

# DEVELOPMENT AND USE OF THE NEXT GENERATION CONCRETE SURFACE (NGCS)

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# Presentation Outline

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- **What is a Quiet Concrete Pavement**
- **What is NGCS**
- **Some Noise Basics First**
- **Development of the NGCS**
- **Use of NGCS**
- **NGCS LITE**
- **Noise Performance of NGCS**
- **Frictional Performance of NGCS**

# What Is a Quiet Pavement?

NCHRP 10-67—Texturing Concrete Pavements (NCHRP  
Report 634)  
(ARA-2009)

## Noise Level (OBSI – dBA)

Low	<102
Fairly Low	102 To 104
Moderate	104 to 106
Fairly High	106 to 108
High	>110

# What is the Next Generation Concrete Surface (NGCS)

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- **NGCS is a term used to describe a category of texture(s) that have or will evolve through current research. The term may apply to several textures that evolve for both new construction and rehabilitation of existing surfaces. The desirable characteristics of such textures will be a very smooth profile coupled with good micro texture and excellent macro texture.**

# What it Looks Like Currently

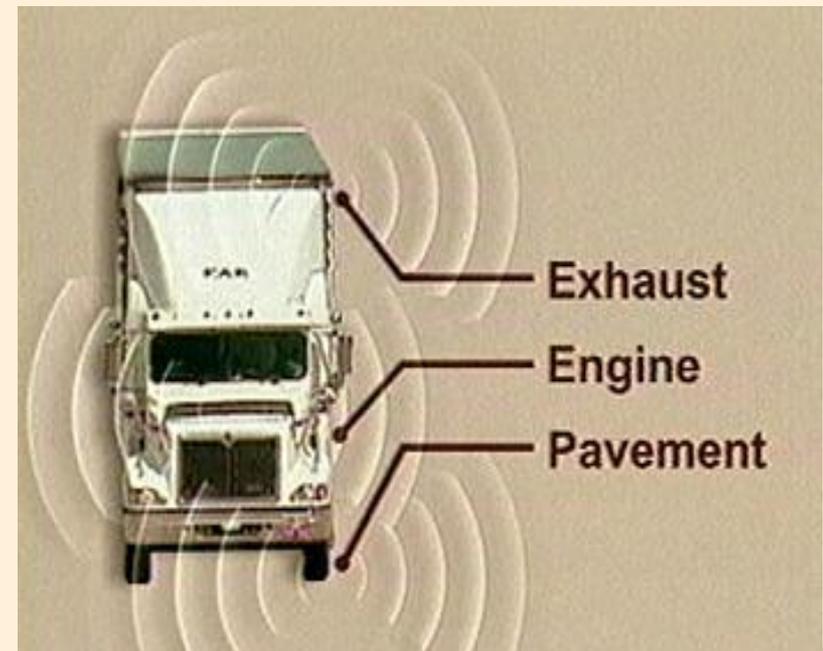


# Noise Measurement Device (OBSI)



# Methods for Mitigating Highway Noise

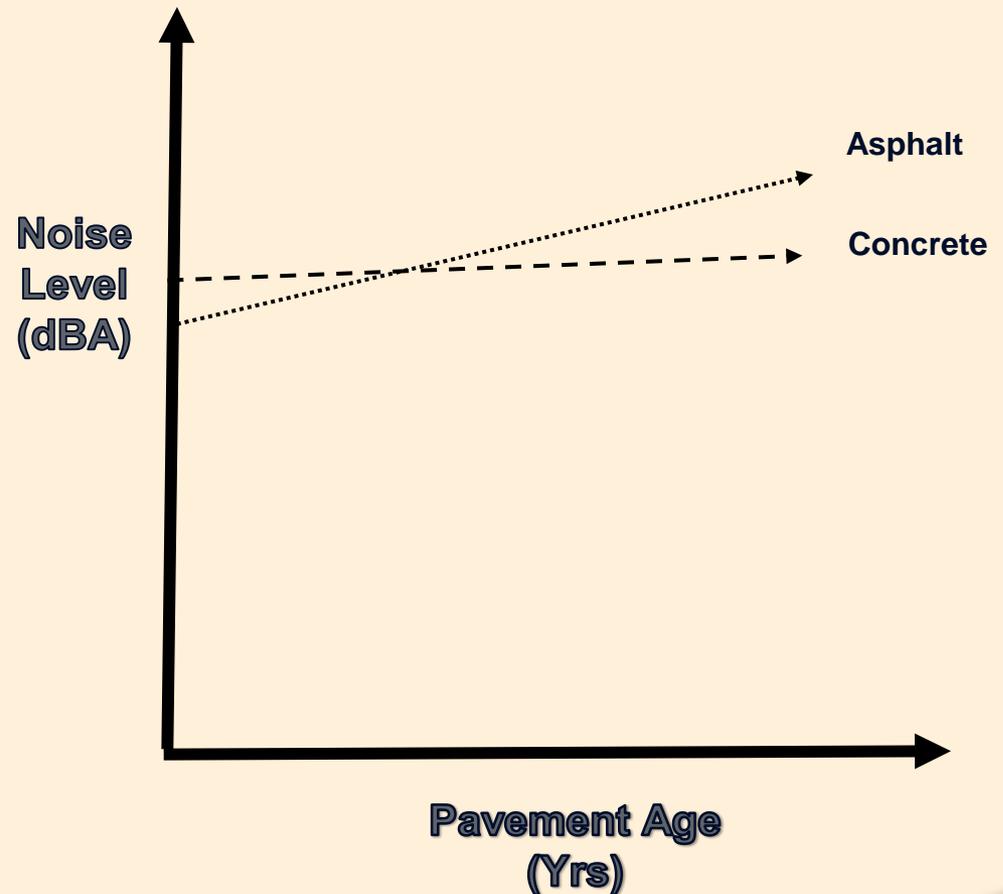
## Controlled At the Source



# Growing Old Or “Acoustic Longevity”



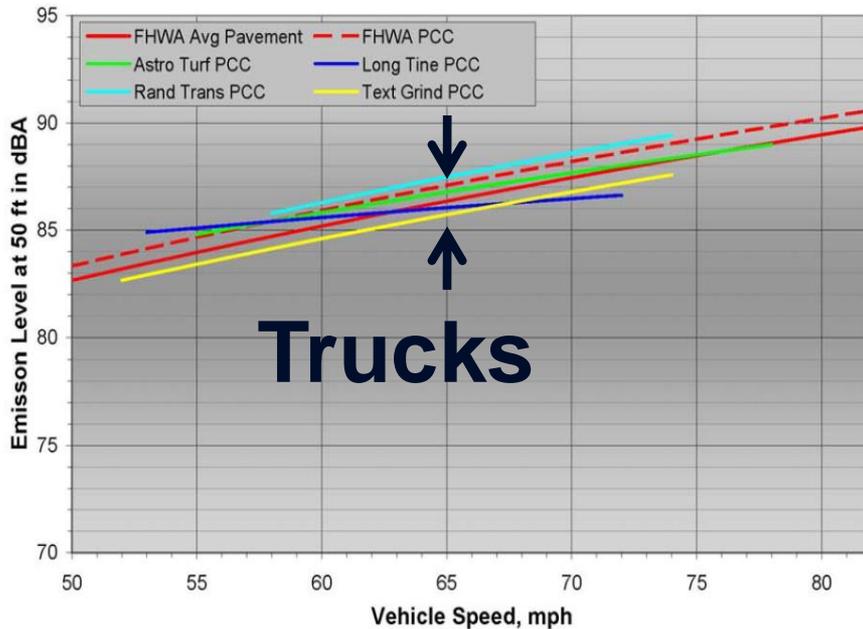
Changing Performance  
Over Time



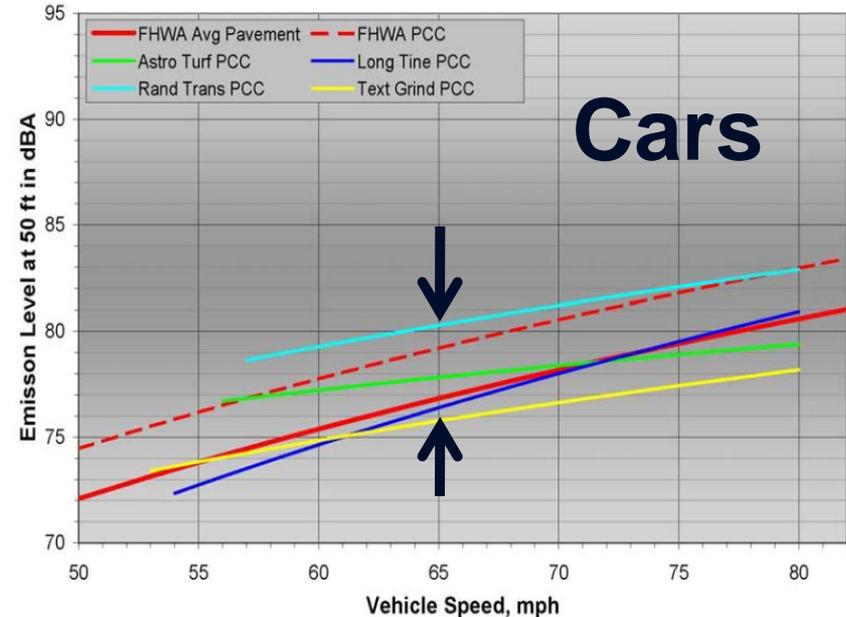
# TNM RESULTS (Noise Mitigation)



FHWA vs. Specific PCC Pavement for Heavy Trucks



FHWA vs. Specific PCC Pavement for Light Vehicles



# Don't Forget Pavement Preservation

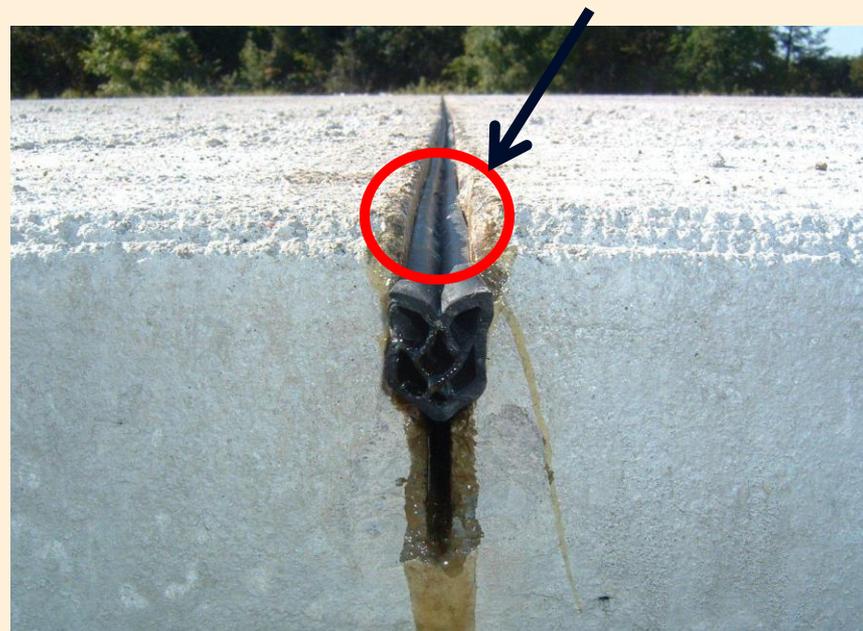
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# Good Joint Design

- Joint Opening Width
- Joint Reservoir Depth
- Sealant Level
- Faulting

Volume of  
Reservoir



# What is NGCS and Where Did it Come From

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**Back to the Future Again**

# Purdue Research– Tire Pavement Test Apparatus (TPTA)

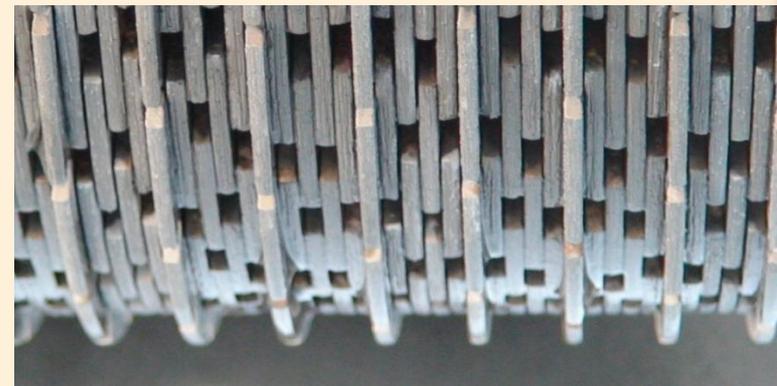
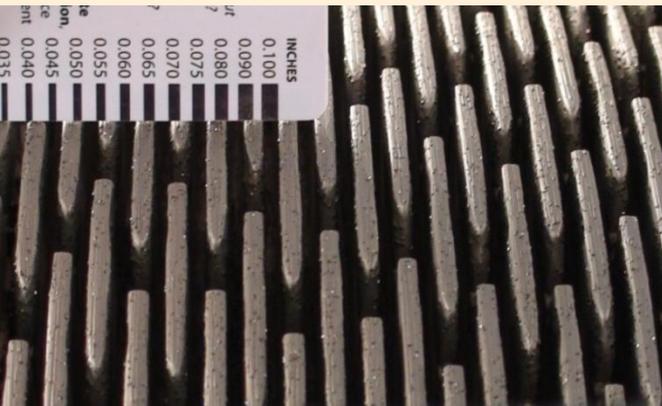


