

NJAPA Rutgers Paving Conference 2014



Close to
our customers



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Improving Milling Quality



David R. Salzmann

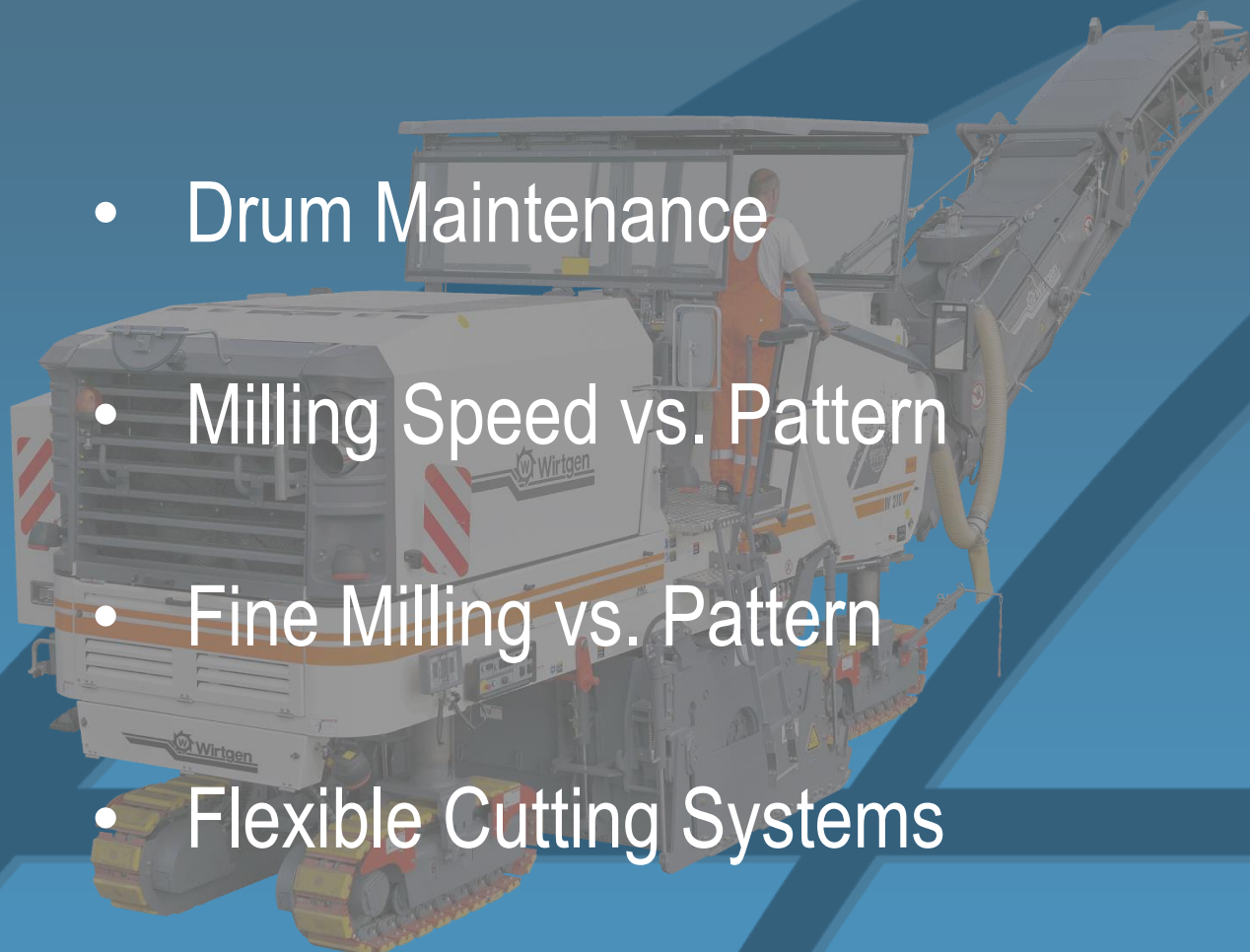
dsalzmann@wirtgenamerica.com



Improving Milling Quality



Close to
our customers

- Drum Maintenance
 - Milling Speed vs. Pattern
 - Fine Milling vs. Pattern
 - Flexible Cutting Systems
- 
- A large, white and grey Wirtgen milling machine is shown in a semi-transparent, faded view. The machine is a tracked vehicle with a large drum and a conveyor system. A person in orange overalls is visible in the operator's cab. The machine is positioned on a blue background with diagonal lines.

The Heart of the Milling Machine



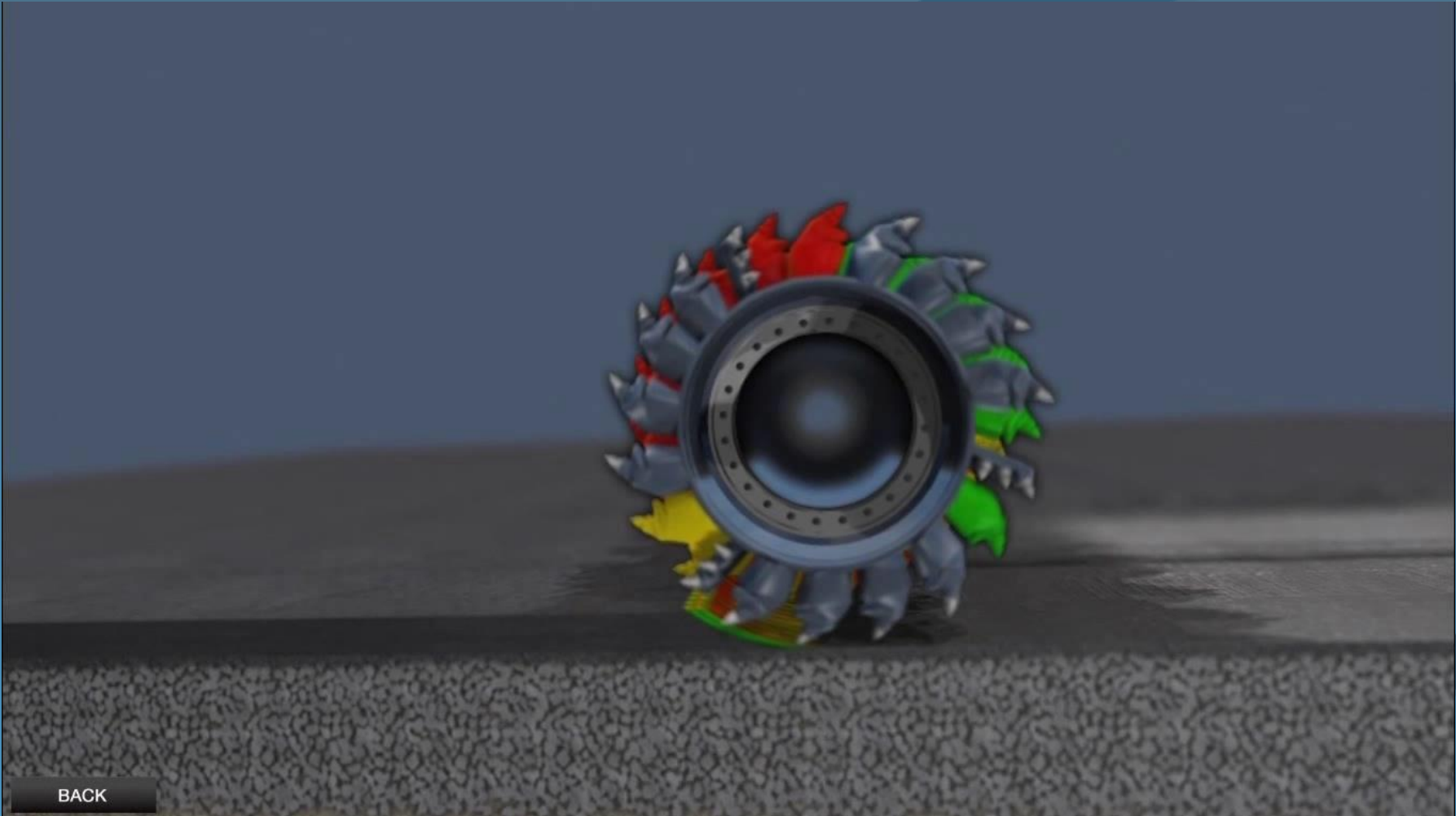
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The Triple Wrap Drum



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BACK

Drum Maintenance



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Drum Maintenance



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Teeth Take Care of the Holders

