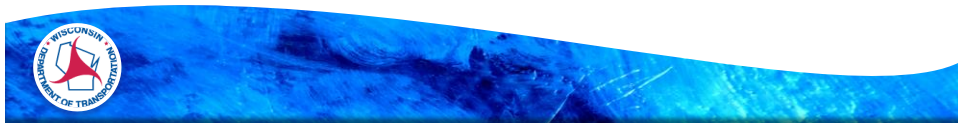


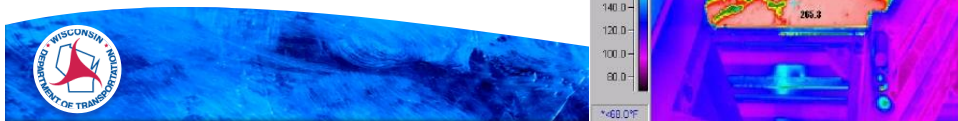
HMA Placement

Session 6



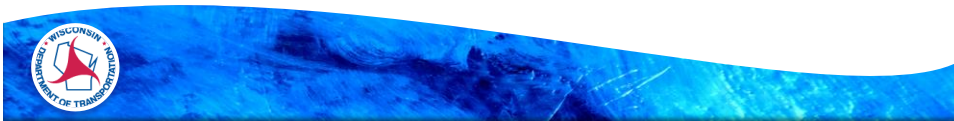
HMA Mix Transport

- ▶ HMA is usually loaded into a truck at a fairly uniform temperature between 260°F to 320°F. Several measures that can be taken to minimize HMA cooling during transport are:
 - Minimize Haul Distance
 - Insulate Truck Beds
 - Place a tarpaulin over the truck bed



WisDOT Standard Specification 450

- ▶ Loading Trucks
 - Release Agent
- ▶ Hauling **[CMM 4-56]**
 - Tarp (mandatory <65 F)
 - Proper number of trucks
- ▶ Mix Temperature **[CMM 4-51]**
 - Deliver to paver within 20 F of the recommended temperature
- ▶ Unloading Trucks **[CMM 4-53]**
 - Inspect Mix / Accept Mix
 - Collect Weigh Ticket (meets requirements)



450.3.1.2 Hauling Vehicles

- ▶ Clean and smooth box
- ▶ Cover/tarp for box
- ▶ No “oil leaks of any magnitude”





Loading Trucks

- ▶ Clean, smooth bed
 - No contamination
- ▶ Optional release agent
 - No excess
- ▶ Multiple drops to control segregation

- Back slowly towards paver
 - Straight and centered
- Stop a few inches before paver
- Light touch on the brakes
- Let paver pick up truck
 - Avoid bumps



Placing Mixture

When should you fold the wings?

- ▶ To minimize segregation, fold the wings as seldom as possible. Just enough to keep the mix in the wings from getting so cool that it won't go through the paver.
- ▶ How often will depend on delivery rate, mix temperature, and the air temperature.
- ▶ Folding the wings should only be done while the hopper is fairly full.



Placing Mixture

What do you do if the next truck is not ready?

- ▶ Do not slowly pull it forward and run the hopper empty.
- ▶ Wait with a full hopper. This keeps the mix and paver warm, and the screed charged with a full head of material.
- ▶ When the truck arrives, have the bed raised and ready to flood the hopper. Start the paver, getting it to paving speed as quickly as possible. When the truck is picked up by the paver, release the gate and flood the hopper.
- ▶ If the paver frequently waits, a paver speed adjustment may be necessary.



HMA Mix Transport

- ▶ When delivering HMA to the paver hopper, the truck bed should be raised 3 to 4 feet prior to releasing the tailgate



Then release gate and load hopper.





When released, truck pulls away.

Repeat with next truck.



