

HOT-IN-PLACE RECYCLING

Presented by:
Patrick A. Faster



Go Green, Save Green

Who is **GALLAGHER** ? **ASPHALT**

- Founded in 1928
- 3rd-Generation, Family-owned Highway Paving Contractor
- Asphalt Plants throughout the Chicagoland area
- Well-respected and active member of NAPA, ARTBA, NCAT
- Hot-in-Place Recycler for over 65 years
- 3rd Largest HIP Recycler in the U.S.



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Who is



Chicago Testing
Laboratory, Inc.

?

- Founded in 1912
- A Full-Service Engineering and Construction Management firm
- Industry leader in QC/QA of asphalt, asphalt materials, liquids, aggregates, concrete and soils
- Provides testing, inspection, training, consulting & research
- Well-respected and active member of NAPA, ARTBA, NCAT
- Provides over 150 years of combined expertise, state-of-the-art facilities and a high degree of professionalism

Hot
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RECYCLING

The logo for Hot inPlace Recycling features the text "Hot inPlace" in a bold, sans-serif font, with "RECYCLING" in a smaller font below it. To the right of the text is a graphic of a recycling symbol (three chasing arrows forming a triangle) with a green leaf-like shape integrated into it.

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2012 IDOT Contractor of the Year

OCT 29 2012



Illinois Department of Transportation

Office of the Secretary
2300 South Dirksen Parkway / Springfield, Illinois / 62764
Telephone 217/782-5597

October 23, 2012

Mr. Charles J. Gallagher, President
Gallagher Asphalt Corporation
18100 South Indiana Avenue
Thornton, IL 60476

Dear Mr. Gallagher:

Congratulations on your recent nomination for Illinois Department of Transportation's Contractor of the Year Awards in the Hot Mix Asphalt category. The nomination was in recognition of patching and resurfacing along IL 1 (Halsted Street) from 152nd Street to 127th Street in Riverdale, Chicago and Harvey.

I am very pleased to announce the project was selected for the award. The department would like to publicly acknowledge your outstanding performance. A plaque will be presented to you or your firm's representative at the Illinois Road and Transportation Builders Association's annual meeting on December 13, 2012, being held at the Hyatt Regency O'Hare in Rosemont. The awards will be presented from 4:30 to 6:00 p.m. in Rosemont Rooms A and B.

Those persons on your staff who are interested in attending the awards ceremony are welcome. Photographs will be taken during this time.

For additional information and tickets to the dinner, you may contact Mr. Michael J. Sturino, Executive Director, Illinois Road and Transportation Builders Association at telephone number (630) 773-1220.

Thank you for your interest in the Illinois transportation system. Once again, congratulations to you and your staff on this outstanding accomplishment.

Sincerely,

A handwritten signature in black ink, appearing to read "Ann L. Schneider".

Ann L. Schneider
Secretary

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National Center for Pavement Preservation



MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING



U.S. Department of Transportation
Federal Highway Administration



Asphalt Emulsion
Manufacturers
Association



International Slurry
Surfacing Association

Slurry & Micro Surfacing, Chip Sealing & Crack Treatment



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ADMINISTRATOR'S MESSAGE:

The National Highway System (NHS) is extensive, with over 160,000 miles of highway pavements and over 128,000 structures, built using large quantities of asphalt, concrete, steel, and aggregate, and smaller quantities of nonferrous metals, plastics, and other materials. Much of the system was constructed in the 1960's and 70's and is in need of major rehabilitation or total reconstruction; and much of the materials used to build that system can be recycled for use in the new construction.

In order to carry out the mission of the FHWA, i.e., to "improve the quality of the Nation's highway system," the NHS must be properly preserved, maintained, rehabilitated, and when necessary, reconstructed. Maintenance of highways and associated structures is critical to our ability to provide the safest, most efficient roadway system possible, while simultaneously providing the greatest level of protection to the human and natural environment.

The same materials used to build the original highway system can be re-used to repair, reconstruct, and maintain them. Where appropriate, recycling of aggregates and other highway construction materials makes sound economic, environmental, and engineering sense. The economic benefits from the re-use of nonrenewable highway materials can provide a great boost to the highway industry. Recycling highway construction materials can be a cost-saving measure, freeing funds for additional highway construction, rehabilitation, preservation or maintenance.

