Rapid Asphalt Production/Construction Controls Feedback - PCF

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Production/Construction Feedback

- PCF – controls and devices designed to provide rapid feedback to the user to improve the density and hence the performance of asphalt pavements.
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- Areas of concern:
  - Aggregate moisture
  - Asphalt Sampling
  - Compaction
States Responding to Survey
Production/Construction Feedback

- Tools: Moisture Control
  - Microwave
  - Radiation

“Increase moisture if unaccounted will lead to a decrease in mix density”.

“In binder cost”

“unaccounted change of aggregate blend/proportions.”

Pictures and quotes from Hydronix and Troxler literature
If yes: Moisture sensor(s) on plant and used for QC?
If yes: Moisture sensor(s) and automatic aggregate belt samplers on plant and used for QC?
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- Tools: asphalt mix sampling
- Needs:
  - Samples of mix as produced
  - Quick access to lab
  - Safe for technician
If yes: Moisture sensor(s), automatic aggregate belt samplers and truck samplers for QC?
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- Tools: Temperature

FLIR
Production/Construction Feedback

- Tools: Temperature
Production/Construction Feedback

- Tools: Temperature
Production/Construction Feedback

Pave-IR Scan
If yes: Real-time measuring of paving temperature? for QC?
INTELLIGENT COMPACTATION for HMA

Yesterday

Buffalo Springfield Steam Roller
Today: IC Roller Equipment

Not shown accelerometer on steel wheel
Instrument Entire Rolling Train

Stabilized / Un-stabilized Full Depth Reclamation (FDR)

HMA Paving Train
If yes: Use IC for Real-time Monitoring of Pavement Rolling? and used for QC?

Data collection?

Cloud and Thumb Drive

Both MN and OK monitor stiffness

OK density = f(CMV)
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Communication
- Manual Data Collection – 40% loss
- Automatic Data Collection <1%

How much data?
~10 million/lines

Rebecca Embacher - MnDOT
Goal: Roll so each section is compacted at the same temperature (±6F) and receives the same number of passes.

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MN, OR and VT are using IC to:
• Monitor Passes
• Monitor % Coverage
• Mn monitoring stiffness
• Mn also using GSSI-RDM for real-time measurement of Density
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MNDOT Pre-map base stiffness, before paving.
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How are the different devices being specified?
• MN, OK, TN and VT - standard specification
• SD – special provision for belt samplers
• ID, IN, DE, MS, NH, OH and VA – no state specifications, allow as contractor options.
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Which of the devices have the most promise to add value to a project (cost savings and improved pavement performance?  
• Moisture Sensor: MD, OH, OK, VT  
• Automated belt sampler: ID, SD  
• Truck sampler: ID, VT  
• Pavement temperature: LA, MN, MS, OH, OK, VA, VT  
• IC Compaction: FL, IN, LA, MN, MS, NH, OK, SD, VT  
• GPR: MD, MN, OK
Production/Construction Feedback – most promising

- GRP
- IC Roller
- Pav't Temperature
- Truck Sampler
- Auto.Belt Sampler
- Moisture Sensor
Production/Construction Feedback

Next Meeting:
• Survey Update
• FHWA Density Project

2017 AAPT Newport Beach
March 19-22