HMA Mix Transport

Visual Mix Inspection

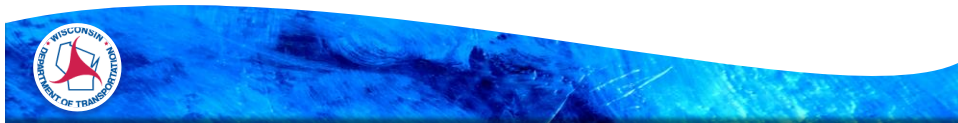
- ▶ **Blue Smoke:** check mix temperature (too hot?)
- ▶ **Stiff Appearance:** check mix temperature (too cold?)
- ▶ **Mix Slumped in Truck:** mix may contain too much asphalt or excessive moisture
- ▶ **Lean, Dull Appearance:** mix may contain too little asphalt
- ▶ **Mix Containing Lumps:** excess moisture?
- ▶ **Segregation:** evaluate mixture & handling procedures
- ▶ **Contamination:** check trucks before loading
- ▶ **Bleeding:** check release agent (no diesel fuel)



CMM 4-50

4-50.2 Environmental Regulations

- ▶ Standard spec 107.18 states that the contractor must comply with laws and regulations controlling environmental pollution.
- ▶ Blue smoke results from overheating asphalt, either in its uncombined form or as salvaged asphaltic pavement, to a high temperature sufficient to release unburned hydrocarbons. It is identified by a blue plume from the smokestack.
- ▶ Black smoke from the plant usually comes from incomplete burning of fuel oil used to fire the drier or heat the drum mixer. It can be corrected by adjusting the burner flame to burn cleanly.



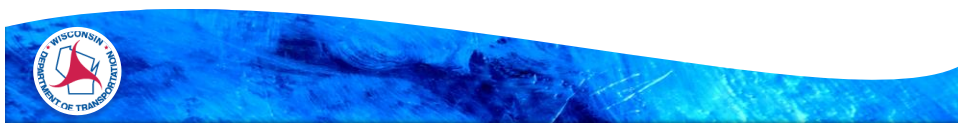
CMM 4-53

4-53.11.2 Color and Texture

A satisfactory mix is colored dark-brown to black, all particles are well coated, the mix has a wormy, alive appearance when agitated and the general texture of the finer portions shows a sugary appearance. A mix that appears a lighter brown in color or dead, does not have a wormy appearance when disturbed, or segregates unduly on discharge, indicates a low asphalt content or wet aggregate. Items to check include mixture proportions, aggregate gradation for excessive fines, tare of asphalt bucket, or the calibration and operation of the asphalt pump. Also, the dryer or mixture temperature, cold feed settings, and moisture content of aggregate or mixture are possible causes.

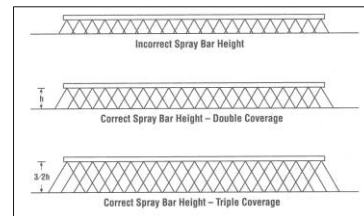
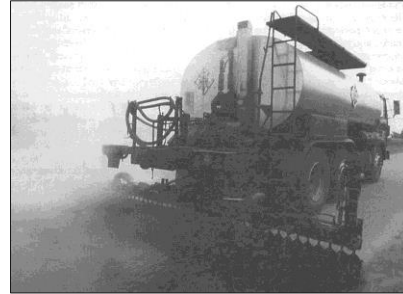
A mix too rich in asphalt shows excessive asphalt in coating. Fines have a tendency to ball up instead of appearing sugary, and on discharge the mix tends to flatten out instead of building a mound. Items to check include mixture proportioning, aggregate gradation for lack of fines, tare of asphalt bucket, or the calibration and operation of the asphalt pump.

Temperature of the mix should be within the range allowed by the specifications or as ordered by the manager. There should be no odor of burned asphalt. If there is, the contractor should reduce plant temperature of the asphalt heater or the mixer.



Tack Coat

- ▶ **Tack Coats:** applications of asphalt (diluted emulsified asphalt) sprayed on the surface of an existing pavement prior to an overlay to promote bonding between the pavement layers
 - Too little tack → slippage
 - Too much tack → surface mix bleeding
- ▶ Do not pave until tack breaks (the water in the emulsified asphalt begins to evaporate) and becomes tacky to the touch



WisDOT Standard Specification 455

- ▶ **Tack Coat**
 - Apply tack coat only when air temperature is 32 F or more and the surface is dry and reasonably free of loose dirt, dust, or other foreign material.
 - Apply to each layer of plant-mixed asphaltic base or pavement that will be overlaid with asphaltic mixture under the same contract.

