ROADTEC POCKET GUIDE FOR PAVING

A guidebook for daily operation & maintenance
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SAFETY

1. **Observe.** When approaching a jobsite observe traffic flow and road surface conditions.

2. **Ask.** Ask where to enter and exit the jobsite and where to safely park your vehicle.

3. **Understand.** Understand and obey work zone signage.

4. **Be Visible.** Be visible to equipment operators at all times.

5. **Safety Equipment.** Wear proper safety equipment.

6. **Clean Work Environment.** Pay attention to help keep a clean work area.

7. **Jobsite Hazards.** Recognize basic jobsite hazards such as tripping hazards, moving equipment and dust.

8. **Elements.** Be prepared for environmental conditions such as heat, rain, and cold.

9. **Be Alert.** Be alert to backup alarms as they can become masked by other jobsite noise. Be alert to your surroundings.

10. **You see it.. You own it.** Let site supervision know of any unsafe situations.
    **IF YOU THINK IT’S UNSAFE, IT IS.**
BEFORE YOU START - KNOW YOUR DUTIES!

**Paver Driver:**
- Coordinate with the crew
- Make the machine ready for work
- Set flow gates
- Position the paver
- Maintain a constant speed

**Screed Hand:**
- Set up the screed for work
- Communicate with the driver
- Check crown and extension height settings
- Position Augers
- Position Sensors
- Maintain constant head of mix
- Check depth and levels
- Watch for soft base

**Dump Man:**
- Ensure safe and smooth truck engagement
- Eliminate spillage potential
- Ensure sufficient supply of mix in hopper
- Communicate with the driver
Asphalt paving is not an exact science…

A screed operator, in essence, is an artist. The finished mat is a direct reflection of the operator’s ability to control the screed and reduce as many variables as possible.

The problem is that there are infinitely more variables that can affect the screed than most people realize.

To produce a mat that has a consistent texture and density, requires all variables to stay at a constant.

It’s All Balance.

These variables are simple, and they are:
- Proper Angle of Attack
- Constant Paver Speed
- Uniform Head of Material
PAVER START UP PROCEDURE

1. Be responsible for personal safety and that of bystanders.

2. Check conveyor flight chains, conveyor drive chains and auger drive chains for proper adjustment. (ALWAYS adjust chains cold!) Check for regular greasing.

3. Check fluids: engine oil, pump drive box on back of engine, hydraulic oil and coolant.

4. Check around drive motors, pumps and cylinders for any hydraulic leaks.

5. Check to see that all operating systems, switches, controls and E-Stops are functional and positioned for safe starting. Battery master, ECU bypass, console select, brake on, travel neutral and E stops.

6. Flip “Main Power” switch and wait for “Wait to Start” light to go off if equipped. If not equipped with “Wait to Start” light, wait for Murphy gauge to boot up. Start engine, allow coolant temperature to get up to 158°F (70°C). Turn on augers. Make sure all is clear (people, shovels, etc.) Now spray down all parts that will contact asphalt, flight chains, hopper, augers, screed, etc. Note: Do not put diesel on screed slides.

7. By this time the hydraulic oil should be up to operating temp. Turn on generator and let it run for about 10 seconds, and then turn on the screed heat.
STRING LINE THE SCREED

Stretch a string across the screed and ensure that the screed is flat.

Not only should you check the tail of the screed but the lead crown, or front of the screed, is also very important. For the lead crown, you should have 1/8” (3.175 mm).
Angle of Attack – for the extension

On a screed with front extensions, the angle of attack on the extensions is adjustable.

As the angle of attack is changed on the main screed, you have to watch the vertical adjustment of the extension.

A straight edge level should be flat along the main, and the tail of the extension should touch the level.

You should then see a 1/4” (6.5 mm) air-gap at the front of the extension.

The angle of attack adjustment comes through the end gate. Tighten the bolt and you increase the angle of attack. This, in turn, tightens the mat behind the extension. Loosening the bolt will decrease the angle of attack, and will loosen the mat behind the extension.
LINE OF PULL

Although the tractor is averaging the ride, what’s important is to keep a proper line of pull between the surface and the screed.

With a high tow-point and a thin lift, you would have a line of pull that is always pulling upward.