Holders Take Care of the Base Blocks

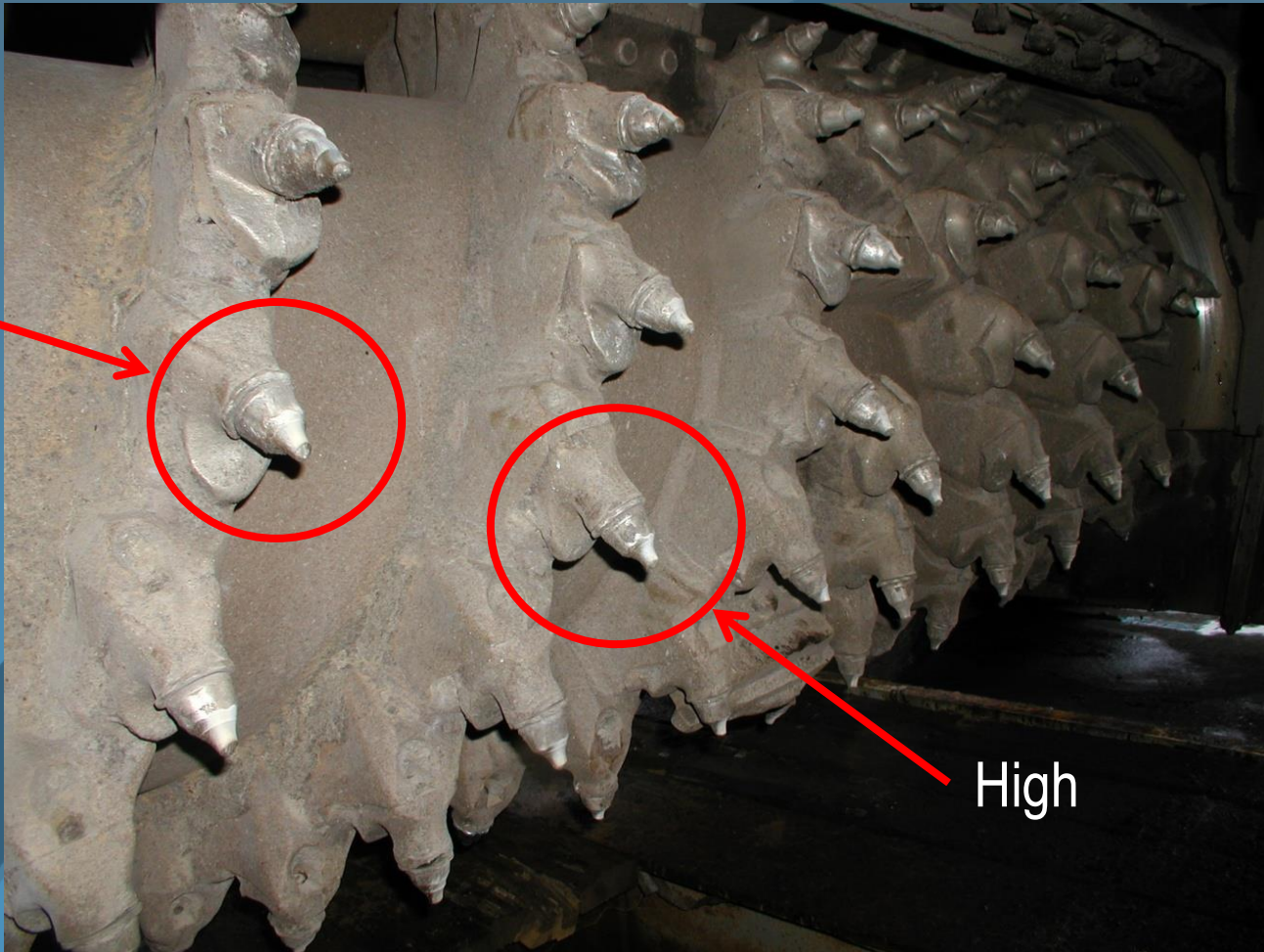
Base Blocks Take Care of the Drum

Drum Maintenance



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Low

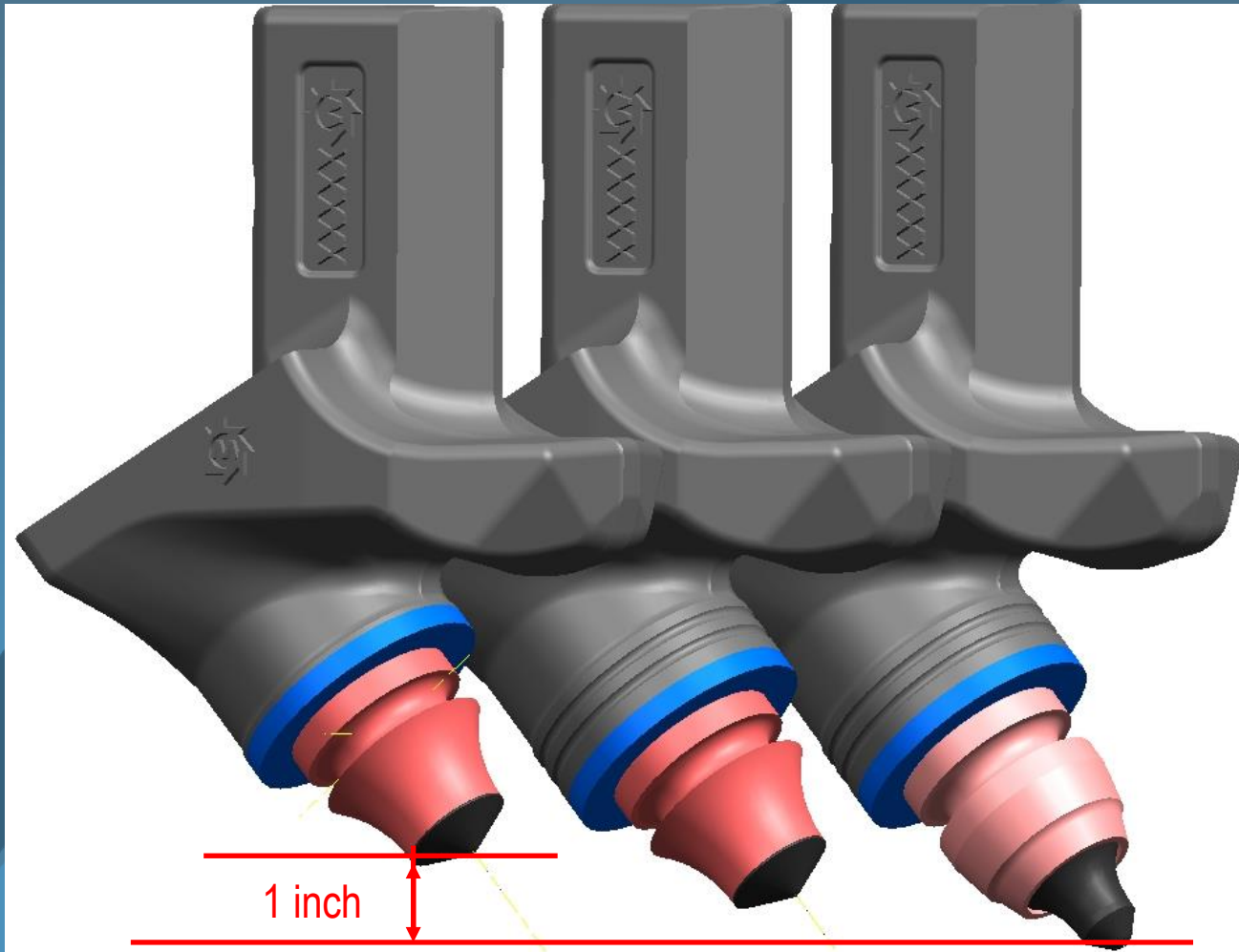


High

Tool/Holder Height Variation



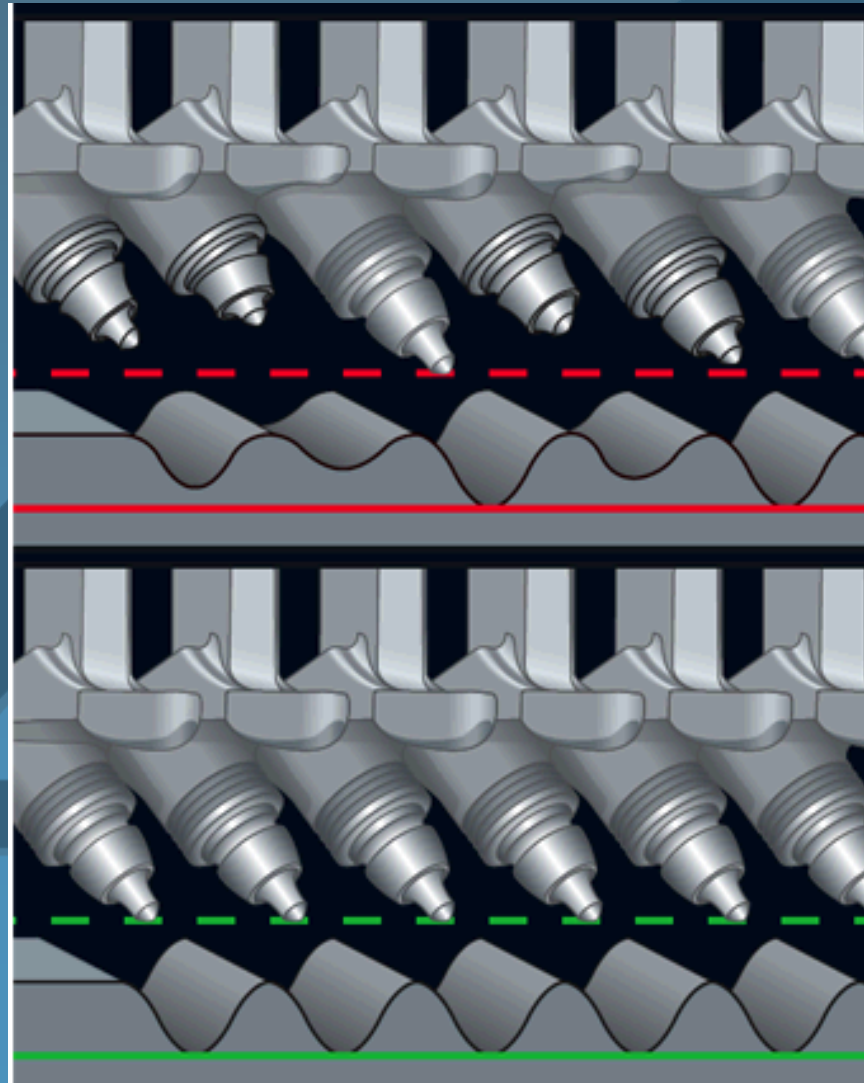
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Tool/Holder Height Variation



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Tool/Holder Height Variation



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Tooth Wear: Hard Vs. Soft Asphalt

Understand how your cutting tools are wearing on the job.

Hard Asphalt



New Tooth

Soft Asphalt



Tooth Wear



Hard Asphalt



Soft Asphalt

Pick the Right Teeth for the Job



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Sharp Tip



Bigger Body



Longer Carbide



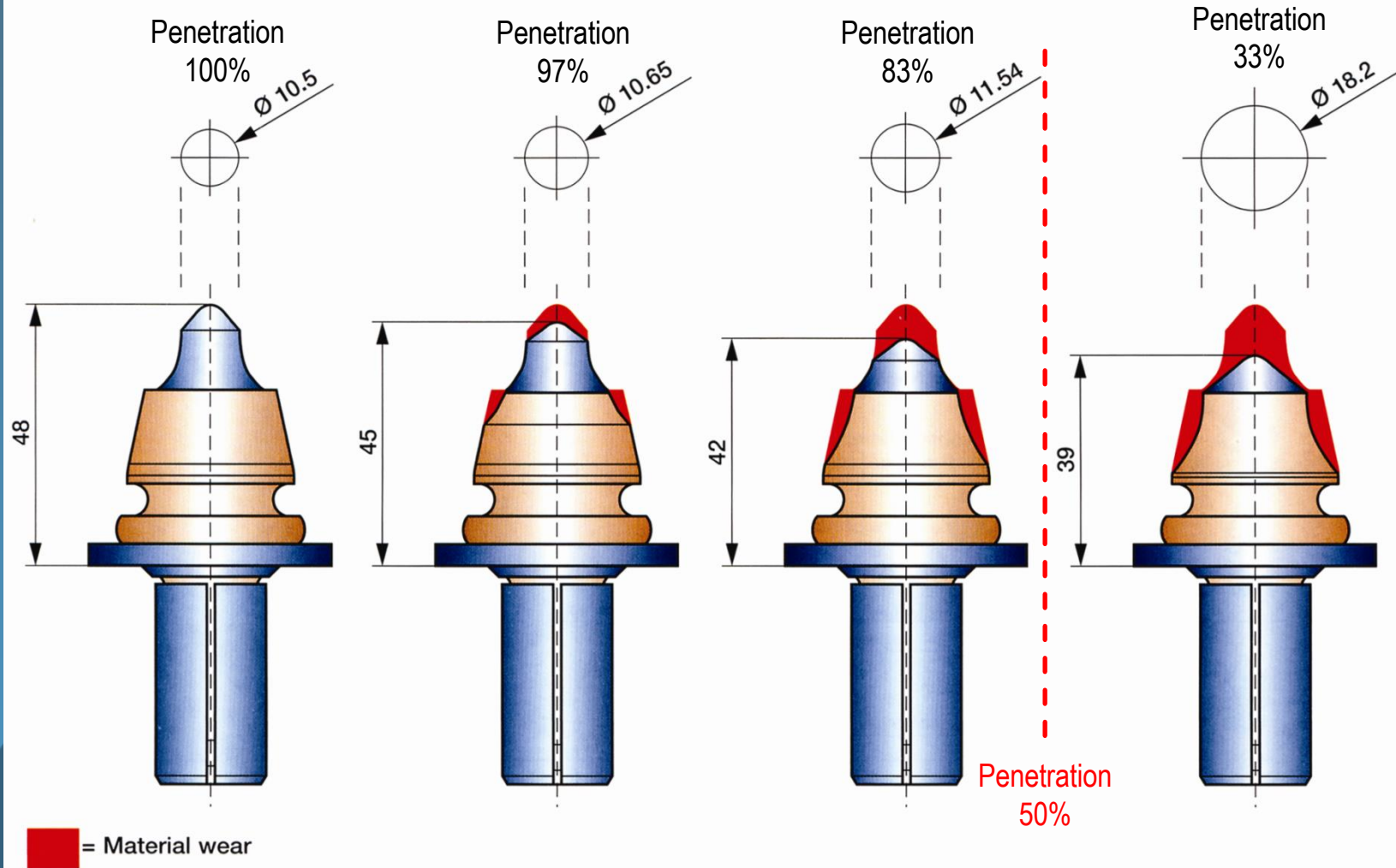
Blunt Tip



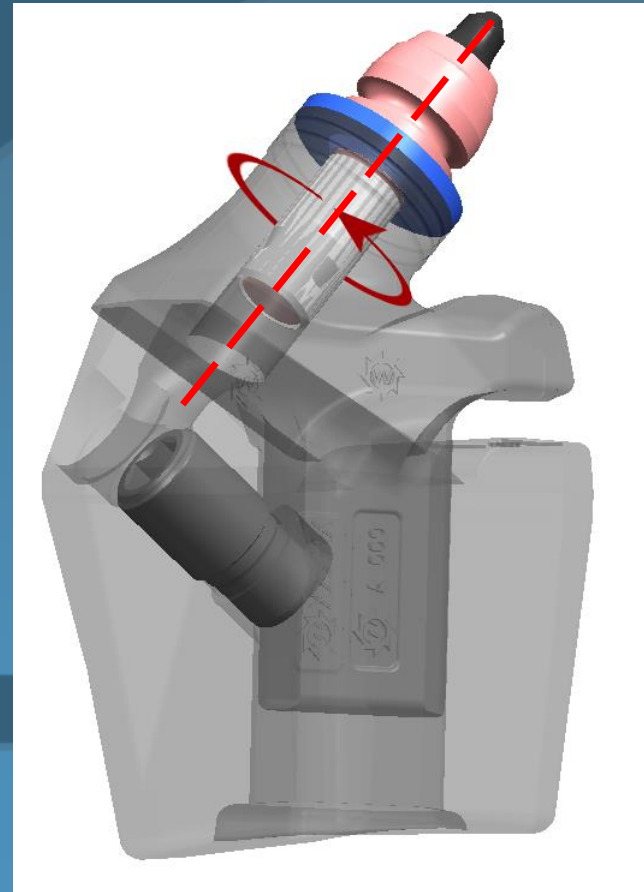
Puller Groove



Penetration vs. Productivity



Rotation! Rotation! Rotation!



Rotation Failure



The Best Thing You Can Do For Your Mill!

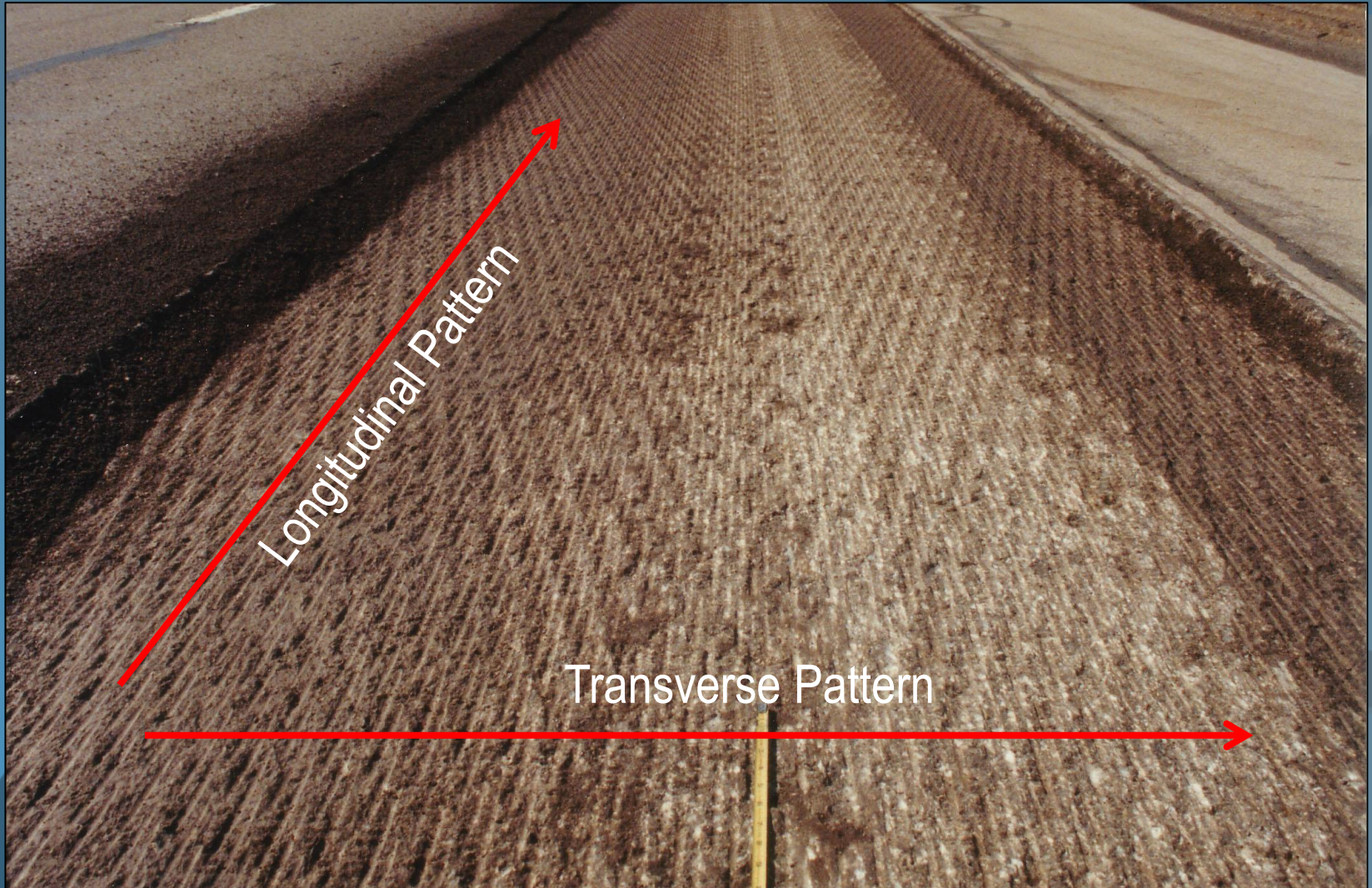


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The Best Thing You Can Do For Your Mill!



