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CONNECTED MILLING



IN THE BEGINNING. . .

There was Intelligent Compaction.



WE WENT FROM CONVENTIONAL TESTING . . .

Troxler



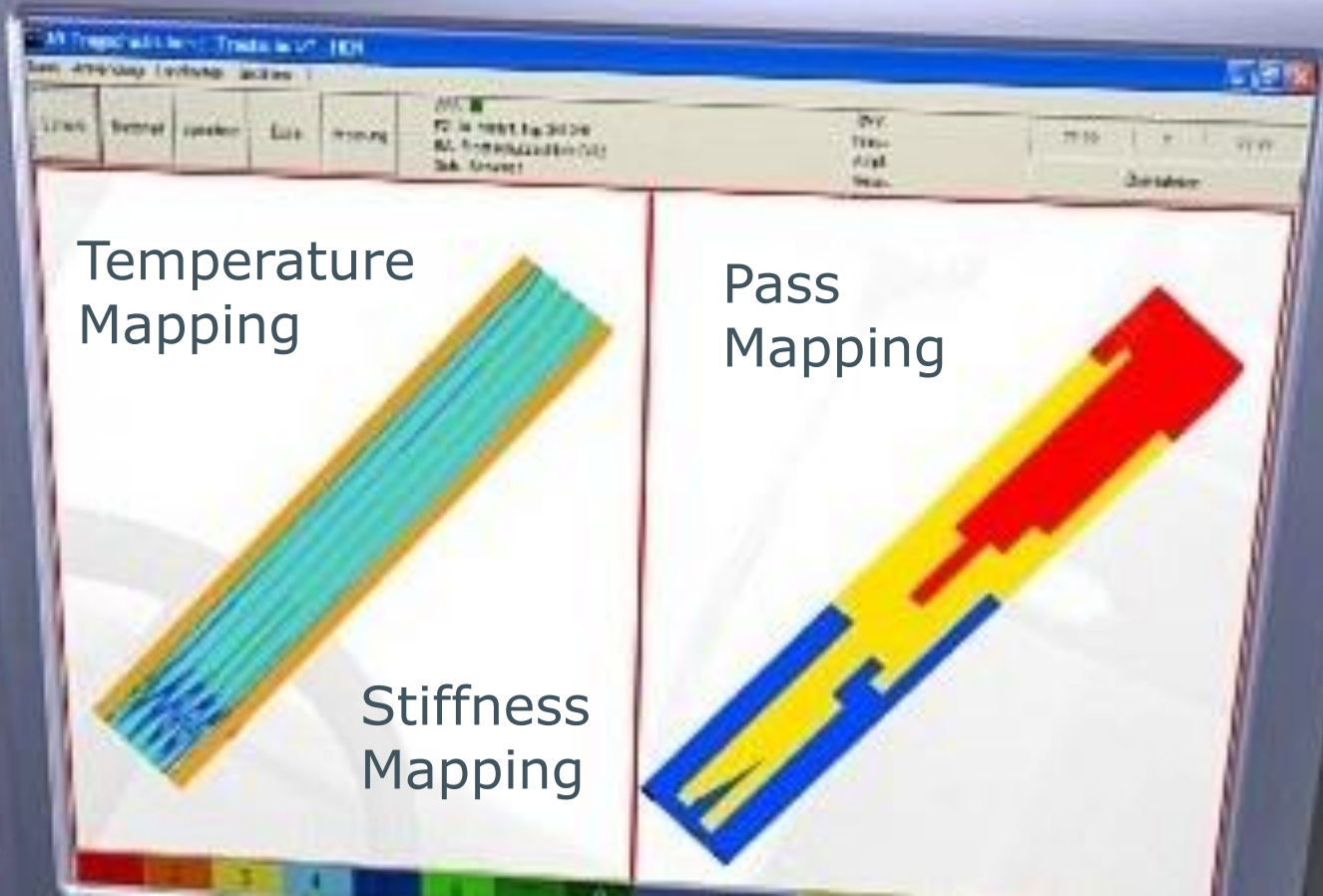
PQI/PDM



Core



TO A GPS BASED SYSTEM . . .



TODAY WE HAVE CONNECTED MILLING



- Seamlessly connects the machine, the operator and the project manager
- Performs an array of functions to simplify the operator's job
- Provides an array of information to simplify the manager's job

CONNECTED MILLING CONSISTS OF . . .



➤ Automated Functions

- Divot prevention
- Match cut assist
- Obstacle assist
- Conveyor swing assist
- Segmented water spray system

