
ARRA

ASPHALT RECYCLING & RECLAIMING ASSOCIATION

ARRA 1976

MEMBERSHIP of ARRA

- CONTRACTORS
- SUPPLIERS
- AFFILIATE MEMBERS

Hot In-Place Recycling

A Rehabilitation Alternative

ARRA

ASPHALT
100% RECYCLABLE
"IN-PLACE"

The 3 Types of HIR

Surface Recycling:

Heating, reworking and rejuvenating the top one-two inch of an existing asphalt pavement in preparation of either a seal coat, micro-surfacing or overlay

Repaving:

Heating, reworking and rejuvenating the top one inch of an existing asphalt pavement and simultaneously applying an overlay while the temperature of the recycled layer is 200°F

Remixing:

Heating, reworking and rejuvenating the top 1 to 2 inches of an existing asphalt pavement adding virgin aggregate and/or admix and mixing the newly recycled material in a pug mill mixing plant prior to laying, either as a binder or surface course

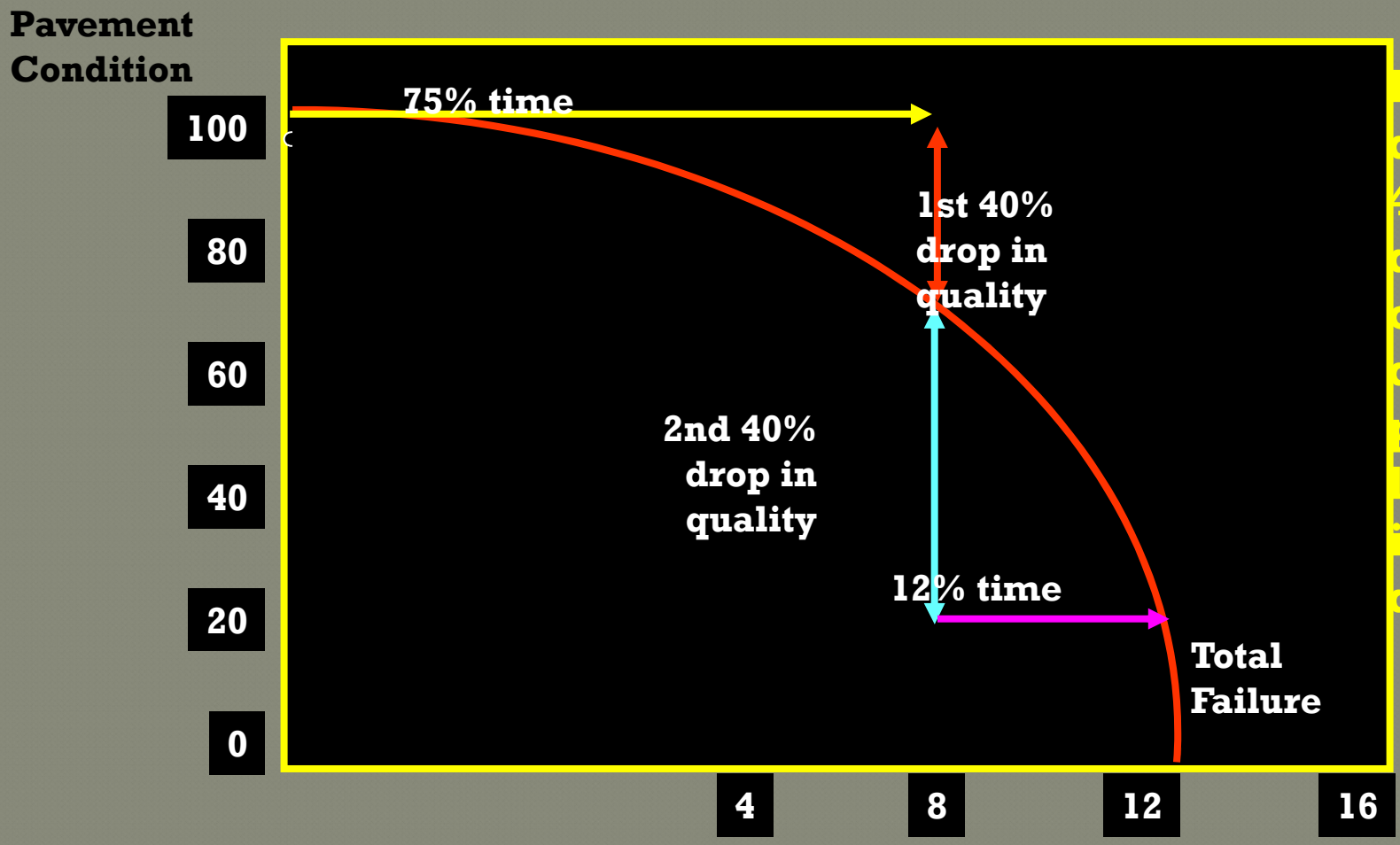
The Bottom Line Question

- How can I maximize the return on my investment in asphalt pavement rehabilitation funding?

Answer

- By repairing your asphalt pavement during the first 40% drop in quality

The Savings of Timely Maintenance



Each $1 spent during the first 40% drop in quality will cost $5-$7 if delayed until pavement loses 80% of its original quality.

