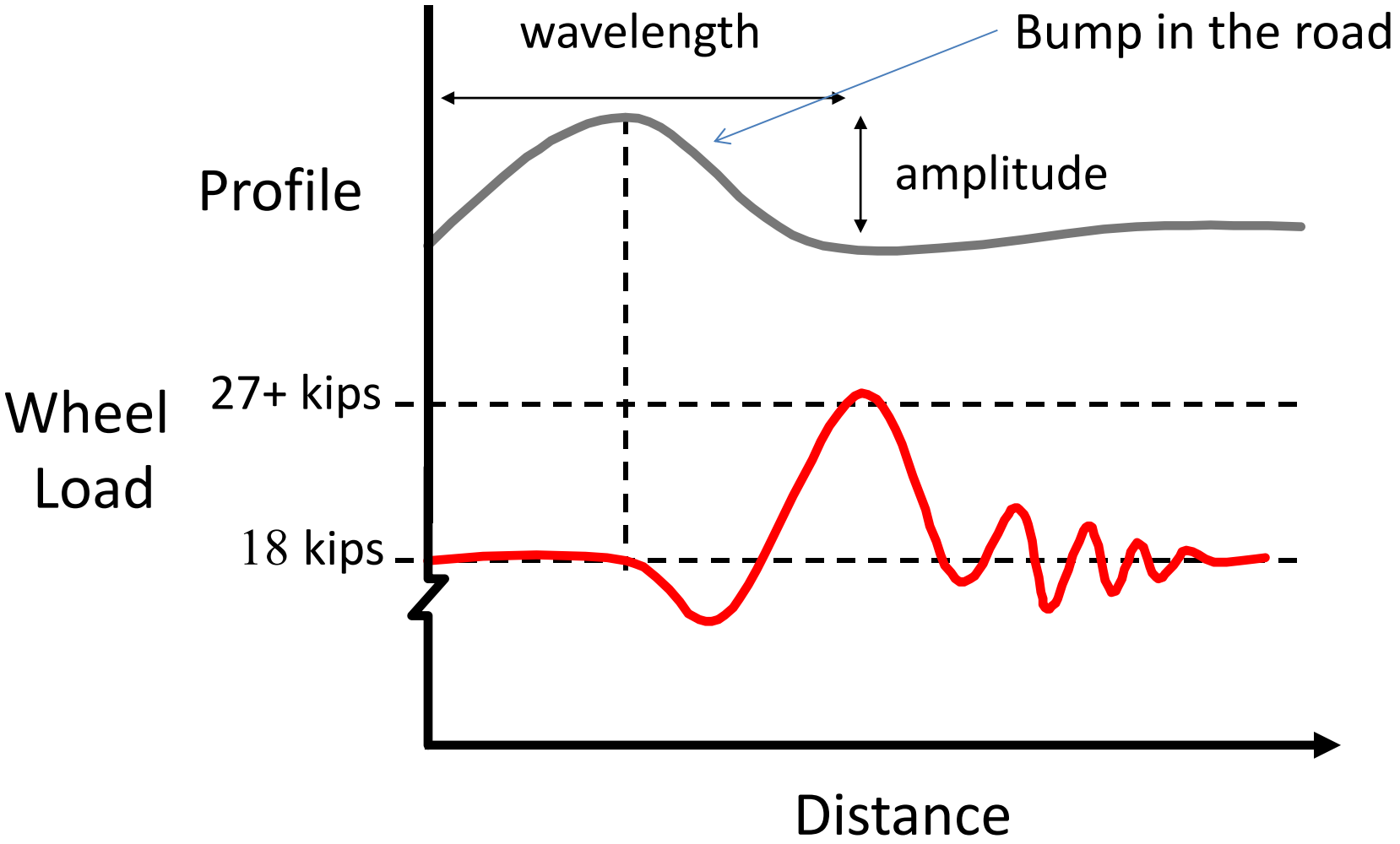
Diamond Grinding Asphalt Pavement for Improved Performance

