

***Rapid Asphalt
Production/Construction ~~Controls~~
Feedback - PCF***

ETG Construction Task Force

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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.

Production/Construction Feedback

- **Areas of concern:**
 - Aggregate moisture
 - Asphalt Sampling
 - Compaction

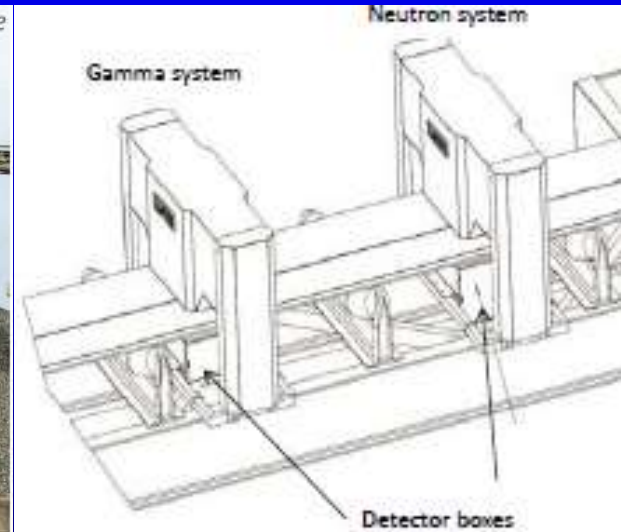
Production/Construction Feedback

- Tools: Moisture Control

Microwave



Radiation



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

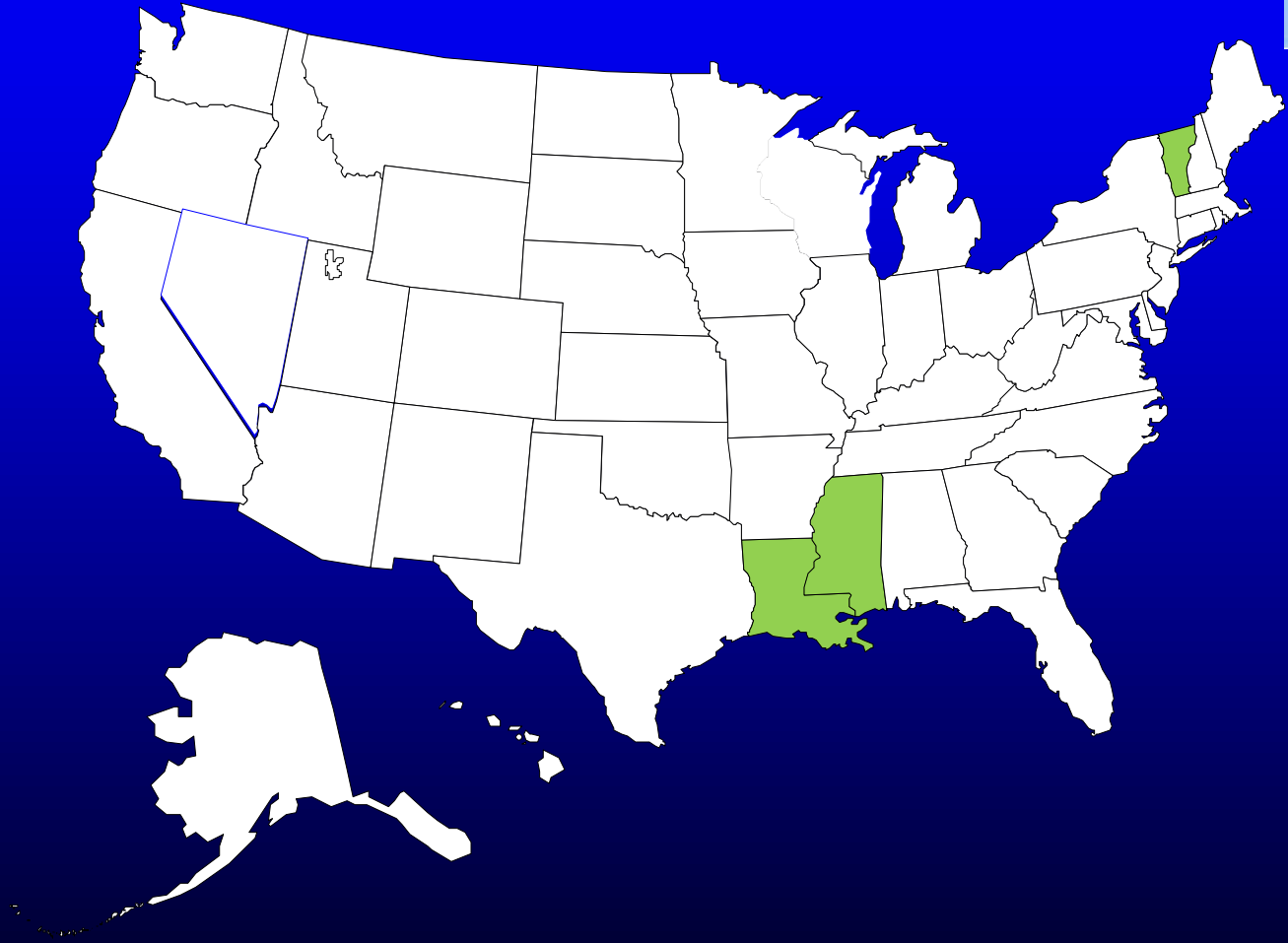
“In binder cost”

“unaccounted change of aggregate blend/proportions.”

