



Will Burtt – AIS Positioning Solutions

Jim Preston – Topcon Positioning Systems

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Topcon Positioning Group

2100+ Active Patents | 500+ Engineers | 45+ PhDs







Topcon Today

Global Network

















Always One Step Ahead

























1932 Founded in Tokyo 1953 Topcon 35A Camera 1980 Mass Market Total Stations 1994 Laser & Machine Control Systems 2000 GNSS Technology 2004 mmGPS 3D precision with GNSS and Laser Tech 2006 Precision Agriculture 2009 3D-MC² Advanced Grade Control 2010 CropSpec Crop Health Monitoring 2017 SmoothRide Road Resurfacing Technology 2019 GTL-1000 Scanning Robotic Total Station 2022 MC-X Accelerate Machine Control



Modern Road Resurfacing

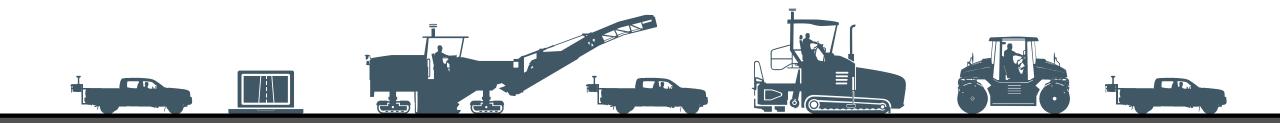
SmoothRide





SmoothRide

Time Safety Quality Cost



Core Technologies





Equipment Automation



Mobile Mapping



Resurfacing







Smoothness

Incentives and disincentives

Material Management

Quantity versus surface

Unknown Situation

Surface data and change orders





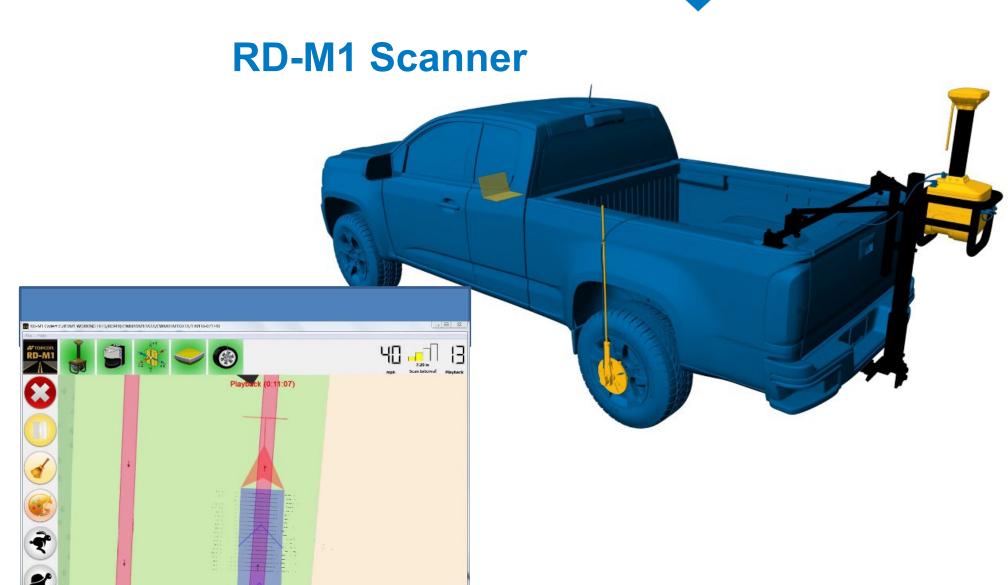
Conventional Methods Topcon RD-M1

















SmoothRide Milling & Paving





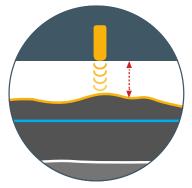








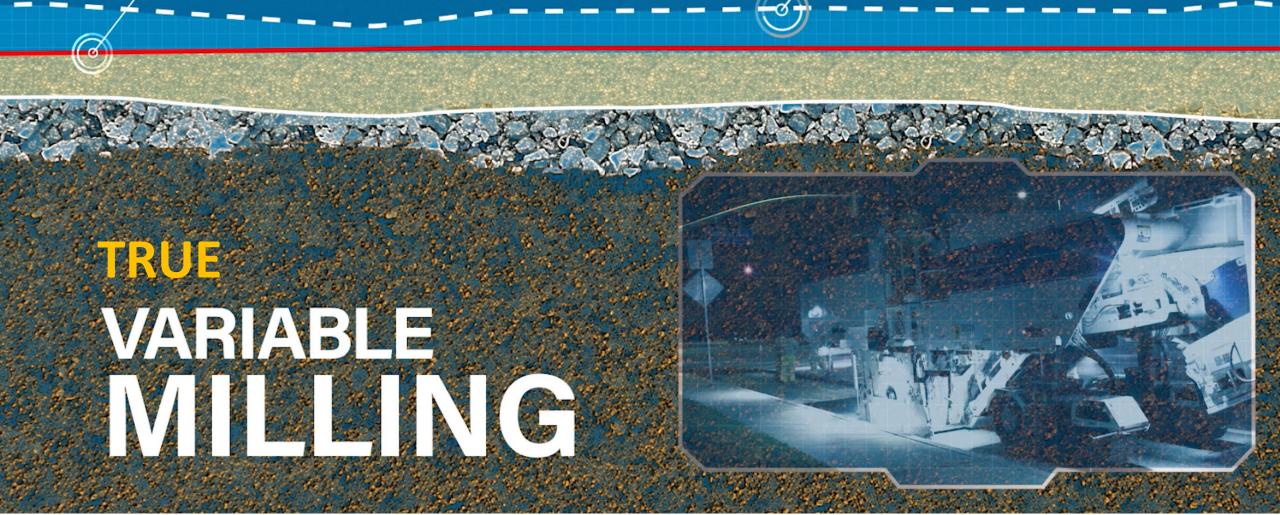






DESIGNED MILLING THICKNESS

ORIGINAL SURFACE





How It Works







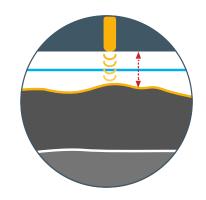


































SmoothRide Paving



DOT Projects

WisDOT

- RT. 83 Project
- IRI from +200 down to 30





Reports

Road Name: PATCHING Surface Name: DESIGN

•	Cross Section	report
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- Profile Report
- Resurface Report
- Slope Report
- VC Report

