# Construction and Inspection

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## Overview

- Surface Preparation
  - Repairs
  - Clean
  - Tack coat
- Delivery
- Placement
- Compaction
- Inspection

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Subgrade preparation
Cut to proper elevation
Compact to required density and moisture content

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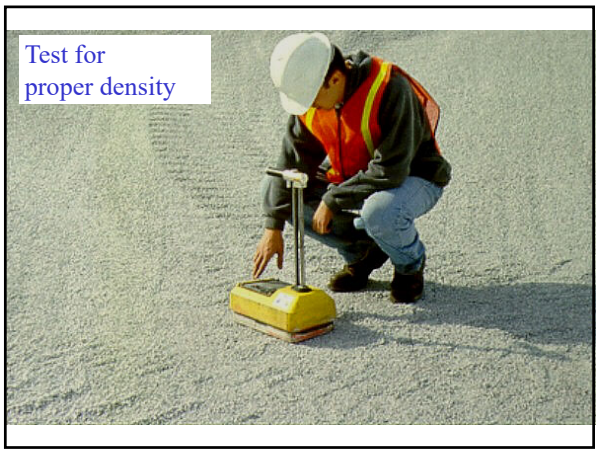
Test for
proper density

4


Overlay of existing
pavement

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Remove and patch failed areas

6


All loose material must be removed
Moisture problems?

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Compact base of
failed areas

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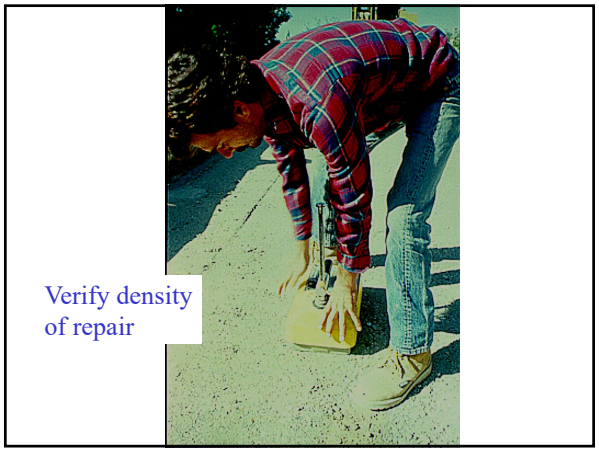
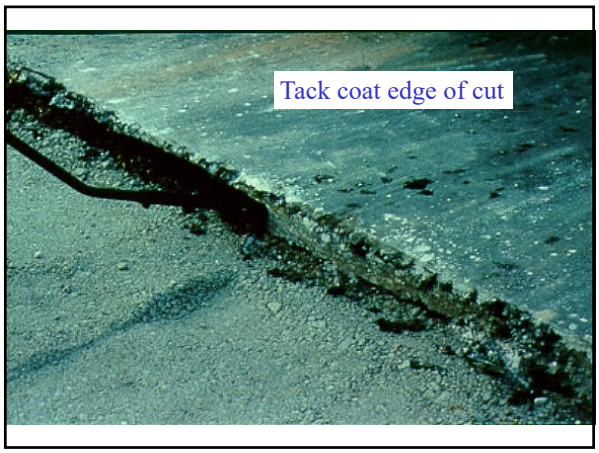

Verify density
of repair

9


Tack coat edge of cut

10


Fill patch – use paver for large areas

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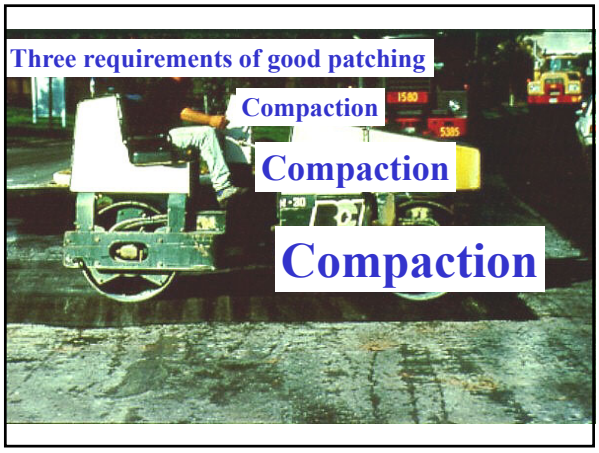
Three requirements of good patching
Compaction
Compaction
Compaction

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Good patch can perform well
And when overlaid provides a good foundation for pavement performance

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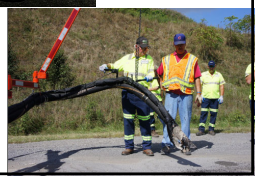
Crews test new pothole repair tool

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## AND….

