

# Concrete Pavement Rehabilitation Best Practices

February 10, 2011

15<sup>th</sup> Annual

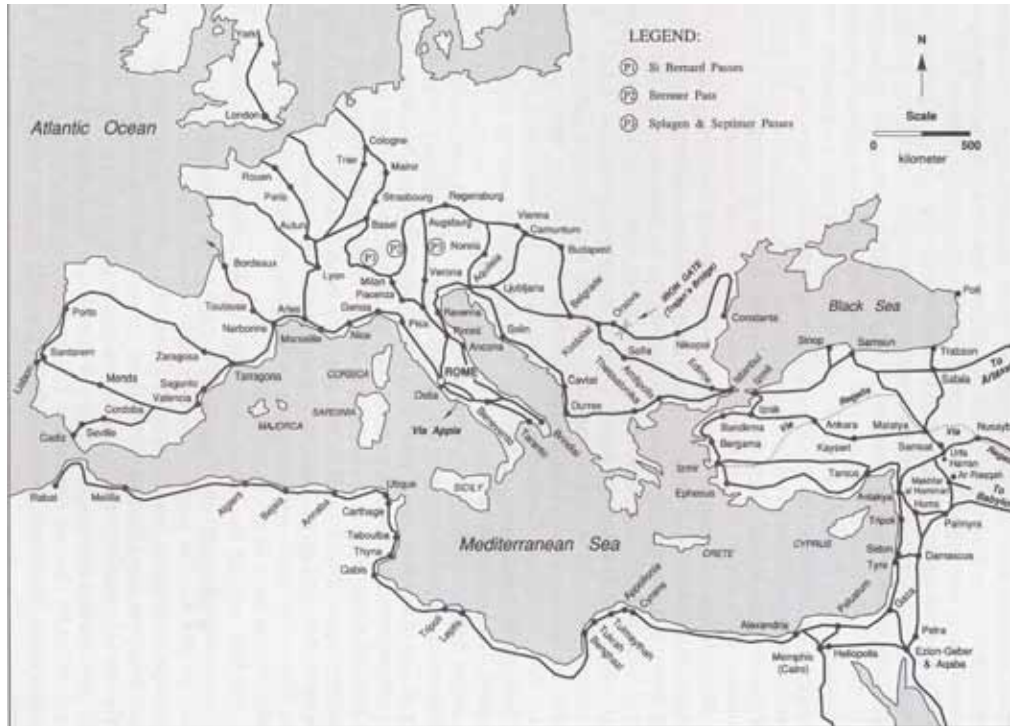
TERRA Pavement Conference

Daniel P. Frentress P.E.

