Concrete Paving Field Inspection
Inspector’s Workshop

What is the inspector’s role?

Iowa State University
Institute for Transportation
www.cp.techcenter.org
Concrete Paving Field Inspection Inspector’s Workshop

1. Why are we here?
2. How do we achieve quality for PCC paving?
3. Got a project….Now what?
4. What is concrete?
5. What kinds of equipment are used?
6. What happens before you start paving?
7. What happens when you’re finally paving?
8. **What is the inspector’s role?**
9. What about all of the other road building stuff?
10. What do you look for in urban paving?
11. What paperwork?
Instructor

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Representing the National Concrete Pavement Technology Center

www.cpTechcenter.org
WHAT IS THE INSPECTOR’S ROLE?
As the inspector, these are the minimum recommended items to check.

- Traffic Control
- Grade
- Concrete Delivery
- Concrete Placement
- Concrete Testing
- Pavement Testing
- Vibration

- Steel Placement
- Finish
- Texture
- Curing
- Station Markers/Dates
- Concrete Strength
- Noncompliance Form
What is Needed for Testing?

Equipment:
- Air meter
- Siphon bottle
- Bucket
- Mallet
- Shovel
- Slump cone
- Rod
- Trowel

- Assemble and check testing equipment
- Calibrate air meter regularly
Inspector’s Role

Traffic Control

• Safety is paramount

• It is Everyone’s responsibility

• Incident ➔ Stopped Traffic ➔ Stopped Paver ➔ $$$
Inspector’s Role

Grade
• Walk the grade
• Look for irregularities

Stringline
• Check alignment
• Walk ahead
Inspector’s Role

Concrete Delivery
Delivery Time

Three Methods of Delivery

• Dump Truck
  ➢ Shortest Allowed Delivery Time (typ. 30 min)
  ➢ Hardest to track
  ➢ Follow a truck in normal traffic
  ➢ Call plant for batch time if necessary

• Agitators
  Longer Allowed Delivery Time (sometimes equal to ready-mix, typ. 90 min.)

• Transit Mixers (Ready-Mix Trucks)
  ➢ Longest Allowed Delivery Time (typ. 90 min.)
  ➢ Batch time written on ticket
Inspector’s Role

Concrete Delivery
Added Water

• Ready-Mix trucks can add water at the grade
• Additional 30 revolutions recommended
• Document volume of water added

➢ Do not exceed max w/c ratio
Inspector’s Role

Concrete Delivery

Adding water will:

- Increase workability (slump)
- Decrease strength
- Increase permeability

- Communicate with plant

Better to add more at plant than in truck later
Inspector’s Role

Placement

• Belt Placer
  ➢ Should be uniform pile
  ➢ Segregation
    – Aggregate gets thrown
    – Paste piles next to belt
    – Edge slump higher on side where trucks dump

• Ready-Mix
  ➢ Evenly spread with chute
  ➢ Stinger (Vibrator) is for consolidation—not moving concrete
    – Do not drag
    – Can cause segregation
Inspector’s Role

Concrete Testing

Air Content

- Determine minimum testing frequency
  - Do more than the minimum
- Know required air content - Target, Min, Max
- Slip-Form Paving
  - What is target, min, max (in-place)
  - Test in front of paver
  - Test behind paver
    - Check if loss through paver
    - Can change throughout the day/time of year
  - Regular testing in front of paver
Inspector’s Role

Slump

• Consistency

• Slip-Form
  ➢ Ability to stand up
  ➢ High slump creates edge slump issues
  ➢ Usually not required
  ➢ Monitor visually for changes
Inspector’s Role

Temperature

- Agencies have different specifications
  - Know your specifications

- Check temperature regularly

- Changes in temperature can relate to:
  - Air content
  - Water demand
  - Workability
Inspector’s Role

Pavement Testing

Edge Slump

• Sign of mix inconsistency
• Edges coming out of paver should be vertical
• Test with straight edge
• Avoid birdbaths
  ➢ Safety hazard (Rain, Ice)

Pavement Width

• monitor regularly
• measure hubs
Inspector’s Role

Cross Slope

• Check with string line
• Check with 4’ Level
  – Ruler
  – Digital (Smart level)
    o Calibrate regularly
    o Check Mode!

  Use Percentage - not degrees
Inspector’s Role

Depth Check

- Probing for thickness or use string line across hubs

- Thickness incentives reduce concern
Inspector’s Role

Vibration

• Important for consolidation
• Check vibrators regularly (2x day)
  ➢ Check vibration specs
    – Typically 4,000 to 8,000 vpm
  ➢ Use vibration monitors
  ➢ Document results
Inspector’s Role

Steel Placement-Transverse Joints

Doweled Pavements

- Basket Assemblies
  - Smooth bars allow bar to slide in concrete
  - Properly secured
  - Must be aligned with the pavement and the joint
  - Check for damage to baskets
  - Baskets staked and marked for saw crews
Inspector’s Role

Steel Placement
Longitudinal Joints

• Keyway
  ➢ Inserted by hand in plastic concrete
• For Drilled /Inserted tie bars, ensure proper:
  ➢ Location
  ➢ alignment

See Detail E
Inspector’s Role

Finish

Slipform

• Some finishing is common
• Too much indicates a problem
• Burlap drag
  ➢ Wet burlap sparingly
  ➢ No puddling
  ➢ Very small amount of slurry created by finishing tools
Inspector’s Role

Finishing

Adding water to surface is often referred to as:

Blessing the Slab
Inspector’s Role

Yield

• Determine theoretical volume of concrete to be used
• \( L \text{ (ft)} \times W \text{ (ft)} \times D \text{ (ft)} / 27 = \text{Theoretical CY} \)

• Yield = CY Used/Theoretical CY x 100 = Yield %

• Normally is over 100%

• Slip-form is usually 103% - 106%, especially with thickness incentive

Extra concrete is good, especially if you’re paying by the SY
Inspector’s Role

If something is not right, communicate to the contractor, if not addressed, document the noncompliance.

<table>
<thead>
<tr>
<th>NONCOMPLIANCE NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor:</td>
</tr>
<tr>
<td>Project No.:</td>
</tr>
<tr>
<td>County:</td>
</tr>
<tr>
<td>Accounting ID No.:</td>
</tr>
<tr>
<td>Date:</td>
</tr>
<tr>
<td>Time:</td>
</tr>
<tr>
<td>To:</td>
</tr>
<tr>
<td>(Name)</td>
</tr>
<tr>
<td>(Title)</td>
</tr>
<tr>
<td>(Signature)</td>
</tr>
<tr>
<td>You are hereby notified that the following observation and/or test noted:</td>
</tr>
<tr>
<td>and is a violation of Article:</td>
</tr>
<tr>
<td>The test data value is:</td>
</tr>
<tr>
<td>and the specification lines are:</td>
</tr>
</tbody>
</table>

Additional tests may be performed.

The violation identified in this notice shall be ceased and/or corrected. This may require a modification of current practices or removal and replacement of materials, including labor, at no cost to the Contracting Authority.

You are to determine corrective action necessary.

You are to determine if you wish to discontinue operations until the violation is corrected or additional tests confirm or refute this failing test.

Remarks:

Correction:

Signed: __________________________
Instructor
Summary – What is the inspector’s role?

- Be prepared – equipment
- Traffic control & safety
- Check the grade and stringline
- Concrete delivery
- Concrete placement
- Testing
- Quality Control
- Communication
THANK YOU!

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