Field Inspection Visual, verify temperature
(Document Findings)

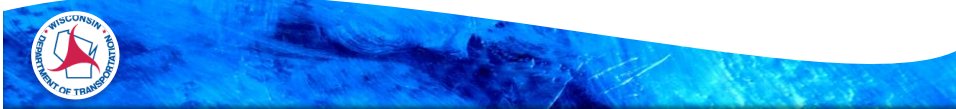


WisDOT Standard Specification 455

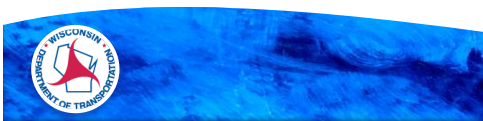
► Tack Coat

- Do not apply if weather or surface conditions are unfavorable or before impending rains.
- Limit application each day to the area the contractor expects to pave during that day.
- Apply at 0.05 - 0.07 gallons per square yard after dilution, unless the contract designates otherwise.
- Have all necessary equipment available on the job before tack coat operations.

Field Inspection Visual (Document Findings)

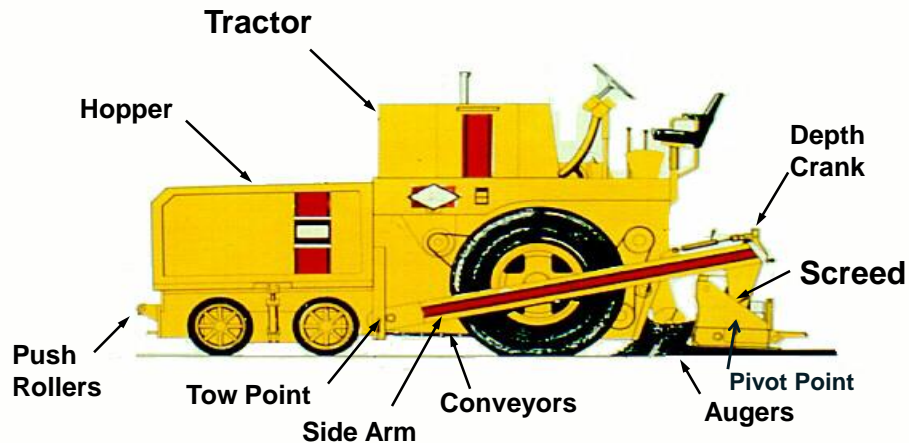


Asphalt Pavers [CMM 4-57]



Asphalt Pavers

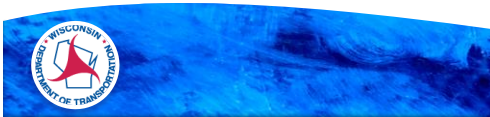
General Overview



Asphalt Pavers

► Power Train

- Tractor can be equipped with either rubber tires or tracks
 - Tires: faster, easier to transport
 - Tracks: better traction
- Truck push rollers
 - Do not back into the paver!!!!
 - Let the paver push into dump truck with the push rollers