International Grooving and Grinding Association



# Appian Way – Roman Road



# Old Idea of Concrete Repair





# Concrete Pavement Restoration - CPR





# Diamond Grinding



# Next Generation Concrete Surface - NGCS



# Research to Project

## Development Work-TPTA



**Proof of Concept- Mn/Road Low  
Volume Loop To Mn/Road Mainline**



**I-35 Project in  
Duluth, Mn  
Full Scale Project**

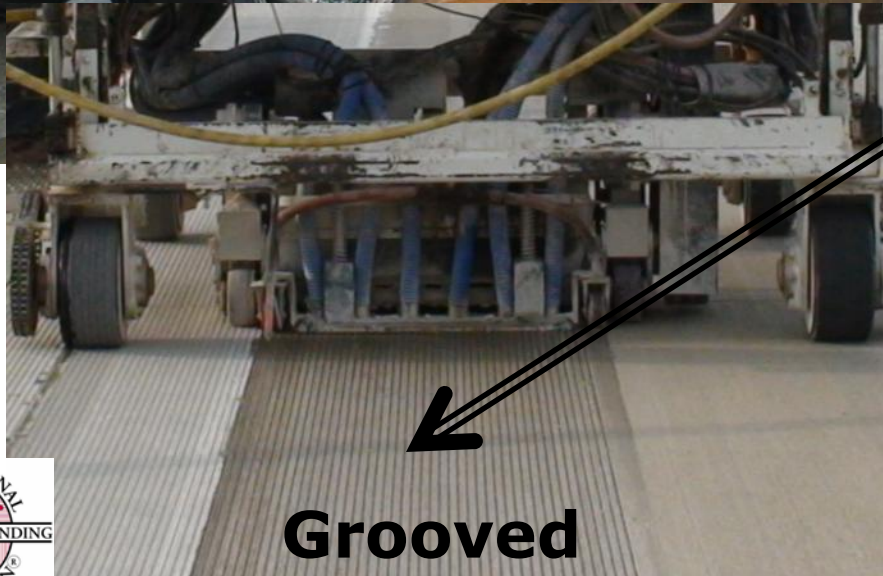




# Single or Two Pass Construction

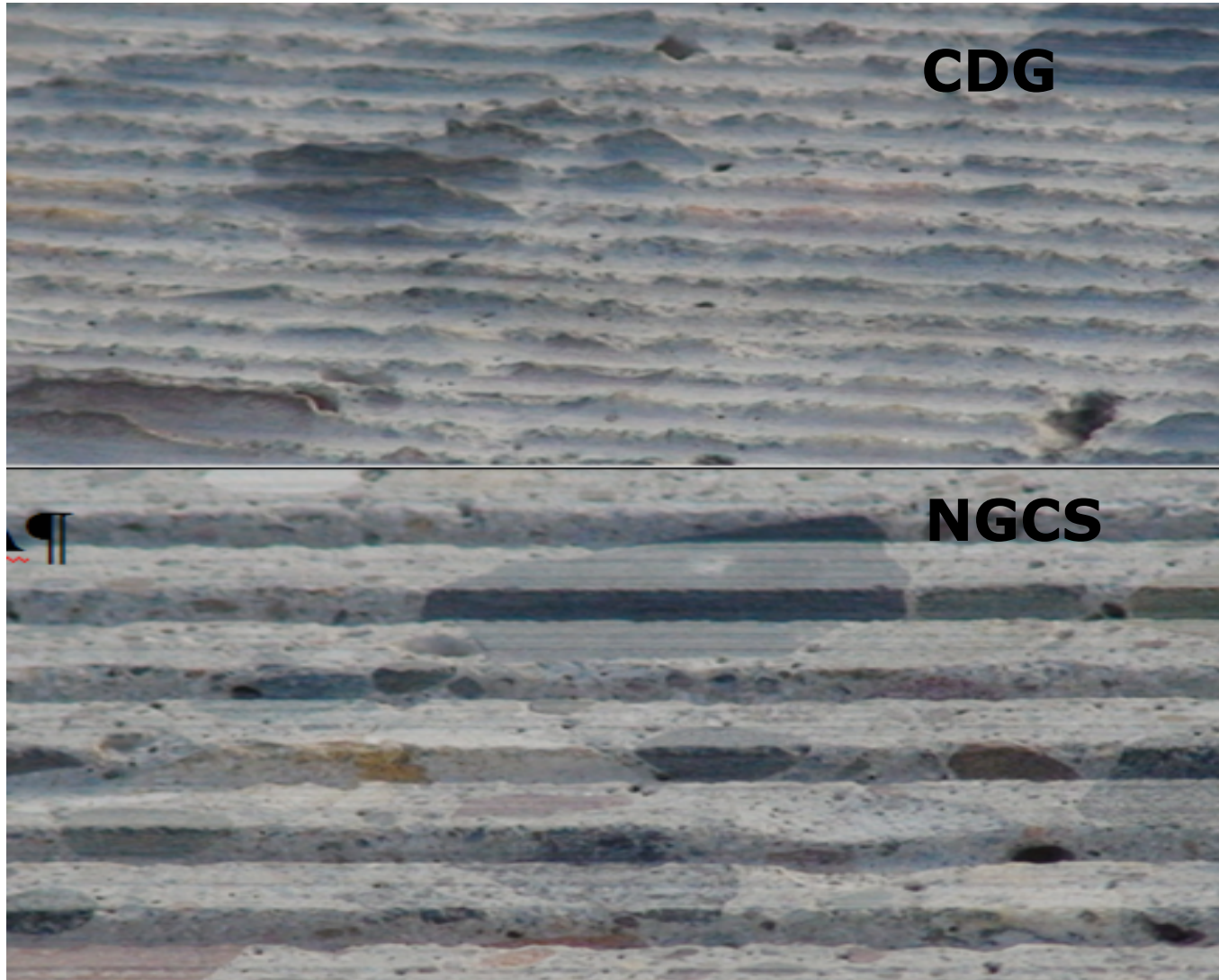


**Flush Grind**



**Grooved**

# NGCS Compared to Pre Traffic CDG





# I-35 in Duluth, MN

## Thompson Hill





# Mn/Road Test Facility



# Mn/Road Old WB I-94

- First time the old concrete pavement is being used for research.



- Built in 1973
- 9" concrete thickness
- 24' wide
- 27' Reinforced panels with Skewed Joints



# Existing WB I-94

Project supported by Mn/DOT District 3

Materials Engineer     Tony Kempenich

Resident Engineer     Dan Anderson

Project Engineer     Dan Labo

MN/DOT Pavement Engineering Section  
Manager Kurt Turgeon

CPAM Matt Zeller

Mn/DOT Concrete Engineer Maria Masten  
Contractor Highway Services – Penhall Co.