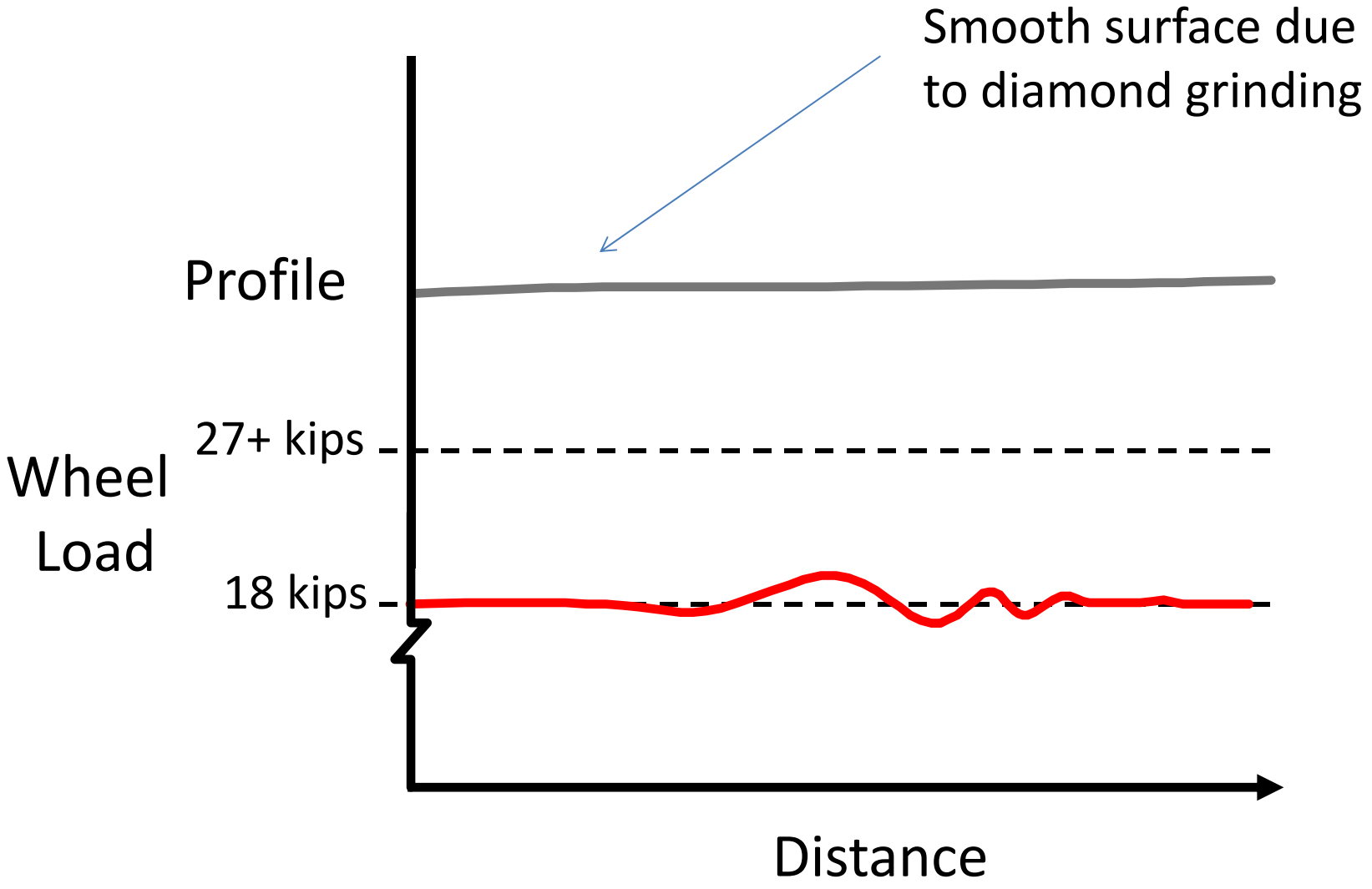
A Beginners Guide to the Diamond Grinding Process

SMOOTH PAVEMENTS LAST LONGER!

