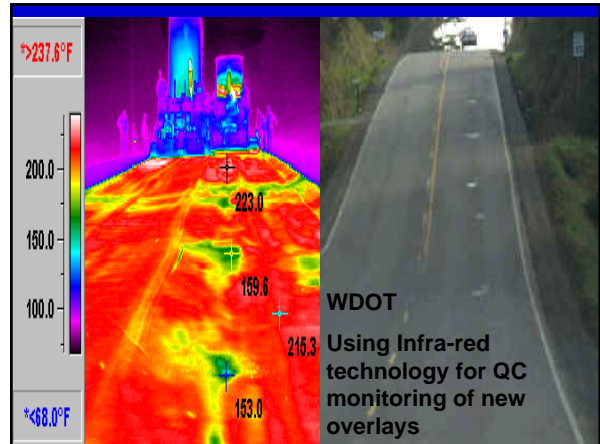


Use of Infra-Red Bar for Thermal Imaging

Tom Scullion, Stephen Sebesta and Wenting Liu
Texas Transportation Institute

Stephen Smith PE Odessa District



Background work in Texas

- Initiated in 2000 using infrared cameras
- Evaluation of 25 F limit on temperature differential
- Current TxDOT Spec
 - > 25F take corrective action
 - > 50F suspend Operations



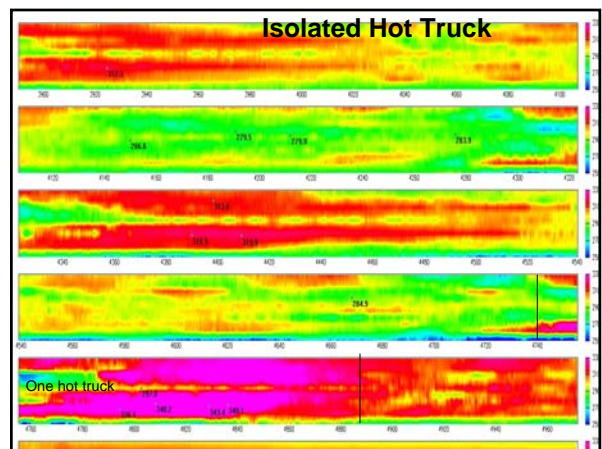
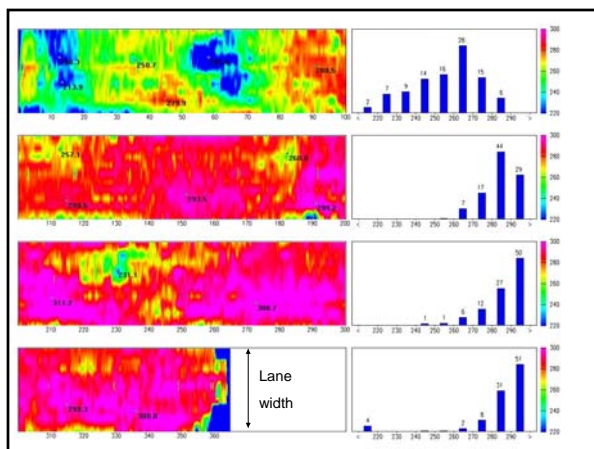
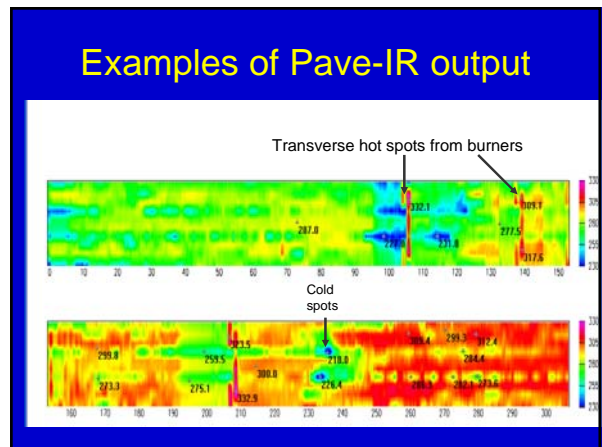
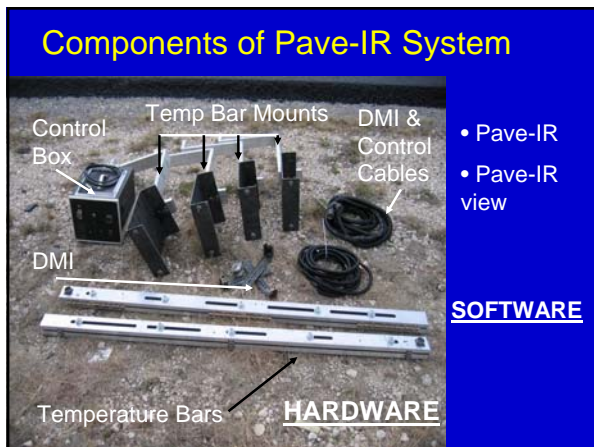
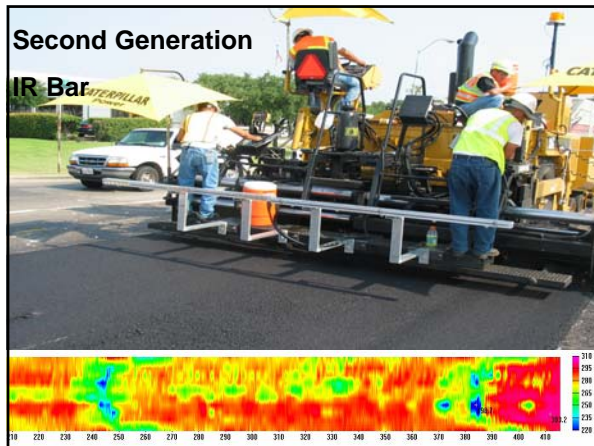
Concerns with IR Cameras