# Coring to check for the Integrity of Concrete



# Partial Depth Repair



# Faulted Slabs





# Locate Old Dowels with MIT Scan

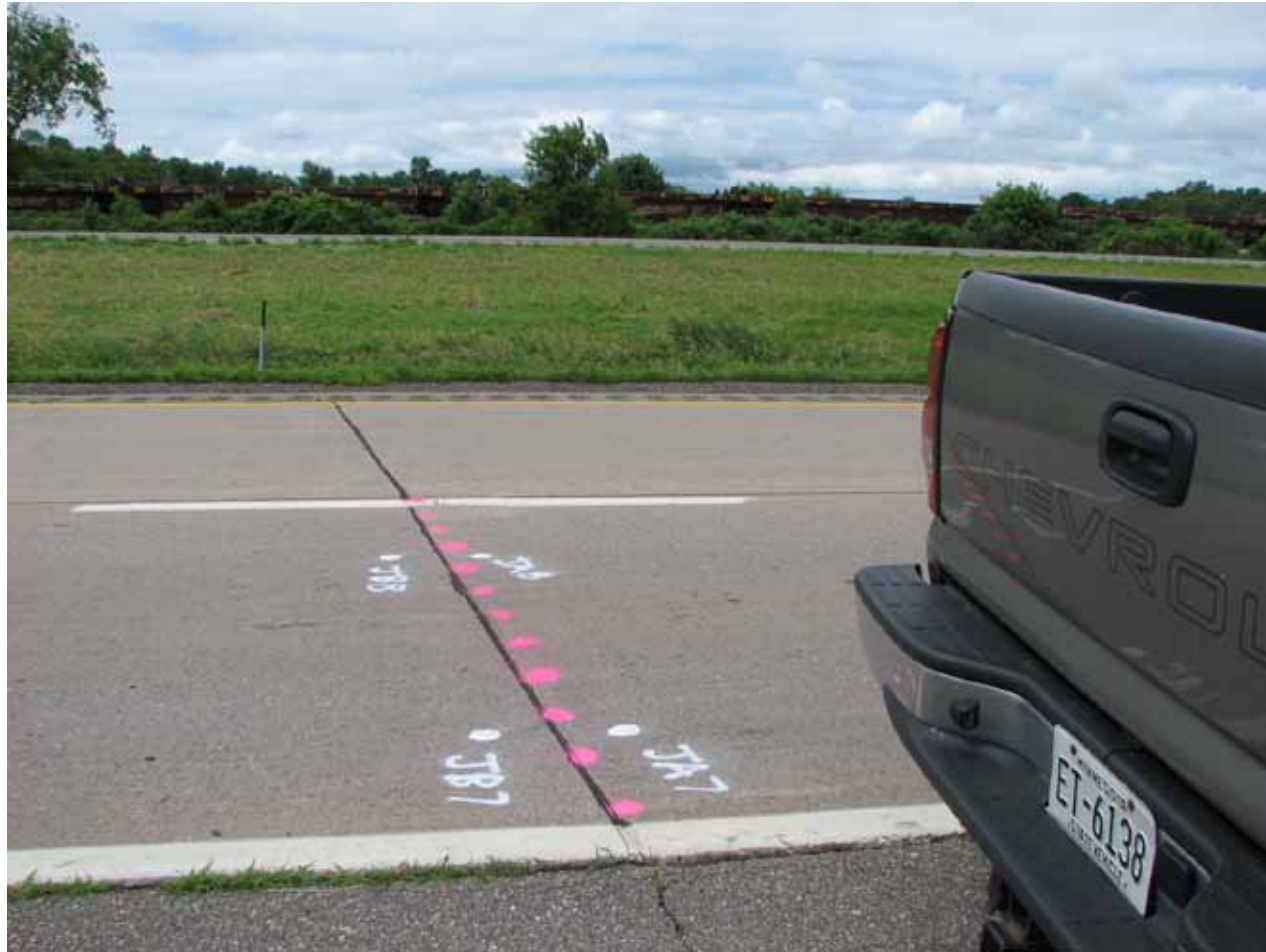


# MIT SCAN - 2

**Designed to find Misaligned dowels**



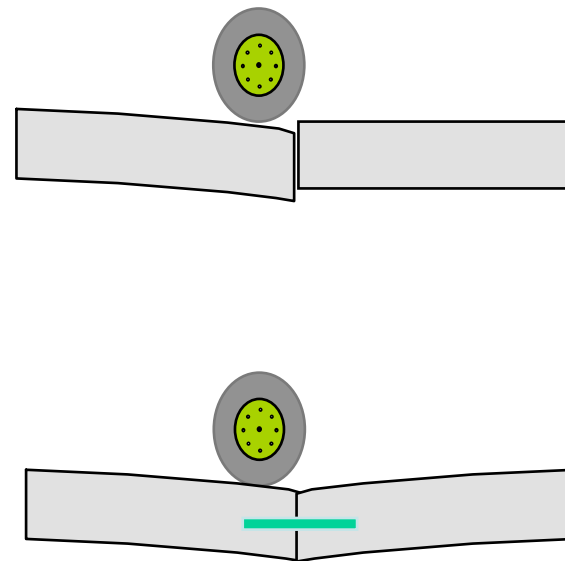
