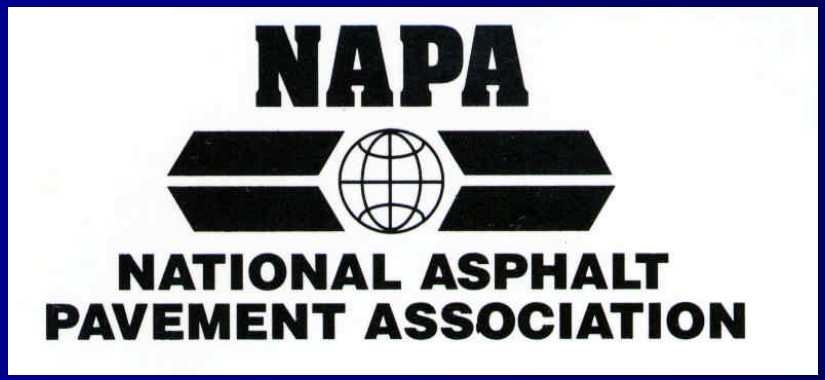
Longitudinal Joint Density



Alaska Paving Summit

December 11, 2003

Anchorage

What a Wise Man Said:

Longitudinal Joints are modern asphalt pavements' Achilles Heel!

Gary Hicks

World Renown Pavement Expert

Soon to be NAPA Award Winning Researcher

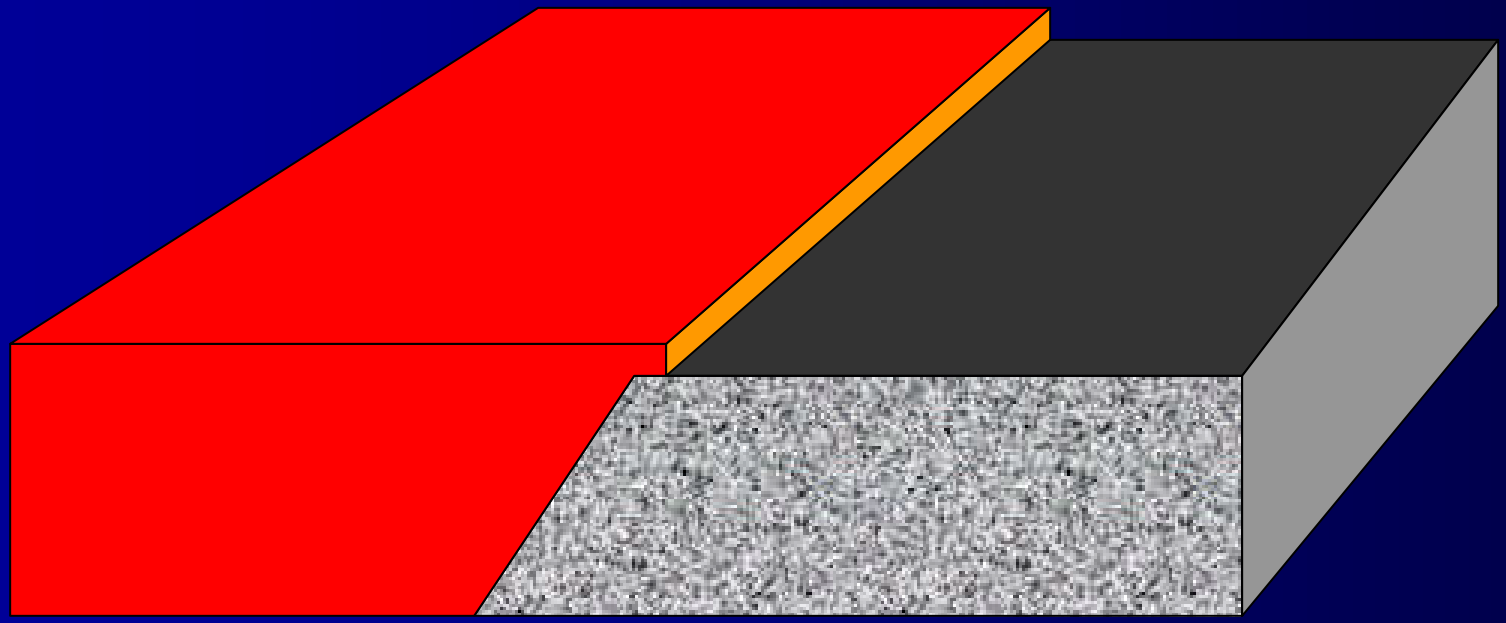
Topics

- Longitudinal Joint Options
- NCAT Study
- Specifications

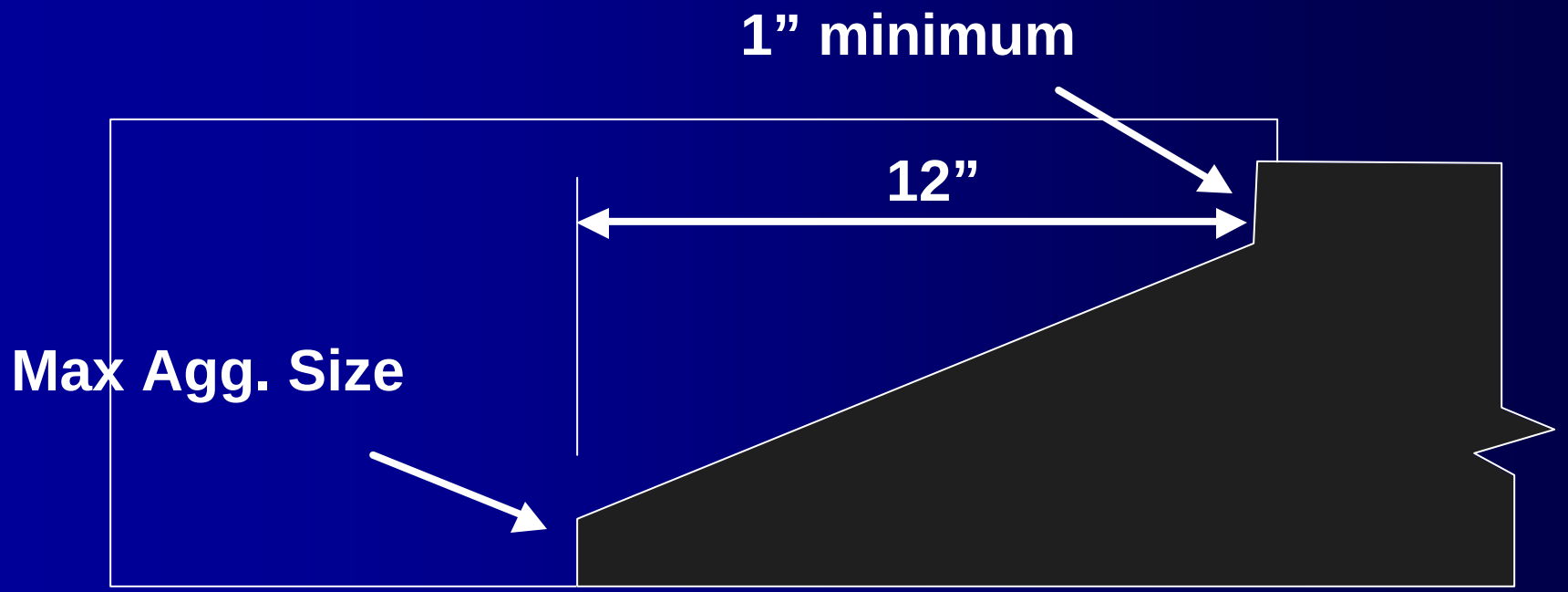
Longitudinal Joint Options

- Tapered Joint
- Notch Wedge Joint
- Vertical with Sealer
- Properly Rolled Vertical
- Hot Joint
- Cutting Back Vertical Joint

