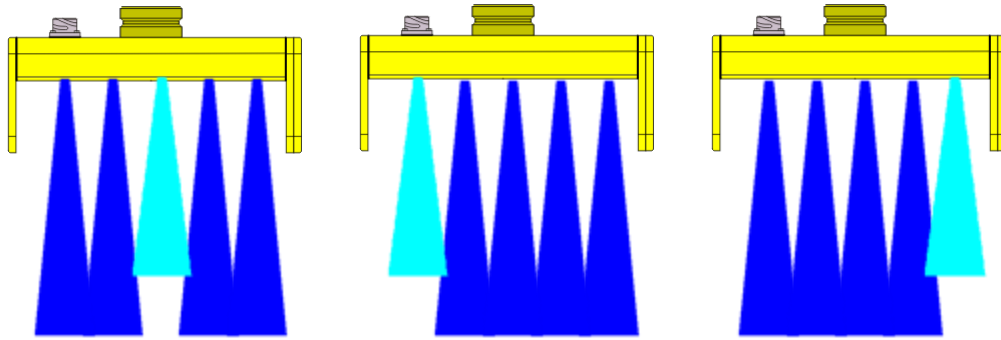
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String-Line / Ground



String-line



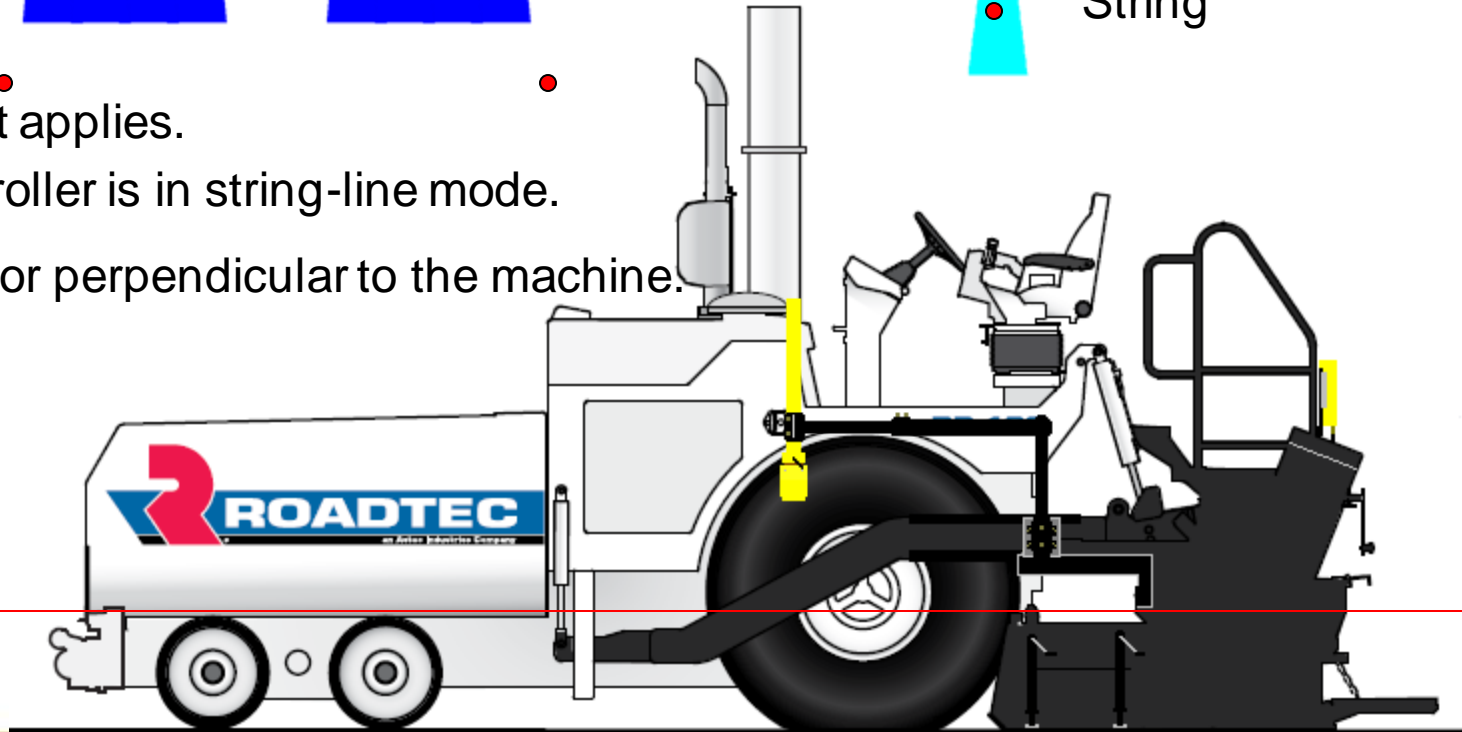
Inactive Sonic

Active Sonic String

Same sensor height applies.

Make sure the controller is in string-line mode.

