

Longitudinal Joint Construction Kansas DOT Specification

**NCAUPG Meeting
January 9, 2008**

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JOINT DENSITY OVERVIEW

- Bit of History
- Test Procedure

JOINT DENSITY HISTORY

- 1920's - Recognized Problem
 - First Machine-Laid Asphalt
- 1997 - Researched Problem
 - Joint Effort with KSU



JOINT DENSITY HISTORY

- 1920's - Recognized Problem
 - First Machine-Laid Asphalt
- 1997 - Researched Problem
 - Joint Effort with KSU
- 2002 - Measured Problem
 - *Borrowed* from TxDOT
- 2004 - Evaluation Period Over
 - Specification Enforcement

JOINT DENSITY TEST PROCEDURE

- Who?
- What?
- When?
- Where?
- How?
- Why?

JOINT DENSITY TEST PROCEDURE

Who?

- Contractor's Responsibility to Test for Acceptance
- KDOT may also Take Tests
 - When available, these will be used for acceptance
- Same Personnel who perform Density Acceptance Testing

JOINT DENSITY TEST PROCEDURE

What?

- All HMA Lifts > 1" thick
- Traveled Way Only
- Any Edge
 - Forms a Joint, OR
 - Has the Potential to Form a Joint



JOINT DENSITY TEST PROCEDURE What?



Forms a Joint-Tested

Free Edge
Not Tested

JOINT DENSITY TEST PROCEDURE

What?



Potential to Form a Joint
Tested

JOINT DENSITY TEST PROCEDURE When?

- Lot is a Day's Paving

Distance Paved	Number of Sublots
0' – 500'	0
501' – 1,000'	1
1,001' – 2,000'	2
2,001' – 3,000'	3
3,001' – 4,000'	4
$\geq 4,001'$	5

JOINT DENSITY TEST PROCEDURE When?

1st sublot tested before
3rd sublot compacted

2nd sublot tested before
4th sublot compacted

3rd sublot tested before
5th sublot compacted



JOINT DENSITY TEST PROCEDURE

Where?

- Traveled Way Only
- Use Nuclear Density Gauge
 - Take 3-1 minute Readings
- Test Interior of the Mat
 - Excludes outside 2'
- Test Joints
 - Source Rod 8" from Edge



JOINT DENSITY - Where?

Joint

8"

