

## PAVING BY THE NUMBERS

- |                        |                                  |  |
|------------------------|----------------------------------|--|
| 1. HEAT THE SCREED     | 7. LOWER SCREED AND REMOVE SLACK | 12. SET FEEDER CONTROLS                  |
| 2. SET THE TOW POINTS  | 8. NULL THE SCREED               | 13. FILL AUGER CHAMBER/<br>PLACE IN AUTO |
| 3. SET PAVING WIDTH    | 9. POSITION END GATES            | 14. SET ACCESSORY<br>FUNCTIONS           |
| 4. SET CROWN           | 10. SET AUGER HEIGHT             | 15. PULL OFF STARTING<br>REFERENCE       |
| 5. SET EXTENDER HEIGHT | 11. POSITION FEEDER<br>SENSORS   |  |
| 6. SET EXTENDER SLOPE  |                                  |  |

## SLOPE CONVERSION TABLE

MM per 3.65 Meter	MM per Meter	Percent	Inches per foot	Inches per f12oot
18	5	0.5%	1/16	3/4
37	10	1%	1/8	1-1/2
55	15	1.5%	3/16	2-1/4
73	20	2%	1/4	3
91	25	2.5%	5/16	3-1/2
110	30	3%	3/8	4-1/4
128	35	3.5%	7/16	5
146	40	4%	1/2	5-3/4
164	45	4.5%	9/16	6-1/2
183	50	5%	5/8	7-1/4
201	55	5.5%	11/16	8
219	60	6%	3/4	8-3/4
237	65	6.5%	3/4	9-1/4
256	70	7%	13/16	10
274	75	7.5%	7/8	10-3/4
292	80	8%	15/16	11-1/2
310	85	8.5%	1	12-1/4
329	90	9%	1-1/16	13
347	95	9.5%	1-1/8	13-3/4
365	100	10%	1-3/16	14-1/2

### FORMULA

$$\text{PERCENT} = \frac{\text{MM PER METER}}{10}$$

### FORMULA

$$\text{PERCENT} = \frac{\text{MM PER FOOT}}{12} \times 10$$

## ASPHALT PAVING

### TROUBLESHOOTING

Use the following troubleshooting guide to help determine the cause(s) of common defects in the bituminous layer. There may be more than one factor contributing to a defect. When troubleshooting any problem, be methodical and change one condition at a time.

#### SURFACE TEXTURE

<b>Problem</b>	<b>Remedy</b>
<b>1. Open texture behind extension</b>	<ul style="list-style-type: none"> <li>- Increase extension angle of attack</li> <li>- Increase heat; check screed heat system for malfunction</li> <li>- Increase depth to prevent dragging</li> </ul>
<b>2. Shiny texture behind extension</b>	<ul style="list-style-type: none"> <li>- Decrease extension angle of attack</li> </ul>
<b>3. Texture stripes, continuous</b>	<ul style="list-style-type: none"> <li>- Flatten trailing edge of screed</li> <li>- Increase heat; check screed heat</li> <li>- Inspect screed for damage or wear</li> </ul>
<b>4. Texture Stripes, intermittent</b>	<ul style="list-style-type: none"> <li>- Check for high spots in grade; correct grade defects; clean up spills</li> <li>- Increase depth</li> </ul>
<b>5. Open texture full width</b>	<ul style="list-style-type: none"> <li>- Raise tow-point to correct line of pull</li> <li>- Increase angle of attack at take-off</li> <li>- Reduce head of material to prevent overreaction by grade control system</li> <li>- Increase plant output temperature</li> <li>- Activate vibratory system</li> <li>- Increase vibratory frequency</li> <li>- Reduce paving speed</li> <li>- Increase screed heat temperature</li> <li>- Increase layer thickness</li> </ul>
<b>6. Shiny texture full width</b>	<ul style="list-style-type: none"> <li>- Lower tow-point to correct line of pull</li> <li>- Decrease angle of attack at take-off</li> <li>- Decrease vibratory frequency</li> </ul>
<b>7. Open texture either side of center</b>	<ul style="list-style-type: none"> <li>- Increase auger height</li> <li>- Decrease lead crown</li> </ul>
<b>8. Open texture in center</b>	<ul style="list-style-type: none"> <li>- Increase lead crown</li> <li>- Check condition of reversing augers</li> <li>- Clean deflector plates</li> </ul>