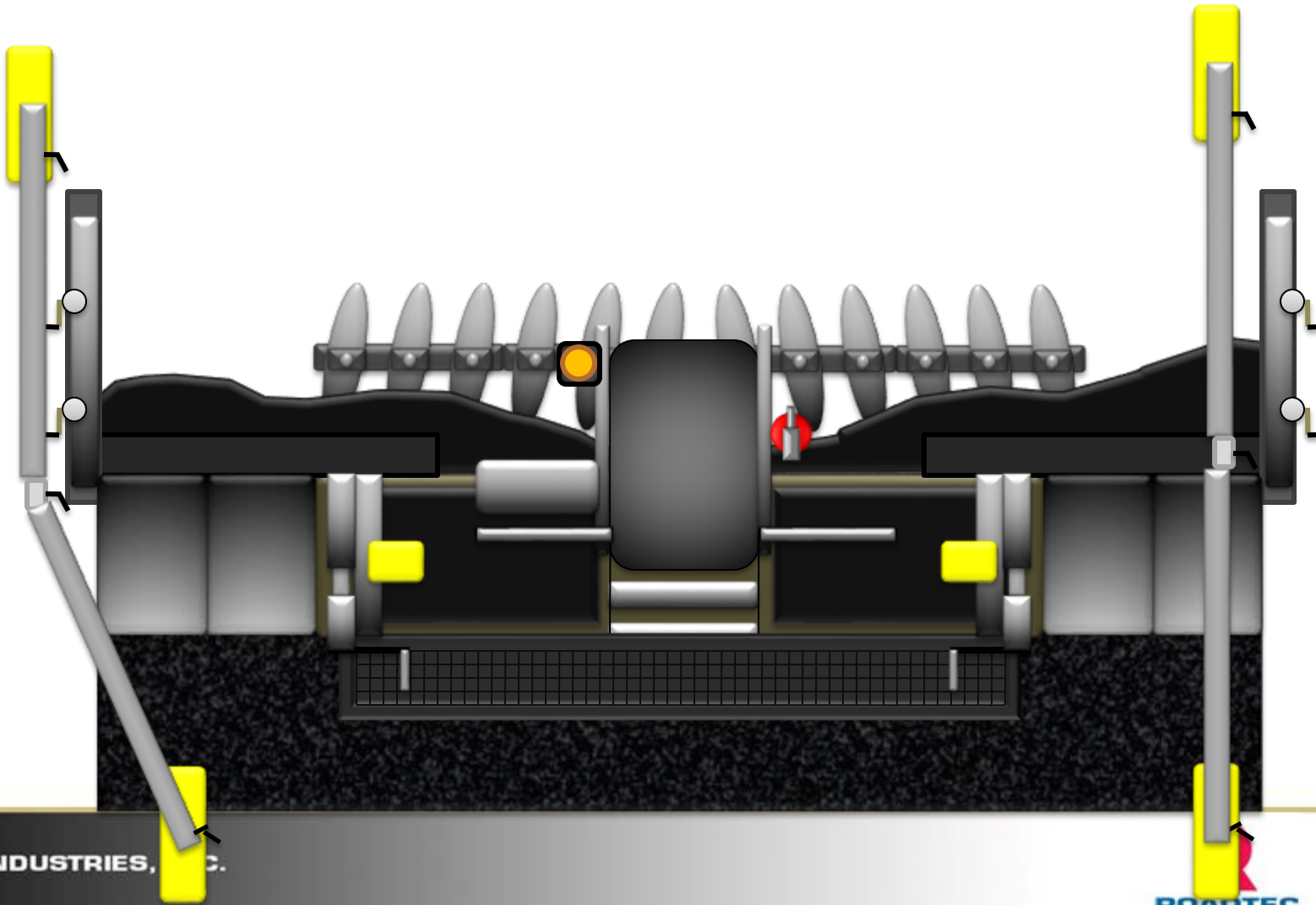
Make sure the sensor perpendicular to the machine.



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Getting Started



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$\frac{3}{4}$ " Start Shim



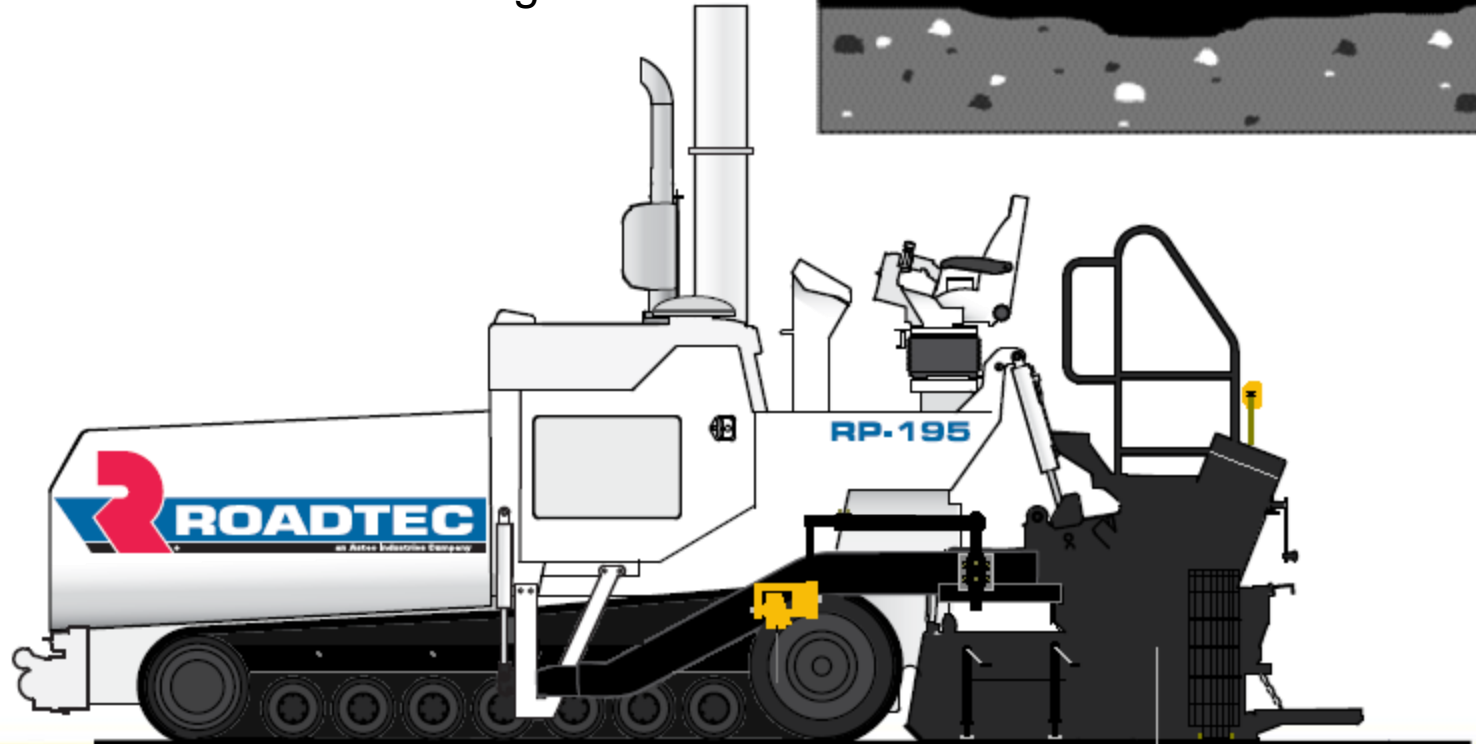
Start Shims must be as long as the screed is deep.



