Antigo

Reconstructing Composite Pavements – Rubblization and HMA

Presented by Matt Shinners, Antigo Construction, Inc.

at Illinois Asphalt Pavement Association Annual Conference 3/27/23

Presentation Outline

- Reuse existing asphalt overlay as an intermediate base layer along with concrete rubblization and HMA overlay
- Wisconsin DOT USH 14 projects
- Crushed aggregate as an intermediate base layer
- Questions & answers

Reflective Cracking of Asphalt Overlay

Before rubblization

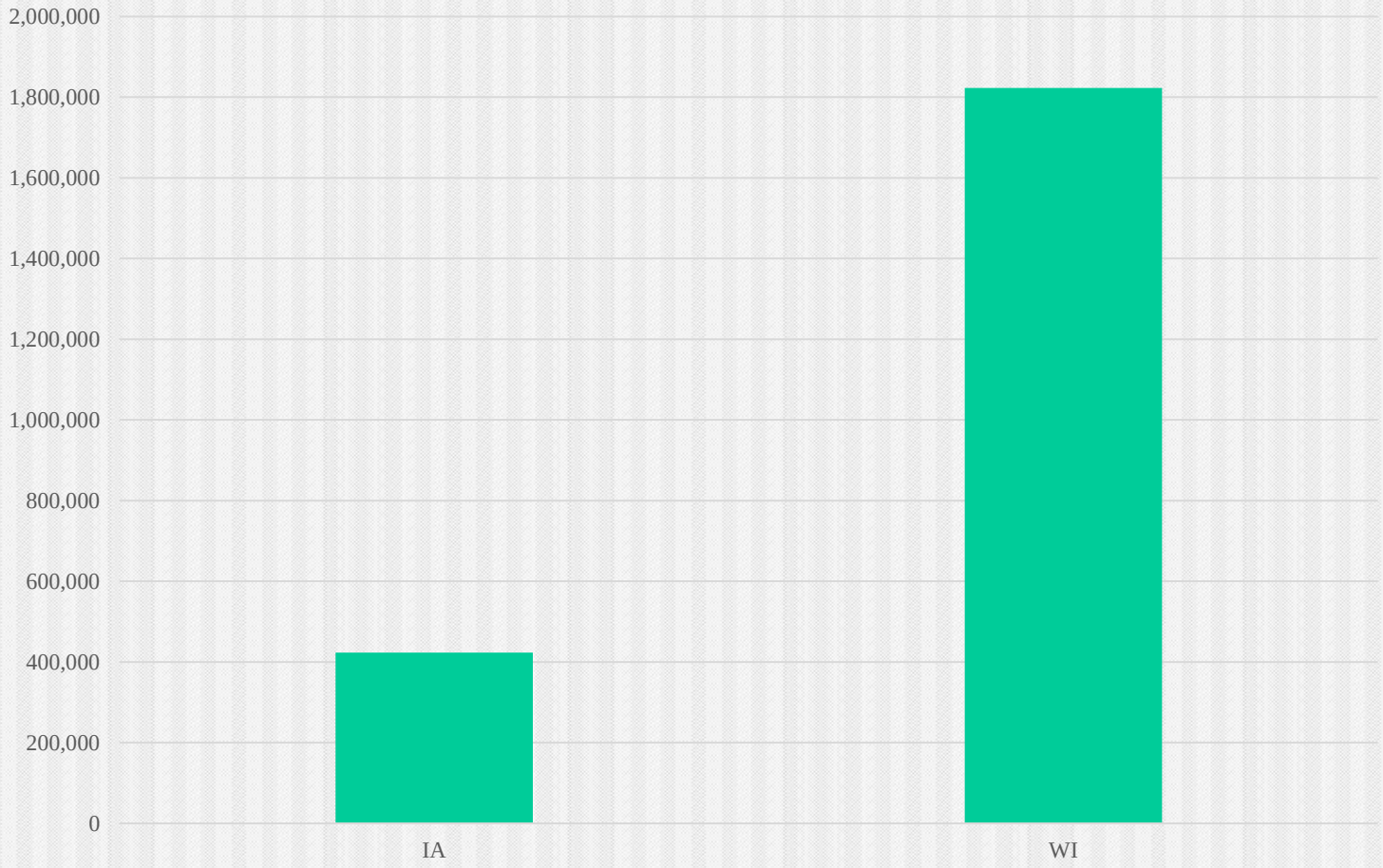
After rubblization

MHB Badger Breaker®

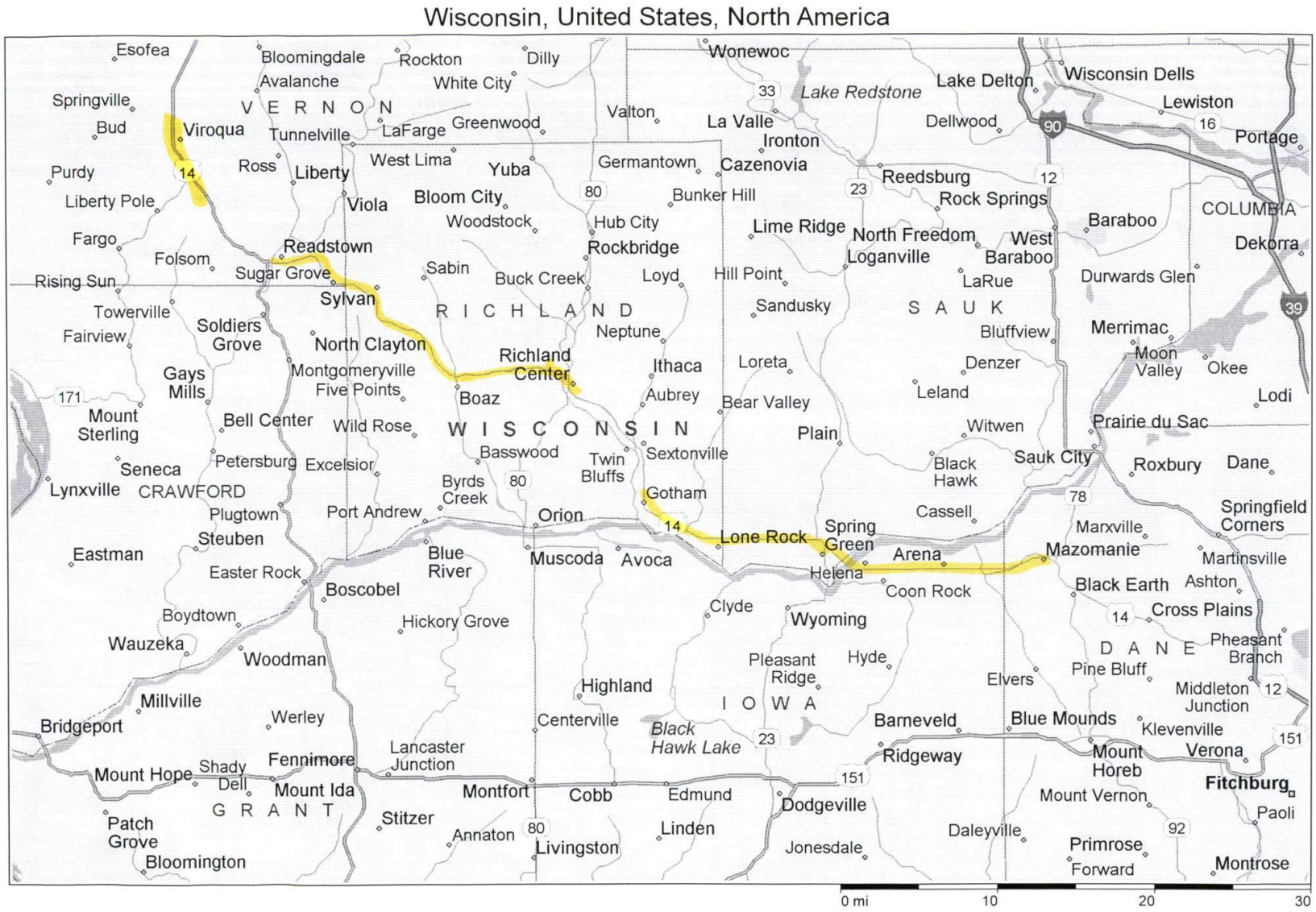
Grid Roller

Rantoul: Professor Marshall Thompson's inspection

Antigo's Square Yards of Rubblization & HMA Overlay with Intermediate Layer of Asphalt Millings