Remixing

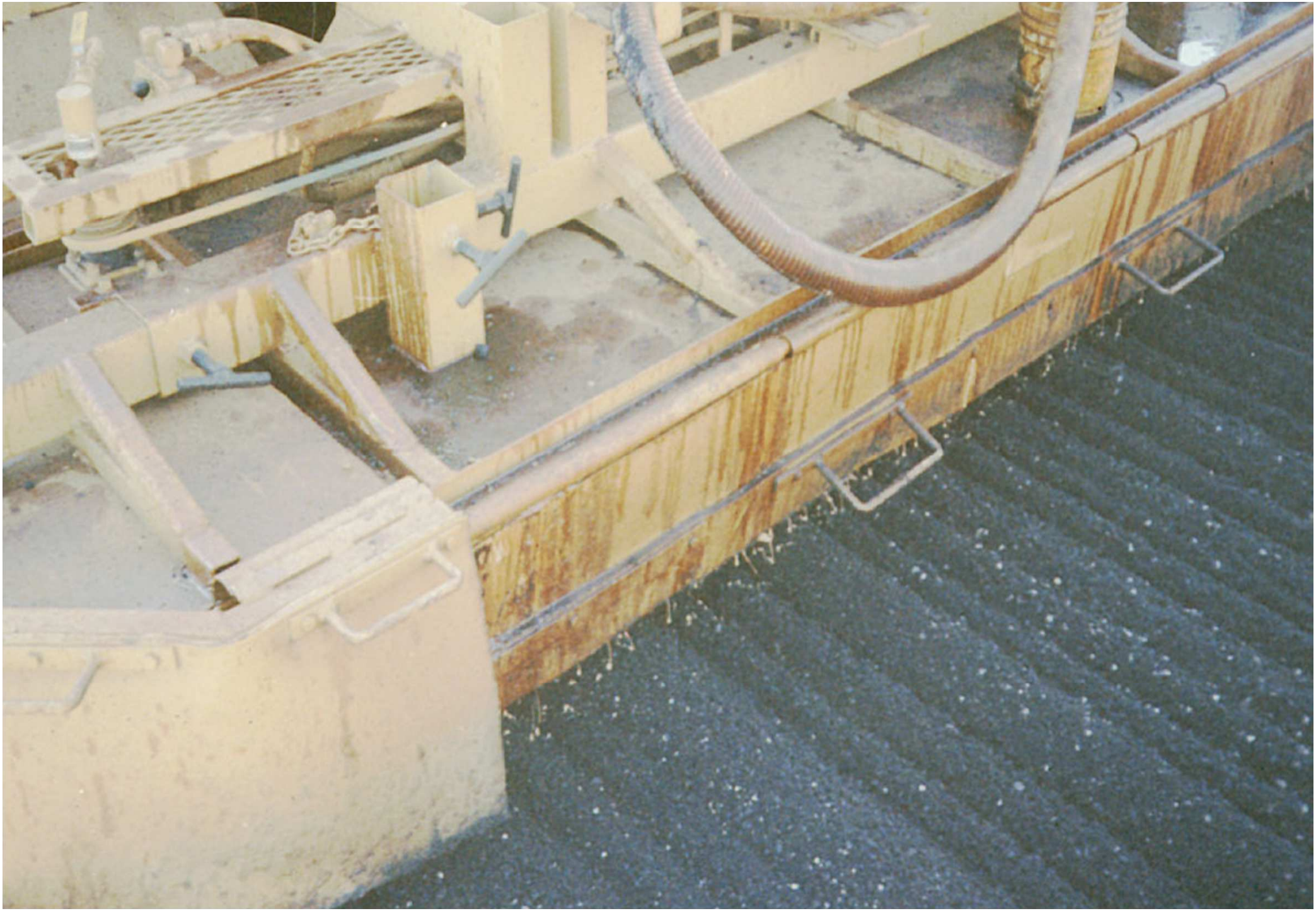
Surface Recycling 1 inch

The 1” HIR Process

- Surface heated to approximately 275°F

The HIR Process

- Softened pavement scarified to depth of 1”




NONPOTABLE


GALLAGHER
ASPHALT
E63


E40
GALLAGHER ASPHALT
GALLAGHER ASPHALT
HOT-IN-PLACE RECYCLING
ASPHALT
100% RECYCLABLE

Dustrol, Inc.

Mobile Asphalt Recycling System

Deep Heating

The Process

DEEP HIR SYSTEM

- Continuous Process with Self-Contained Train
  - Asphalt Surface Heated
  - Heated Pavement Milled in ½" to ¾" increments
  - Engineered Emulsion Added at Design Content
  - Materials Mixed and Windrowed
  - Recycled Mix Placed by Paver with Vibratory Screed
  - Mat Compacted
  - Surface Applied
    - Such as UBAWS, Micro, Polymer Chip Seal, Thin HMA overlays

The Process

DEEP HIR SYSTEM

Continuous with Self-Contained Train

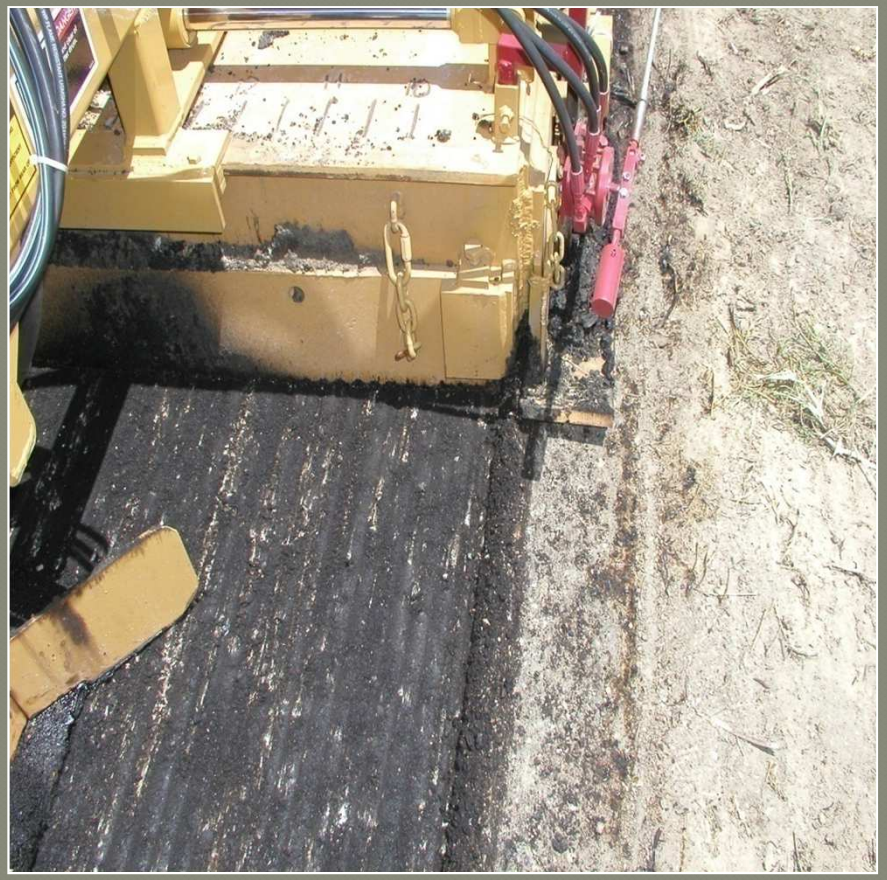
Mobile Asphalt Recycling Train

- Asphalt pre-heaters and milling heaters working in front of the asphalt recycling unit. Several pre-heaters and heater millers can be used to achieve the specified heating depth

Pre-heaters and milling heater

Milling Heater

- Milling Heater cutting ½” of heated material. The milling heads are capable of milling 15’ wide.



Milling Heater

- Milling heater's windrow of material. This material is being processed between 200 and 275 degrees F.

Tunnel Heater

- Windrow of material from milling heater going under a tunnel heater. Heat is transferred into underlying pavement and into windrow.

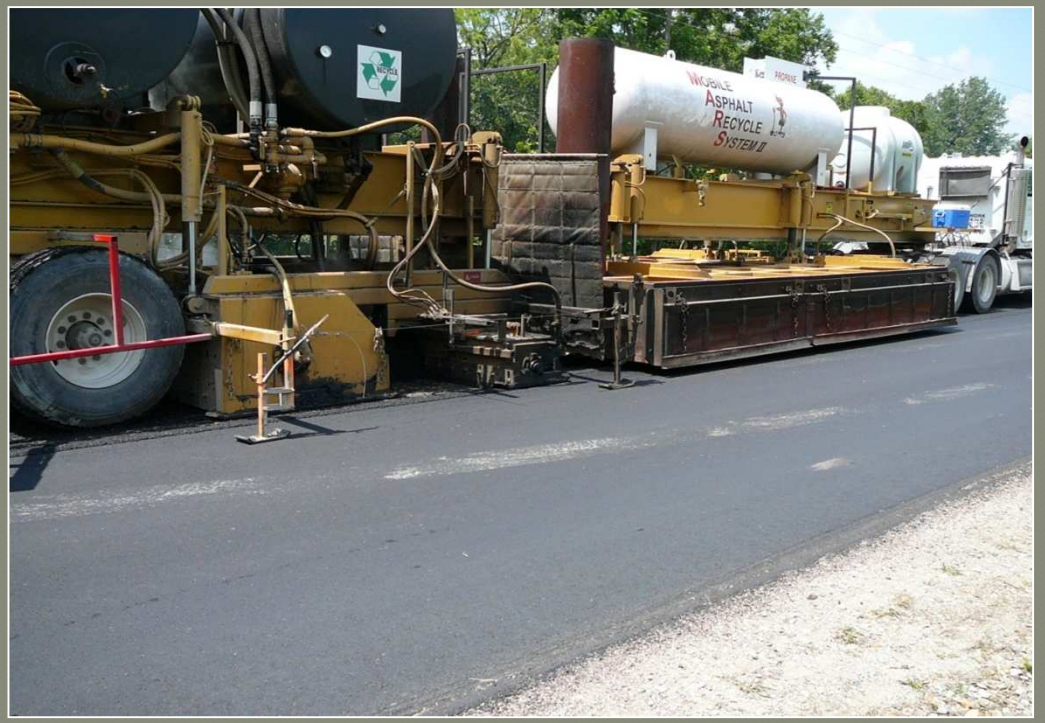
The Process

DEEP HIR SYSTEM

Multiple heaters and heater mills used as needed

Milling, Mixing Heater

Milling drum on main unit mills additional depth and adds emulsion. The milling drums extend to process width up to 15 feet



