

Concrete Preservation Innovations



Your Pavement Preservation Resource® since 1972

Larry Scofield, P.E.
IGGA-Director of Engineering and Research

When Innovation Was Everywhere (120 Years Ago)



- Wet on Wet Two Lift Construction
- Higher Quality Aggregate Used for Top Lift
- Specially Designed Surface Texture for Traction
- *****Properly Maintained*****

What is Innovation???

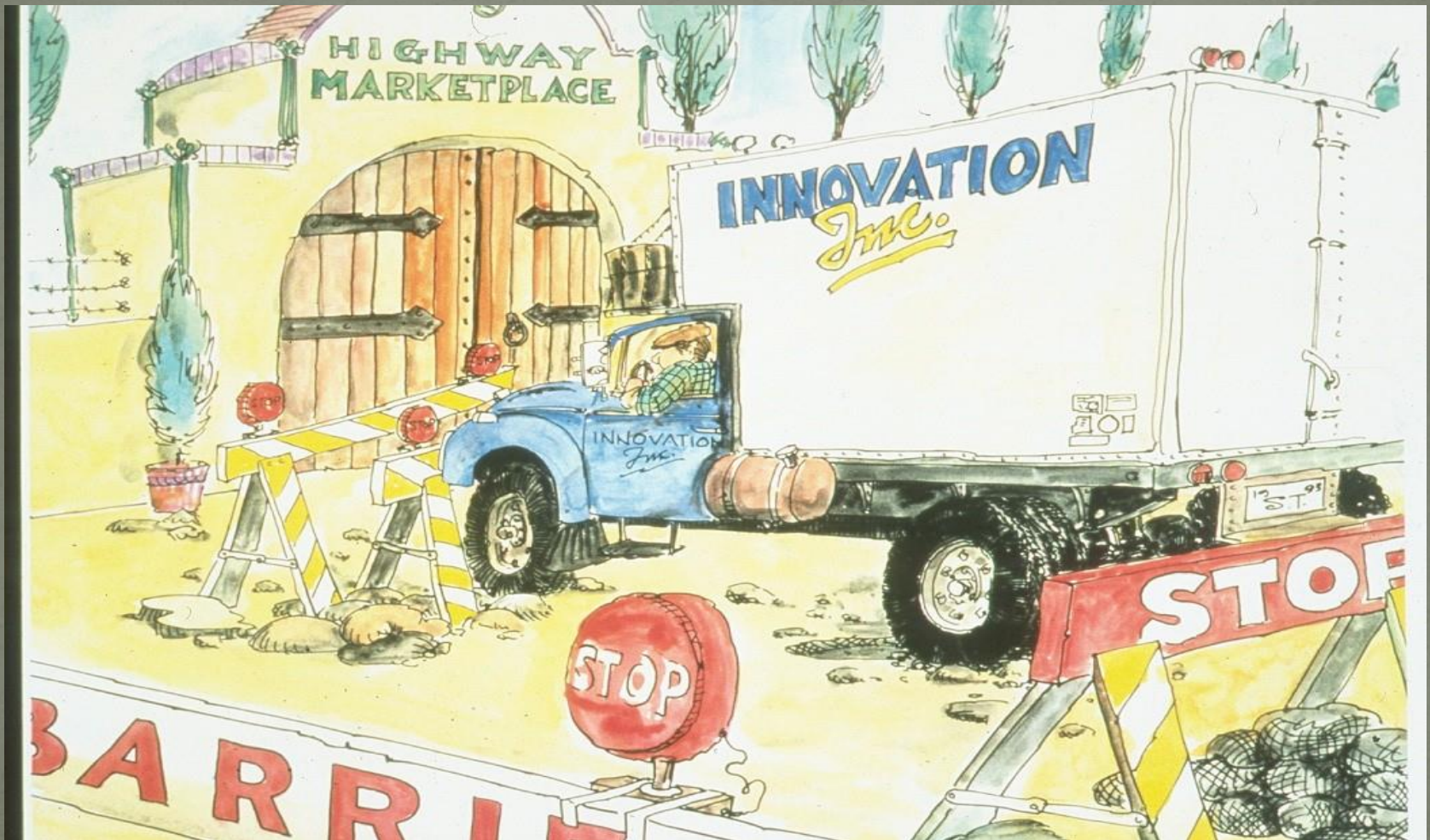
----"Introduction of New Things or New Methods"----

Or

**Get Back to Funding, Programming, Constructing,
and Preserving Roadways**

"VALUE"

