Paving Best Practices: Focus on Transportation

Understanding Mat Defects -- Contents

I. Truck Exchanges
II. Mat Textures
III. Segregation
VI. Ride Quality
I. Truck Exchange

- Truck transfer into hopper still a common practice
- Follow an established procedure
- Operator and dump person and truck drivers have to work together

Truck Exchange
Truck Exchange

07-06-2013 09:53

Truck Exchange

07-06-2013 13:32
Poor Truck Exchange

- Paved too long without cycling hopper wings
- Conveyors low on material
- Jeopardize head of material in front of screed
- Screed will drop
Crew use feeder system override to refill auger chamber
Cool, segregated mix flows back to auger chamber
Temp Segregation
Screed Drops
Truck Exchange - Stop Paver

- Stop paver and lower hopper wings
- Level in hopper covers deck and conveyors
- Mix in hopper will be covered by next load

Ride Quality – Settlement Marks

- Observe settlement marks during breakdown compaction
- If marks disappear, no issue with ride quality due to normal paver stops
Truck Exchange = The one that gets away

Truck= Exchange
Truck = Exchange

Truck = Exchange
Truck= Release Agent

Truck= Dump Site
Truck = Beds

Truck = Beds
Truck=Beds

Truck= Tarps
Truck = Release Agent

Truck = Safety
Preventing Defects -- Truck Exchange

- Communication between Operator, Dump Person and Truck Driver
- Pave at normal speed between trucks exchange. If you can not, Stop Paver
- Fold hopper wings every truck when allowed
- Cycle hopper wings when conveyors are still covered with mix
- Avoid prolonged stops
- Do Not Pave Hopper out of material if anyway possible
- There are a lot of jobs we can't do this

Tack = Applications
Tack = Applications

Tack = Applications
Tack = Applications

Tack = Applications
Mat Texture -- Factors

- Texture affected by:
  -- Angle of attack
  -- Line of pull
  -- Screed condition
  -- Screed adjustments
  -- Auger height
  -- Type of mix
  -- Temperature of mix
  -- Paving Speed
  -- Base condition
Mat Texture – Angle of Attack

- Correct angle of attack
- Flat angle of attack
  -- adjustment needed
- Slough box
  -- no adjustment possible

Mat Texture – Angle of Attack Adjustment

- Adjust extension angle of attack
- Turn trailing edge adjusters clockwise to increase angle of attack
- Make final adjustments while paving, if possible
Mat Texture – Angle of Attack Corrected

- Surface texture uniform after adjusting angle of attack
- Open texture behind strike-off unavoidable

Mat Texture – Screed Condition

- Condition of screed affects mat texture
- Texture striping indicates non-uniform pressure
- Check screed for flatness
- String Screed Plate
Mat Texture – Centerline Stripe

- Centerline stripe can have several causes:
  - lack of lead crown
  - worn or missing reversing augers
  - reversing augers not installed correctly

Mat Texture – Centerline Stripe – Kicker Paddles

- Consider kicker paddles in place of reversing augers
- More aggressive material action
- Missing
- Worn out
Mat Texture -- Strike-off Adjustment

- Strike-off setting affects angle of attack and mat texture
- 25 mm (1") above screed is right for most mixes
- Check height at beginning of each shift
- Adjust as required

Mat Texture – Cold Screed

- Mix sticks to cold screed plate
- Creates very open texture
- Screed drops
- Pick up, heat screed and re-start OR
- Repair low spot while screed rests on hot mat to warm up.
Mat Texture – Separation Marks – Extension High

- Continuous lines mean height mismatch between main screed and extension
- Lined up with outer edge of main screed, extension too high
- Lower extension to erase line

Mat Texture – Separation Marks – Extension Low

- Lined up with inner edge of screed extension, extension too low
- Raise extension to erase line
- If line re-appears behind outer edge of main screed, use extension slope switch to erase line
Mat Texture – High Spots & Spills

- Mix spilled on grade acts like high spot
- Screed drags cold mix
- Texture opens
- Smoothness & density suffer
- Clean all spills!