➤ Mill Assist Technology

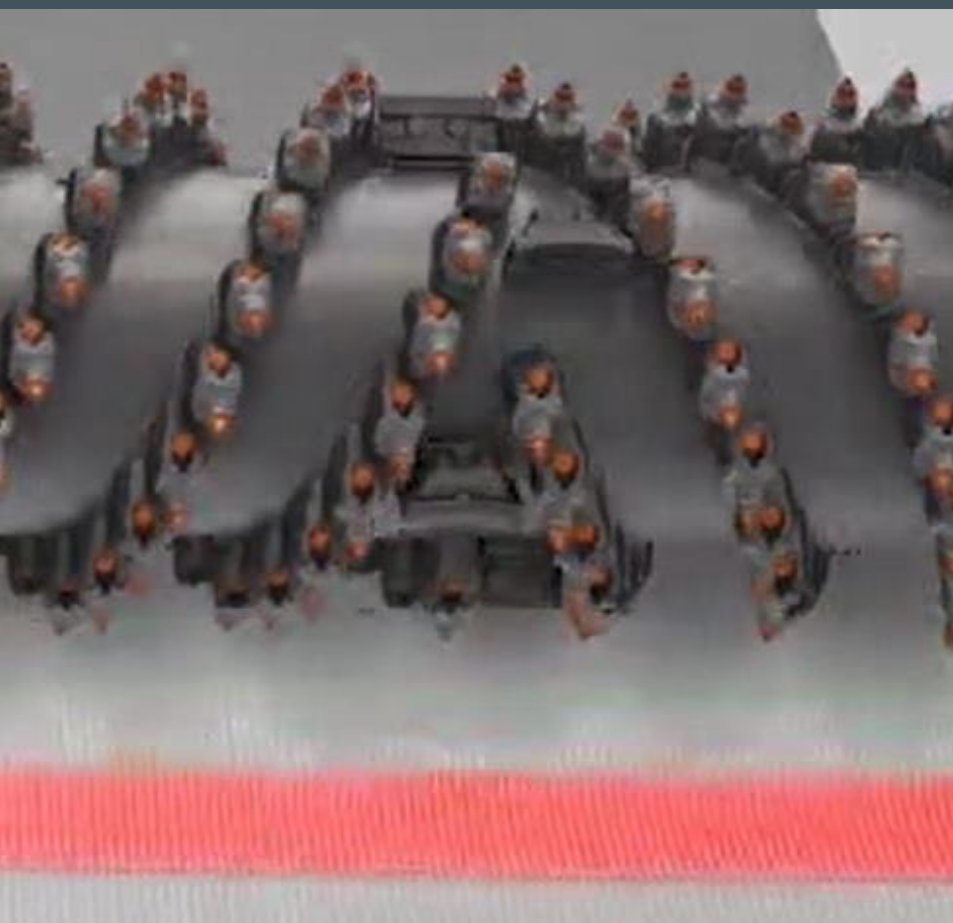
- ECO mode
- Power mode
- Quality mode

➤ Wirtgen Performance Tracker

- Laser sensors
- GPS receiver
- Complete job reporting

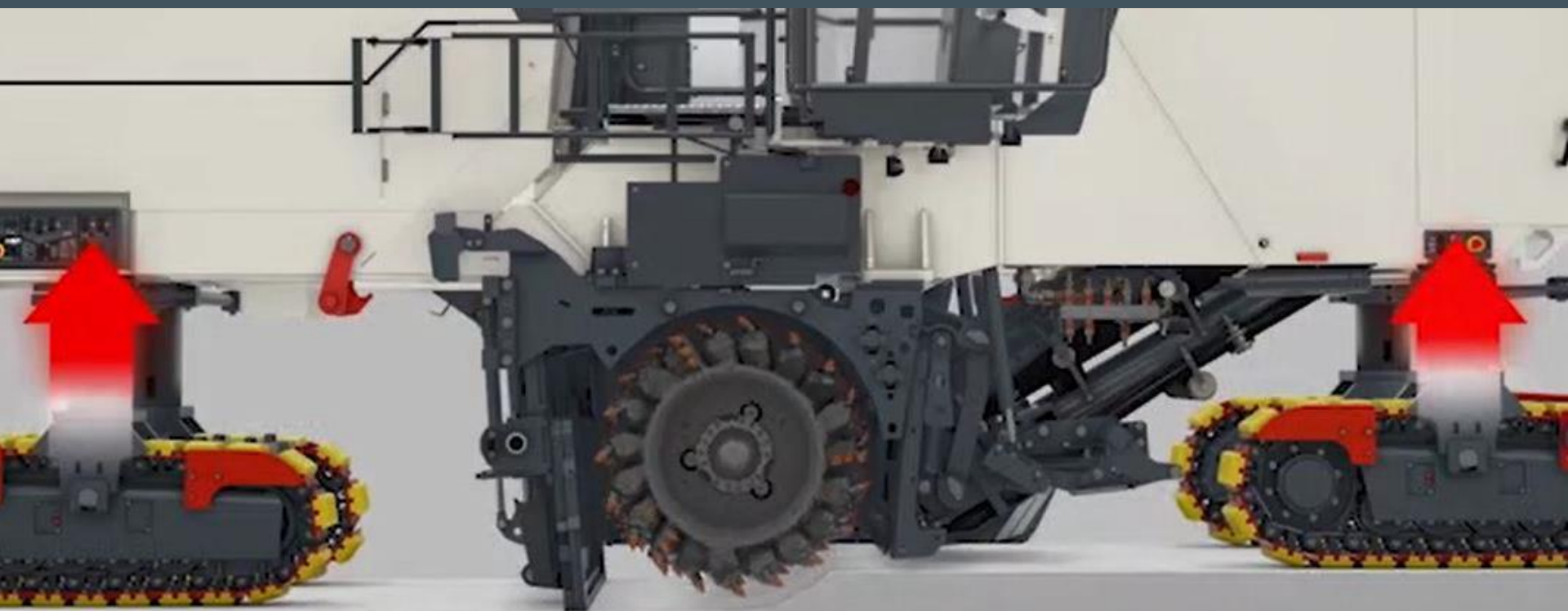
AUTOMATED FUNCTIONS

DIVOT PREVENTION



- When the milling machine stops with the drum running, it makes a divot in the milled surface.
- This ultimately affects the rideability of the finished pavement.
- Unless the machine takes care of it automatically.

