



**Intelligent Compaction**

Intelligent Compaction in the U.S. Present and Future

By  
Victor (Lee) Gallivan, FHWA  
FHWA/TPF IC Team

Federal Highway Administration

---

---

---

---

---

---

---

---



What is Intelligent Compaction Technology

An Innovation in Compaction Control and Testing

Office of Pavement Technology  
Federal Highway Administration  
[www.fhwa.dot.gov/pavement/](http://www.fhwa.dot.gov/pavement/)

Federal Highway Administration

---

---

---

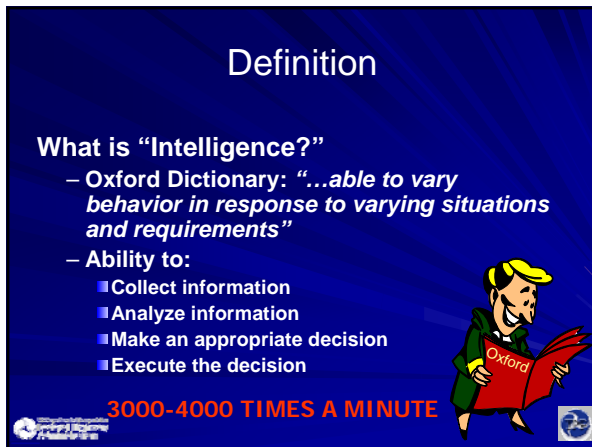
---

---

---

---

---



Definition

What is "Intelligence?"

- Oxford Dictionary: "...able to vary behavior in response to varying situations and requirements"
- Ability to:
  - Collect information
  - Analyze information
  - Make an appropriate decision
  - Execute the decision

**3000-4000 TIMES A MINUTE**



Federal Highway Administration

---

---

---

---

---

---

---

---

### Shortcomings Density Acceptance...



Limited Number of Locations



---

---

---

---

---

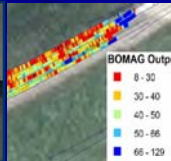
---

---

---

### Benefits of IC for HMA

- Improve density....better performance
- Improve efficiency....cost savings
- Increase information...better QC/QA



### Onboard Display and IC System



Courtesy Bomag America



---

---

---

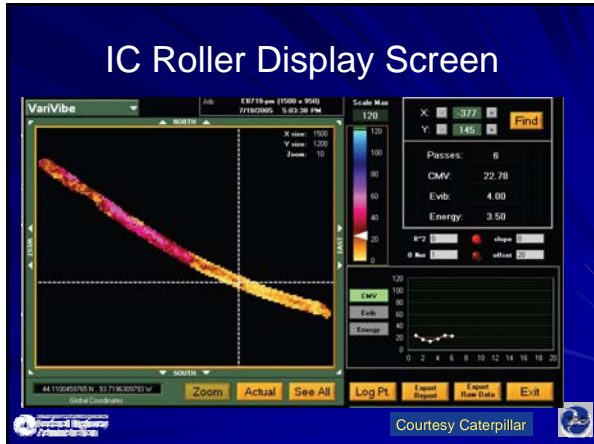
---

---

---

---

---



---

---

---

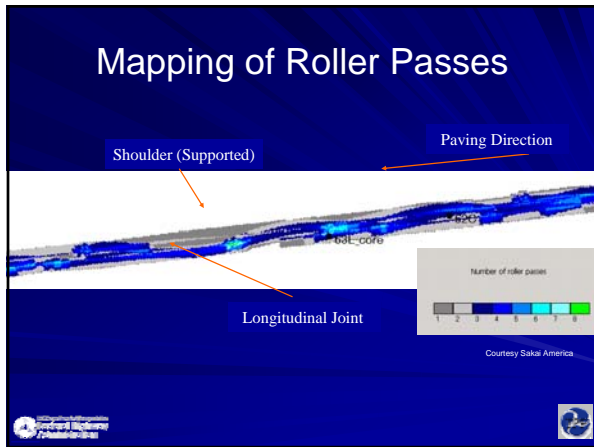
---

---

---

---

---



---

---

---

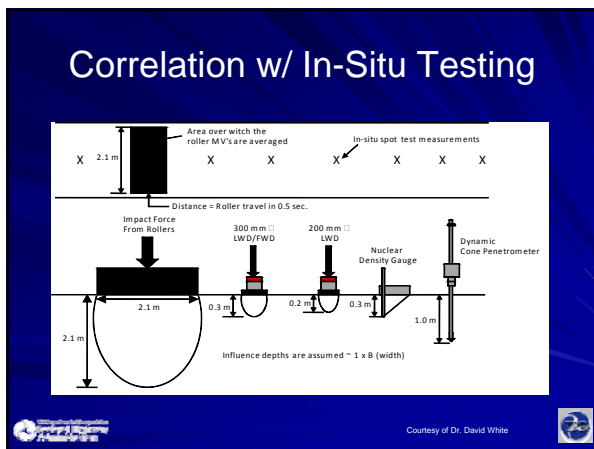
---

---

---

---

---



---

---

---

---

---

---

---

---

## IC National Efforts

- **NCHRP 21-09** "Examining the Benefits and Adoptability of Intelligent Soil Compaction"  
(Completed but not published yet)
- **Transportation Pooled Fund #954** – "Accelerated Implementation of Intelligent Compaction Technology for Embankment Subgrade Soils, Aggregate Base and Asphalt Pavement Material"  
The Transtec, Group (George Chang- PI)
- **Additional State IC Programs (OK, WI, etc.)**