USH 14, SW Wisconsin



USH 14, SW Wisconsin

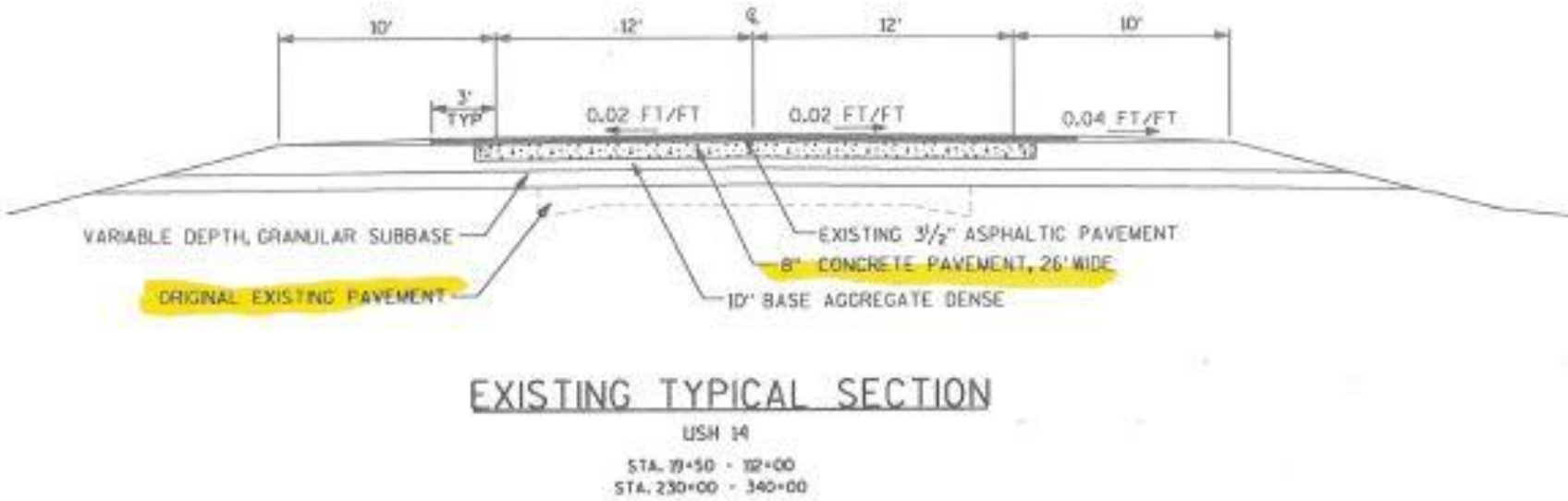
⇨ Rubblized and overlaid 55 miles of JPCP on 2-lane highway between 1998 and 2013 on 8 WisDOT projects

⇨ Milled and crushed existing asphalt overlay and reused as intermediate base layer (typically 4” to 5” thick)