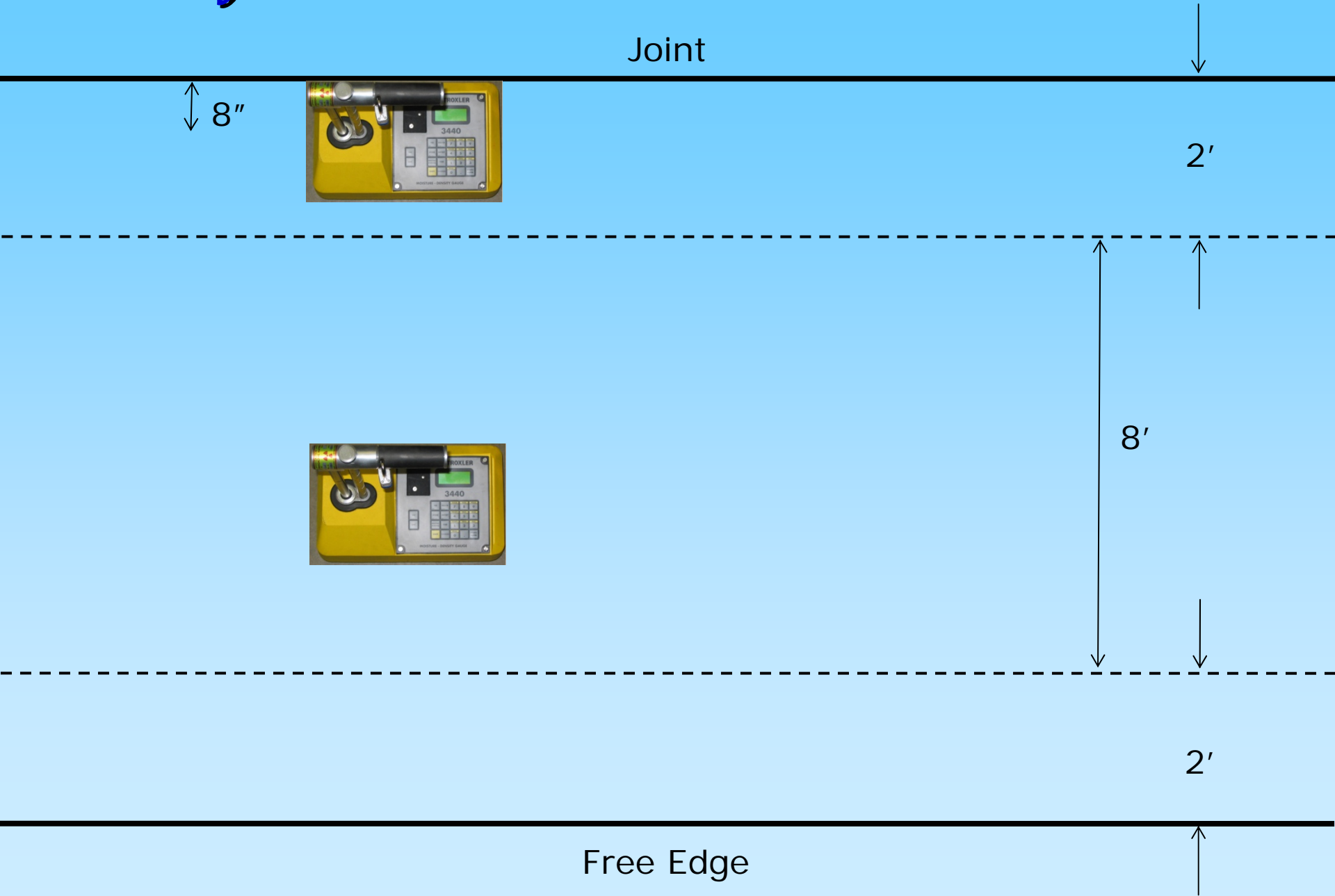


2'

8'

2'

Free Edge



JOINT DENSITY - Where?

Joint

8"