# Old Dowels Marked in Red





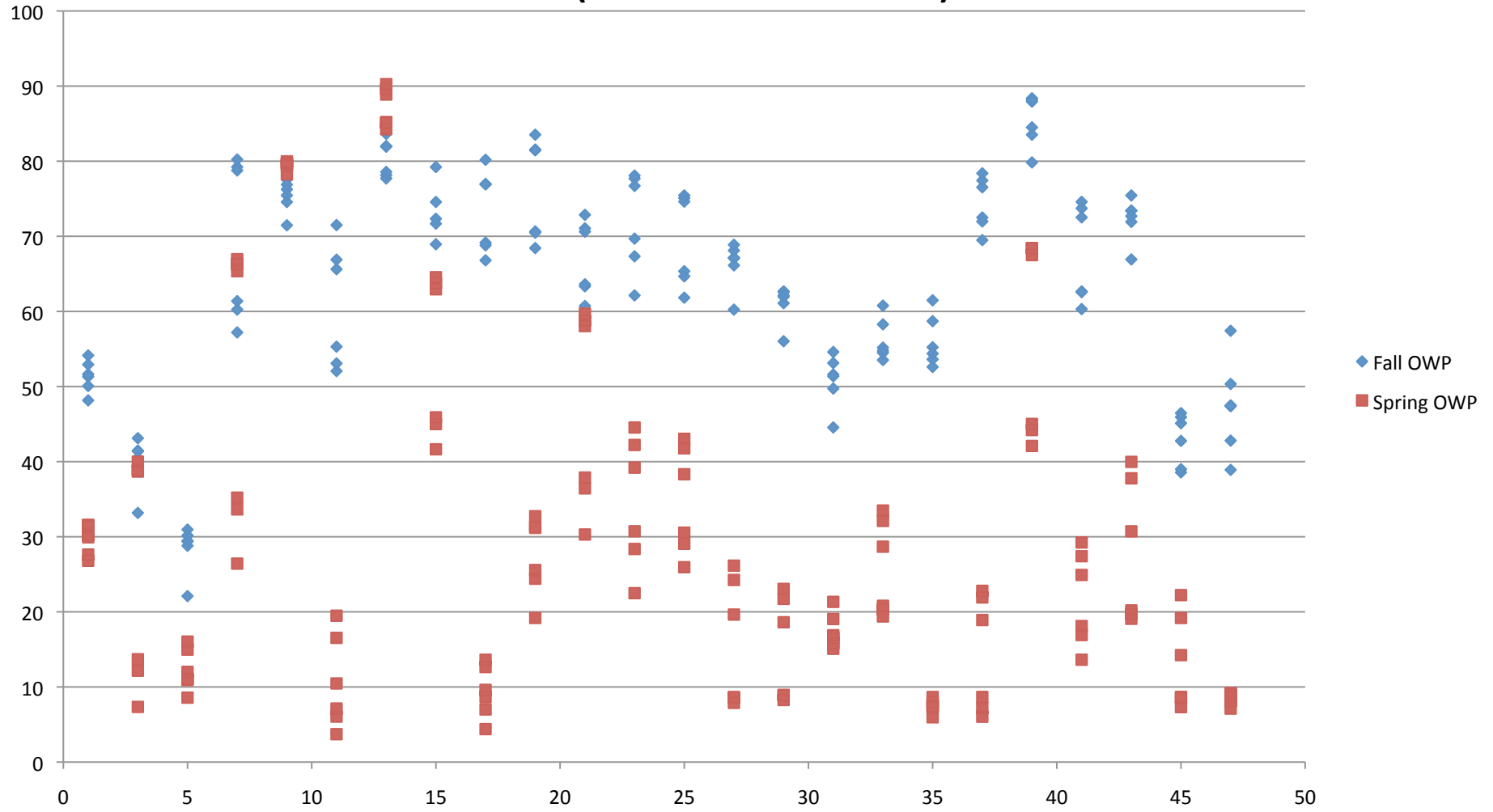
# Load Transfer Restoration

- Reestablish load-transfer across joints or cracks
  - Load-transfer is a slab's ability to transfer part of its load to its neighboring slab
- Used in JRC and JPC pavements to limit future faulting