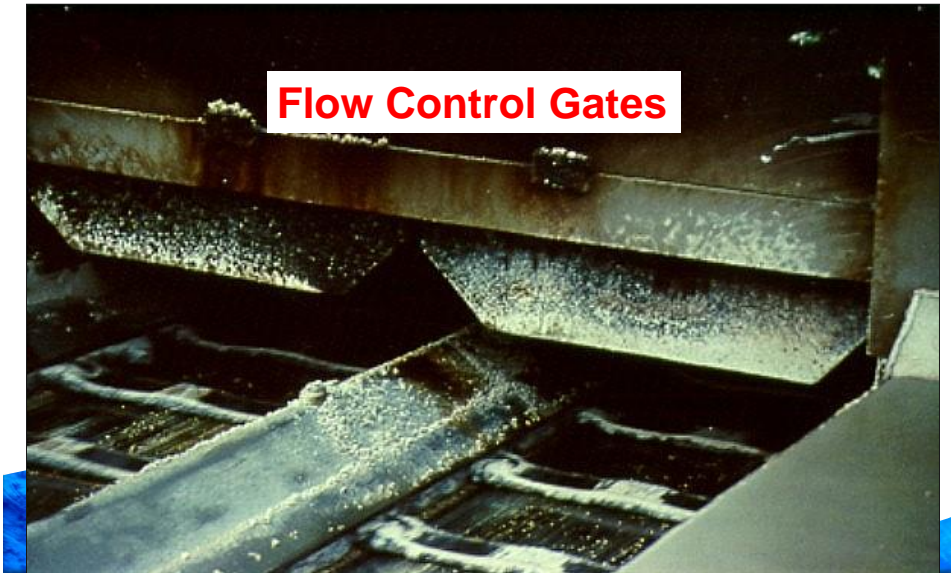
Asphalt Pavers



Asphalt Pavers



Asphalt Pavers



Asphalt Pavers



Asphalt Pavers

Distributing Augers:

(~75% height)

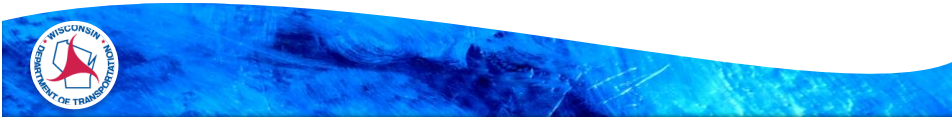


Asphalt Pavers

Material Feed Operation

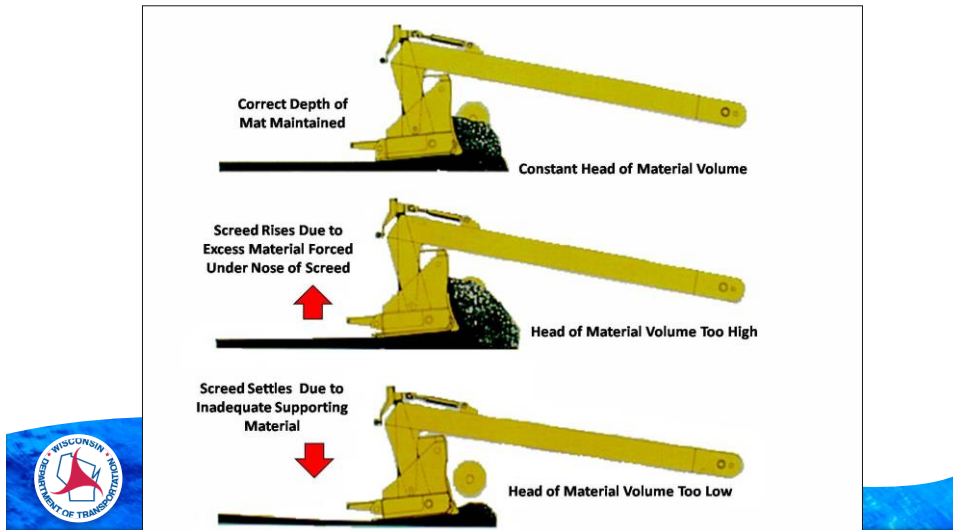
► Operation Goals:

- Keep a constant head of material in front of the screed
- Have the flow gates set so that the slat conveyors are running continuously



Asphalt Pavers

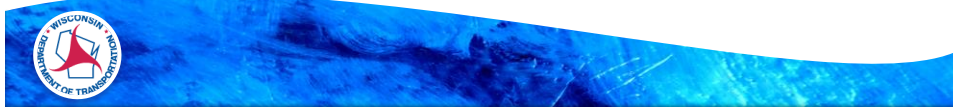
Material Feed Operation



Asphalt Pavers

Material Feed Operation

- ▶ **Automatic Feed Controls:**
 - **Automatic Feed Control Systems** measure the amount of mix in the auger chamber and control the slat conveyors and augers
 - **System Types:**
 - Control arms
 - Ultrasonic sensors
 - Infrared sensors
 - Laser sensors
 - **Proper position of the sensor** is as close to the end of the augers as possible