The Road to Innovation is Always Under Construction



You Usually Don't Recognize Innovation Until You See it



All Innovation is Not Good



Potential Failure Cost Exposure

Cost

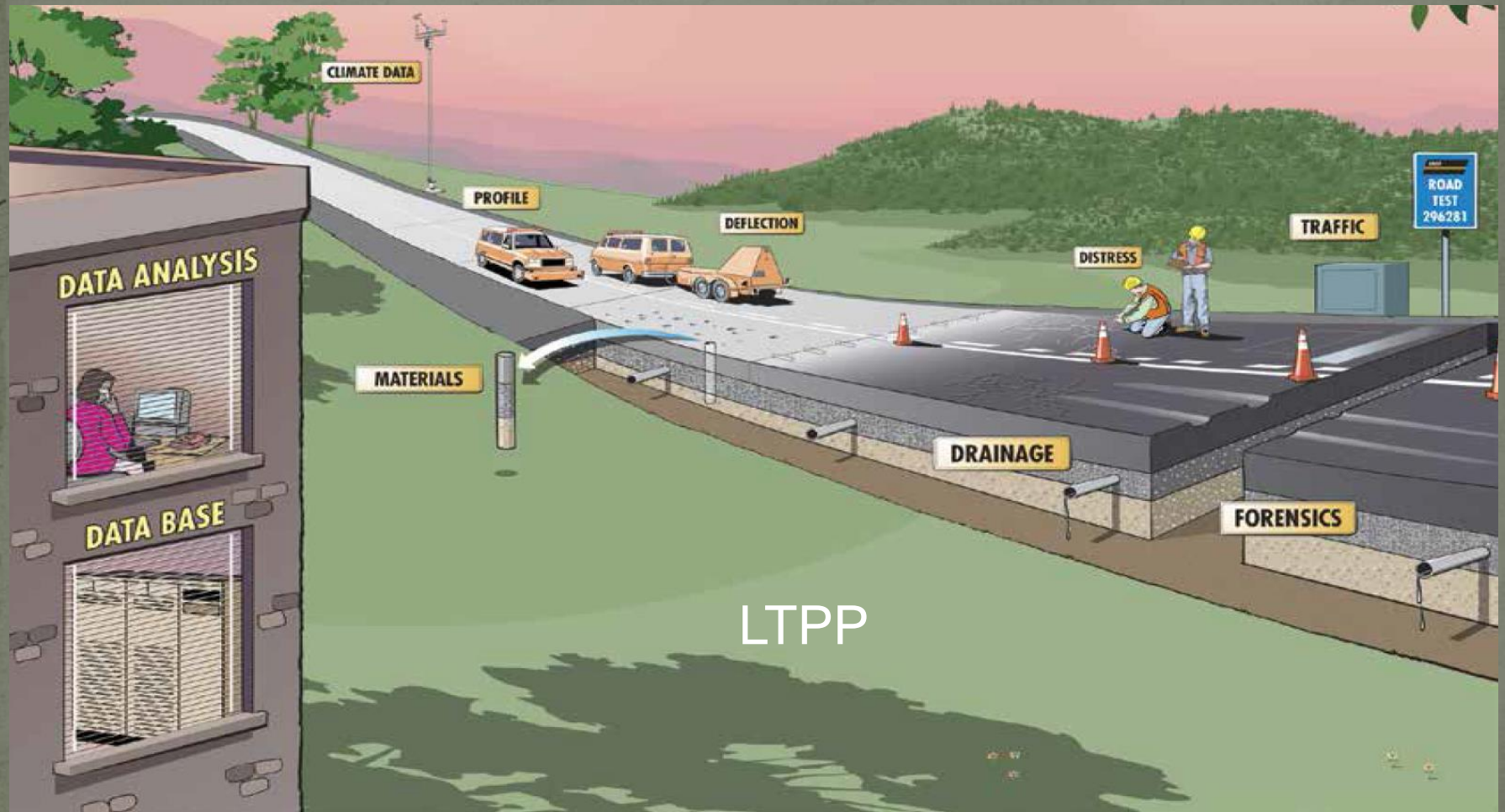


Design

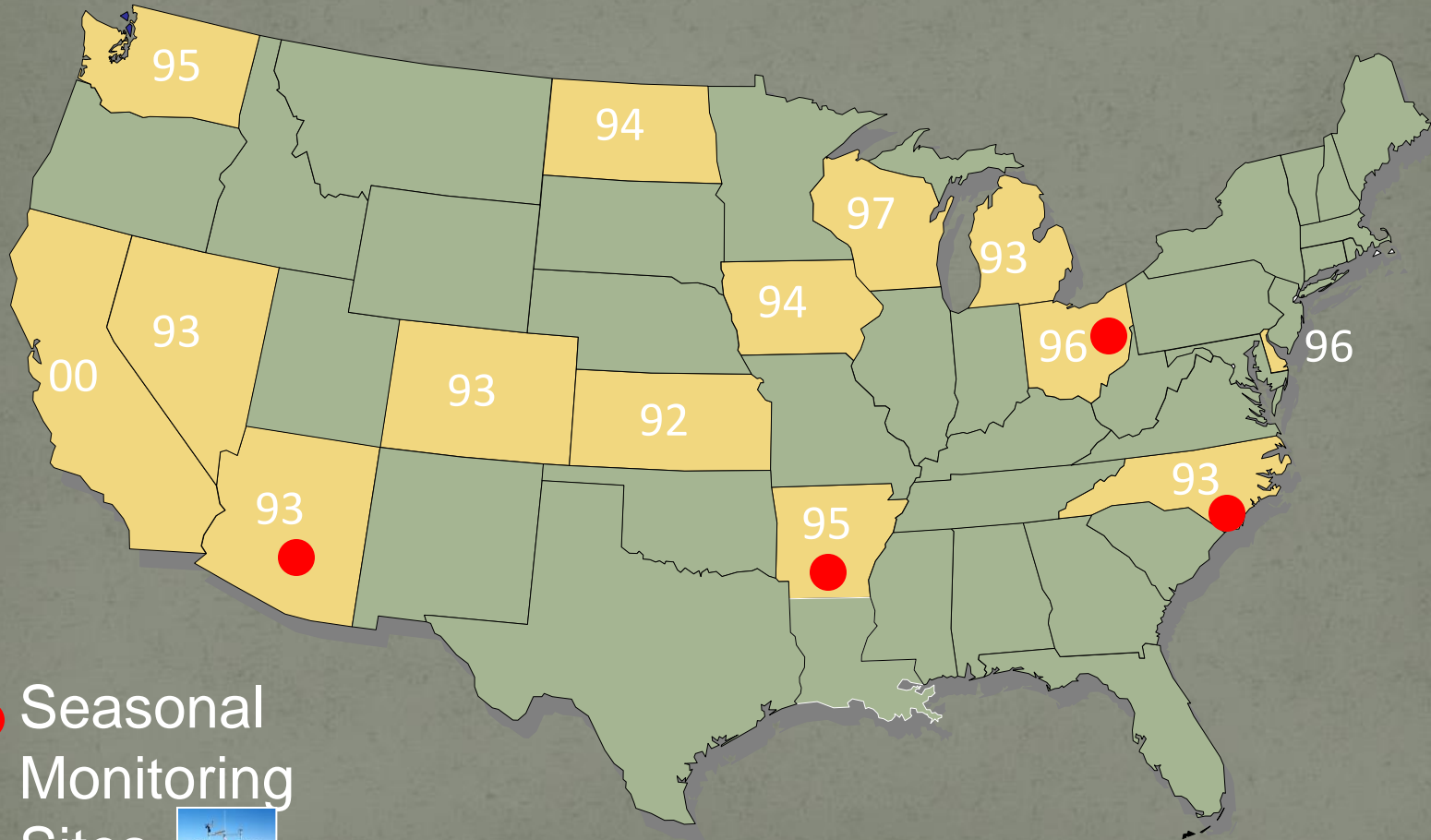
Construction

Maintenance

National Innovation: Largest Concrete Research Program in the Last Half Century



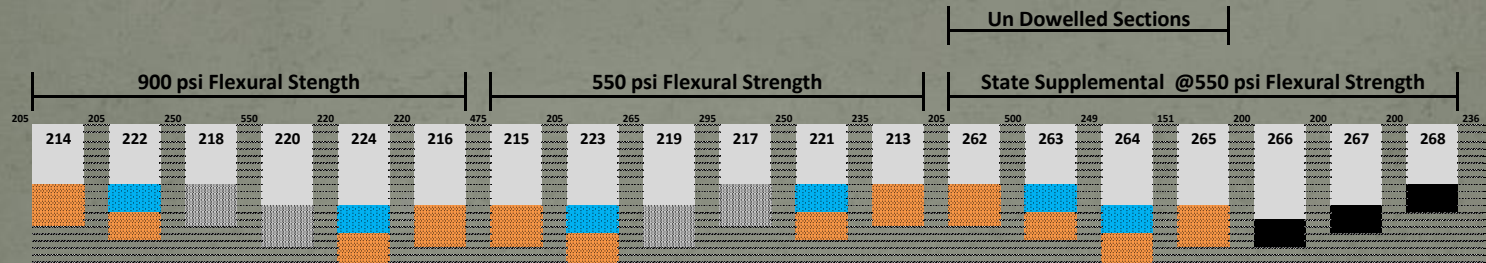
States with SPS-2 Experiment (84%)







● Seasonal Monitoring Sites





SPS-2: Five Design Features



Base Types

-  Dense Graded Aggregate Base (4" & 6")
-  Permeable Bituminous Treated Base (4") Note: These are the only Sections with Edge Drains
-  Lean Concrete Base (6")
-  Bituminous Treated Base (4")

Shoulder Types

-  12 ft Shoulder Width
-  14 ft Shoulder Width

- Concrete Thickness (8" & 11")
- Base Type (LCB, DGA, PATB, PATB/DGA)
- Flexural Strength (550 & 900)
- Lane Width (12' & 14')
- Drainage (with and without)
- Site Factors
 - Temperature
 - Precipitation
 - Subgrade