Congress declares that it is in the national interest to promote the use of innovative technologies and practices that increase the efficiency of construction of, improve the safety of, and extend the service life of highways and bridges... The innovative technologies and practices described in paragraph (1) include state-of-the-art intelligent transportation system technologies, elevated performance standards, and new highway construction business practices that improve highway safety and quality, accelerate project delivery, and reduce congestion related to highway construction... such as... (ii) innovative construction equipment, materials, or techniques, including the use of in-place recycling technology and digital 3-dimensional modeling technologies;



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ARRA Recycling Disciplines

- Cold Planing / Milling
- Hot in Place Recycling
- Cold in Place Recycling
- Full Depth Reclamation
- Soil Stabilization



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ARRA Sub-categories within the HIR Discipline

- Surface Recycling (ie. Heater Scarification)
- Remixing
- Surface Repaving

Gallagher Asphalt's Hot-in-Place Recycling Options:

- Re-HEAT
- Surface Recycling (Heater Scarification)

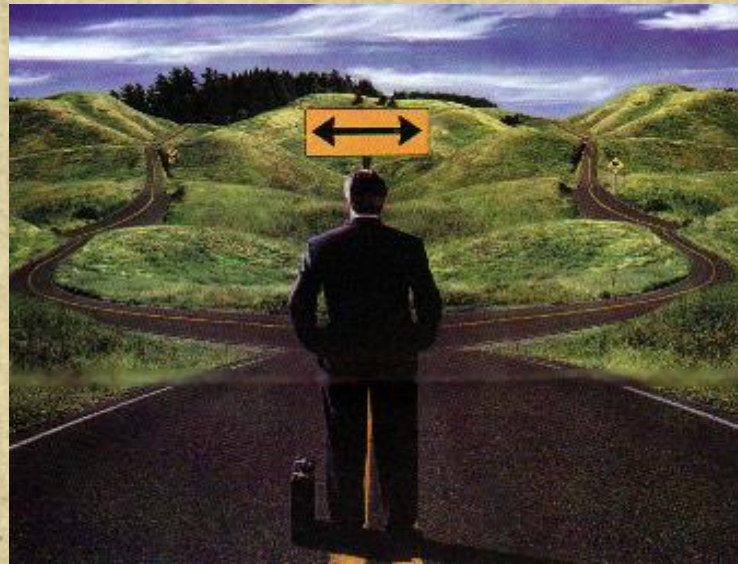


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HIR

Where Does IT Fit In?

Re-Construction



Preventive
Maintenance

Value of "Timely" Pavement Maintenance

Pavement Condition

Very Good

Good

Fair

Poor

Very Poor

Time for HIR

Time (Years)

0

2

4

6

8

10

12

14

Typical Grind & Overlay

- Grind to a 2" depth
- Haul grindings away
- Tack course
- Haul leveling course to jobsite
- Place level course
- Roll It
- Haul surface course to jobsite
- Place surface course
- Roll It



So, Re-HEAT or the Conventional
Heater Scarification?



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What is the Hot-in-Place Recycling **SURFACE METHOD?**

Hot-In-Place Recycling Surface Method is an on-site, in place, pavement rehabilitation method that consists of **heating, scarifying, mixing, replacing and re-compacting** the existing bituminous pavement.



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Surface Recycling: Step 1

- 1st Pre-Heater takes pavement temp to 180 – 200 degrees



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Surface Recycling: Step 2

- 2nd Heater takes pavement temp to 280 – 300 degrees



Surface Recycling: Step 3

- Introduction of rejuvenating agent



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Surface Recycling: Step 4

- Spring-loaded tines set hydraulically at prescribed depth will drag over existing structures to avoid damage