# NGCS is a Diamond Grinding Procedure



CDG

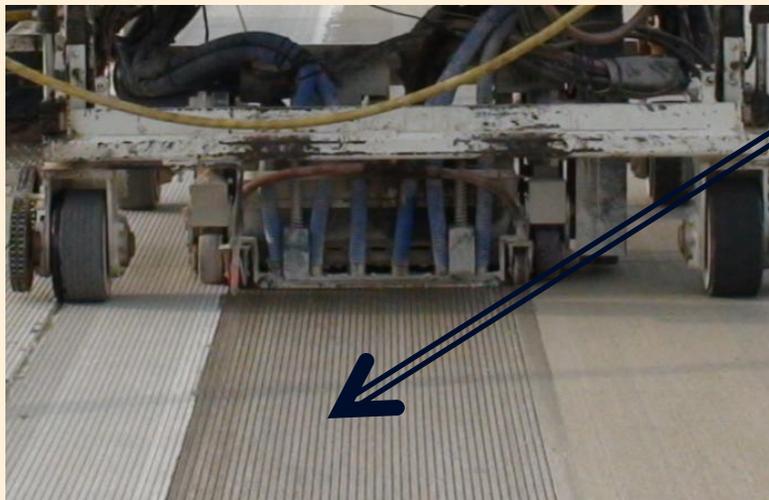
NGCS



# NGCS Construction

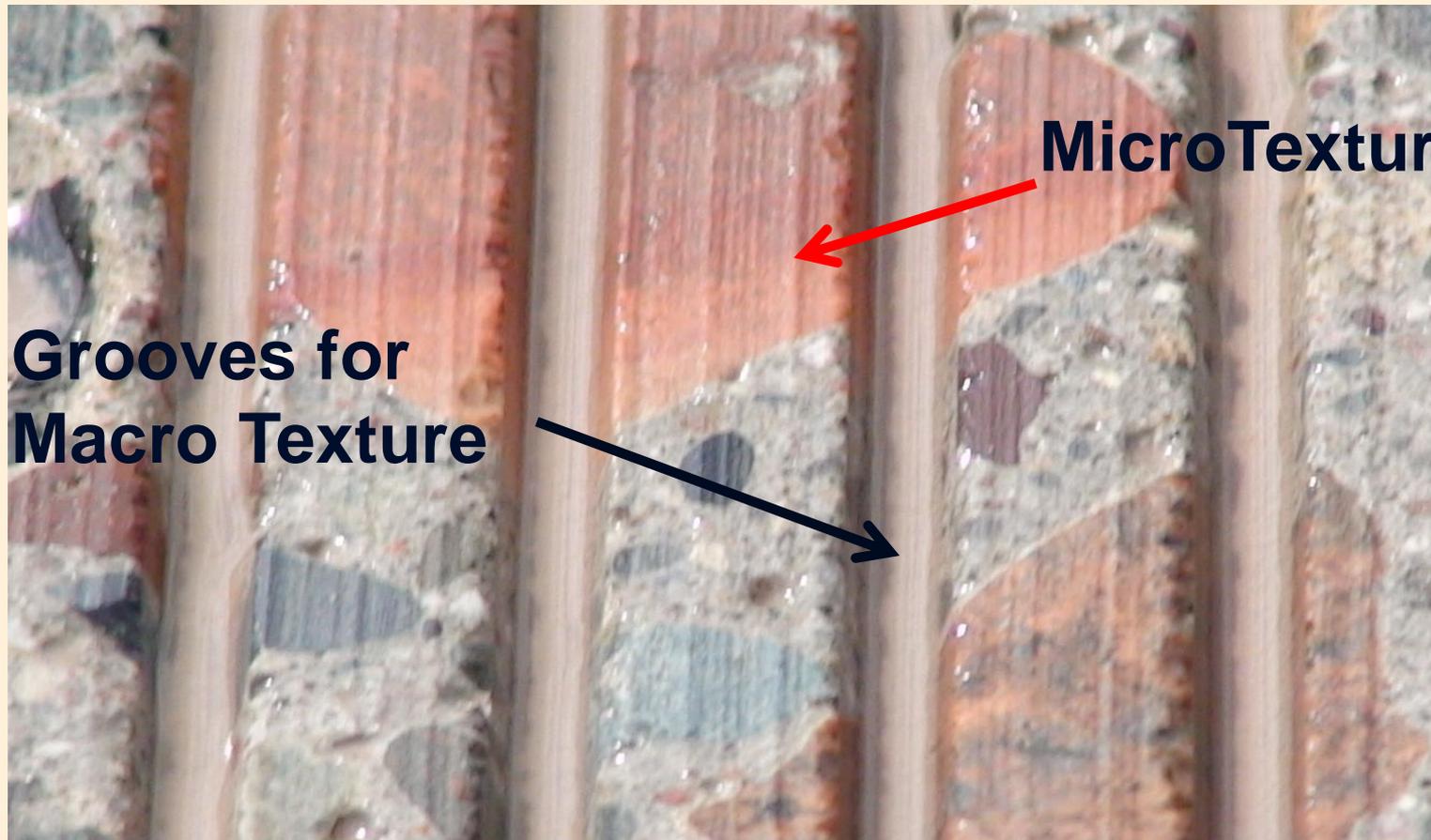


**Positive Texture  
Removal**



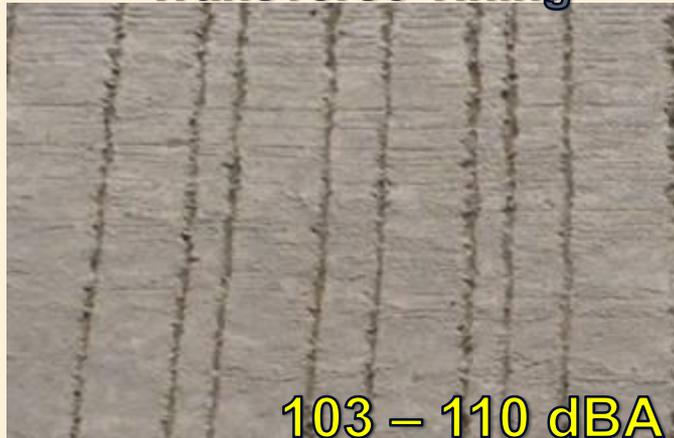