DIVOT PREVENTION



DIVOT PREVENTION



DIVOT PREVENTION



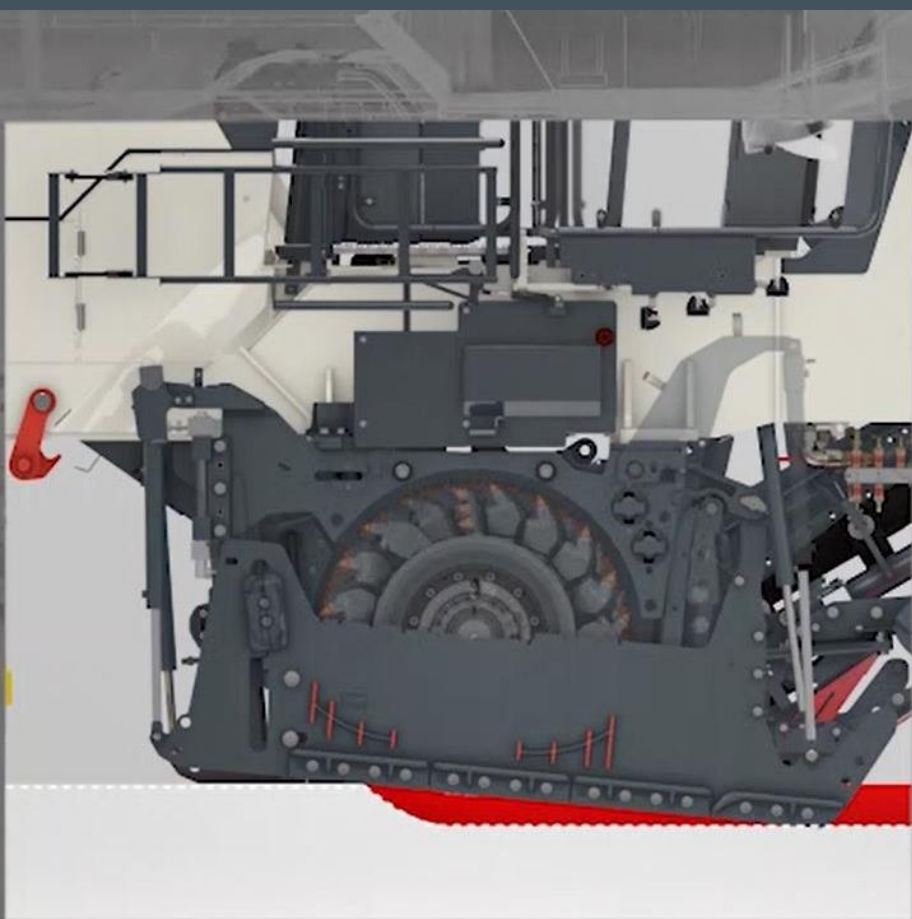
Active Lift Up ON



Active Lift Up OFF

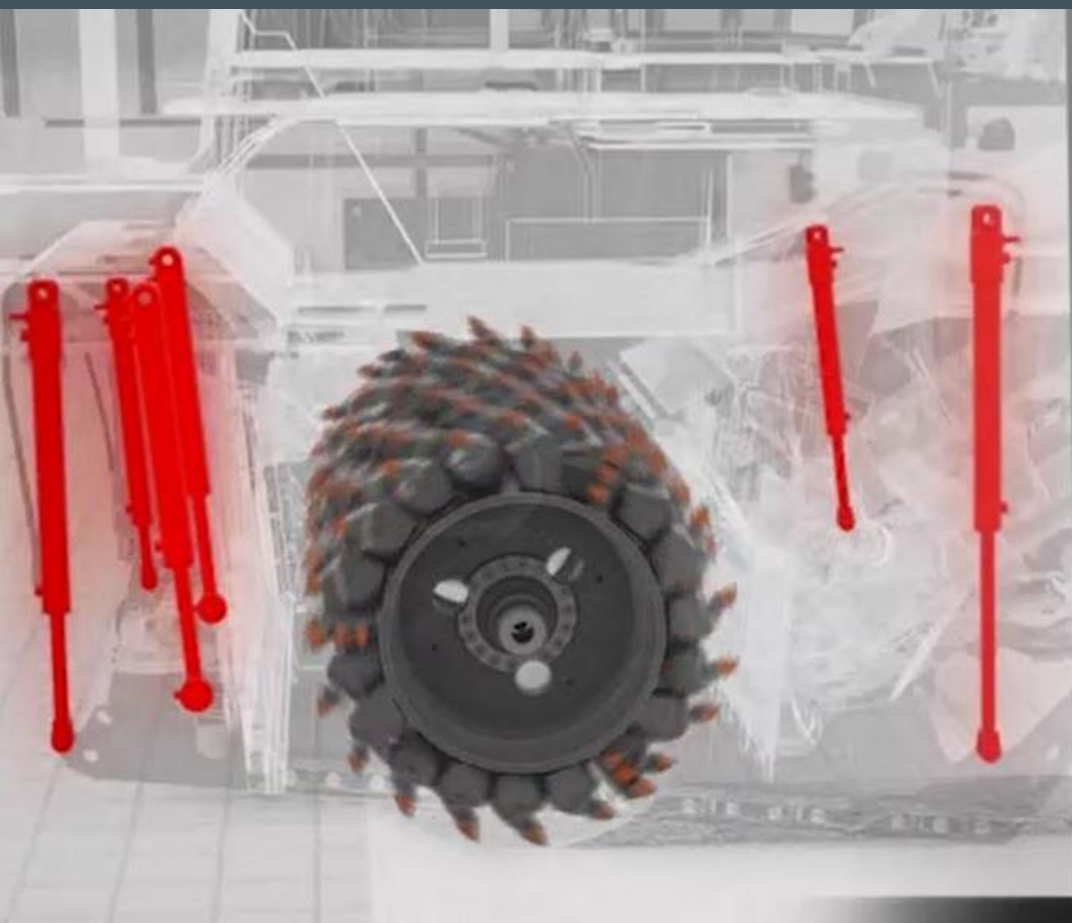
MATCH CUT ASSIST

MATCH CUT ASSIST

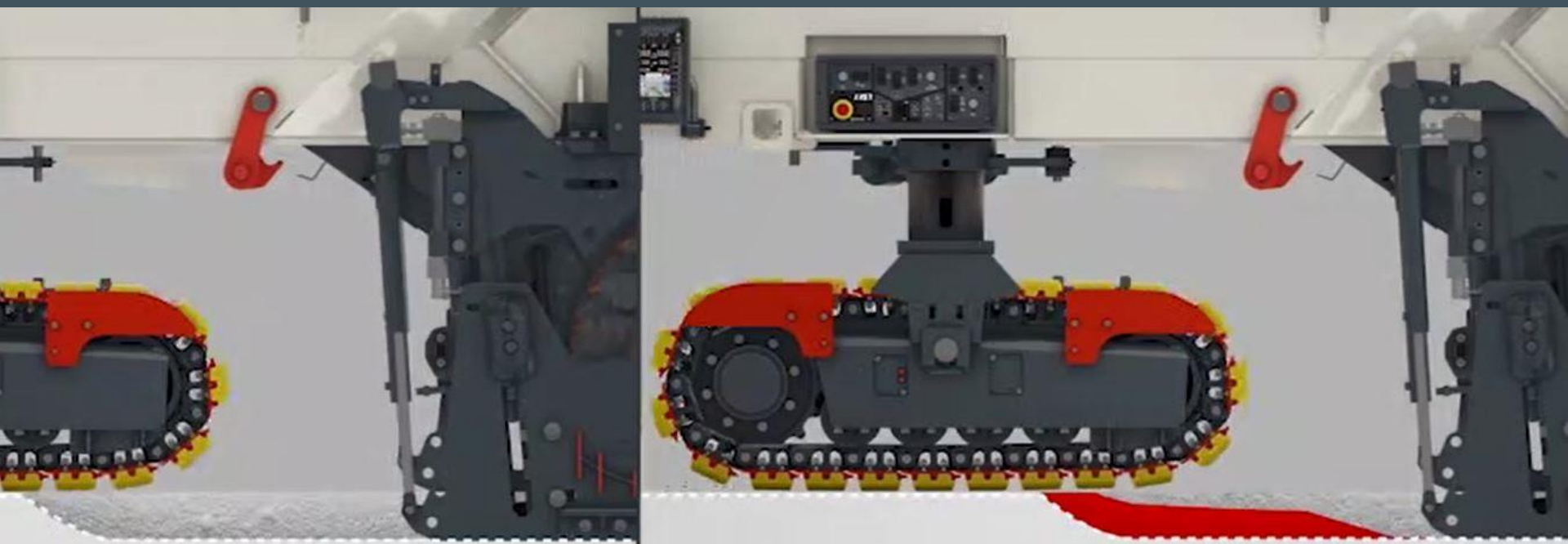


MATCH CUT ASSIST

 **WIRTGEN**



MATCH CUT ASSIST



▶ Match cut assist ON

▶ Match cut assist OFF

OBSTACLE ASSIST

OBSTACLE ASSIST

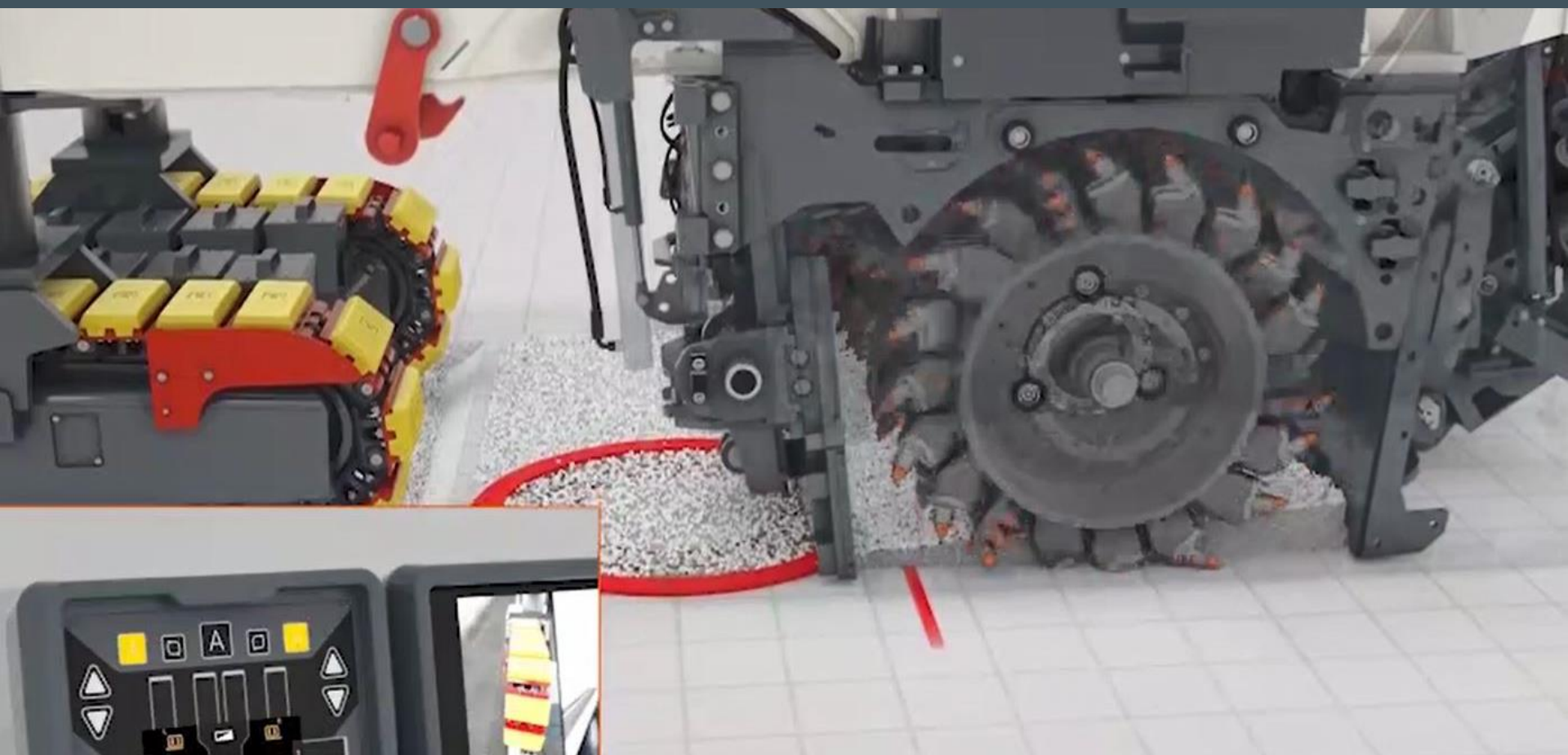


OBSTACLE ASSIST



OBSTACLE ASSIST

 **WIRTGEN**



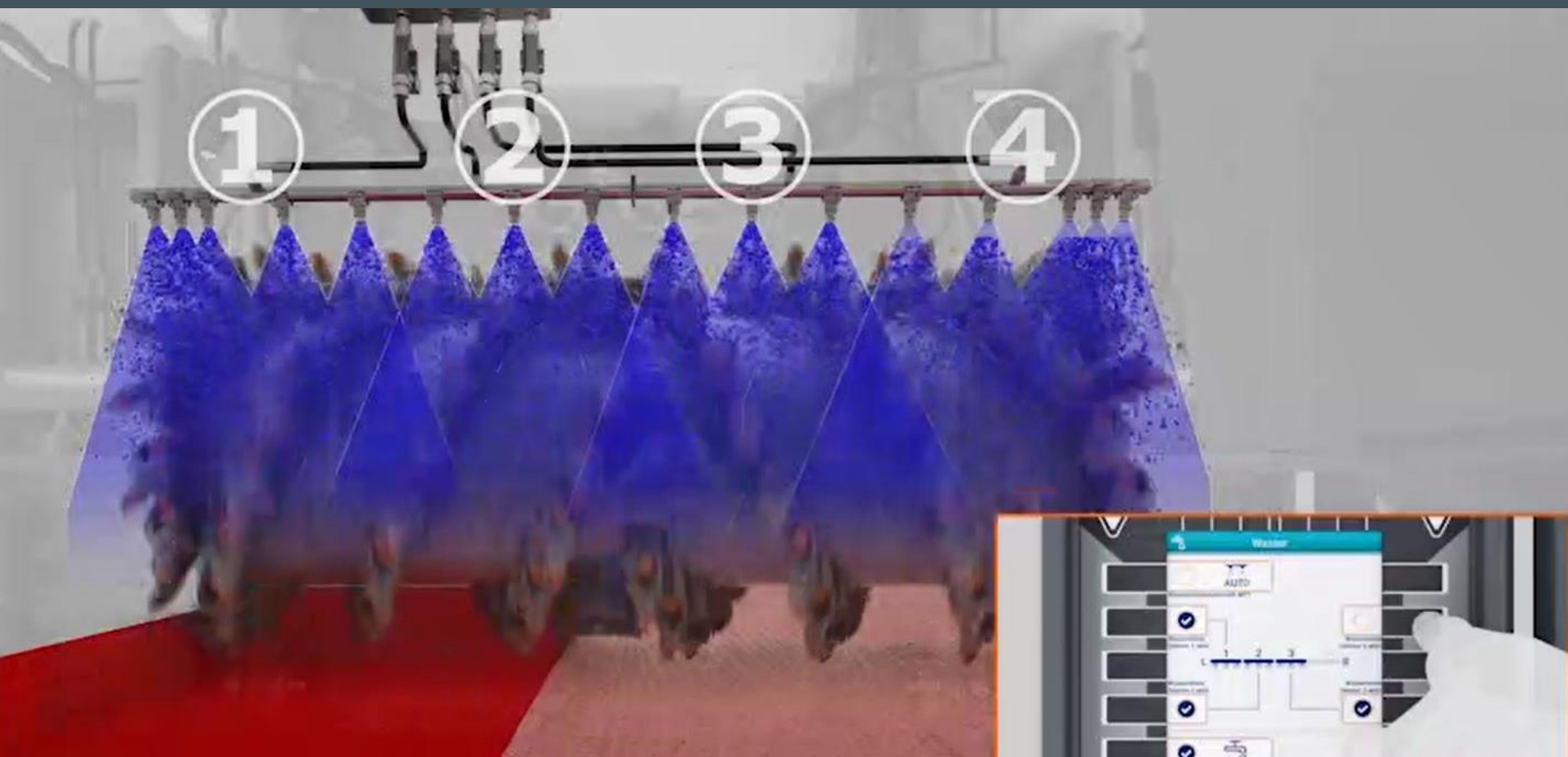
