Concrete Pavement Preservation

Improved Performance and Customer Satisfaction Through Diamond Saw-Cut Surface Textures

Presented by John Roberts – Executive Director IGGA

Introduction

- John Roberts
- Executive Director - International Grooving and Grinding Association
- Vice President – American Concrete Pavement Association's Pavement Preservation Partnership

Life is Full of Decisions To Be Made!

How Do We Navigate All The Needs?

- Minimal system expansion
- Maintain the present system
- Minimize traffic disruptions
- Increase safety
- Address customer's needs
  - Reduce roughness
  - Reduce noise
- Inadequate Funding
- Protect the Environment

I-10 Katy Freeway – Houston TX
26 lanes wide – All Diamond Ground

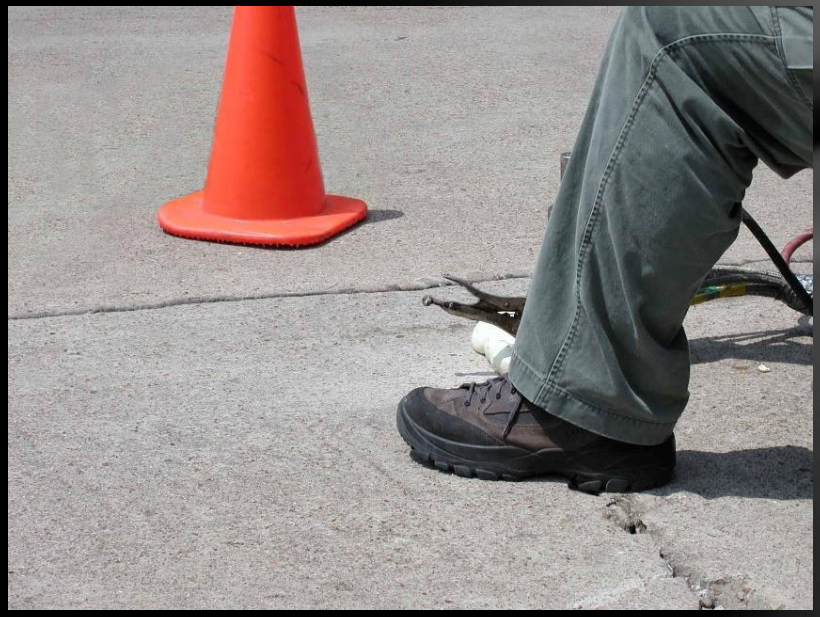
Pavement Preservation Philosophy

PCCP Preservation Techniques

- Subsurface rehab (Undersealing and Slab-Jacking)
- Cross-stitching longitudinal cracks/joints
- Partial-depth repair
- Dowel bar retrofit
- Full-depth repair
- Diamond Grinding and Grooving
- Joint & crack resealing

Pavement Sub-Surface Rehabilitation

- Used for sub-grade repair



Cross Stitching

- Used for longitudinal cracks that are in good condition
- **Not** appropriate for transverse cracks – use DBR

Partial Depth Repair - PDR

- Used on surface defects and joint spalls.