Surface Recycling: Step 5

- Full width reversible augers to re-mix



Surface Recycling: Step 6

- Re-profiling with standard paving screed

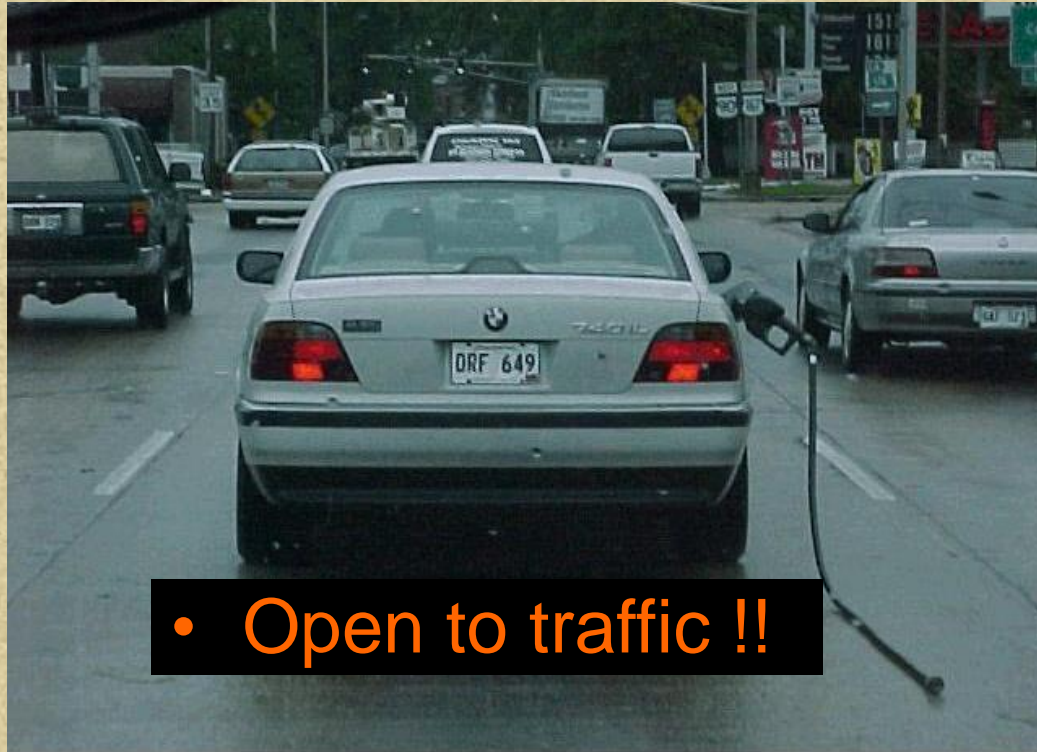


Surface Recycling: Step 7

- Roller



Open to Traffic. . .



- Open to traffic !!



Surface Recycling: Step 8

The now re-plasticized asphalt is ready to receive its final surface course; such as:

- Hotmix
- Microsurface
- Slurry Surface
- Chip Seal



What is the Hot-in-Place Recycling



METHOD?

Re-HEAT is an on-site, in place, pavement rehabilitation method that consists of **heating** the existing pavement, **removing** the top surface course, **adding** an asphalt rejuvenating emulsion, **mixing** the material uniformly in an on-board mixing drum, **re-laying** the recycled material, followed by **compacting**.



Step 1: Heating the Existing Pavement

- The road surface is softened with radiant convection heat.





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Step 2: Removing Top Surface Course

- A rotary blade system dislodges the material for processing.





Step 3: Adding Asphalt Emulsion

- Additives are injected to reconstitute the rejuvenated asphalt.





Step 4: On-Board Mixing Plant

- A heated mixing plant uniformly blends the additives with the asphalt.





Step 5: Relaying Recycled Material

- The rejuvenated asphalt is immediately placed to the correct slope and grade.



