Concrete Paving Field Inspection Inspector's Workshop

What is the inspector's role?

National Concrete Pavement Technology Center

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IOWA STATE UNIVERSITY

Institute for Transportation

www.cptechcenter.org

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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?

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Instructor

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Representing the National Concrete Pavement Technology Center

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WHAT IS THE INSPECTOR'S ROLE?

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

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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

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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.)

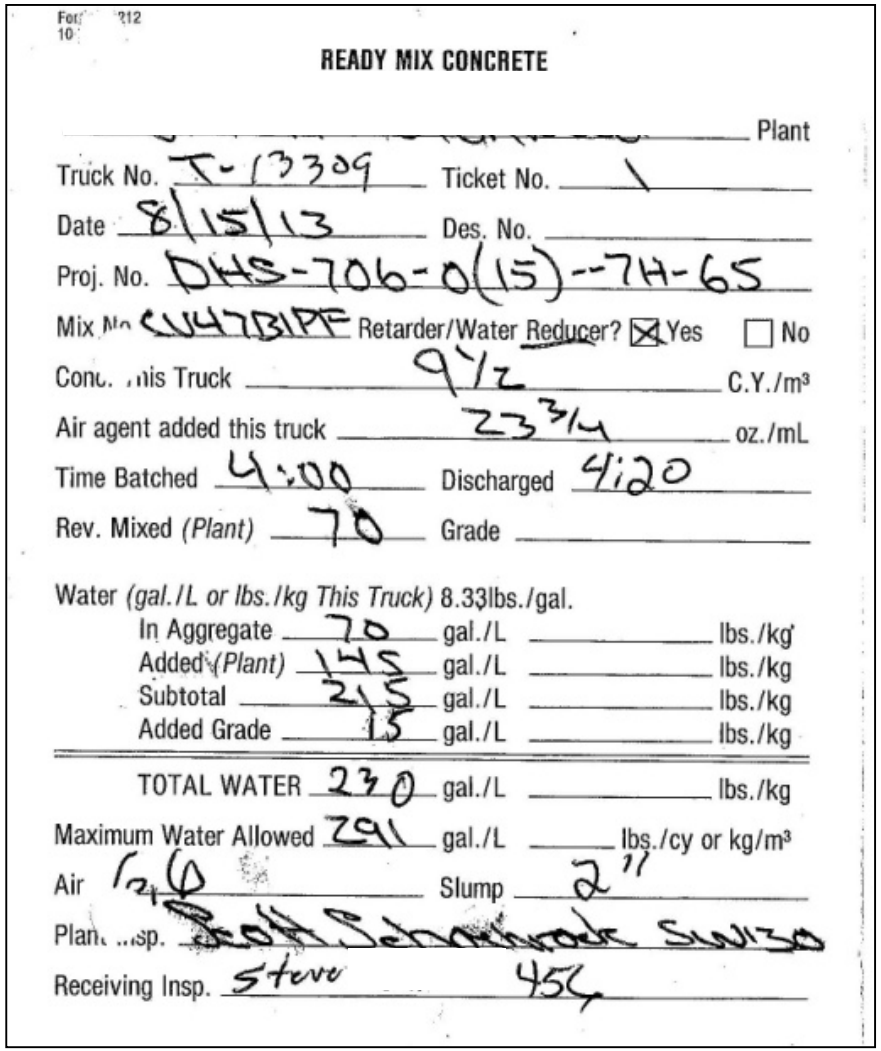
- Transit Mixers (Ready-Mix Trucks)
  - ➢Longest Allowed Delivery Time (typ. 90 min.)
  - ➢Batch time written on ticket

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



READY MIX CONCRETE

Plant

Truck No. T-13309 Ticket No. 1

Date 8/15/13 Des. No.

Proj. No. DHS-706-0(15)--7H-65

Mix No. CW47B1PF Retarder/Water Reducer? ☒ Yes ☐ No

Conc. this Truck 9½ C.Y./m³

Air agent added this truck 23 3/4 oz./mL

Time Batched 4:00 Discharged 4:20

Rev. Mixed *(Plant)* 70 Grade

Water *(gal./L or lbs./kg This Truck)* 8.33lbs./gal.

