Lessons Learned from Research in Innovative Resurfacing and Pavement Preservation Techniques on Roadways in Metro Nashville – Davidson County

Using The Right Treatment - At The Right Place - At The Right Time

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Public Works Department
The Metropolitan Government of Nashville – Davidson County

Metro Nashville
PUBLIC WORKS

Our Presentation Covers 3 Main Topics

- The Business Case for Innovation in Paving & Pavement Preservation Techniques
- Industry Research Behind Pavement Preservation Techniques
- Results of New Pavement Preservation & Resurfacing Techniques on Nashville Streets & Roads

The Business Case for Innovation in Paving & Pavement Preservation Techniques

Old-School Paving Operations

- **Identify the bad roads.**
- **Pave them until the budget runs out.**
- **Repeat.**

- Smart management of this process keeps things within budget, but it's still *pave me now or pave me later*.
- Worked fine until resurfacing costs went through the roof (and the street network grew so quickly).

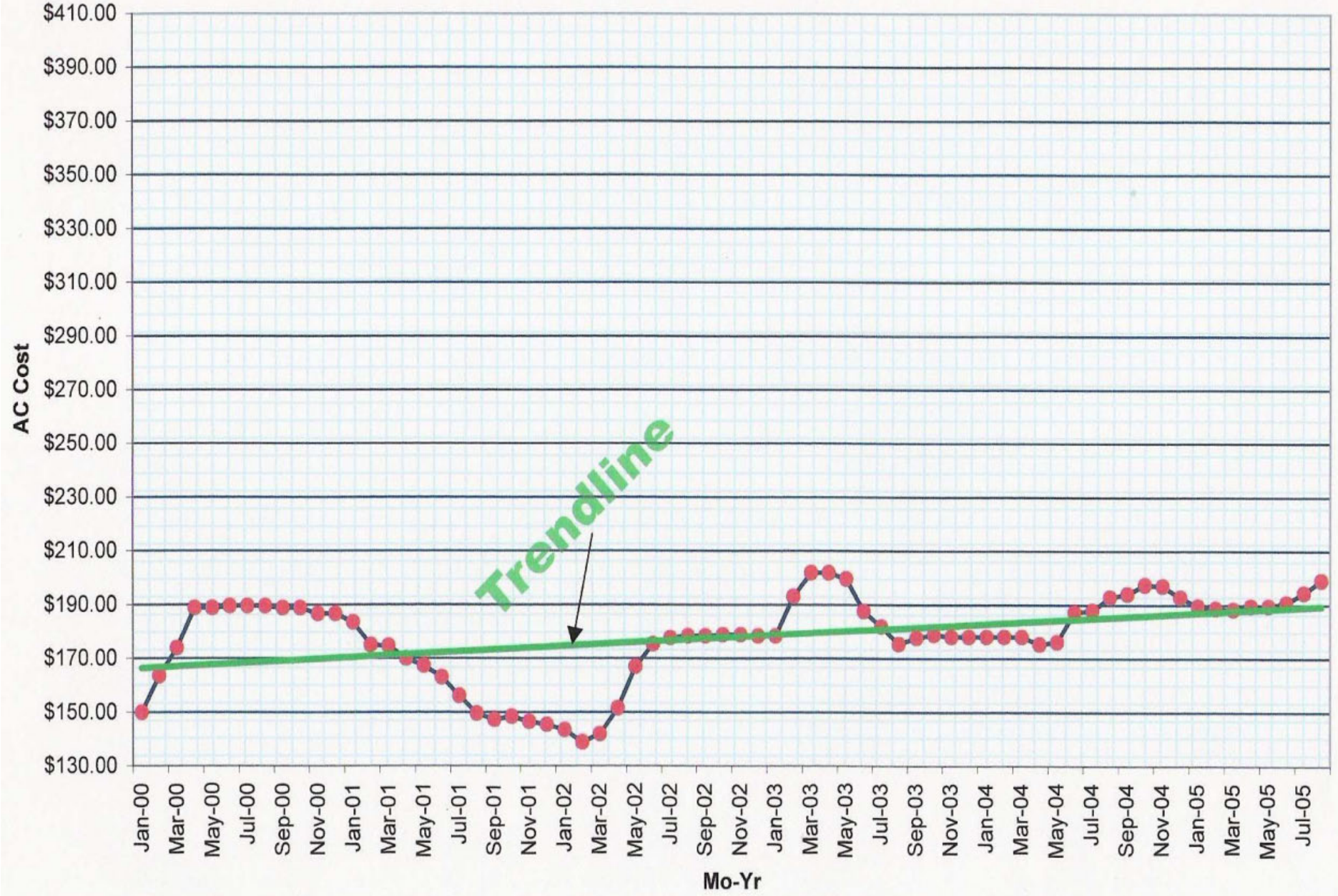
New-School Paving Operations

