

COLD RECYCLING TECHNOLOGY

Stronger Roads Built to Last!



FDR vs. Paver Laid FDR vs. CIR

Traditional FDR



Paver Laid FDR



Cold in Place Recycling





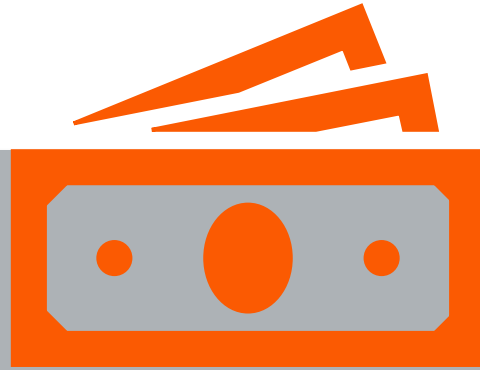
Benefits of Pavement Recycling

- Makes maximum use of YOUR funds



100%

of existing pavement
materials are used in
recycling process



Materials are
already
paid-for



Cost savings up to
60%
compared to
traditional
construction methods

➤ It is a SELF SUFFICIENT process with SUSTAINABLE benefits



90%
reduction in
transportation
of materials



Avoids dumping
good materials
in landfills and
mining virgin
resources for
new materials



Up to
80%
less emissions
created compared
to conventional
methods



60%
less
CO₂
emissions

FDR FULL DEPTH RECYCLING WHAT EQUIPMENT WILL YOU NEED?



Recycler for Traditional FDR

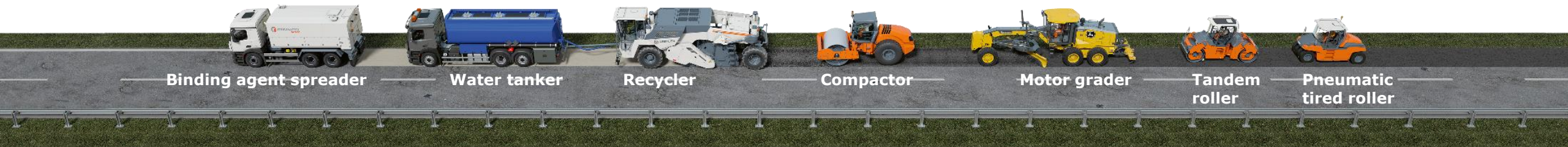


Rollers and Motor Grader

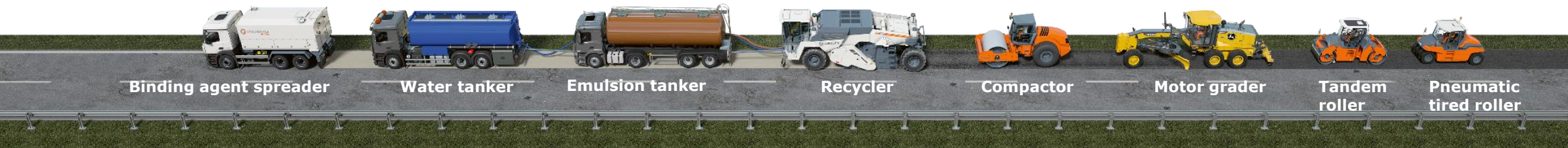


Traditional FDR Train

Recycling with pre-spread cement



Recycling with pre-spread cement and bitumen emulsion



Recycling with pre-spread cement and foamed bitumen



PAVER-LAID FDR



W 380 CRi – Paver Laid FDR



High Density Paver plus Width > 12'



Necessary Equipment Innovations:

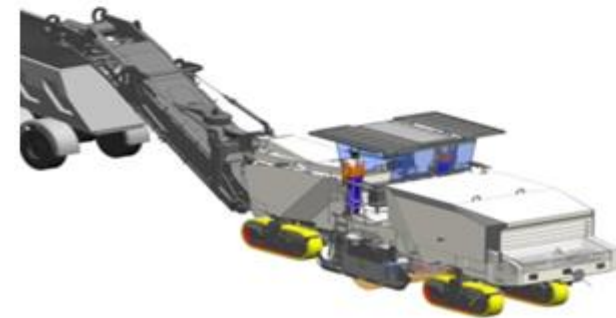
- Recycler with:
 - Depth ability up to 12"
 - Injection system for small or large volumes of material
- Paver with:
 - Larger tunnels and augers
 - Ability to lay mats up to 15" in depth
 - Screeds with high density compaction