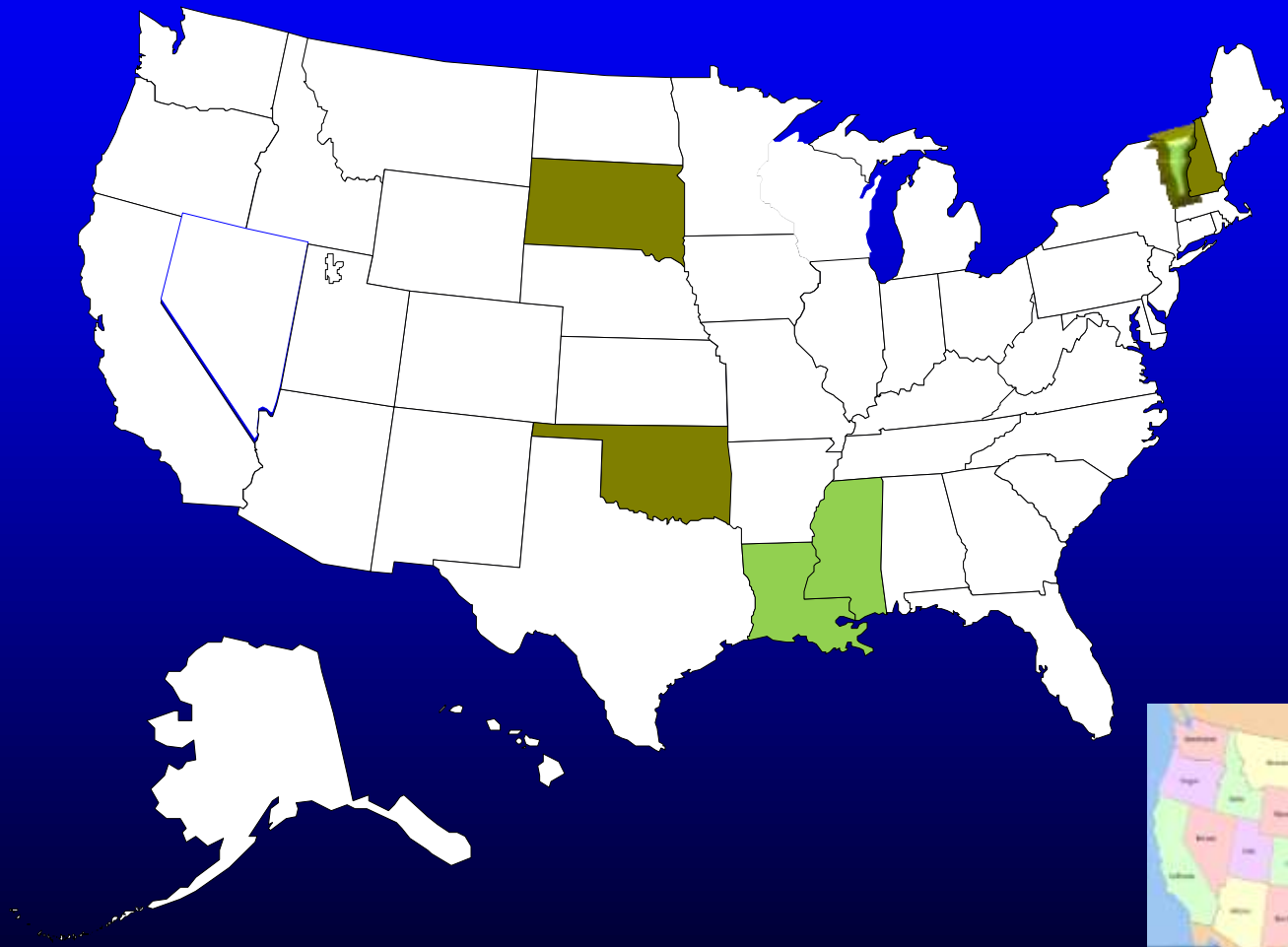
Pictures and quotes from Hydronix and Troxler literature

AAPT

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?