The Process

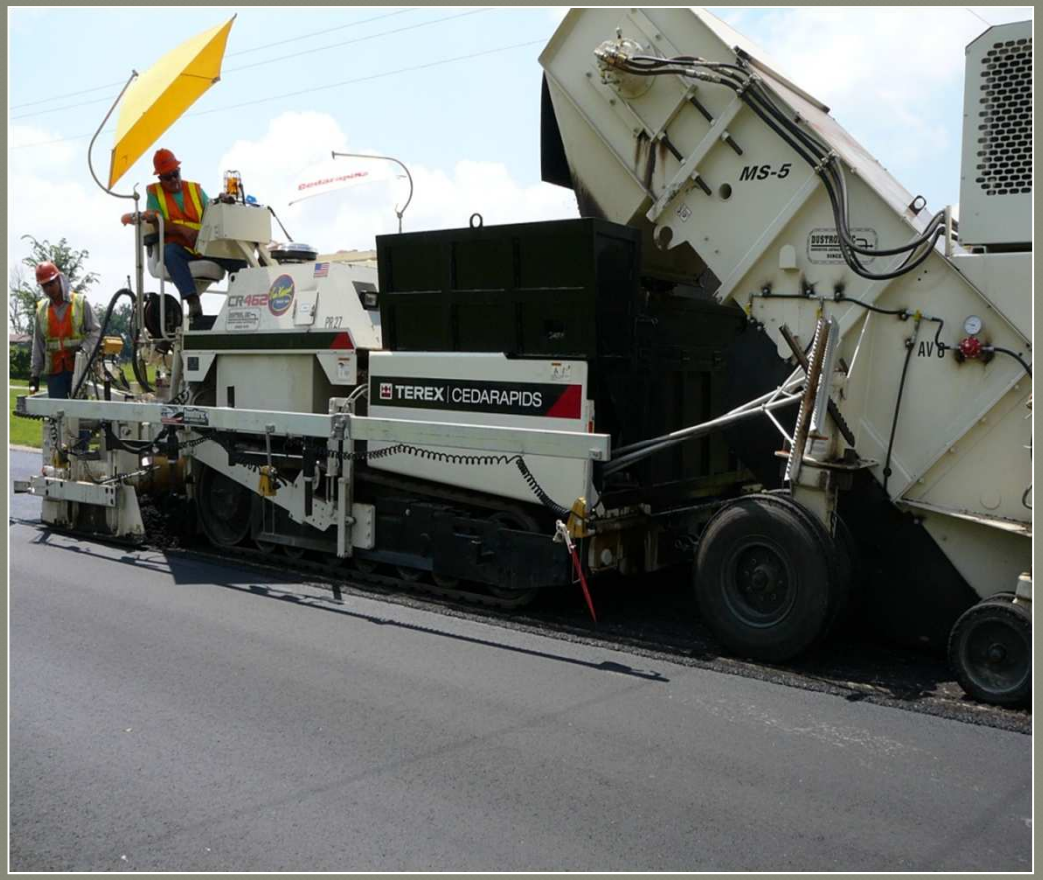
- Combination – Heater Unit and Milling Section
- Engineered Emulsion Metered at Design Content

The Process

- Side view of Wind-Row

Recycled Asphalt Laydown

- Windrowed 100% recycled material is picked up and paved in a conventional paver to the specified width



The Process

DEEP HIR SYSTEM

Recycled Asphalt Mix Placed with Paver and Vibratory Screed. Minimum temp at screed 190 F

Recycled Material Compaction

- The blended recycled material is compacted using conventional rollers.

Finished Mat

- Finished material after lay-down and compaction. The road can be opened to traffic after a cool off period similar to an asphalt paving operation.

ARA-1P

This safe, water-based emulsion replaces the chemical constituents of the asphalt that have oxidized. ARA-1P emulsion also contains polymer modified asphalt, which further improves elasticity and coating. Moisture, rutting, and crack resistance are also improved.

Surface Repaving

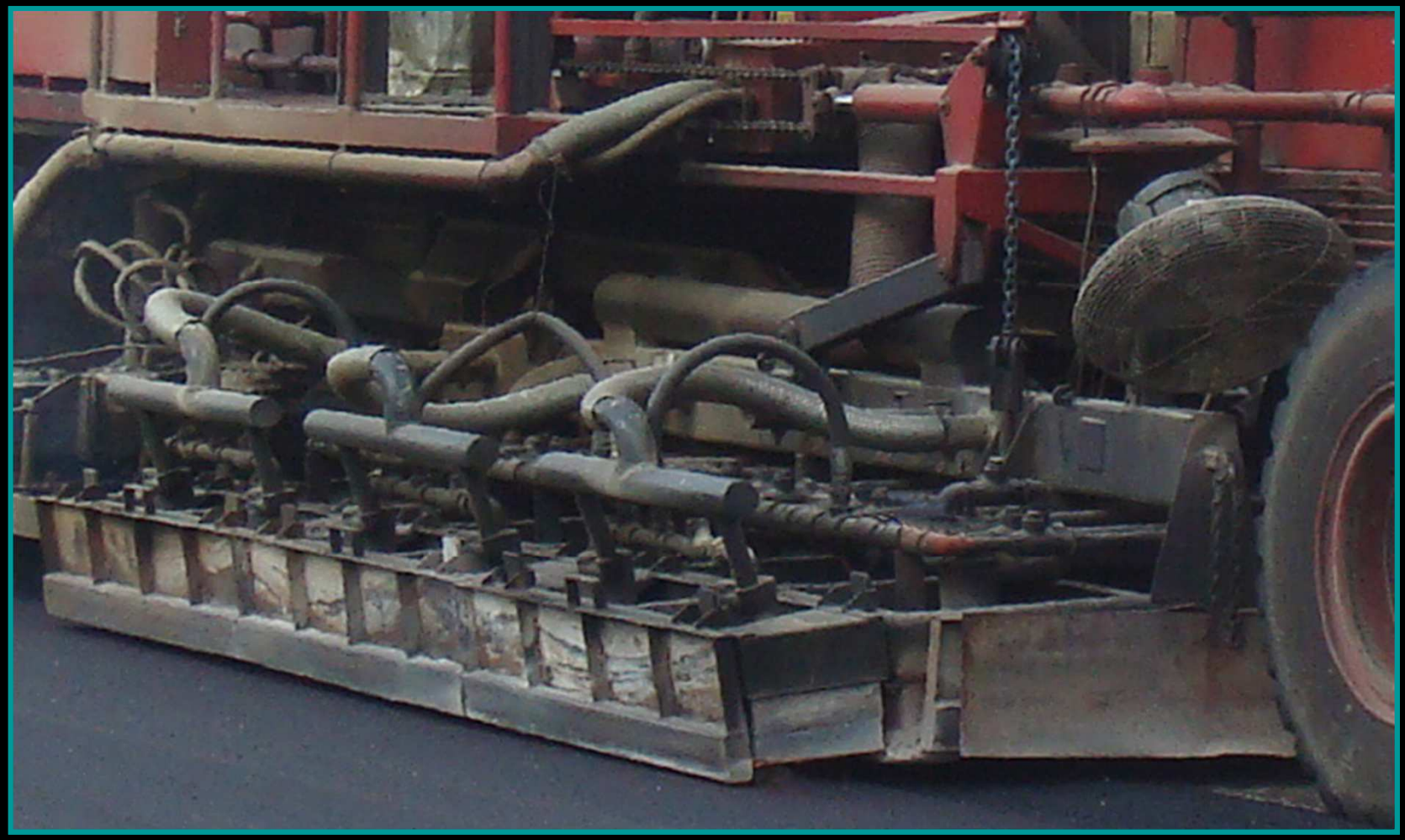
Heating, reworking and rejuvenating the top 1 to 2 inches of an existing asphalt pavement and simultaneously applying an overlay while the temperature of the recycled layer is 200°F

Self Contained Pre-heater

CUTLER Repaving, Inc.