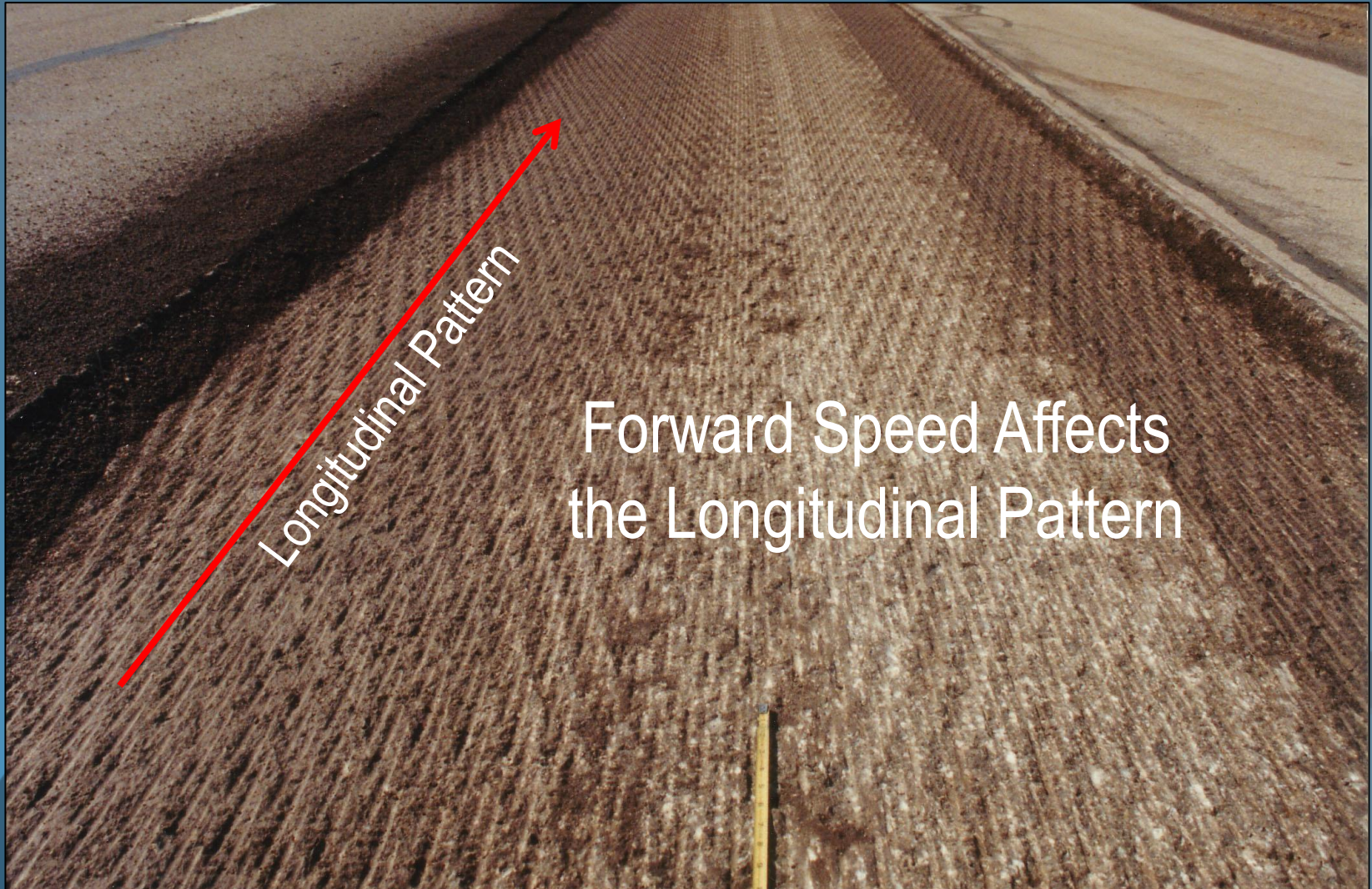
Pattern of the Milled Surface



Mill Speed vs. Cut Pattern



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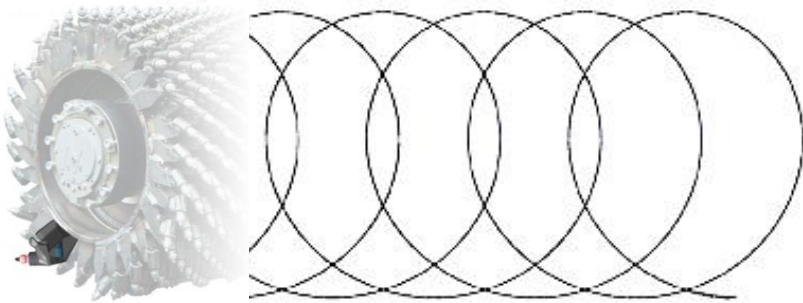


Longitudinal Pattern

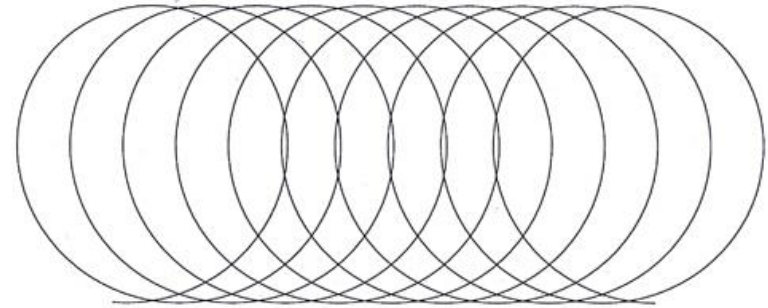
Forward Speed Affects
the Longitudinal Pattern

Milling Speed vs. Cut Pattern

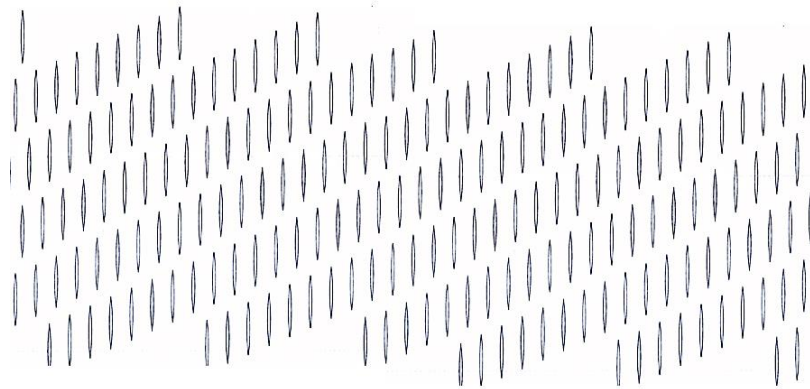
Advance speed: **130 ft/min**



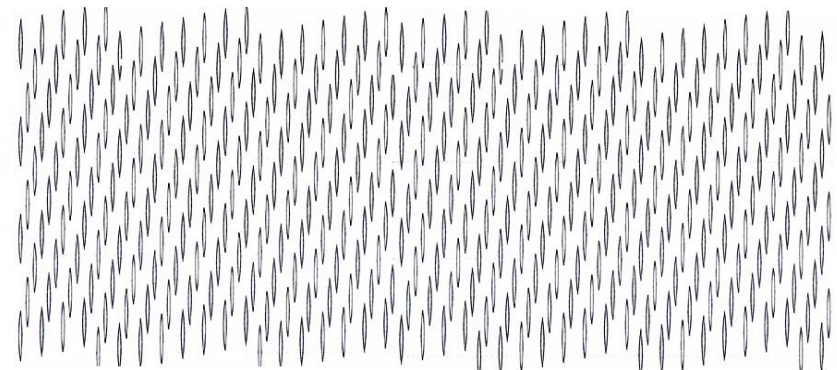
Advance speed: **65 ft/min**



Standard milling drum – 5/8 in. spacing



Standard milling drum – 5/8 in. spacing

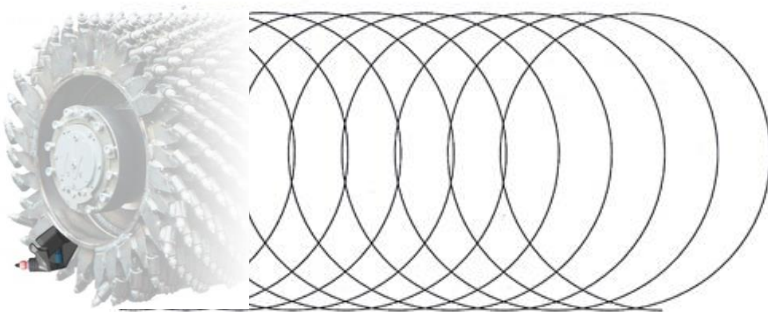


Note that the white areas between tooth strikes represents UNREMOVED material!