Rough Pavement



Smooth Profile



Diamond Grinding

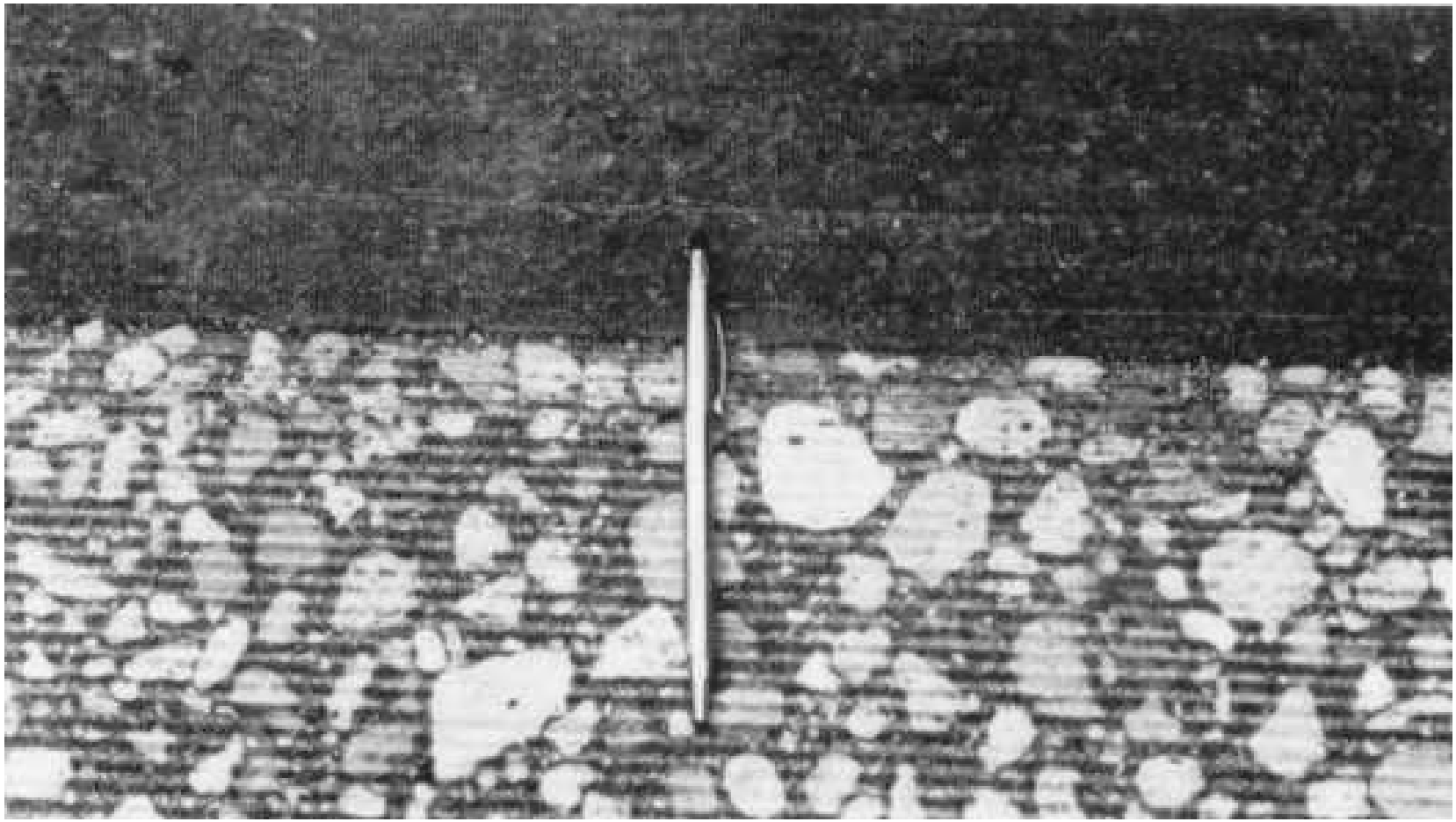
The Origins of Diamond Grinding

- Diamond grinding was first used as part of an engineered system to preserve PCC Pavement in 1965.

Diamond Grinding Asphalt Pavement

- Asphalt pavement can be ground and grooved just like concrete pavement.

Diamond Ground Asphalt Surface

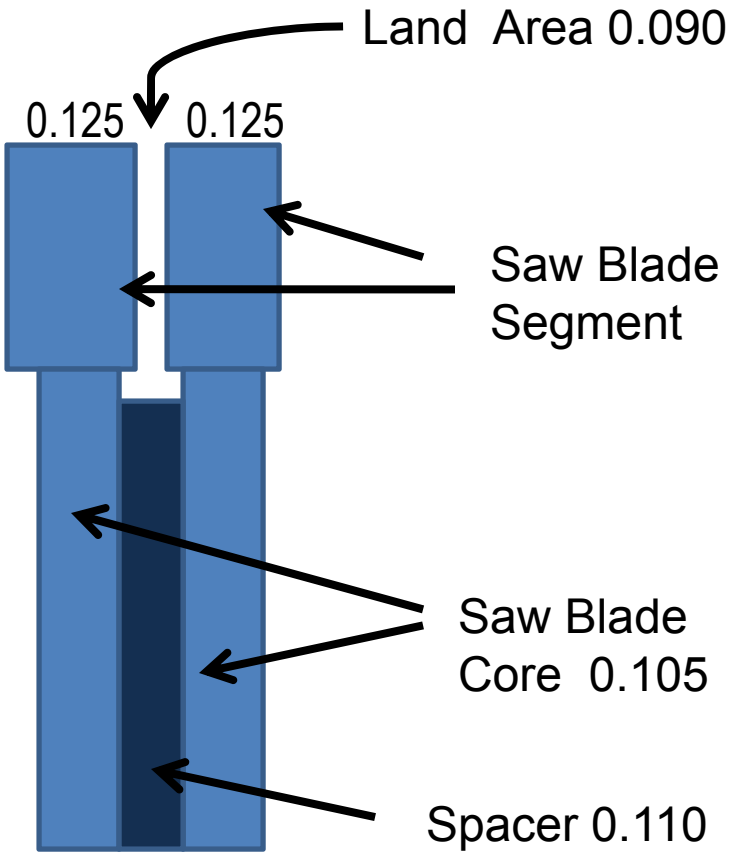


What is Diamond Grinding?