First Step: Heat the Pavement

Main Heating Unit of Repaver



CUTLER Repaving, Inc.

First Step: Heat the Pavement

Underside of Heating Hood

CUTLER Repaving, Inc.

First Step: Heat the Pavement

Using Multiple Pre-heaters

CUTLER Repaving, Inc.

First Step: Heat the Pavement

Using Multiple Pre-heaters

First Step: Heat the Pavement

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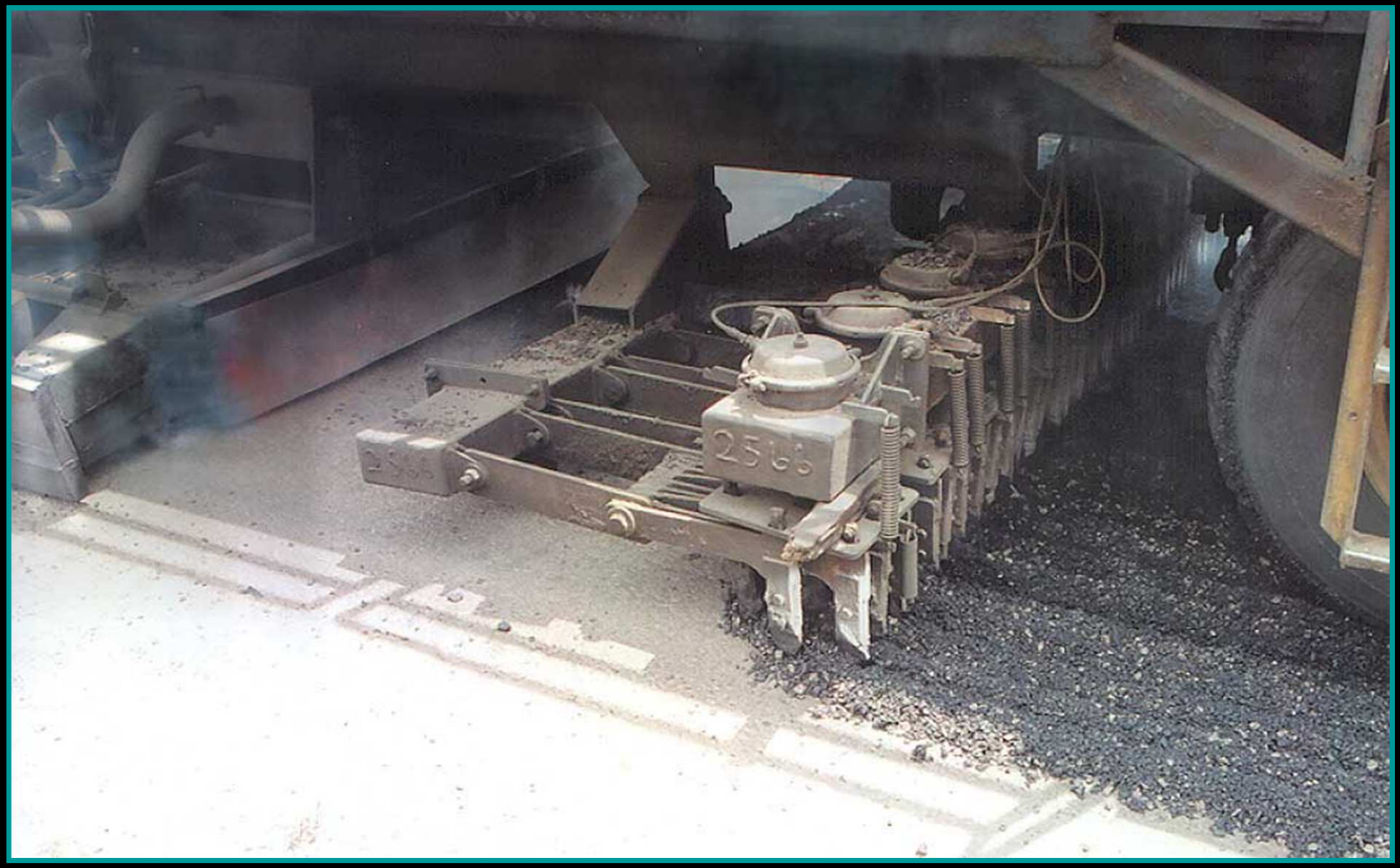
Scarifier System

CUTLER Repaving, Inc.

Second Step: Scarify the Pavement



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Second Step: Scarify the Pavement

Liquid Application System

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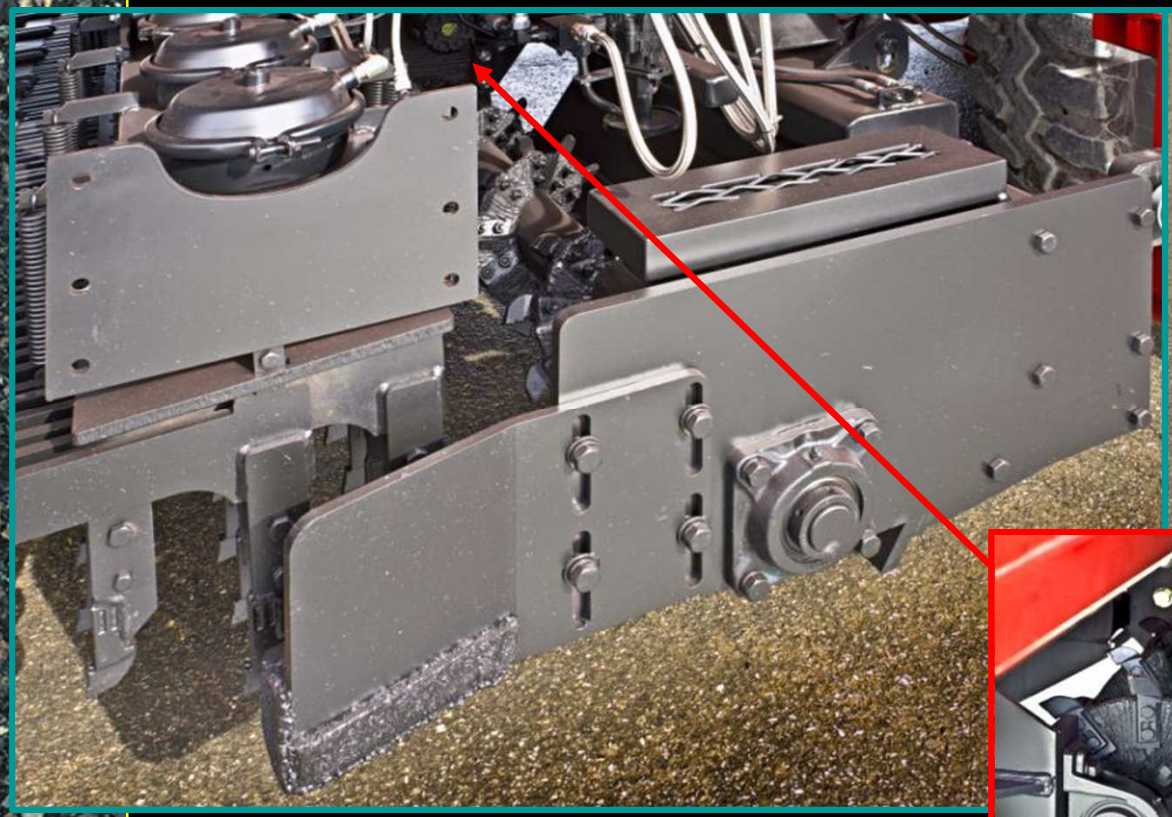
Third Step: Apply & Mix Emulsified Recycling Agent