**Grooved**

# NGCS Surface



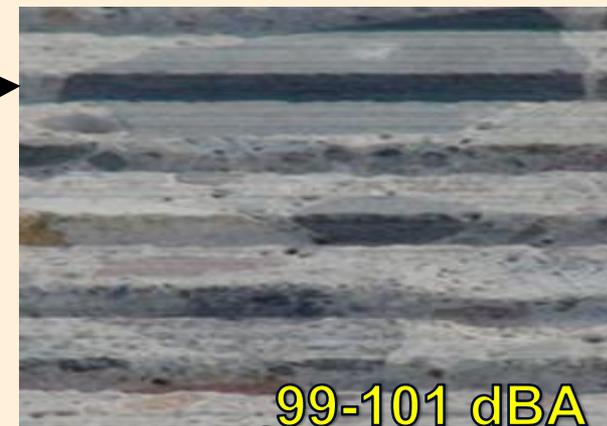
# Concrete Texture Types and Levels

**Transverse Tining**



**Longitudinal Tining**

**Conventional Diamond Grinding**

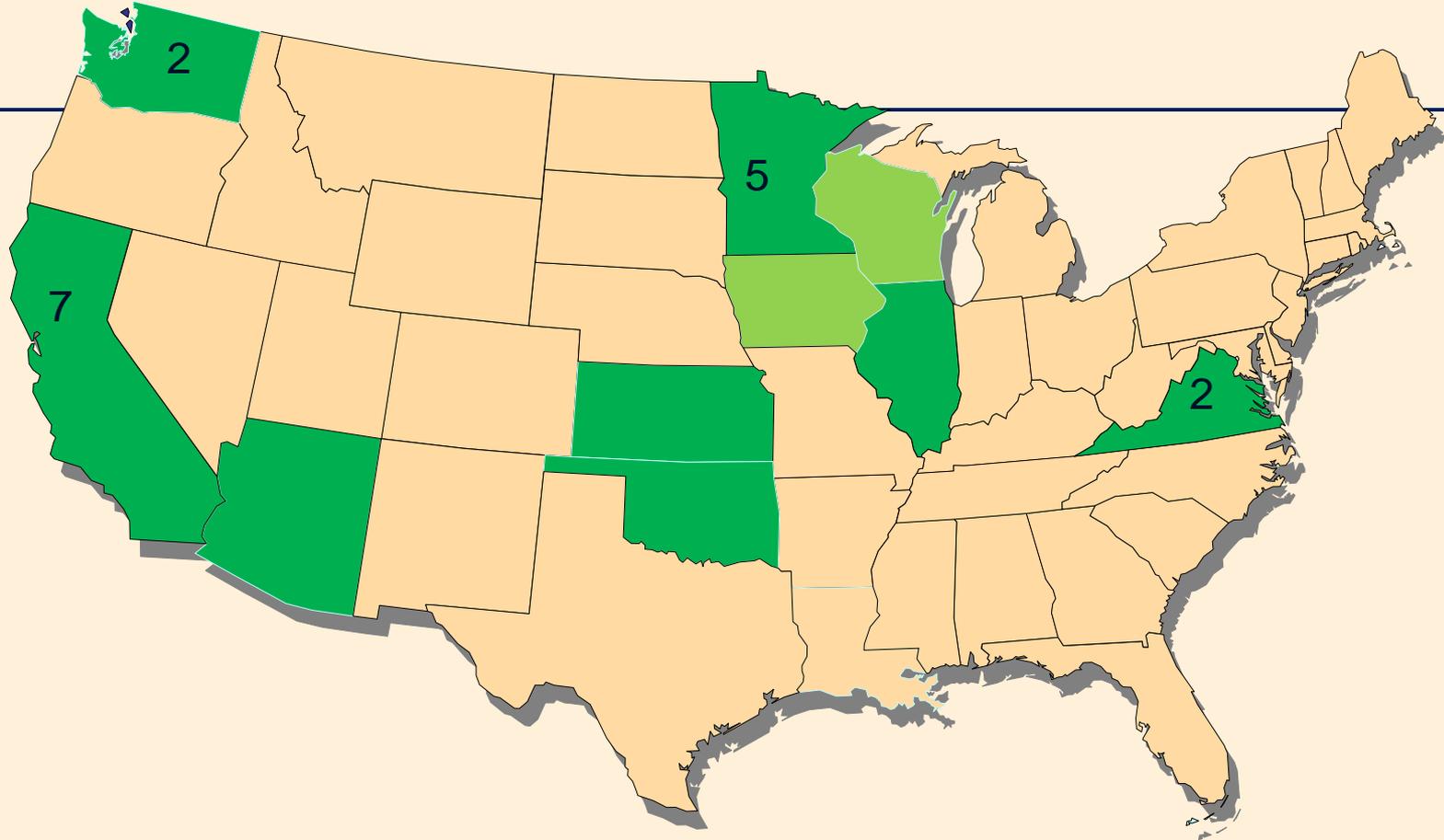


**Next Generation  
Concrete Surface**