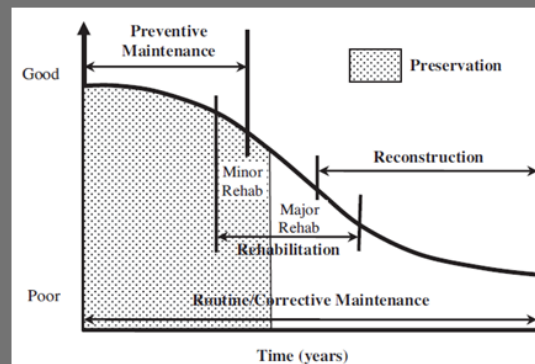
National SPS-2 Pooled Fund

2012

Development of an SPS-2 Pavement Preservation Experiment

Preliminary Draft—Not for Distribution

This report provides a concept to develop a pooled fund effort targeted at developing and implementing a pavement preservation experiment for extending the service life of the LTPP SPS-2 projects. The report contains general information regarding the original experimental design and presents potential pavement preservation opportunities. The appendix contains more detailed information regarding the original experimental design and the supplemental sections constructed by the 14 states that participated in the SPS-2 Experiment.



IGGA
Larry Scofield
7/25/2012



<http://www.pooledfund.org/details/solicitation/1336>

What are Potential Innovations

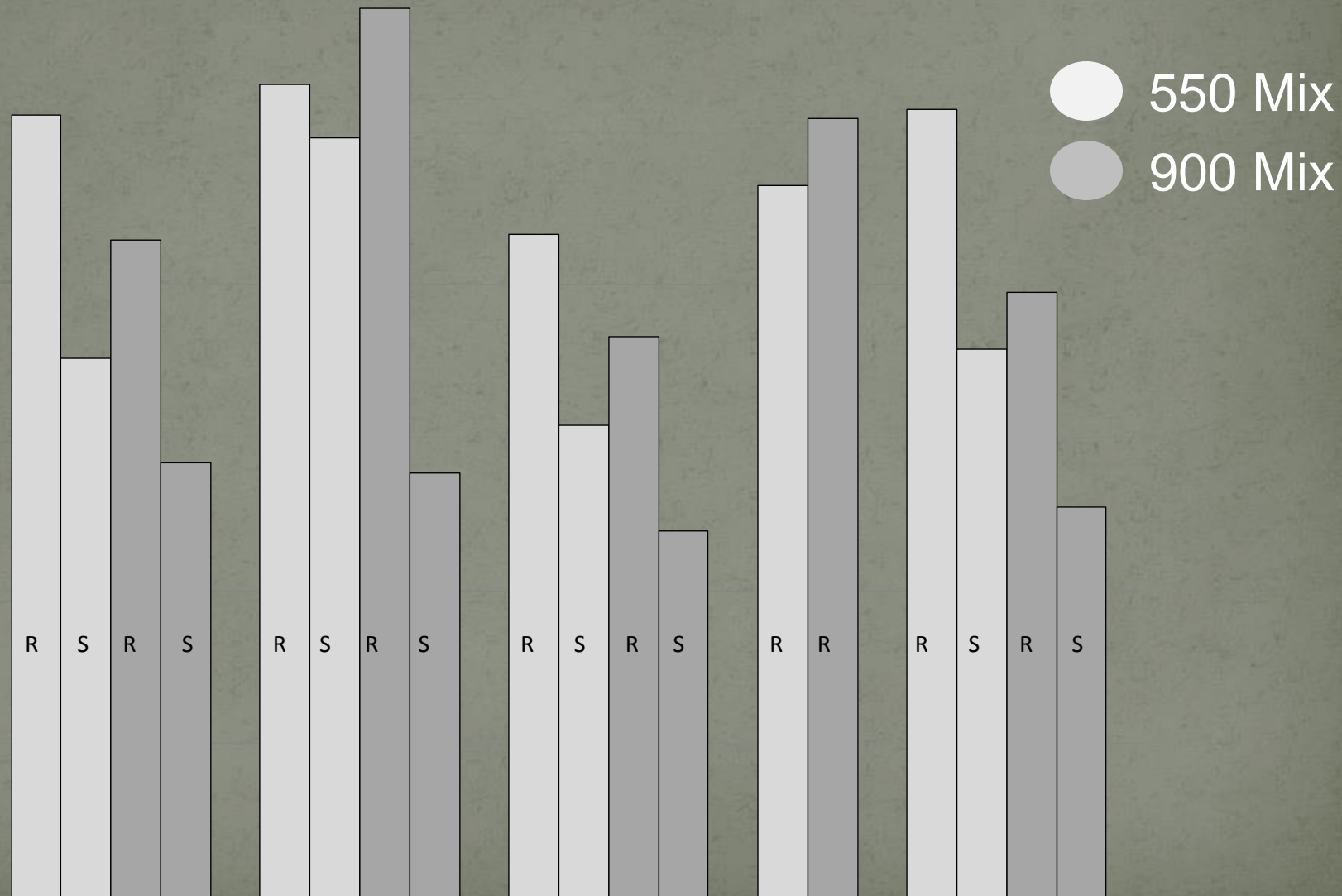
- Determining the Life Extension of Concrete Preservation Treatments
- Development of PMS Trigger Values
- Changes in Material Properties Over Time
- Evaluating the Cradle to Grave Performance of Design Features
- Improving the Current SPS-2 Experiment

Alternative Definition for Innovation

- “But innovation comes from people meeting up in the hallways or calling each other at 10:30 at night with a new idea, or because they realized something that shoots holes in how we’ve been thinking about a problem.”

-----Steve Jobs

Friction Innovation---Anonymous Friction Data



Friction Innovation



What About Friction in Other Directions



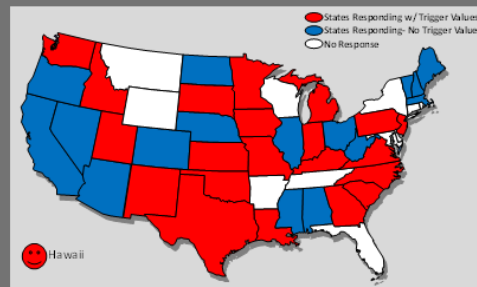
Programming Innovation--When to Preserve Pavements