CONVEYOR SWING ASSIST



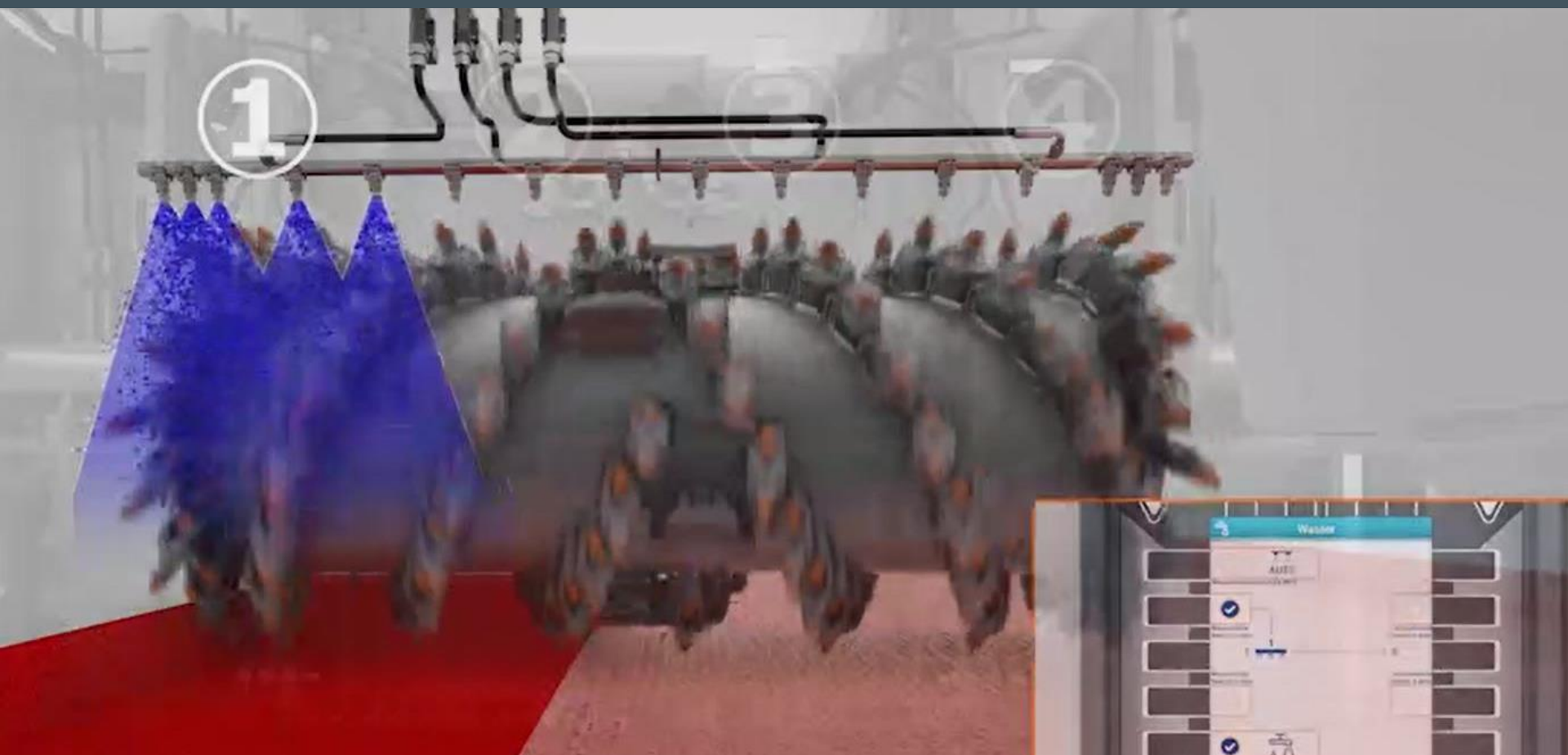
- Uses **smart** conveyor swing cylinders and the steering sensors
- Operator positions conveyor over the truck bed
- System help maintain conveyor position over truck bed while steering around obstacles

SEGMENTED SPRAY SYSTEM

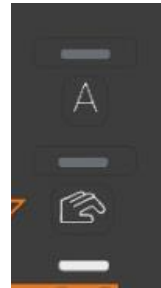
SEGMENTED SPRAY SYSTEM



SEGMENTED SPRAY SYSTEM



MILL ASSIST TECHNOLOGY



AUTOMATIC

Balance performance and costs



ECO

Minimize costs (fuel, teeth, and water)



POWER

Maximize performance



QUALITY (PATTERN)