Twice  
as  
Loud

Traffic

# Current and Future NGCS Sites

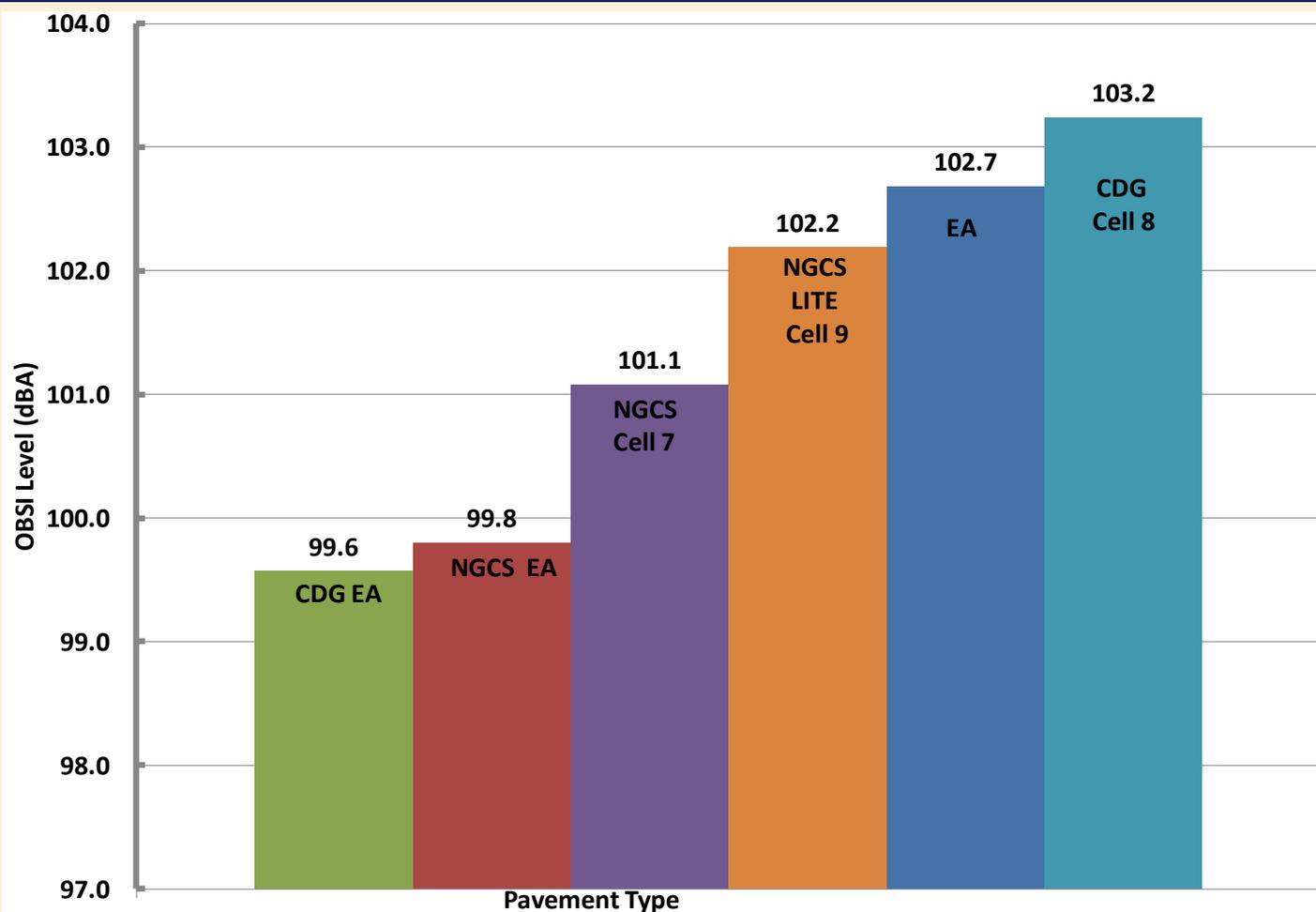


# Noise Results (OBSI)

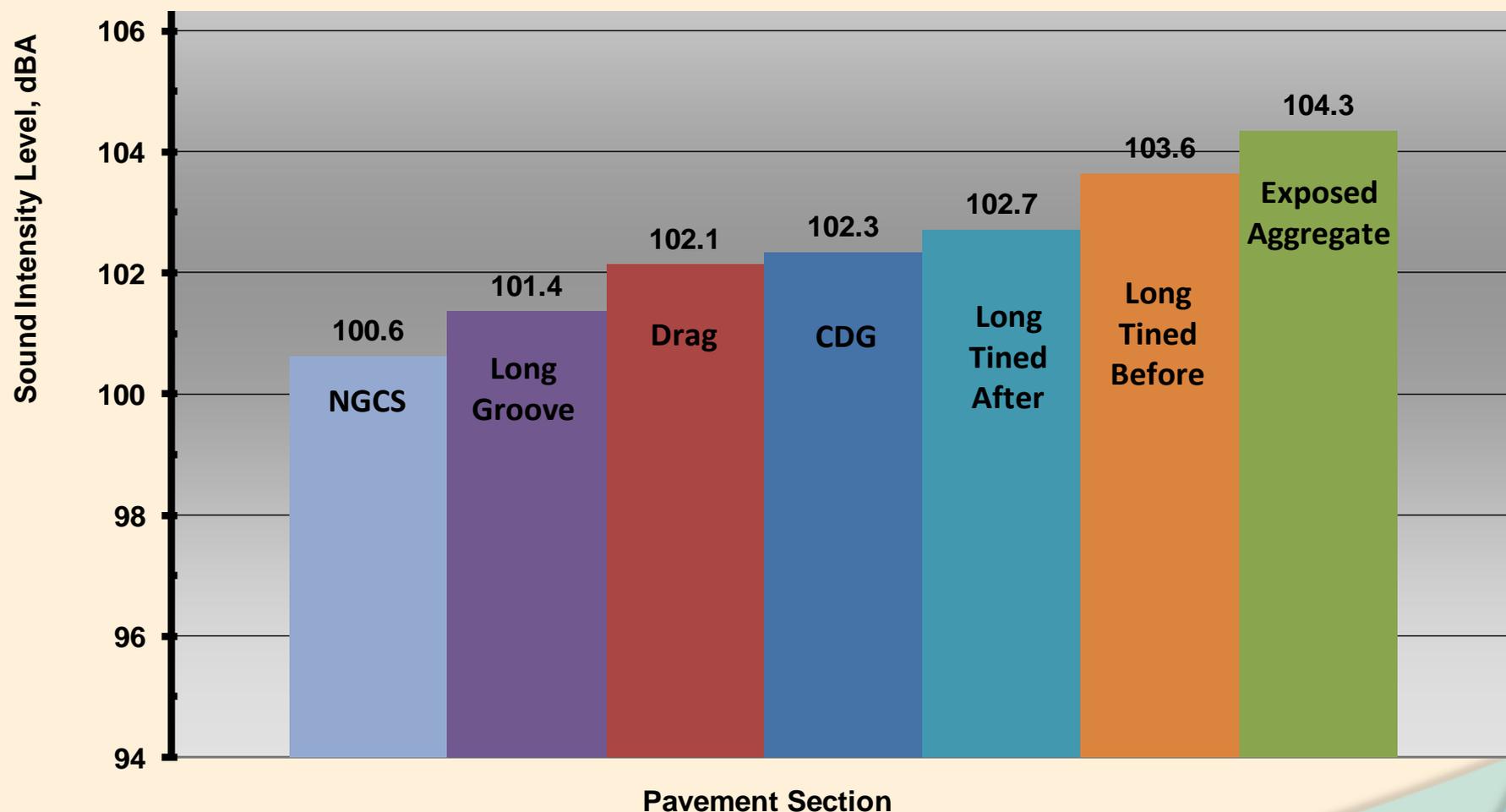
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# MnROADs Test Sections