Start Paving

As the machine starts forward we will need to check depth.
Always check and adjust as much as you can within the first 1.5 Ft.

By doing this you will make sure that the grade is perfect.



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Checking Depth.

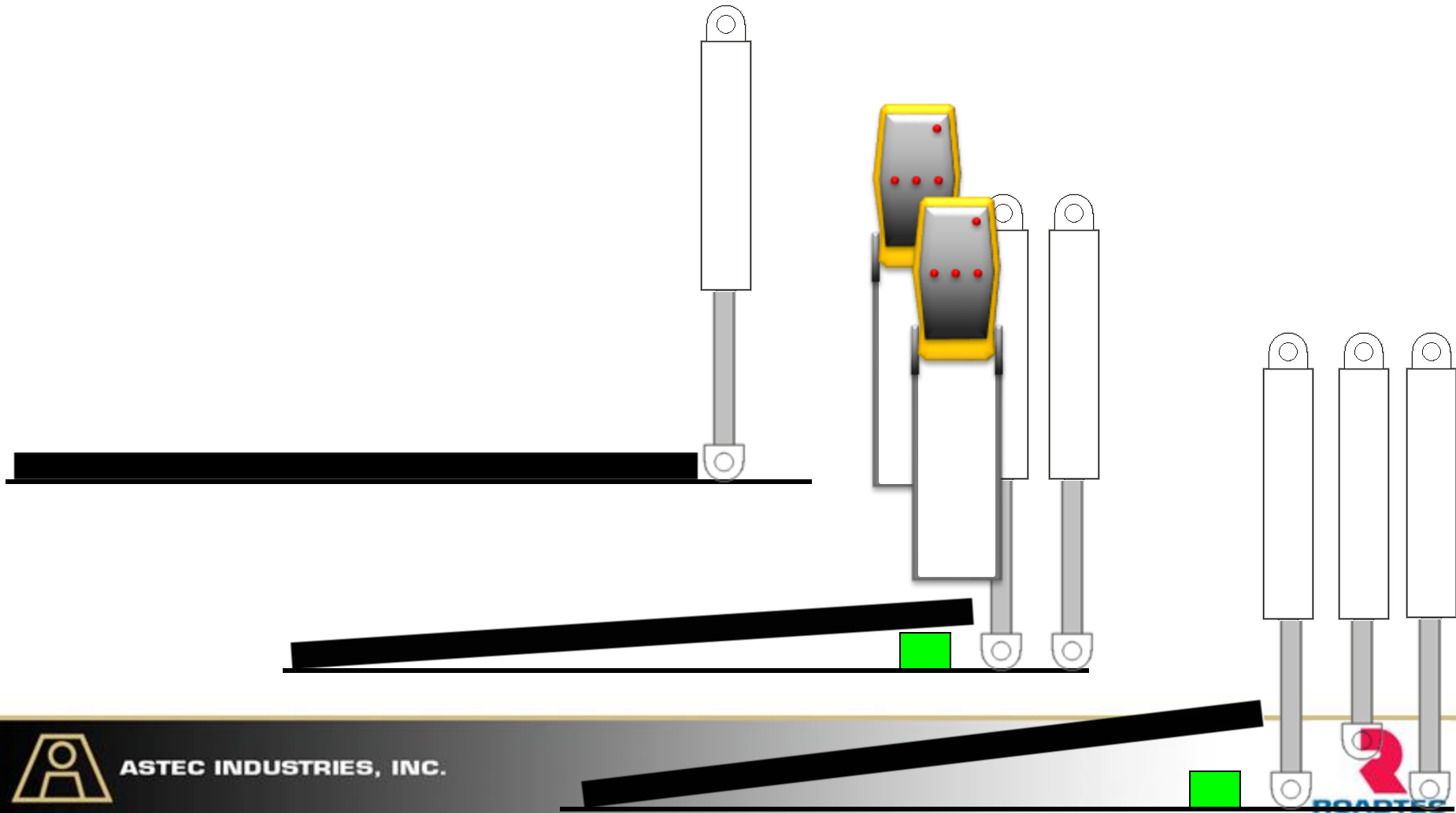


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The thickness of a Washer is 1/8" which = 13.75 lbs/yd in yield. Run Correct Depth