		378+25.000	-23.000	2811607.514	710734.085	168.85	7 LMA	тсн	-4.91				
		378+25.000	-20.000	2811606.174	710736.769	168.90	2	LT5	-6.73				
Offset Station	Offset	378+25.000	-16.000	2811604.388	710740.348	168.98	4	LT4	-7.58				
		378+25.000	-12.000	2811602.601	710743.927	169.07	6	LT3	-5.63				
		378+25.000	-8.000	2811600.815	710747.505	169.14	5	LT2	-5.94				
378±25 000	9 999	378+25.000	-4.000	2811599.028	710751.084	169.21	7	LT1	-7.21				P Station (yd)
	01231000	378+25.000	0.000	2811597.241	710754.663	169.30	5	CL		- RC	RC - RT	RT - REP	
378+30.000	0.000	378+25.000	4.000	2811595.455	710758.242	169.26	1	RT1	-3.61				
378+35.000	0.000	378+25.000	8.000	2811593.668	710761.821	169.17	8	RT2	-6.83	3.13	3.94	4.47	0+00.000
279 40, 000	000 0 000	378+25.000	12.000	2811591.882	710765.400	169.11	3	RT3	-5.34	2.47	3.74	5.07	0+25.000
378+40.000	0.000	378+25.000	16.000	2811590.095	710768.978	169.05	169.058 RT4		-4.45				0+50.000 0+75.000
378+45.000	0.000									3.50	4.01	3.96	1+00.000
378+50.000	0.000	378+30.000	-23.000	2811611.988	710736.318	168.83	5 LMA	тсн	-5.06	3.58	4.57	3.03	1+25.000
		378+30.000	-20,000	2811610.648	710739.002	168.88	2	LT5	-7.01	4.00	4.44	4.02	1+50.000
378+55.000	0.000	378+30.000				168.96	7	1 T4					1+75.000
378+60.000	0.000	169.190				2+25.000	-3.25	-3.53	-4.41	4.16	4.46	3.71	2+25.000
378+65.000	0.000	160 105				2+50.000	-2.88	-3.24	-3.94	4.14	4.40	4.15	2+50.000
		109.105				2+75.000	-2.79	-3.03	-3.75	3.24	3.84	4.41	2+75.000
378+70.000	0.000	169.162				3+00.000	-2.92	-3.08	-3.45	2.61	2.99	2.52	3+00.000
378+75.000	0.000	169.128				3+25.000	-5.07	-2.63	-3.07	2.09	2.41	2.50	3+25.000
	378+25.000 378+30.000 378+35.000 378+40.000 378+45.000 378+50.000 378+60.000 378+65.000 378+70.000	378+25.000 0.000 378+30.000 0.000 378+35.000 0.000 378+40.000 0.000 378+50.000 0.000 378+55.000 0.000 378+60.000 0.000 378+65.000 0.000 378+65.000 0.000	0ffset Station 0ffset 378+25.000 378+25.000 378+25.000 378+25.000 378+25.000 378+25.000 378+35.000 0.000 378+35.000 378+25.000 378+40.000 0.000 378+45.000 378+25.000 378+45.000 378+25.000 378+55.000 378+25.000 378+55.000 378+25.000 378+55.000 378+30.000 378+60.000 0.000 378+60.000 0.000 378+65.000 0.000 378+70.000 0.000 169.185 378+70.000 0.000 169.162	0ffset Station 378+25.000 -20.000 378+25.000 -16.000 378+25.000 -12.000 378+25.000 -8.000 378+25.000 -4.000 378+25.000 -4.000 378+25.000 -4.000 378+25.000 -4.000 378+25.000 4.000 378+25.000 8.000 378+25.000 8.000 378+25.000 10.000 378+25.000 10.000 378+25.000 