- Even with good patching practices traffic will densify the patch.
- Best practiceS
  - Place patches 3 to 6 months prior to overlay.
  - Make all needed corrections to drainage ditches or structures.

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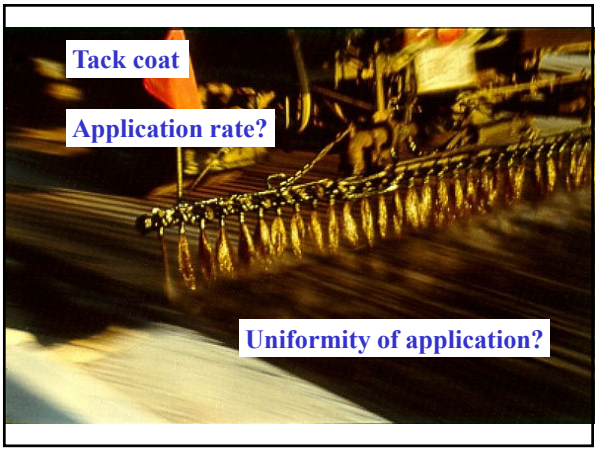


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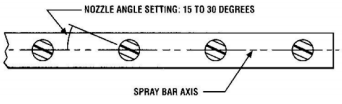
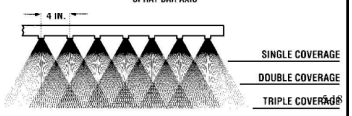
## Tack Application

The right nozzle

The right angle




The right height

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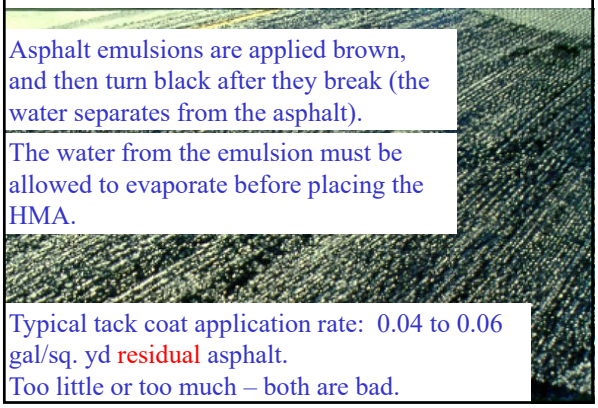
Some surface will show through a properly placed tack coat.



Asphalt emulsions are applied brown, and then turn black after they break (the water separates from the asphalt).

The water from the emulsion must be allowed to evaporate before placing the HMA.

Typical tack coat application rate: 0.04 to 0.06 gal/sq. yd residual asphalt.
Too little or too much – both are bad.

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## Almost every thing done right ☹

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Leveling course
Fill depressions
Does not cover entire surface

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•The center was thinner than the edges–the white aggregate pieces were being crushed by the screed.

WDDOH:
- Types of applications
- Equipment used for placement
- Equipment used for compaction
- Density checked?

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Milling
Alternative to level up
Removes distress
Maintain elevation
Rough texture – tack coat?

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**Types of Haul Trucks**
**End Dump Truck – 11 to 18 tons**

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Bottom (or belly) dump truck
Delivers load from beneath, into a windrow
Capacity: 18 to 23 tons

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Horizontal discharge (live bottom) truck. Conveyor discharges mix from back, without raising bed, directly into paver. Capacity varies; truck shown has 45 ton payload, used only in Michigan.


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Cover load with tarp while transporting hot mix

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## Four Process for Paving

- Mix production – 200 to 700 tph
- Transportation – balance number of trucks
- Lay down – continuous operation
  - Width of paving
  - Depth of lift
- Compaction – number of rollers

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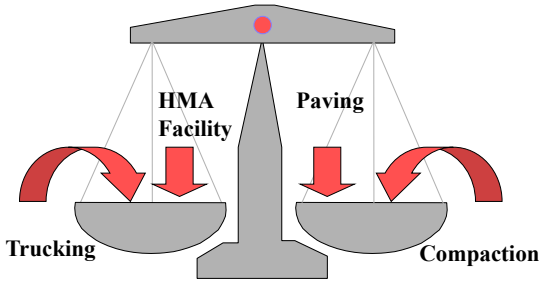
## Balancing Production

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## Number of Trucks Example

**Tons scheduled to be placed (MIX):** 1800 tons

**Hours of paving scheduled (TIME):** 10 hours
**Rate of mix needed to be delivered to jobsite (H-RATE):**

= MIX ÷ TIME = 1800 ÷ 10 = **180** tph

**Rate of mix available from HMA facility (F-RATE):** = 210 tph
STOP: Is the H-RATE slightly greater than or equal to the F-RATE?