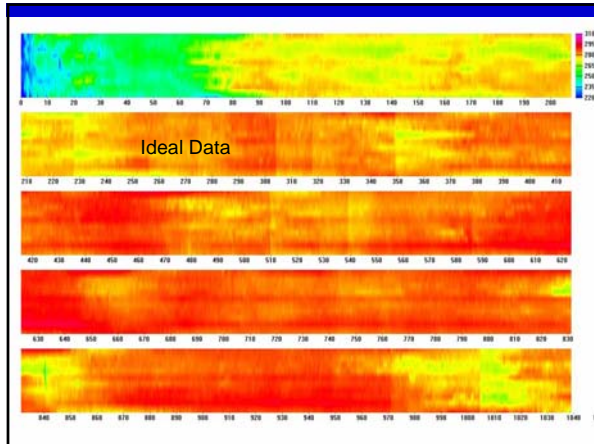
- At time of work, IR cameras quite expensive and fragile
- Concerns with impact of camera angle
- Cross-referencing IR image with location on HMA mat a concern
- Need to collect and merge multiple images with IR camera not practical for achieving desired near-100% coverage in testing and evaluation of HMA mat
- Who will collect and process data??

TTI's First Generation IR Bar (2002)



2007 SEAUPG CONFERENCE – SAN ANTONIO, TEXAS






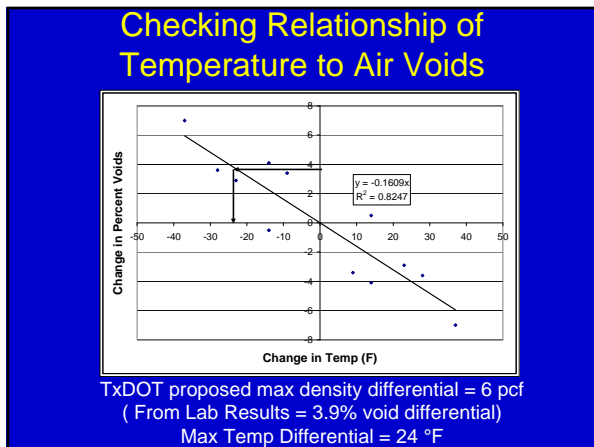
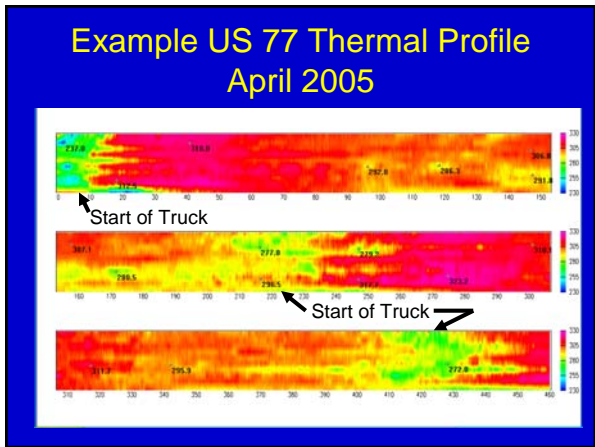
- ### TYPE OF EVALUATIONS
- Evaluating TxDOT's current temp spec
 - Is 25 F a good target ?
 - Addressing district concerns during paving
 - Inspector requests assistance
 - Evaluation of first days operation
 - Complete Project testing