10.000 378+25.000 10.000 378+35.000 -23.000 378+30.000 -23.000 378+30.000 -23.000 378+30.000 -20.000 378+30.000 169.102 378+60.000 0.000 169.185 378+70.000 0.000 169.162	Offset Station Offset 378+25.000 -20.000 2811606.174 378+25.000 -16.000 2811604.388 378+25.000 -12.000 2811602.601 378+25.000 -8.000 2811602.601 378+25.000 -8.000 2811599.028 378+30.000 0.000 378+25.000 -4.000 2811597.241 378+35.000 0.000 378+25.000 4.000 2811593.668 378+40.000 0.000 378+25.000 12.000 2811591.882 378+45.000 0.000 378+25.000 16.000 2811590.095 378+50.000 0.000 378+30.000 -23.000 2811611.988 378+55.000 0.000 378+30.000 -22.000 2811610.648 378+60.000 0.000 169.190 378+65.000 2811610.648 378+65.000 0.000 169.185 378+70.000 0.000 169.185	Offset Station 378+25.000 -20.000 2811606.174 719736.769 378+25.000 -16.000 2811604.388 710740.348 378+25.000 -12.000 2811602.601 710733.927 378+25.000 -8.000 2811608.815 710747.505 378+25.000 -4.000 2811599.028 710751.084 378+30.000 0.000 378+25.000 -4.000 2811597.241 710754.663 378+35.000 0.000 378+25.000 4.000 2811593.608 710758.242 378+40.000 0.000 378+25.000 8.000 2811593.608 710761.821 378+45.000 0.000 378+25.000 12.000 2811591.882 710765.400 378+45.000 0.000 378+25.000 16.000 2811590.995 710768.978 378+50.000 0.000 378+30.000 -23.000 2811611.988 710736.318 378+60.000 0.000 178+30.000 -20.000 2811618.648 710739.002 378+65.000 0.000 169.190 378+65.000	0ffset Station Offset 0ffset Station 0ffset 0	0ffset Station 0ffset 378+25.000 -20.000 2811606.174 710736.769 168.002 378+25.000 -16.000 2811604.388 710740.348 168.984 378+25.000 -12.000 2811602.601 718743.927 169.076 378+25.000 -8.000 2811609.815 710747.505 169.145 378+30.000 0.000 378+25.000 -4.000 2811599.028 710751.084 169.217 378+35.000 0.000 378+25.000 4.000 2811597.241 710754.663 169.305 378+40.000 0.000 378+25.000 4.000 2811593.668 710761.821 169.261 378+45.000 0.000 378+25.000 8.000 2811591.882 710765.400 169.113 378+45.000 0.000 378+25.000 16.000 2811590.095 710768.978 169.058 378+55.000 0.000 378+30.000 -23.000 2811610.648 710736.318 168.832 378+40.000 0.000 378+30.000 -23.000 2811610.648 710730.318 168.882 378+30.000 -0.000 378+30.000<	Offset Station Offset 378+25.000 -20.000 2811606.174 710736.769 168.902 LT5 378+25.000 -16.000 2811604.388 710746.348 168.984 LT4 170736.759 169.076 LT3 378+25.000 378+25.000 -1.2.000 2811602.601 710733.927 169.076 LT3 378+25.000 378	Offset Station Offset 0	Offset Station Offset Station	Offset Station Offset	Offset Station Offset

