Alaska Asphalt Summit-2011

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Hot Mix Placement

Opportunity is missed by most people because it is dressed in overalls and looks like work.— Thomas Edison

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HMA Placement

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HMA Placement

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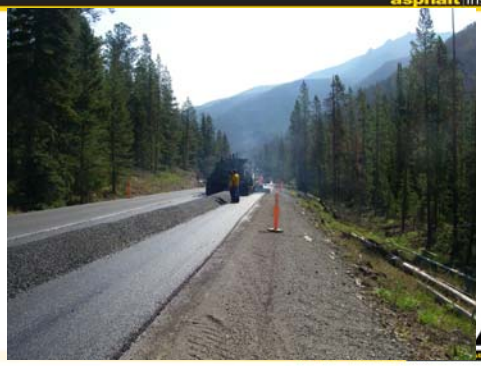


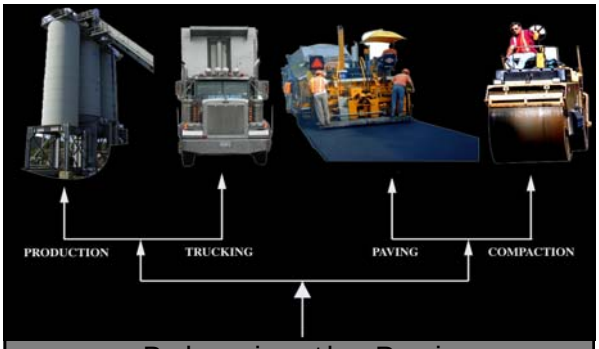
HMA Placement

HMA Placement

Courtesy: Caterpillar Global Paving

Asphalt Tonnage

- Hot plant output
- Length of haul
- Traffic conditions
- Number of trucks



Balancing the Paving Operation

Construction Methods

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- Placement
- Screed
  - Head of Material
  - Reaction Time
  - Control
- Mix Delivery
- Longitudinal Joints
- Compaction

Placement Topics

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- Surface Preparation
- Hot Mix Delivery
- Paving Equipment
  - Tractor
  - Screed
- Paving Procedures
  - Longitudinal joints
  - Compaction

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Surface Preparation

Surface Preparation

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- Often doesn't get due consideration
- It is often time consuming and labor intensive
- Asphalt layers cover up the potential problems
- THE PROBLEMS WE DO NOT TAKE CARE OF TODAY WILL NOT GO AWAY
  - Often the problems get worse
  - They are more costly to fix the second time

Surface Preparation

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The most common surfaces overlaid with HMA or WMA include:

- Subgrade
- Granular Base Course (Aggregate Base)
- Existing Asphalt Pavement
- Existing PC Concrete Pavement

Subgrade Preparation

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- The subgrade is the pavement foundation
- Must support the pavement, anticipated traffic, and construction equipment
  - Soil type considered in thickness design
- Must be properly graded to provide drainage
  - Transverse and longitudinal grade
  - Smoothness and cross slope
- Must be uniformly compacted to required density

Aggregate Base Preparation

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- Mix to proper moisture content
- Best Practice - place using a laydown machine
- Place in 4” - 8” compacted lifts
- Stagger longitudinal and transverse joints at least one foot in each succeeding layer
- Compact base to percentage of proctor specified
- Cure before applying Prime Coat

Prime Coat

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Why do we use Prime Coat?

- **To seal in the subgrade at the proper moisture content**
- **To fill the surface voids and protect from the weather**
- **To stabilize the surface fines**
- **To promote bonding to the subsequent pavement layer**

Preparing to Overlay Existing HMA

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Preparing an existing asphalt surface may be as simple as sweeping (*multiple passes may be necessary*) the existing surface and applying tack coat

Preparing to Overlay Existing HMA

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Or it may involve one or more of the following:

- Patching
- Cleaning and filling cracks
- Placing a leveling course
- Milling the surface

Failed areas MUST be cleaned, repaired and brought into good structural condition before overlaying.

Tack Coat

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Why do we use Tack Coat?