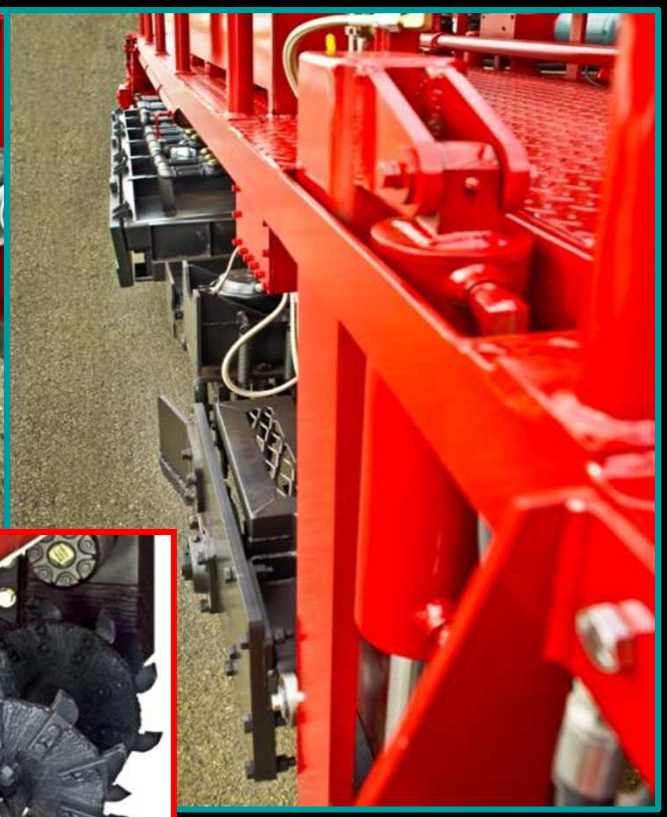
Recycling Agent Applied

CUTLER Repaving, Inc.

Third Step: Apply & Mix Emulsified Recycling Agent

Moldboard Gathers Recycled Material Into Recycled Windrow



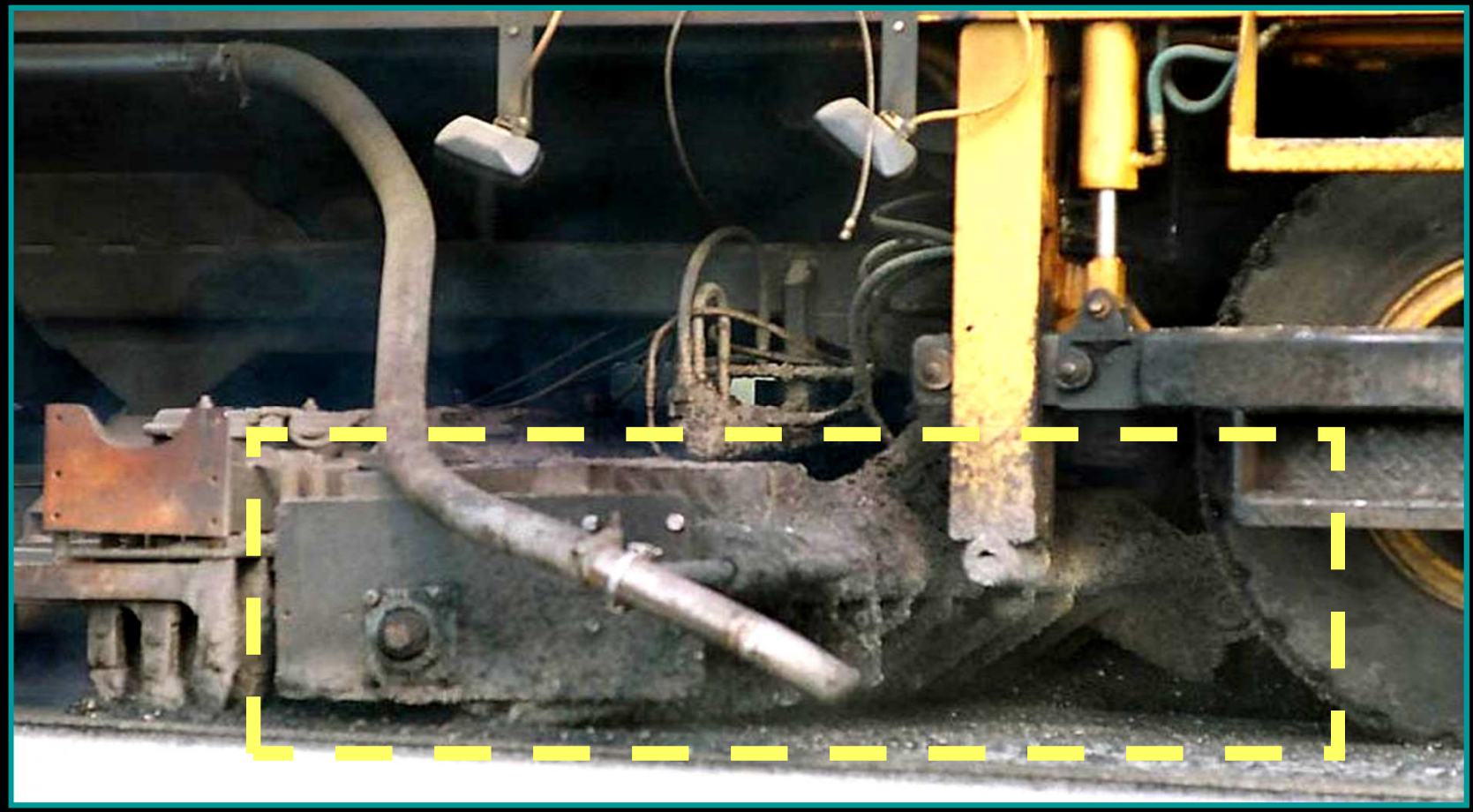


Rotary Auger distributes recycled material into windrow

CUTLER Repaving, Inc.