Longitudinal Butt Joint

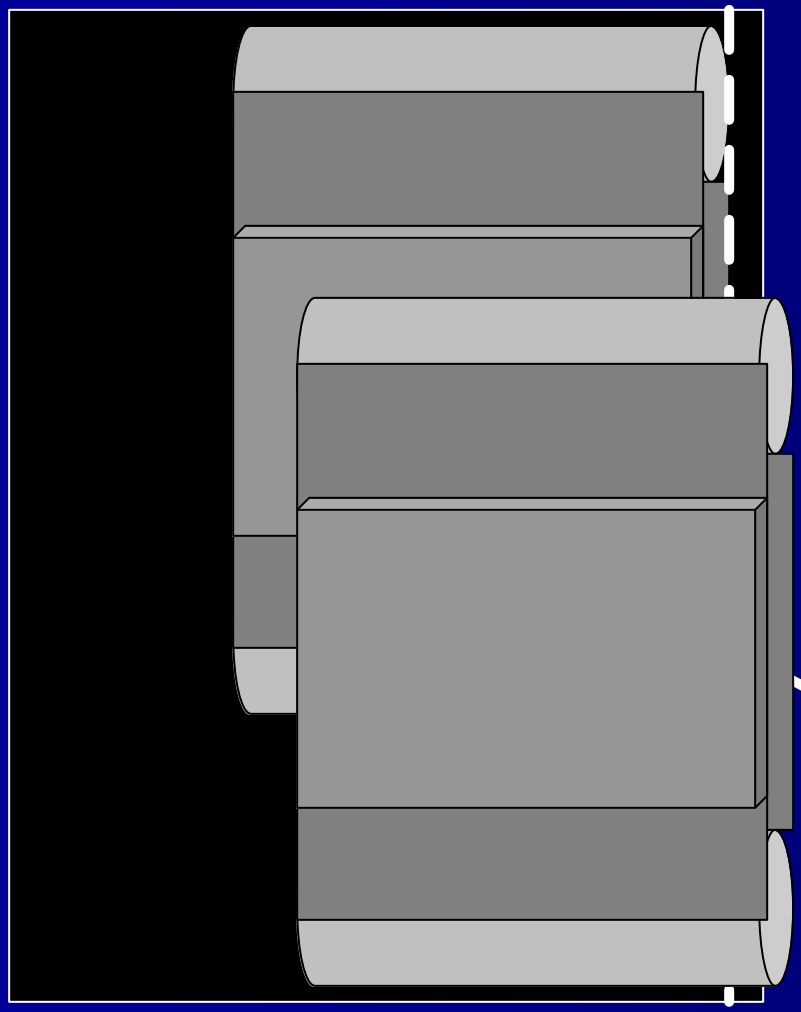


Notched Wedge Joint



Notched Wedge Joint Attachment

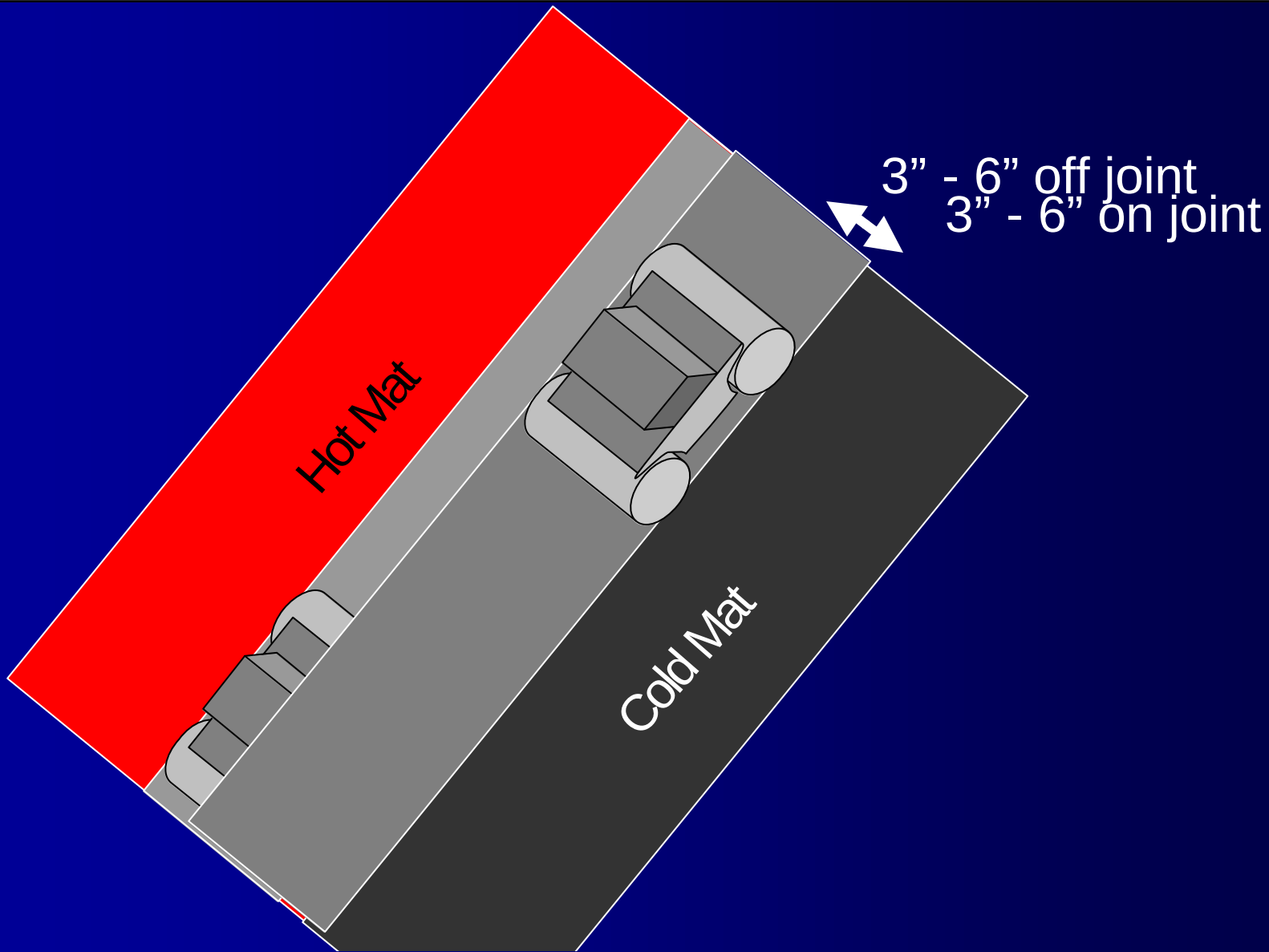