Full-Depth Repair

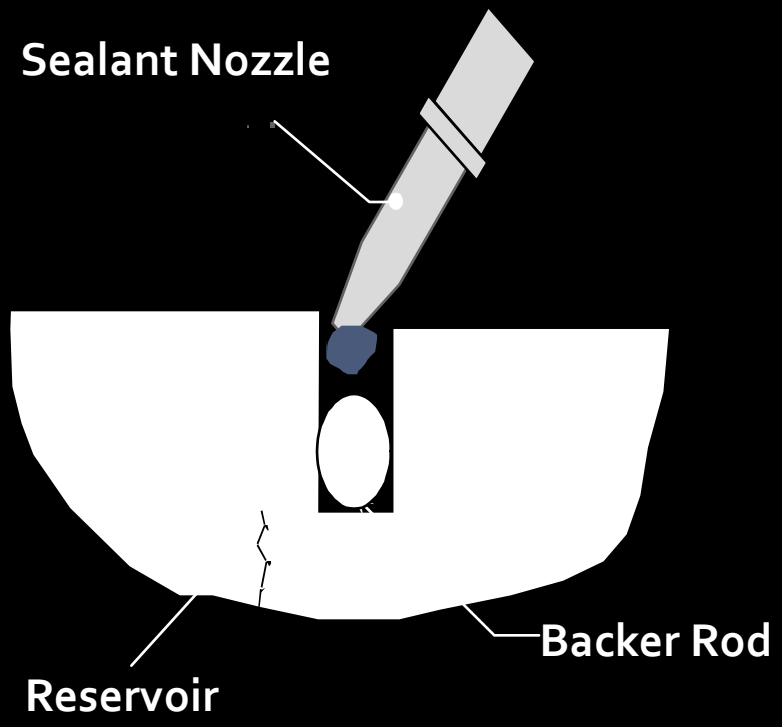
- Removal and replacement of concrete through entire depth.

Dowel Bar Retrofit - DBR

- Placement of dowels across transverse joints or cracks of existing pavements.
- Used to limit future faulting.