---

---

---

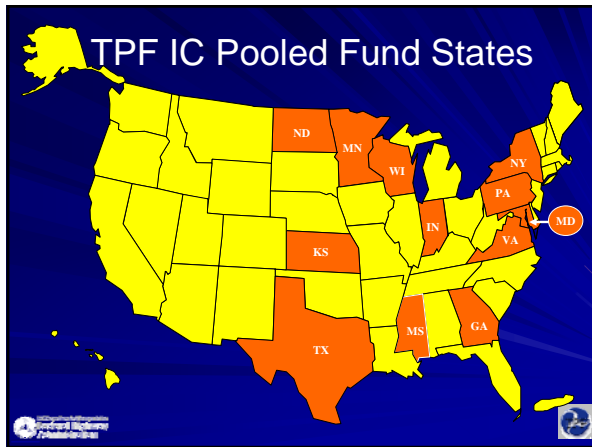
---

---

---

---

---



---

---

---

---

---

---

---

---

## Objectives

- **Based on data obtained from field studies:**
  - Accelerated development of QC/QA specifications for granular and cohesive subgrade soils, aggregate base and Hot Mix Asphalt (HMA) pavement materials...
  - Short, Long and Future Term Goals
  - 3-year IC study for all the above materials
  - 12 participating States
  - 12+ field demonstration



---

---

---

---

---


---

---

---

## Goals

- Develop an experienced and knowledgeable IC expertise base within Pool Fund participating State DOTs
- Identify and prioritize needed improvements to and/or research of IC equipment and field QC/QA testing equipment



---

---

---

---

---

---

---

---

## IC Roadmap

- **Short Term Goals**
  - Improved Density
  - More Uniform Density
  - More efficient compaction process
  - Operator Accountability
  - Correlate Measurements with Field Densities
  - Real-time Density Control (QC)
- **Long Term Goals**
  - Continuous Compaction Control specifications
  - Real-time Density Acceptance (QA)
- **Future Goals**
  - Tie to Design Guide (verify design)
  - Performance specifications



---

---

---

---



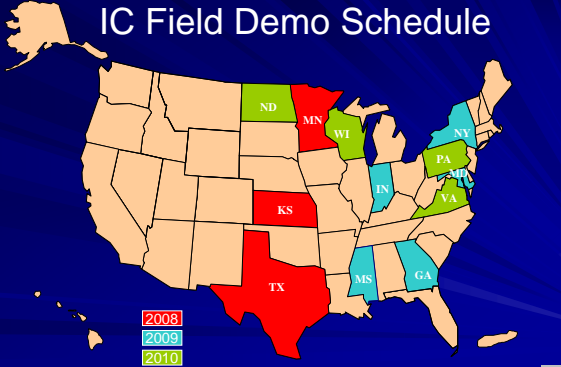
---

---

---

---

## IC Field Demo Schedule



---

---

---

---

---


---

---

---

## Future Initiatives

- Regional Conferences – that target practitioners 
- Establishment of Optimum Measurement Values
- Guidance Manual/Best Practices for both Soils and Hot Mix Asphalt Materials
- Mini-IC Demo's – Limited support for field trials with Non-TPF States
- IC Website Continuation



---

---

---

---

---

---

---

---



[www.IntelligentCompaction.com](http://www.IntelligentCompaction.com)



---

---

---

---

---




---

---

---

## Benefits of IC

- Improve density...  
better performance
- Improve efficiency...  
cost savings
- Increase information...  
better QC/QA



---

---

---

---

---

---

---

---

## Ultimate Goals of TPF IC

- Gain the knowledge needed to develop credible and productive **IC specifications** for future projects



---

---

---

---

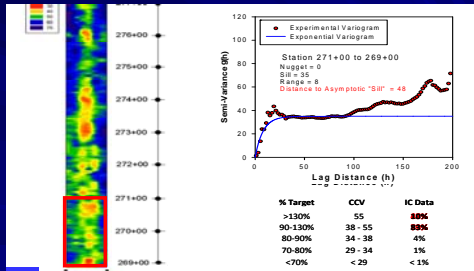
---

---

---

---

## Future IC Spec



Courtesy of Dr. David White



---

---

---

---

---

---

---

---

Thank you



---

---

---

---

---

---

---

---