Consistent surface quality

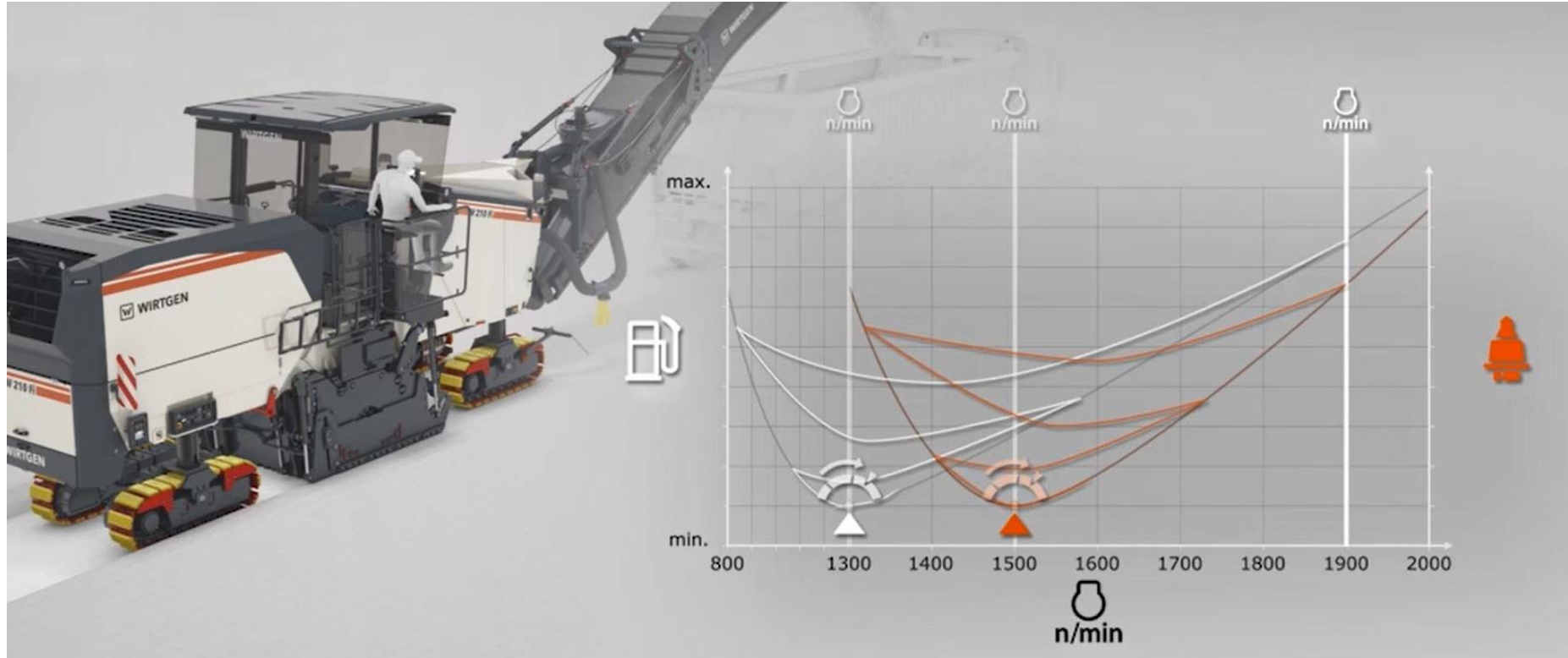
MILL ASSIST TECHNOLOGY

ECO MODE

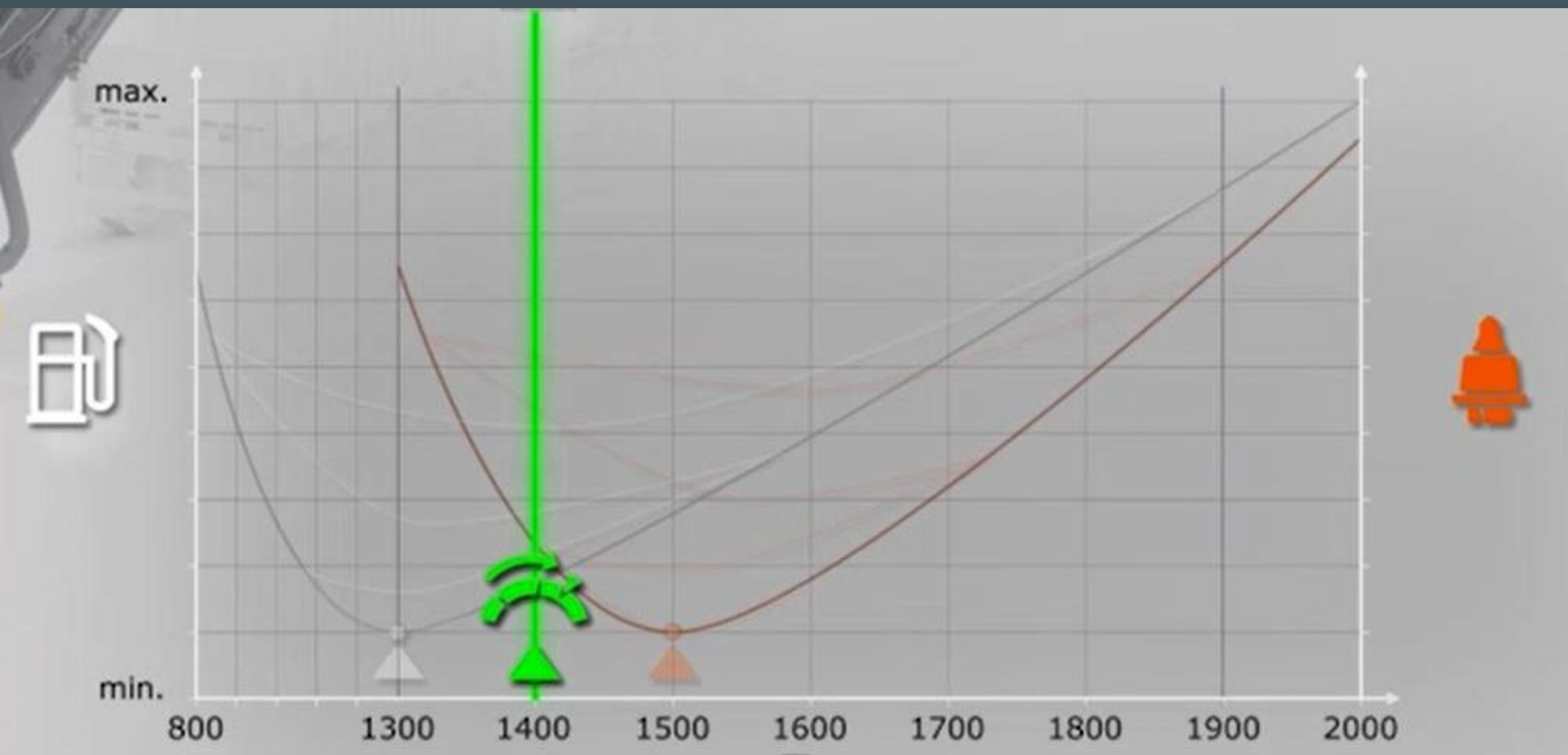
ECO MODE



ECO MODE



ECO MODE



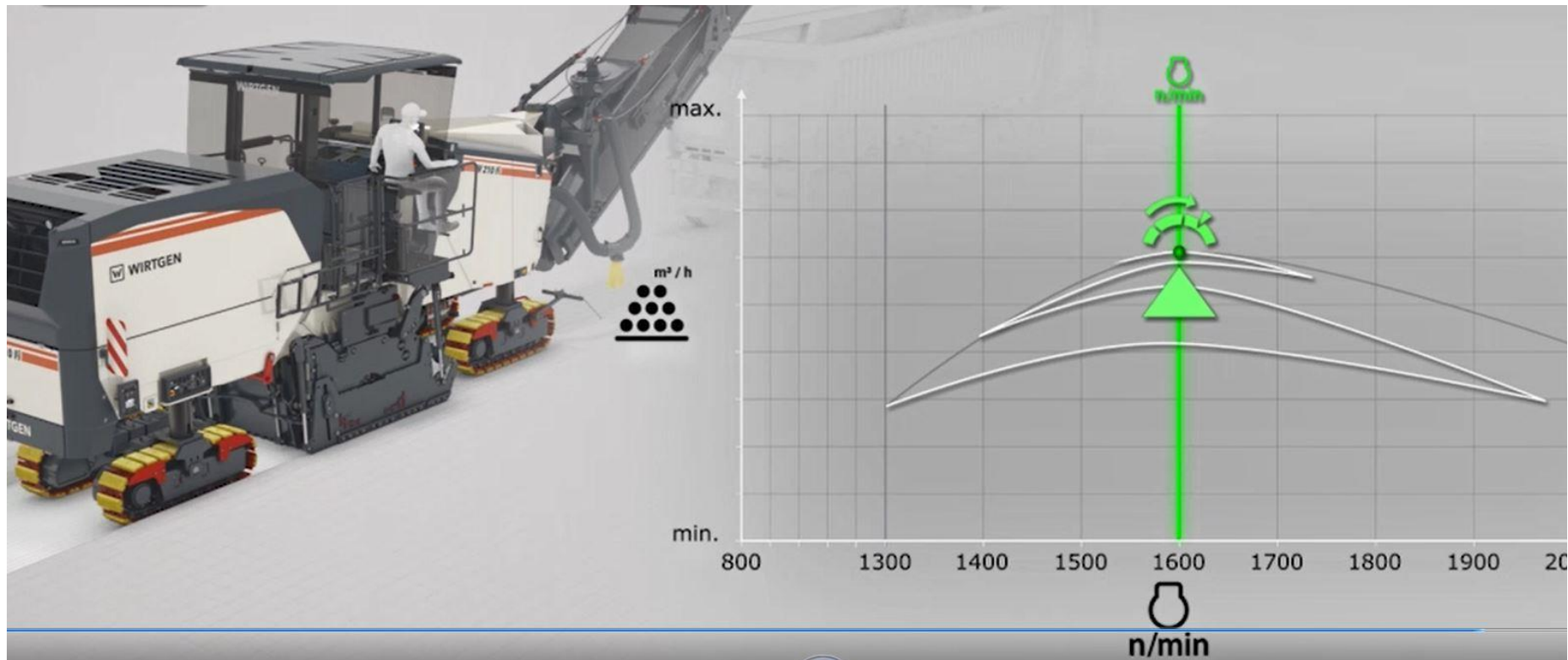
MILL ASSIST TECHNOLOGY

POWER MODE

POWER MODE



POWER MODE



MILL ASSIST TECHNOLOGY

QUALITY MODE

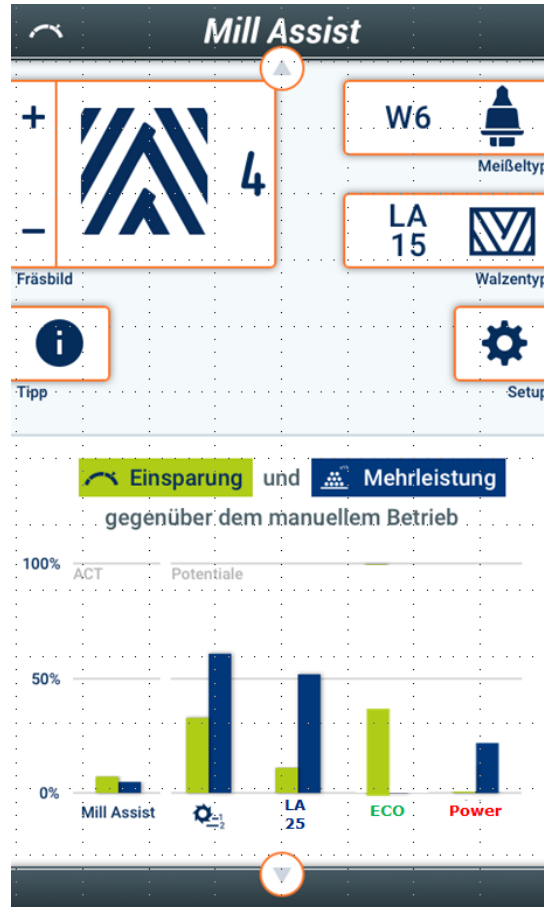
PATTERN/QUALITY MODE





Surface quality index
1 - 10

Comparison of
cost vs. performance

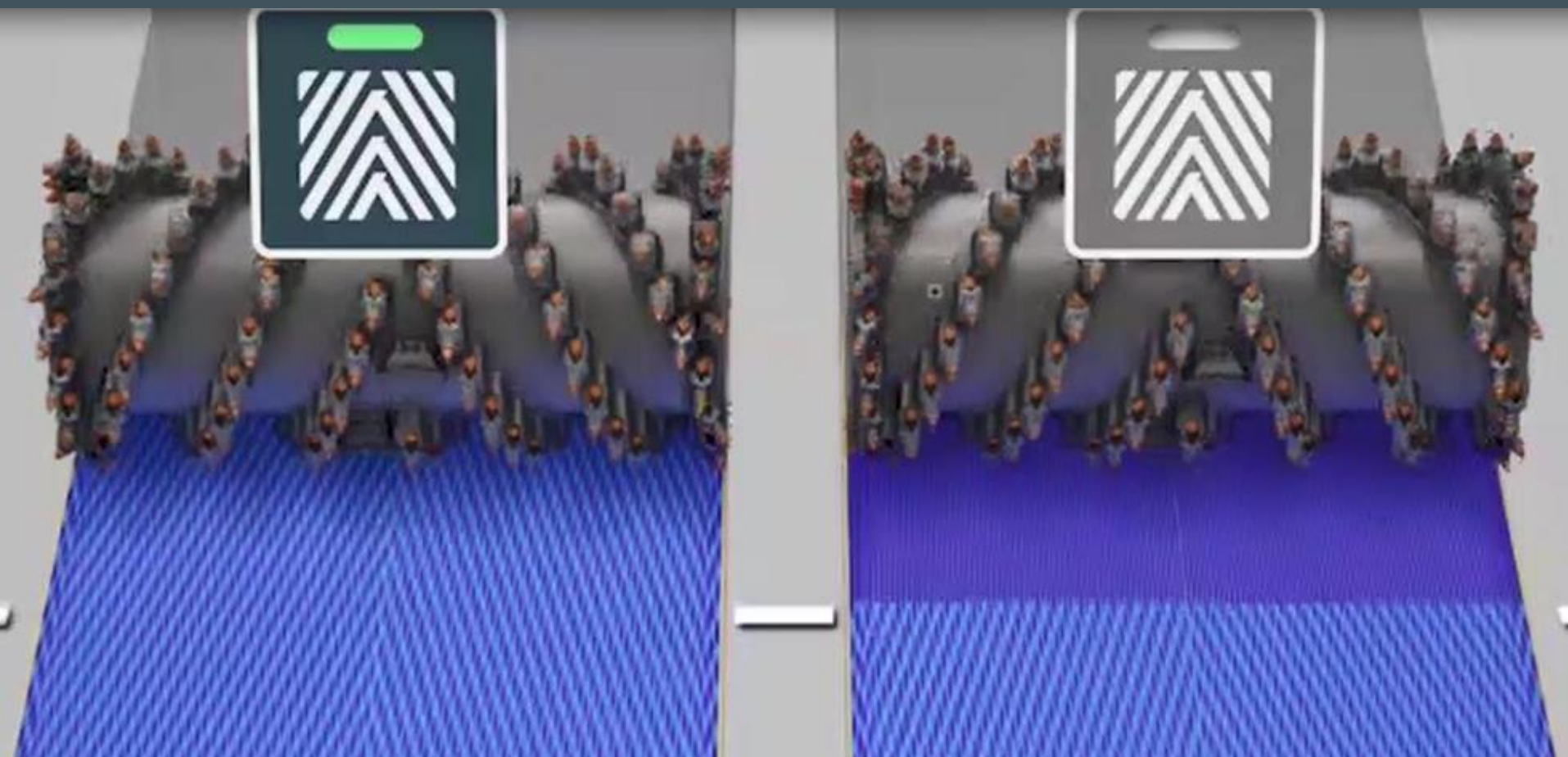