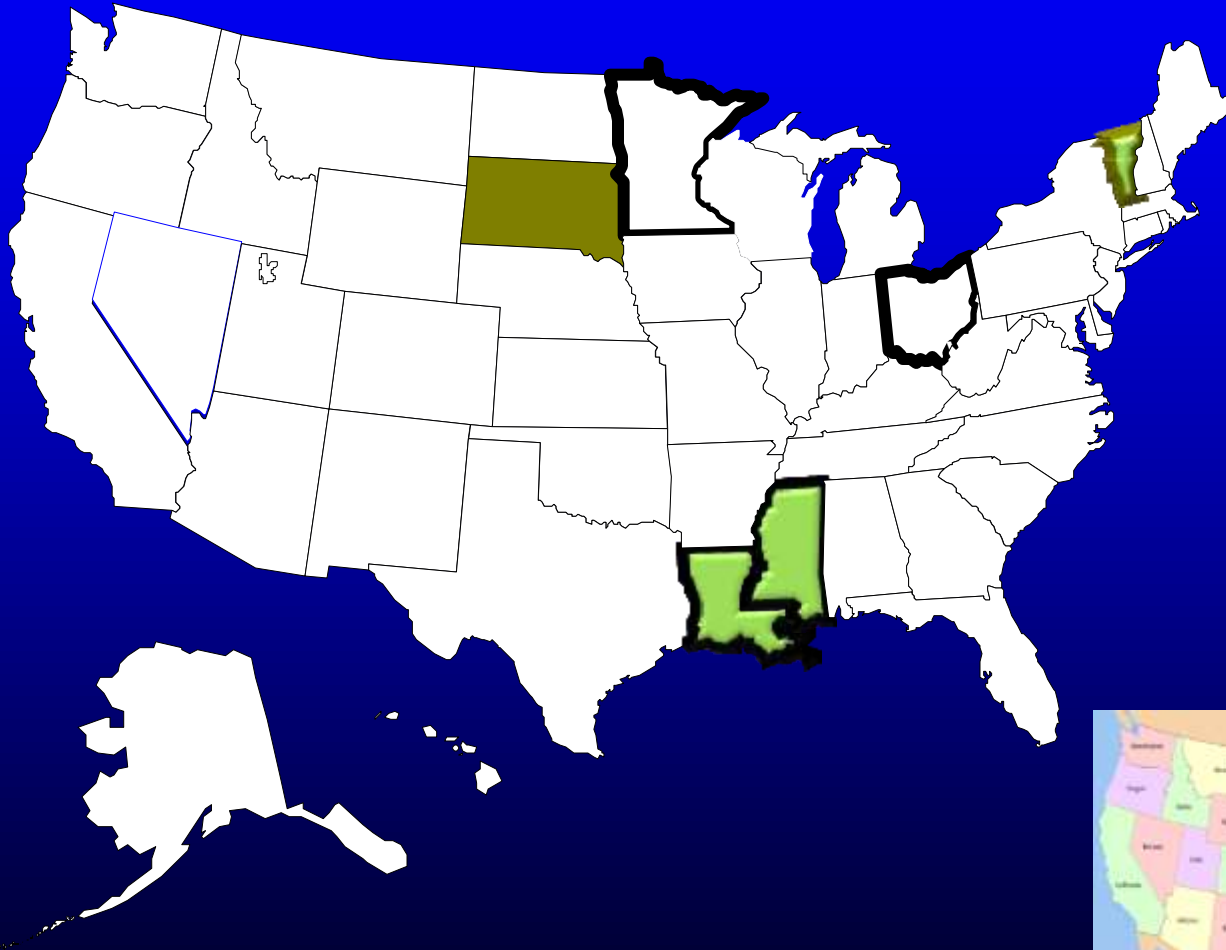


Production/Construction Feedback

- **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?

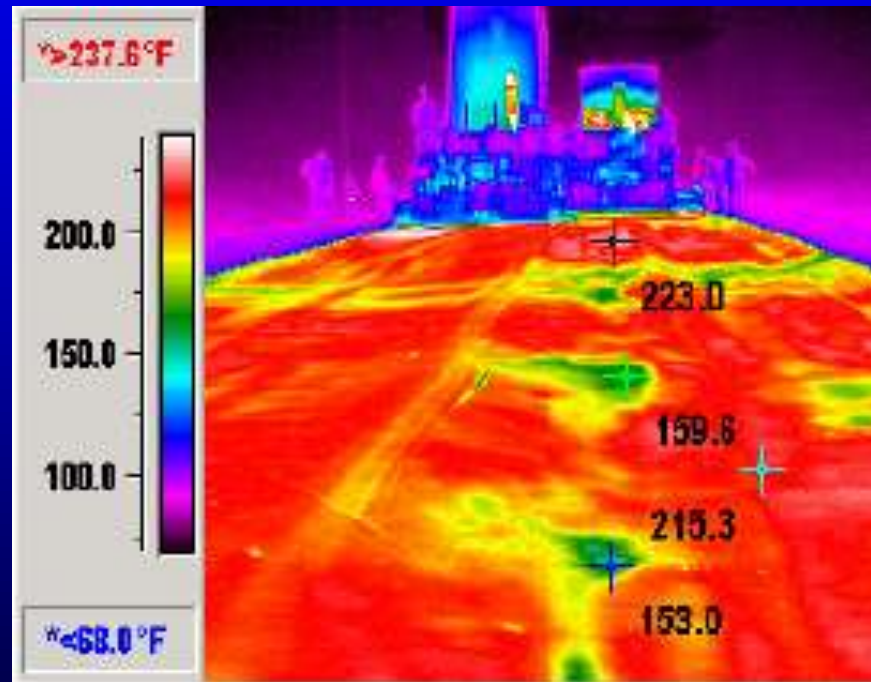


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Production/Construction Feedback

