How Does Finishing Play a part?

1

Why do we care?

2

Common Pavement Distress

- **Surface Defects**
  - **Map Cracking**
  - **Shrinkage Cracking**
  - **Scaling**
  - **Polishing/ Loss of skid resistance**
- **Joint Spalls**
- Transverse Cracks
- Longitudinal Cracks
- Corner Breaks
- Shattered Slabs
- Joint Seal Damage
- Materials Related Distress
  - ASR
  - Chloride Damage

3

Subgrade Fundamentals

- Construction always starts with the subgrade
- Grade uniformity more important than grade strength
  - Soil type
  - Moisture content
  - Density
- Grade control influences the pavement
- Do not sacrifice stability for anything!
  - Construction platform

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Placing Concrete on Grade

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Placing Concrete

- A placer should be used when dowel or tie bar baskets are in use
- Spreaders may be used at contractor discretion
- Limit Free Fall
- Moist Subgrade

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- One time water addition
- Do not exceed W/CM ratio
- Be Careful around reinforcement

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Stringline

- Rigid stakes
- Quality line
- No perceptible sagging
- "Eyeball" for staking errors
- Re-survey staking errors
- Adjust stake spacing to fit conditions

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Slip Form Pavers

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Paving Sensors

- Control alignment and elevation of the paver
- Sensitivity Controls
- Each track controlled seperately

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Stringless Paving



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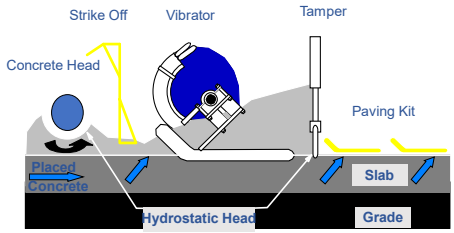

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Augers and Plows

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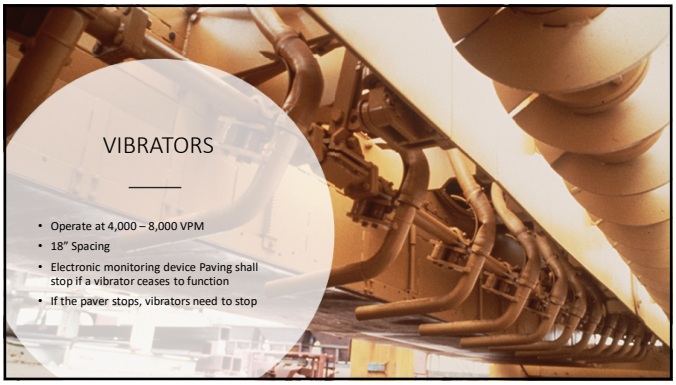

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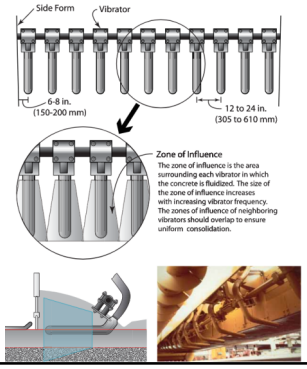

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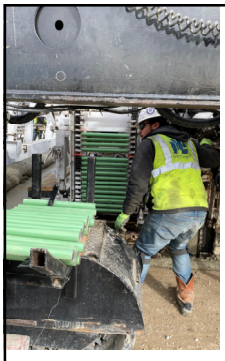

Dowel Bar Inserter


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Tie Bars

- Center bars use Tie Bar Inserter
- Side bars hydraulically inserted

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Oscillating Correcting Beam/ Tamper Bars


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What affects the Slab behind the paver

- Workability/ reaction to vibration of the mix
- Paver setup and operation
  - Consistent head in front of the paver
  - Auger direction
  - Vibrator Frequency
  - Finishing pan angle
  - Paver speed
    - Should be adjusted based on anticipated concrete delivery to the paver
    - Minimize adjustments during production
    - Better to stop than to slow down paver during production

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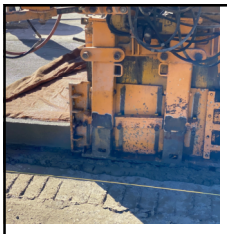

Finishing

- Straightedges/ V-Floats may be used
- Minimal Hand Finishing

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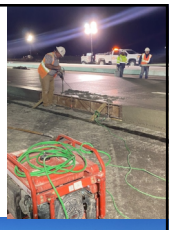
How much finishing is too much?

- Standard Finishing
  - Single pass with bump cutter or straightedge
  - Float the edges and broom for texture
  - Isolated areas of re-finishing
- Too Much
  - Based on Judgement
  - Rebuilding entire edge
  - Fixing entire width for more than a few feet
  - Re-working material that has reached initial set

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Proper Correction Techniques Behind the Paver

- Set form if area is on the edge
- Add additional material that contains aggregate
- Vibrate for consolidation
- Refinish

- If initial set has begun, repairs should not be attempted
- Should not be done following placement of curing compound

- Surface does not need to be perfect, minor defects are better left alone

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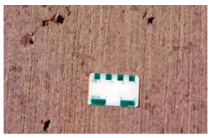
Minor Defects



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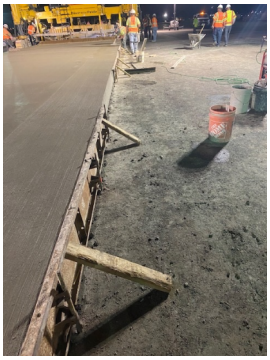

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Screeds

Types:
- Bridge Deck
- Laser
- Truss
- Roller

- Screeds should be wider than the forms

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Bridge Deck

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Laser Screed

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Truss Screed


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Roller Screed


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Finishing Aids

- Evaporation Retarders ≠ Finishing Aids

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Colloidal Silica Finishing Aids

- Designed to improve workability under hot, dry and windy conditions
- Increases Abrasion and Impact Resistance
- Increases surface compression strength
- Creates a denser, less permeable surface

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Texture

- Burlap Drag
- Should not pull up rocks or create voids in surface


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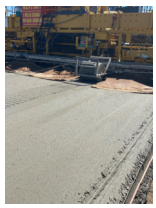
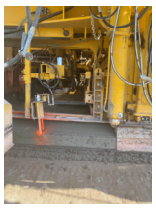


Rumble Strips, C&G, Safety Edge

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Curing

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Why do we care about smoothness?

- Smoother roads last longer
- Smoother roads are safer
- Smoother roads save drivers money

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What affects smoothness

- Mix design
- Project Phasing
- Paver Setup
- Roadway Geometry
- Stringline or 3D model
- Temperature
- Finishing


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Smoothness Equipment

- High Speed Profiler (10-80mph)
- Lightweight Profiler (5-15mph)
- Real- Time
- Straightedge

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How do we measure smoothness

- International Roughness Index (IRI)
  - Accumulated motion of vehicle suspension divided by distance traveled- units are in/mi
  - Evaluated per wheelpath
  - Evaluated in 1/10th mile sections
- Requirements differ by type of roadway
  - Interstate- 82in/mi
  - Urban roadway- 100 in/mi

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Questions?

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