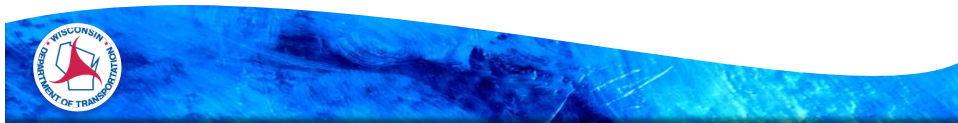
Asphalt Pavers

Screed Unit

- ▶ Strikes off mix to desired thickness and surface qualities
- ▶ Provides initial compaction



The most important part of the paving machine

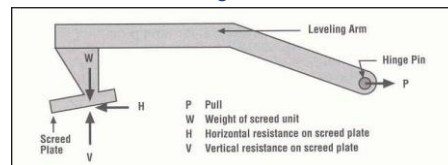


Asphalt Pavers

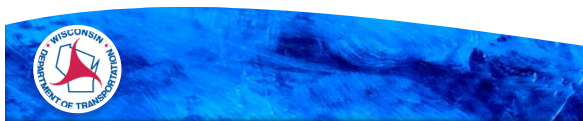
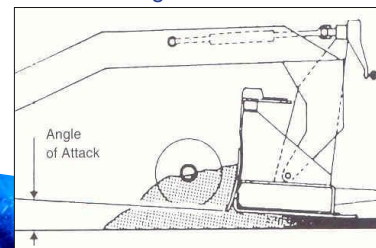
Screed Unit

- ▶ Primary Forces
 - Towing Force
 - Head of Material
- ▶ Screed moves (changes its angle of attack) when a force changes causing mat thickness to change

Forces Acting on the Screed

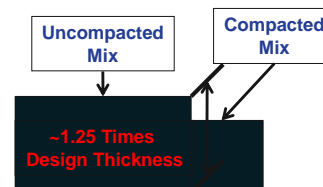
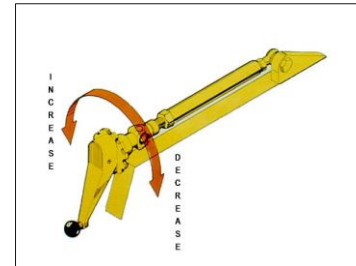


Angle of Attack



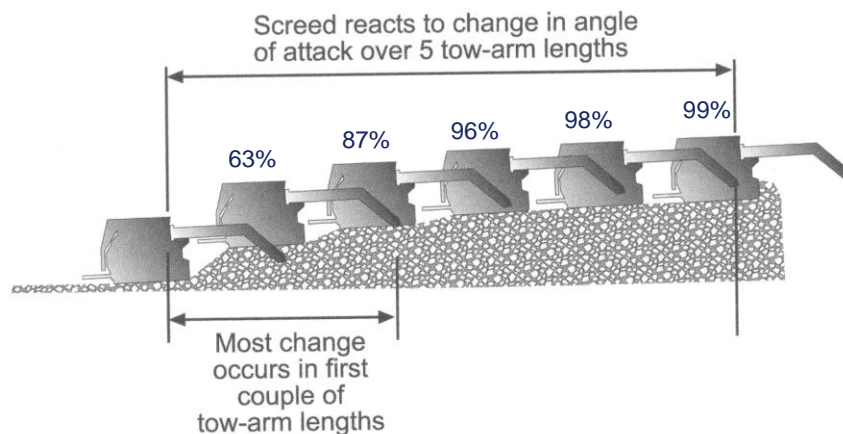
Asphalt Pavers Screed Unit

- ▶ The thickness control screws rotate the screed about its pivot point
- ▶ The rotation changes the screed's angle of attack, causing the screed to raise or lower
- ▶ One full turn of the crank produces $\sim 1/4"$ change in mat thickness