This upward pull would have an effect that would want to put pressure on the screeds’ nose. With this in mind you will find your screed is very quick to move up and sluggish to move down because of a constant upward pull.

Another thing you may see is that your depth screw will be almost maxed in, causing the screw to become difficult to turn.
LINE OF PULL

- Incorrect line of pull will result in increased wear rates and reduced pre-compaction.

- Incorrect line of pull will adversely influence automation reaction.

- Refer to screed set up page.
AUGER & FLOW GATE SETTINGS

Auger Adjustments

95% of all mat flaws originate from paving with an improper head of material

Augers should be set to 2” (50 mm) above mat height

Flow gates are designed to meter the amount of material that is delivered to the auger chamber and the augers should turn evenly. **(Rule of Thumb: 3-4 on gauge)**

Flow gates that are set too high will flood the center auger area.
Screed Set Up

1. Check crown and extension, angle of attack, slope, level and height settings.

2. Set starting blocks including compaction roll down. (Rule of Thumb: mat thickness plus 25%)

3. Set both tow points to depth of mat to be paved. *Rule of thumb: mat +1” (25 mm).* Take out slack in tow arms by moving forward.

4. Null screed and introduce positive angle of attack.

5. Check extension height and slope (2 lines below 0). Check crown setting.
1. Feeder set up

2. Turn “Pile Height” (Rule of Thumb: Dial to 3/4 on dial).

3. Set auger 2” (50 mm) higher than mat.

4. Set flow gates (Rule of Thumb: 3-4).

5. Feed auger tunnel and extensions with a uniform head of material (half auger height).

6. Position sonic feed sensor on endgate so that it is pointing toward the rolling face of the head of material – positioned at a 90° angle to face of material.

7. Turn up auger speed dial (Rule of Thumb: 3/4 on dial).

8. While paving, use dial to adjust height of material – “Pile Height” dial controls height of material not the speed of the augers. While moving, augers should always be turning.

9. Make sure “Feed Set Up” switch is in “Run” position once a uniform head of material is achieved.
Adjusting the proper head of material

Looking across the tunnel, you should see an even head of material. You could adjust this by the flow gates, decrease the pile height or adjust the auger speed.

It may be possible that a combination of all of them will fix the issue.

You should have an even amount of material across the auger chamber and your augers should be running **100%** of the time.
(Force P) The pulling force is determined by the speed at which the tractor is pulling the screed.

As you increase paving speed, the screed will want to fall because you are reducing the head of material.

When you open the extensions, you reduce the head of material and the screed will fall.

When at a constant speed of paving, material flow, screed width and depth is maintained, you will have a balance on all forces.
For a screed to re-balance, it takes 5 tow-arm lengths for the screed to re-balance the forces working against it.

The distance for these forces to balance is 50’ - 60’ (15.25 - 18.25 m) or 1½ paver lengths. You must be patient for the full reaction to take place.

Do not turn and check… then turn and check again. In other words, don’t over react.
PAVER OPERATOR

1. **Paving speed.** Select a paving speed that balances delivery, capacity, compaction and pave with little to no stopping.

2. **Screed operator.** Work with the screed operator for establishing and maintaining the head of material.

3. **Reference.** Steer the paver holding to a predetermined reference.

4. **Trucks.** Direct the truck drivers to raise bed and exit when empty.

5. **If stopping and starting.** Utilize rapid but smooth starts and stops to help prevent end of load roughness. This helps not only to minimize mat deviations but also to maintain a constant, uniform head of material.

6. **Be observant.** Look for changes in the mix characteristics being delivered.

7. **Monitor equipment.** Monitor the paver for any sounds, vibrations, leaks and report them.

8. **Dump person.** Work with the dump person to make sure trucks do not bump the paver, let the hopper run low and keep material out from the front of the paver.

9. **Work as a team.** A crew is a team, and it will take the team to have success.

10. **Strive to be the best.**
PAVE BY THE NUMBERS

1. Heat the screed.
2. Set the tow points.
3. Set the paving width.
4. Set the crown height.
5. Set extension height.
6. Set extension slope.
7. Set screed and remove slack.
8. Null the screed.
9. Set the angle of attack.
11. Set auger height.
12. In low idle, fill the auger chamber.
13. Adjust the feeder controls.
14. Set accessory functions.
15. Pull off with starter blocks.
16. Adjust depth as needed.
17. Double check settings.
18. Adjust the grade system.
19. Null or survey your controls.
20. Go to automatic.
21. Start slow and consistent.
1. Activate Diff Lock
2. Activate Front Wheel Assist
3. Disengage Truck
4. Activate Screed Assist/Boost
5. Raise Augers
6. Remove Spillage
7. Activate Steer Assist
8. Lift Screed
9. ________________________
Question:
When should I empty the hopper?