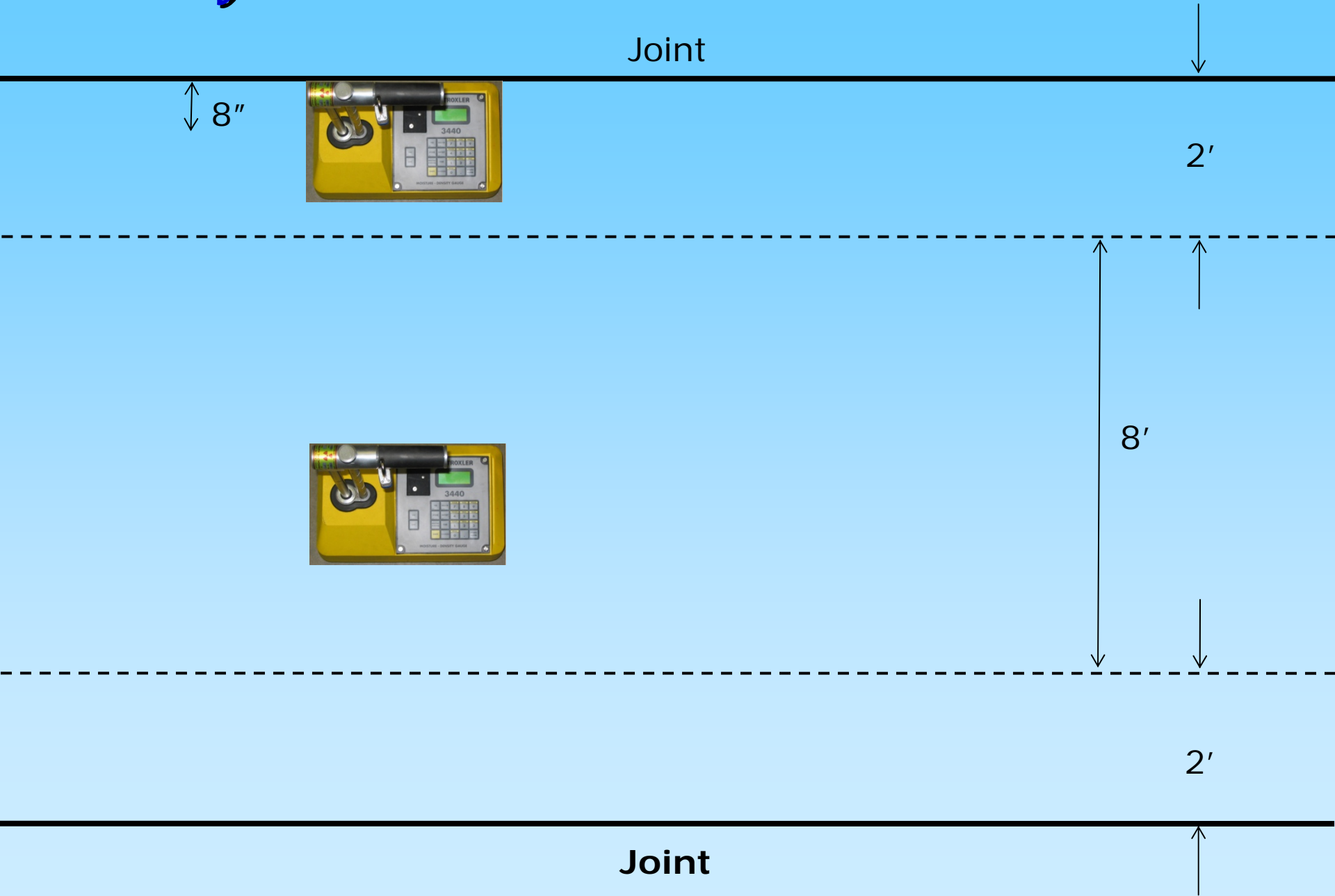


2'

8'

2'

Joint



JOINT DENSITY TEST PROCEDURE

How?

Acceptable Criteria

Interior Density – Joint Density \leq 3.0 lbs/cu.ft.

OR

Joint Density \geq 90.0% of G_{mm} (*Added in 2003*)

Each Joint must pass.

JOINT DENSITY TEST PROCEDURE

How?

The Teeth

- Suspend paving if 2 consecutive Joint Densities Fail
- Contractor must make changes
 - Mix,
 - Plant, and/or
 - Roadway Operations
- Pave 2000 feet and **STOP**.

JOINT DENSITY TEST PROCEDURE How?

The Teeth (Continued)

- Test 2 Locations in that 2000' Section
- Both joint densities must pass to resume Normal Paving Operations.
- If both Joint Densities do not pass
 - Pave 2000' and Stop
 - Repeat Evaluation Process

JOINT DENSITY TEST PROCEDURE

How?

The Results

- Earliest Projects
 - Difference between Interior Density and Joint Density was the only criteria
 - Contractors had difficulties meeting Specification on a Regular Basis
 - One Contractor tried Several of the Methods Described in the Previous Presentation

JOINT DENSITY TEST PROCEDURE

How?

The Results (Continued)

- Earliest Projects (Continued)
 - His Methods were taught in formal training sessions to both KDOT Personnel and Contractors
 - This Helped Contractors Meet the Specification Regularly

JOINT DENSITY TEST PROCEDURE

How?

The Results (Continued)

- Current Projects
 - Most Contractors just pay closer attention to Rolling Procedure
 - Adding ~1" of HMA on the adjacent pavement is critical to getting joint density
 - KDOT added the 90% of G_{mm} Criteria, which also increased the potential for joints to pass

JOINT DENSITY TEST PROCEDURE

How?

The Results (Continued)

- Current Projects
 - Joint Performance has improved
 - Still Room for Improvement
 - Stricter Enforcement of Specification will ensure satisfactory Joint Densities

JOINT DENSITY TEST PROCEDURE

Why?

- Refer to Previous Presentation
 1. Minimize Moisture Entering Joints
 2. Reduce Raveling Potential
 3. Increased Joint Durability

... And we get some pretty good looking joints



Sometimes the Joints look better than the Striping



... And Sometimes the Joints don't look as good as we'd like



... And Sometimes the Joints get rolled better than the interior of the Mat



... But Overall, We think the Joint Density Criteria has Increased Joint Durability



Questions