- Removal of thin surface layer of pavement surface using closely spaced diamond saw blades
- Results in smooth, level pavement surface
- Provides a longitudinal texture with desirable friction and low noise characteristics
- Frequently performed on pavements to improve smoothness, increase friction, repair profile/drainage and reduce tire/pavement noise

Blades and Spacers

Typical Conventional Diamond Grinding (CDG) Blade Configuration



Diamond Grinding Equipment

Diamond Grinding Process

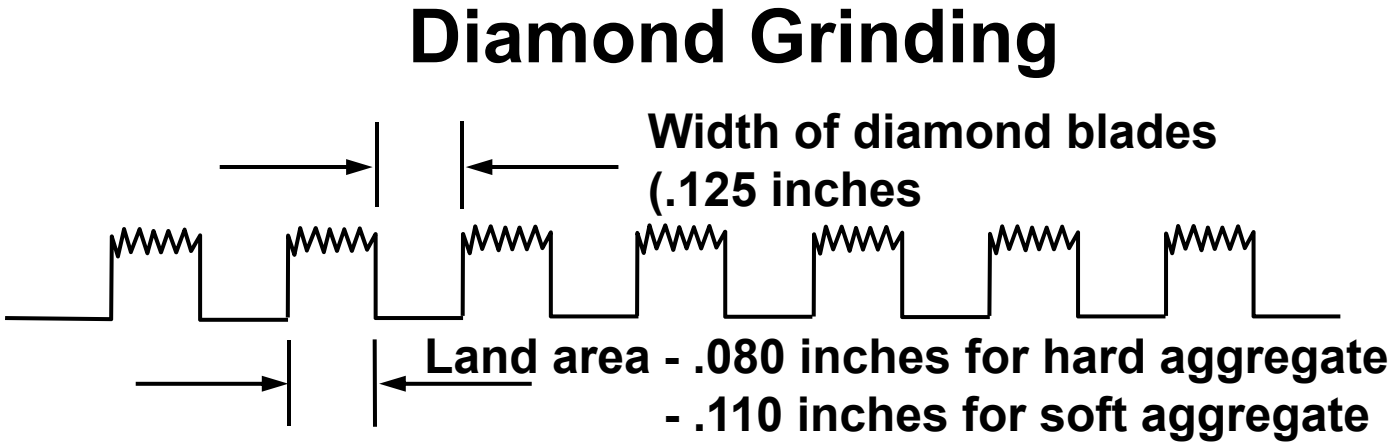
Diamond Grinding Final Surface

Operating Grinding Machine

Important Aspects of Operation:

- Grinding head blade setup
- Grinding head power
- Machine speed
- Steering

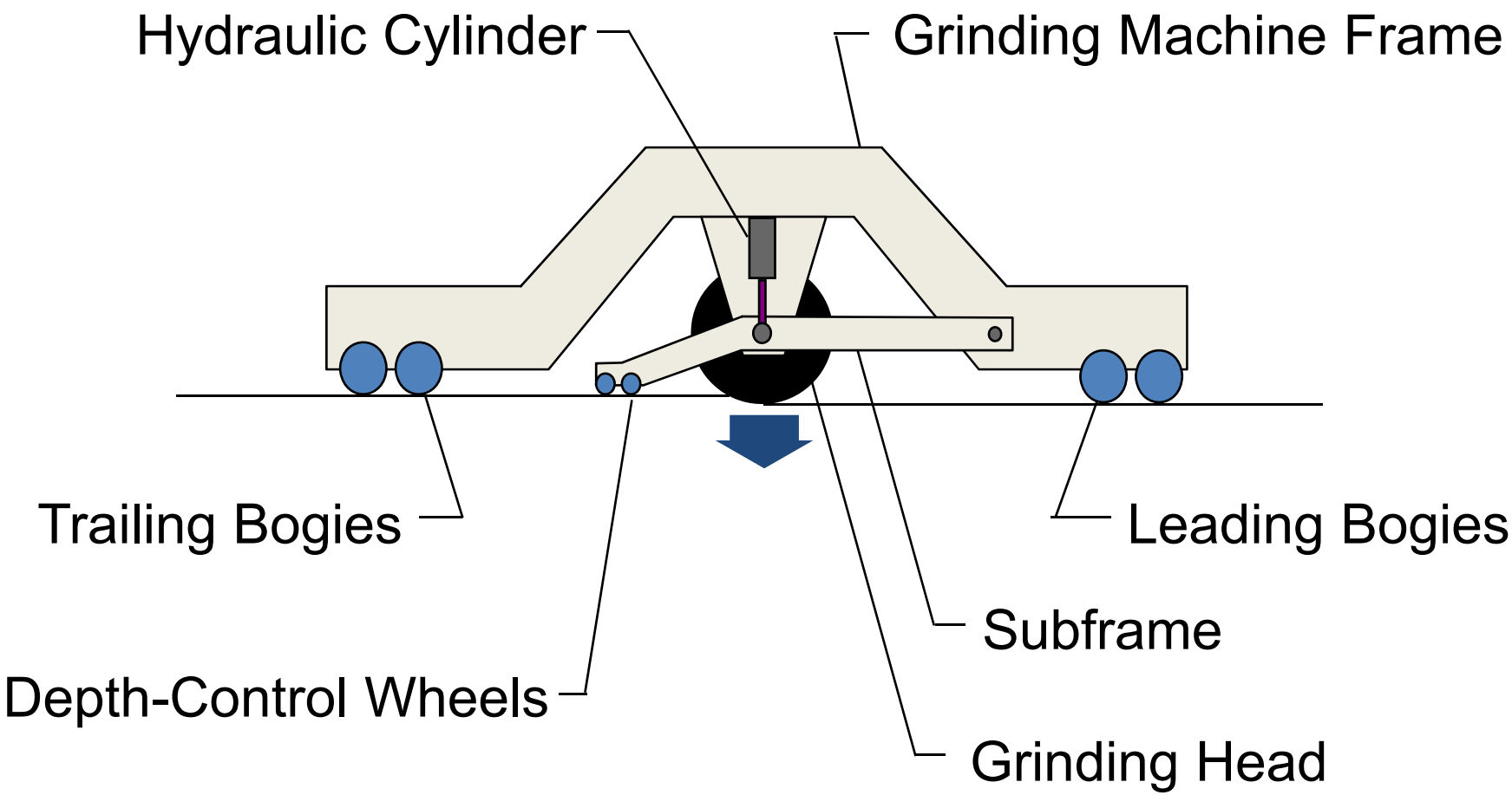
Diamond Grinding Texture Dimensions

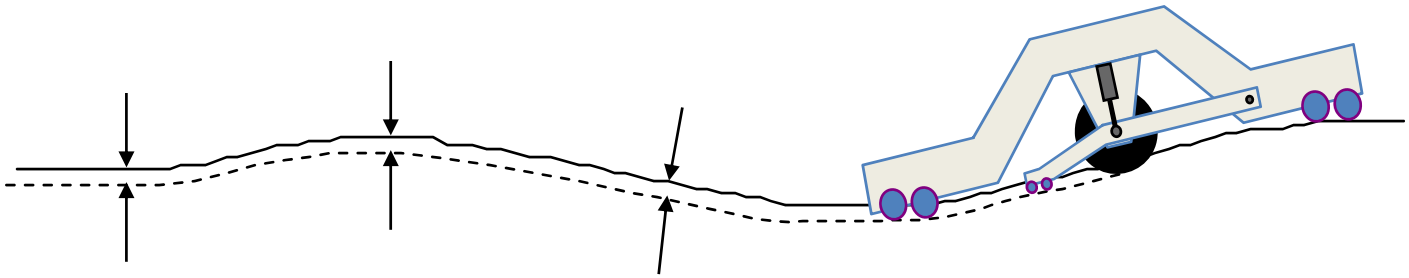


Blade Spacing Affects Fin Height

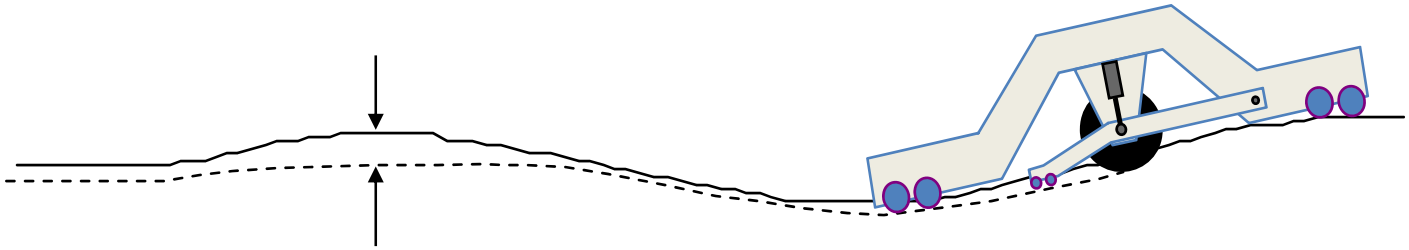
60 Blades vs 52 Blades per Foot

Basic Components





Tracing Profile Only Gives Uniform Depth Cut



Should Remove High Spots

