Diamond Grinding Asphalt Pavement for Improved Performance

A Beginners Guide to the Diamond Grinding Process
SMOOTH PAVEMENTS LAST LONGER!
Rough Pavement

Profile

wavelength

Bump in the road

amplitude

Wheel Load

27+ kips

18 kips

Distance
Smooth Profile

Smooth surface due to diamond grinding

Profile

Wheel Load

27+ kips

18 kips

Distance
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

- Land Area 0.090
- Saw Blade Segment
- Saw Blade Core 0.105
- Spacer 0.110
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

Diamond Grinding

Width of diamond blades (.125 inches)

Land area - .080 inches for hard aggregate
-.110 inches for soft aggregate
Blade Spacing Affects Fin Height
60 Blades vs 52 Blades per Foot
Basic Components

Hydraulic Cylinder
Grinding Machine Frame
Trailing Bogies
Leading Bogies
Subframe
Grinding Head
Depth-Control Wheels
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

Dog tail in ground surface
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

Leading wheel drops into expansion joint

Dip in surface

Expansion Joint
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
Visit Us on the Web

International Grooving and Grinding Association

at

igga.net

THANK YOU!