# Kansas I-70 Results



# Friction Testing



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@<http://www.school-for-champions.com>

# Friction Testing ASTM E274

Ribbed



**SN40R**



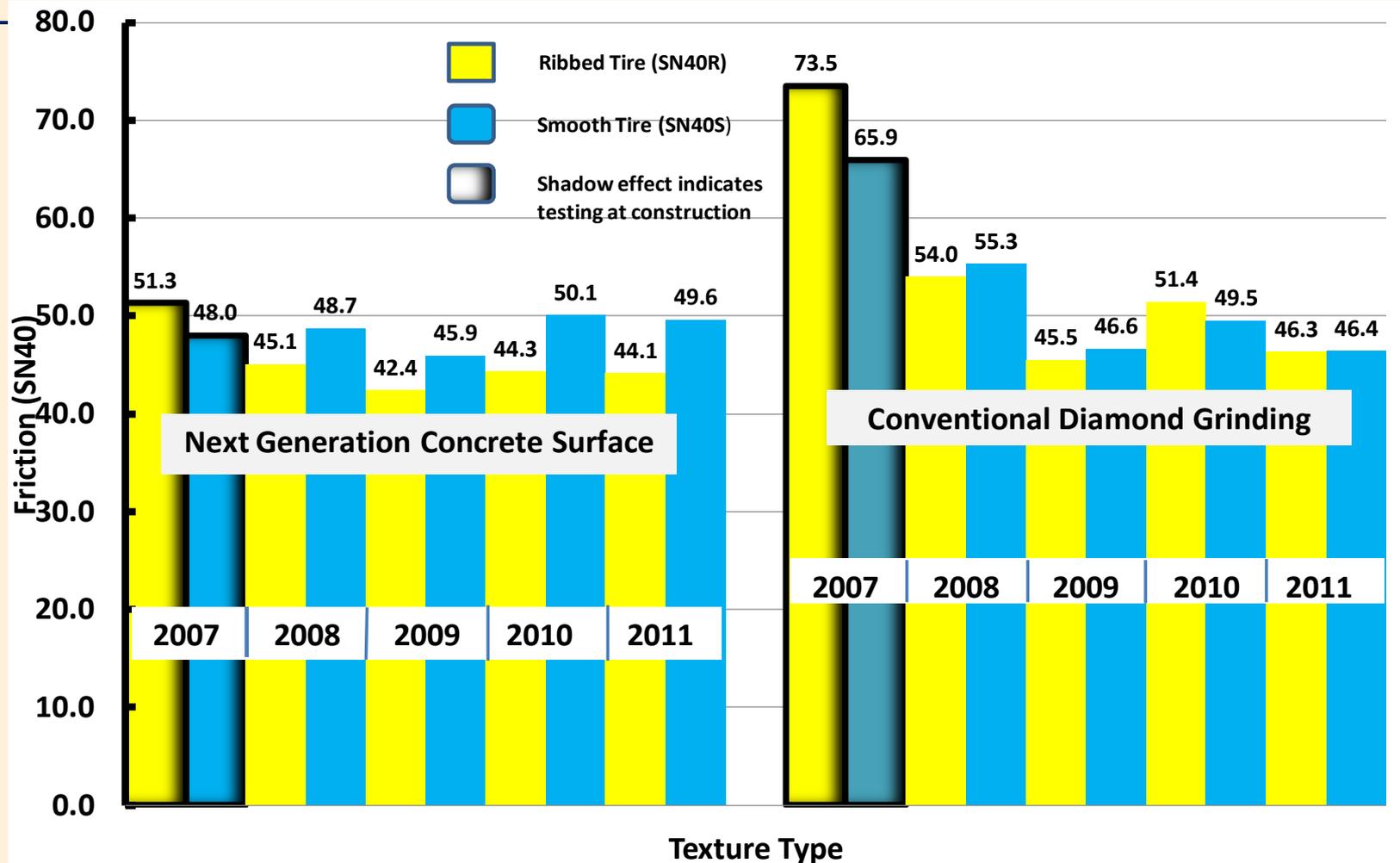
**SN40S**

Smooth

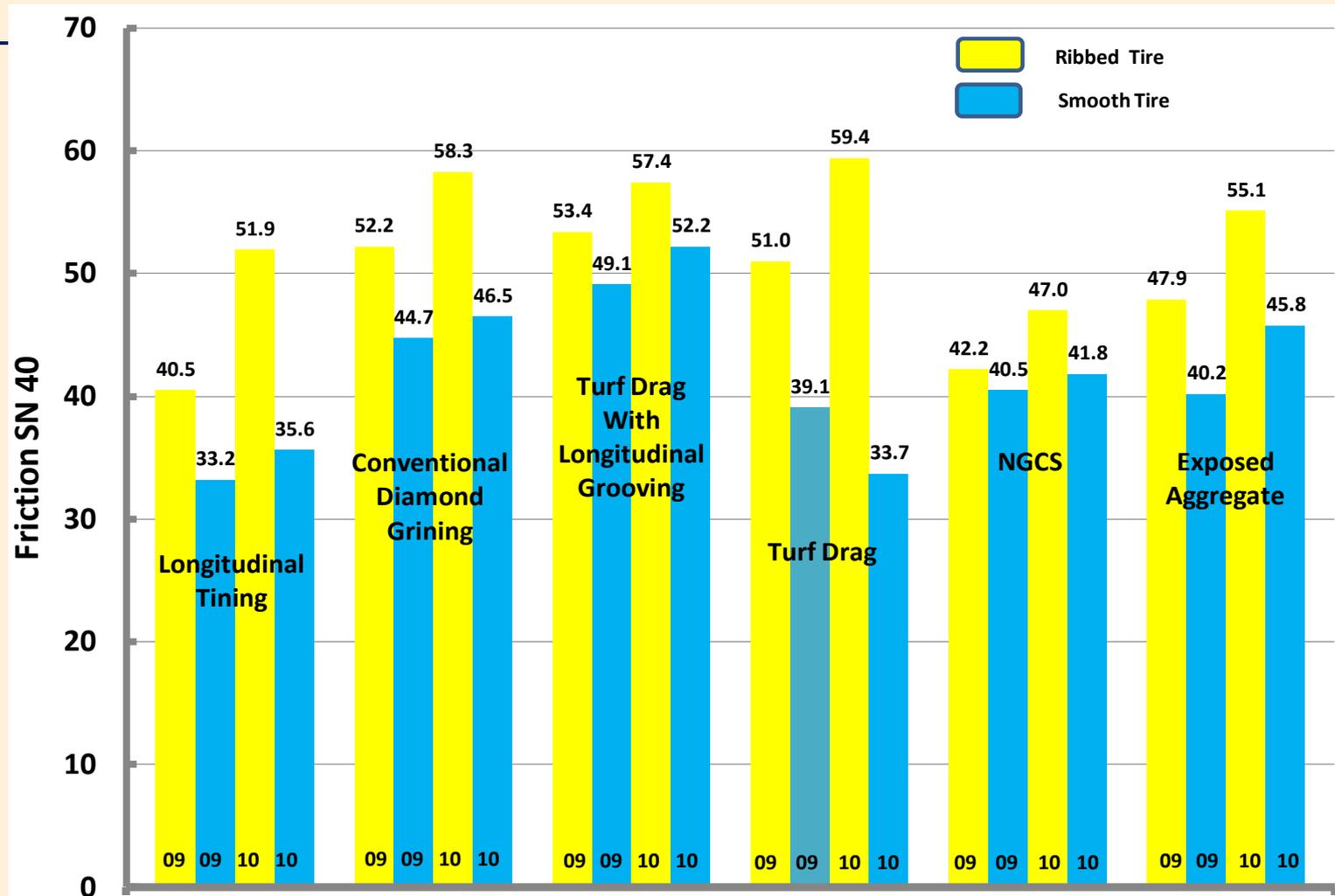


Test Speed = 40 MPH

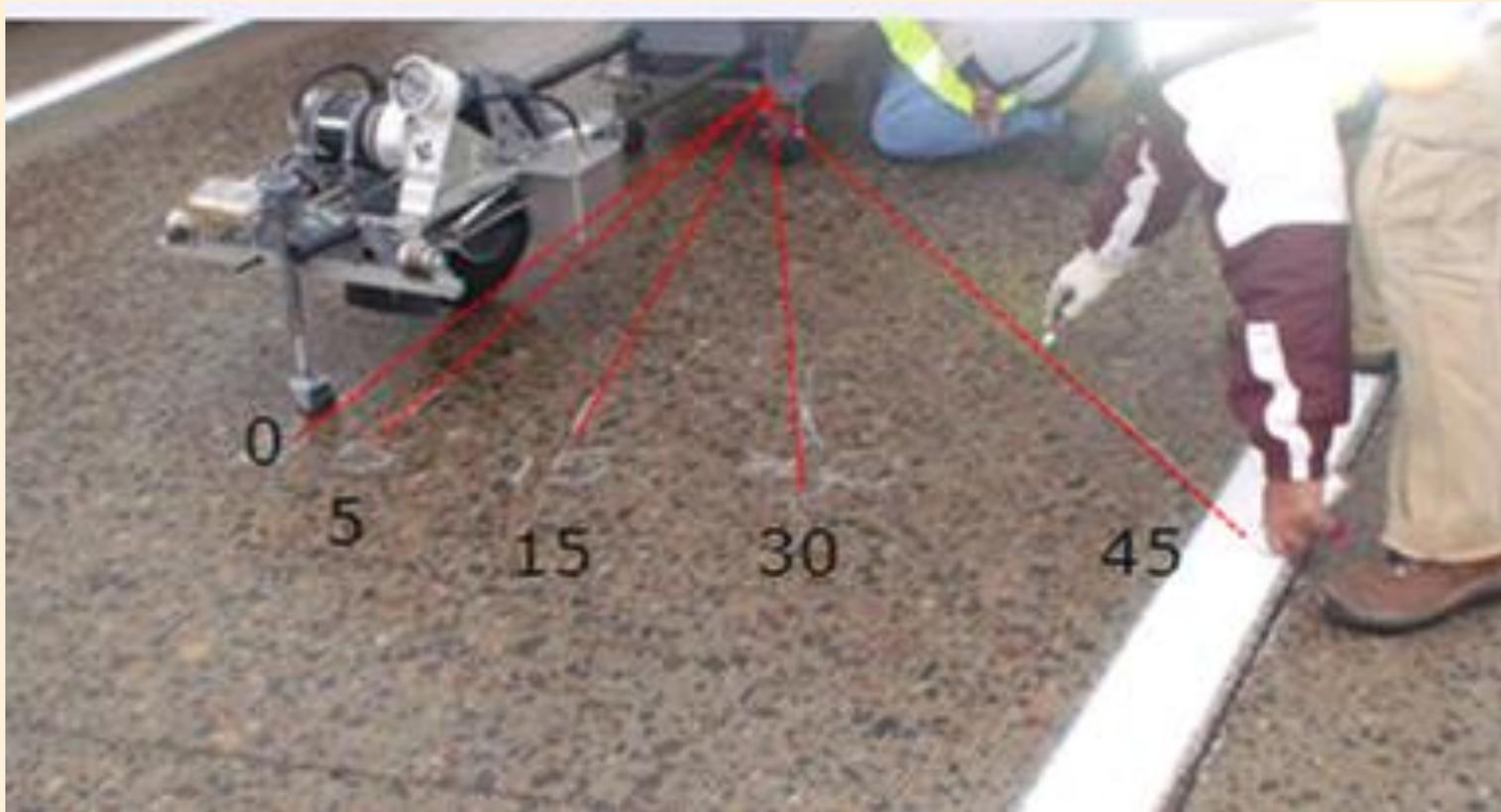
# MnROADs Friction Testing of NGCS



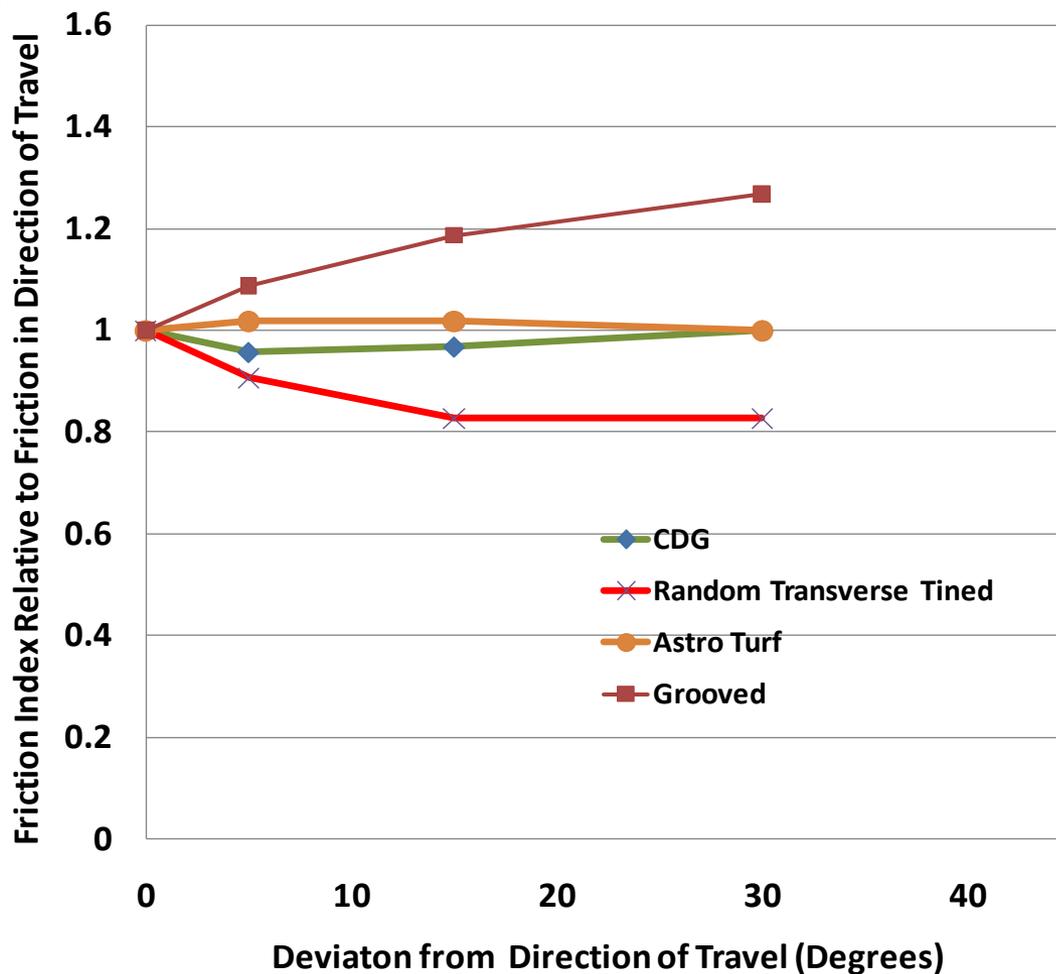