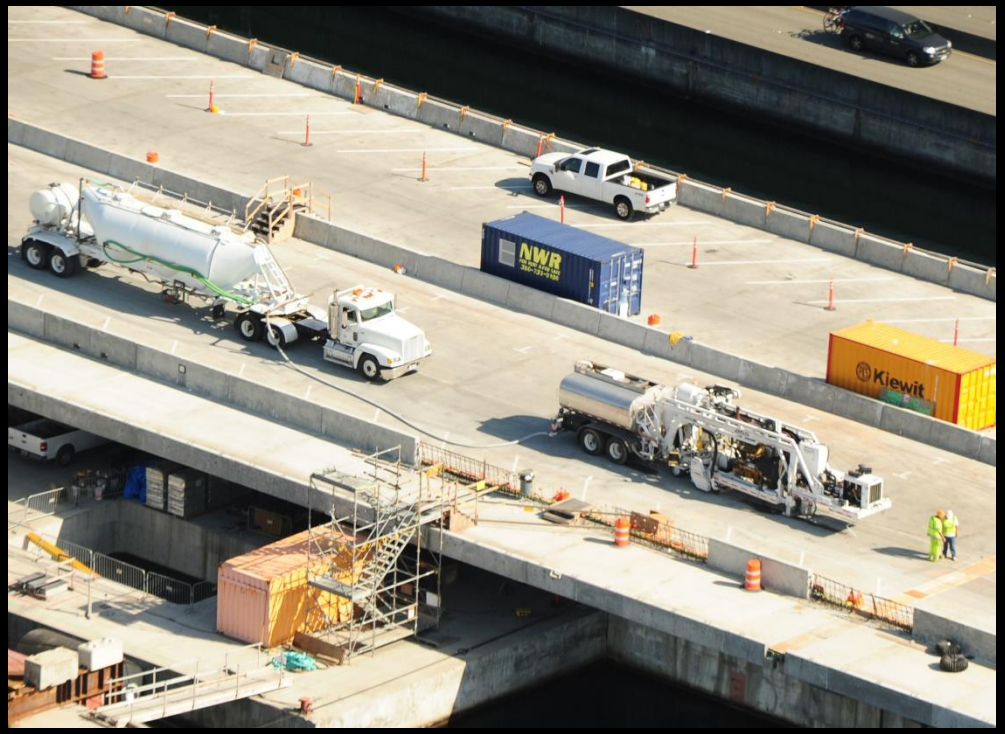
Joint and Crack Resealing

- Minimizes water & incompressibles into pavement system



Diamond Saw-Cut Surface Textures

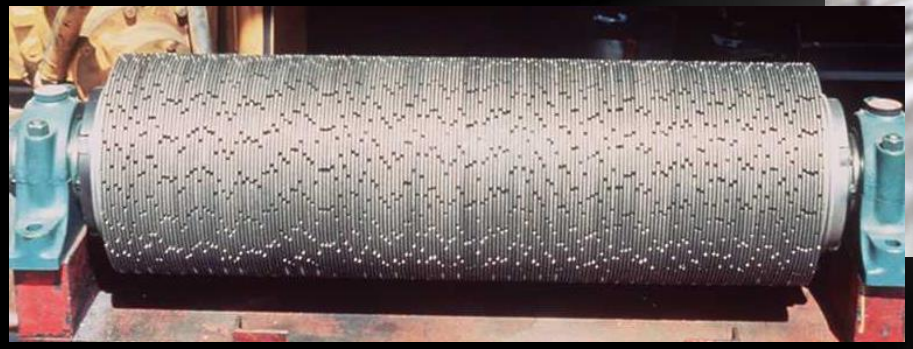
- Increasingly Specifiers are utilizing diamond saw-cut surfaces to reduce roughness, reduce noise, increase friction and extend the life of their pavements, bridges, tunnels and runways.
- Economical
- Long-lasting