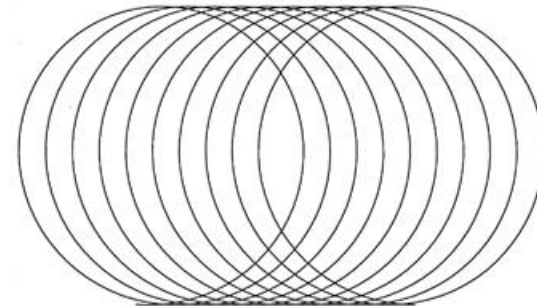


Milling Speed vs. Cut Pattern

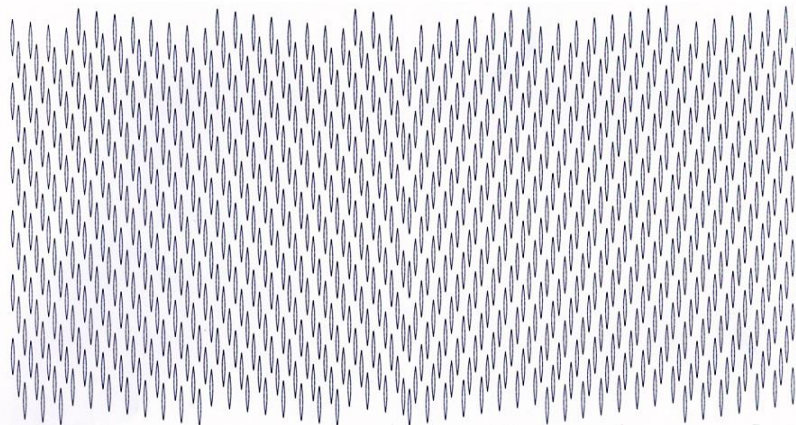
Advance speed: **50 ft/min**



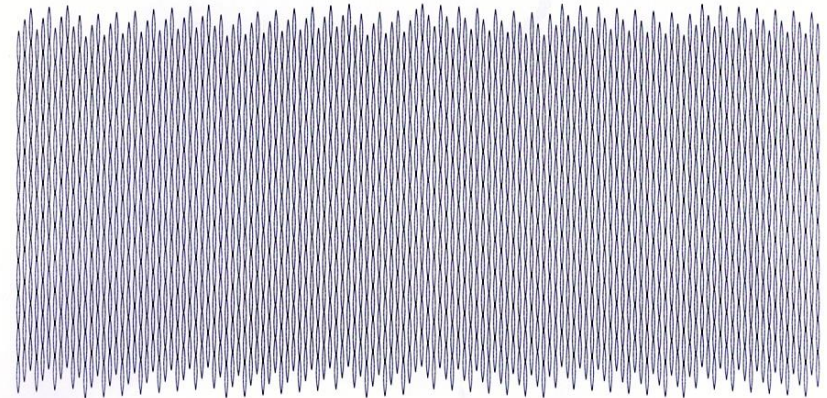
Advance speed: **25 ft/min**



Standard milling drum – 5/8 in. spacing



Standard milling drum – 5/8 in. spacing

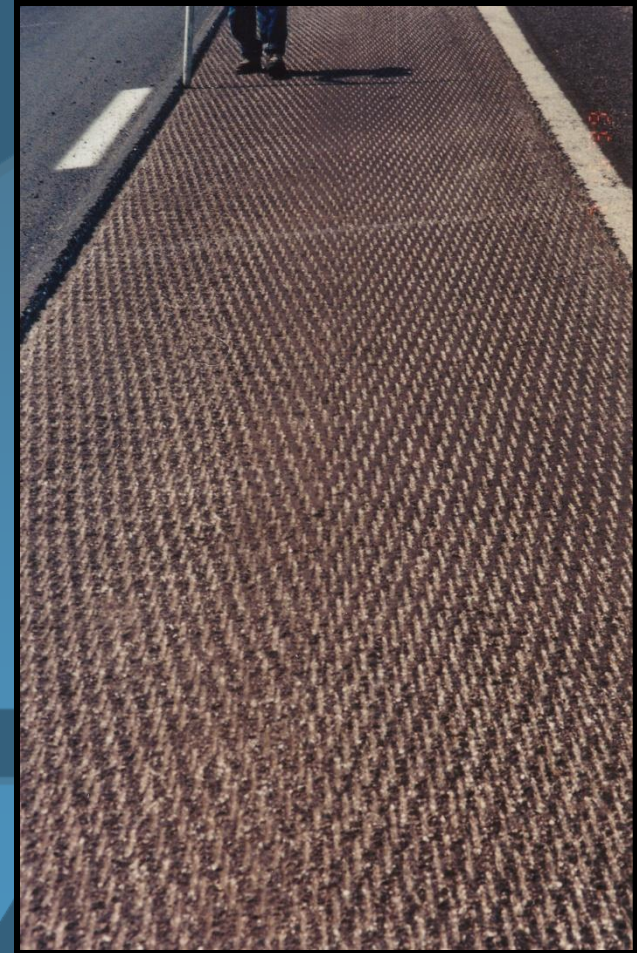
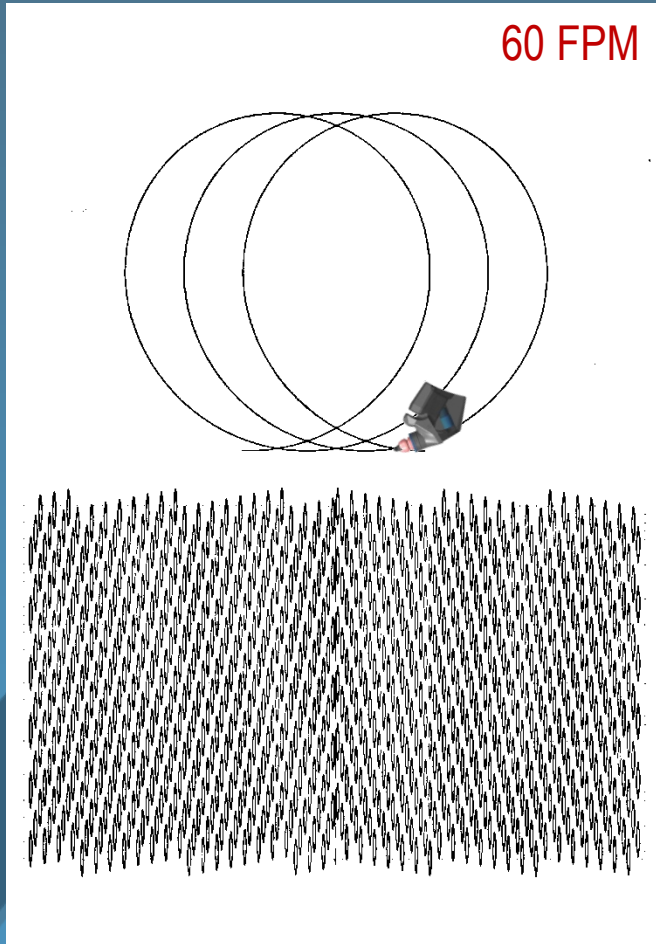


Note that the white areas between tooth strikes represents UNREMOVED material!

Milling Speed vs. Cut Pattern



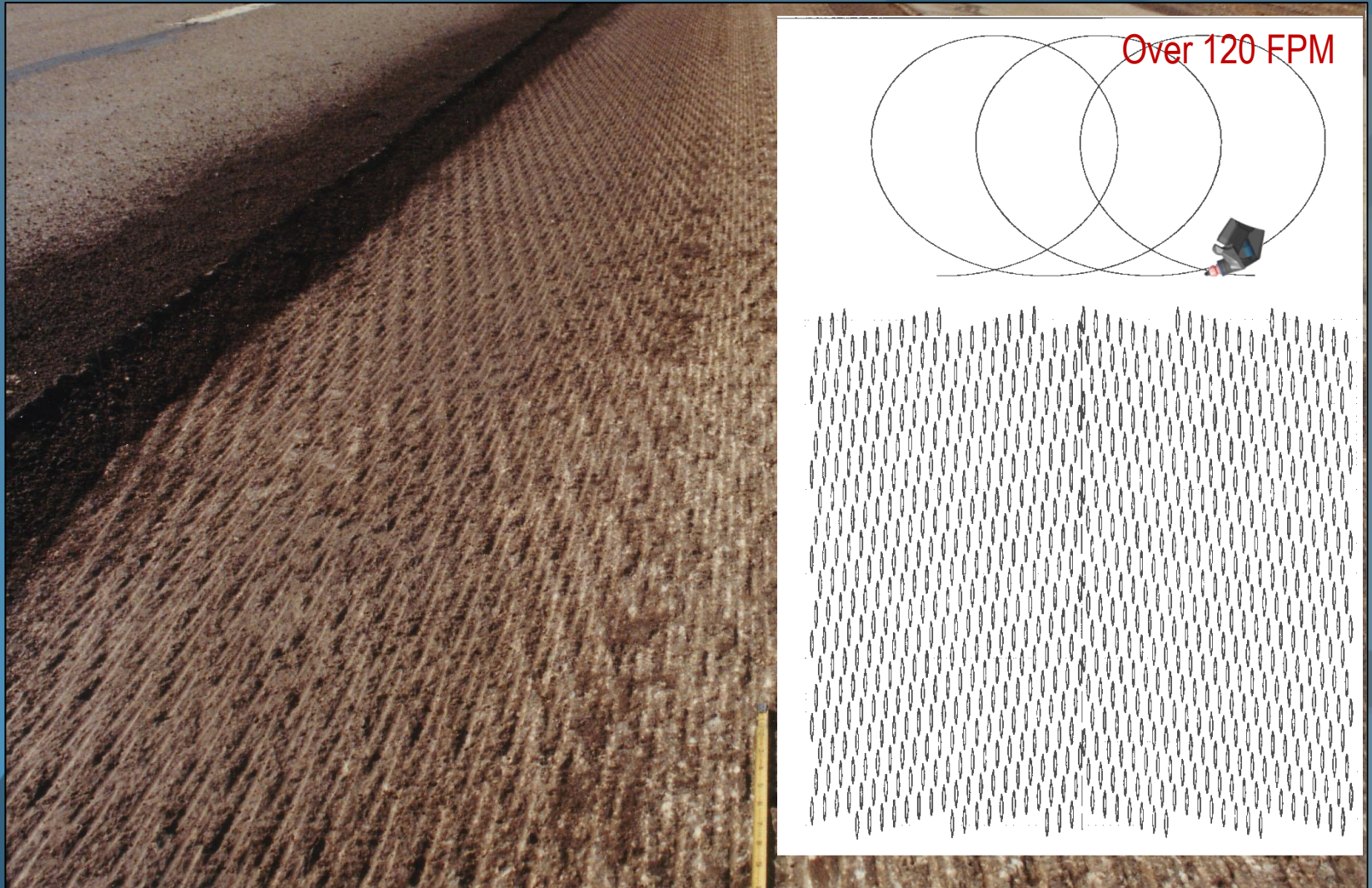
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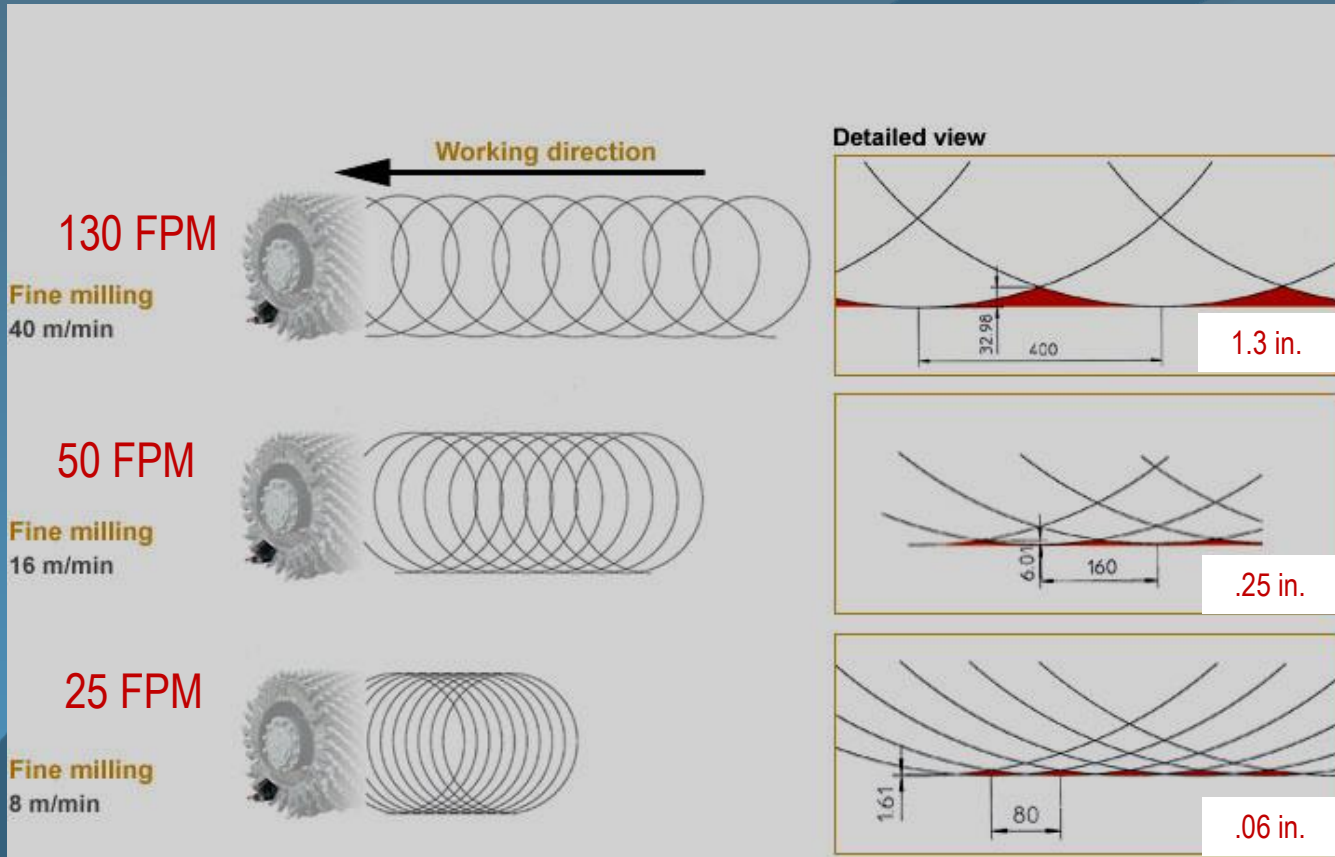
Milling Speed vs. Cut Pattern



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our customers



Milling Speed vs. Cut Pattern



Note how the height of the unremoved material varies with speed.

The Effect of a “Double Hit” Drum

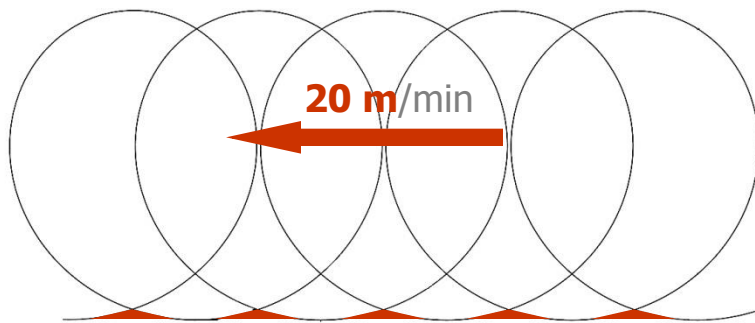


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1 cutting tool per cutting line



(For example. LA 6)

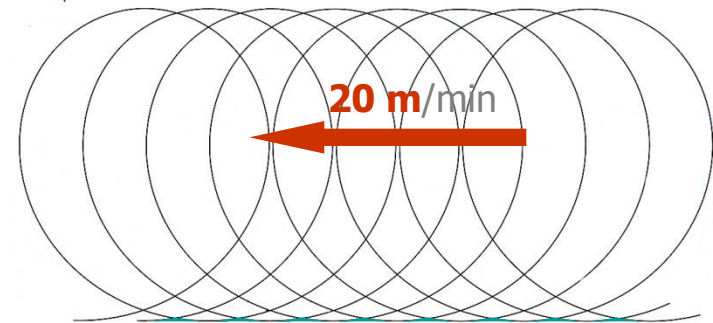


With 1 rotation of the milling drum,
1 cutting tool cuts per each cutting line.

2 cutting tools per cutting line



(For example LA 6 x 2)

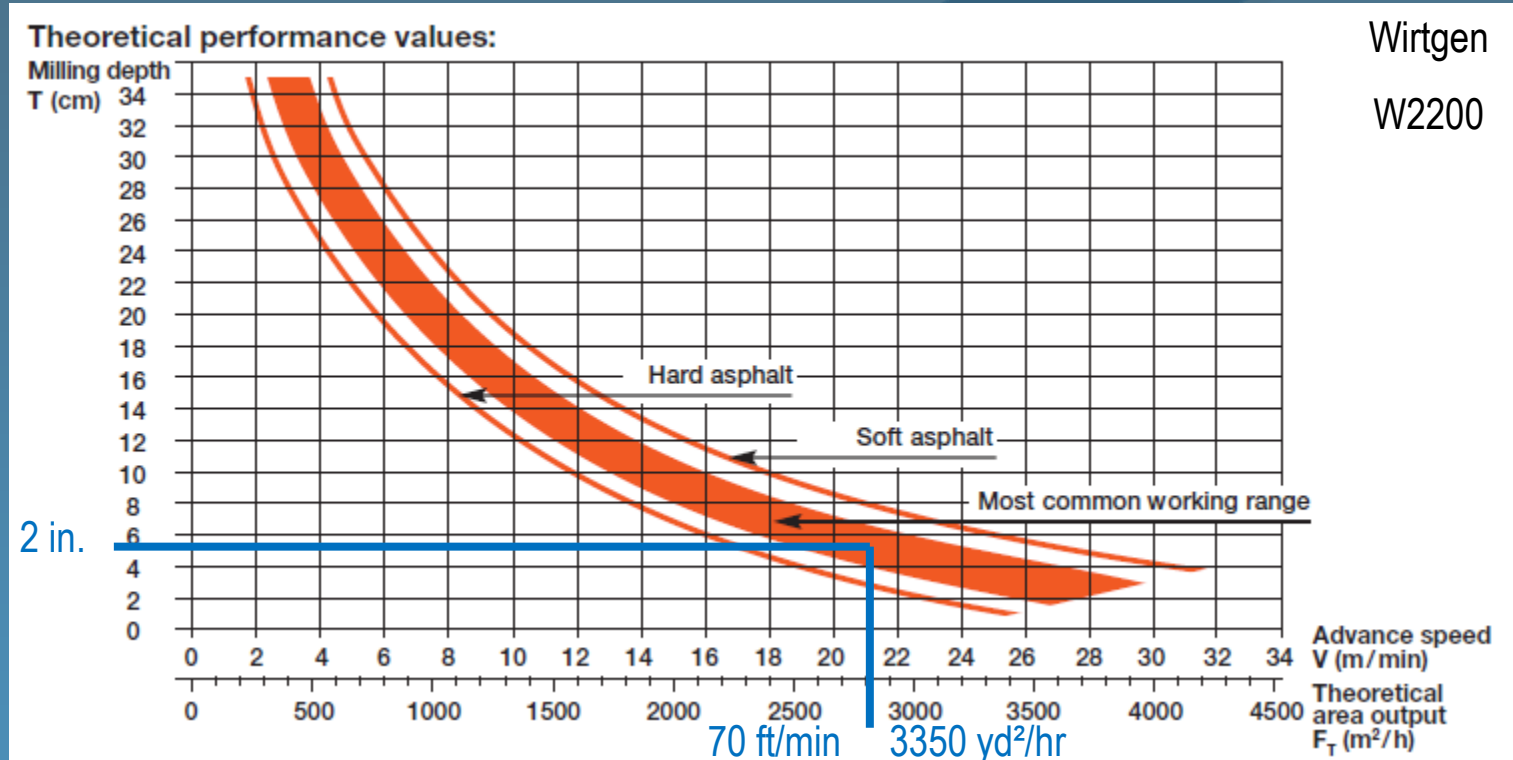


With 1 rotation of the milling drum,
2 cutting tools are cutting per each cutting line.