➤ Rear-load Recycler into Paver

- CIR – 3" – 6"
- FDR – 12" **(NEW)**

➤ Secondary machine applications:

- Front-load milling
- This proves beneficial as all Paver Laid roads need to be trimmed to get the needed rideability.

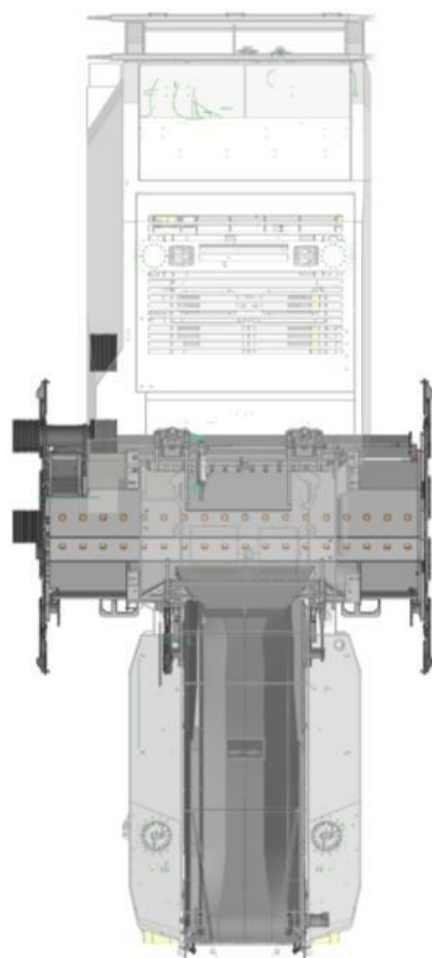


W380CRi

W 380 CRi Flexible Working Widths

W 380 CR(i)