- Effective
- Environmentally Friendly



Evergreen Floating Bridge- Washington With Next Generation Concrete Surface

Diamond Saw-Cut Surface Textures

- Diamond Grinding
- Safety Grooving
- Next Generation Concrete Surface



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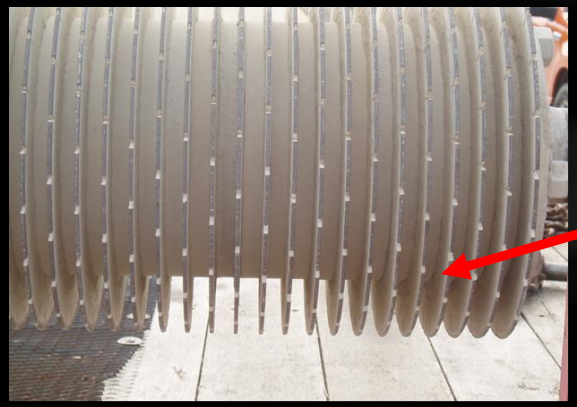
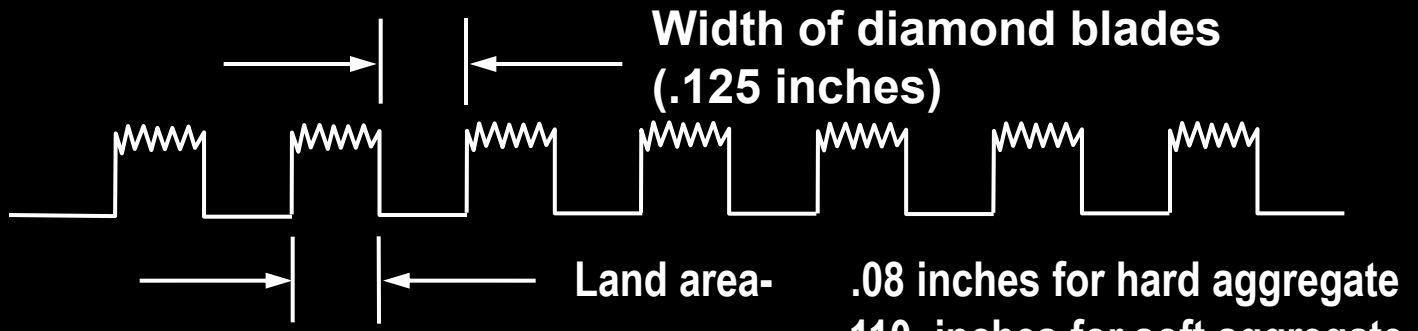
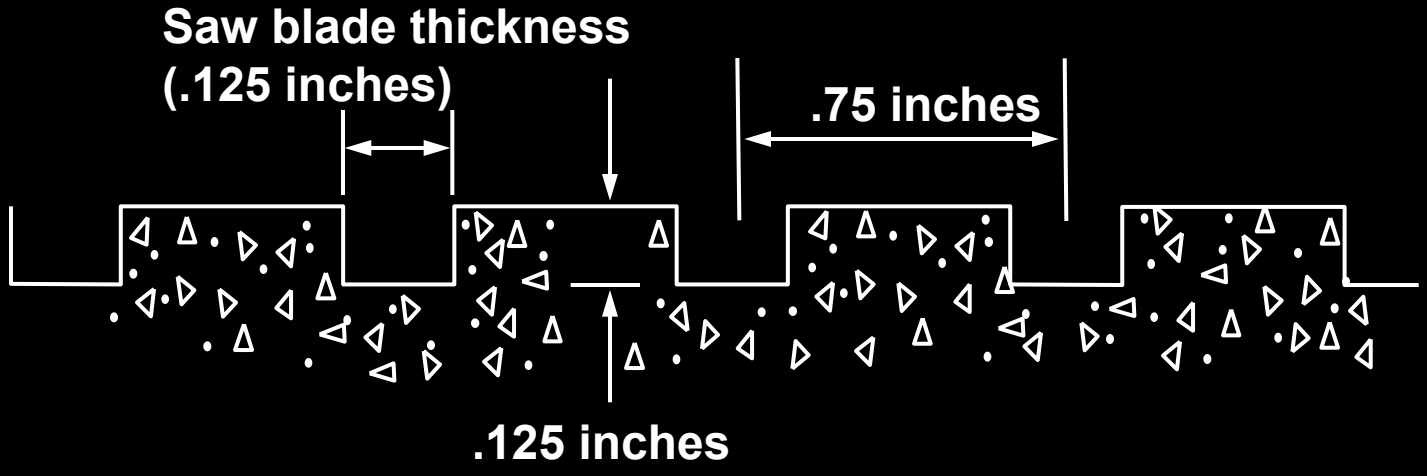