- Traditional paving is not enough.
- Until recently, the cost of roadway resurfacing increased along a gentle, natural curve that reflected normal increases in the cost of asphalt concrete (AC).
- Increases sloped gently around 4%-10% per year from 1997 through mid-2005.

Average Local Government Resurfacing Costs in Tennessee 1996-2007 YTD

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007 YTD
Cost Per Ton In Place	$27.00	$28.00	$29.75	$31.00	$32.30	$29.82	$32.38	$34.13	$35.68	$43.00	$63.00	$62.00
% Increase/Decrease		3.70%	6.25%	4.20%	4.19%	-7.68%	8.58%	5.40%	4.54%	20.52%	46.51%	-1.59%
Cost Per 11' Lane Mile	$14,364	$14,896	$15,827	$16,492	$17,184	$15,864	$17,226	$18,157	$18,982	$22,876	$33,516	$32,984
Cost Per Mile (22' W)	$28,728	$29,792	$31,654	$32,984	$34,367	$31,728	$34,452	$36,314	$37,964	$45,752	$67,032	$65,968
Cost Per Mile (25' W)	$32,606	$33,814	$35,927	$37,437	$39,007	$36,012	$39,103	$41,217	$43,089	$51,929	$76,081	$74,874
Cost Per Mile (28' W)	$36,628	$37,985	$40,359	$42,055	$43,818	$40,454	$43,927	$46,301	$48,403	$58,334	$85,466	$84,109

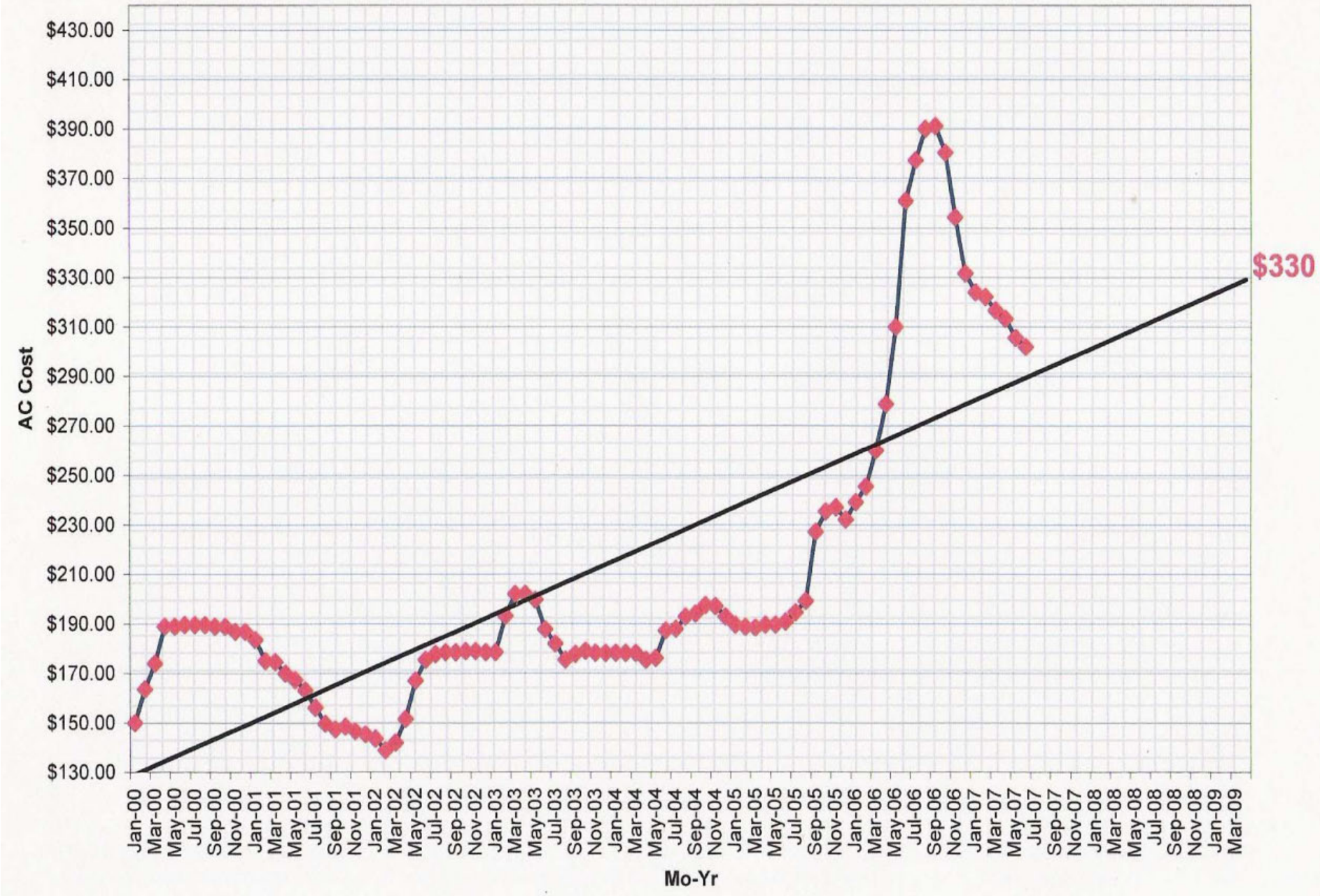
TDOT Bituminous Index
Jan. 2000 to Aug. 2005