**Average Truck Capacity (SIZE):** 20 net tons

**Total Truck Trips Needed (TRIPS):**
= MIX ÷ SIZE = 1800 ÷ 20 = **90** trips = TRIPS

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**Truck Cycle (in minutes):**

| | | |
|---|---|---|
| Delay at Facility | : 2 | |
| Load Time | | : 2 |
| Ticket & Tarp | : 3 | |
| Haul to Job | | : 19 |
| Delay on site | : 5 | |
| Dump/clean up | : 10 | |
| Return Haul | : 19 | |

==========

Total cycle in minutes = 60 ÷ 60 min/hr

= **Truck Cycle (CYCLE):** 1.0 hours/trip

**Number of Trips per Truck (LOADS):**

= TIME ÷ CYCLE

= 10 ÷ 1.0 = (Round down) 10 trips/truck = LOADS

**Number of Trucks Needed (TRUCKS):**

= TRIPS ÷ LOADS

= 90 ÷ 10 = (Round up) 9 total trucks = TRUCKS

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## Truck Loading Practice

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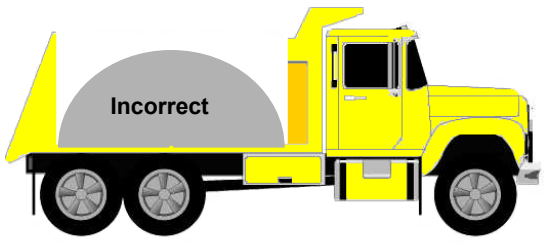


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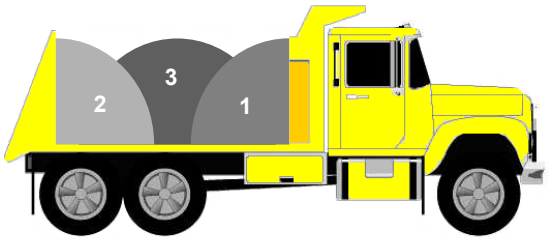
Loading Sequence
Needed to reduce segregation

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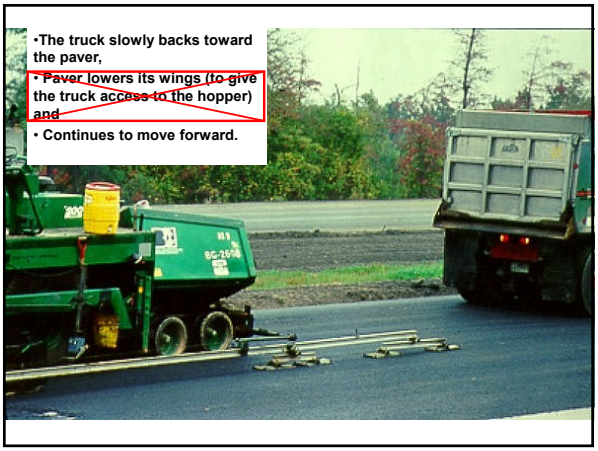


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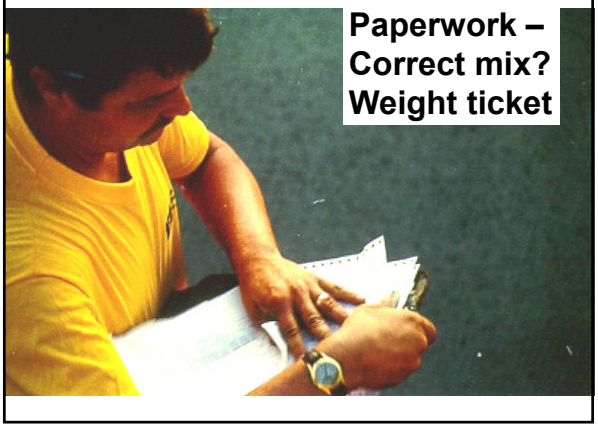