2011

Survey of State DOT PMS Trigger Values for Concrete Pavement Preservation

Preliminary Draft Not for Distribution

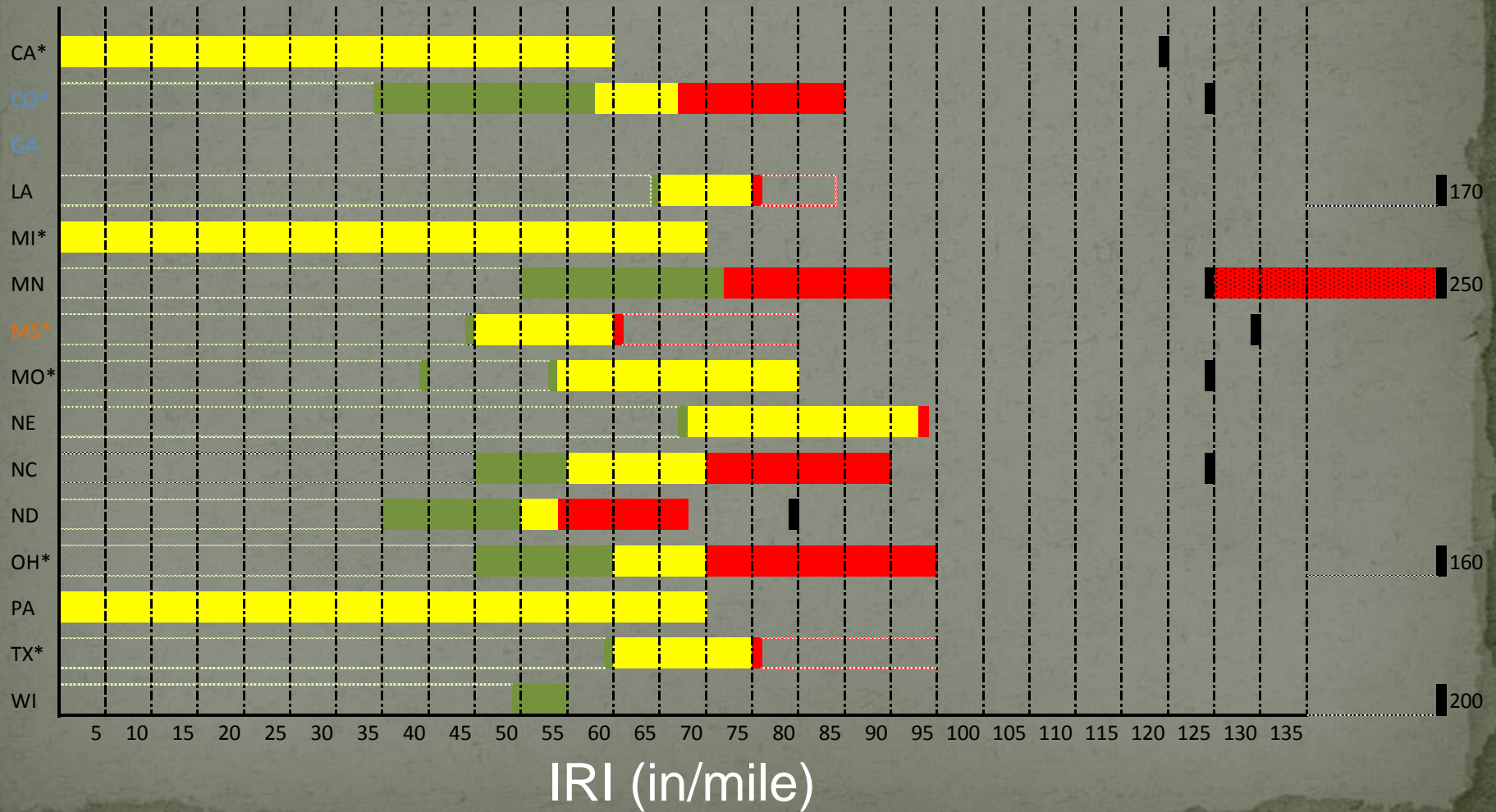
The FHWA Pavement Preservation ETG Rigid Subcommittee conducted a survey of the state DOT PMS practices to determine the state-of-the-practice of concrete pavement preservation. Thirty eight states responded to the survey and 23 states (61%) used trigger values for managing concrete pavements within the PMS system. Recommendations for follow up activities are included.



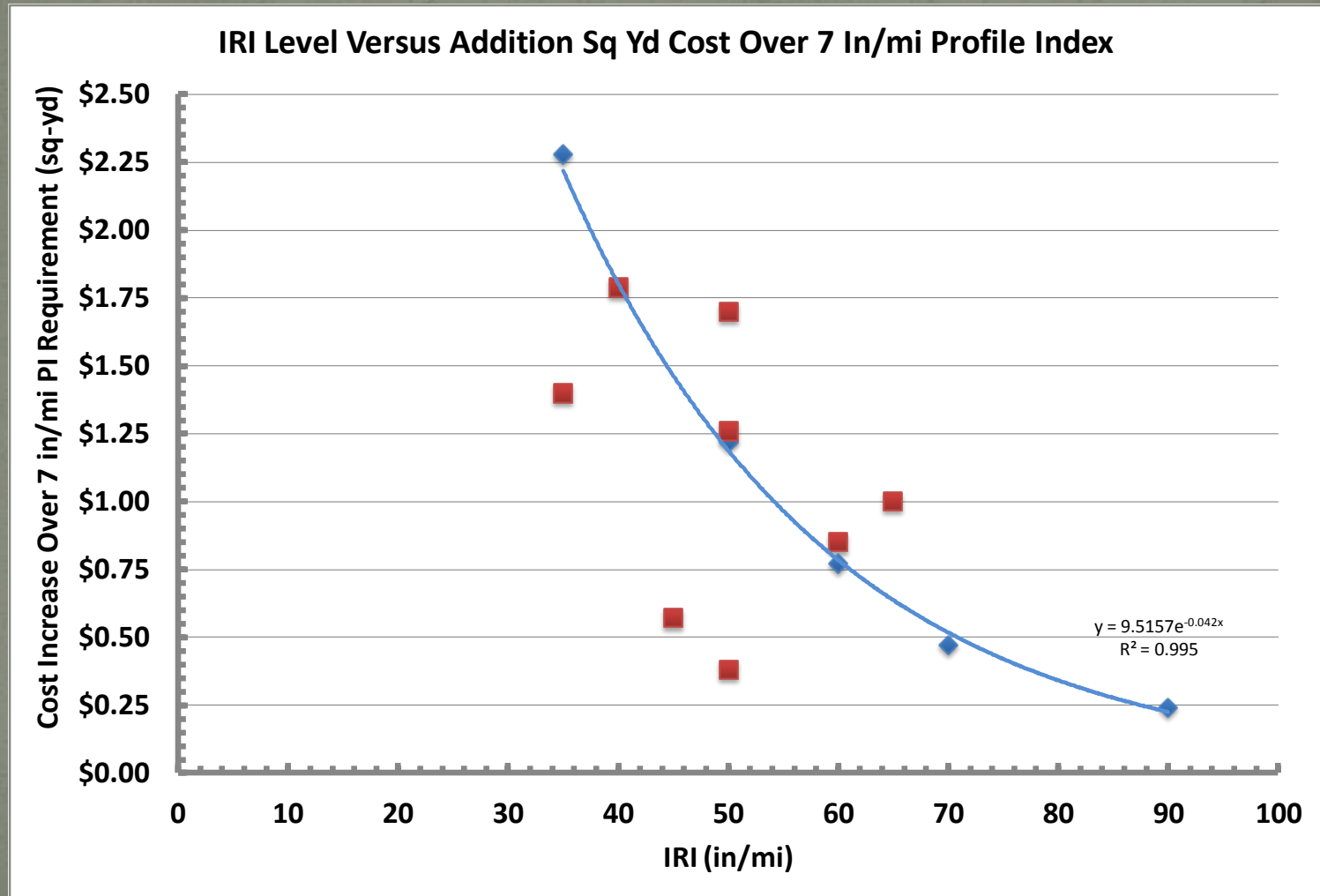
FHWA ETG
Pavement Preservation
--Rigid Subcommittee--