Prices Are On the Rise, and the Market is Volatile

- From 2005 through 2006, volatility in the price of crude oil caused AC prices to double.
- Hurricane Katrina and other unforeseeable events helped spur huge cost increases.
- More recently, prices have dropped from those peaks, but the trend is still generally upward.

Trendline Projection of TDOT Bituminous Index for May 2009
Using Costs from Jan. 2000 to June 2007



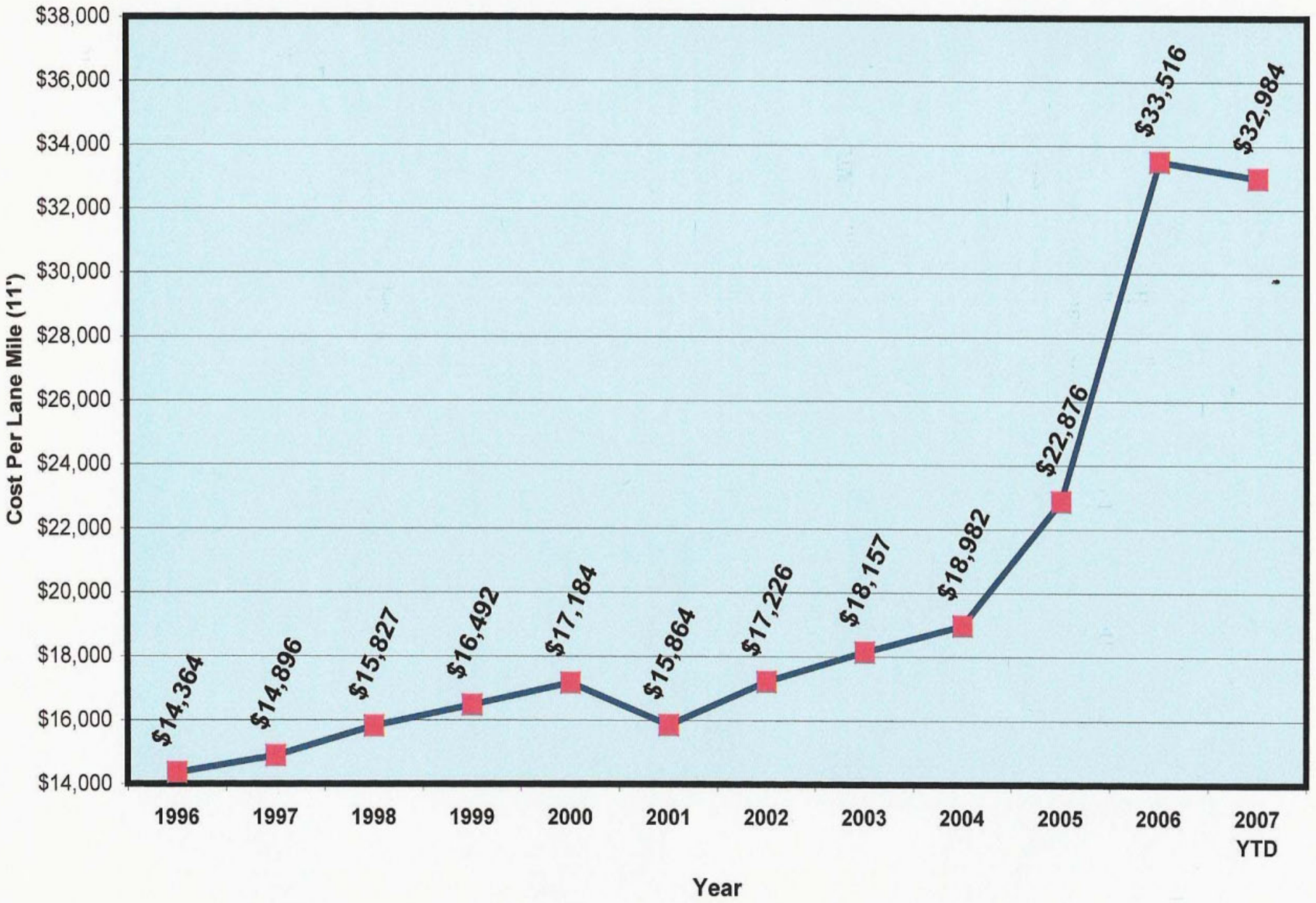
The Cost of Resurfacing Is Radically Increasing