Joint Rolling - Unconfined Edge



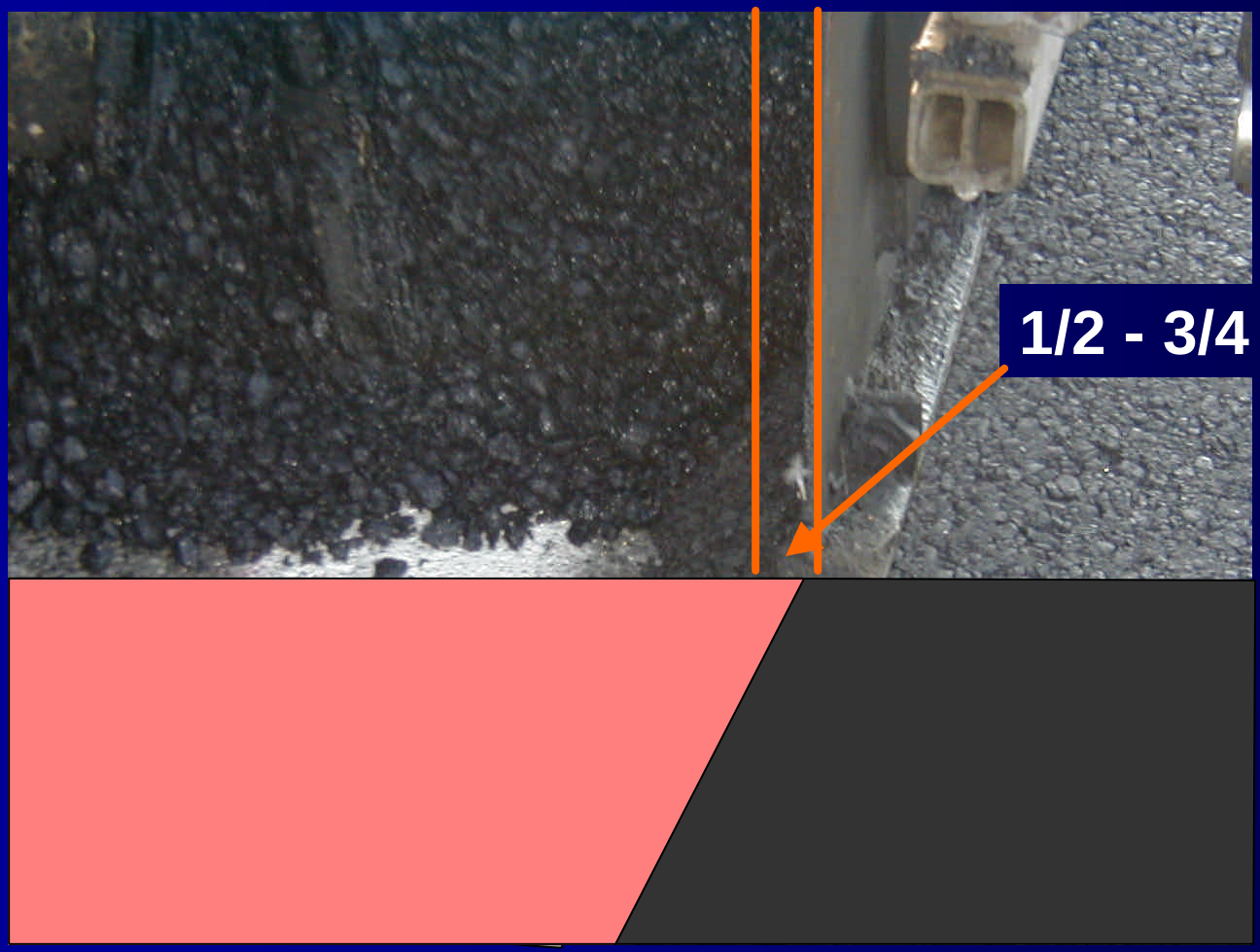
First Pass - Steel Wheel
Rollers Inside of edge ~ 6”

Second Pass - Steel Wheel
Rollers Overhang edge 3-6”