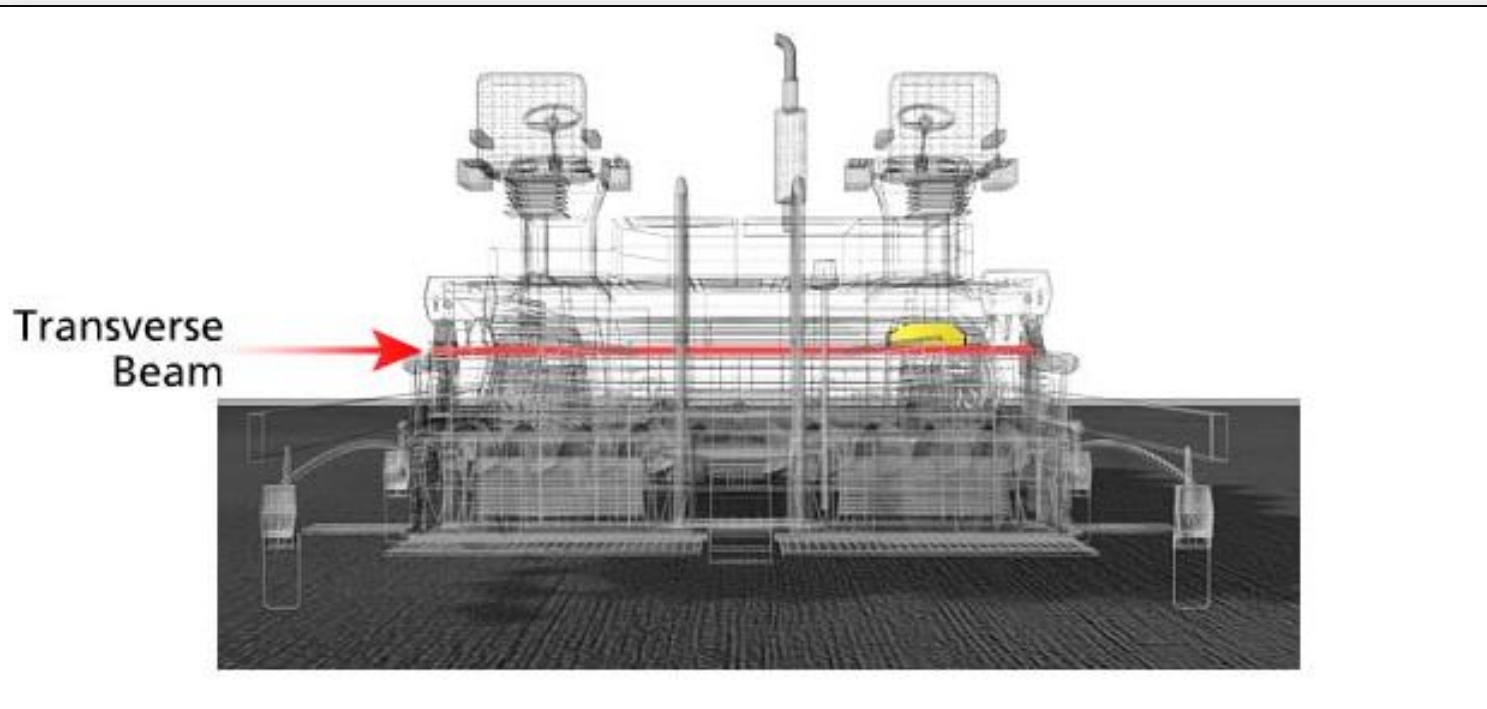
Why the system reacts different



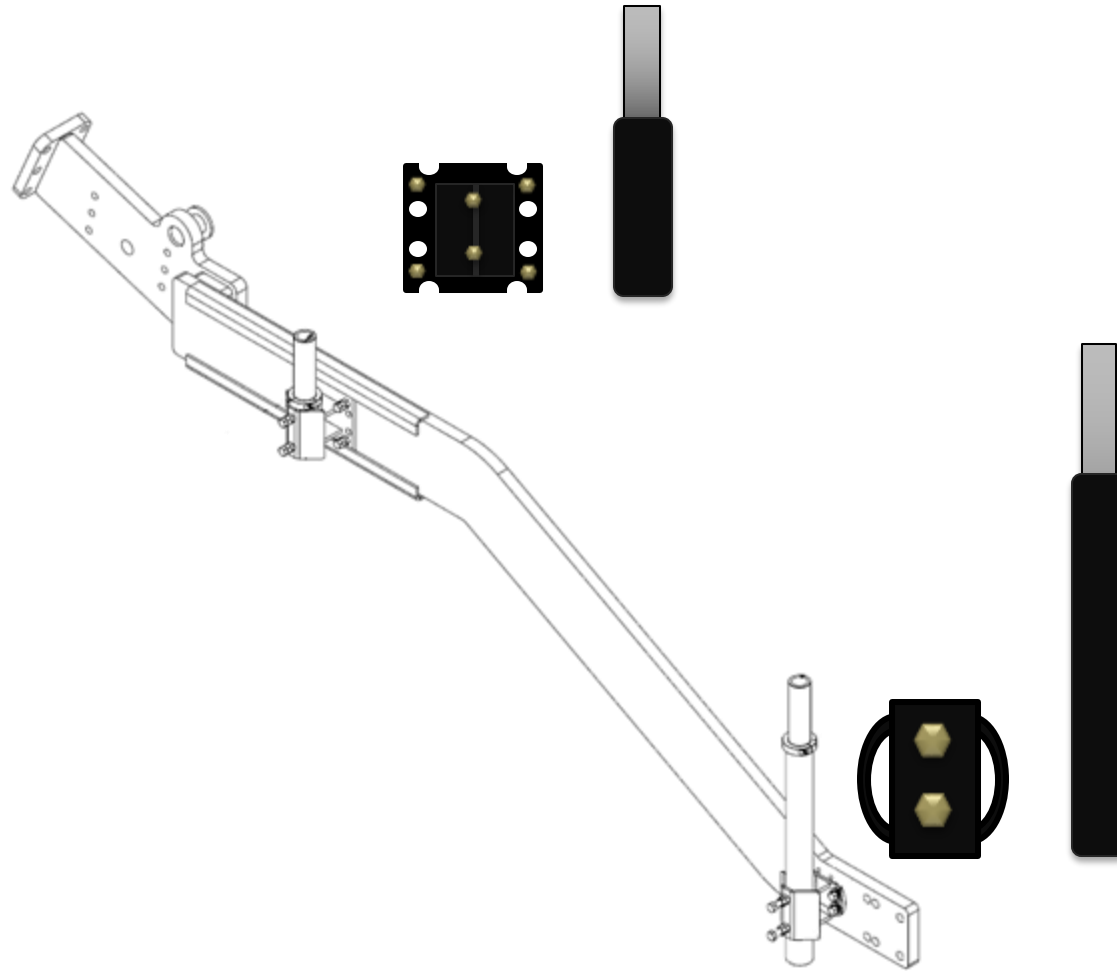
Slope Control

The slope sensor is located on the transverse beam on the screed.

This device will measure the slope between the two tow-points and send the output to the controller.