It doesn't look like crude oil will be getting any cheaper and the market is very volatile.

In addition to base price, think about the "soft" costs:

- Diesel for transport vehicles, machinery.
- Energy cost for heating the hot mix asphalt.
- Equipment cost.

Resurfacing Cost 1996-2007 YTD



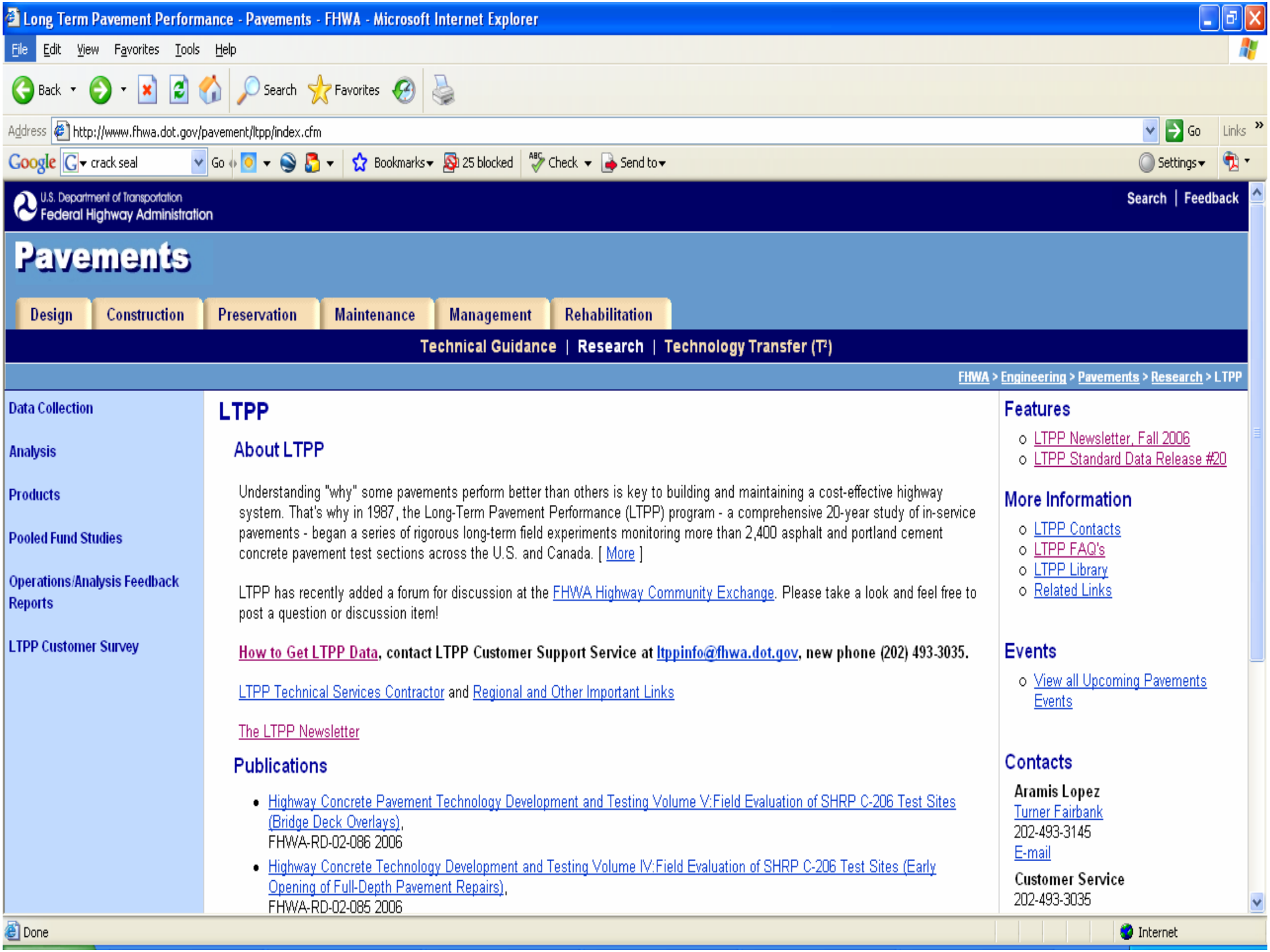
Industry Research Behind Pavement Preservation Techniques