Diamond Grinding



Diamond Grooving



Diamond Saw-Cut Surface Textures

- Diamond Grinding
- Safety Grooving
- Next Generation Concrete Surface (NGCS)

Advantages of Saw-Cut Textures

- Costs are competitive and stable over time;
- Enhance smoothness, surface friction and safety
- Can be accomplished during off-peak hours with short lane closures
- Texturing of one lane does not require grinding of the adjacent lane
- Does not affect overhead clearances underneath bridges, signs or tunnels
- Blends patching and other surface irregularities into a consistent, smooth surface
- Environmentally friendly and sustainable

What Is Diamond Grinding?

- Removal of thin surface layer of concrete using closely spaced diamond saw blades
- Results in smooth, level pavement surface
- Provides a longitudinal texture with desirable friction and low noise characteristics

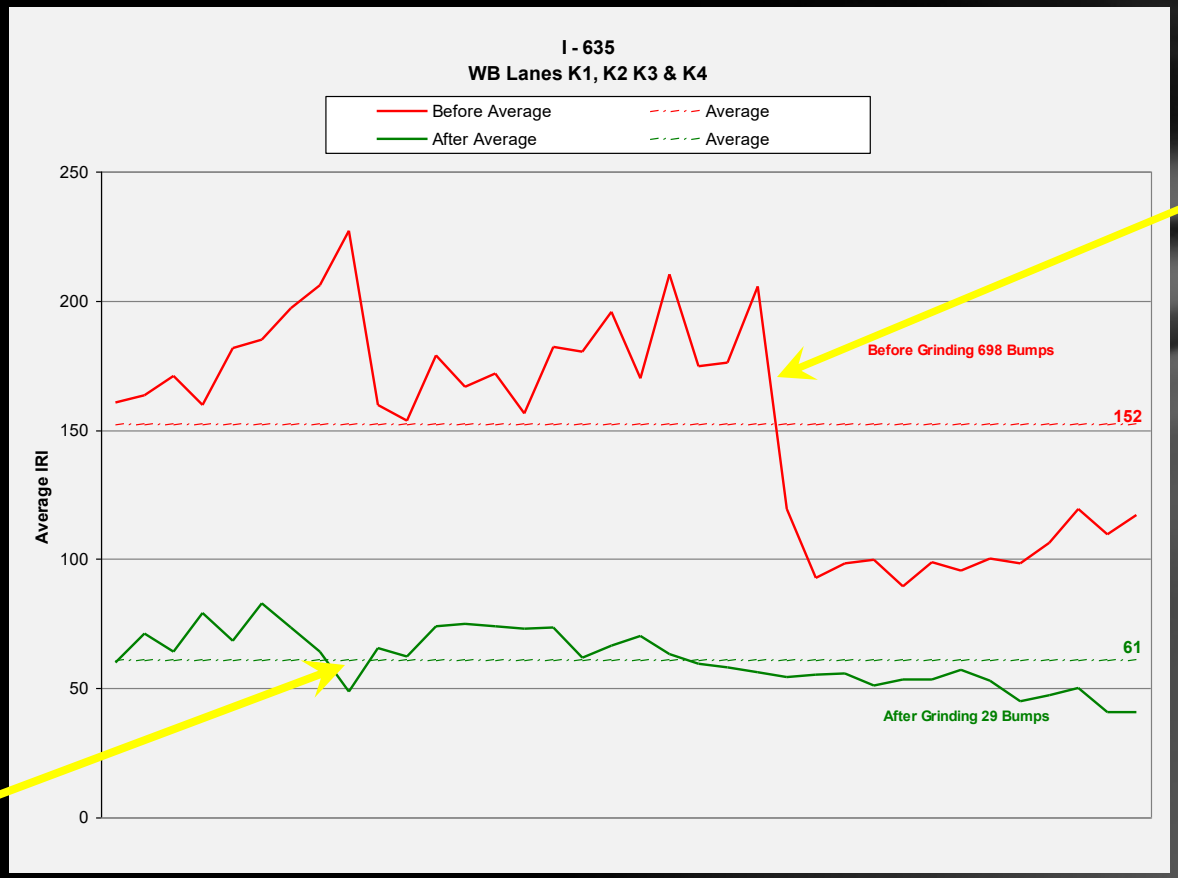
Pavement Problems Addressed

- Faulting at joints and cracks
- Built-in or construction roughness
- Polished surfaces
- Wheel-path rutting
- Curling and warping
- Unacceptable noise level