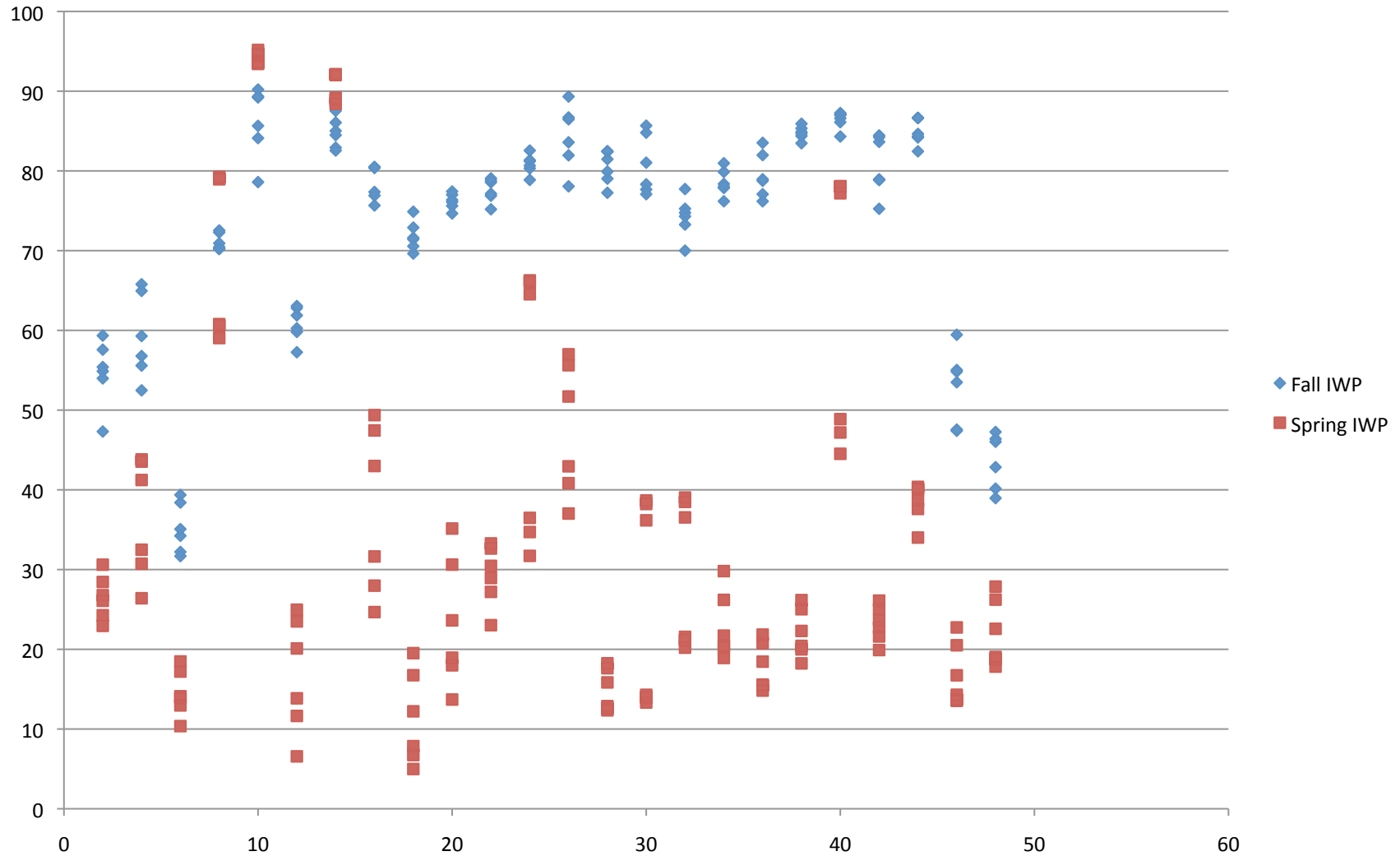
# Outside Wheel Path

OWP - All Points (Before and After Joint) & Load Levels



# Inside Wheel Paths

IWP - All Points (Before and After Joint) & Load Levels





# Slot Saw



# Slot Removal



**Max 30 lb. Chipping Jack Hammers**



# Slot Removal

- Some existing dowel basket shipping wires found in rubble.
- Old dowels were 1" X 18"
- No epoxy coating





# View of Slots before Sand Blasting

- Red Paint Dots show location of old dowels
- 3 Dowel pattern used
- Dowels 1 ¼" X 18"
- 6 Joints 1 ½" X 18"  
Dowels used



# Sand Blasting Slots



# View of hole at side of Slot





# Sheet Rock Compound

- House construction  
Sheet Rock  
compound used to fill  
hole next to slots.
- With Excessive  
compound use  
Performance is  
questionable!!!



# Broken Dowel



# Some Holes at bottom of Slot





# Some Joints used Very Little Silicone Joint Sealant



# Dowel Placement





# Concrete Materials





# Batching Operations



# Concrete Placement



# Mn/Road DBR in Existing Basket





# Questions?

## International Grooving and Grinding Association

Website [www.IGGA.NET](http://www.IGGA.NET)

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