EXPERT RESEARCH HAS ALREADY BEEN DONE

- Technology has come to the rescue, and the results are positive.
- But where do you start? *Learn from the current research.*
- LTPP = Long Term Paving Performance
- SHRP = Strategic Highway Research Program
- FP^2 = Foundation for Pavement Preservation

Long Term Paving Performance (LTTP)

- Under the Federal Highway Administration (FHWA), the largest pavement performance research program ever undertaken.
- Data from 2,000 pavement test sections over a 20-year test period.
- Web site for current and historical information on environment, traffic, inventory, monitoring, maintenance, materials, and rehabilitation for each test section.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About LTPP
Understanding "why" some pavements perform better than others is key to building and maintaining a cost-effective highway system. That's why in 1987, the Long-Term Pavement Performance (LTPP) program - a comprehensive 20-year study of in-service pavements - began a series of rigorous long-term field experiments monitoring more than 2,400 asphalt and portland cement concrete pavement test sections across the U.S. and Canada. [More]
LTPP has recently added a forum for discussion at the FHWA Highway Community Exchange. Please take a look and feel free to post a question or discussion item!
How to Get LTPP Data, contact LTPP Customer Support Service at ltppinfo@fhwa.dot.gov, new phone (202) 493-3035.
LTPP Technical Services Contractor and Regional and Other Important Links
The LTPP Newsletter
Publications
Highway Concrete Pavement Technology Development and Testing Volume V:Field Evaluation of SHRP C-206 Test Sites (Bridge Deck Overlays), FHWA-RD-02-086 2006
Highway Concrete Technology Development and Testing Volume IV:Field Evaluation of SHRP C-206 Test Sites (Early Opening of Full-Depth Pavement Repairs), FHWA-RD-02-085 2006
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Sort By: Publication Title | Publication Year | FHWA # | General Interest | Research

Publication Title	Publication Year	FHWA #	General Interest What's This	Research/ Reference What's This
LTPP 2006 Year in Review	2007	FHWA-HRT-07-028		
Multiple Corrosion Protection Systems for Reinforced Concrete Bridge Components	2007	FHWA-HRT-07-043		
Concrete Pavement Technology Update August 2007	2007	FHWA-IF-07-037		
Corrosion Resistant Alloys for Reinforced Concrete	2007	FHWA-HRT-07-039		
Long-Life Concrete Pavements in Europe and Canada	2007	FHWA-PL-07-027		