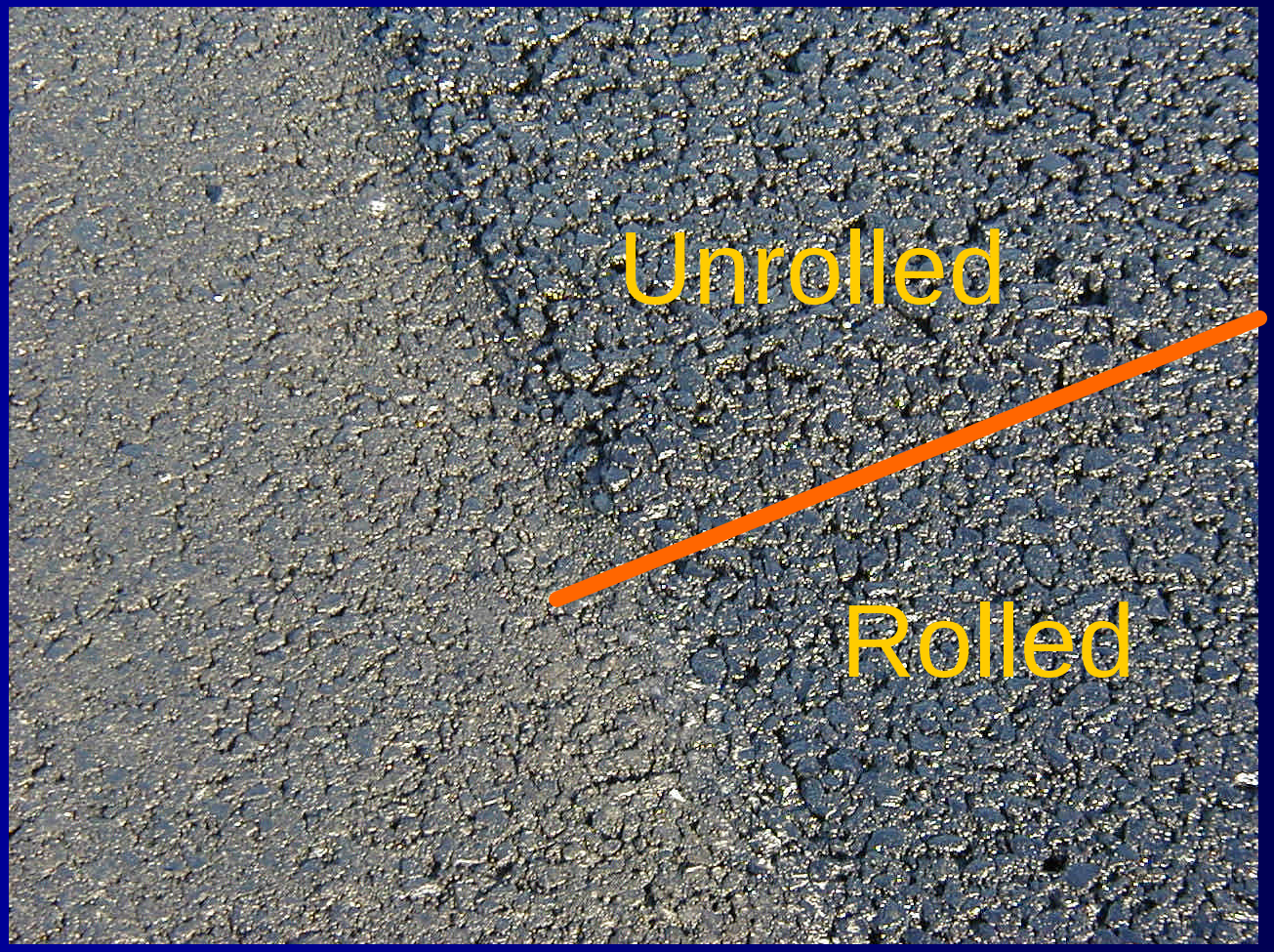
Longitudinal Joint



Longitudinal Joint



Longitudinal Joint



Minimizing Joint Problems

- Minimize Joints
- Pave in Echelon!
- May Require More Lane Closures
- But, It Minimizes Return Trips!

Echelon Paving

- Australian APA Guidelines
- Leave 4 - 8 inches of 1st paver pass uncompacted.
- Pave adjacent pass within 15 min.
- Straddle joint with breakdown roller.
- The best way to compact OGFC

Cutting Back the Edge

- Compact with 1st pass 6” from edge. Then overlap edge.
- Trim unsupported edge back 2 - 3”.
- Cut back edge with 10” wheel.
- Tack face before paving adjacent lane.