Answer:
As seldom as possible!

When you limit the amount of times you empty the hopper, you will have a much better mat quality.

Stop the paver before the material drops below the flow gate, and keep the conveyor deck covered with a minimum of 6” (152 mm) of material.
TRUCK EXCHANGES

Keep control of your drivers. Explain to your drivers what you need and how they should approach the machine each time they unload.

Slamming into the machine is poor paving practice.

Ensure the truck stops approximately 20” (.5 m) in front of the paver, then allow the paver to engage the truck. The truck should then release their brakes to allow the paver to push the truck. The dump operator will then signal the driver to raise the truck bed.

When unloading a truck, discharge the material as a mass instead of dribbling the material into the paver.

Allowing the trucks to bump the paver when backing up will produce bumps and ridges that will not roll out.

Spillage will result in cool mix being compacted by the paver wheels resulting in cold spots and uneven densities.
BEST PRACTICE FOR SMOOTHNESS

1. Keep the hopper full.
2. Control hopper wing cycling.
4. Use a hopper insert.
5. Consistent head of material.
6. Time the conveying and auger system.
7. Keep the paver speed steady.
8. Correct lead crown settings and proper strike off adjustments.
9. Correct auger length.
10. Use a thermal gun.
11. Don’t broadcast material.
12. Use your grade control.
13. Train your people.
1. Be consistent. Decide on a plan and stick with it.

2. Commit to a good joint. Quality contractors build quality joints.

3. Maintain a proper taper. Tapers range from near vertical to 12:1. Regardless of what taper is used, keep it consistent. Keep vertical edges and notches as vertical as possible. Keep edges confined as long as possible. Maintain a proper head of material.

4. Maintain a proper overlap. 1/2” to 1” (13 mm to 25.5 mm) overlap. Don’t Rake It. If the joint matcher is set correct, speed is consistent and head of material consistent you will get a good joint.

5. Use proper rolling techniques.
1. Press \( \text{A}_\text{M} \) button and \( \rightarrow \) button together so that you see \( 5 - 5 \) or sensor select.
2. Now use up and down arrows until \( 5 - 5 \) is displayed. This means that the sonic grade sensor is the active sensor.
3. Press and hold blue \( \rightarrow \) button to set On-Grade: the display will read \( 0.0 \).
4. Press \( \text{A}_\text{M} \) button to enter automatic mode.
5. Begin paving and adjust thickness using up and down arrow buttons.
6. While in automatic press and hold blue \( \rightarrow \) button while using arrow buttons to change reference number match the desired thickness.
1. Press $\text{M}$ button and $\downarrow$ button together so that you see $5\rightarrow5$ or sensor select.
2. Now use up and down arrows until $123$ is displayed. Now all 3 sensors are active and this will turn on.
3. Press and hold blue $\downarrow$ button to set On-Grade: the display will read $0.0$
4. Press $\text{M}$ button to enter automatic mode.
5. Begin paving and adjust thickness using up and down arrow buttons.
6. While in automatic press and hold blue $\downarrow$ button while using arrow buttons to change reference number match the desired thickness.
1. Press \textbf{ÅM} button and \textbf{👈} button together so that you see \textbf{5-5} or sensor select.

2. Now use up and down arrows until \textbf{SLO} is displayed. This means that the slope sensor is the active sensor.

3. Press and the blue \textbf{👈} button to set On-Grade: the display will read whatever the slope sensor is sensing.

4. Press \textbf{ÅM} button to enter automatic mode.

5. Begin paving and check the slope behind you with a level.

6. While in automatic press and \textbf{hold blue} \textbf{👈} button while using arrow buttons to change reference number to the measured slope.
1. With the Auto / Manual key, switch the controller to the operating mode “Manual”.