Ski Mounting



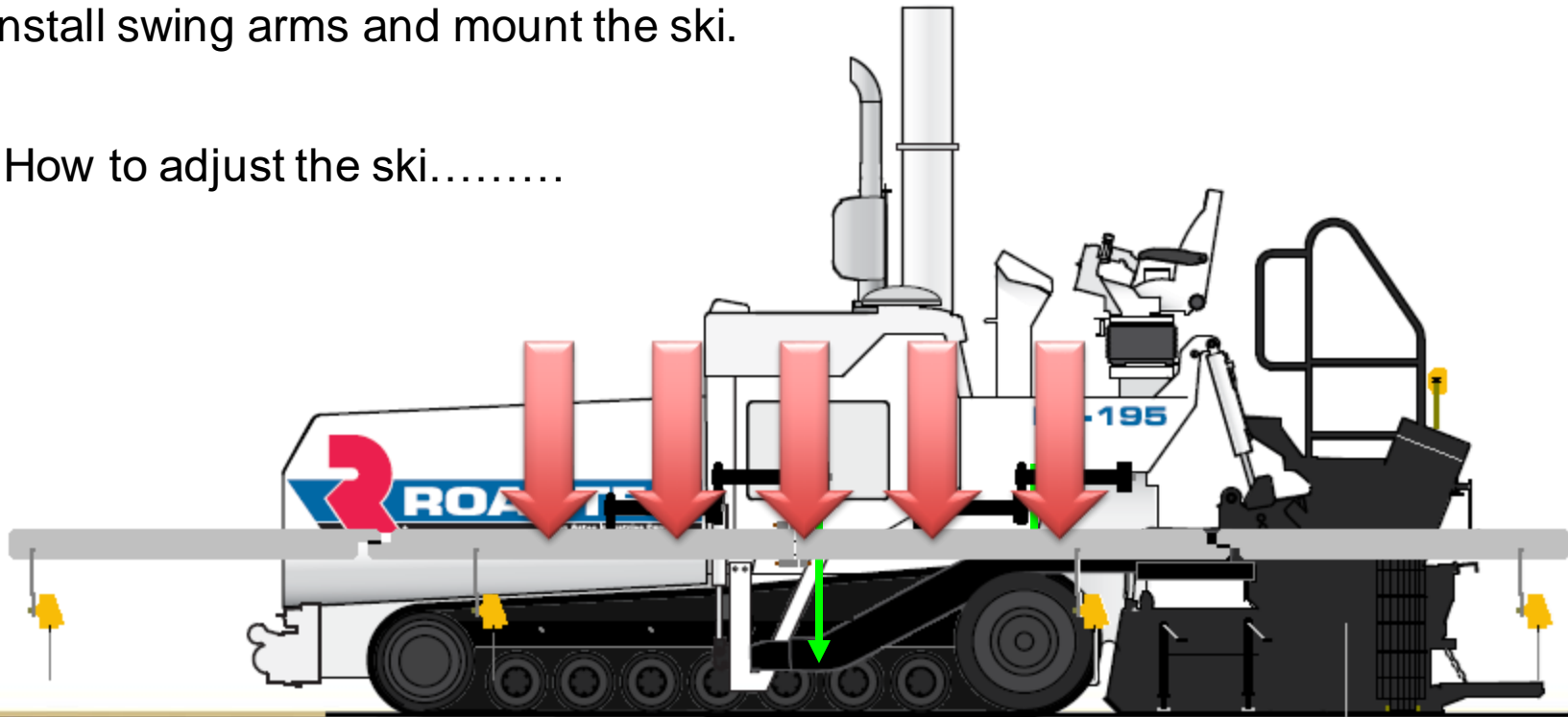
Mounting the SKI

Install the brackets that mount the system.

Make sure that the poles are 60" apart and plum on a TopCon ski.

Install swing arms and mount the ski.

How to adjust the ski.....