- To promote the bond between old and new pavement layers.
- To prevent slippage between pavement layers
- To provide an additional moisture barrier, especially when applied along the transverse and longitudinal vertical surfaces

Tack Coat

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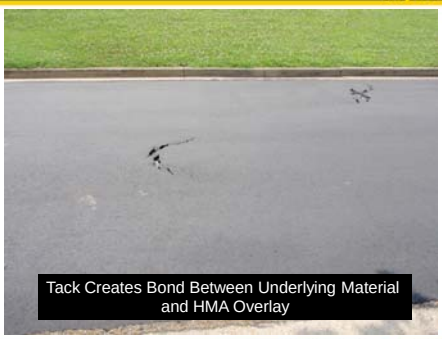
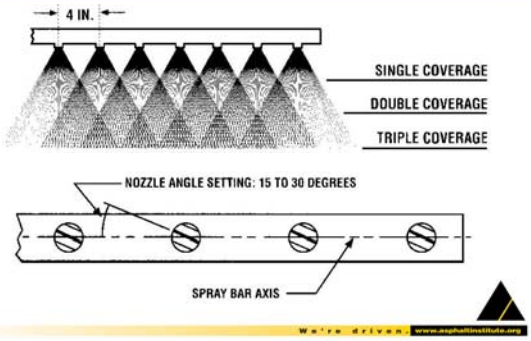


Tack Creates Bond Between Underlying Material and HMA Overlay

HMA Placement



Patching

- Make sure to get well into the sound pavement when you mark the patch for removal
- Use good straight lines that are cut with vertical faces
- Remove all loose material
- Tack base and all vertical surfaces
- Patches must be strong enough to become a part of the permanent structure or they *will* be back!

Patching

Look for local pictures

Irregular patch - getting proper compaction is going to be difficult on this one.

Nice straight lines, no distress visible outside the patched area

Preparing to Overlay Existing PCC

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- Full depth replacement of distressed slabs
  - Asphalt or PCC patch
  - Correct problems in base/subgrade
- Spalled joints repaired partial depth
  - Use PCC for patching
- Stabilize rocking slabs
- Replace joint sealer as required
- Clean and tack surface

Above precautions often don't work long-term

Preparing to Overlay Existing PCC

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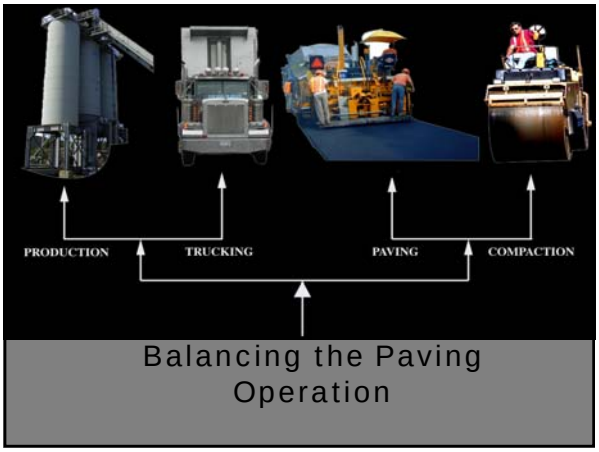
A better way to handle PCC pavement which needs to be overlaid is through one of the following techniques:

- Cracking and Seating
- Breaking and Seating
- Rubblization

These techniques reduce the size subject to movement, which makes them easier to permanently seat and stabilize.

Hauling



Balancing the Paving Operation

Trucking

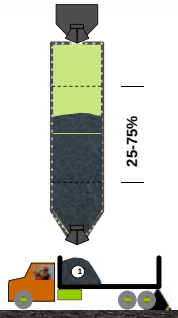
- How Many?
  - Need enough for uninterrupted paving
  - Don't want trucks waiting too long at paver or hot plant

Trucking

- Trucking Goals
  - Consistent delivery
  - Get in and out of paver smoothly
  - Consistent cycling
  - Uniform delivery
  - Uniform speed

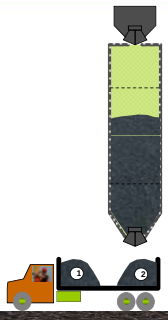
Truck Loading

- **Use multiple drops**
- **Loading sequence:**
  - **Front**



Truck Loading

- **Use multiple drops**
- **Loading sequence:**
  - **Front**
  - **Back**



Truck Loading

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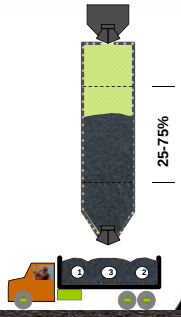
- Use multiple drops
- Loading sequence:
  - Front
  - Back
  - Middle
- Always transfer HMA in "bulk"



Haul Trucks

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- Clean, smooth beds
  - Approved release agent
  - No diesel!
- Insulated & tarped
  - Front, sides, bottom
  - Thin overlays, long hauls, cold weather

HMA Delivery

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Trucks

- Coordinate delivery schedule
  - Maintain steady supply of material
  - Number, capacity, distance
- Break load before opening tailgate


2007/01/20 06:06


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Basin


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Don't Bump the Paver!
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HMA Placement

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- Role of the paver is to meet specifications for grade, texture & smoothness