Cutting tooth designation

Milling drum line spacing

PATTERN/QUALITY MODE

 **WIRTGEN**

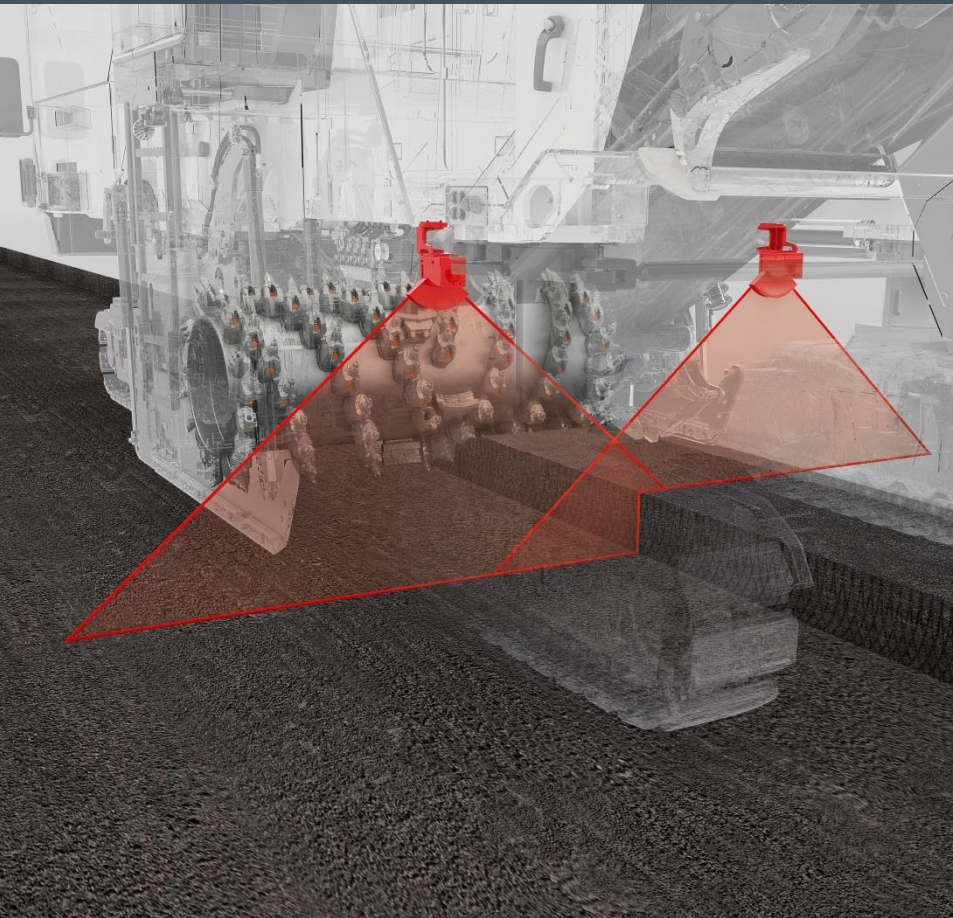


WIRTGEN PERFORMANCE TRACKER



- Documentation of work progress and work performed
- Precise data for job cost calculations
- Documented working efficiencies
- Documented machine performance

HOW DOES IT WORK?



- **Laser sensors** constantly determine the exact profile of the material to be milled.
- **GPS** receiver determines precise machine positioning.