US-45 West Bend WI – Pre Grind

US-45 West Bend WI - Post Grind

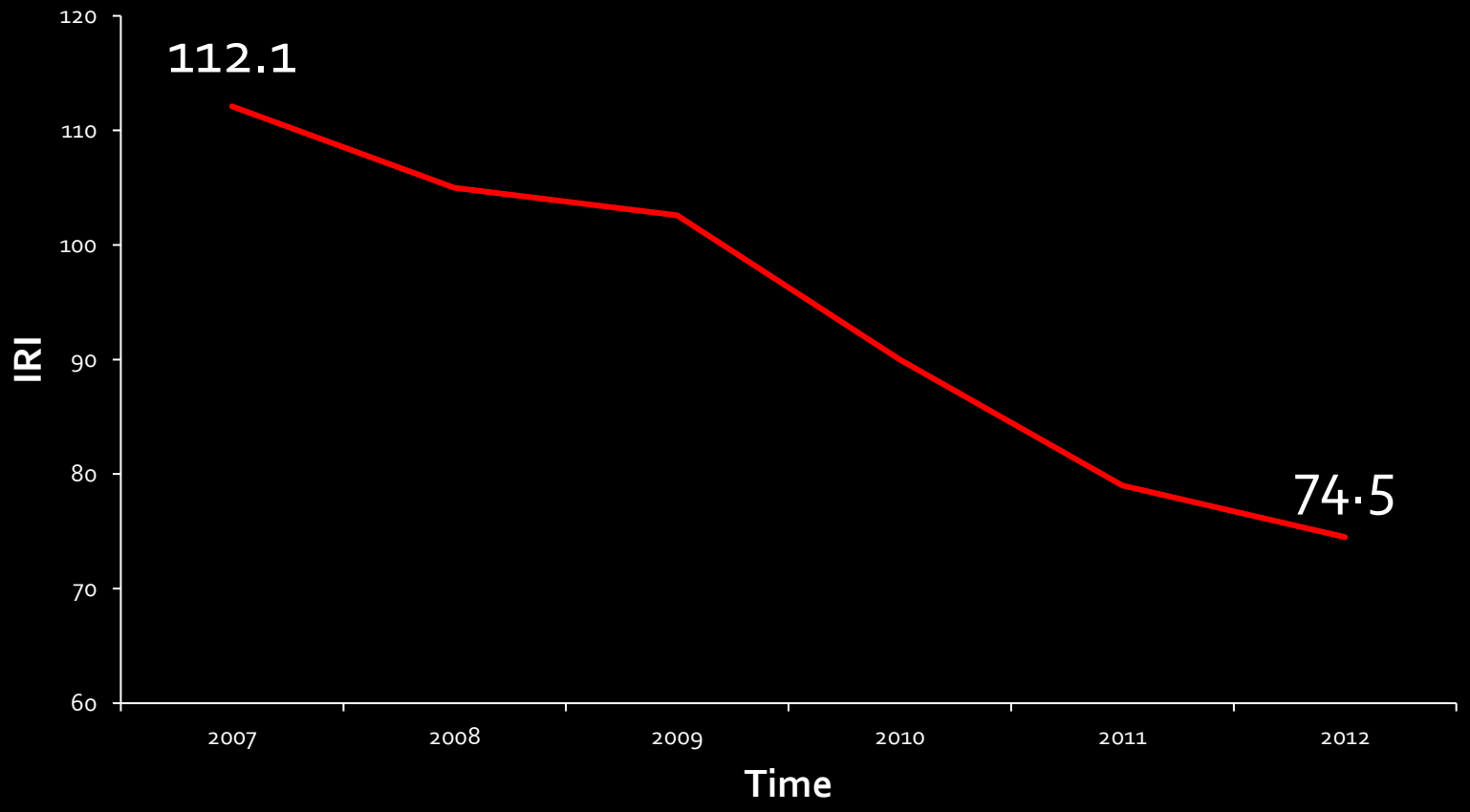
Diamond Grinding can provide a 50%-70% improvement over the pre-grind profile on average!