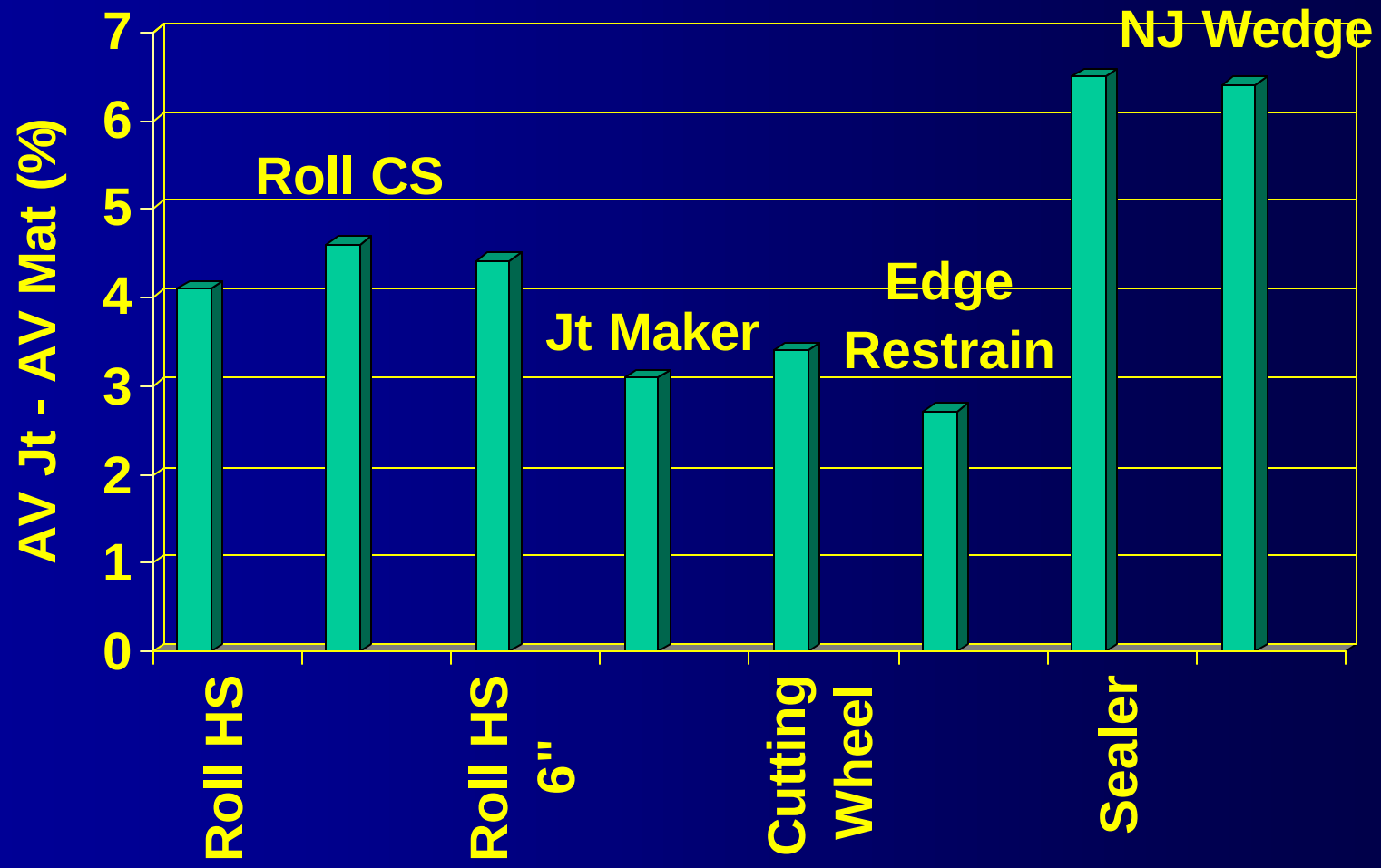
NCAT Study of Joint Performance

- Roll from cold side with 6” overlap.
- Roll from hot 6” from joint on 1st pass.
- Roll from hot with 6” on cold side.
- Seal with rubberized sealer.
- Use joint maker.
- Use edge restraint on roller.
- Use 3:1 New Jersey wedge.