Events

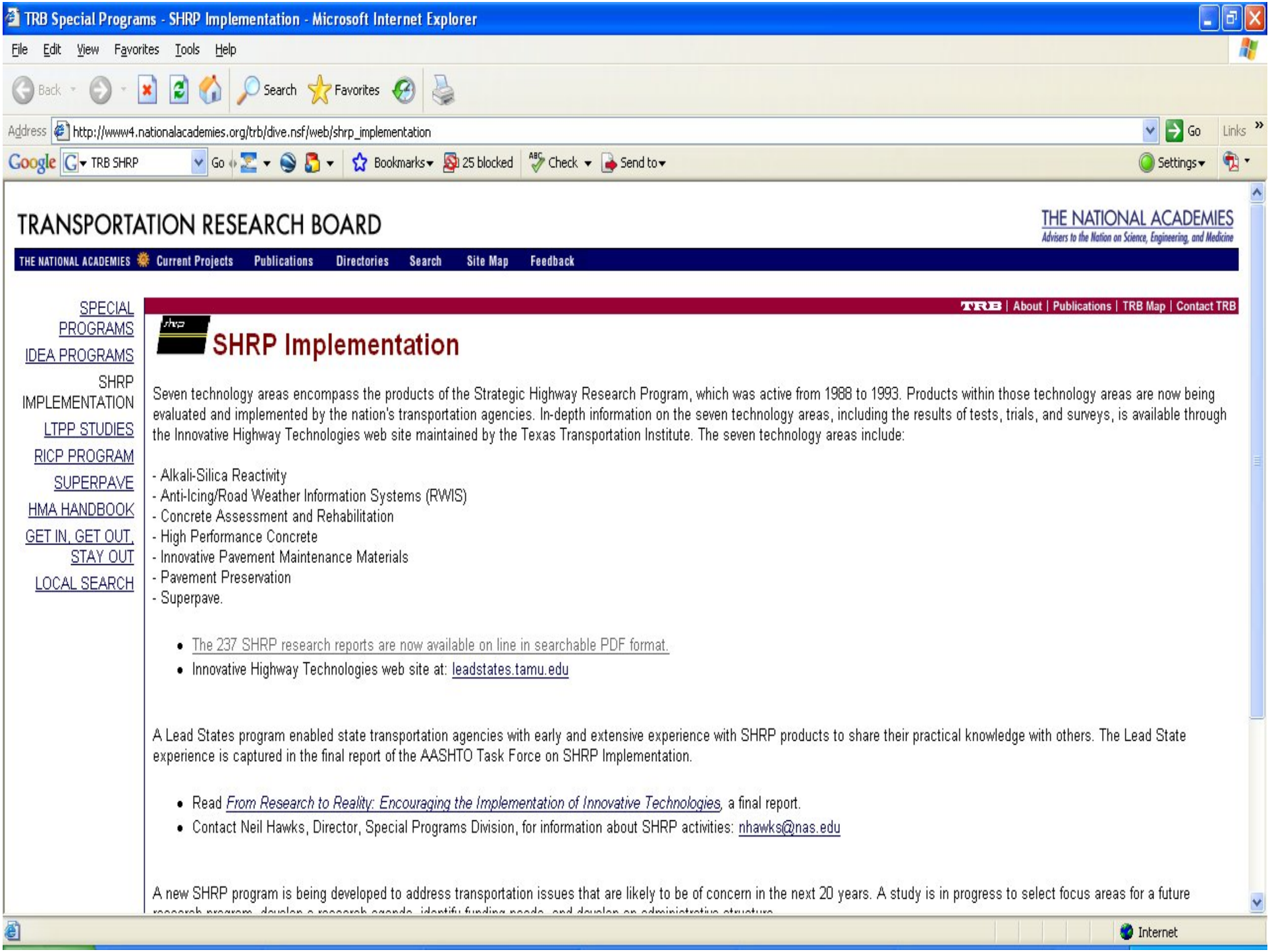
- View all Upcoming Pavements Events

More Information

- Bureau of Transporation Statistics
- Focus Magazine
- International Programs Publications
- LTPP Library
- Public Roads
- Publication Order Information
- Research & Technology Transporter

Strategic Highway Research Program (SHRP)