Another way to change mat thickness is to change the height of the tow point

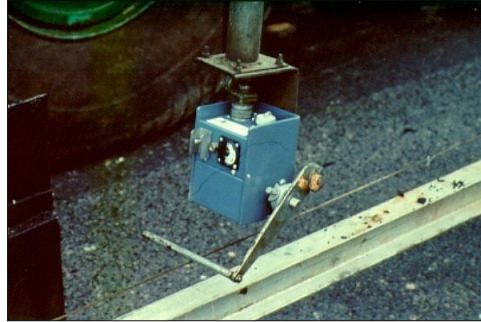
Asphalt Pavers Screed Reactions



Asphalt Pavers

Automatic Screed Control

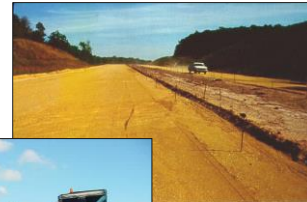
- ▶ Electronic adjustment to screed height using sensing and referencing system
- ▶ Sensor detects elevation changes, adjusts the height of the tow point
 - Sensing devices:
 - Wand
 - Ultra sonic
 - Laser



Asphalt Pavers

Automatic Screed Control

- ▶ Reference Systems:
 - Stringline
 - Can provide the smoothest ride
 - Requires survey crews
 - Mobile
 - Long skis (25' to 60')
 - "Construction Friendly"
 - Joint matching shoe
 - Short ski that rides on adjacent surface



Asphalt Pavers

Slope Control

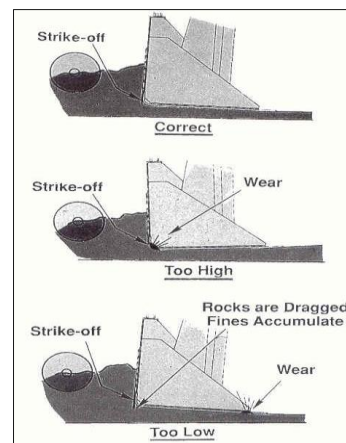
- ▶ Slope control operates through a slope sensor that is located on a cross-beam between the two side arms of the screed
- ▶ Usually, one side of the screed is controlled by the grade sensor and the other is controlled by the slope controller



Asphalt Pavers

Strike - Off

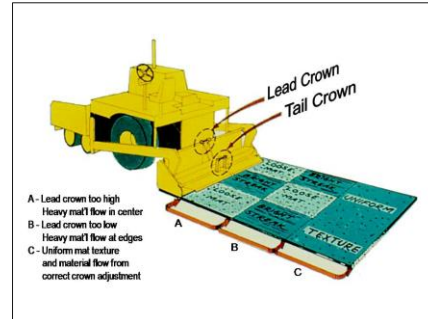
- ▶ Controls the amount of HMA allowed to pass under the nose of the screed
- ▶ Reduces wear on the leading edge of the screed



Asphalt Pavers

Crown Control

- ▶ The screed plate can be angled at its center and any extension point to provide a positive or negative crown to the mat
- ▶ The amount of crown can be varied; a turnbuckle device is used to flex the screed plate to its desired position



To facilitate the passage of mix under the screed the lead crown should be set ~1/8" higher than the tail crown



Asphalt Pavers

Extensions & Cut-Off Shoe & End Plates

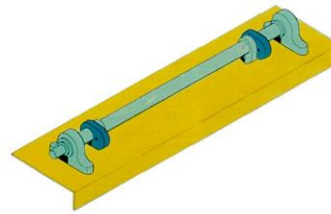
- ▶ Extensions can be hydraulic or rigid
- ▶ Extensions can change paving width and slope
- ▶ Hydraulic extensions screeds can be either in front of or behind the paver's screed
- ▶ Cut-Off shoes are used to reduce the width of paving
- ▶ Shoes come in 1' & 2' widths and are adjustable in 1 1/2" increments
- ▶ End Plates restrict the outward movement of the mix around the end of the screed



Asphalt Pavers

Screed Vibrator

- ▶ Rotating eccentric weights are used to create vibration in the screed
- ▶ Amplitude and frequency can be adjusted
 - Low amplitude for thinner lifts
 - High amplitude of thicker lifts
- ▶ The screed can develop 75-85% of the theoretical maximum density of the mix



Vibratory Shaft With Weights



Asphalt Pavers

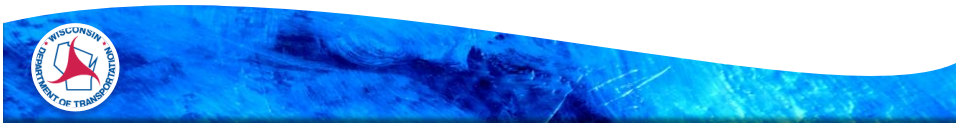
Heating System

- ▶ The screed is equipped with heaters that are used to warm up the screed bottom prior to the start of paving
- ▶ If not used, the texture of the mat will appear open and torn
- ▶ The heaters should be turned off during actual paving