Production Example



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Wirtgen

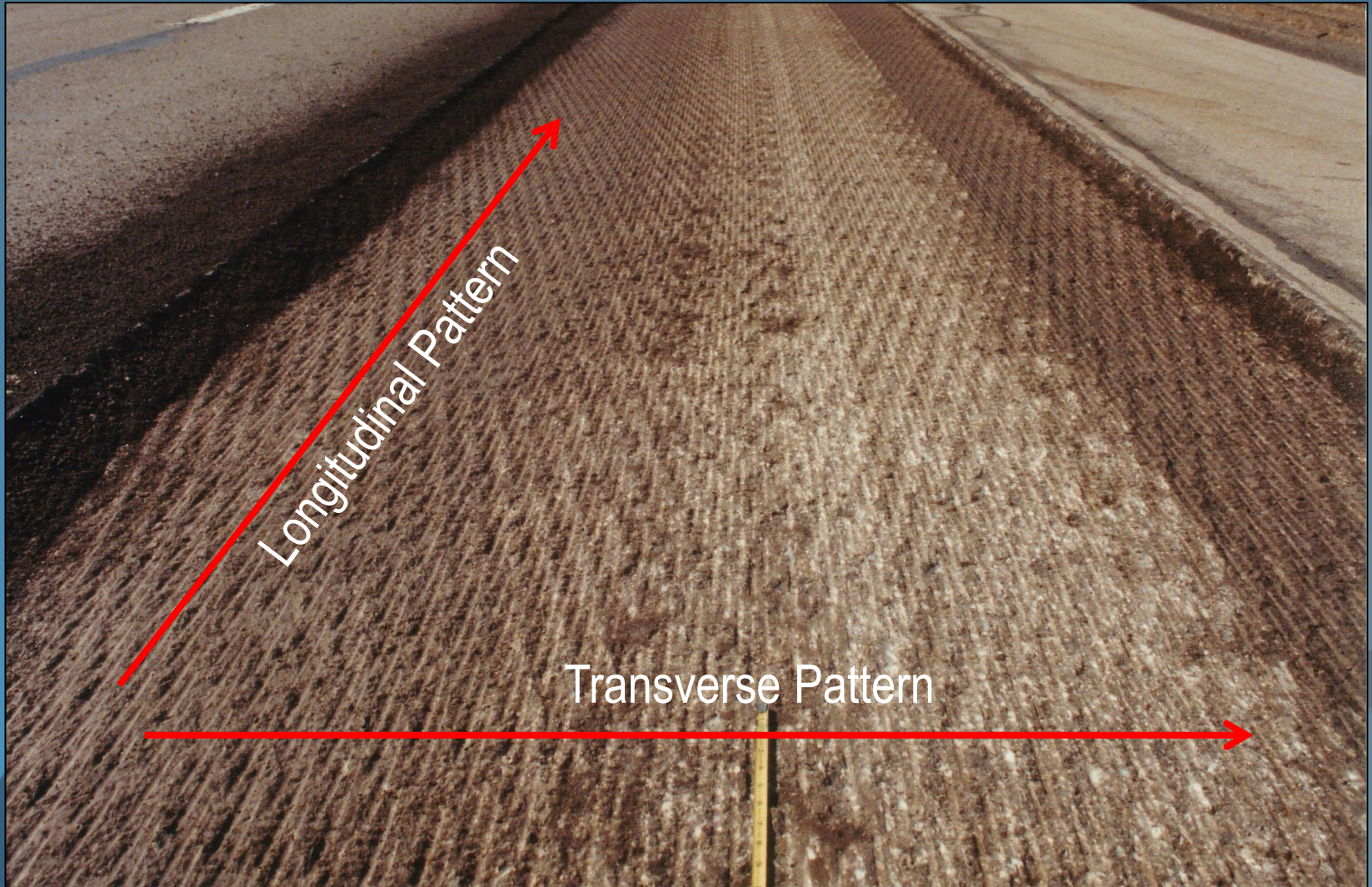
W2200

In a 2 inch cut at 70 ft/min, you'll cover 3350 yd²/hr.

If you apply a 60% efficiency factor (you are milling 40 minutes out of the hour), you'll get 2010 yd²/hr.

That's over 16,000 yd² in an 8 hour shift.

Pattern of the Milled Surface



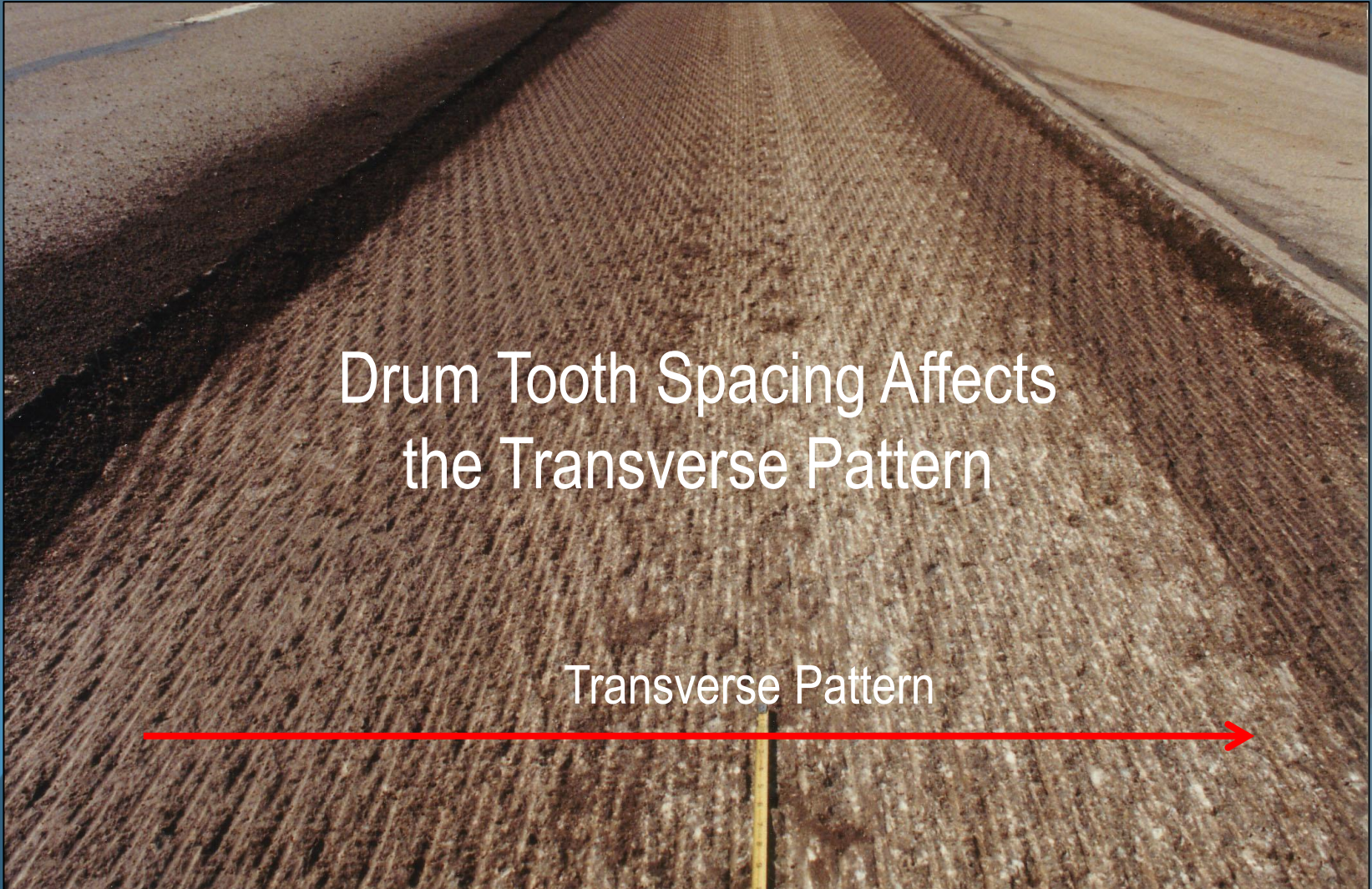
Fine Milling



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Drum Tooth Spacing Affects
the Transverse Pattern

Transverse Pattern



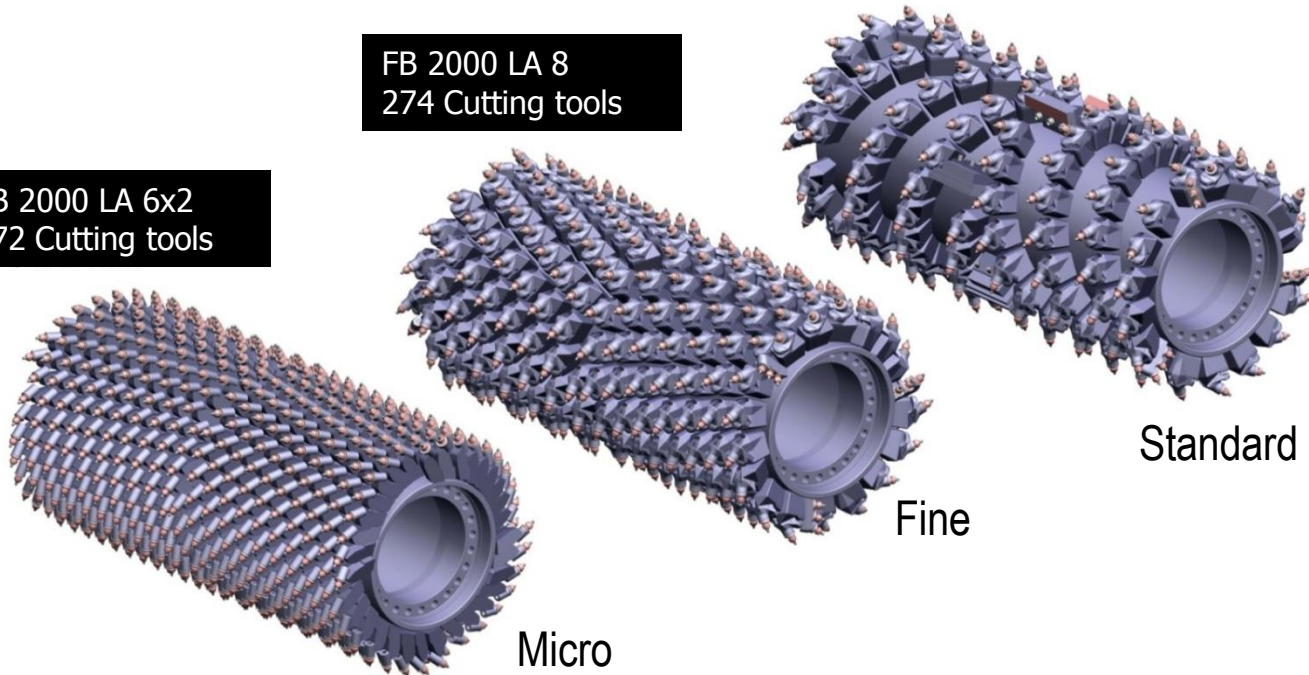
Different Available Tooth Spacings

FCS-Milling drums with different tool spacing

FB 2000 LA 6x2
672 Cutting tools

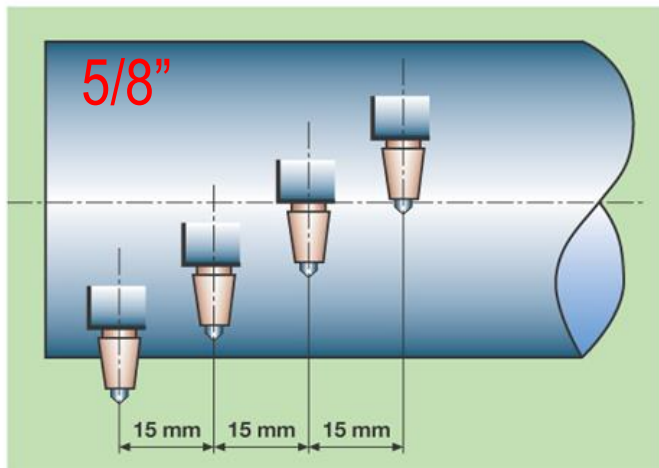
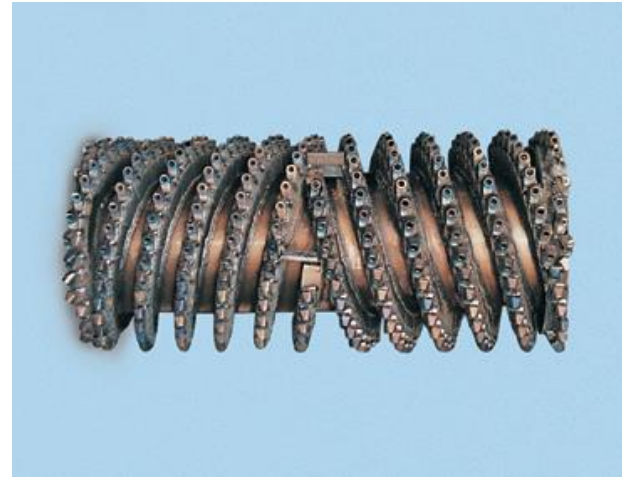
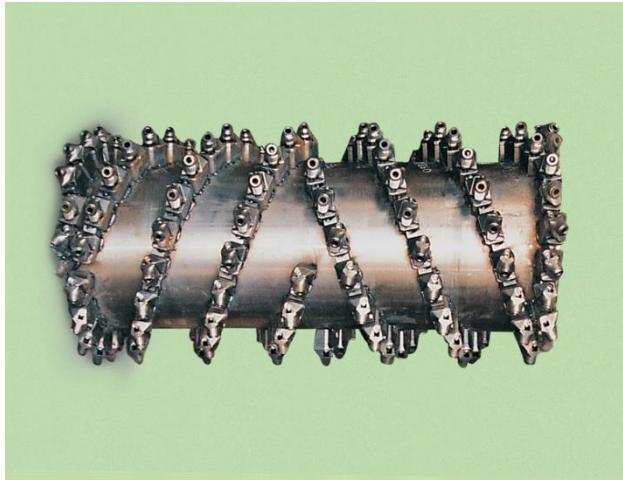
FB 2000 LA 8
274 Cutting tools