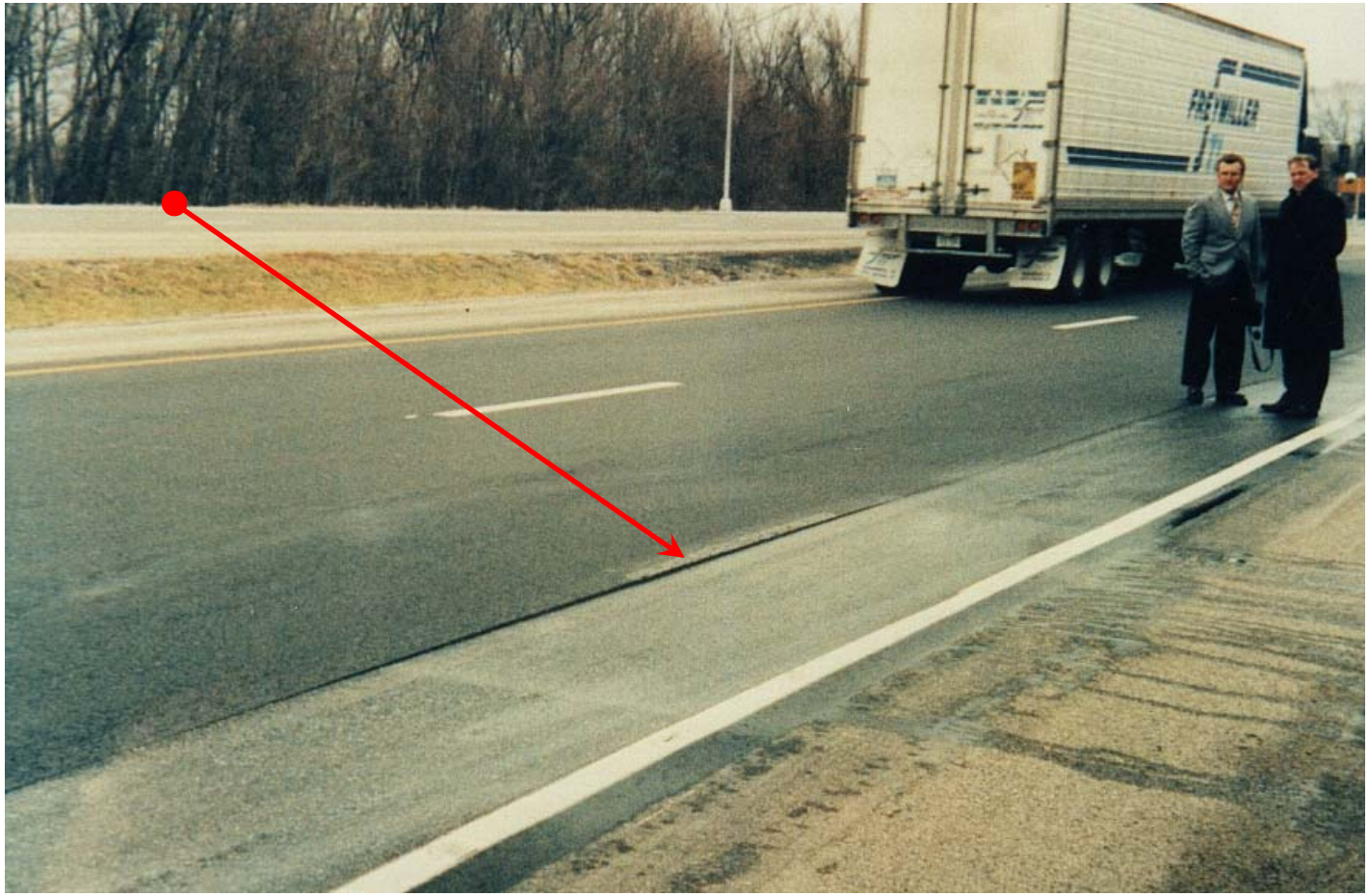
Cutting Through Bumps

- Machine weight is ballast
- To cut bumps must control:
  - Forward speed
  - Grinding head depth
  - Down pressure

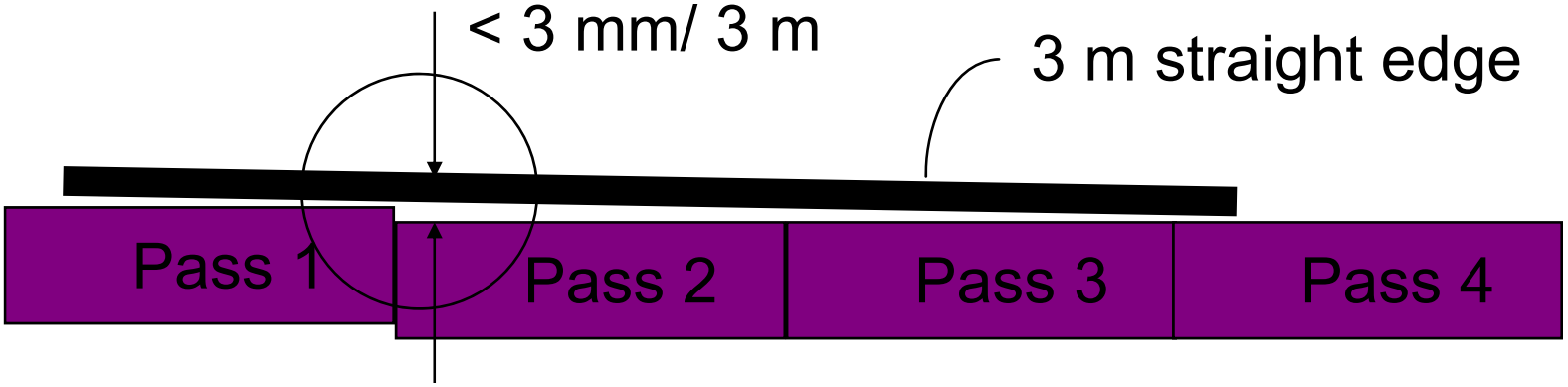
Cutting Through Bumps

To Verify Check for:

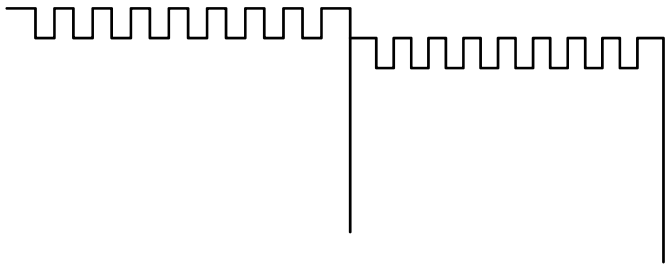
- Variation in cut depth along longitudinal cut line
- Vertical cut depth match from pass to pass



