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

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

Courtesy: Caterpillar Global Paving

Balancing the Paving Operation
Construction Methods

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

Placement Topics

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

- 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

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

- 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

- 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

**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

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

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

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 Creates Bond Between Underlying Material and HMA Overlay.
HMA Placement

• 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

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

- 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

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 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

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

Haul Trucks

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

HMA Delivery

Trucks
- Coordinate delivery schedule
  - Maintain steady supply of material
  - Number, capacity, distance
- Break load before opening tailgate
Don’t Bump the Paver!
HMA Placement

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

Paver Unit

- Hopper
- Tractor
- Screed
- Tow Point
- Augers
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

- 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

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

Augers

- Gates too High – Augers overloaded
- Gates too Low – Not enough material
- Proper adjustment – Good material flow
Screed Control Systems

- Sticking the Mat
- Manual Controls
- Automatic Controls

Sticking the Mat

Checking yield and average depth
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

Vibrating Screed
Head of Material

- 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.