Multiple Cutting System-MCS Extend

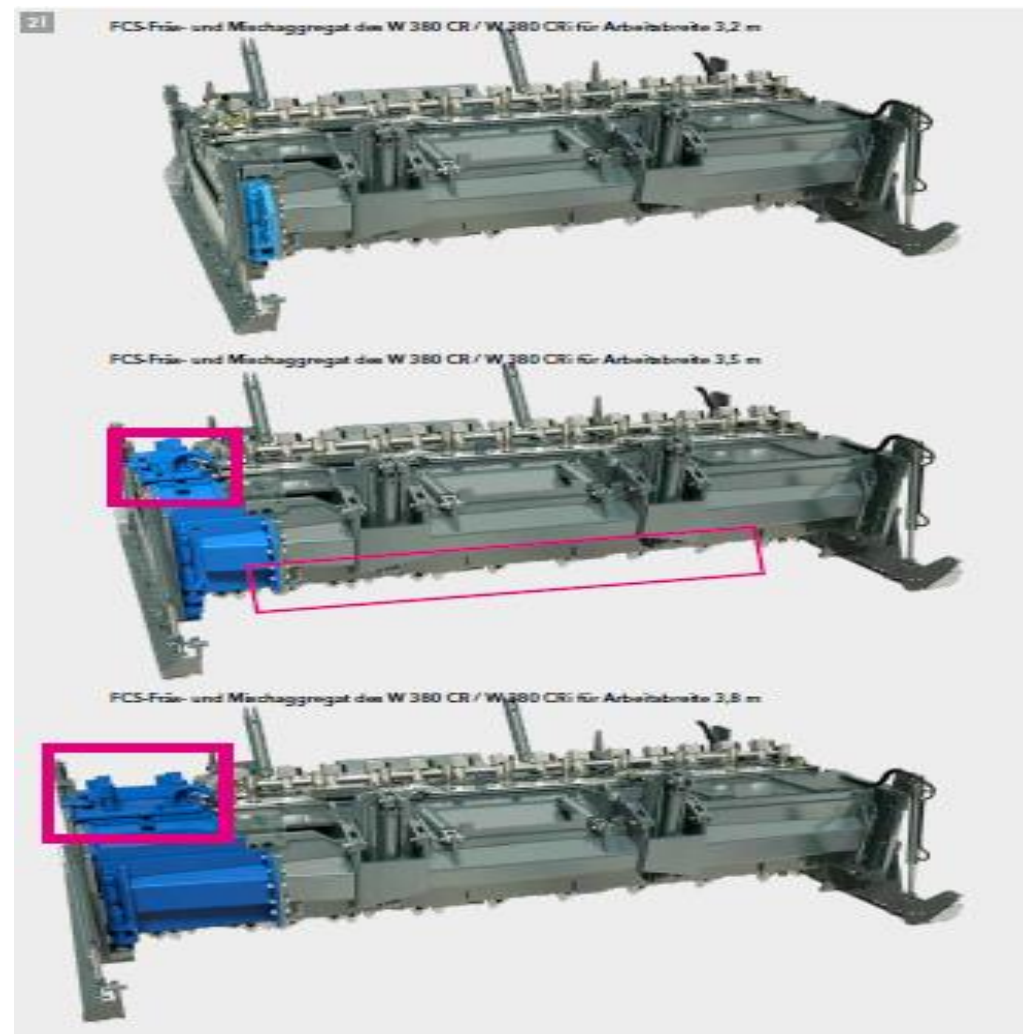


FB: 3.2 m-- 3.8 m

10' 6"

11' 6"

12' 6"



Greater than 12' 6" widths?



- Mill shoulder with 4' or 5' mill, windrow material in front of W 380CRI
- Left and right independent adjustable plows funnel material b/t tracks

Recycling Performance - North Carolina Case Study

- Rear load application with high production up to 875 t/h
 - Pre-milling with standard mill for variable cutting width – windrow in front of CR
 - Picked up by CR, milled and mixed with main pass
 - Pave with Vögele in one width
 - Production example:
14.5ft x 8" x 22ft /min = 212.7ft³/min