Third Step: Apply & Mix Emulsified Recycling Agent

Moldboard and Recycled Windrow



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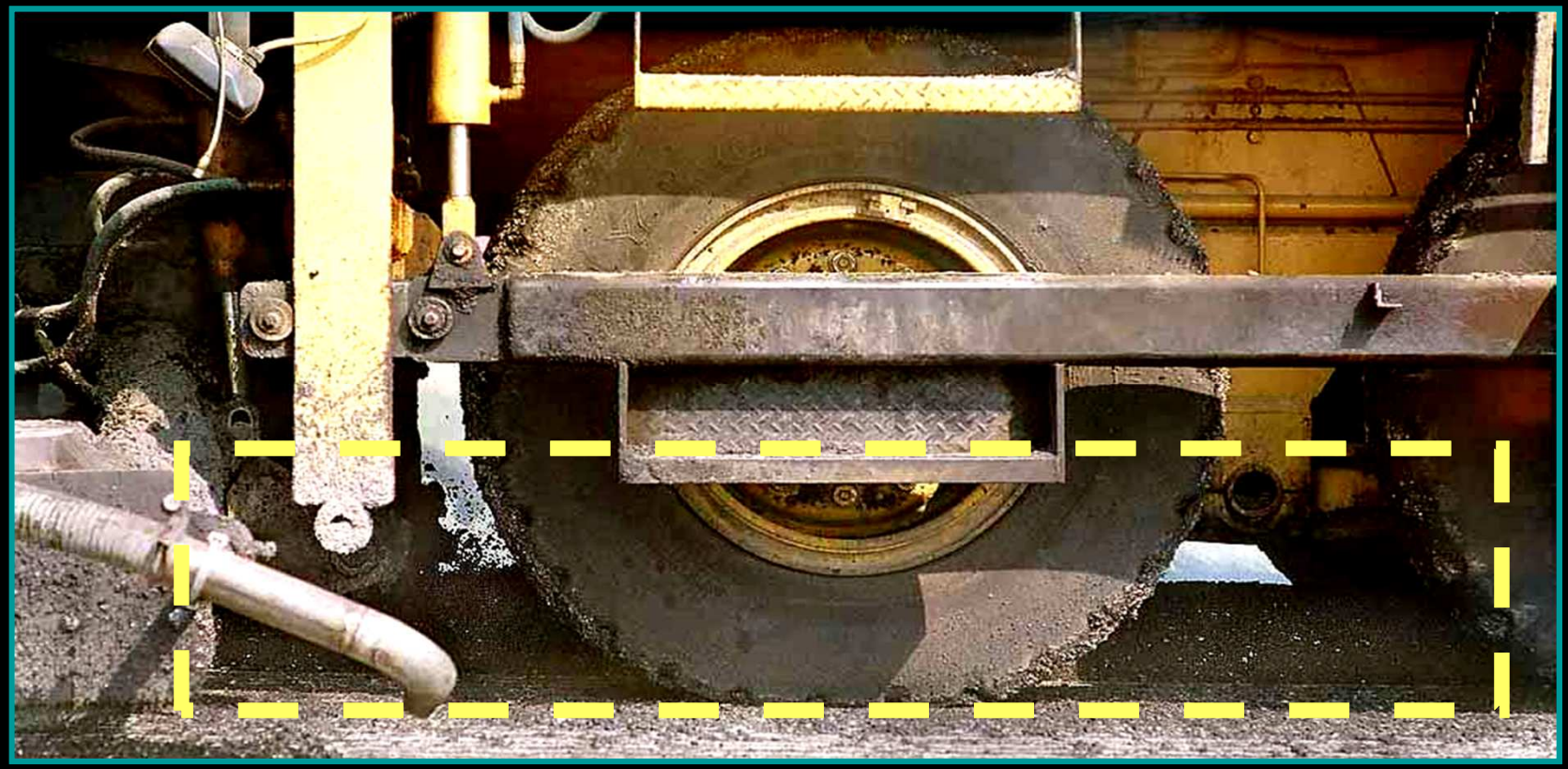
Third Step: Apply & Mix Emulsified Recycling Agent

Recycled Windrow



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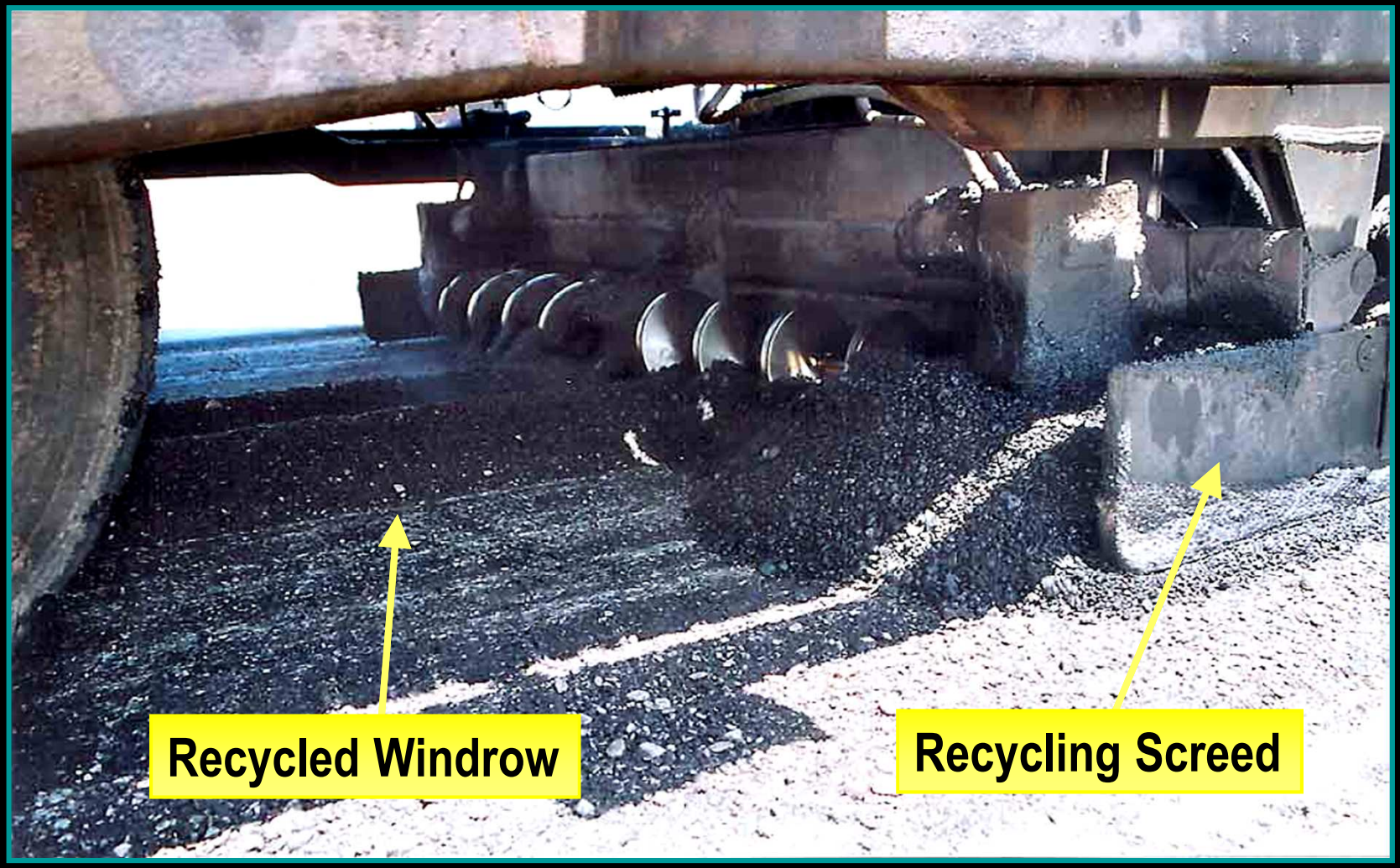
Third Step: Apply & Mix Emulsified Recycling Agent