Rigid Subcommittee
L. Scofield, C. Hennings, S. Varnedoe, S. Healow, D. Harrington
4/30/2011

Smoothness Innovation



IRI Level Versus Additional Sq Yd Cost Over 7 in/mile on 0.2" Blanking Band



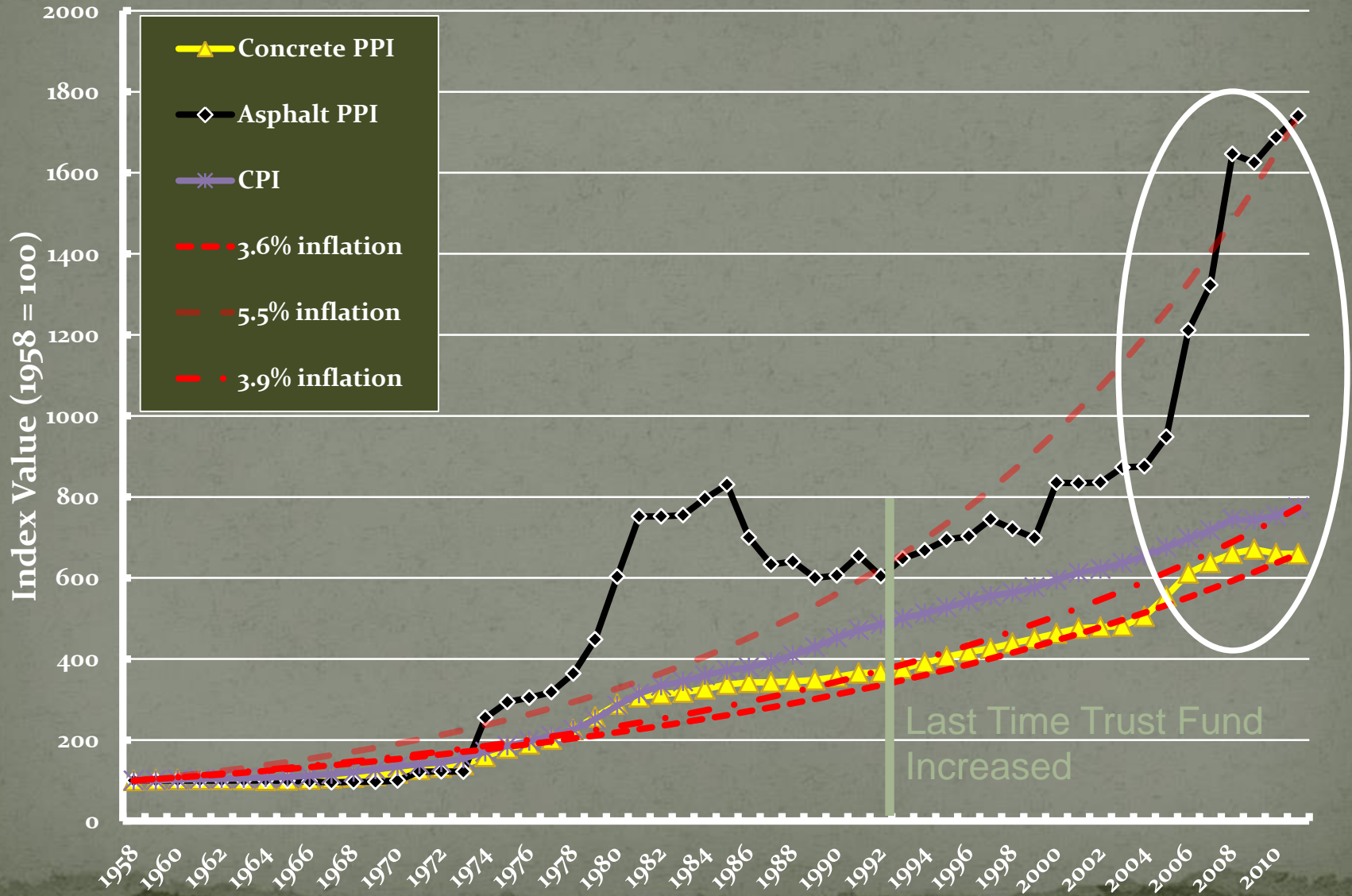
Economic Innovation

“purposeful change to existing activities that improves economic performance”

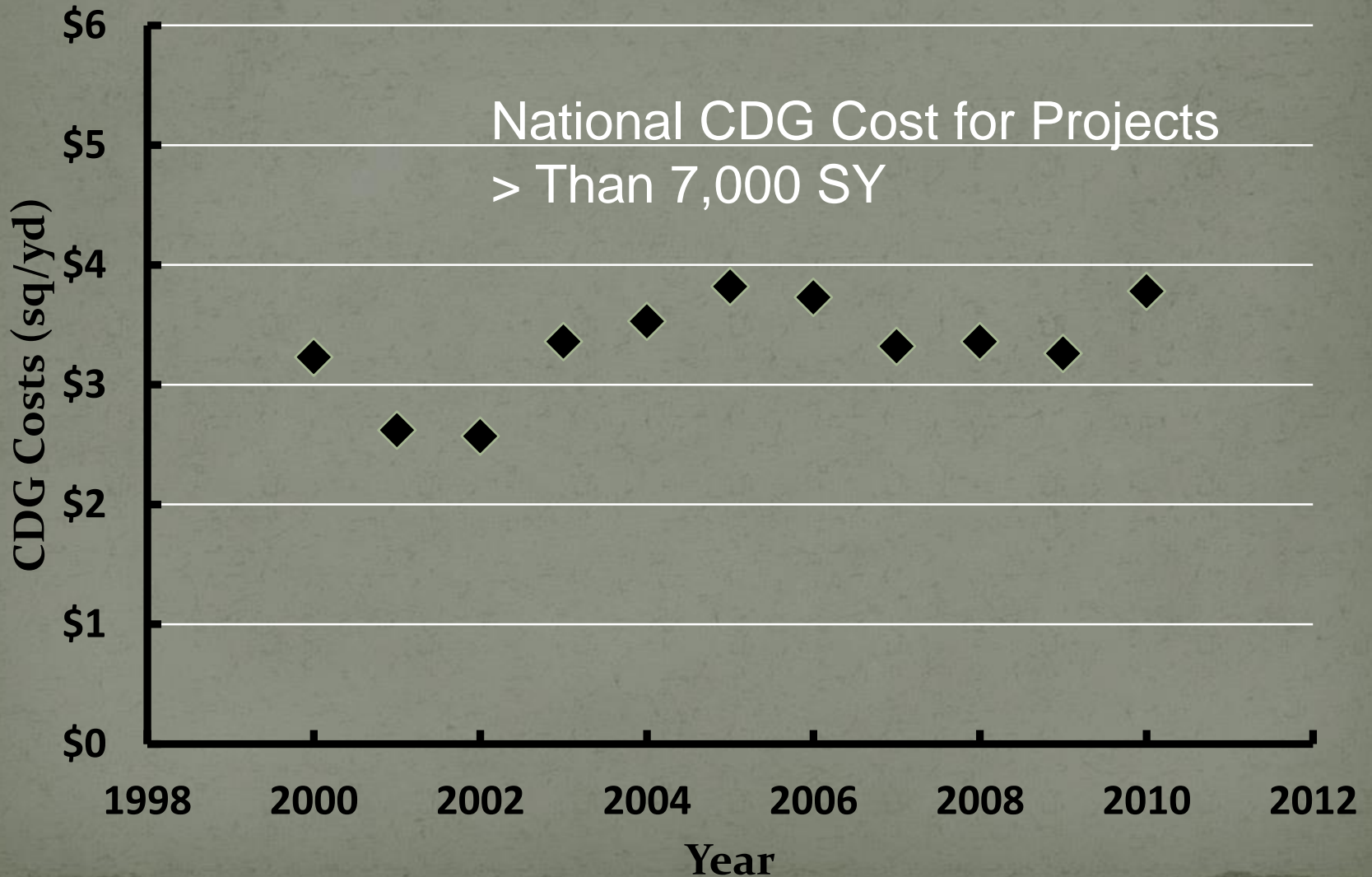
or

More Bang for Your Buck!!!!!!!
“Best Value”