TopCon System 5 SAS

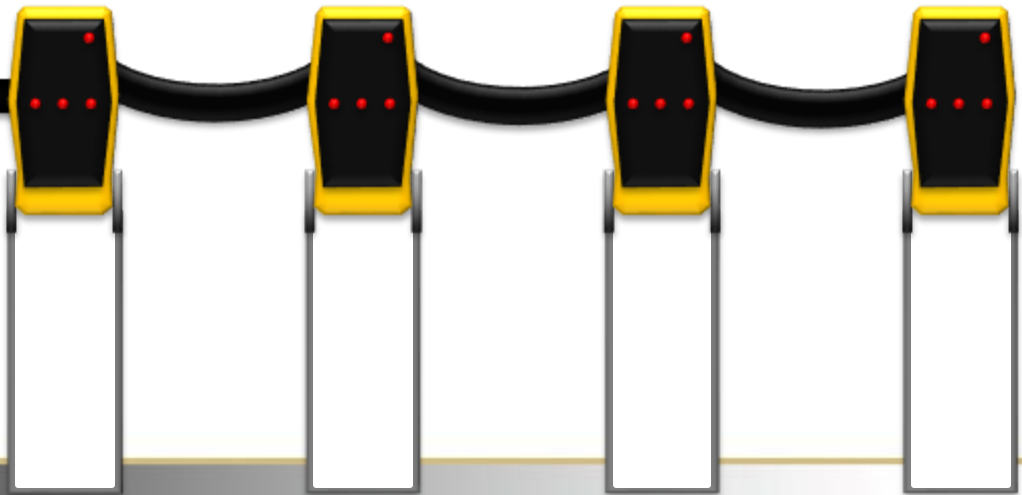
This is a non-contact averaging system

This system uses 4 trackers to get an average of the surface.

Do I need to run all 4 Sensors? Yes and NO



TopCon System 5 SAS



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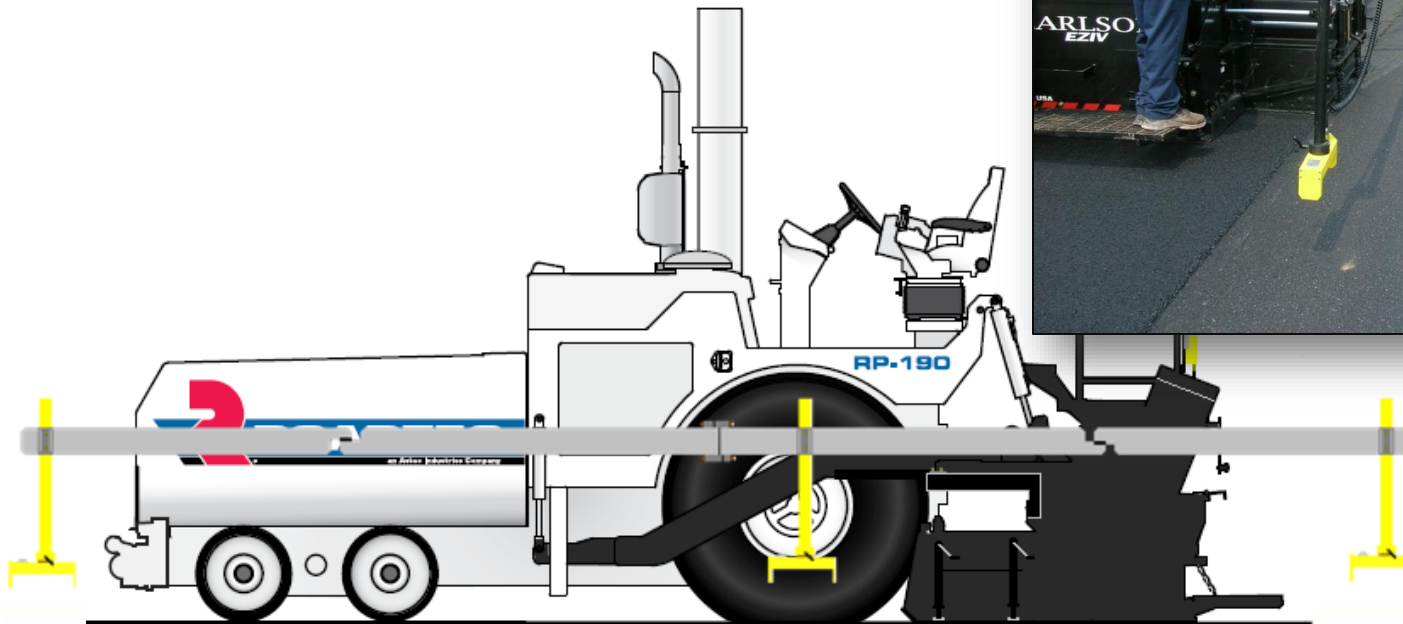