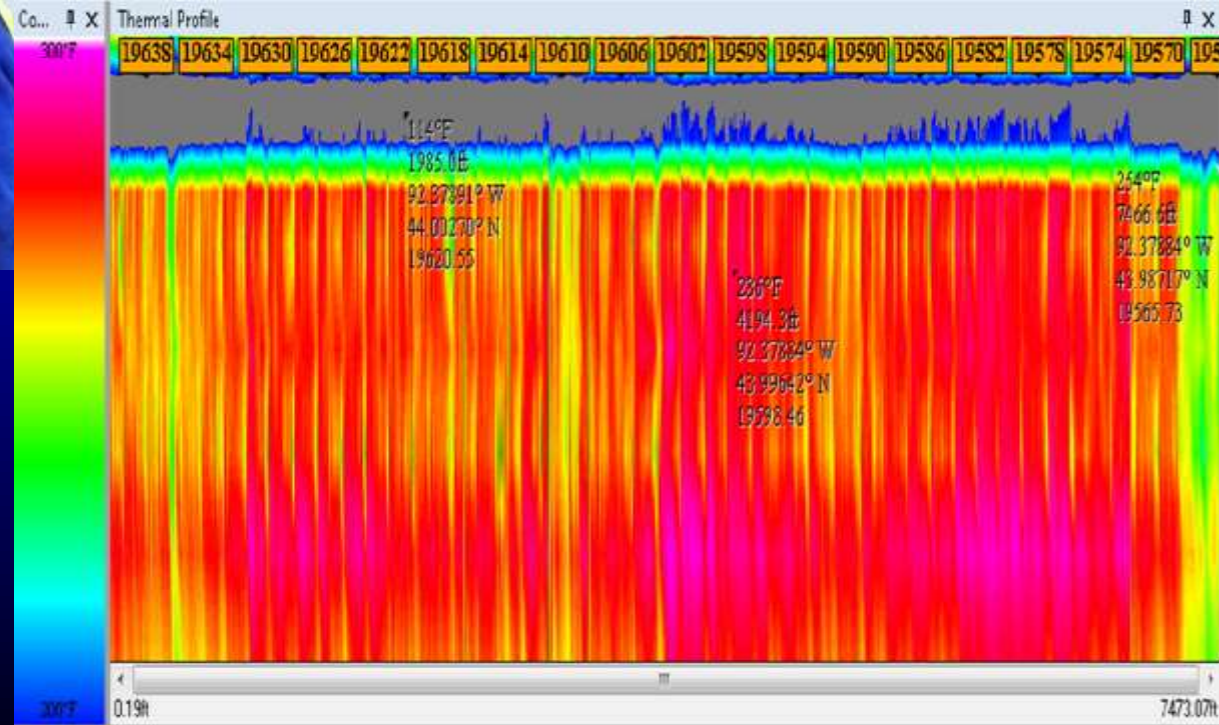
- Tools: Temperature

FLIR



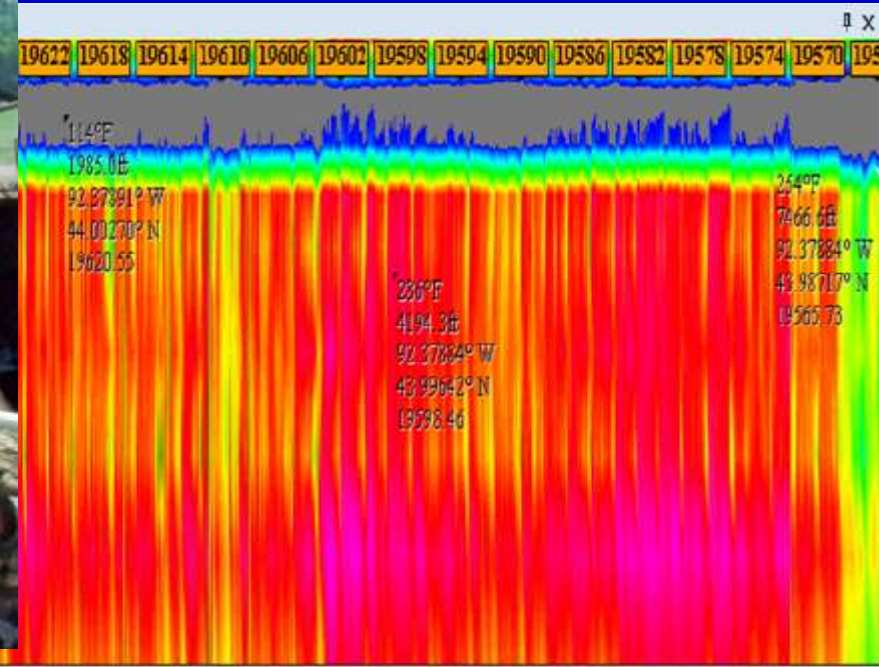
Production/Construction Feedback

MOBA • Tools: Temperature



Production/Construction Feedback

MOBA • Tools: Temperature

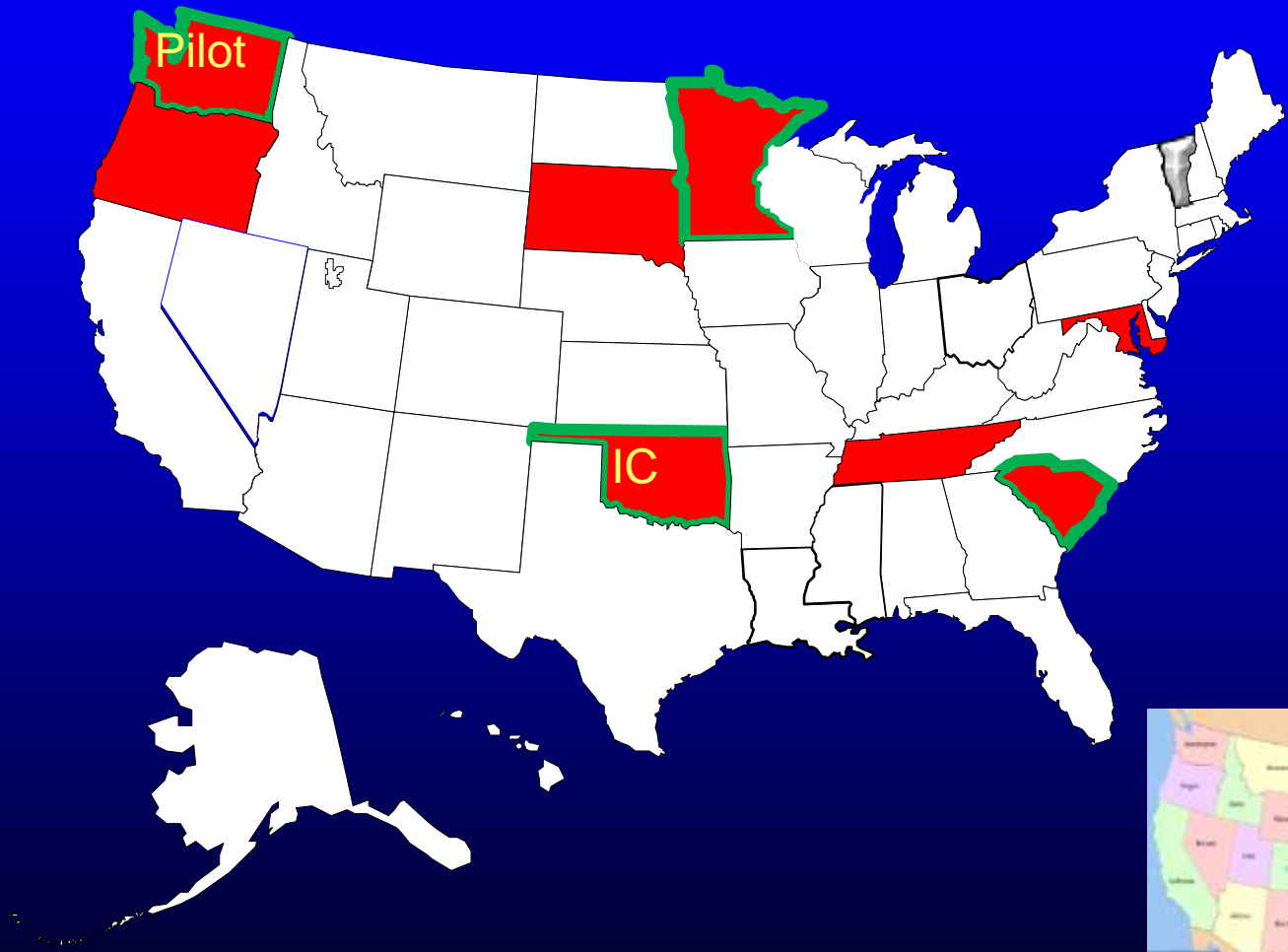


Production/Construction Feedback

Pave-IR Scan



If yes: Real-time measuring of paving temperature? for QC?



INTELLIGENT COMPACTION for HMA

asphalt institute

Yesterday



Buffalo Springfield Steam Roller



AAPT

Today: IC Roller Equipment



Temperature Sensor



GPS

RADIO



Not shown accelerometer on steel wheel

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Instrument Entire Rolling Train

