Best Practices for Specifying and Constructing HMA Longitudinal Joints

A Cooperative Effort between Asphalt Institute & FHWA

Canadian User Producer Group for Asphalt 2012 Workshop

Project Overview

Two-year cooperative effort between the FHWA and AI regarding best practices for specifying and constructing longitudinal joints.

Reviewed existing knowledge and practices in four ways:

1) The FHWA conducted a benchmark survey of their 52 offices regarding LJ methods, performance, and specifications
2) An extensive literature review going all the way back to the 1960’s
3) Conducted interviews with acknowledged experts
4) Met with representatives (DOT, contractors, researchers) from 5 states that have implemented LJ specs
Two Goals for Project

Best way To Build it.

Best way To Spec it.

Don’t We Already Know How To Build a Longitudinal Joint?
• Note condition of the rest of the mat
• Also sealed each side of patch.
An Agency and Industry Concern

Longevity matters, it impacts:

- LCC
- Alternate Bid Competitiveness
- DOT Program Costs
- HMA Industry’s Livelihood
- the Travelling Public

Experts Interviewed…

10 Consultants
- Jim Scherocman
- Chuck Deahl
- Jim Hedrich
- Ron Corun
- Larry Michael
- Steve Neal
- Brian Prowell
- Tom Skinner
- Frank Colella
- Wes McNett
9 NAPA Sheldon G. Hayes Winners
“Single best paving project of the year.”

Note: Lindy Paving has won 3 times in the last 10 years!

Interview Questions

1. What is your background in the industry?
2. Describe a project you worked on.
3. What is your favorite aspect of the job?
4. What is the most challenging part of the job?
5. How do you ensure quality control on the site?
6. What is the most important lesson you've learned in your career?
7. What are your thoughts on the future of the industry?
8. How do you stay current with industry trends?
9. What is your favorite project you've worked on?
10. What is your proudest moment in the industry?
11. What do you do to relax outside of work?
Do the Experts Agree?

Not Always

The Best Longitudinal Joint
Echelon Paving

New Jersey

Rolled Hot
Echelon Paving Longitudinal Joint

Joint passes between the quarters

But, the need to maintain traffic limits the opportunities to pave in echelon

Consequently, most longitudinal joints are built with a cold joint.
Experts Were Evenly Divided Regarding Preference

Notched Wedge

Butt

Half-hearted commitment to new technology or practices often produces poor results (Not the right way to build a wedge joint!)
Mix Selection and Design Considerations

- Less permeable mixes
  - Smallest NMAS that will do the job
  - Consider using a “fine” gradation
  - Lower gyration levels

- Optimum lift thickness is NMAS x 4, exception: for “fine” gradation NMAS x 3

Where you make the joint is as important as how you make the joint!
Tack Coat

Full width of mat to minimize movement of unsupported edge

First Pass Must Be Straight!
Unanimous that a string-line should be used to assure first pass is straight
Tough to get proper overlap (1”) with next pass

Auger Overload
…these are unacceptable
Auger not extended to within 12 to 18-inches of the end gate.

The result - SEGREGATION at joint

Proper Overlap: 1.0 ± 0.5 inches.

Exception: Milled or sawed joint should be 0.5 inches
Top Photos Show Voids at Bottom of Lift (no overlap)

Core #2 (No Overlap)

Core #7 (No Overlap)

Core #9 (Overlap 1 ½")

Core #10 (Overlap 1 ½")

Prefer ugly joint with good density over pretty joint with premature failure!
If the roadway being paved is uneven, the tractor, and therefore the tow point, follows the road profile also. If tow point changes 1," leading edge 0.125." Grade controls attempt to keep the tow point at a constant elevation, producing a smooth overlay that is thinner in high spots and thicker in low spots.

Two Types of Long. Joints

Confined (Supported) Longitudinal Joint

Unconfined (Unsupported) Longitudinal Joints
Longitudinal Joint Compaction

- “Confined” joints are placed against an existing structure
  - Previously placed lane, curb & gutter, etc.
- Unconfined joints more difficult to compact than confined joints
- Various joint compaction methods can be successful
  - Success means target density/air voids at joints

Our Recommendation (Unsupported Edge):
1st Roller Pass Hangs Over 4-6 inches
Rolling the Supported Edge

Our Recommendation:

1st pass off the joint approx 6-8 inches

2nd pass overlap onto the cold mat

Other Options / New Products

- Mill & Pave One Lane at a Time
- Cut Back joint
- Wedge Compactors
- Joint Heaters
- Joint Adhesives (hot rubberized asphalt)
- Surface Sealers Over Joint
- Rubber Tire Rollers
- Warm Mix Asphalt