Checking Vertical Match of Passes



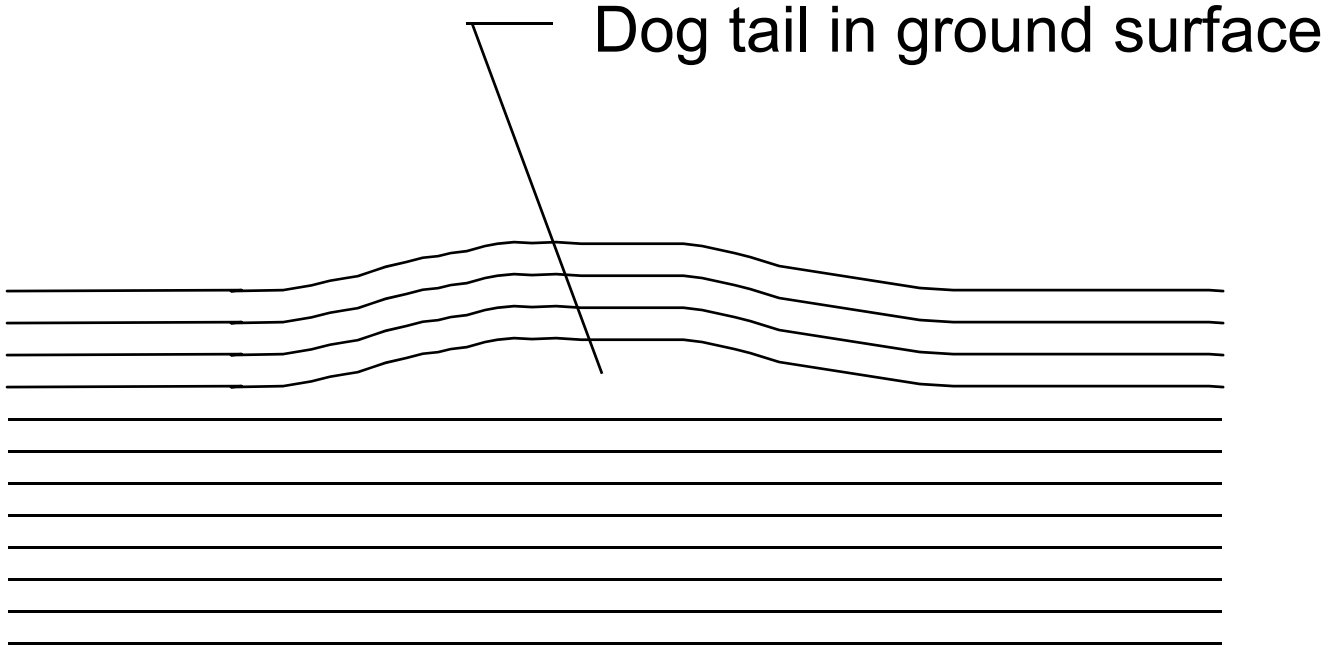
Poor Match Between Passes



Dog tails

- Result from no horizontal overlap
- Requires steady steering of grinder
- Attempt to maintain 25-50 mm horizontal overlap