- **Level Pro** grade control system uses drum side plate and moldboard sensors determine the precise amount of milled material.



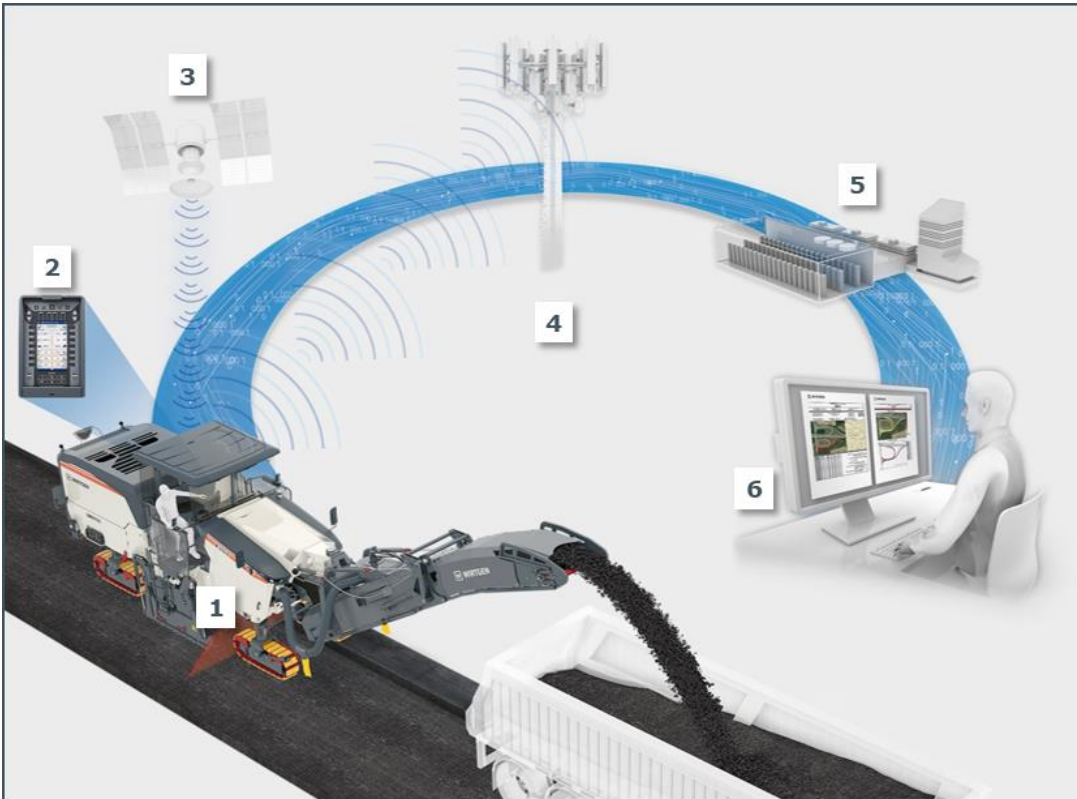
- Bulk density of milled material
- Drum type
- Cutting tooth type
- Pattern index



- Milled material
 - yd^2 , yd^3 , tons, truckloads
- Fuel consumption
- Water consumption
- Tooth consumption
 - recorded by hydraulic tooth ejector
- GPS job map
 - color coded milling depths
 - job segments