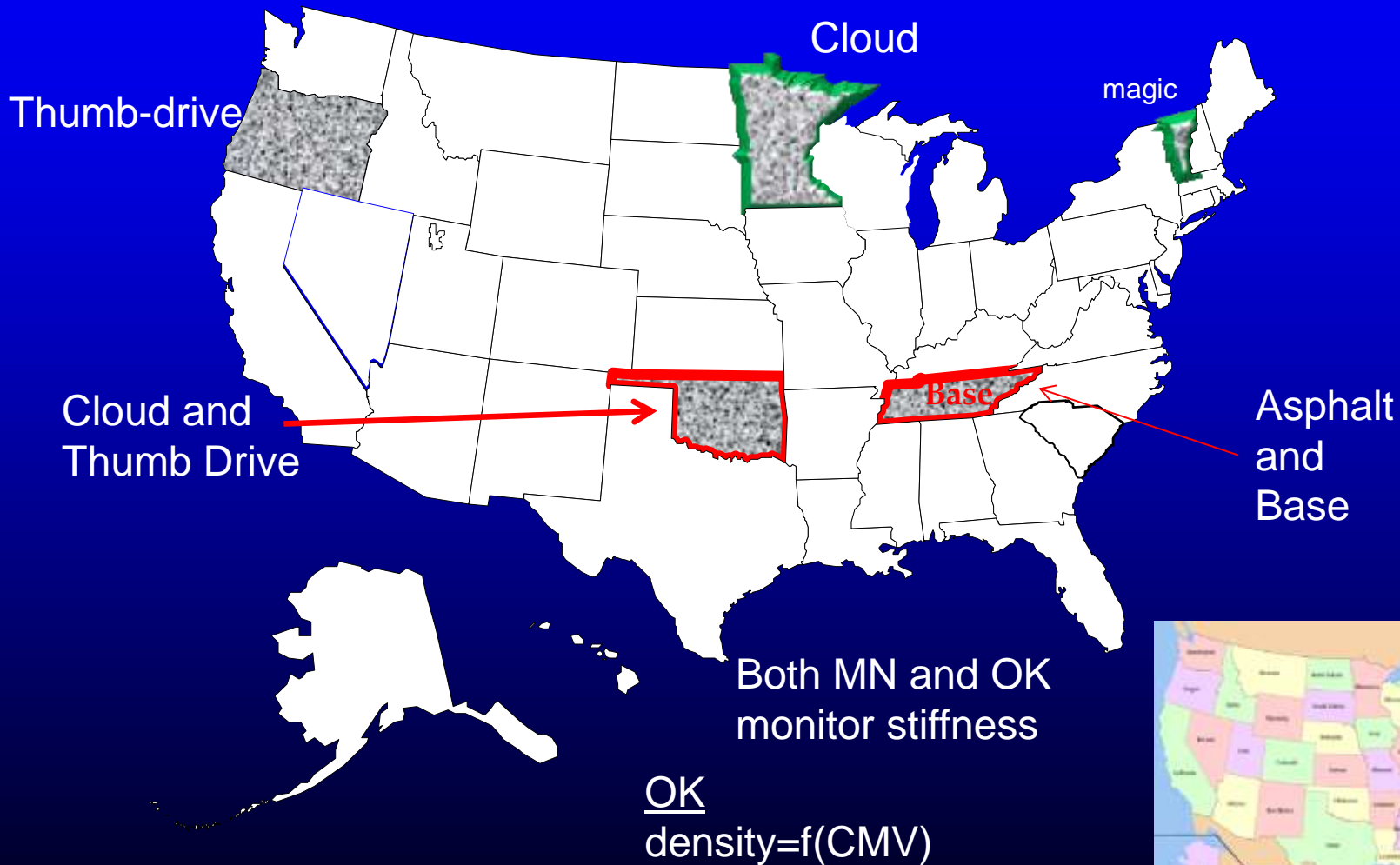


Stabilized / Un-stabilized Full Depth Reclamation (FDR)



HMA Paving Train

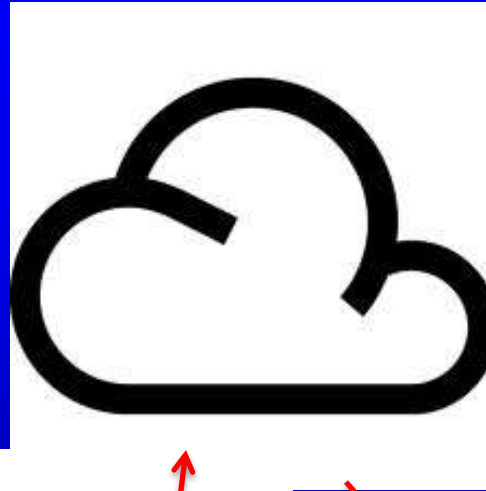
If yes: Use IC for Real-time Monitoring of Pavement Rolling? and used for QC? Data collection?



Production/Construction Feedback

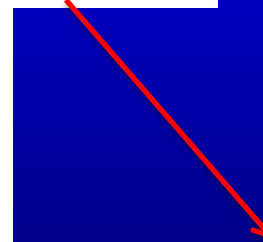
Communication

- Manual Data Collection – 40% loss
- Automatic Data Collection <1%



How much data?