Recycled Material Distributed



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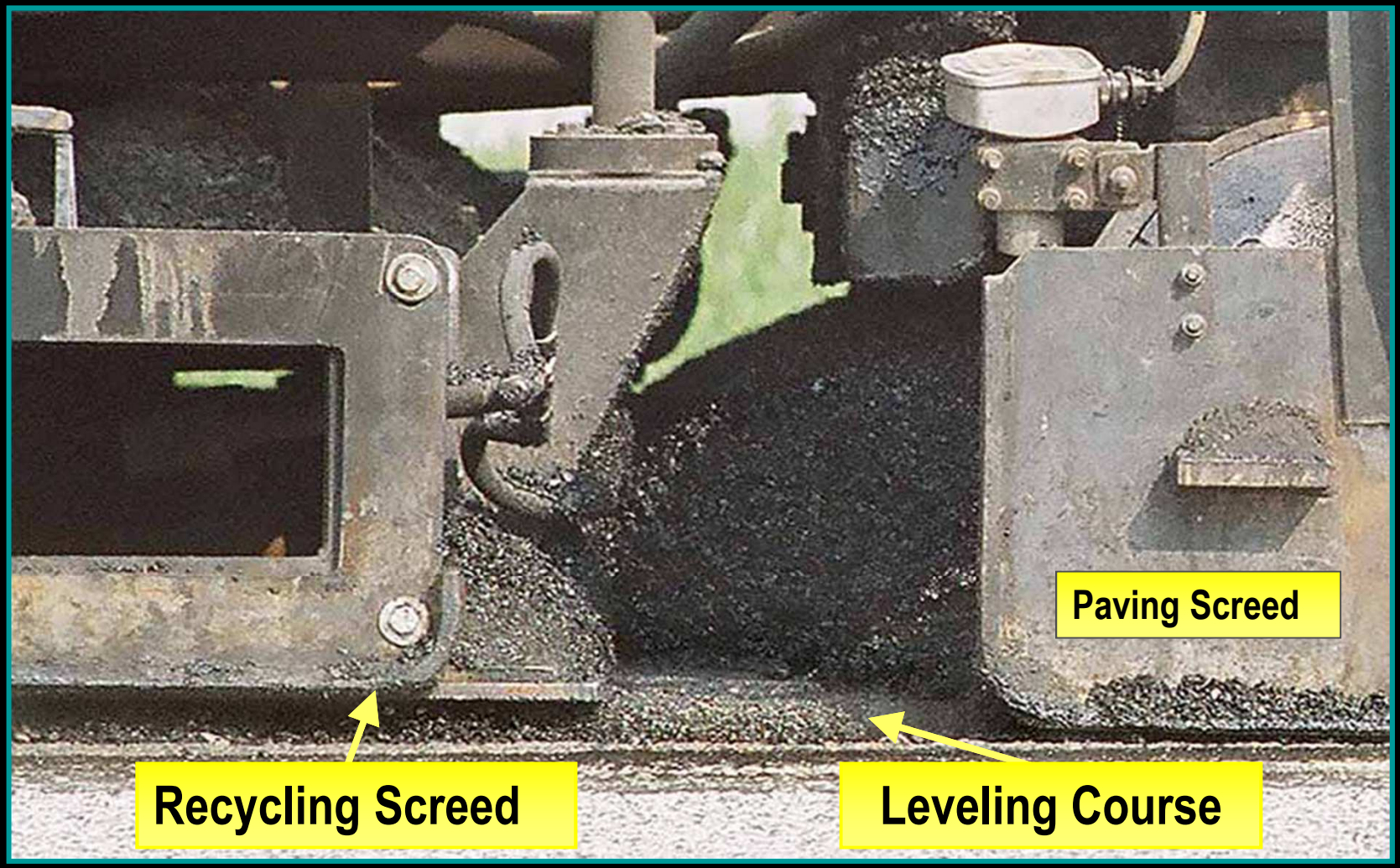
Fourth Step: Lay Recycled Material With Recycling Screed

Recycled Material Laid



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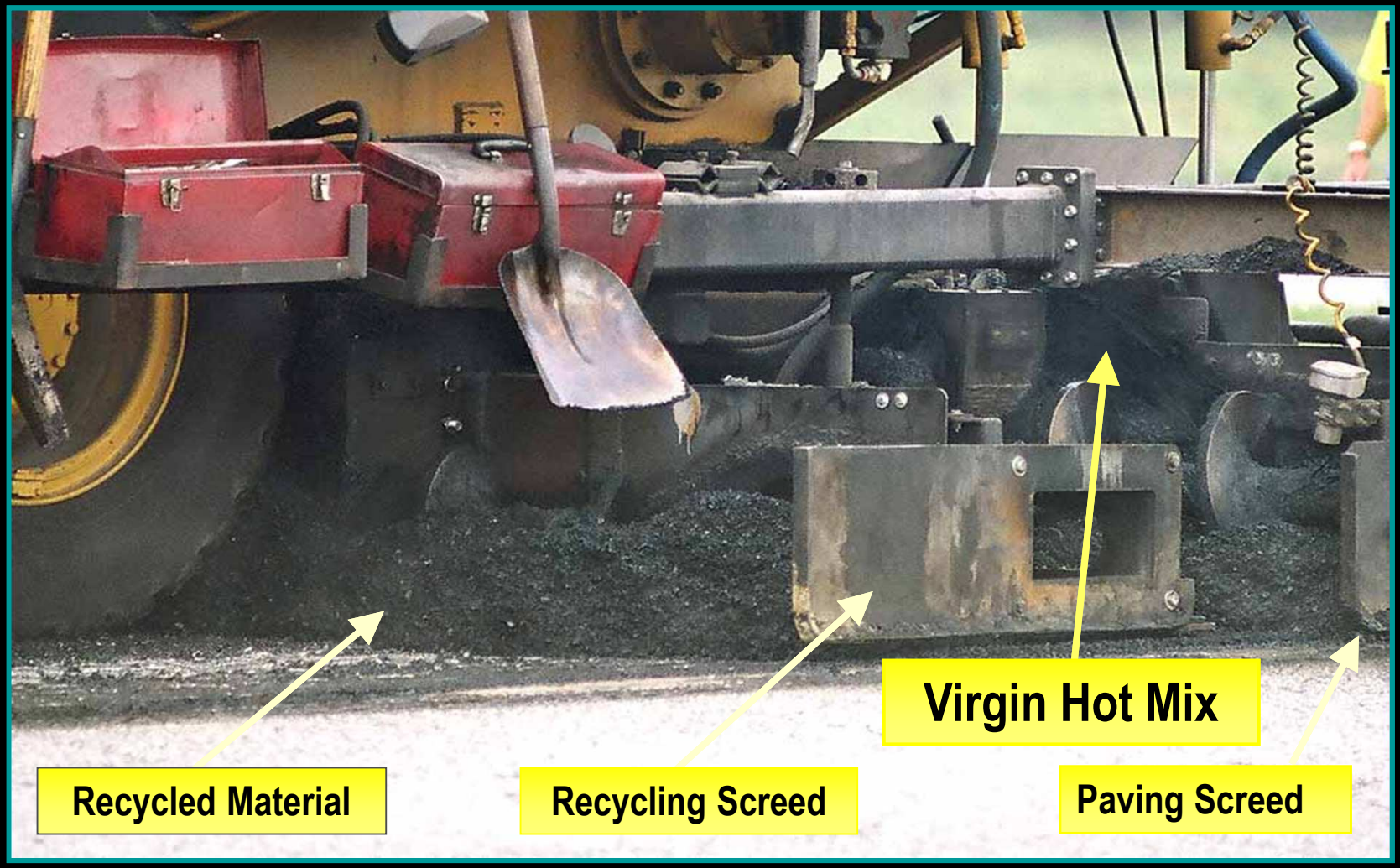
Fourth Step: Lay Recycled Material With Recycling Screed