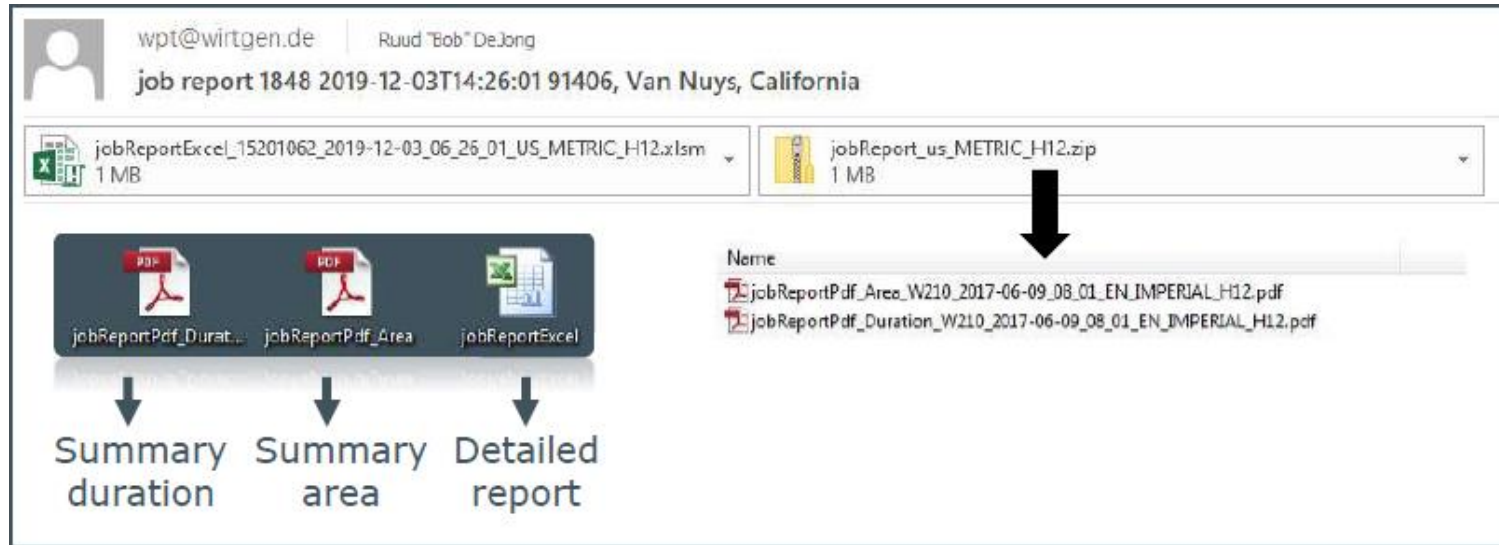
CONVENTIONAL JOB REPORTING





- 1** Laser scanner to measure the cross-sectional profile to be milled
- 2** Control panel on the operator's platform with current milling data
- 3** Satellite connection for precise position sensing
- 4** Mobile connection to transmit the data
- 5** Data centre to automatically generate the WPT report
- 6** WPT report with the most important performance and consumption data for the materials requirements planner

- Job reports are sent via email



- Job report PDF's
 - The two .pdf files contain a **summary of the job milling area and job duration**.

 jobReportPdf_Area

 **WIRTGEN**

machine site measuring 15200001-6
Köhlershohner Straße 60, Windhagen, 09.06.2017


machine name:	W210
job number:	15200001-6
order number:	TEST0001


overview

total area [m²]:	1557,3	Ø material density [kg/m³]:	2343,7
undefined [%]:	8,7	Ø cutting width [m]:	1,95
total weight [t]:	139,1	Ø cutting depth [cm]:	3,8
total volume [m³]:	59,3		
milling distance [m]:	799,0		



 milled area

 jobReportPdf_Durat...

 **WIRTGEN**

machine site measuring 15200001-6
Köhlershohner Straße 60, Windhagen, 09.06.2017

job begin:	09.06.2017 10:01
job end:	09.06.2017 11:27
machine name:	W210
job number:	15200001-6
order number:	TEST0001

overview

operating hours at	1198	job duration [hh:mm]:	01:26
job begin [h]:			



WIRTGEN

machine site measuring 15200001-6

order no. 18510001

Kühlenschanz Straße 60, Windhagen, 06.06.2017

job begin: 06.06.2017 07:00
job end: 06.06.2017 12:00

machine name: W20
W20 machine: 18510001

job no.: 18510001-6
order no.: 18510001

statistics

total area [m²]: 100,0

material density [kg/m³]: 1000,0

total tracks: 20

description:

material area [m²]: 100,0

material weight [kg]: 100,0

main motor 1: 1

material area:

time measured [h]: 1,0

material weight [kg]: 100,0

main motor 2: 1

material area:

total volume [m³]: 100,0

job time [h]: 1,0

main motor 3: 1

material area:

material density [kg/m³]: 1000,0

material time [h]: 1,0

current operating time [h]: 1

engine clockwise [h]: 0,0

order no. 1	material	material	material	material	material
	weight	weight	weight	weight	weight
	[kg]	[kg]	[kg]	[kg]	[kg]
1	100,0	100,0	100,0	100,0	100,0
2	100,0	100,0	100,0	100,0	100,0
3	100,0	100,0	100,0	100,0	100,0
4	100,0	100,0	100,0	100,0	100,0
5	100,0	100,0	100,0	100,0	100,0
6	100,0	100,0	100,0	100,0	100,0
7	100,0	100,0	100,0	100,0	100,0
8	100,0	100,0	100,0	100,0	100,0
9	100,0	100,0	100,0	100,0	100,0
10	100,0	100,0	100,0	100,0	100,0
11	100,0	100,0	100,0	100,0	100,0
12	100,0	100,0	100,0	100,0	100,0
13	100,0	100,0	100,0	100,0	100,0
14	100,0	100,0	100,0	100,0	100,0
15	100,0	100,0	100,0	100,0	100,0
16	100,0	100,0	100,0	100,0	100,0
17	100,0	100,0	100,0	100,0	100,0
18	100,0	100,0	100,0	100,0	100,0
19	100,0	100,0	100,0	100,0	100,0
20	100,0	100,0	100,0	100,0	100,0

1. material area: The area of the material is calculated by the material weight divided by the material density. The area is calculated in square meters (m²).

2. material weight: The material weight is calculated by the material area multiplied by the material density. The weight is calculated in kilograms (kg).

3. material density: The material density is calculated by the material weight divided by the material area. The density is calculated in kilograms per cubic meter (kg/m³).

4. material time: The material time is calculated by the material area multiplied by the material density. The time is calculated in hours (h).

5. material volume: The material volume is calculated by the material area multiplied by the material density. The volume is calculated in cubic meters (m³).

6. material weight [kg]: The material weight is calculated by the material area multiplied by the material density. The weight is calculated in kilograms (kg).

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15. material weight [kg]: The material weight is calculated by the material area multiplied by the material density. The weight is calculated in kilograms (kg).

16. material weight [kg]: The material weight is calculated by the material area multiplied by the material density. The weight is calculated in kilograms (kg).

17. material weight [kg]: The material weight is calculated by the material area multiplied by the material density. The weight is calculated in kilograms (kg).

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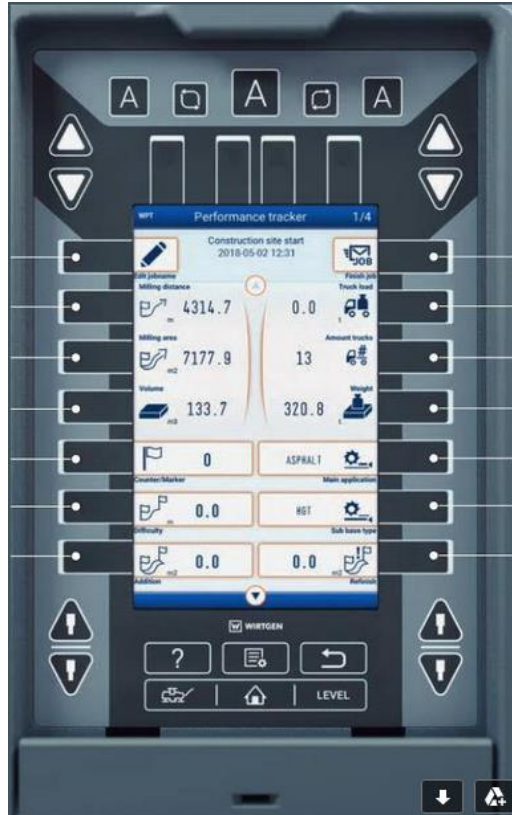
19. material weight [kg]: The material weight is calculated by the material area multiplied by the material density. The weight is calculated in kilograms (kg).

20. material weight [kg]: The material weight is calculated by the material area multiplied by the material density. The weight is calculated in kilograms (kg).

➤ Job Report in Excel provides detailed results and is editable



- An automatically generated report shows the daily milling performance including all consumables, a precise layout diagram, etc.



- ▶ The machine operator is directly supplied with all job information via the display panel.



- Seamlessly connects the machine, the operator and the project manager
- Performs an array of functions to simplify the operator's job
- Provides an array of information to simplify the manager's job

. . . AND JUST AROUND THE CORNER



CONNECTED PAVING

- Thermal imaging
- Real time process data
- Plant integration
- Trucking integration
- Real time data on your smart phone or computer

STAY TUNED!



THANK YOU!

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