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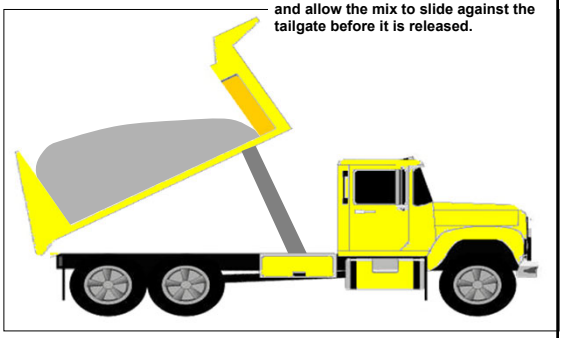
•With end dump trucks, the proper procedure for dumping the mix into the hopper is to raise the truck bed slightly and allow the mix to slide against the tailgate before it is released.



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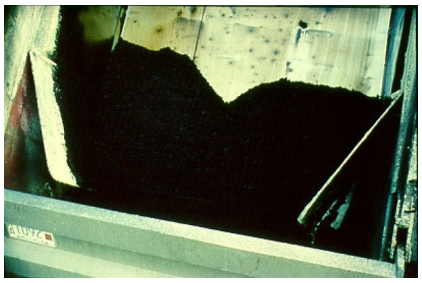
This truck has baffles just inside the tailgate.

Direct mix to the middle of the hopper.

Force mix from the trucks sides to the middle.

Ultimately–to help reduce segregation.



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Mix can also be dumped into a material transfer vehicle.

These vehicles receive the mix from the trucks, then feed the paver.

Improves continuity of paving

Eliminates truck bumping paver.

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Truck hitch and push rollers

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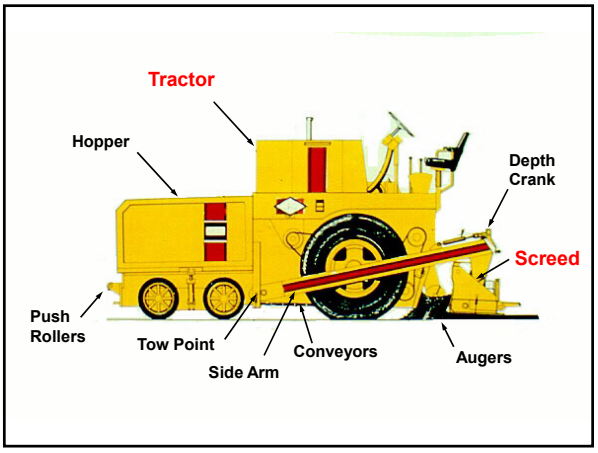


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## Tracked Paver


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The paver hopper is where the mix is received from the truck or pickup machine.

The hopper must be wide enough to allow the bed of the truck to fit inside its edges.

The hopper must be low enough to allow the truck bed to be raised.

Actual purpose of the wings is to reduce the paver width during transport.

Folding wings can cause segregation.

The wings should be folded while the hopper is relatively full of mix.

**Better never fold the wings and waste the material at the end of the day**

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## Slat conveyors

- Slat conveyors at the bottom of the hopper
- Transport the mix from the hopper spreading screws.
- Slat conveyors move independently, to feed each side of the screed.
- Above the slat conveyors at the back wall of the hopper are flow gates.

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The augers reside directly between the tractor and screed units, in the auger chamber.

The mix should not cover the augers, nor should the bottom of the augers be visible.

It is important that the head of material is consistent across the screed, to keep forces on the screed constant.

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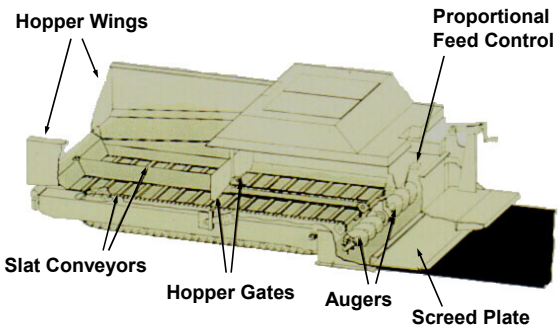
## Material Flow

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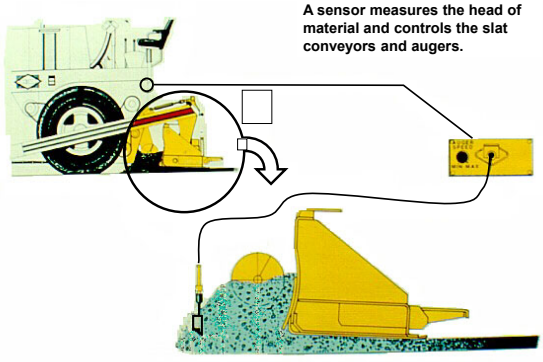
**Automatic feed control.**
A sensor measures the head of material and controls the slat conveyors and augers.