~10 million/lines



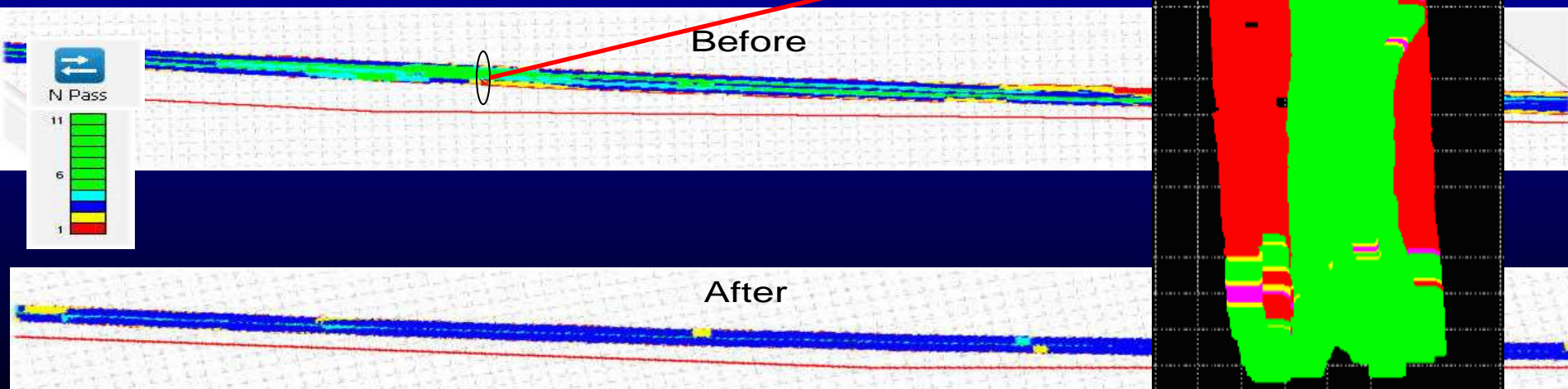
Production/Construction Feedback

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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

Goal: Roll so each section is compacted at the same temperature ($\pm 6F$) and receives the same number of passes.



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MNDOT Pre-map base stiffness, before paving.



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Production/Construction Feedback

How are the different devices being specified?

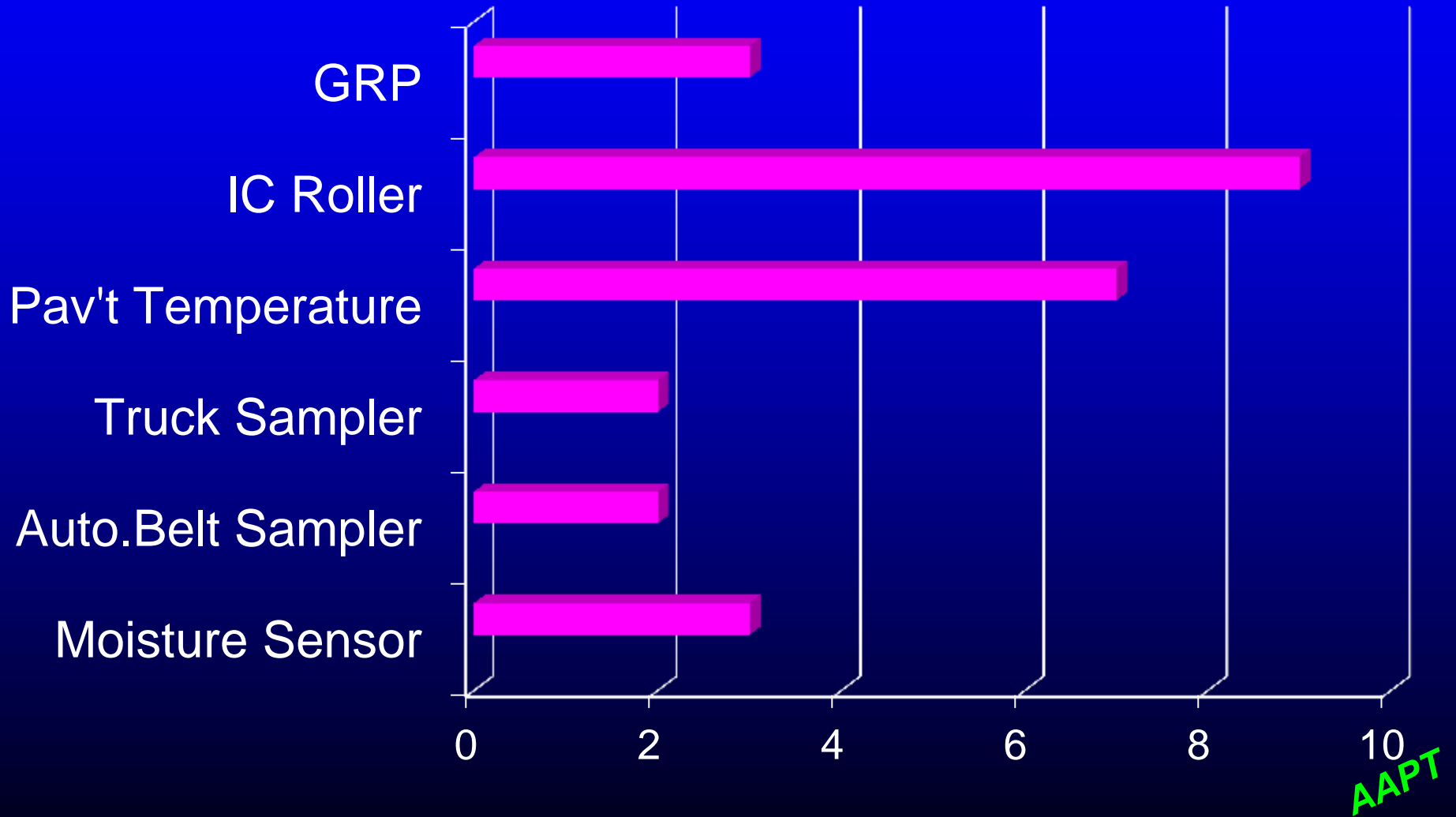
- MN, OK, TN and VT - standard specification
- SD – special provision for belt samplers
- ID, IN, DE, MS, NH, OH and VA – no state specifications, allow as contractor options.