- Established by Congress in 1987 as a 5-year, $150-million research program to improve the performance, durability, and safety of U.S. highways.
- Under the umbrella of the National Research Council and the Transportation Review Board (TRB), independent research targeted four areas:
  - asphalt,
  - concrete and structures,
  - highway operations,
  - and long-term pavement performance.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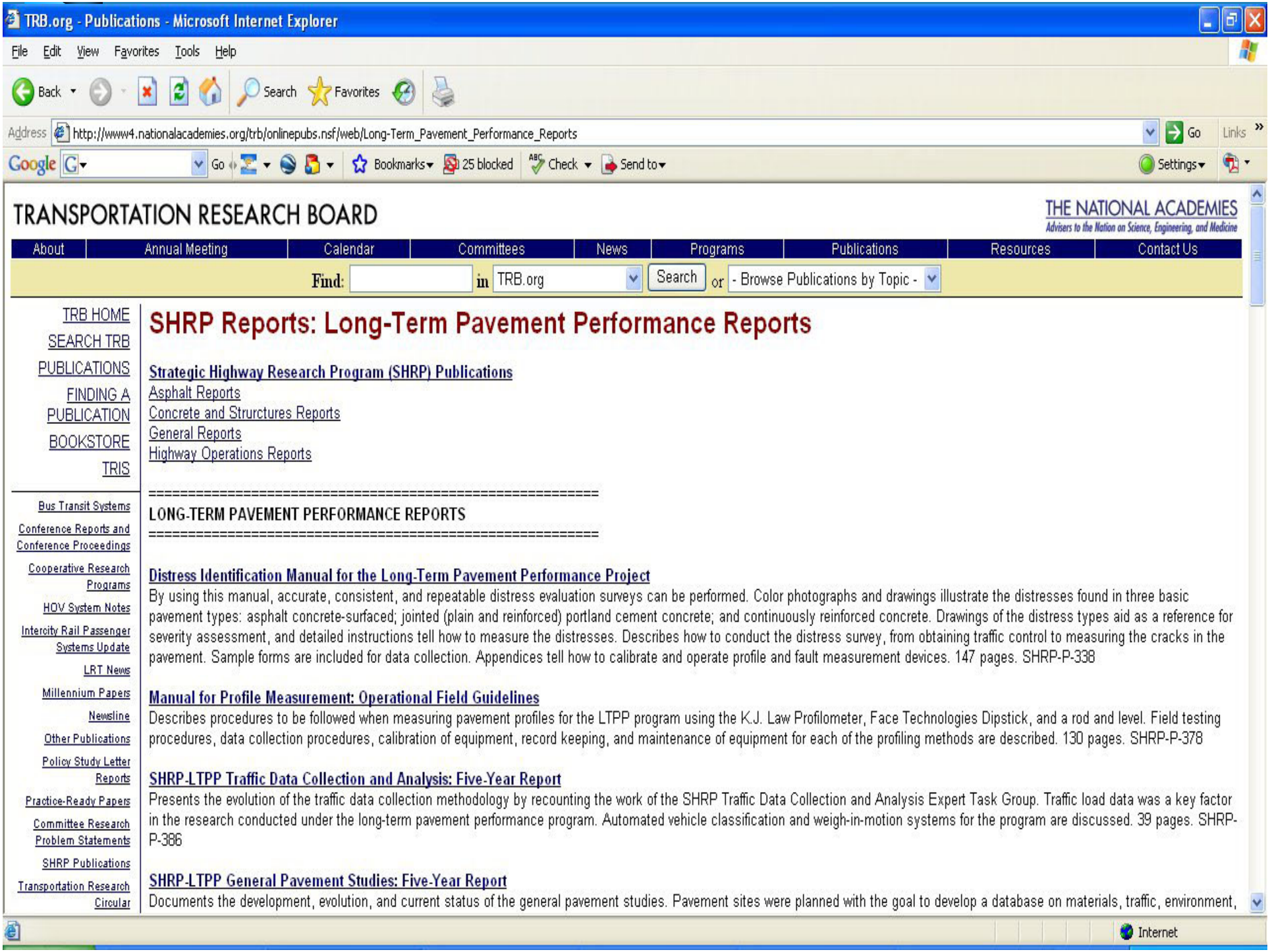
SHRP Implementation
Seven technology areas encompass the products of the Strategic Highway Research Program, which was active from 1988 to 1993. Products within those technology areas are now being evaluated and implemented by the nation's transportation agencies. In-depth information on the seven technology areas, including the results of tests, trials, and surveys, is available through the Innovative Highway Technologies web site maintained by the Texas Transportation Institute. The seven technology areas include:
- Alkali-Silica Reactivity
- Anti-Icing/Road Weather Information Systems (RWIS)
- Concrete Assessment and Rehabilitation
- High Performance Concrete
- Innovative Pavement Maintenance Materials
- Pavement Preservation
- Superpave.
The 237 SHRP research reports are now available on line in searchable PDF format.
Innovative Highway Technologies web site at: leadstates.tamu.edu
A Lead States program enabled state transportation agencies with early and extensive experience with SHRP products to share their practical knowledge with others. The Lead State experience is captured in the final report of the AASHTO Task Force on SHRP Implementation.
Read From Research to Reality: Encouraging the Implementation of Innovative Technologies, a final report.
Contact Neil Hawks, Director, Special Programs Division, for information about SHRP activities: nhawks@nas.edu
A new SHRP program is being developed to address transportation issues that are likely to be of concern in the next 20 years. A study is in progress to select focus areas for a future
Internet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Transportation Research Circular
SHRP Reports: Long-Term Pavement Performance Reports
Strategic Highway Research Program (SHRP) Publications
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Concrete and Strurctures Reports
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Highway Operations Reports
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LONG-TERM PAVEMENT PERFORMANCE REPORTS
==========
Distress Identification Manual for the Long-Term Pavement Performance Project
By using this manual, accurate, consistent, and repeatable distress evaluation surveys can be performed. Color photographs and drawings illustrate the distresses found in three basic pavement types: asphalt concrete-surfaced; jointed (plain and reinforced) portland cement concrete; and continuously reinforced concrete. Drawings of the distress types aid as a reference for severity assessment, and detailed instructions tell how to measure the distresses. Describes how to conduct the distress survey, from obtaining traffic control to measuring the cracks in the pavement. Sample forms are included for data collection. Appendices tell how to calibrate and operate profile and fault measurement devices. 147 pages. SHRP-P-338
Manual for Profile Measurement: Operational Field Guidelines
Describes procedures to be followed when measuring pavement profiles for the LTPP program using the K.J. Law Profilometer, Face Technologies Dipstick, and a rod and level. Field testing procedures, data collection procedures, calibration of equipment, record keeping, and maintenance of equipment for each of the profiling methods are described. 130 pages. SHRP-P-378
SHRP-LTPP Traffic Data Collection and Analysis: Five-Year Report
Presents the evolution of the traffic data collection methodology by recounting the work of the SHRP Traffic Data Collection and Analysis Expert Task Group. Traffic load data was a key factor in the research conducted under the long-term pavement performance program. Automated vehicle classification and weigh-in-motion systems for the program are discussed. 39 pages. SHRP-P-386
SHRP-LTPP General Pavement Studies: Five-Year Report
Documents the development, evolution, and current status of the general pavement studies. Pavement sites were planned with the goal to develop a database on materials, traffic, environment,
Internet