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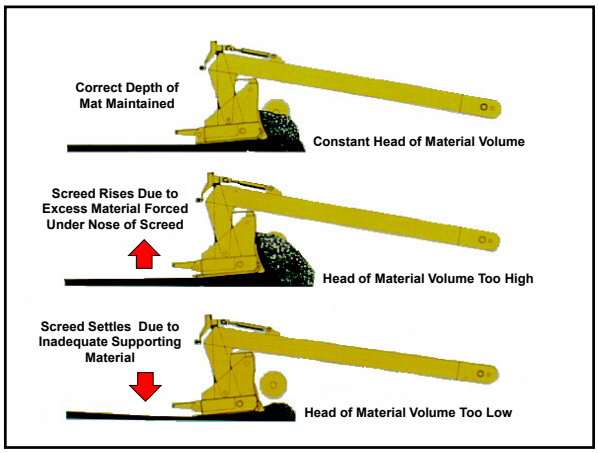
Correct Depth of Mat Maintained
Constant Head of Material Volume
Screed Rises Due to Excess Material Forced Under Nose of Screed
Head of Material Volume Too High
Screed Settles Due to Inadequate Supporting Material
Head of Material Volume Too Low

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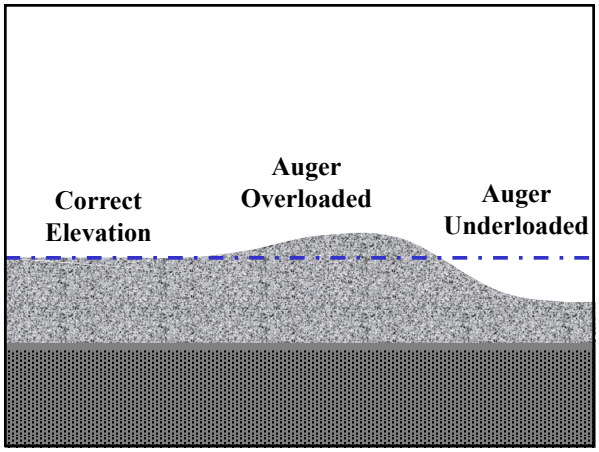
Correct Elevation
Auger Overloaded
Auger Underloaded

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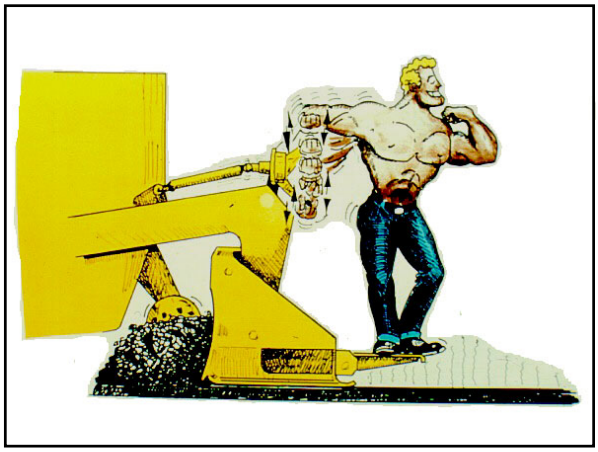

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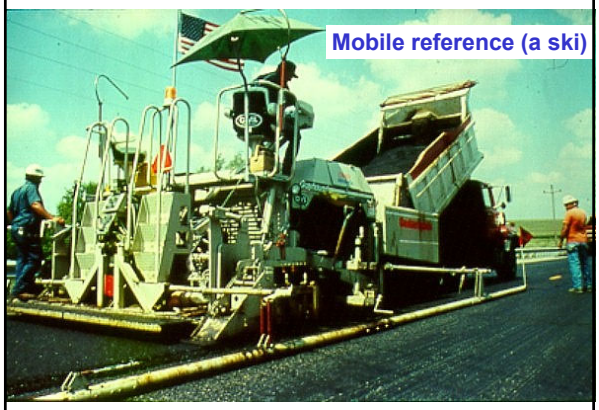
Mobile reference (a ski)