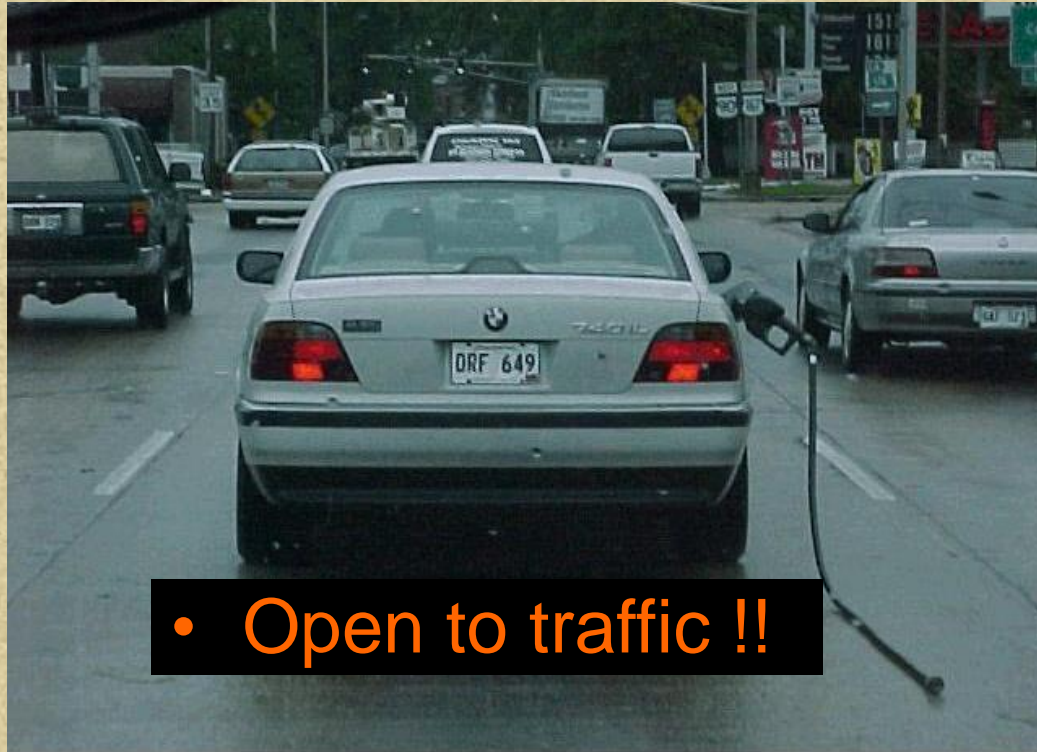


Step 6: Compaction

- While still hot, the newly recycled asphalt pavement is rolled to final compaction.



Open to Traffic. . .



Rejuvenating Agent Application Rate

Both HIR process will introduce a rejuvenating agent typically at the rate of $1/10^{\text{th}}$ gallon per square yard.

Pre-requisites for HIR:

- Pavement must be structurally-sound with no base failures
- Pavement must have at least 3” of hotmix asphalt

What Types of Asphalt Pavements Are Candidates for Hot-in-Place?



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Thermal Cracking



Fatigue Cracking



Patches



Poor Rideability

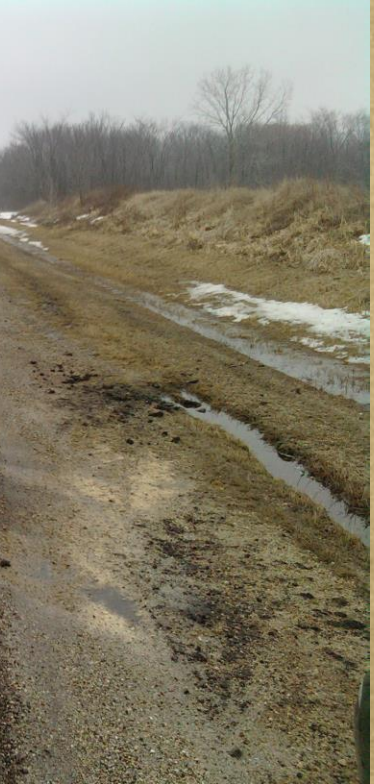


Raveling

WALT Infrastructure Services LTD.



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Waukesha County, Wisconsin

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St. Louis, Missouri



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Hot-in-Place Comparison

	Re-HEAT	Heater Scarification
Need for Surface Treatment /Overlay	No	Yes
Materials Added During Process	Asphalt Rejuvenator	Asphalt Rejuvenator
SYs per Day	4,500	9,000
Pavement Penetration Depth	Up to 2" (Depending on Surface Course Thickness)	Up to 1.5" (Depending on Surface Course Thickness)
In-Place Mixing Capability	On-board drum mixer	Scarifying Tines & Augers
Thermal Bond Effect	Moderate - High	Low - Moderate
Mat Re-Placement	Conventional paving screed	Conventional paving screed
Compaction Equipment	Double Drum Vibratory Roller	Double Drum Vibratory Roller
Budgetary Price per SY	\$9.00 Total	\$4.00 plus Surface Treatment/Overlay



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So What Have We Done?