MAGNET Construction

378+80.000

378+85,000

378+90.000

378+95.000

378+99.000

379+00.000

379+05.000

0.000

0.000

0.000

0.000

0.000

0.000

169,099

169,058

169.014

168,961

168.914

168.902

378+80,000

378+85,000

378+90.000

378+95.000

378+99.000

379+00.000

379+05.000







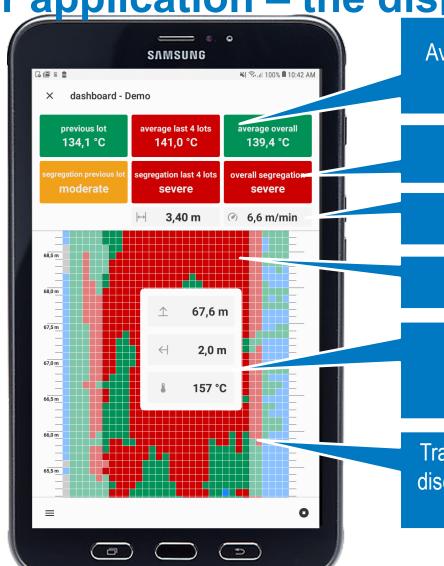


Pavelink Thermal Mapper application – the display

 Information presented by lot or truck load area

 No overwhelming information to process on-site

Easy to see color coding



Average temperature of current, recent and all areas.