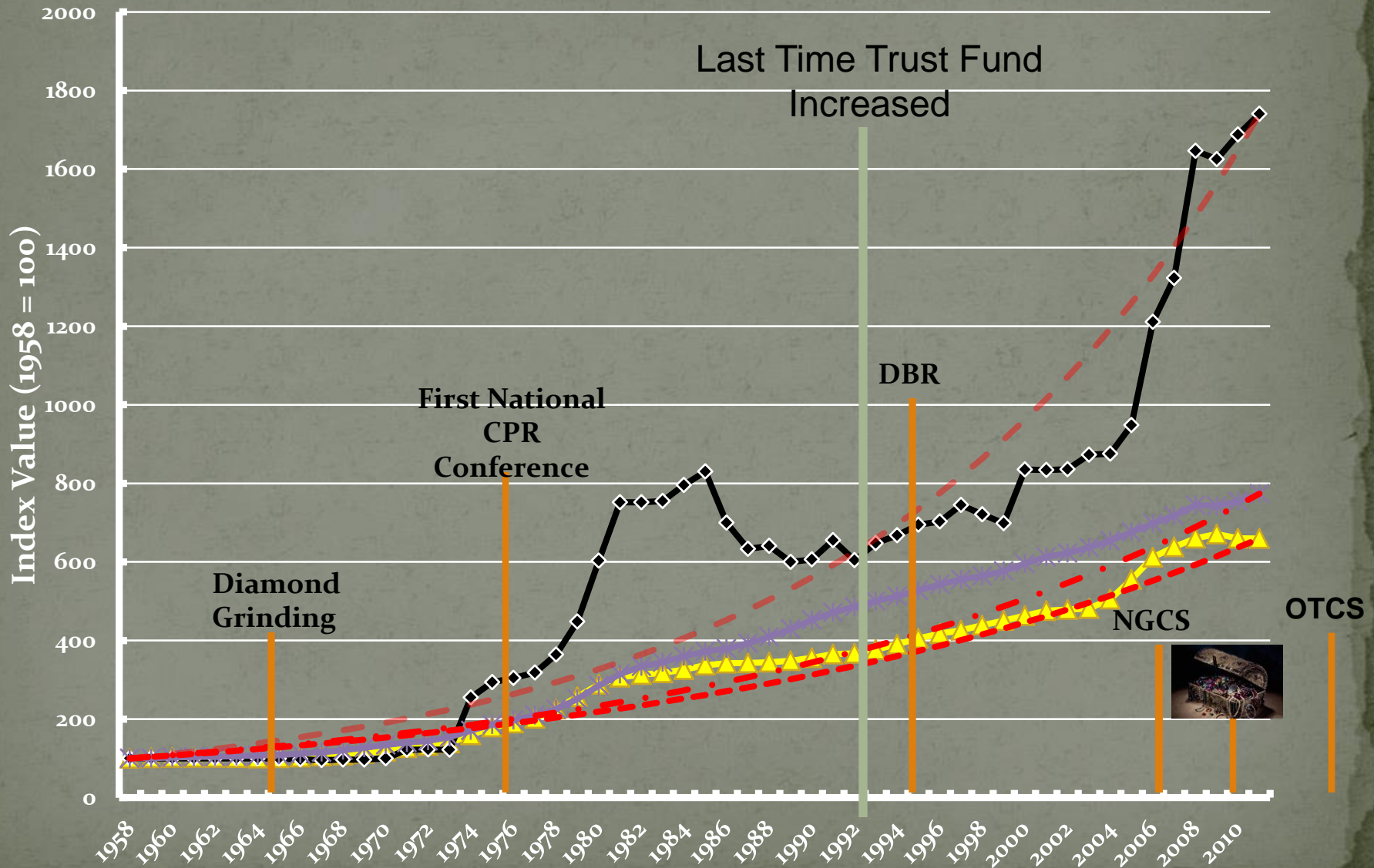
Commodity Price Increases



Its Cost Effective and Predictable



Commodity Price Increases



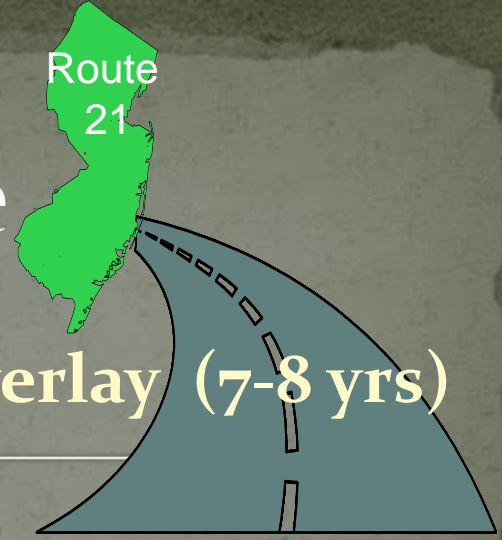


--What is Buried Treasure--



- ❑ A Pavement Preservation Technique that Uncovers and Renews Aged PCCP that has Been Overlaid with Asphalt due to Functional Requirements and Not Structural Issues
 - Functional Issues Consist of Noise, Friction, and Smoothness
- ❑ A Planned Preservation Strategy that can Maximize the Original Life of a Our National Treasure which is a Multi-Trillion Dollar Investment