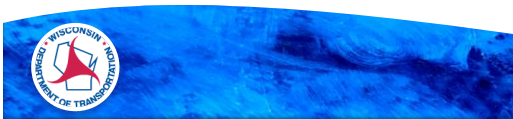
MTD Benefits

- ▶ Provides additional surge volume for the paver
Keeping the paver moving → smoother pavement
- ▶ Serves as a buffer between the paver and the haul trucks
Avoiding bumps → smoother pavement
- ▶ Provides remixing capability
Remixing → less segregation



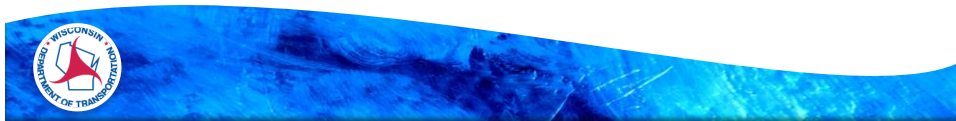
Material Transfer Device

One of the essentials for a consistent and high quality HMA pavement is to provide for a continuous operation



Reheating of Longitudinal Joints

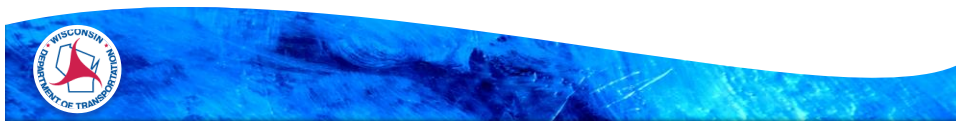
- ▶ Special Provision item 460-015
- ▶ Paid for by the linear foot
- ▶ To be used on mainline pavements
- ▶ Not to be used on projects less than 1 mile in length
- ▶ Bid item 460.4110.S.



Reheating of Longitudinal Joints

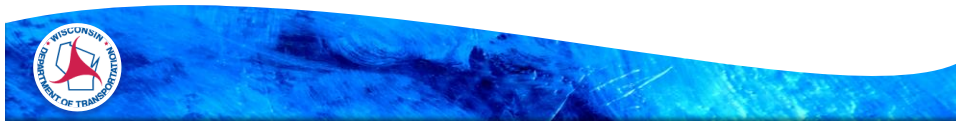
REQUIREMENTS:

- ▶ Reheat abutting edge of previously compacted layer in adjacent lane (8" wide)
- ▶ Use on all layers of mainline pavement
- ▶ Self contained heating unit (convection only-no forced air)
- ▶ Mount heating unit on the paver inside the leveling device



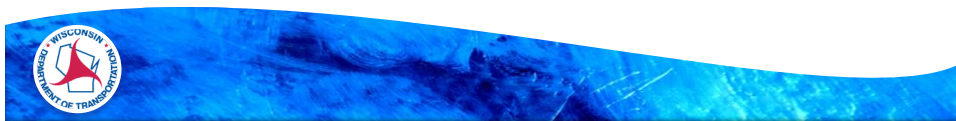
How to reheat the longitudinal joint

- ▶ Evenly reheat 8" wide strip of adjacent lane
- ▶ Reheat to within 60°F of the mix temperature at the paver auger
- ▶ Joint temp. is to be measured immediately behind the heater
- ▶ Engineer may allow the joint temp. to be cooler than specified to adjust for weather, wind, and other field conditions



Tips for Joint reheating

- ▶ Coordinate the heater output and paver speed to achieve the required joint temp. without visible smoke emission
- ▶ Fireproof barrier must be provided between the flame and heater's fuel source
- ▶ Heater must shut off when the paver stops
- ▶ Heater must provide uniform distribution of heat within the heat box



Video

<http://asphaltheater.com/longitudinal-joint-heating/>



Thermal Bars



Safety Edge