Segregation information

Width and paving speed

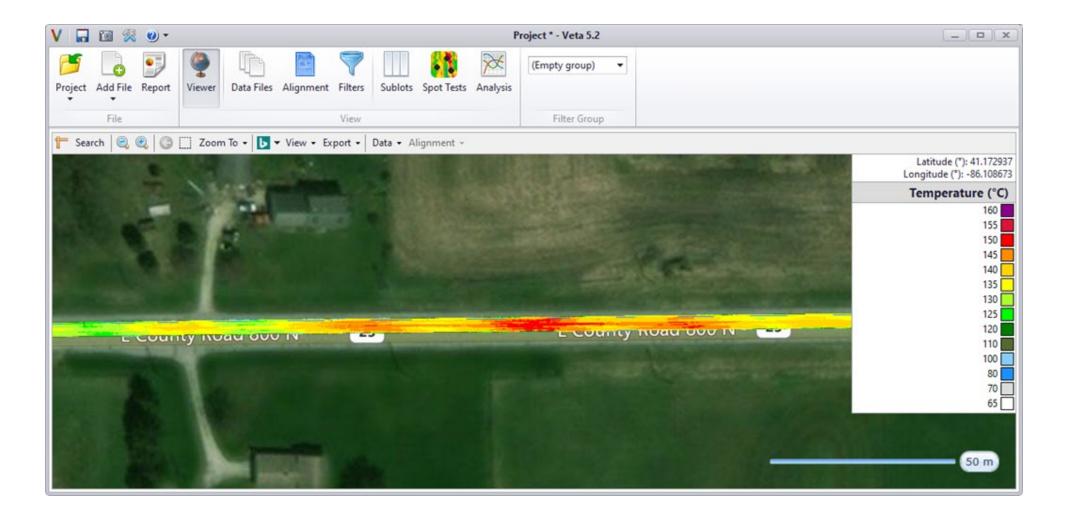
Interpreted thermal image

Touch and hold for local temperature

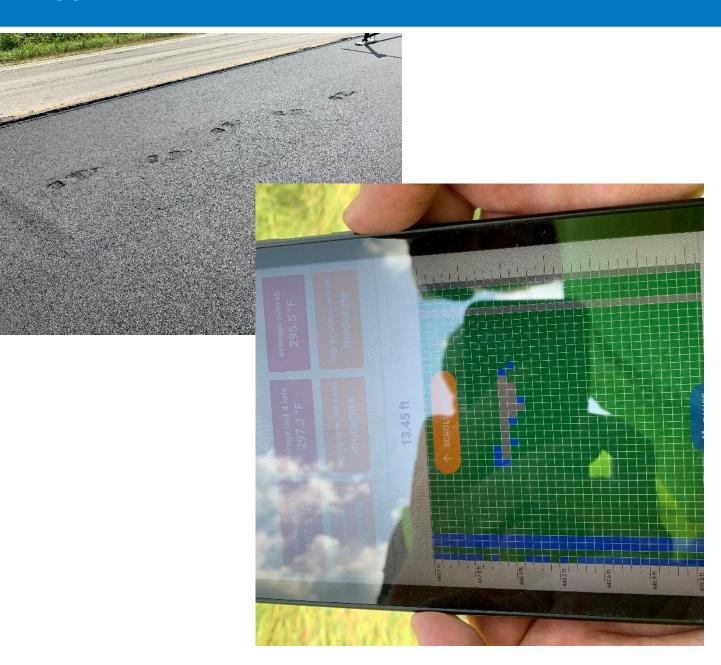
Transparent part is measured but discarded for statistics: adjustable edge cut-off



Dashboard Example (Veta)