Poor Overlap Between Passes



Evaluate Rideability

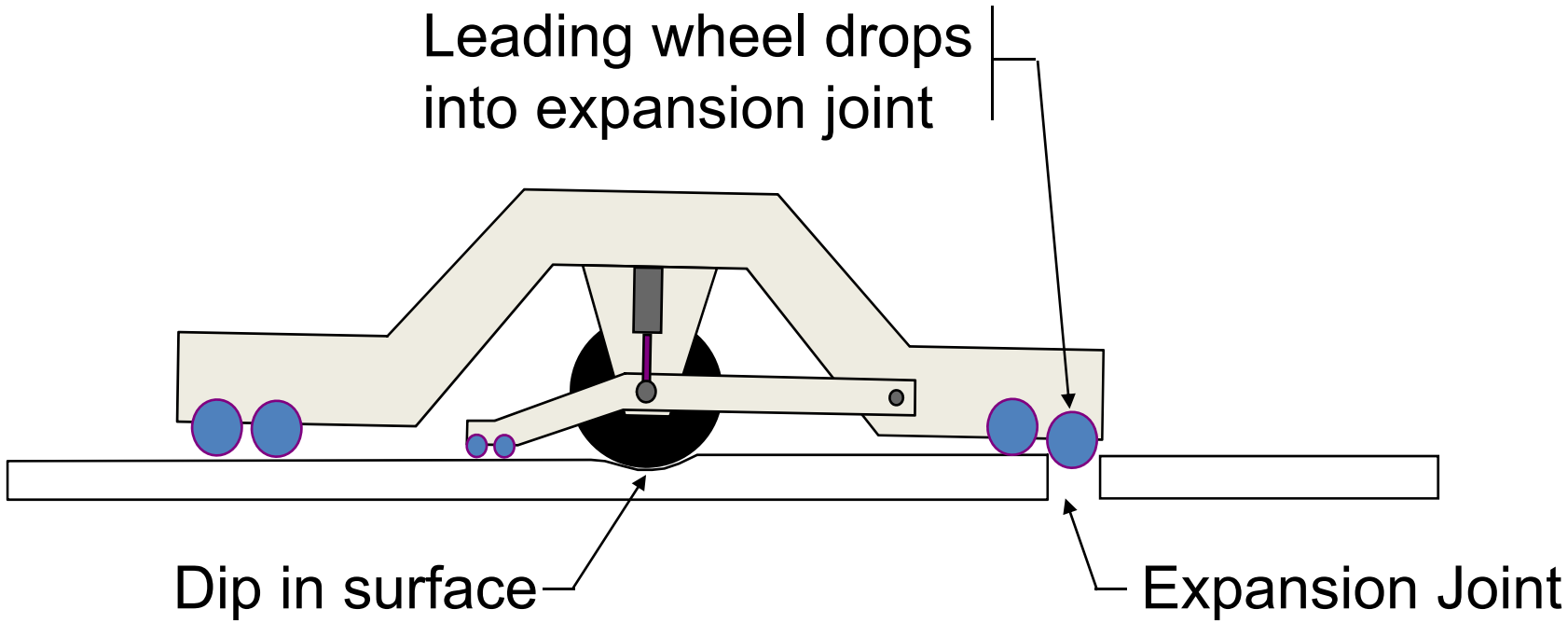
- California profilograph (or similar)
- Take traces before and after grinding
- Should be able to provide 65% improvement over pre-grind profile
- Verify profile index against specification requirement

Special Conditions

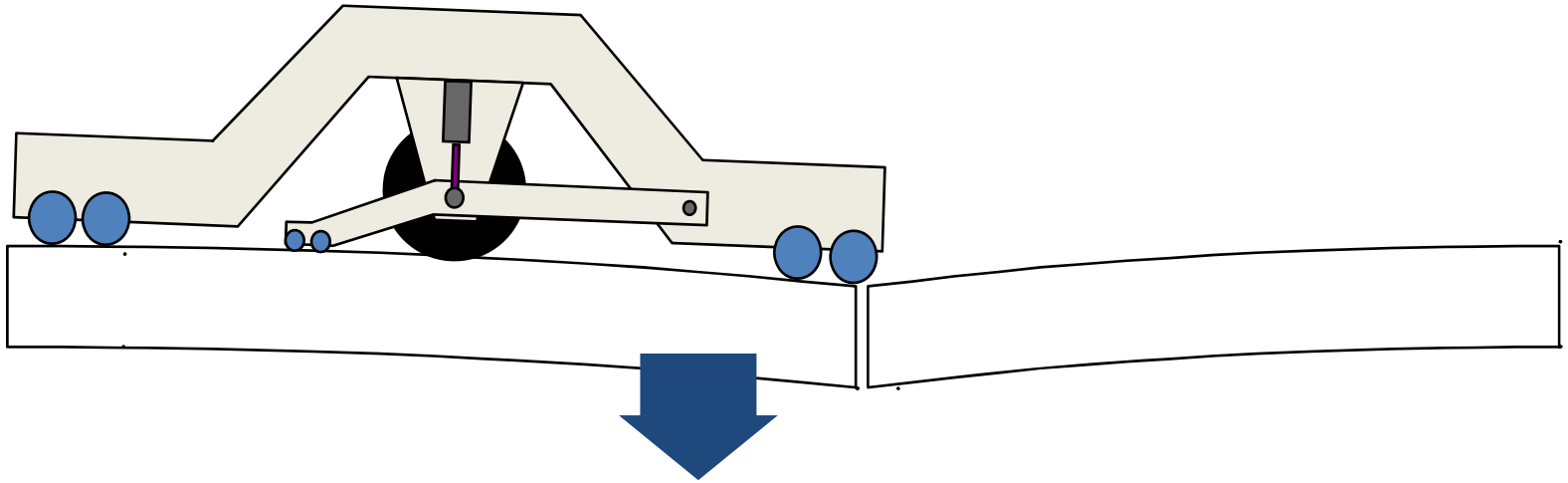
- Expansion Joints
- Deflecting slabs

Dipping into an Expansion Joint

Composite Pavement or Bridge Approach



Deflecting Slabs Under Grinding Machine Composite Pavement



Weight of Grinding Machine
Deflects Joint and Pushes Down
Any Faulting at the Joint

Costs

- Typically done on an hourly basis
  - Ranges $700.00 - $1000.00 per hour
- Additional mobilization costs are standard
  - $2.50 – $3.50 per mile per unit
- Not uncommon to eliminate $50,000 - $100,000 in penalty

Production Rates

- Depends on location and severity
- Mark out bumps in advance of grinding operation
- Measure smoothness immediately after grind
- Average production ranges from 30 to 60 bumps per 10 hour shift

IGGA
International Grooving & Grinding Association

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THANK YOU!