Moba Big Ski

Three sensors mounted together on a fixed beam,

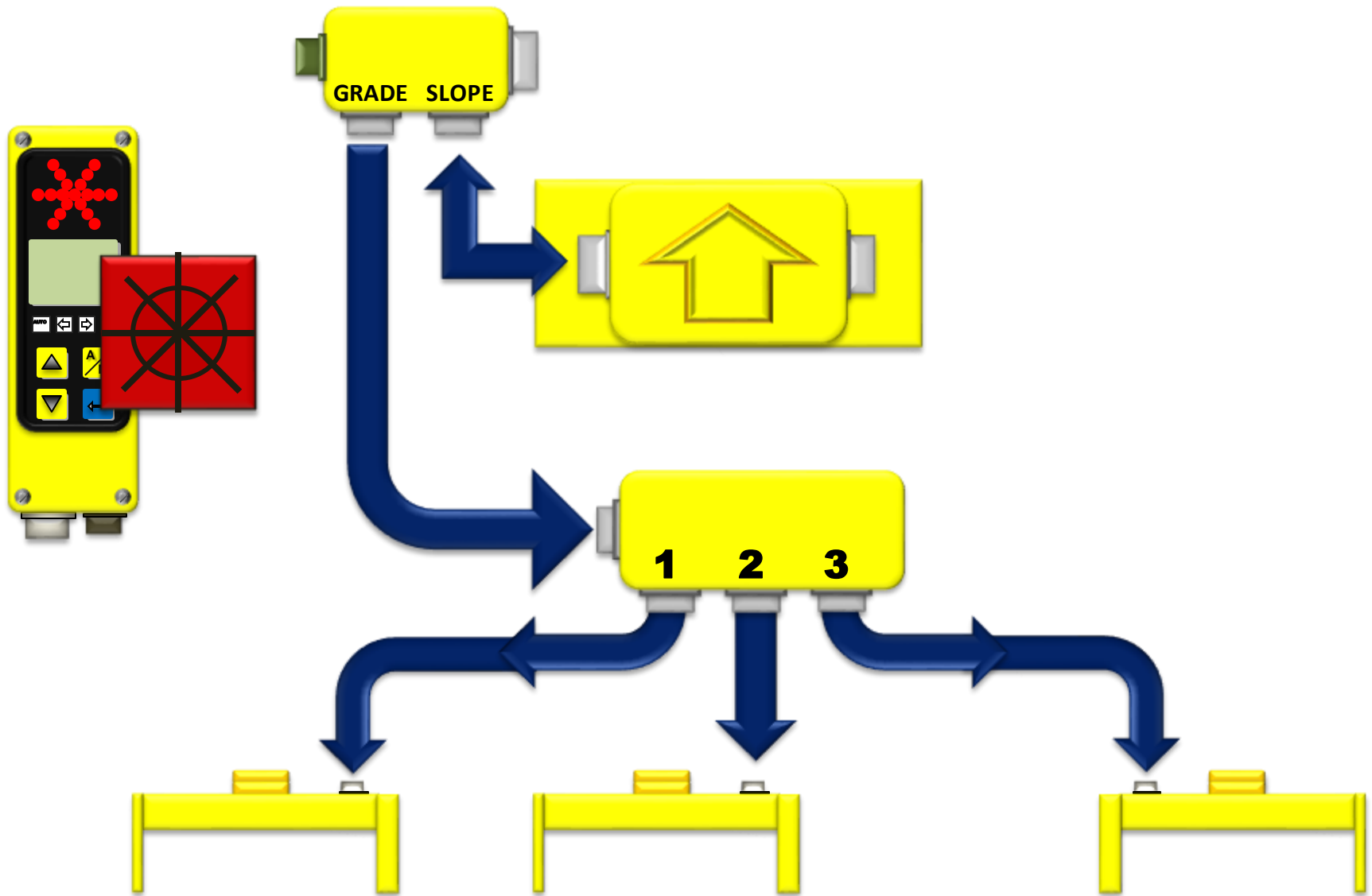
Typically you run all three sensors but you have the option to run just the middle.

The same sensor height applies. (14")



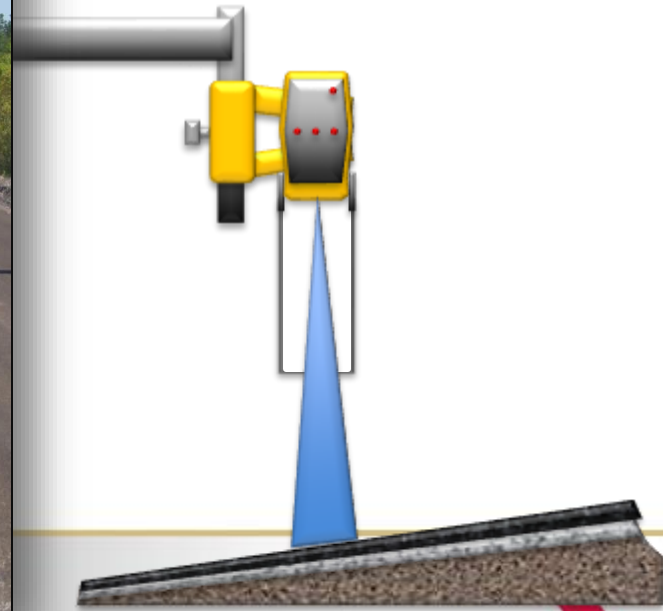
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Watch your angle of the Ski

Problems come into play for running a super elevated curve. The higher you go on the super, you will have different elevations to deal with.



Tighten all brackets.



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Averaging

Mount the sensor in the middle of the averaging platform.