Courtesy: Caterpillar Global Paving

Paver Unit

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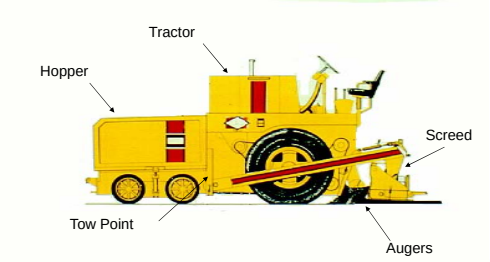

Screed Unit

- Screed plate
- Strike-off
- Crown control
- Extensions and End plates
- Thickness control screws
- Screed arm
- Pre-compaction system
- Heating systems
- Maintenance

Paving Speed

- Consistency, Consistency, Consistency
  - Run non-stop
  - Constant speed – all day
    - Speed increases – depth decreases
    - Speed decreases – depth increased

Why? Change the speed, and you change the balance of the forces.

Screed Operation

- Balance the Forces Acting on Screed
  - Speed of paver
  - Head of material
  - Angle of attack
  - Screed weight
- Pre-compaction

Screed Reaction Time

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- Changes to settings or in speed require time to be fully accomplished.
- Generally 3 to 5 tow lengths. (50 to 80 yds.)

Understanding the Paver

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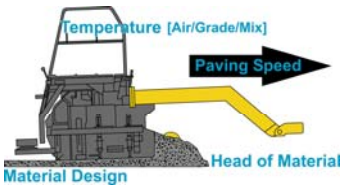

Factors Affecting the Screed

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

Courtesy: Caterpillar Global Paving

Augers

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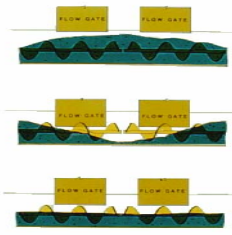
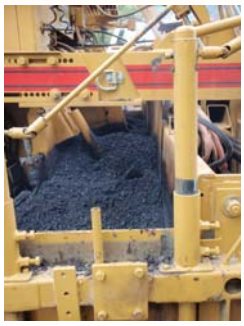
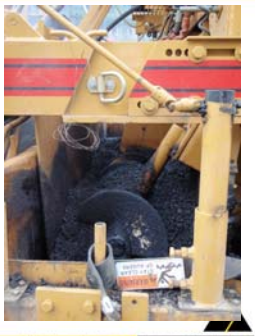


Augers





Screed Control Systems

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- Sticking the Mat
- Manual Controls
- Automatic Controls

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Sticking the Mat

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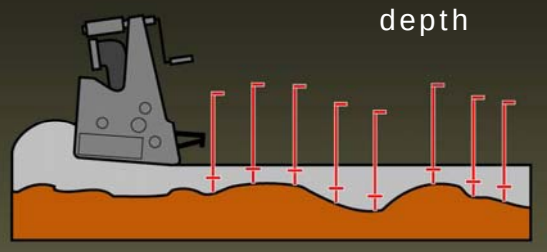
Paving Professionals Workshop

Checking yield and average depth



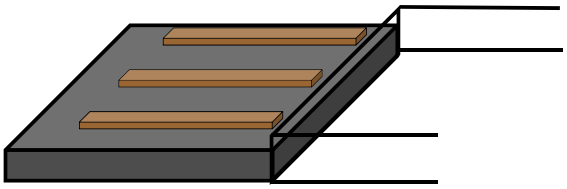
ROADTEC

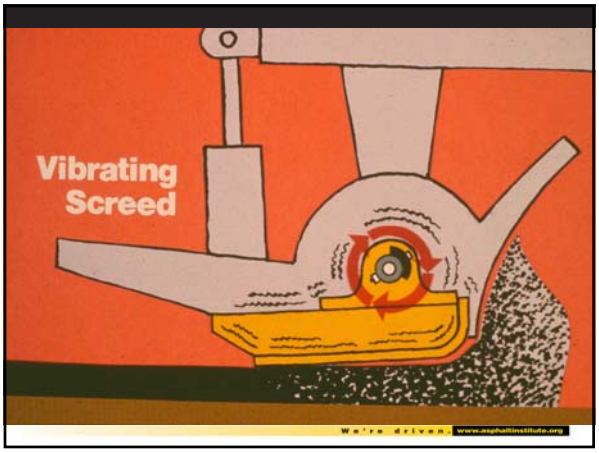
Grade Reference

- Stringline
- Mobile Reference
- Joint Matching Shoe
- Sonic Sensor
- Laser

Starting Blocks

Rule of thumb is to raise the screed 25 percent more than the compacted lift thickness





Head of Material

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- The paving material that lies in front of and spans the entire screed.
- **95 to 98 percent of all mat flaws originate with an improper head of material.**

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