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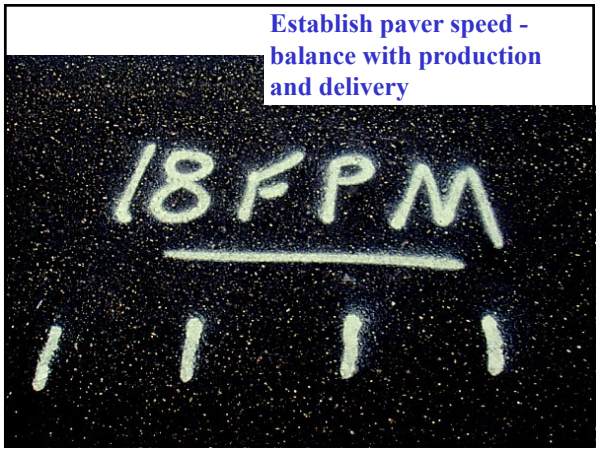
Establish paver speed - balance with production and delivery
18 FPM

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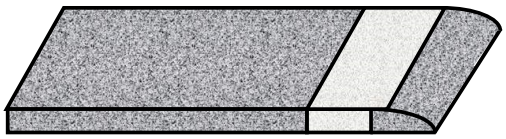
## Butt Joint



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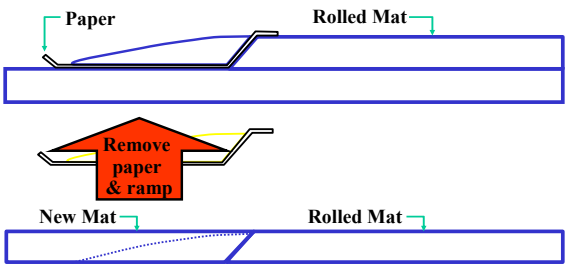
## Papered Transverse Joint

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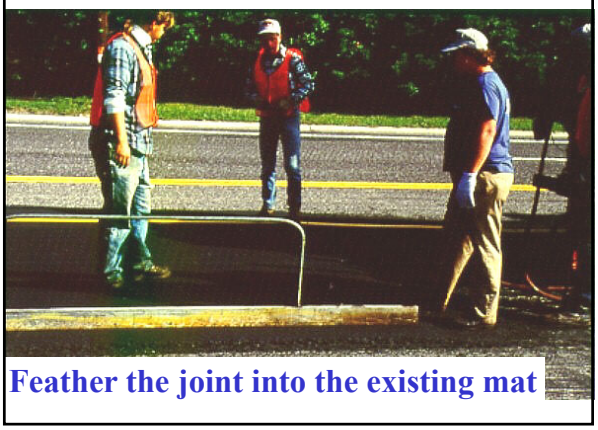


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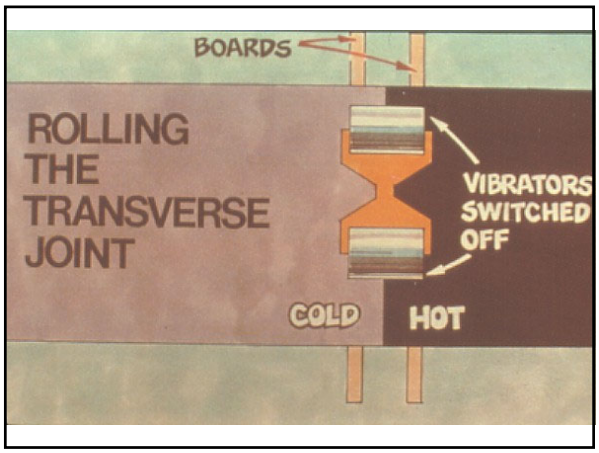
BOARDS
ROLLING THE TRANSVERSE JOINT
VIBRATORS SWITCHED OFF
COLD
HOT