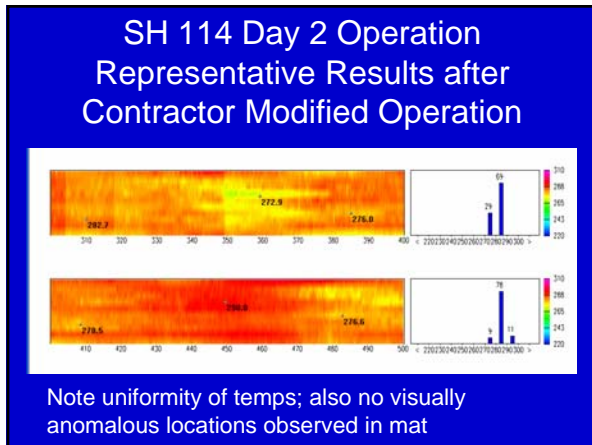
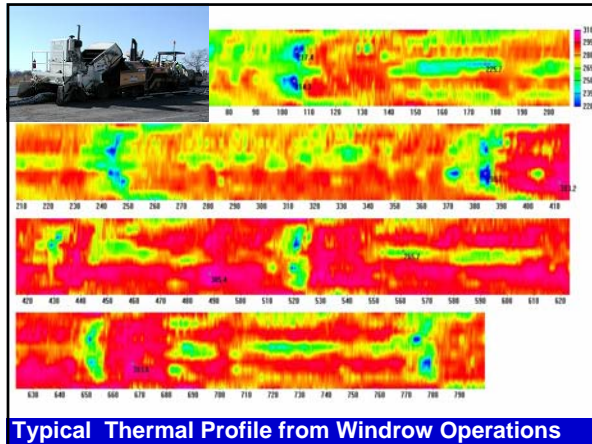
Spec Evaluation Study

- Type C Dense Graded
- PG 70-22 w/1% lime
- Lincoln elevator
- BG 260C Paver

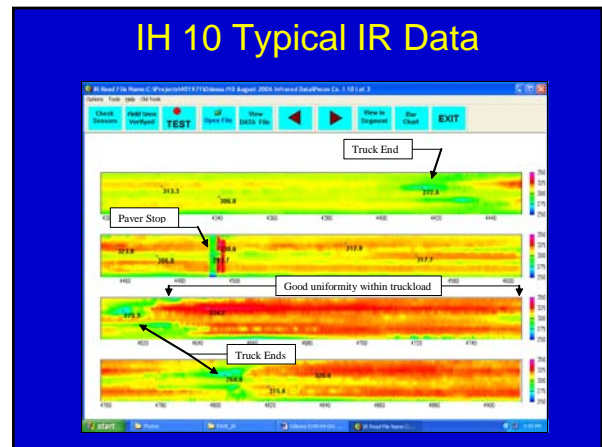
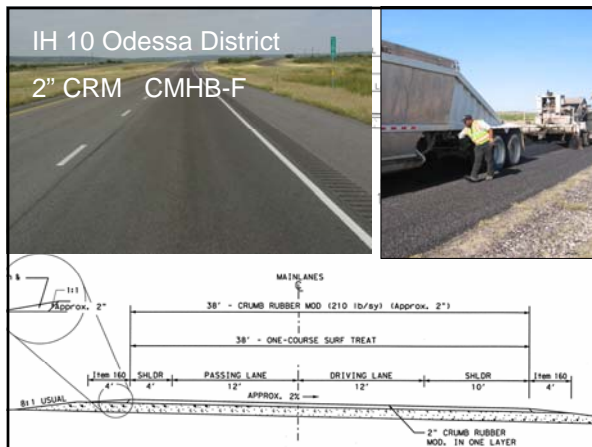