Before Grinding

After Grinding

IRI of Kentucky Interstate PCCP



Re-textures Polished Surfaces

Unground Section

Ground Section

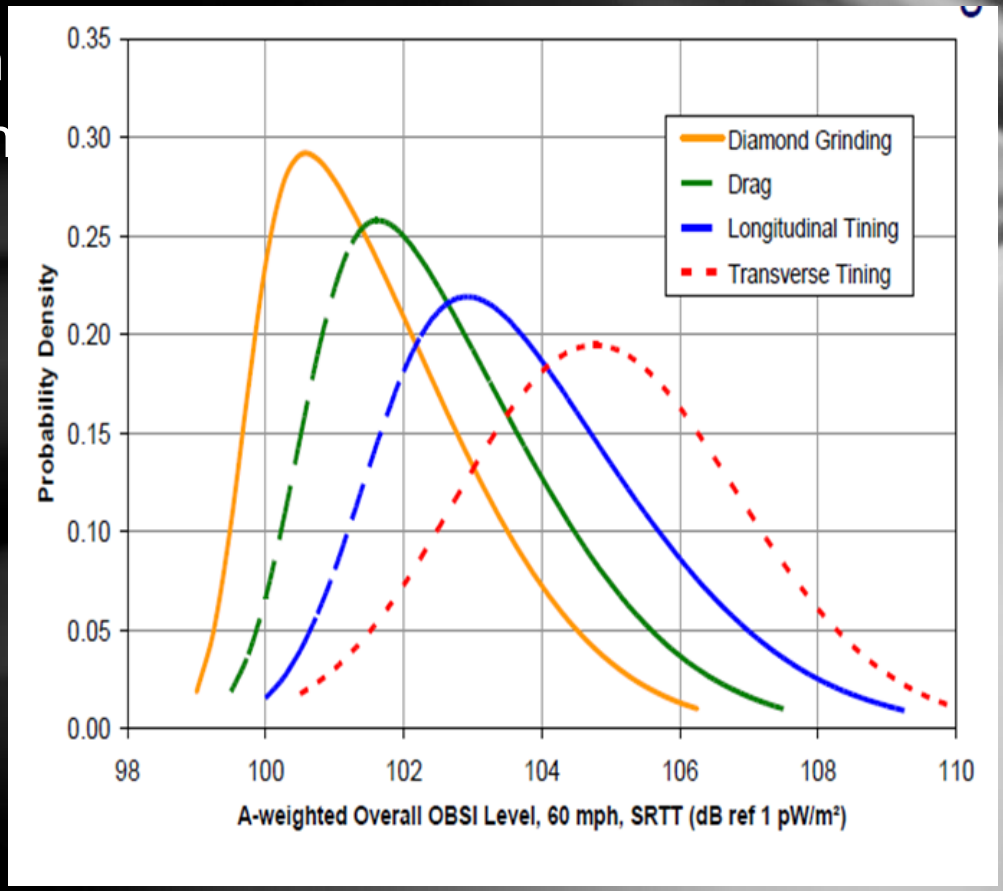
Sand Patch Test Shows Increased Macro-texture After Diamond Grinding

Safety, Surface Texture and Friction

- Wisconsin DOT and Marquette University found that, overall accident rates for ground surfaces were 40% less than for un-ground surfaces over a 6-year research period, 57% in wet weather conditions

Blade Spacing Can Be Optimized

- Research conducted by th National Concrete Pavemen Technology Center shows diamond grinding as the most quiet PCCP surface texture commonly used



Safety Grooving

- Brought to Langley Research Center to evaluate several test groove patterns
- NASA begins runway grooving research in 1962 in Virginia

Safety Grooving

- CALTRANS begins using safety grooving in 1963 for wet pavement accident reduction
- Concurrently research grooving over a four-year period
- Study includes 322 lane-miles of grooved pavement
- Study includes 750 lane-miles of un-grooved control sections

Caltrans Safety Grooving Research

Technical Report Documentation Page

1. REPORT No. | 2. GOVERNMENT ACCESSION No. | 3. RECIPIENT'S CATALOG No.

4. TITLE AND SUBTITLE
Study Of The Effect Of Grooving On Motor Vehicle Accidents

5. REPORT DATE
January 1972

6. PERFORMING ORGANIZATION

7. AUTHOR(S)
Darryl R. White

8. PERFORMING ORGANIZATION REPORT No.

9. PERFORMING ORGANIZATION NAME AND ADDRESS
State of California
Business and Transportation Agency
Department of Public Works

10. WORK UNIT No.

11. CONTRACT OR GRANT No.

12. SPONSORING AGENCY NAME AND ADDRESS

13. TYPE OF REPORT & PERIOD COVERED

14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT
Grooving has proved to be one of the most cost-effective safety programs of the Department of Public Works. Grooving has contributed greatly to savings in lives, injuries and dollars for the travelling public. Rainfall is comparatively moderate in California but the accident rate is four times greater on wet pavement than on dry pavement. This is one of the problem areas for which a positive solution has been found.