⇨ HMA overlays ranged from 3.0” to 5.5” thick

⇨ Constructed one lane at a time with traffic flagging

USH 14, SW Wisconsin

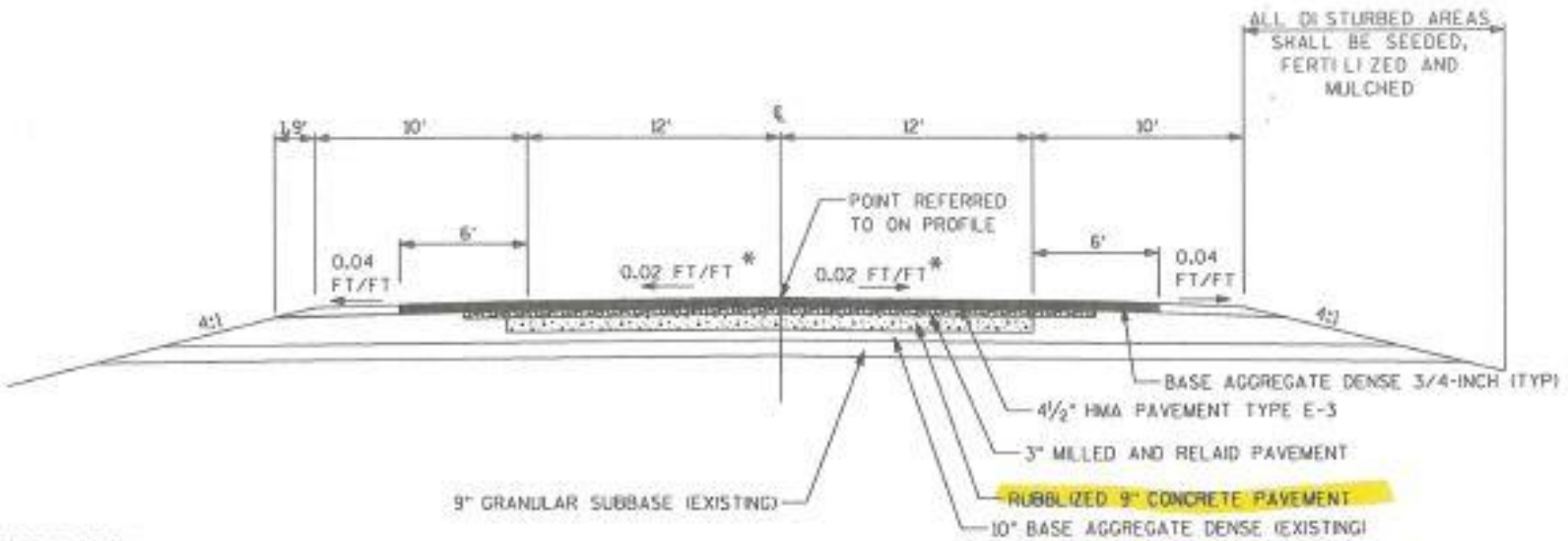


EXISTING TYPICAL SECTION

USH 14

STA. 179+50 - 192+00
STA. 230+00 - 340+00

USH 14, SW Wisconsin



SUPERELEVATION

MAINLINE

e= 4.0%	STA. 20+46.84 - 50+05.76
e= -2.0%	STA. 64+44.59 - 68+30.73
e= -2.7%	STA. 233+64.52 - 247+26.01
e= 2.7%	STA. 269+93.32 - 291+92.49

TYPICAL FINISHED SECTION

USH 14

STA 19+50 - STA 112+00
STA 230+00 - STA 340+00

EXCAVATION BELOW SU

USH 14, SW Wisconsin

HMA THICKNESS DESIGN

5/14/2008

Project ID:	1643-05-05
Highway Name:	USH 14
Project Termini:	
County Name:	Richland
Designer Name:	TAM

WisPave 2.4

C:\Program Files\State of Wisconsin\WisPave\1643-05-05 USH 14 STH 171 Richland

LOADING

Truck Type	% of ADT	DLT	# of Trucks	ESAL Load Factor	ESAL's
2D	2.3	3,112	72	0.3	22
3-SU	1.3	3,112	40	0.8	32
2S-1, 2S-2	1.3	3,112	40	0.5	20
3S-2	3.6	3,112	112	0.9	101
DBL BTM	0.1	3,112	3	2.0	6
			Design Lane Daily ESAL's		181
			Design Lane Total Life ESAL's		1,321,300

SOILS

DGI	14
Frost Index	F-3
Soil Support Value (SSV)	4

DESIGN CALCULATION

Required SN	4.29

USH 14, SW Wisconsin

DESIGN CALCULATION

Required SN 4.29

RUBBLIZE & HMA

HMA Alternative # 1

LAYER	MATERIAL TYPE	LAYER COEFFICIENT	LAYER THICKNESS (in)	SN
SURFACE	E-3	0.44	4.5	1.98
BASE	Milled & Relayed Asphaltic Concrete	0.2	3	0.6
SUBBASE 1	Rubblized Concrete Pavement	0.2	8	1.6
SUBBASE 2	EXISTING BASE	0.05	3	0.15
				4.33