Newark N.J. Case Example



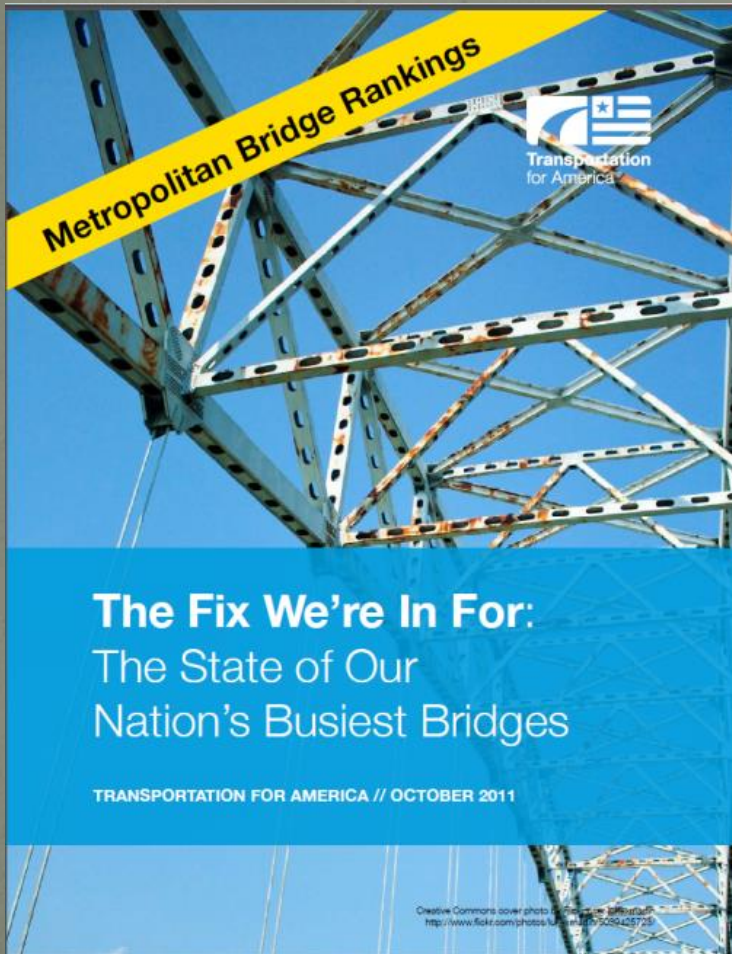
Concrete (23-60 yrs)

- 1931 – 1.4 Mile (Asbuilt)
- 1958 – 3.5 Mile (Asbuilt)
- 1970 – 1 Mile (Asbuilt)
- 9 Inches Thick
- 70,000 ADT
- Dowels

Asphalt Overlay (7-8 yrs)

- 1993 Micro Surfacing for Skid Improvement
- 2001 Micro Surfacing to Repair Previous Micro Surfacing Deterioration
- 2008 Buried Treasure

Bridge Deck Innovations



McDonald's vs. deficient bridges in 102 largest US metropolitan areas



~14,000

Number of US locations



18,239

Number of deficient bridges



64 million

Daily customers served worldwide



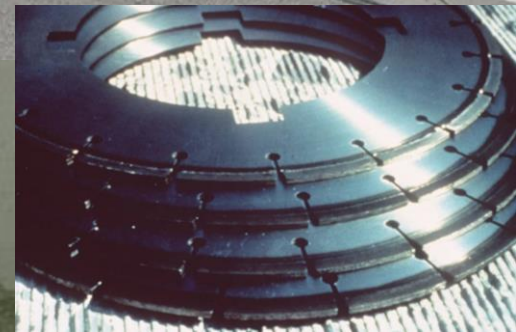
210 million

Trips taken daily on deficient bridges

What is Diamond Grinding?

- Removal of thin surface layer of hardened PCC using closely spaced diamond saw blades;
- Results in smooth, level pavement surface;
- Longitudinal texture with desirable friction and low noise characteristics;
- **Comprehensive part of any PCC Pavement Preservation program**

Diamond Grinding Equipment



Diamond Grinding Equipment Process



Texture Development Innovation



Texture Innovation

**IGGA Diamond
Grinding Head**

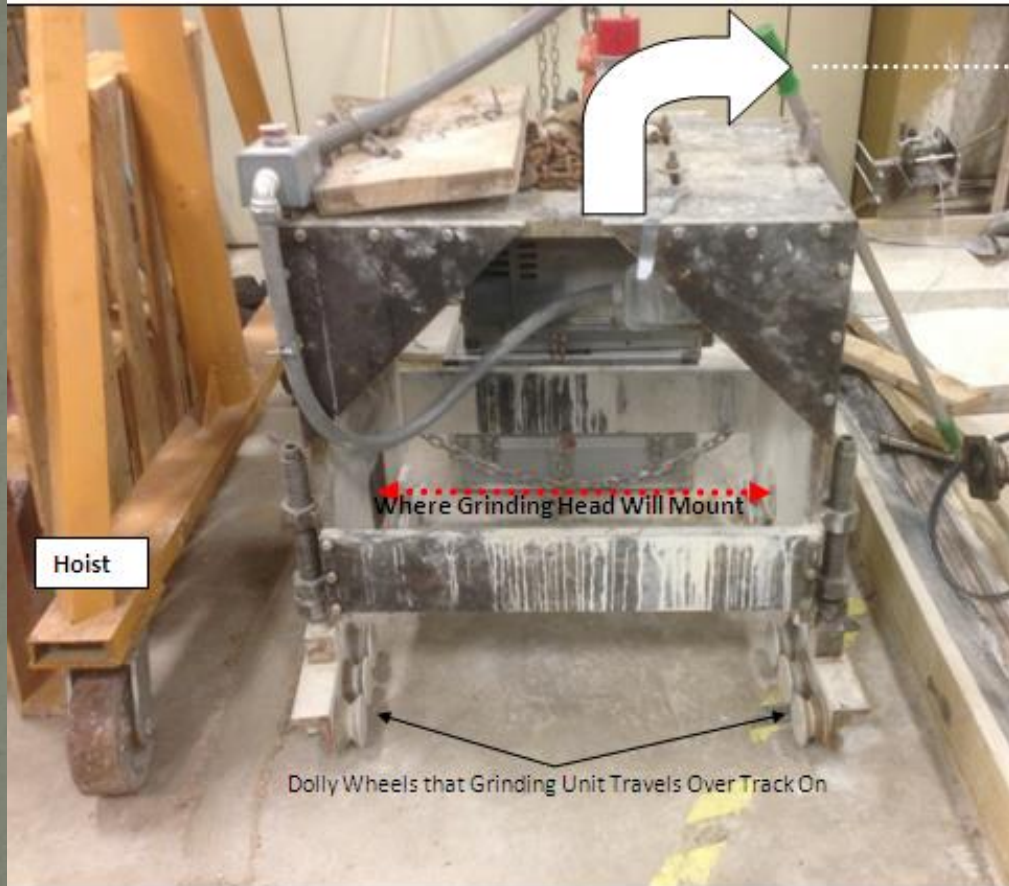


TPTA

NGCS



Innovation Isn't Always Pretty





City Street Texture (OTCS)