2. Press the F1 key and use the up or down arrows to find the Sonic Ski Ground Mode and then press F3.

3. Press and hold the Enter key until you see zero.

4. Press the Automatic Key. Use the up or down to adjust the thickness accordingly.

5. Measure to get the actual thickness. **IN AUTOMATIC** Hold the Enter key and use the up or down to adjust the number to match what you measured.
1. With the Auto / Manual key, switch the controller to the operating mode “Manual”.

2. Press the F1 key and use the up or down arrows to find the Big Ski and then press F3.

3. Press and hold the Enter key until you see zero.

4. Press the Automatic Key. Use the up or down to adjust the thickness accordingly.

5. Measure to get the actual thickness. **IN AUTOMATIC** Hold the Enter key and use the up or down to adjust the number to match what you measured.
1. With the Auto / Manual key, switch the controller to the operating mode “Manual”.

2. Press the F1 key and use the up or down arrows to find the Slope and then press F3.

3. Press and hold the Enter key until you see zero.

4. Press the Automatic Key. Use the up or down to adjust the thickness accordingly.

5. Measure to get the actual thickness. IN AUTOMATIC Hold the Enter key and use the up or down to adjust the number to match what you measured.
1. Turn on the system.

2. Press the grade/slope button and ensure the grade light is on.

3. Press the survey key.

4. Ensure you now have a green on grade bar.

5. Press the auto key and the light is now red.

6. Adjust the grade as needed.

7. Measure the depth behind the paver.

8. Hold the set key and turn the grade dial to match what was measured.
Ensure all sensors are plugged in

**Note:** If only 3 sensors can be used, connect them and cycle the power to re-register the sensors.

1. Turn on the system.
2. Press the grade/slope button and ensure the grade light is on.
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3. Press the survey key.

4. Ensure you now have a green on grade bar.

5. Press the auto key and the light is now red.

6. Adjust the grade as needed.

7. With a level check the slope behind the paver.

8. Hold the set key and turn the grade dial to match what was recorded at the level.
1. Turn on the system.

2. Press the grade/slope button and ensure the grade light is on.

3. Press the survey key.

4. Ensure you now have a green on grade bar.

5. Press the auto key and the light is now red.

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3. Press the survey key.

4. Ensure you now have a green on grade bar.

5. Press the auto key and the light is now red.

6. Adjust the grade as needed.

7. With a level check the slope behind the paver.

8. Hold the set key and turn the grade dial to match what was recorded at the level.
1. **Communicate.** Speak with the paving crew and foreman for job requirements.

2. **Material Temperature.** Monitor material temp at the paver and screed.

3. **Rolling Drum Mode.** Vibratory or static.

4. **Optimize Water.** Optimize water to avoid material pick-up and excessive water use.

5. **Set Rolling Pattern.** Determine by paver width, drum width, drum overlap and unsupported edges.

6. **Set Rolling Speed.** Set speed to achieve proper impact spacing to meet smoothness requirements.

7. **Coordinate Rolling Pattern.** Speak with QC/QA about the final rolling process.

8. **Monitor Rolling Temp.** Work within optimum temperature zones.

9. **Adjust Rolling Operation.** Make adjustments to satisfy density, smoothness and production.

10. **Maintain Consistency.** Stay focused, alert and on task.
PAVER SHUTDOWN PROCEDURE

1. Move the machine to a designated (and safe) cleaning area.

2. Always apply the parking brake.

3. Idle down engine for 3 minutes, turning off the heat and then the generator.

4. Remove all tools and accessories.

5. Scrape off excess asphalt from auger posts, screed extensions, steer components, push beam etc.

6. Lightly spray release agent around augers, conveyors, hopper, screed extensions, side plates etc. NOTE: Do not apply release agent to chrome slides.

7. Raise screed extension verticals to fully up (in case of transport).

8. Grease machine as per maintenance guide.

9. Isolate batteries.

10. Secure machine.
### Paver Speed vs. T.P.H. & Mat Thickness

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<th>Paver Speed F.P.M.</th>
<th>Mat Thickness in Inches</th>
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Based on 12 foot wide lane - Mix compacted to 140 lbs./cf © 2007 Roadtec, Inc.
Calculating Paver Speed - Mat Thickness in Millimeters

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<th>Mat Thickness in Millimeters</th>
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</tbody>
</table>

Based on 3.7 M wide lane - Mix compacted to 2243 kg/cu. m

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