PAVEMENT DESIGN WORKSHEET

1/2

EXHIBIT #4

Mill overlay, crush, & windrow on shoulder

Windrow on shoulder

Grader scrape concrete surface

Rubblize 1st lane

Close-up of MHB rubblizing

Grid roll 1st lane

Rubblized & grid rolled surface

After rubblize & grid roll

Blade crushed millings over rubblized concrete

Pneumatic-tired roller on crushed millings

Rubblize 2nd lane

Rubblize 2nd lane

Grid roll 2nd lane

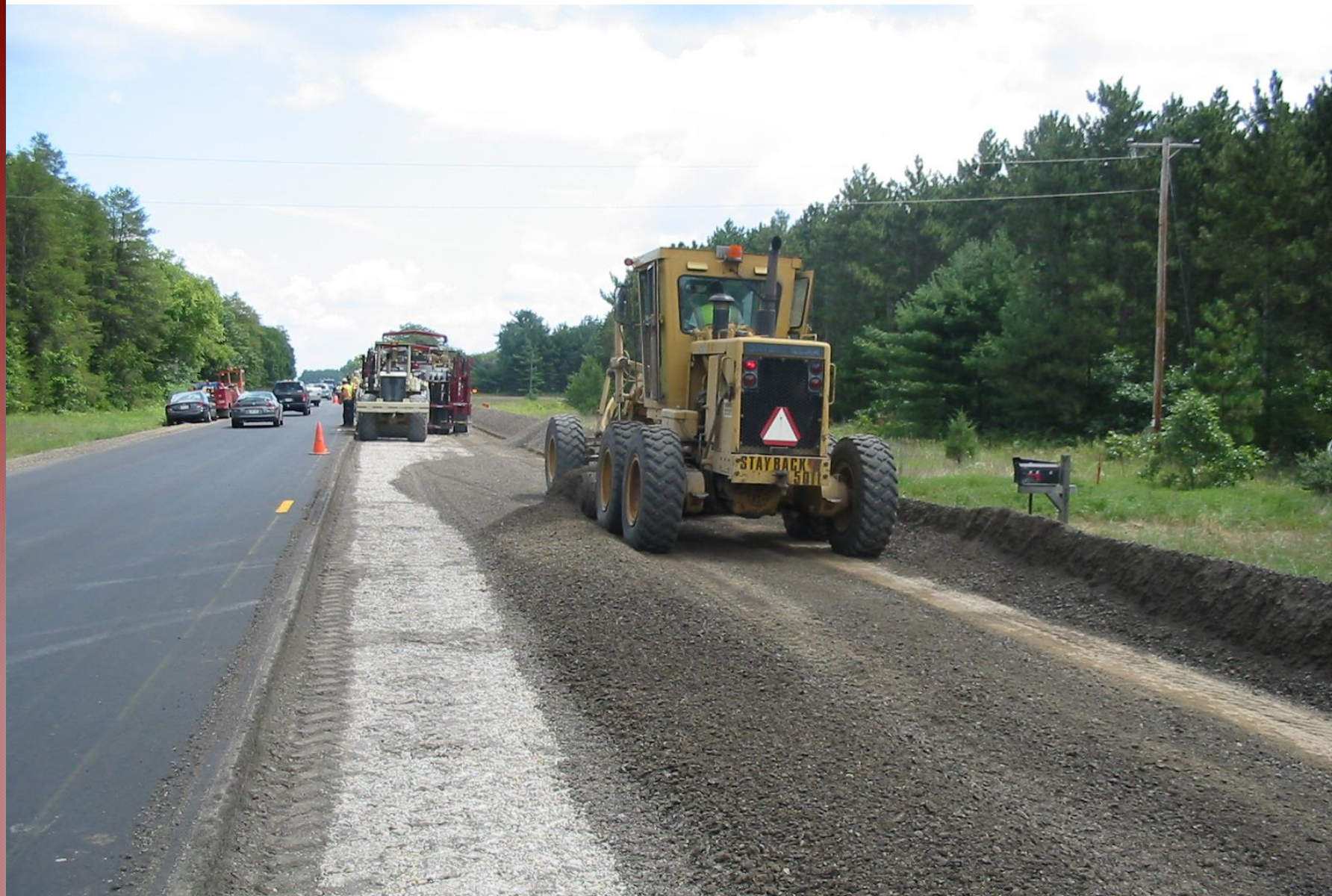
Antigo

Blade millings over 2nd lane

Some projects: pave 1st HMA lift each day

Grid roll 2nd lane

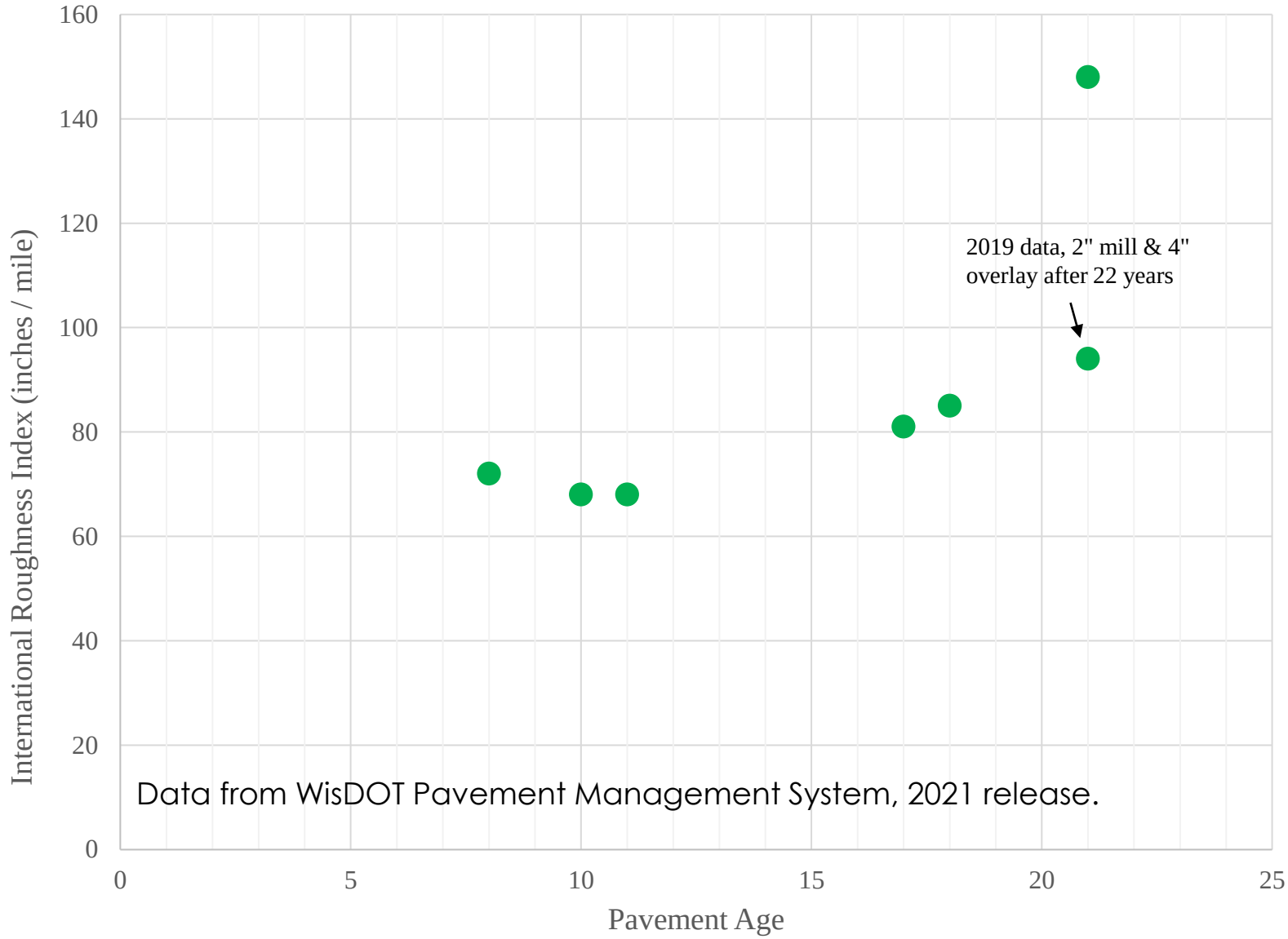