Relationship - Segregation, Temperature & Smoothness

- Open Texture
- Low Temperature
- Low Density
- Rough Ride

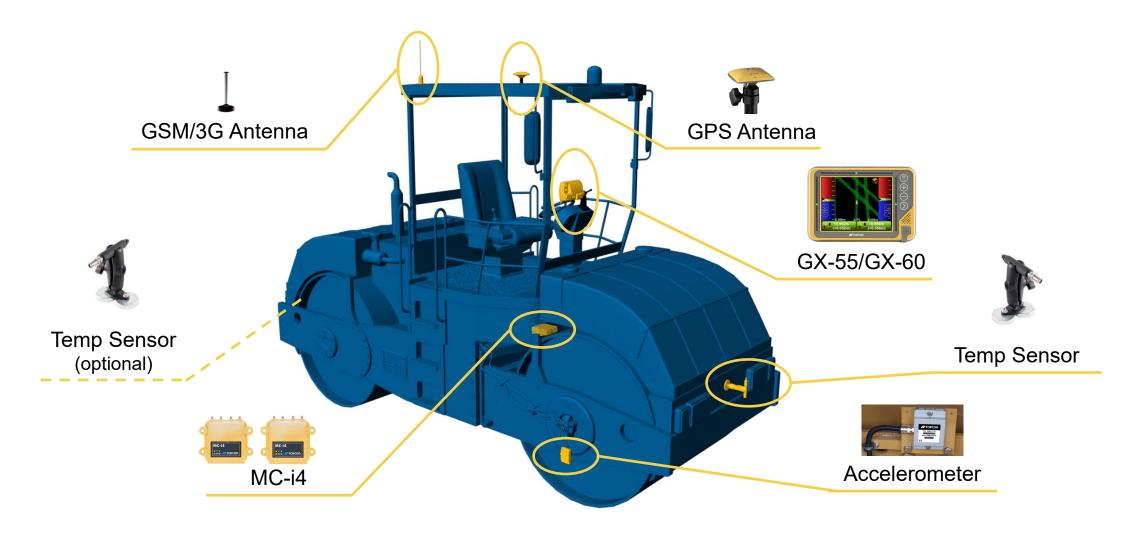




Intelligent Compaction



Machine Layout





Why Intelligent Compaction?

Shortcomings in Conventional Compaction



Limited on-the-fly feedback



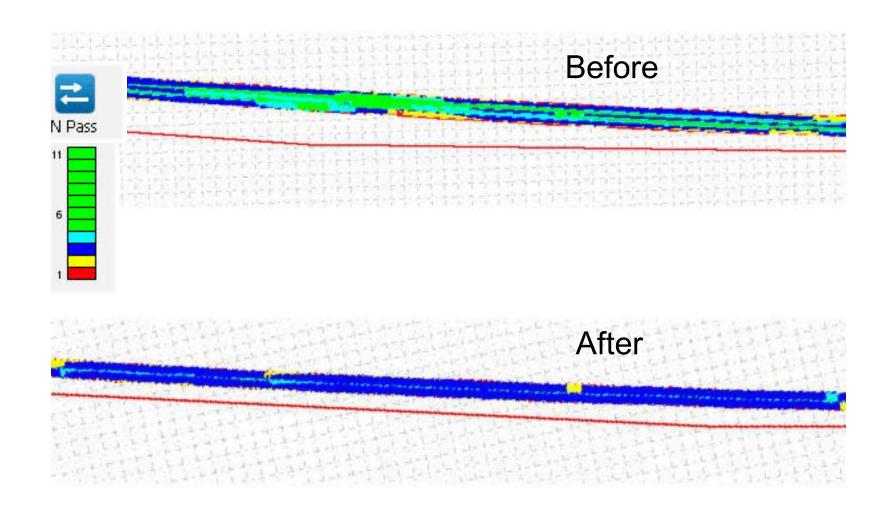
Over-compaction breaks down material



Under-compaction leaves air voids



Improved Rolling Pattern





Reporting and Analysis

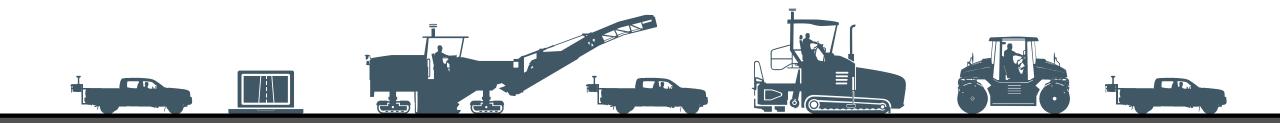






SmoothRide

Time Safety Quality Cost





HTOPCON