In Aggregate	70	gal./L		lbs./kg
Added *(Plant)*	145	gal./L		lbs./kg
Subtotal	215	gal./L		lbs./kg
Added Grade	15	gal./L		lbs./kg
TOTAL WATER	230	gal./L		lbs./kg
Maximum Water Allowed	291	gal./L		lbs./cy or kg/m³

Air 6½ Slump 2"

Plant Insp. Scott Schonhoff SW130

Receiving Insp. Steve 456

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

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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

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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

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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

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Inspector's Role

Cross Slope

- Check with string line
- Check with 4' Level
  - –Ruler
  - –Digital (Smart level)
    - ○Calibrate regularly
    - ○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

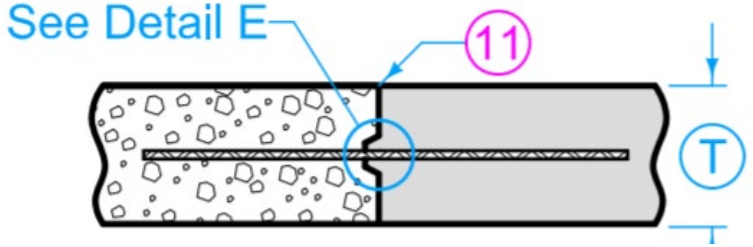
- Basket Assemblies
  - Smooth bars allow bar to slide in concrete
  - Properly secured
  - Must be aligned with the pavement and the joint
  - Check for damage to baskets
  - Baskets staked and marked for saw crews

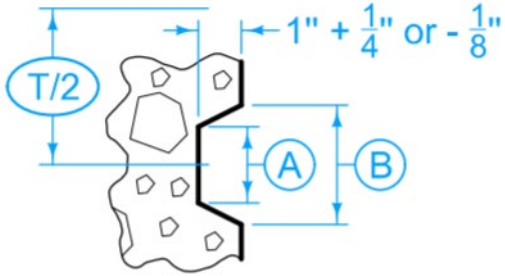
Inspector's Role

Steel Placement

Longitudinal Joints

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





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

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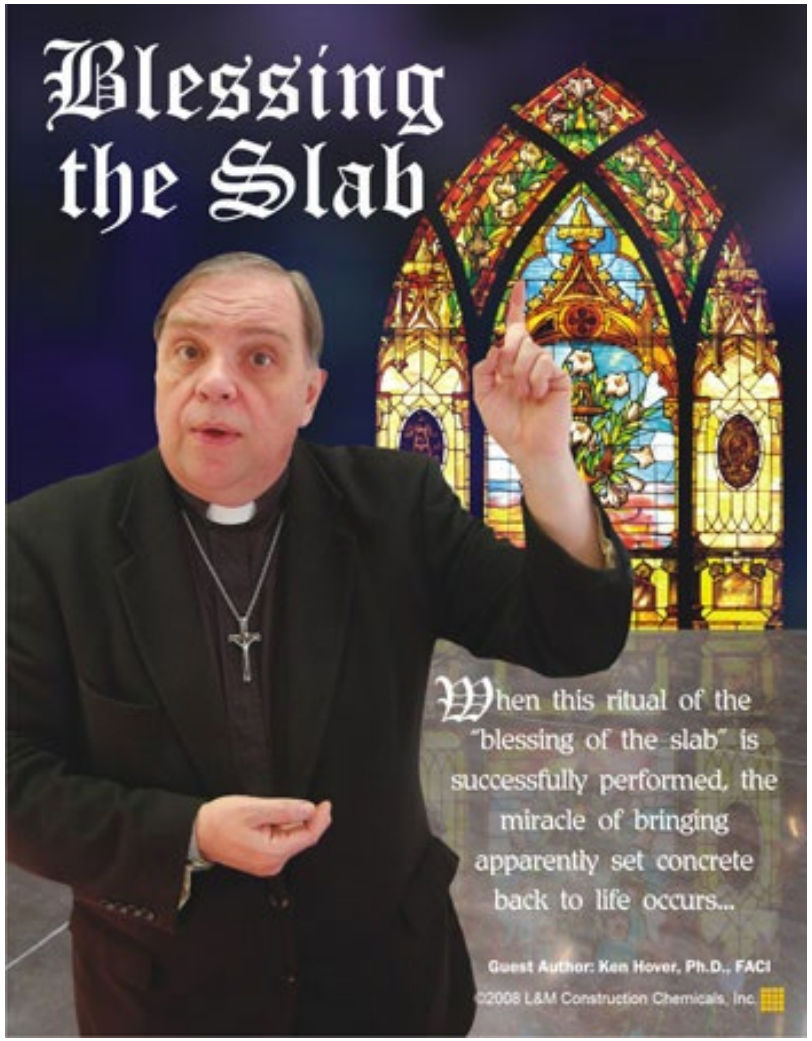
Inspector's Role

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 (ft) x W (ft) x D (ft) / 27 = 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

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Inspector's Role

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

Form 830245
4-96

NONCOMPLIANCE NOTICE

Contractor _____ Project No. _____

County _____ Accounting ID No. _____ Date _____ Time _____

To: _____ _____ _____
(Name) (Title) (Signature)

You are hereby notified that the following observation and/or test noted _____

_____

_____

and is a violation of Article _____

The test data value is _____

_____

_____

and the specification limits are _____

_____

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: _____
Inspector

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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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