FB 2000 LA 15
162 Cutting tools

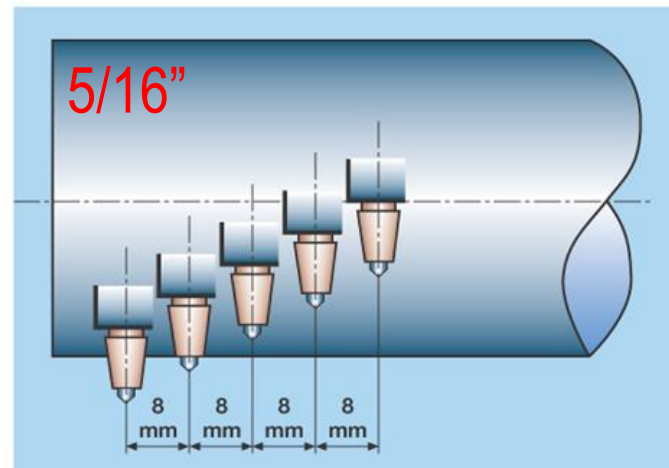


Tooth consumption is about the same because each tooth does less work!

Standard vs. Fine Milling

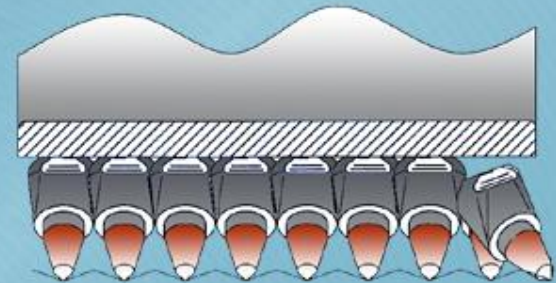
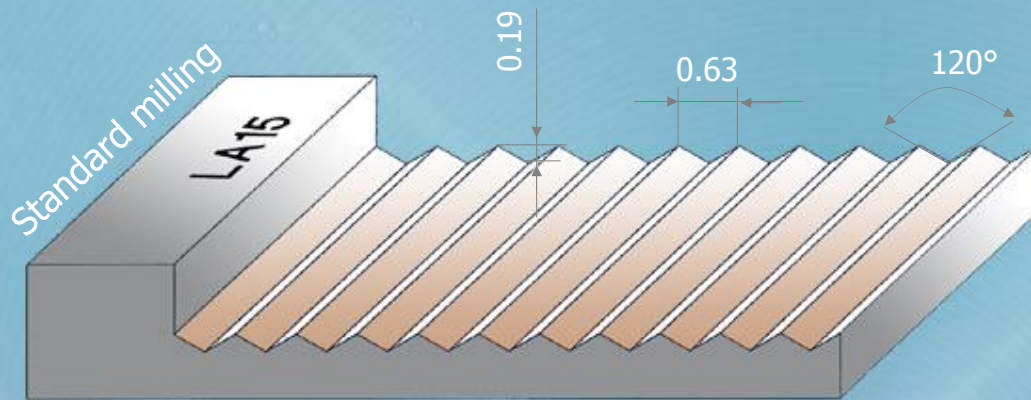


Standard milling drums with a spacing of 15 mm are eminently suitable for removing complete road pavements.

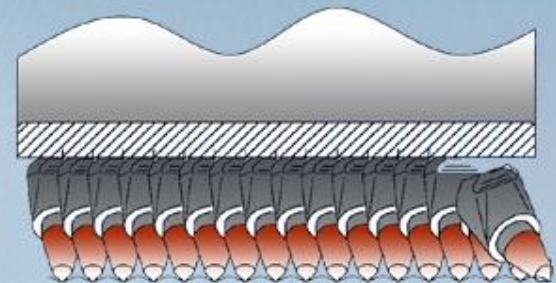
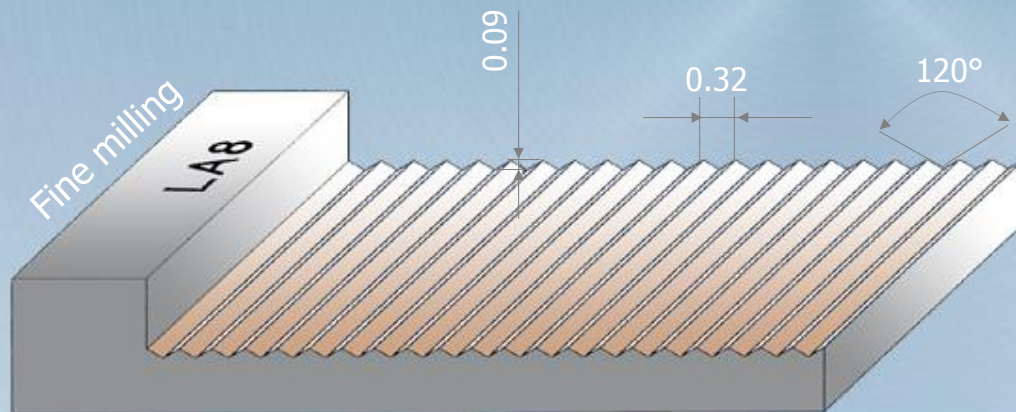


The fine milling drums with a spacing of 8 mm are ideal for treating the surface of pavement courses.

Standard vs. Fine Milling



Standard milling, spacing 0.63 in.



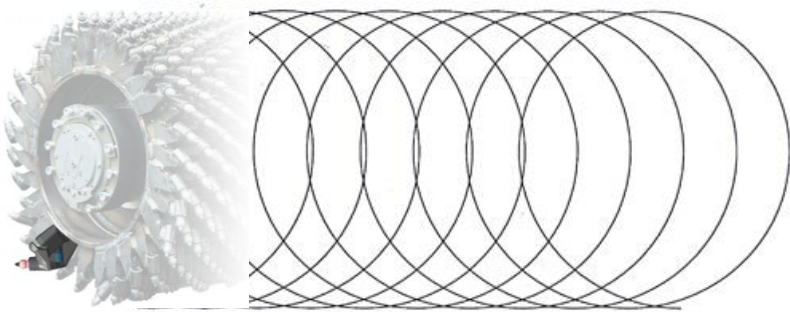
Fine milling, spacing 0.32 in.

Let's Compare

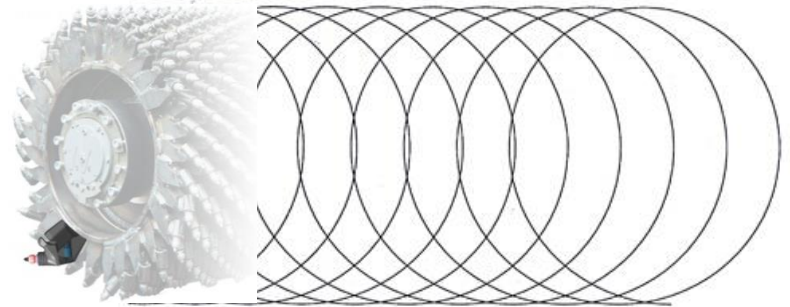


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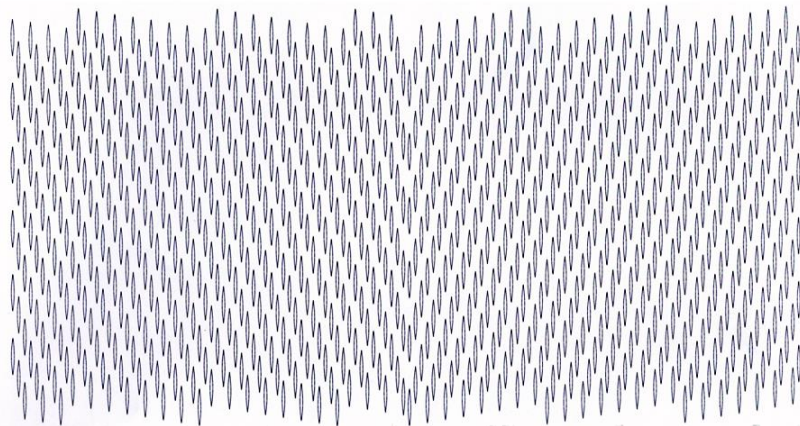
Advance speed: **50 ft/min**



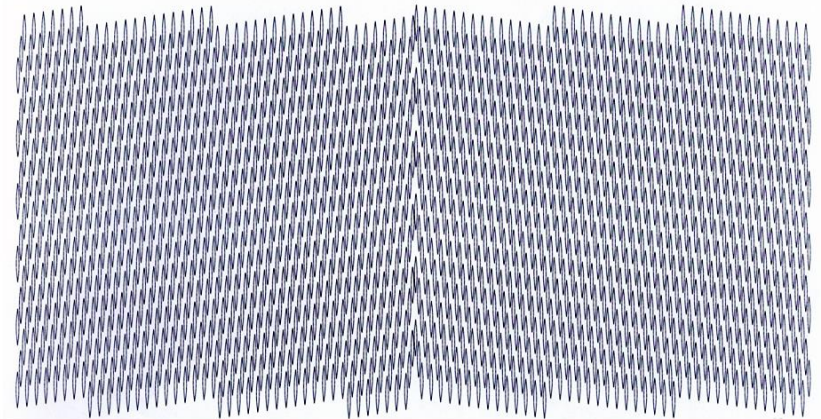
Advance speed : **50 ft/min**



Standard milling drum – 5/8 in. spacing

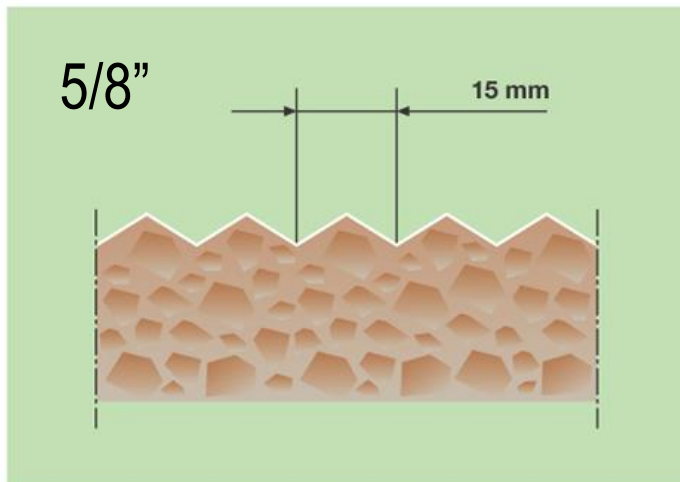


Fine milling drum – 5/16 in. spacing

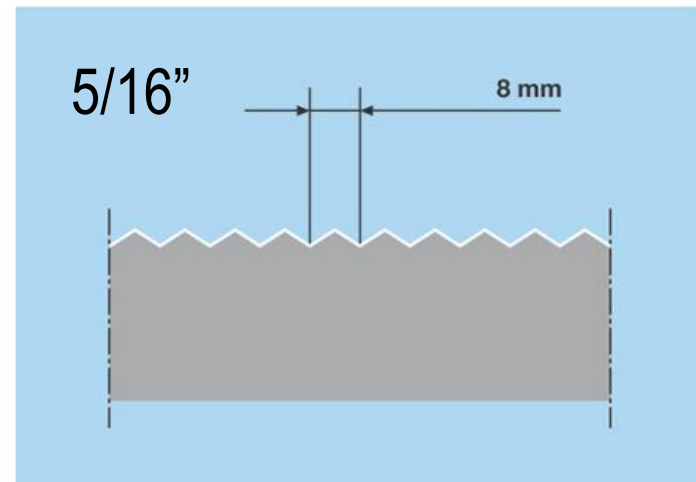


Note that the white areas between tooth strikes represents UNREMOVED material!

Standard vs. Fine Milling



Standard milling operations with a spacing of 15 mm produce a roughly textured milled surface.