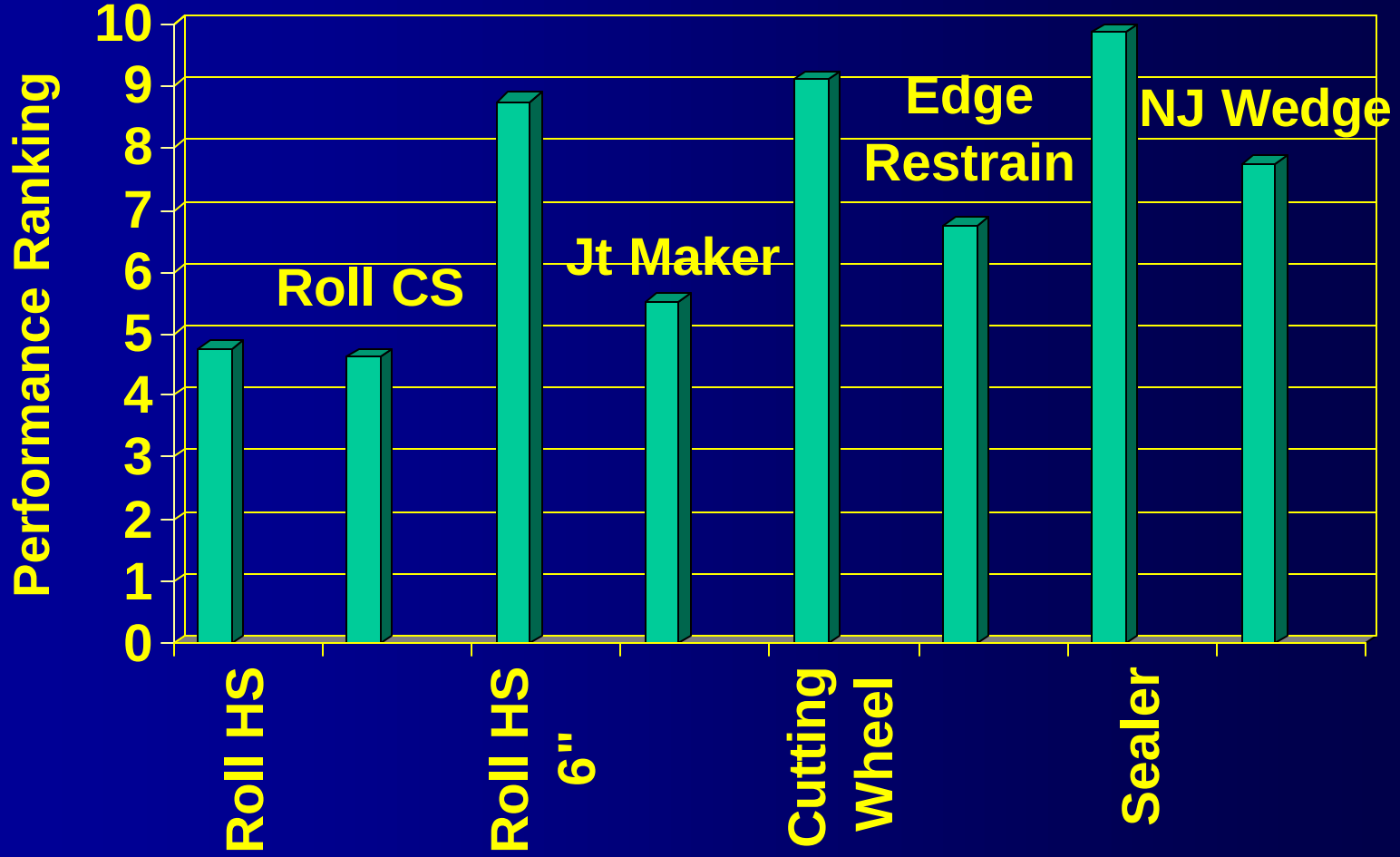
NCAT Study

- Construction in 1997
- Participants
  - Michigan
  - Wisconsin
  - Colorado
  - Pennsylvania
  - New Jersey
- Follow-up on performance in 2001 for Pennsylvania
- http://www.eng.auburn.edu/center/ncat/reports