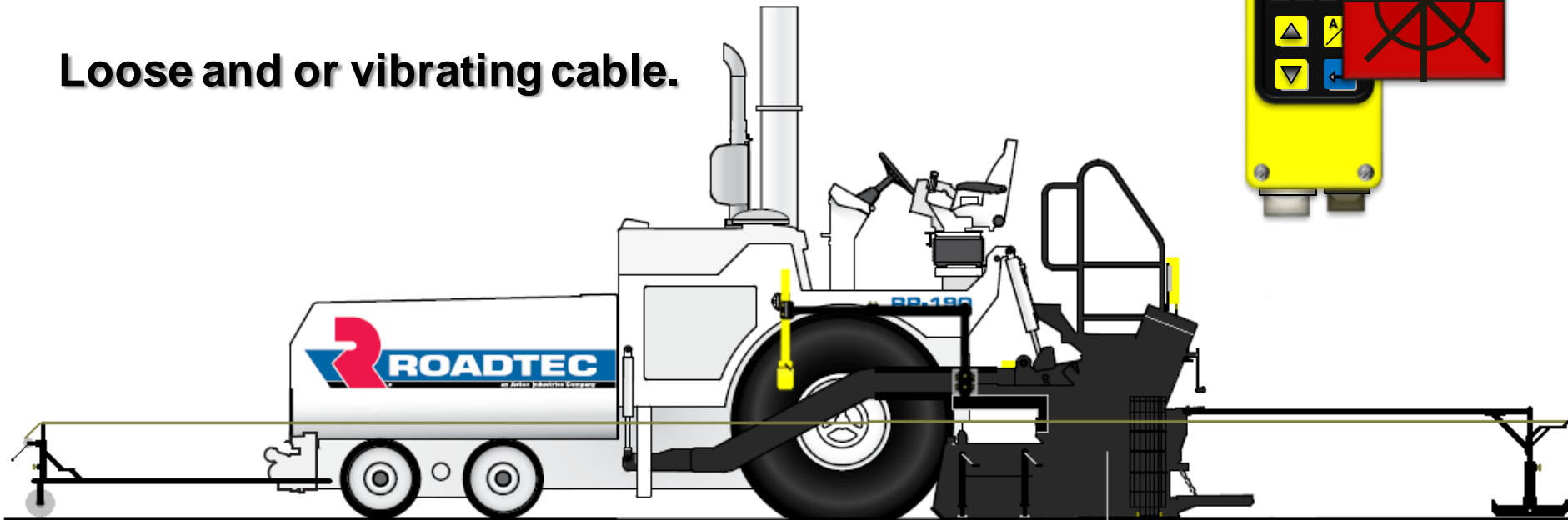
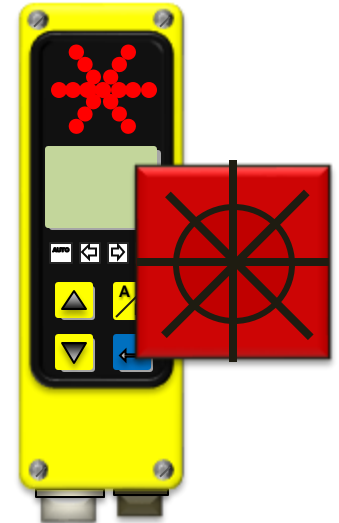
Sensor mounting is the same as in String-line.

What to watch out for:

Rear section not heated and leaves streaks in the mat.

Build up of tack and material on the front wheel.

Loose and or vibrating cable.



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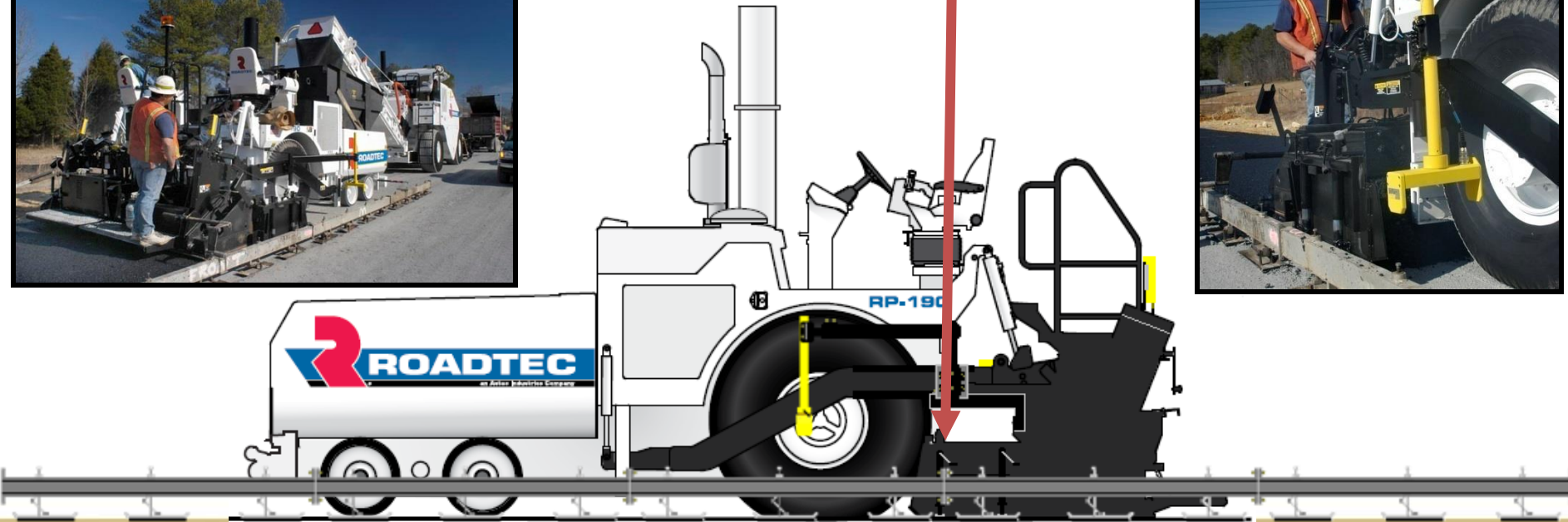
Contact Ski

Mount the ski to be centered on the sensor mount location.

Sensor is mounted the same as in a String-line configuration.



Wrong



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System Operation



This is the reaction you want to see when you average.



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QUESTIONS?



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Could you please take time to fill this
out

- <https://www.surveymonkey.com/r/Q86BB2F>
- Thank You



What Happened When I ?

Put my controller into Automatic and the Tow-point shot to the bottom.

Started into a super and the mat on the left side got very loose and the tow-point shot to the bottom.

Set my sensor up on our string and the sensor will not lock on.

Came to a stop and a crew member leaned on the string and the tow-point moved.

Came to a stop and the feed system over filled.

Came to a stop by turning the speed pot and all the sensors were still working.

Was running slope and the material was getting too thin on the slope side.

Was averaging and getting a variable depth.

Plugged in my control box and the display was blank.

Put my foot under the sensor and the tow-point moved up.

Decided that I needed to adjust the system and now the system will not work.

What Happened When I ?

Keep seeing an up arrow for a long period and then the cylinder jumps up to grade.

Keep having to adjust the system at a truck transfer.

Keep having to calibrated the slope sensor.

Am having a varying head of material and the system will not hold a joint.