Density: 129# per cu ft
= **814.7 tons per hour**



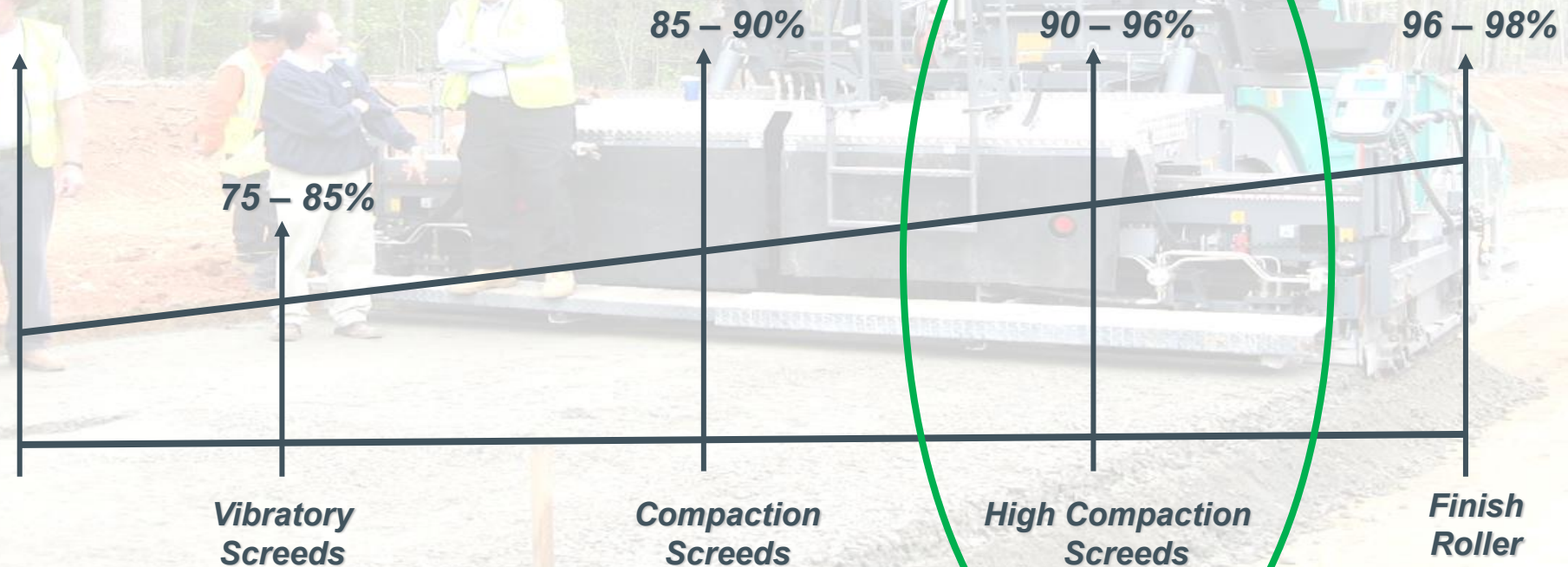
Paver-Laid FDR



Paver-Laid FDR

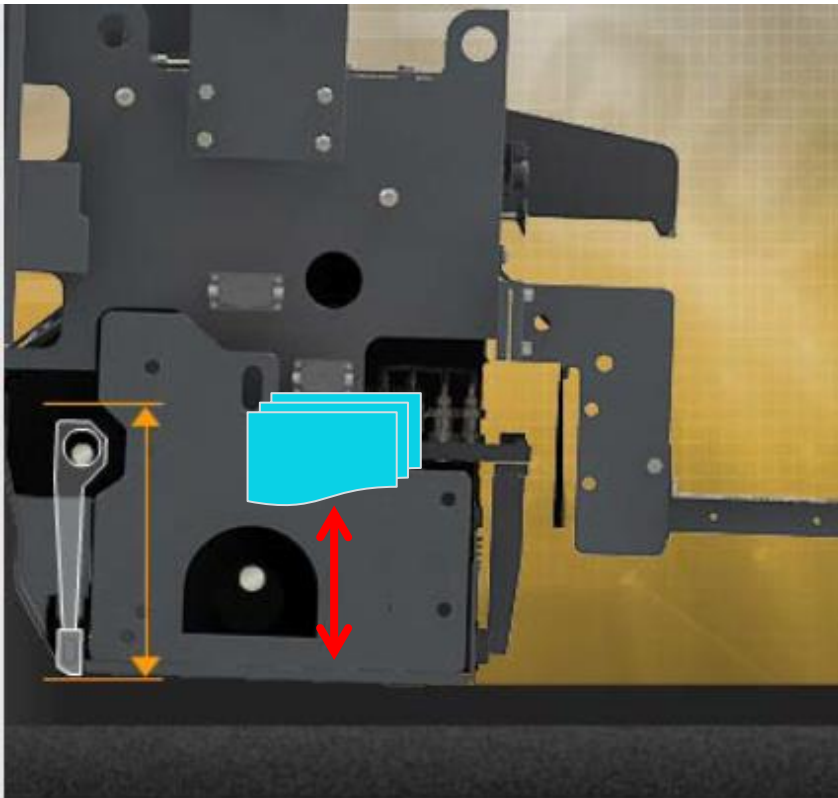
Screeds & Roller Compaction Comparisons:

Average Density at the back of the screed:

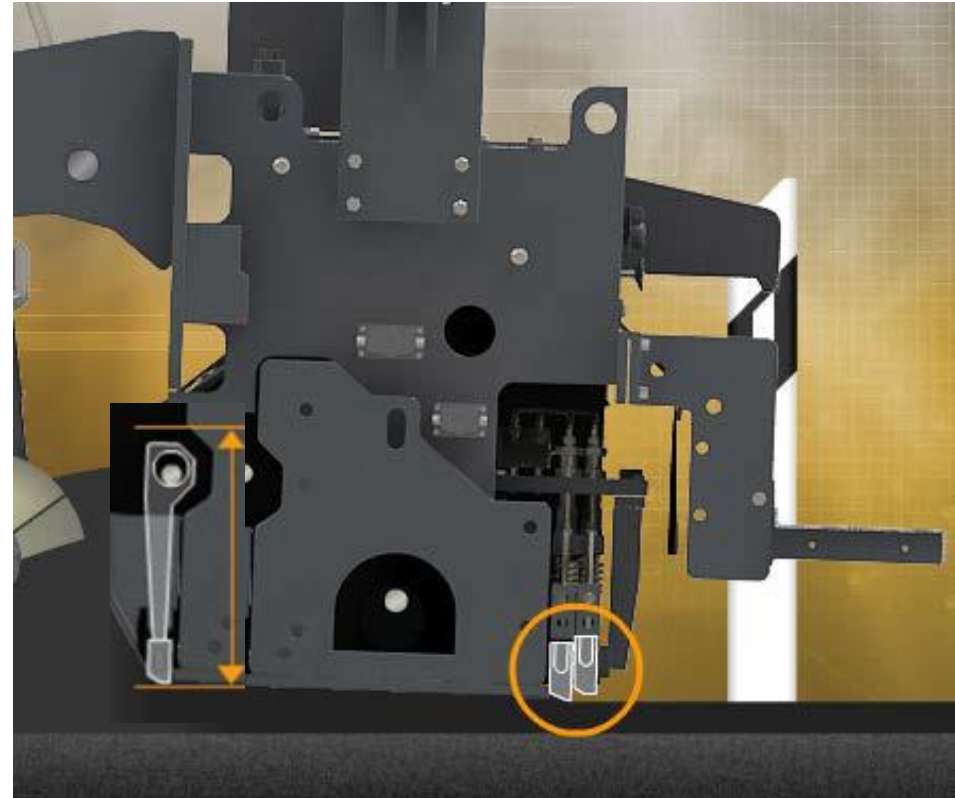


Paver-Laid FDR

Compaction Screed 6"- 8"



High Compaction Screed >8"



Pros:

- Full lane width in one pass
- All one direction except for rollers
- Safer for workers and traveling public
- Less segregation = higher quality
- Shorter schedules means less disruption
- A do it YOURSELF total base repair

Cons:

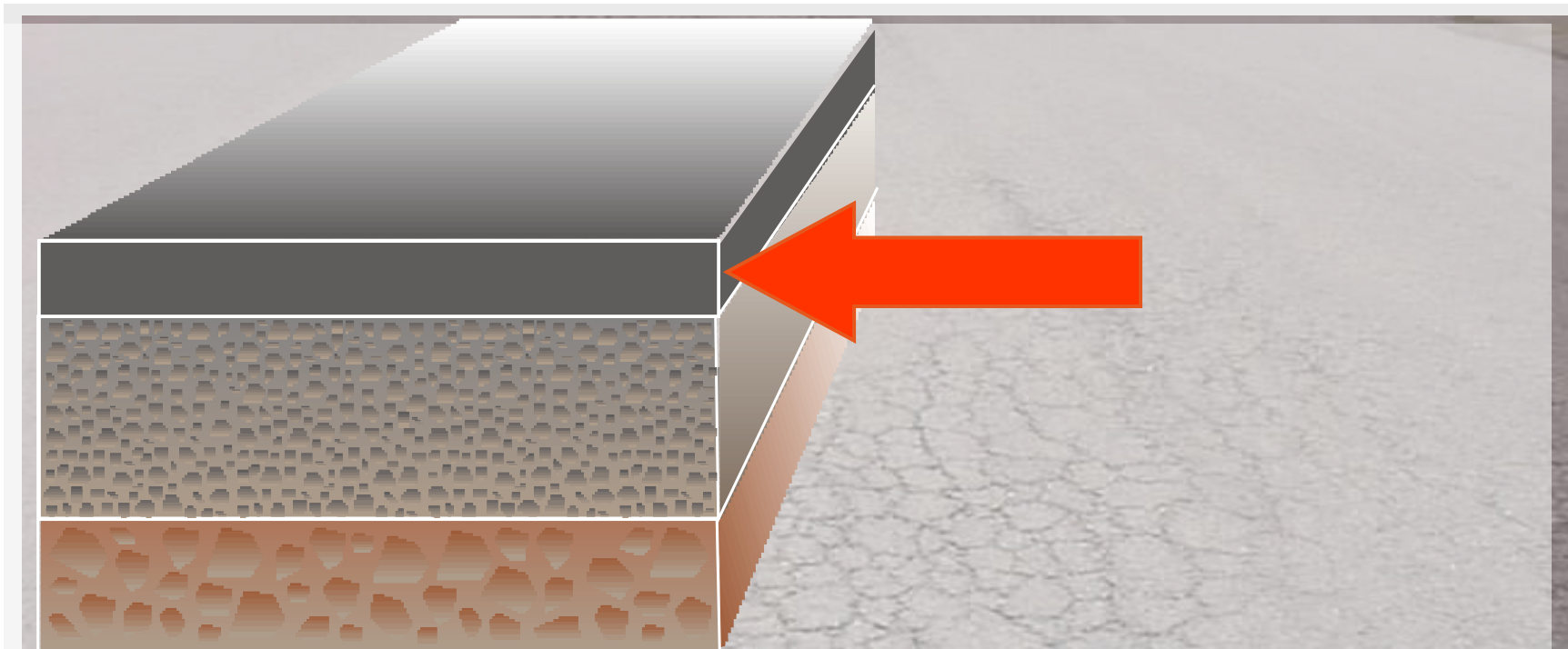
- Recycled layer will likely need to be trimmed
- Equipment investment

CIR COLD IN-PLACE RECYCLING

380 CR – Cold In Place Recycling



- Typical application range – 3"-6"
- Construction of Base Layer



Typical Pavement for Cold Recycling

Cold In-Place Recycling Candidate



Cold In-Place Recycling Candidate





- ▶ Completed >4" foamed bitumen CIR first pass

FDR vs. Paver Laid FDR vs. CIR

Traditional FDR

- ✓ Cracks propagate into the subbase or subgrade
- ✓ Up to 20" Depth
- ✓ Addresses surface and subgrade failure
- ✓ Motor Grader Required
- ✓ Multiple pass operation

Paver Laid FDR

- ✓ Cracks propagate into the subbase or subgrade
- ✓ Up to 12" Depth
- ✓ Addresses surface and subbase and subgrade failures
- ✓ HD Paver Required
- ✓ 1 full lane pass operation

Cold in Place Recycling

- ✓ Cracks do NOT enter the subgrade
- ✓ 3"-6" Depth
- ✓ Addresses only asphalt layers
- ✓ Standard Paver Acceptable
- ✓ 1 full lane pass operation

LONGEVITY AND DURABILITY

States with Recycling Programs

ARIZONA	SP 408	NEVADA	SP 305
CALIFORNIA	SP 30-1	NEW MEXICO	SP 415
COLORADO	SP 310	NEW YORK	SP 304
FLORIDA	SP 332	OHIO	SP 827
GEORGIA	SP 315	PENNSYLVANIA	MS -0370
IDAHO	SP 308	RHODE ISLAND	SP 406
ILLINOIS	SP 400	SOUTH CAROLINA	SP 306
INDIANA	SP 307	SOUTH DAKOTA	SP 280
IOWA	SP 2116	TENNESSEE	SP 304
KENTUCKY	SP 207	TEXAS	SP 3089
MAINE	SP 307	VERMONT	SP 310
MINNESOTA	SP 2215	VIRGINIA	SP 315
MISSISSIPPI	SP 632	FHWA	SP 306

Thank you for your attention

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