Air Voids at Construction



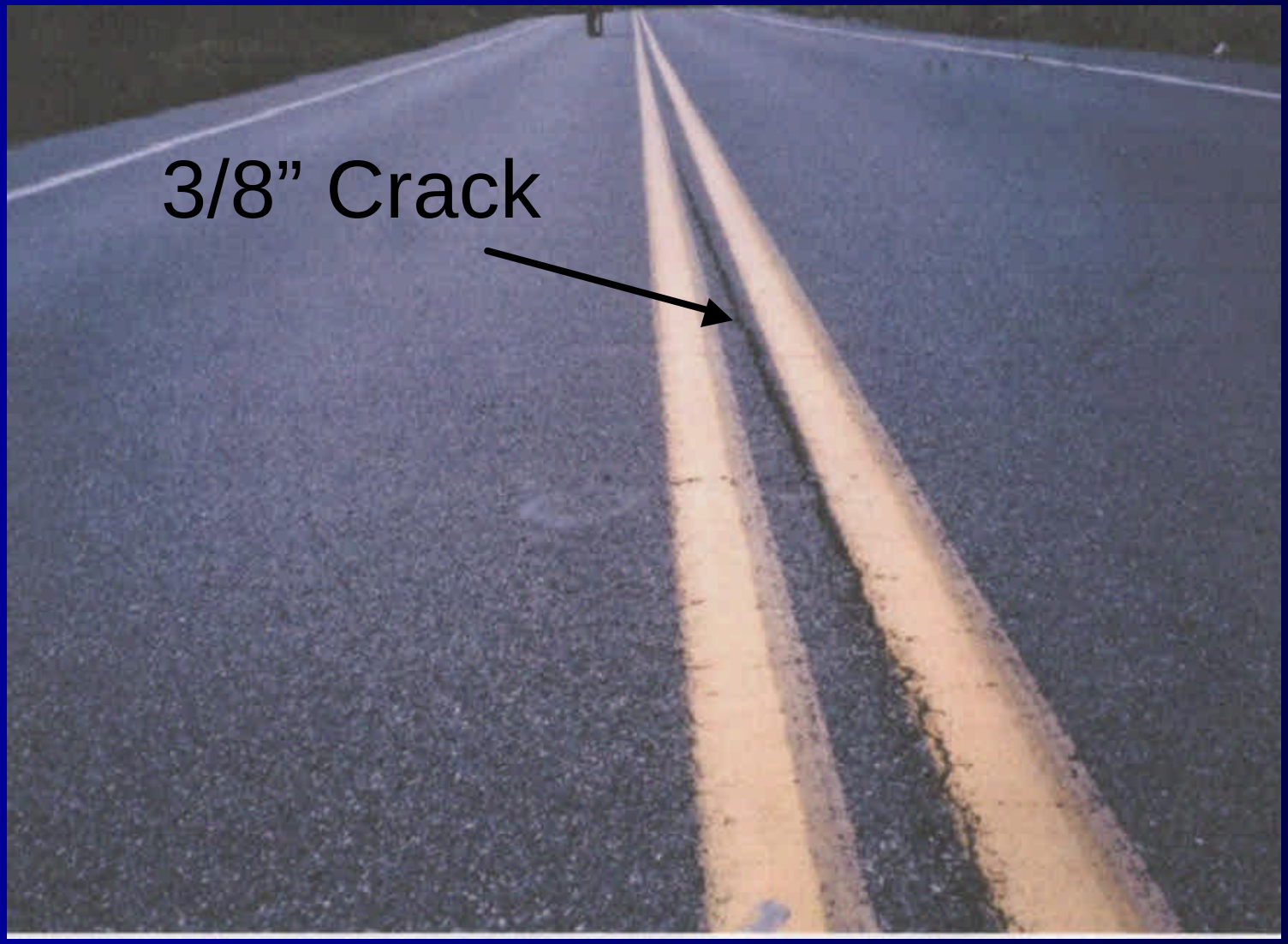
6-Year Performance



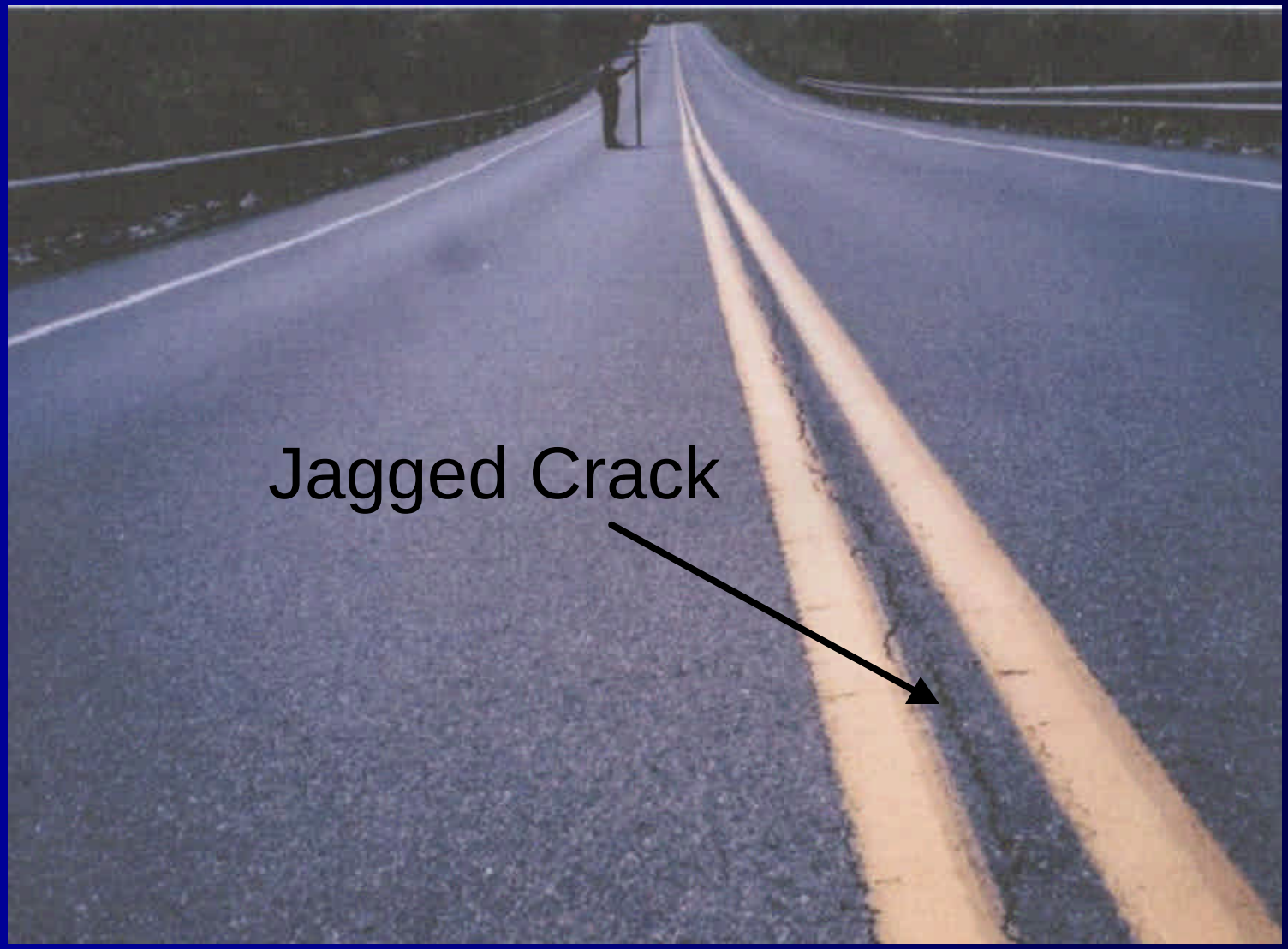
Cutting Wheel

Roll Hot Side 6”

Joint Maker



Hot Side Overlap to Cold



Cold Side

Sealer

Specifications

- Most states have a vague method specification.
- Approx. 20 states are considering joint density specs. Most considering [Mat density - 2%].
- http://fhwapap04.fhwa.dot.gov/

Specifications

- MN - Jts subject to mat density requirements
  - Unsupported edge - No cores within 1’
  - Confined edge - Core @ 6”
- MO - Jts to be [Mat - 2%] minimum
  - Sample taken within 6” of joint
- TX - No samples within 2’ of edge or joint

Specification

- CO - Apply tack to joint edge before adjacent lane placement
- DE - Method spec.
- ID - Method spec.
- LA - No density samples within 1’ of joint.

Into the Future . . .

Full-width paving in multiple layers!

Summary

- Good long. joints are important.
- Proper construction is key to performance.
- NCAT Study
  - Rubberized Sealer
  - Cutting Wheel
  - Roll 6” from Edge on 1st Pass
- What’s important? Density or performance?