Preventing Defects - Mat Texture

- Run slight nose-up angle of attack
- Adjust tow point height for parallel line of pull
- Check screed for flatness (String Line)
- Adjust strike-off height
- Position augers 5 – 7.5 cm (2 - 3”) above mat surface
- Check mix temperature, especially when mix is stiff or sticky
- Set paving speed that does not tear mat
- Clean spills / remove high spots in the grade
Segregation – End-of-load – Three drops at Plant

- Troubleshoot truck loading
- First drop at front
- Second drop at rear
- Third drop in center
- Significant reduction in material roll-down
- Very important when paving with large stone mixes
- Helps on Temp segregation

V. Segregation

- Lack of uniformity of aggregates of in-place mat
- Three types
  -- repeat, pattern patch
  -- continuous stripe
  -- random patch or stripe
- May include temperature differential
**Segregation – End-of-Load**

- Usually appears as equally spaced pattern
- Often has chevron shape
- Most common when aggregates are 19 mm (3/4"") or larger

**Segregation – End-of-Load – MTV Blending**

- Pattern segregation minimized
- Highly recommended for large stone mixes and SMA
Segregation – End-of-Load – Cold Chunks

- Cold weather and long hauls may cause cold chunks
- MTV will re-mix and break up chunks
- Lower flow gates, if equipped
- Cover loads
- Insulated beds

Segregation – End-of-Load – Cold Chunks

- Lots of hand work to remove chunks and repair the mat
- Consider putting laborers at each end of the auger chamber
- May be able to shovel out chunks before going under screed
Segregation – End-of-Load – Cold Chunks
Segregation – Continuous Stripes

• Easily confused with texture stripes
• Open texture appearance
• Presence of mostly large aggregate in the stripe
• Almost always caused by feeder system operation or set-up
  • Follow the stripe to its source at the paver

Segregation – Continuous Stripe

• Mix rolling forward at end of tractor frame
• Excessive head of material
• Caused by lack of auger and mainframe extensions
Segregation – Continuous Stripe

- Wide-width paving kit for 1.8 m (6') extension
- Augers within 60 cm (2') of end gate
- Augers covered by mainframe extension
- No stripe in mat

Segregation – Continuous Stripe

- Correct head of material
- Correct position for feeder sensor
- Uniform flow out to end gate
- No stripe segregation
Preventing Defects – Segregation

- Three-drop loading trucks
- Discharge truck properly
- Do not fold hopper wings when segregated mix is present in hopper
- Load paver using MTV with re-mixing capability (When Applicable)
- Do not run hopper inserts low or hopper
- Do not empty MTV
- Add auger and mainframe extensions appropriate for paving width
- Position feeder sensors correctly
- Adjust feeder controls to get uniform material flow

Ride Quality – Head of Material

- Proper head of material covers one half the auger shaft
- Low level causes screed to drop
- Often happens during truck exchange
Ride Quality – Head of Material

- Forces acting on screed increase
- Screed rises
- Often results from use of feeder system manual overrides
- Often due to poor set-up technique

Ride Quality – Head of Material High

- Screed climbs on excessive material
- Head of material fluctuates
- Grade control reacts
- Wavy mat results
- Poor planning and set-up
Preventing Defects – Ride Quality

- Continuous paving (MTVs)
- Calculated, consistent paving speed
- Short stops between trucks
- Screed assist for tender mixes (on newer models)
- Proper set-up for wide width paving
- Proper grade reference
- Sensor position
- Using slope correctly
- **Consistent Head of Material**

Planning for Asphalt Compaction

- Understand the project
- Gather information
- Plan the process
- Communicate the plan
- Verify the results
Factors that Affect Compaction

Compaction Factors
- Project design
- Mix design
- Layer thickness
- Aggregate type
- Mix temperature
- Climate conditions
- Communication

Factors that Affect Compaction

- Thin layer pavement maintenance is common application
- Usually 5 cm (2”) or less
- High frequency, low amplitude to avoid drum bouncing
Factors that Affect Compaction

Climate Conditions
- High ambient temperature
  - asphalt retains heat
  -- longer compaction time
- Low ambient temperature
  - asphalt cools faster
  -- shorter compaction time
- Adjust rolling pattern as ambient condition change

Longitudinal Joints

Build joint correctly
- Paver leaves straight edge to match
- Paver Operator should have Steering Guide Paint Stripe or String, to Follow
**Longitudinal Joints**

**First Pass for Higher Joint Density**
- Correct amount of mix against face of joint

**Best Joint Density**
- First pass on hot side 15-20 cm (12-15”) away from joint
- Pushes asphalt toward the joint to help gain density
Longitudinal Joints

Best joint density
- Slight overlap onto the cold side on second pass
- Begins the process of pinching the joint and gaining density

Summary
- Paving crew builds joint correctly
- Verify overlap and pre-compaction height
- Select rolling pattern that meets project requirements
1938 Barber Greene Model 879 Asphalt Paver

Volvo 2015 Asphalt Paver
Questions ??????

• Increase Rap

30%