# KDOT I-70 Friction Results



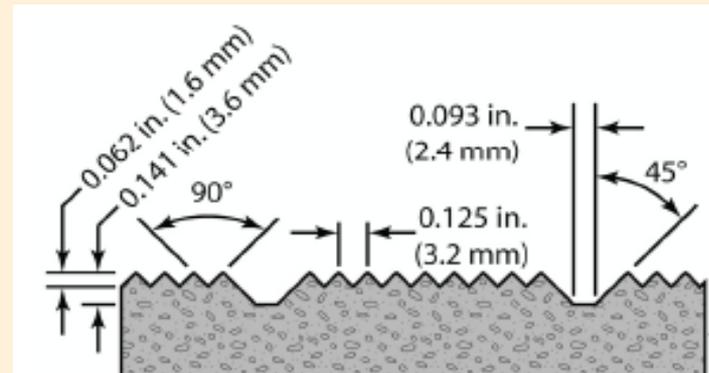
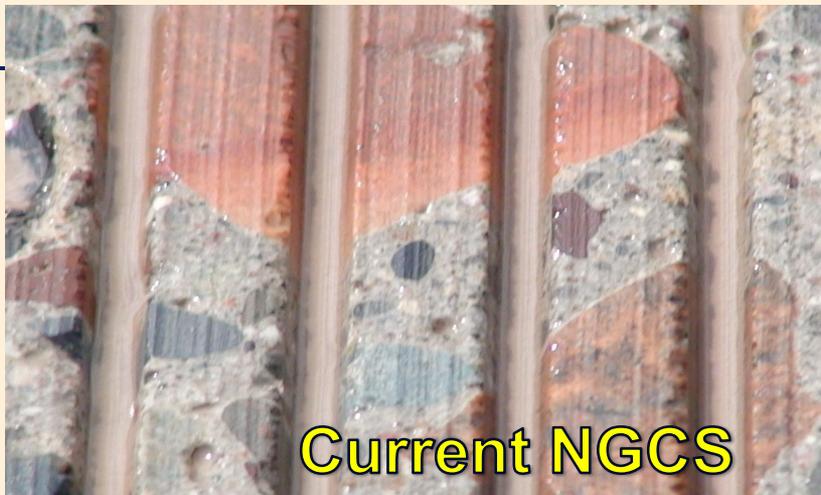
# Anisotropic Friction Testing



# Anisotropic Friction Behavior



# Back to the Future Again



**Style 15 Christensen Diamond  
Grooving Pattern**

**1960's  
California  
Texture**

# Summary

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- **You Can Build Quiet Concrete Pavements!**
- **NGCS has Been Placed in 10 States at 22 Locations with the Oldest Being 5 Years**
- **All the Surfaces Have Produced Consistent Results**
- **Contractors are Gaining More Experience and More Confidence with NGCS**
- **The NGCS LITE is Intended to be an Economical Renewable Surface Texture**
- **Diamond Grinding Costs are Not as Subject to Inflationary Forces**

# Thank you-

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# -Questions?

[www.IGGA.net](http://www.IGGA.net)

[www.NGCS.info](http://www.NGCS.info)