Production/Construction Feedback

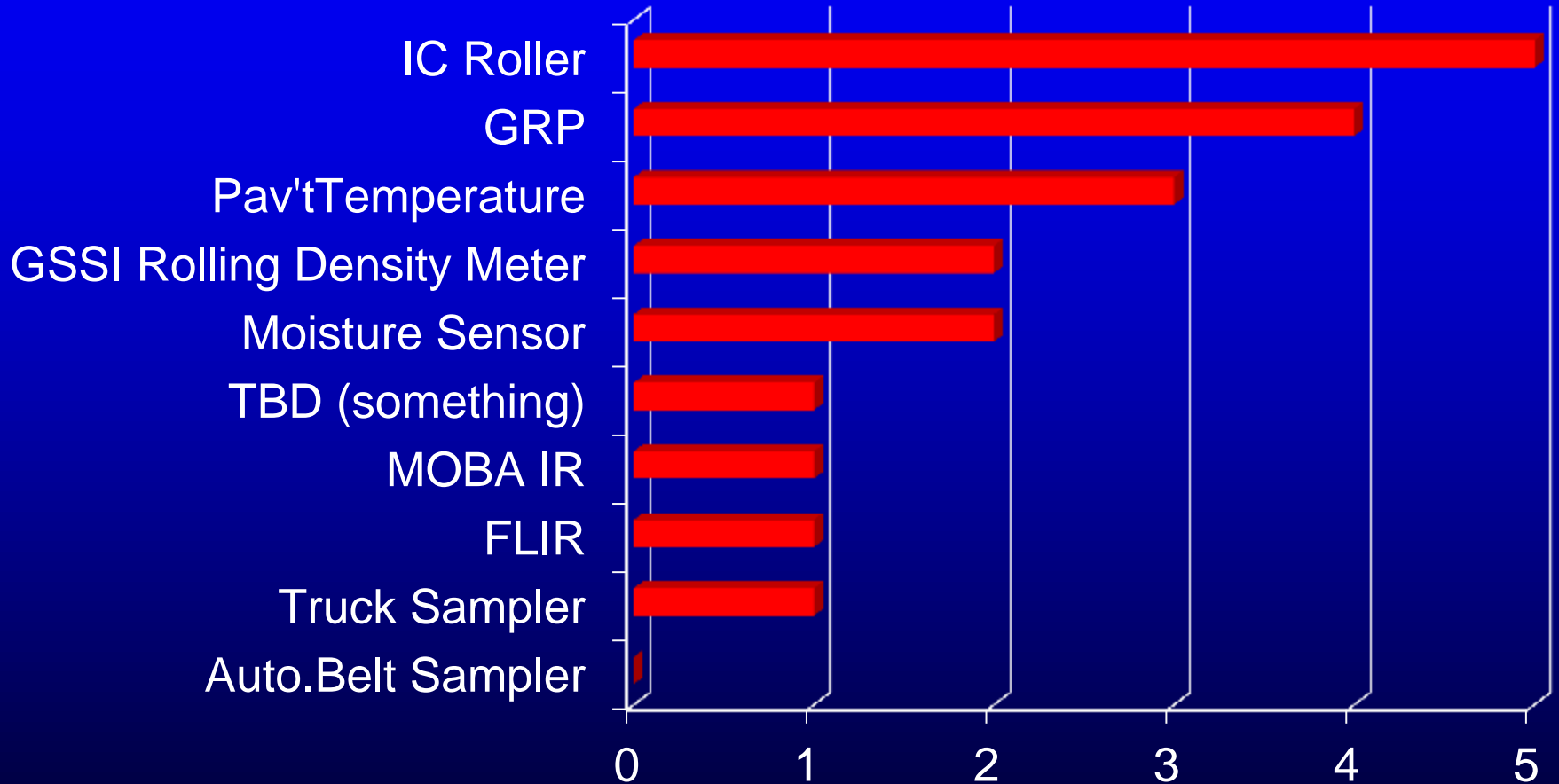
Which of the devices have the most promise to add value to a project (cost savings and improved pavement performance?)

- 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



Production/Construction Feedback – Planning to try



Production/Construction Feedback

Next Meeting:

- Survey Update
- FHWA Density Project

**2017 AAPT
Newport Beach
March 19-22**