Blade crushed millings on 2nd lane



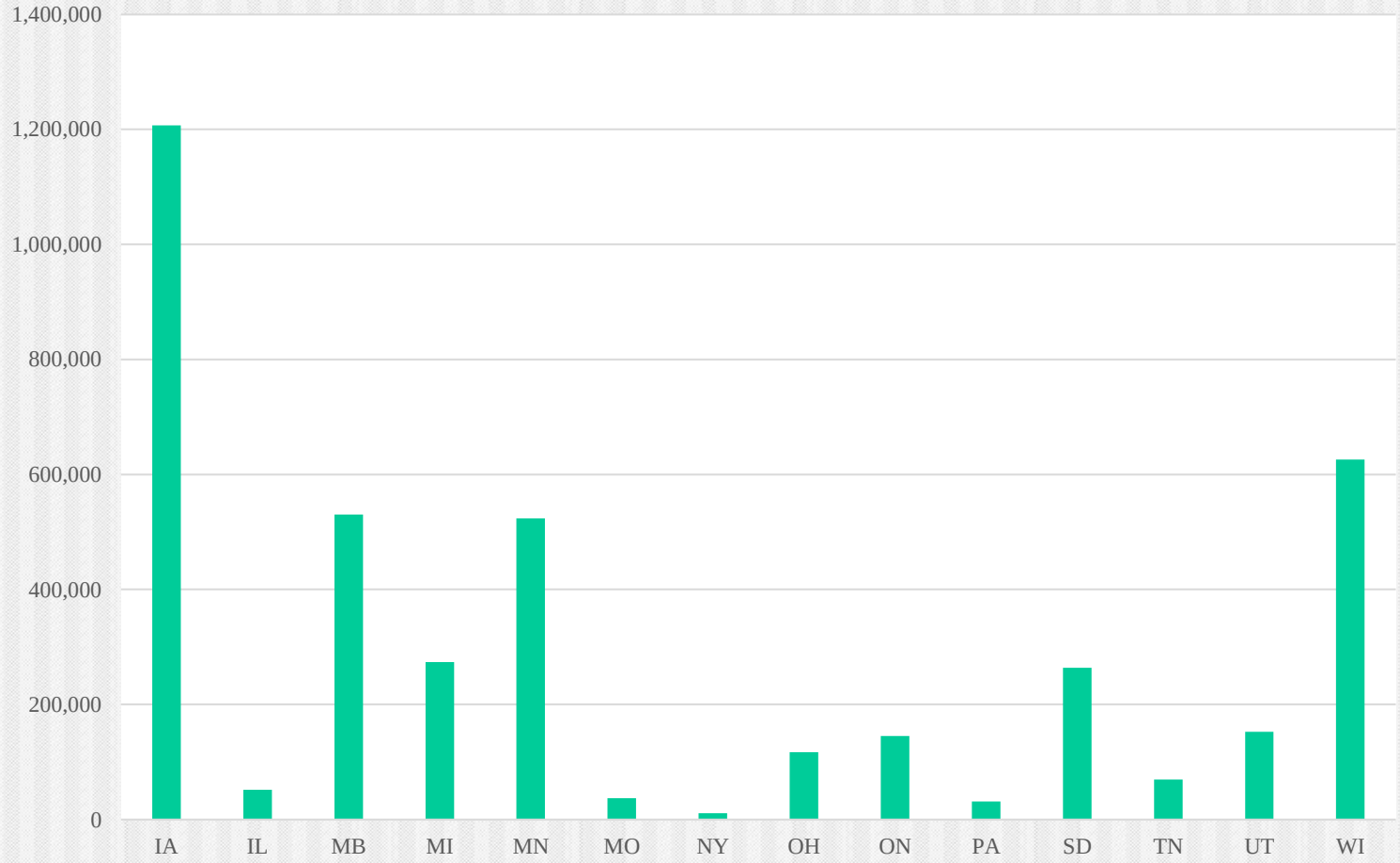
Smooth drum vibratory on crushed millings

Lined up for paving

USH 14 Projects: 2021 Average IRI vs Age



Antigo's Square Yards of Rubblization & HMA Overlay with Intermediate Layer of Crushed Aggregate