Laying Virgin Hot Mix



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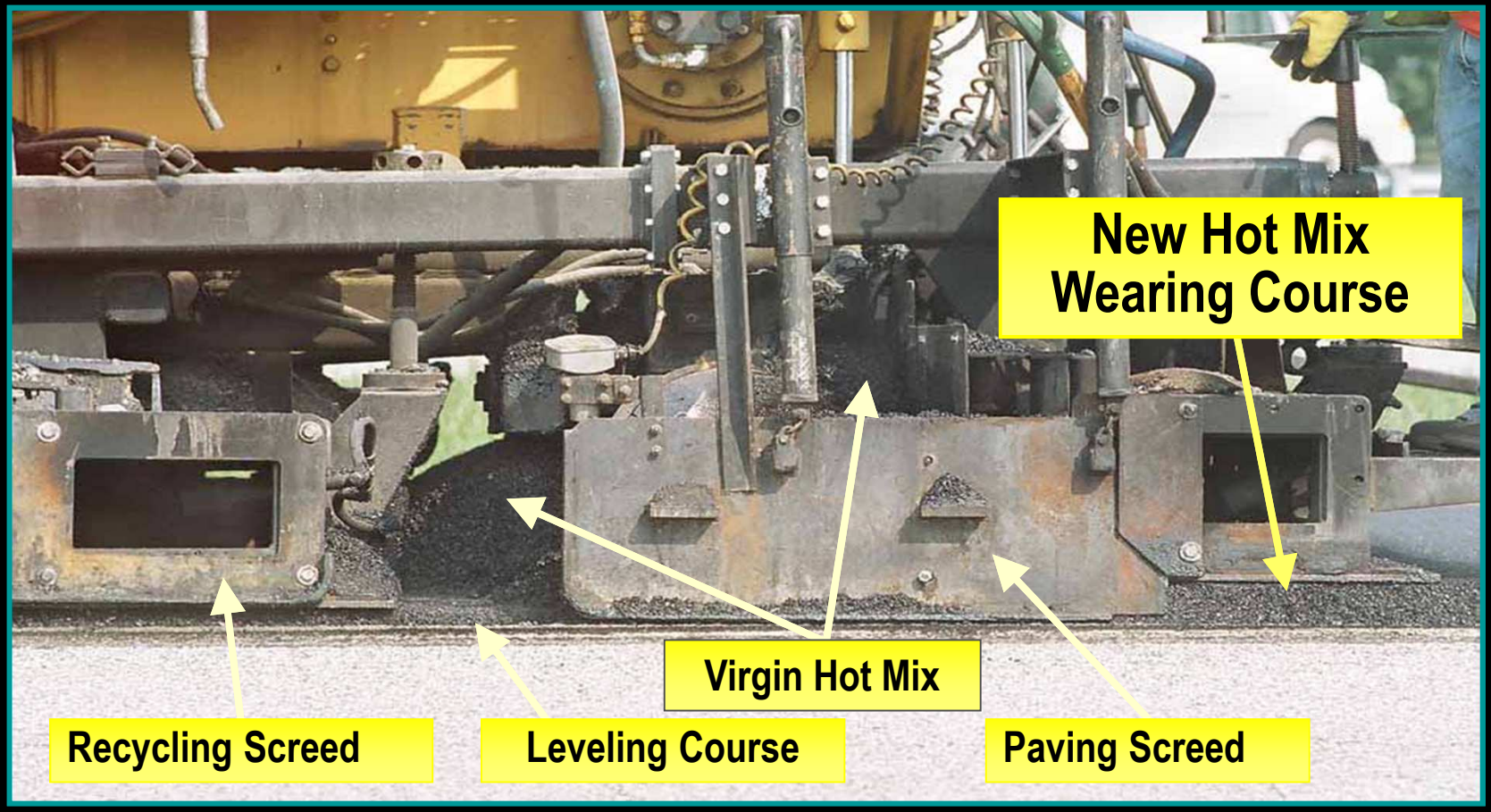
Fifth Step: Lay Virgin Hot Mix Over Recycled Material

New Hot Mix Wearing Course Laid



Fifth Step: Lay Virgin Hot Mix Over Recycled Material

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Paving 17 Feet Wide

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Fifth Step: Lay Virgin Hot Mix Over Recycled Material

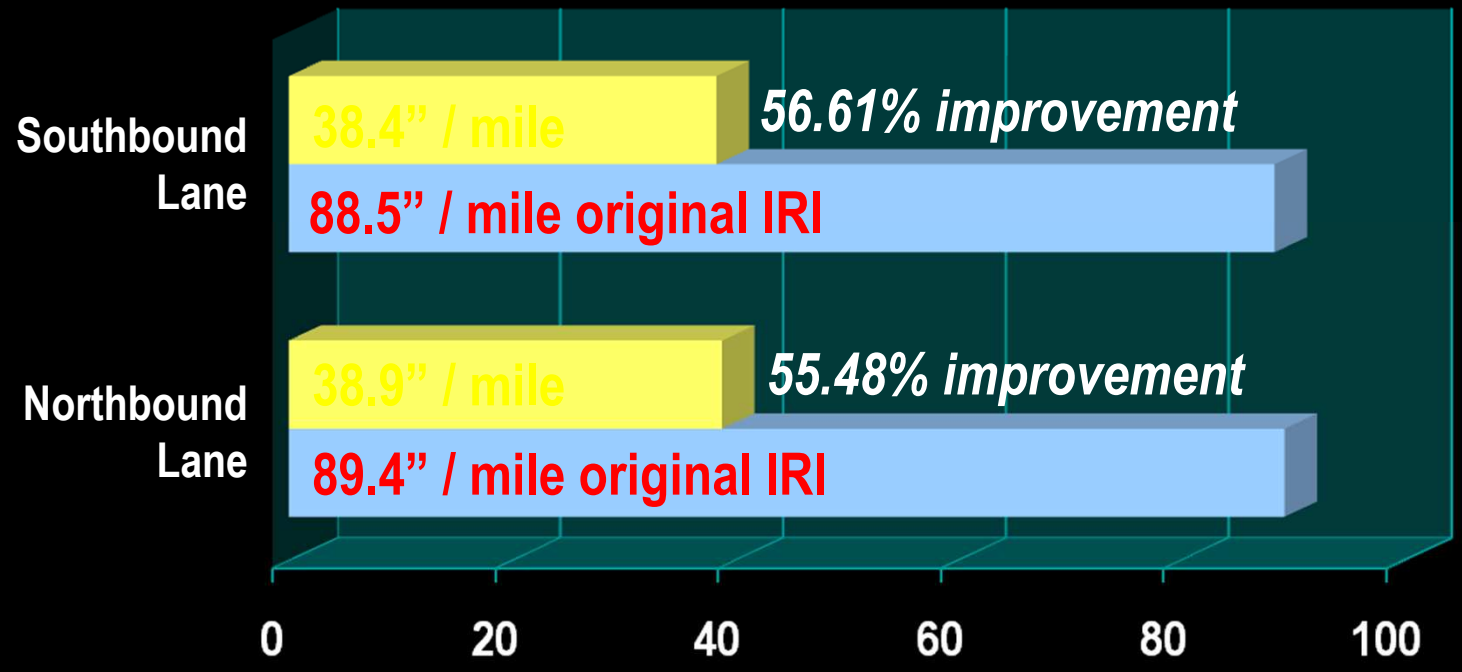
SH 150 Alamosa, CO Project

CUTLER Repaving, Inc.

Proven Performance

Results

International Roughness Index (IRI) Normal Improvement Expectation: 25-30%



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Proven Performance – SH 150 Alamosa, CO Project

Urban Applications

- Curb line milling may be necessary
- Traffic easily controlled in work zone
- Environmental considerations


NO
PARKING


INGERSOLL-RAND

Project Considerations

- Uniformity
- Depth of existing HMA
- Presence of Chip Seals
- Asphalt content (bleeding)
- Asphalt properties
- Traffic
- Types of pavement distress
- Environment

5.16.8 Selecting the Appropriate Hot In-Place Recycling Process

Table 5.5 below provides a general guideline for the preliminary selection of candidate recycling or reclamation methods for the rehabilitation of asphalt pavements.

Table 5.5 Selection Guidelines for HIR Process
Distress-Related Considerations

Pavement Distress Mode	Candidate HIR Process		
	Surface Recycling	Remixing	Repaving
Raveling			
Potholes			
Bleeding			
Skid Resistance			
Rutting			
Corrugations			
Shoving			
Fatigue Cracking			
Edge Cracking			
Slippage Cracking Block Cracking Long. /Trans. /Reflect. Cracking			
Swells, Bumps, Sags, Depressions			
Marginal Existing Pavement Strength			

More Appropriate → Less Appropriate

Non-Distress-Related Considerations			
Initial Cost[1]	$1.00 - $2.00 SY	$3.75 - $4.75 SY	$1.25 - $2.00 SY
User Costs	See PDM, C.4.3.1	See PDM, C.4.3.1	See PDM, C.4.3.1
Min. turning radius greater than 500'			
Min. turning radius less than 500'			

More Appropriate → Less Appropriate

[1]The initial cost does not include the cost of any succeeding pavement layer that will be required to complete the work. The cost of any additional pavement overlay to be installed after each hot in-place recycling process should be considered in the cost evaluation step.

Potential HIR Benefits

- Repairs Distress
- Extends Life
- Improves Ride Quality
- Improves Friction Coefficient
- Improves Appearance
- Improved Bonding
- Work completed in a single pass

Thank you.
Questions?