The Department of Public Works' accident experience reveals that grooving has yielded a:

1) 20 percent reduction in total accidents
2) 50 percent reduction in fatal accidents
3) 70 percent reduction in wet pavement accidents

Motorcycle accident reports were reviewed from both grooved and ungrooved sections. Abstracts of these reports are given in the following pages. They show little evidence that grooves consitute a hazard to the cyclist.

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18. No. O
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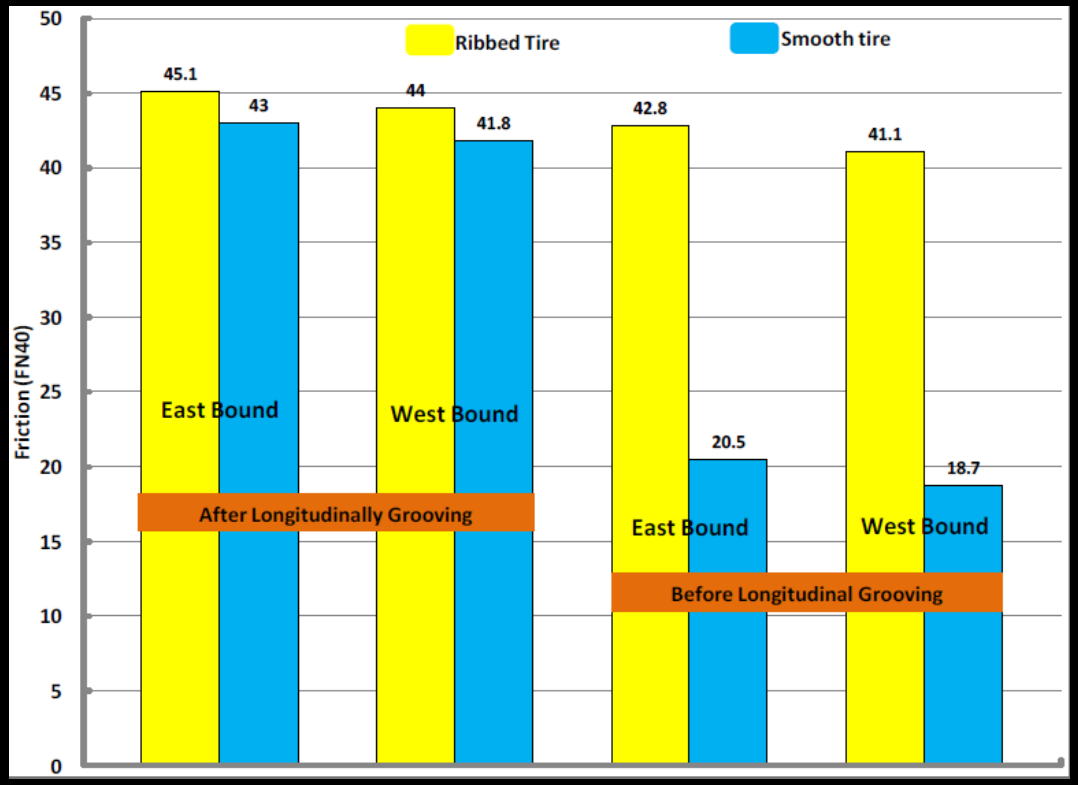
Motorcycles not impacted by Grooved surface

Friction Enhancement by Grooving



I-70 Surface Texture Research by KDOT

Conclusions – Diamond Saw-Cut Surfaces

- Enhance smoothness, surface friction and safety
- Can be accomplished during off-peak hours and closures
- Texturing of one lane does not require work on the adjacent
- Does not affect overhead clearances
- Blends patching and surface irregularities smooth
- Longitudinal grooving has been shown to reduce wet pavement accident rates up to an average of 70%
- Grooving does not create a hazardous riding condition for motorcycles and lighter vehicles
- Grooving and Grinding are inexpensive, long lasting and Environmentally friendly

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