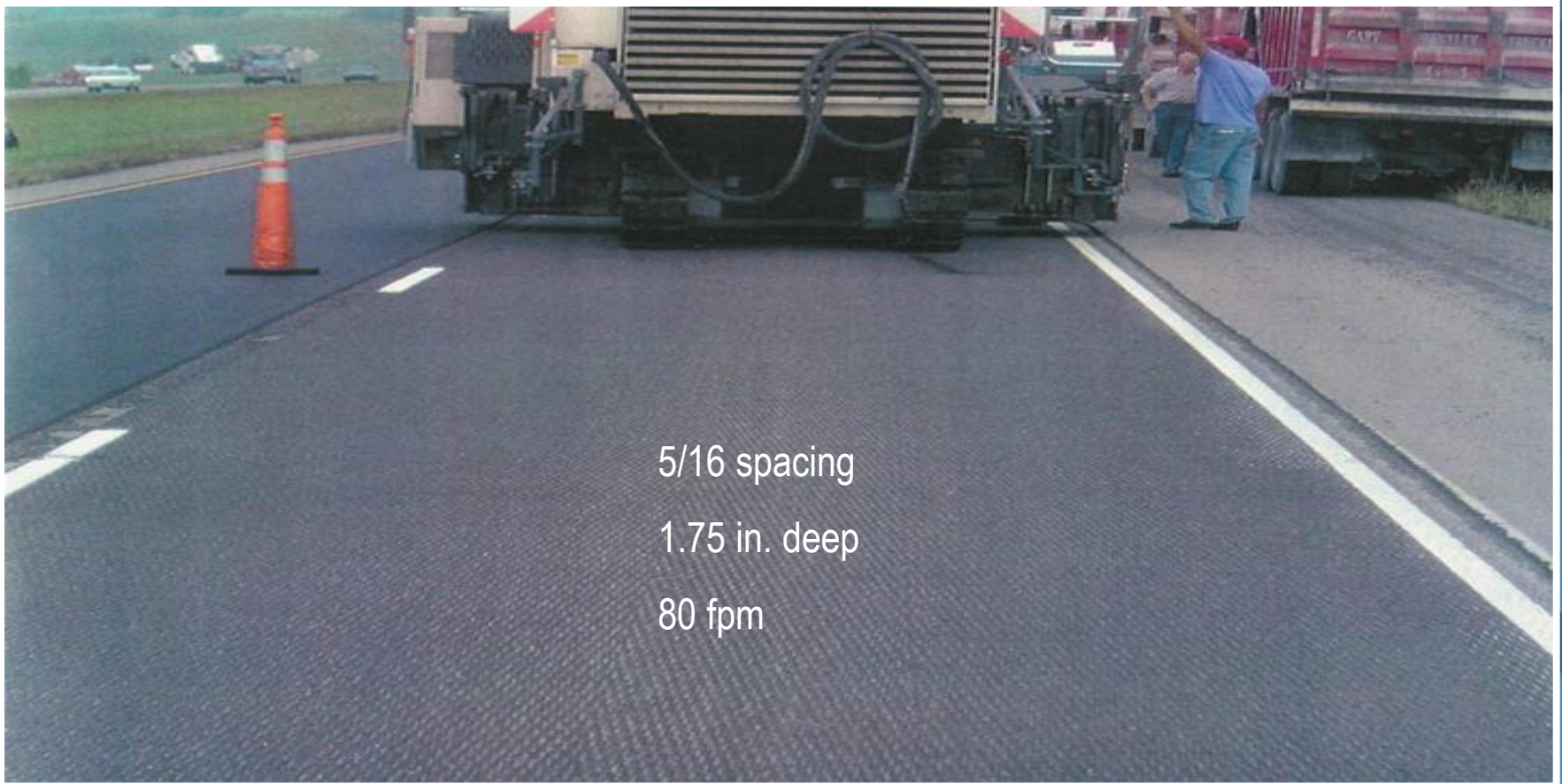


The milled surface produced by fine milling with a spacing of 8 mm is very finely textured.

Fine Milling



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5/16 spacing

1.75 in. deep

80 fpm

Fine Milling on Concrete



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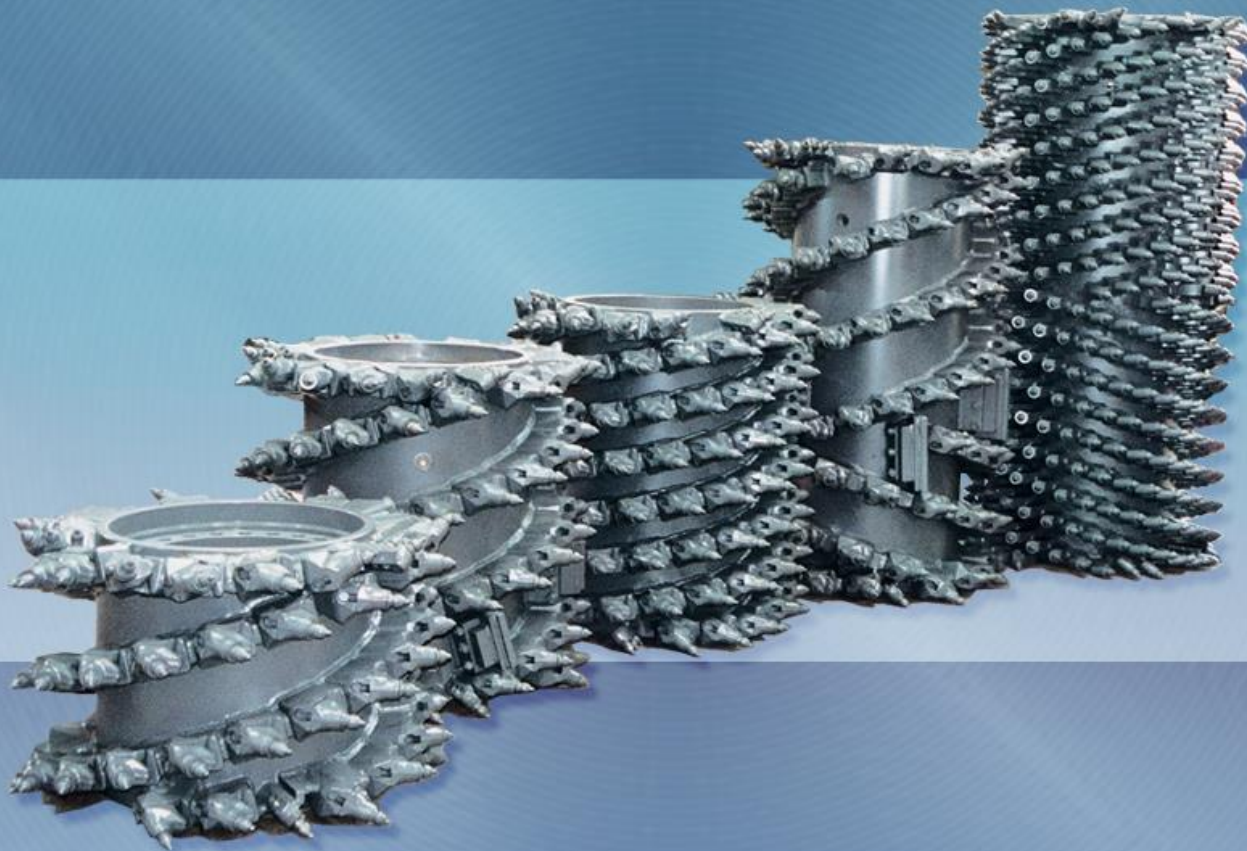


5/16 in. Tooth Spacing on Concrete

Flexible Cutter Systems (FCS)



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Flexible Cutter Systems (FCS)



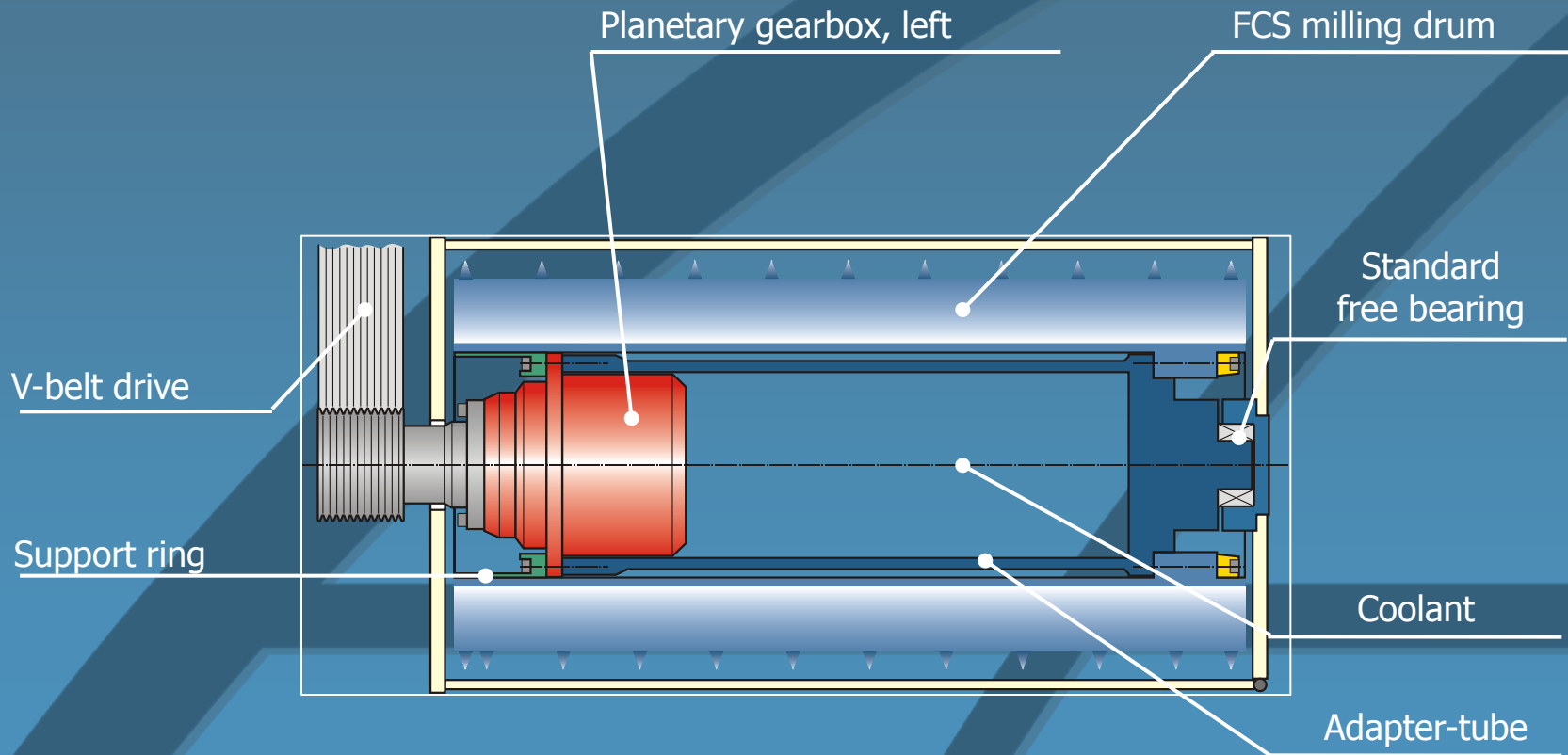
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Flexible Cutter Systems (FCS)

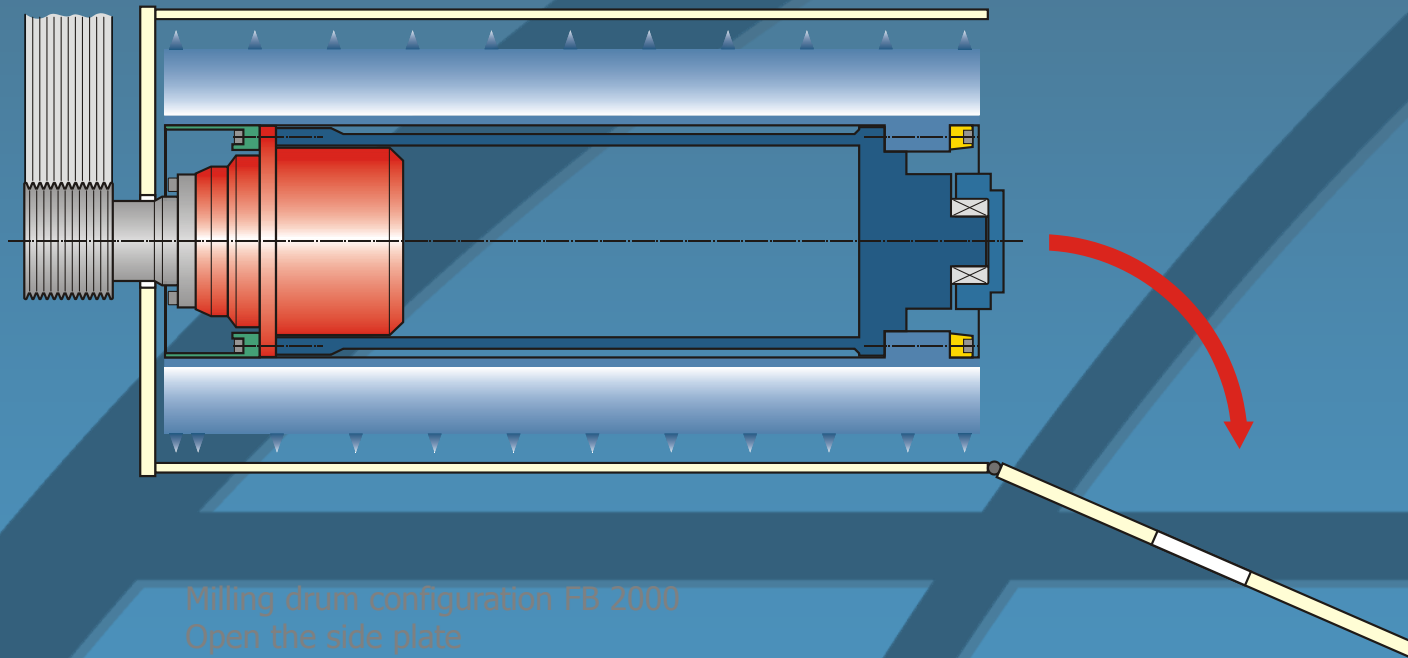


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Flexible Cutter Systems (FCS)

Changing from a standard 5/8" spaced drum to a
5/16" fine milling drum.