## SEGREGATION

Problem	Remedy
<b>1. Segregation one side of layer</b>	<ul style="list-style-type: none"> <li>- Look for segregation in storage silo</li> <li>- Check opening of clam gates in silo</li> <li>- Inspect loads in haul unit bodies</li> <li>- Load haul units from opposite direction</li> </ul>
<b>2. Stripe at longitudinal joint</b>	<ul style="list-style-type: none"> <li>- Reduce overlap onto cold side</li> <li>- Adjust end gate height</li> <li>- Adjust notch height if using notched wedge joint</li> </ul>
<b>3. Continuous stripes</b>	<ul style="list-style-type: none"> <li>- Adjust auger speed to 20-40 rpm</li> <li>- Check for high spots in the grade</li> <li>- Check for worn or damaged augers</li> <li>- Check for trapped material</li> <li>- Add auger / mainframe extensions</li> </ul>
<b>4. Intermittent stripes</b>	<ul style="list-style-type: none"> <li>- Check for erratic auger speed</li> <li>- Adjust auger speed to 20-40 rpm</li> <li>- Clean up spills in front of paver</li> <li>- Check for high spots in the grade</li> </ul>
<b>5. Stripe in the center</b>	<ul style="list-style-type: none"> <li>- Clean deflector plates</li> <li>- Check reversing augers / paddles</li> <li>- Add lead crown</li> </ul>
<b>6. Repetitive patches</b>	<ul style="list-style-type: none"> <li>- Check haul unit loading at plant</li> <li>- Inspect for segregation in truck bodies</li> <li>- Keep hopper at least half full</li> <li>- Stop folding hopper wings</li> <li>- Fold hopper wings over full conveyors</li> <li>- Increase windrow overlap</li> </ul>
<b>7. Random patches</b>	<ul style="list-style-type: none"> <li>- Inspect material coming out of silos</li> <li>- Check for on / off auger operation</li> <li>- Adjust auger speed to 20-40 rpm</li> <li>- Stop paving before emptying hopper Insert</li> <li>- Stop paving before emptying transfer vehicle</li> </ul>

## ROUGHNESS

Problem	Remedy
<p><b>1. Ripples</b></p>	<ul style="list-style-type: none"> <li>- Adjust feeder controls to get consistent head of material</li> <li>- Reduce head of material</li> <li>- Check for excessive auger wear</li> <li>- Check for worn screed plates</li> <li>- Adjust paving speed to be consistent</li> <li>- Reduce haul unit brake pressure</li> <li>- Check for variable material temperature; correct at asphalt plant</li> <li>- Check for excessive play at screed pivot point</li> <li>- Check for excessive play at thickness screws</li> <li>- Increase tamper bar frequency or reduce paving speed to achieve correct tamper overlap</li> <li>- Adjust tow-point height to get parallel line of pull</li> <li>- Adjust angle of attack to get correct 3 mm (0.125") nose-up attitude</li> </ul>
<p><b>2. Wavy surface (short)</b></p>	<ul style="list-style-type: none"> <li>- Avoid over-correction with manual depth screws</li> <li>- Calibrate grade control system</li> <li>- Adjust feeder controls to deliver consistent head of material</li> <li>- Adjust auger speed to 20-40 rpm</li> <li>- Reduce head of material</li> <li>- Position grade sensor closer to tow-point</li> </ul>
<p><b>3. Wavy surface (long)</b></p>	<ul style="list-style-type: none"> <li>- Check grade reference for long depressions or high spots</li> <li>- Reduce time stopped waiting for trucks; reduce paving speed</li> <li>- Activate screed counterbalance system</li> <li>- Increase pressure in screed counterbalance system</li> <li>- Activate screed hold system, if equipped</li> <li>- Stop paving with conveyors full</li> <li>- Stop folding hopper wings if segregation is occurring</li> </ul>
<p><b>4. Intermittent roughness</b></p>	<ul style="list-style-type: none"> <li>- Calibrate grade control system</li> <li>- Inspect grade sensor(s)</li> <li>- Monitor averaging ski operation while paving super elevations</li> <li>- Clean spills in front of paver</li> <li>- Clean spills in front of grade sensor(s)</li> <li>- Correct high spots in grade prior to paving</li> <li>- Monitor feeder system operation</li> <li>- Discontinue automatic slope control; control slope manually</li> <li>- Install averaging ski in place of single grade sensor</li> </ul>

## BLEMISHES

Problem	Remedy
<b>1. Drag marks</b>	<ul style="list-style-type: none"> <li>- Clean spills in front of paver</li> <li>- Correct high spots prior to paving</li> <li>- Increase layer thickness</li> <li>- Check slope of grade prior to using automatic slope control</li> <li>- Monitor head of material; do not run low</li> <li>- Increase screed heat</li> </ul>
<b>2. Oversized material</b>	<ul style="list-style-type: none"> <li>- Check gradation screens at plant</li> <li>- Check scalping screens at recycle stockpile</li> <li>- Clean truck bodies</li> <li>- Lower flow gates, if equipped</li> </ul>
<b>3. Screed marks</b>	<ul style="list-style-type: none"> <li>- Trucks stop short of push rollers</li> <li>- Reduce time stopped waiting for trucks; reduce paving speed</li> <li>- Activate screed counterbalance system</li> <li>- Increase pressure in screed counterbalance system</li> <li>- Activate screed hold system, if equipped</li> </ul>
<b>4. Rich spots / bleeding</b>	<ul style="list-style-type: none"> <li>- Correct moisture in mixture</li> <li>- Reduce asphalt cement content</li> <li>- Reduce vibratory frequency</li> <li>- Switch to static compaction</li> <li>- Plant maintenance to eliminate dust balls</li> </ul>
<b>5. Separation marks</b>	<ul style="list-style-type: none"> <li>- Adjust screed extension height</li> <li>- Adjust screed extension slope</li> <li>- Adjust slope stop to flatten screed extension</li> </ul>