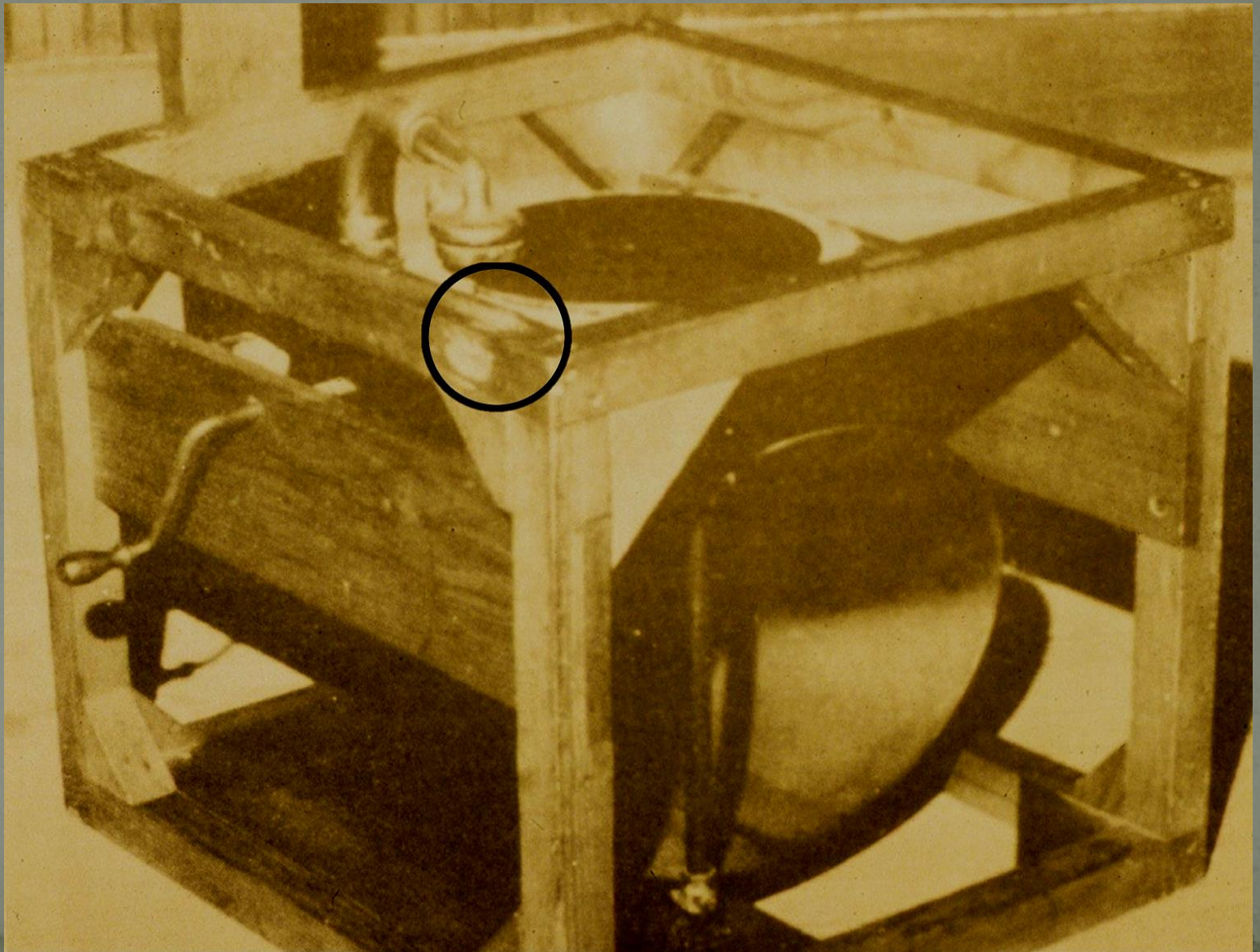
Summary

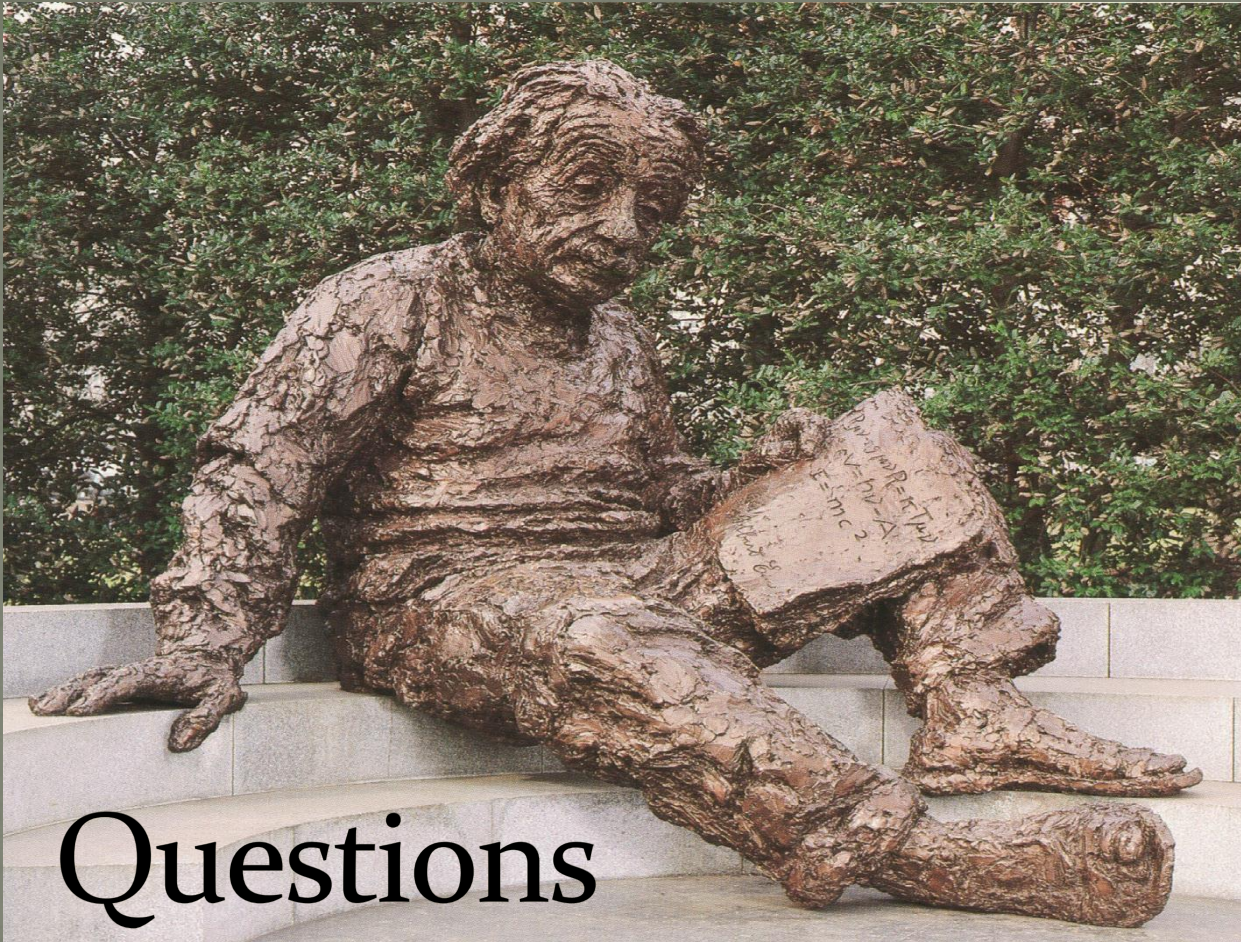
- Innovation Should not Just Be Something New, it Should add Value
- Innovation Applies to All Aspects, When to Apply Treatments, What Treatments to Apply, Establishing the Best Value
 - Friction
 - Economics
 - Smoothness
 - Texture
- Innovation is Sweating the Details.....

Pavement Problems Addressed

- Faulting at joints and cracks
- Built-in or construction roughness
- Polished concrete surface
- Wheelpath rutting
- Unacceptable noise level
- Permanent upward slab warping
- Inadequate transverse slope

Audience Participation in Innovation





Questions

Thank You

and

Visit Us on the Web

www.igga.net



Your Pavement Preservation Resource® since 1972