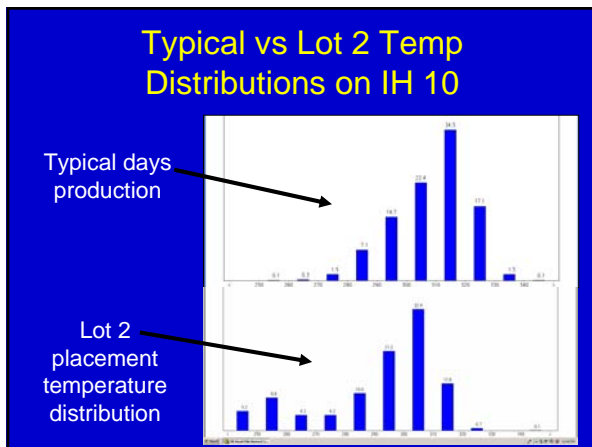
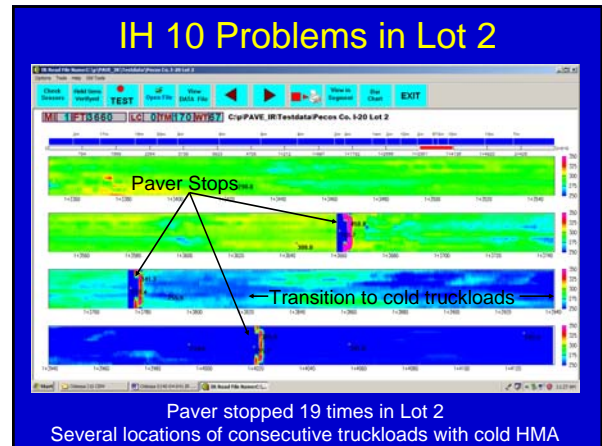
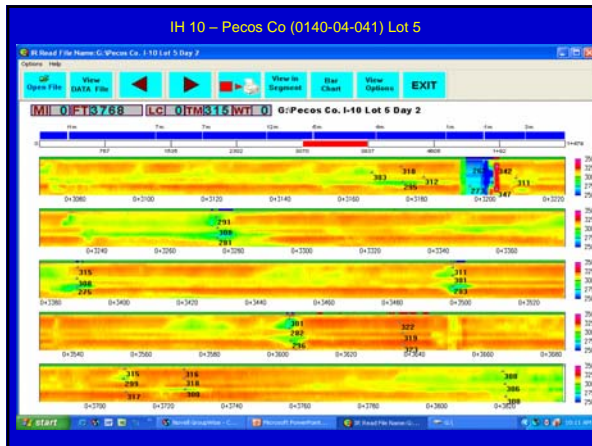
- Surveyed April 2005
- Follow-up May 2006





- ### Full Scale Testing
- Houston District Waller/West Harris Area
 - IR Bar written into Contract
 - TTI supply equipment and training to contractor,
 - Contractor collects data; and
 - Data Provided to TxDOT at end of day
 - Odessa District used Houston approach on IH 10, collected IR data for 19 days.





- ### Current Activities
- Add GPS for problem location detection
 - Device being ruggedized
 - TxDOT plans monitoring of thermally segregated areas and locations of extended paver stops (new study)
 - Exploring commercialization options

- ### Conclusions
- IR - full coverage NDT
 - Automated system - data can be viewed in real time
 - Summary reports can be prepared each day
 - Related to mix properties
 - Typically best correlation is to density
 - IR for Quality Control
 - IR - 25 °F temp differential matched density differential