MHBT Badger Breaker®

Antigo

Modified rubblization w/occasional spalling

Weak area

Grid roll

Early start

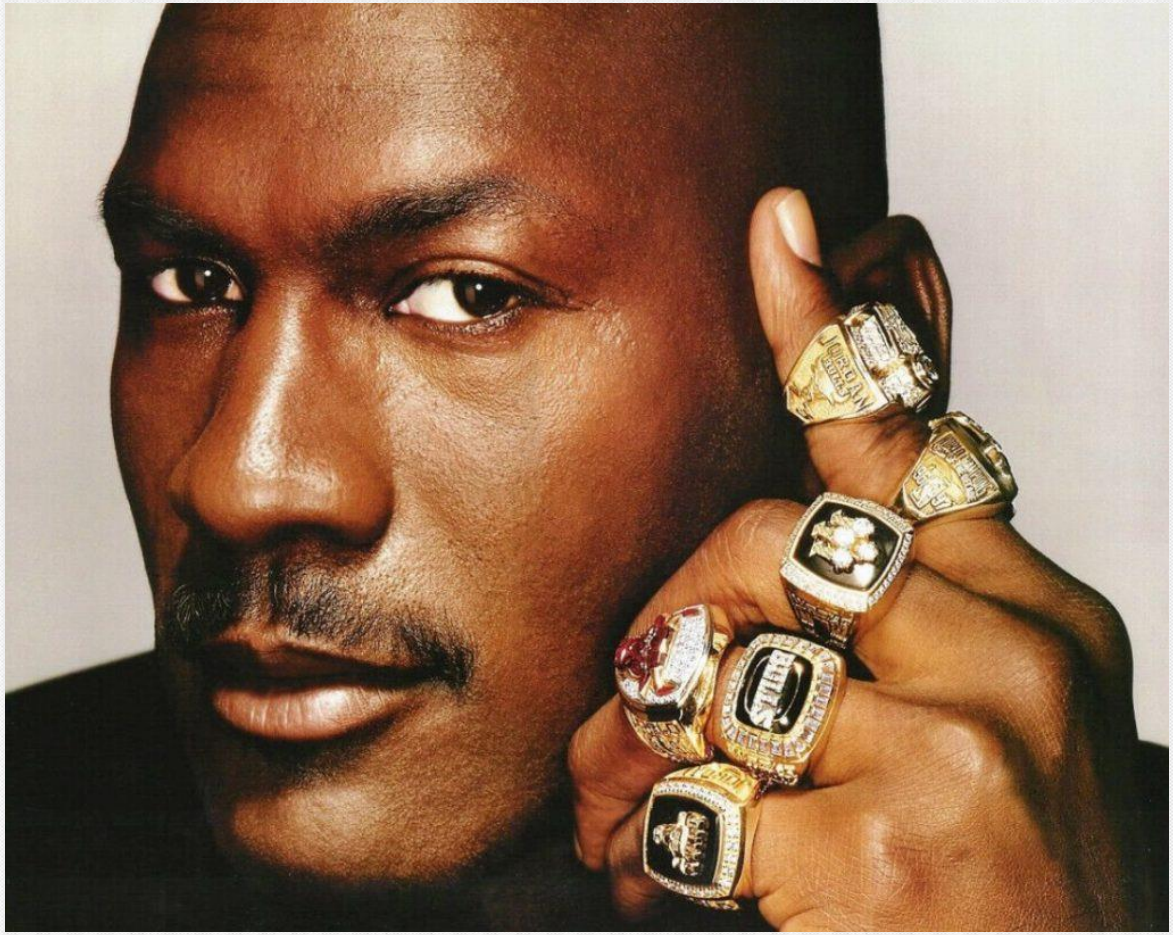
“Pave” choke stone 2” thick

Compact stone layer

Rubblization is Green

1. Existing concrete pavement and base recycled in-place reduces need for new materials.
2. Reduction in truck movements and equipment usage.
3. Good long-term performance of asphalt overlay.
4. Asphalt surface can be replaced as needed over time leaving rubblized layer as is (perpetual pavement).
5. Accelerated construction reduces impact on travelling public and reduces associated emissions.

Questions & Answers



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