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- Saves time & reduces “user delays”
- Minimizes the demand on oil & aggregate (non-renewable resources)
- Re-uses/recycles the existing materials – liquid asphalt & aggregates
- Eliminates milling dust & hassles
- Eliminates trucking pollution & traffic
- Reduces overall emissions by 65%
- Reduces carbon footprint by 80%
- Uses propane – a cleaner energy source
- Uses a dual stage incineration system to protect air quality during operation



Conestoga-Rovers Carbon Footprint Analysis



COMPARATIVE CARBON FOOTPRINT ANALYSIS: HOT-IN-PLACE RECYCLING (HEATER SCARIFICATION/SURFACE RECYCLING AND RE- HEAT) VERSUS TRADITIONAL ASPHALT PAVING

Prepared for:
Gallagher Asphalt
Over 60 Years of Paving Excellence.
**GALLAGHER
ASPHALT**

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Conestoga-Rovers Carbon Footprint Analysis

- Versus Conventional asphalt paving with 20% RAP Hotmix:
 - Heater Scarification emits 28% less GHGs
 - Re-HEAT emits 62% less GHGs

CTL Rejuvenator Study



PROPERTIES OF RECOVERED HOT
IN PLACE REJUVENATED
MATERIAL
PRODUCT COMPARISON

Chicago Testing Laboratory, Inc.
8/9/2011



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CTL Rejuvenator Study

- Samples were taken from an HIR project to represent existing material after the heating process and material after the rejuvenation process
- Results:
 - Air voids improved from 10.1% to 4.9% (3-5% is acceptable)
 - Viscosity & penetration improved over 21%
 - Total bitumen content increased from 4.8% to 5.9% after addition of rejuvenating agent
 - Stability & flow of the compacted material after treatment was statistically the same as prior to treatment
 - Tensile Strength Ratio (TSR) of the material improved nearly 8% and increased the stripping resistance of the pavement from a typically failing test to a passing one
 - Hamburg Wheel Analysis of the rejuvenated sample resulted in a 3.56mm average rut depth (a very rut resistant pavement)



South Coast
Air Quality Management District
Cleaning the air that we breathe...



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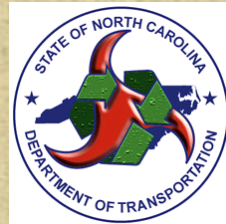
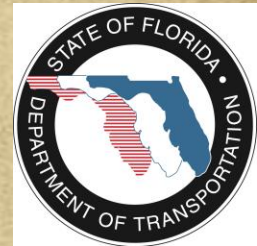


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Used by Many DOTs:



New York State
Department of Transportation



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THE RIGHT FIX

THE RIGHT ROAD

AT THE RIGHT TIME



QUALIFIED CONTRACTOR

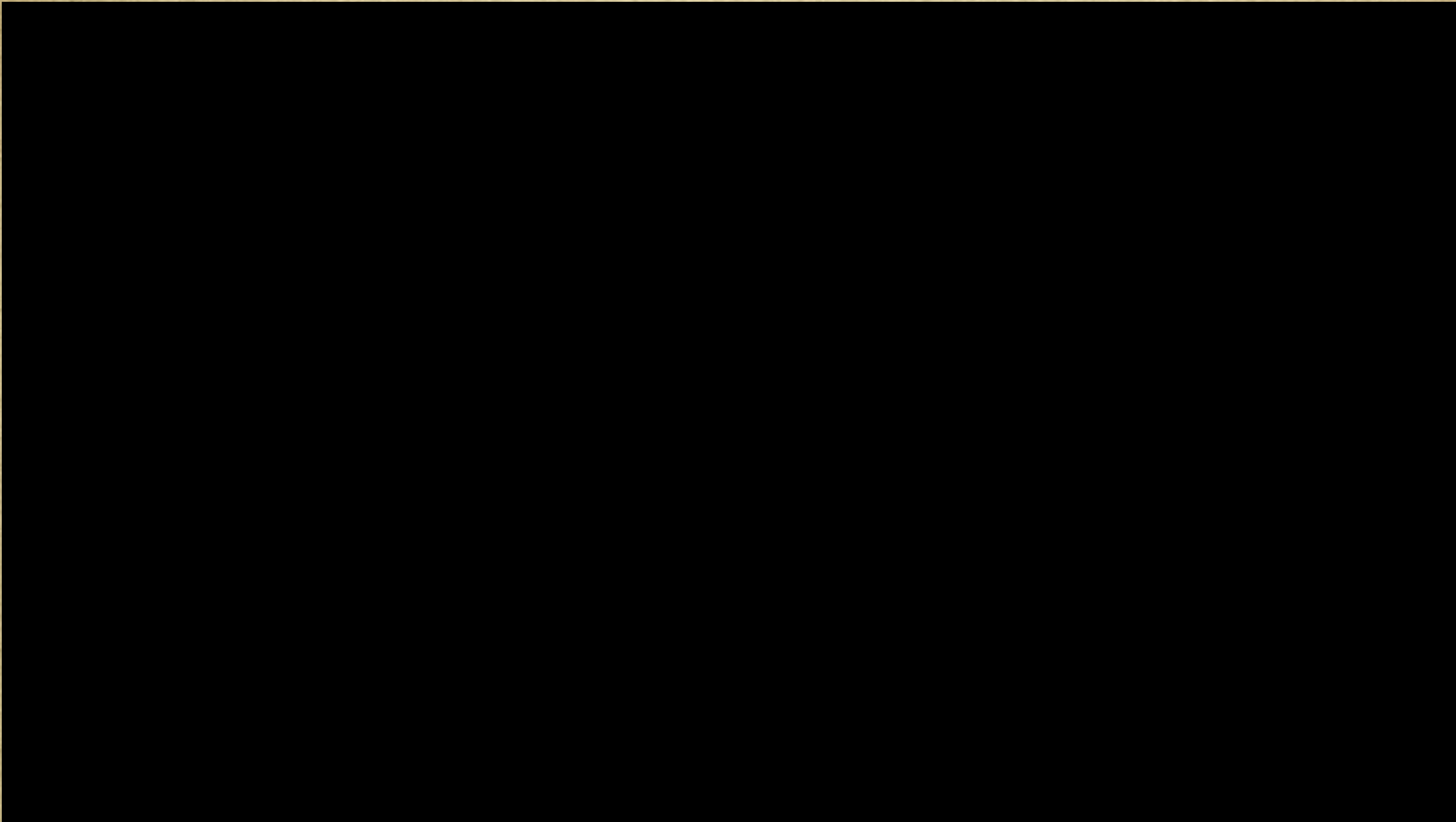


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KNOW YOUR CONTRACTOR



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www.hotinplacerecycling.com



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Thank You! Any Questions?

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Cobb County, Georgia

- Timing: Summer 2006
- Quantity: Approximately 50,000 SYs



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2208







GALCHER
Asphalt
Asphalt
WE COVER IT ALL

GALCHER
ASPHALT
85301

Worker in high-visibility vest





Washington County, Minnesota

- Timing: Summer 2010
- Quantity: Approximately 60,000 SYs



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SAKAI
SW90G

NO LEFT TURN

Waukesha County, Wisconsin

- Timing: 2006 – 2010
- Quantity: 1 million+ SYs



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City of Manistee, Michigan

- Timing: 2009
- Quantity: 63,000 SYs



Go Green, Save Green



Orange pickup truck

Worker in high-visibility vest

White truck with "Go Green, Save Green" and "STOP" sign

Blue signpost

STOP

Go Green, Save Green



An orange Chevrolet pickup truck with a yellow emergency light on its roof, parked on the gravel road. A worker in a high-visibility vest is standing next to the driver's side door.

A white truck with a green tank, featuring the slogan "Go Green, Save Green" and a "STOP" sign on its side. It is parked on the gravel road in the background.

A blue signpost with a white sign, likely a mailbox or a street sign, located on the left side of the gravel road.

STOP

Go Green, Save Green









Thank You!



Go Green, Save Green