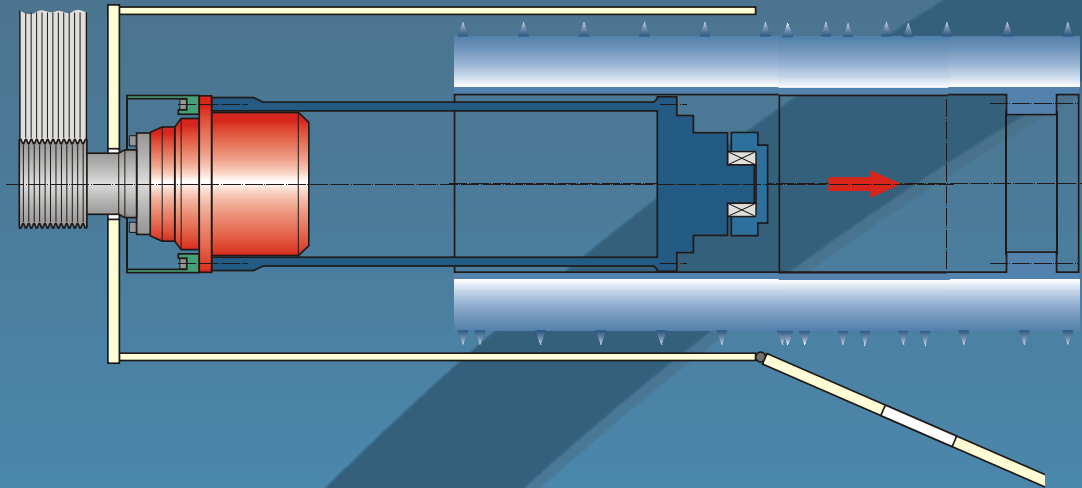


Milling drum configuration FB 2000
Open the side plate

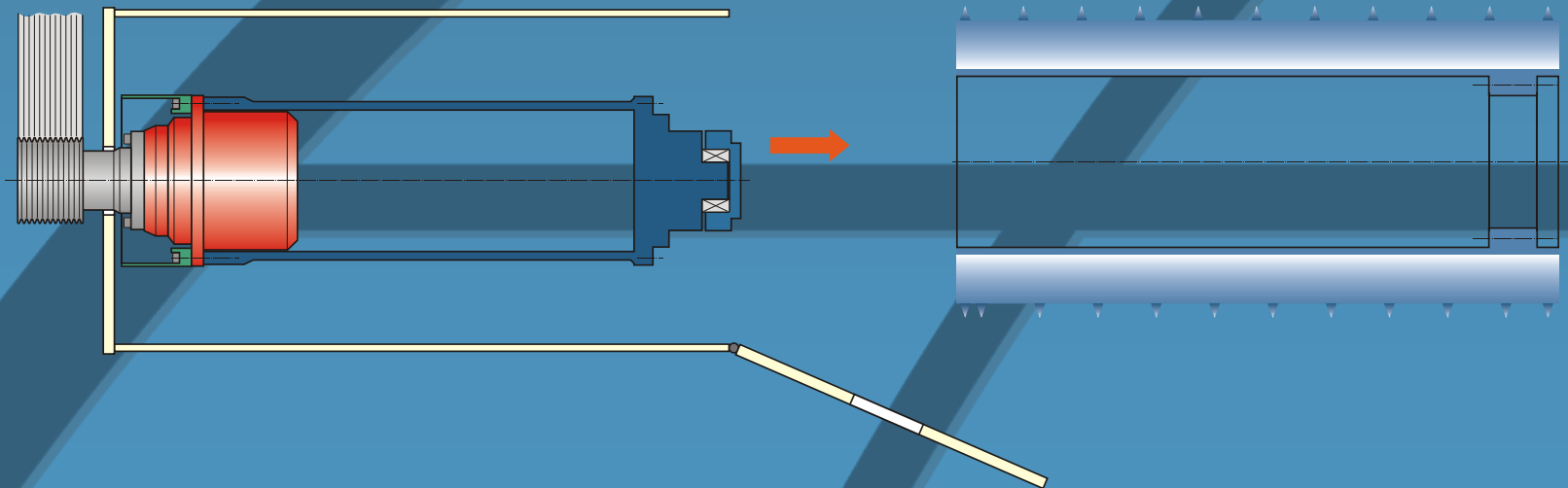
Flexible Cutter Systems (FCS)



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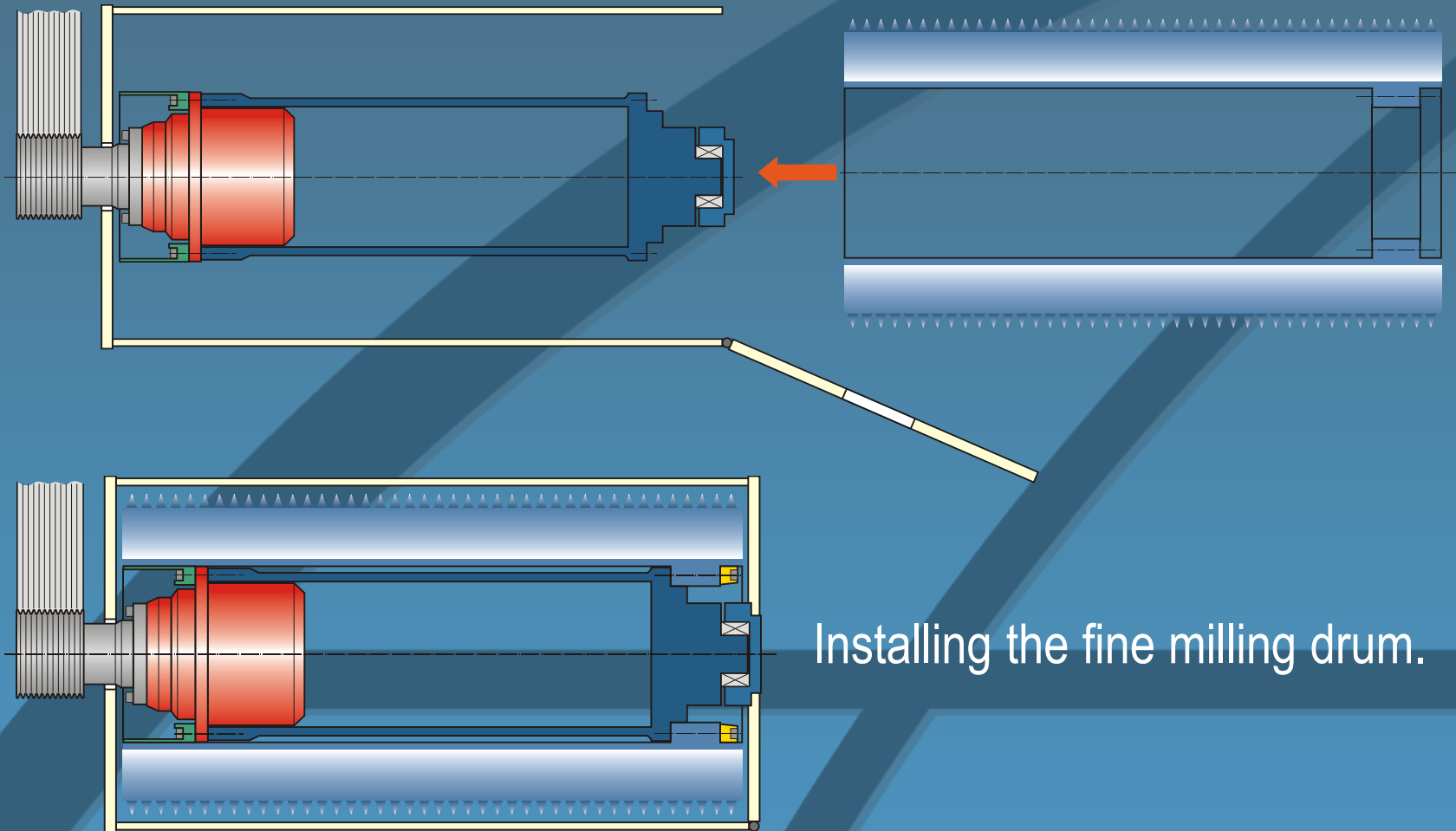
Removing the
milling drum



Flexible Cutter Systems (FCS)



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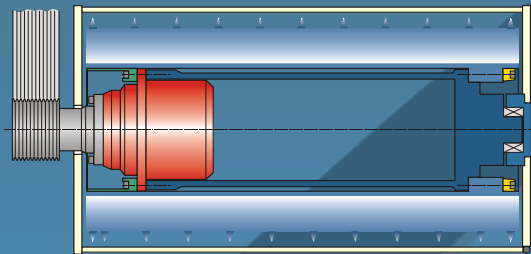
Installing the fine milling drum.

Flexible Cutter Systems (FCS)

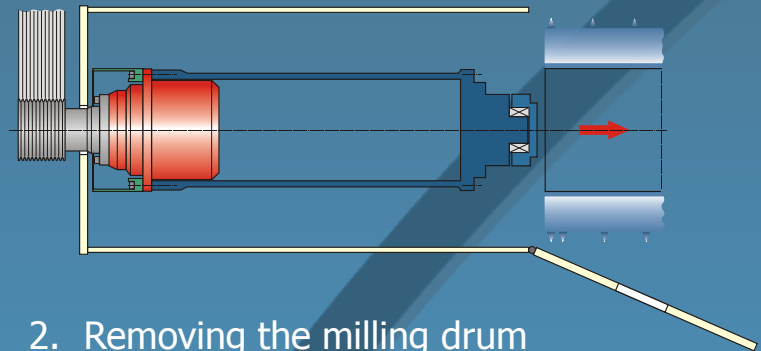


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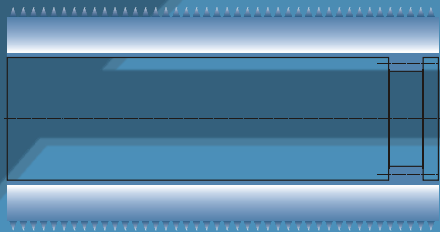
The process takes about 2 hours depending on how clean you keep your machine.



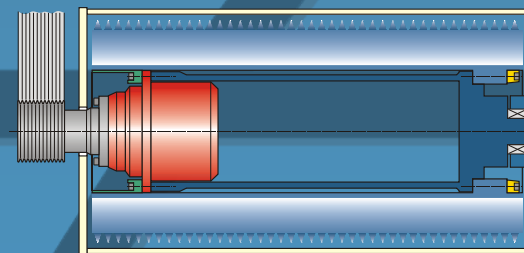
1. Standard milling drum – 5/8 in.



2. Removing the milling drum



3. Fine milling drum – 5/16 in.

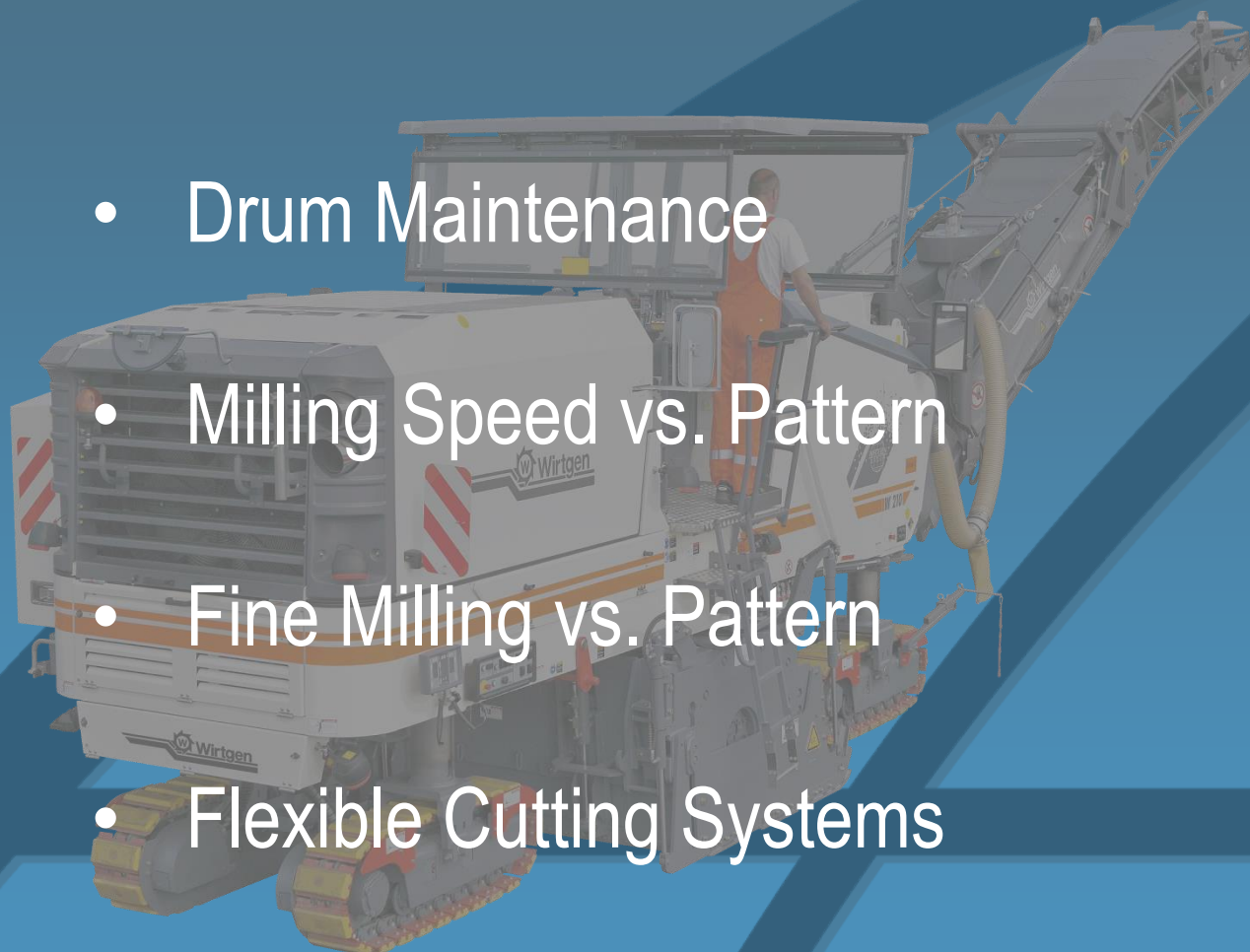


4. Installing the fine milling drum

Stay Focused



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our customers

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 - Fine Milling vs. Pattern
 - Flexible Cutting Systems
- 
- A large, white and orange Wirtgen milling machine is shown in a semi-transparent, faded view. The machine is a tracked vehicle with a large drum and a conveyor system. A person in orange overalls is standing on the machine, operating it. The machine has "Wirtgen" branding on it. The background is a blue gradient with a white line.

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