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HYSTER
502
HYSTER

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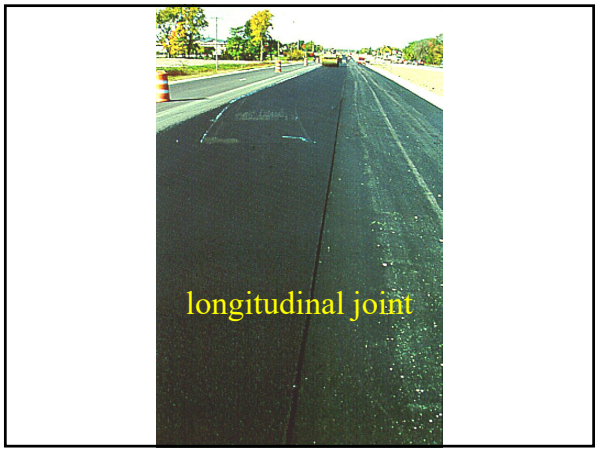
longitudinal joint

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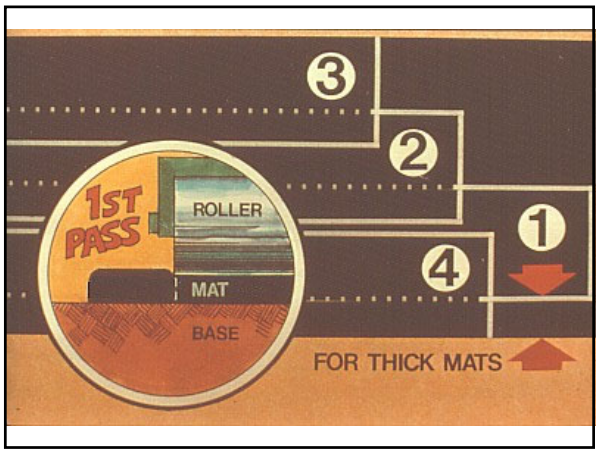


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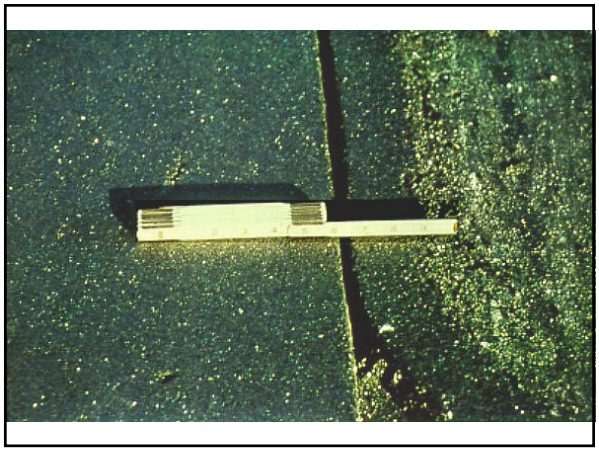

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- To prepare the cold joint for the next mat, clean the joint area, and apply a tack coat if needed.
- Some specs require the joint to be "cut back" 1 to 2 inches before the next mat is placed. This can be done with a saw, or a cutting wheel attached to a grader or loader.
- The purpose of this is to remove the part of the mat that may have less density than the rest of the mat due to lack of confinement during compaction.
- If traffic will not be passing over the mat, cutting back the joint while the mix is still warm requires less effort.
- Cutting back definitely requires a tack coat.

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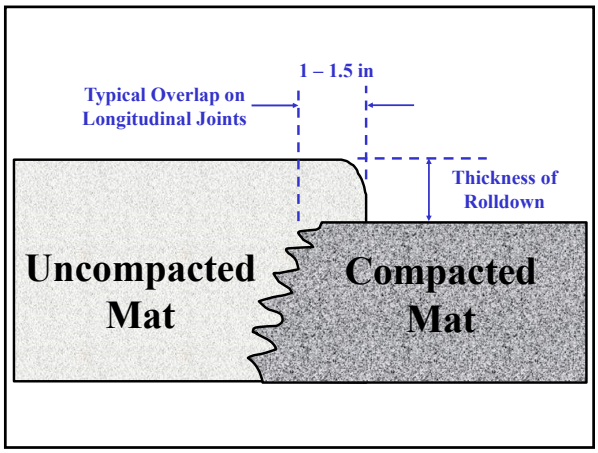


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This luter is flattening out the joint, pushing all of the coarse aggregate away from the joint and onto the mat.

This will produce both an unsightly and poorly performing joint.

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West Virginia
IS FOR
Riders
FALLING IN LOVE WITH A LOT OF GREAT ROADS.
STORY AND PHOTOGRAPHY BY MARIO CARUSO

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