Hot-Mix Asphalt Paving Handbook 2000

Responding to recommendations from industry, government, and academic officials, the first edition of the Hot-Mix Asphalt Paving Handbook was prepared by the Transportation Research Board in 1991 with financial support from the American Association of State Highway and Transportation Officials, the Federal Aviation Administration, the Federal Highway Administration, the National Asphalt Pavement Association, and the U.S. Army Corps of Engineers. Although field manuals and handbooks were then available from many sources, none had been adopted by all major industry segments. Since its appearance, the *Hot-Mix Asphalt Paving Handbook* has been widely accepted as a standard training aid throughout the major segments of the paving industry.

In the 1990s, asphalt paving practices evolved rapidly, and TRB has updated the handbook at the request of its sponsors to address this evolution. This second edition of the handbook addresses recent research findings, including those of the Strategic Highway Research Program, new paving equipment, the growth in recycling, changes in quality control practices, and the introduction of new techniques from Europe and elsewhere.

This second edition is available in both print and CD formats from the following sources:

AASHTO Publications
444 North Capitol Street, NW
Suite 249
Washington, DC 20001
Tel: 202-624-5800
Fax: 202-624-5806
Email: aashto@aashto.org

Federal Highway Administration
Report Center
9701 Philadelphia Court, Unit Q

Foundation for Pavement Preservation (FP^2)

Non-profit consortium of PP-related vendors and agencies created to

- Identify and pursue industry/agency research needs
- Coordinate with industry and agency partners - AASHTO and FHWA
- Identify "Best Practices" for pavement preservation programming and techniques
- Promote pavement preservation internationally
- Develop activities for highway users and auto industry groups

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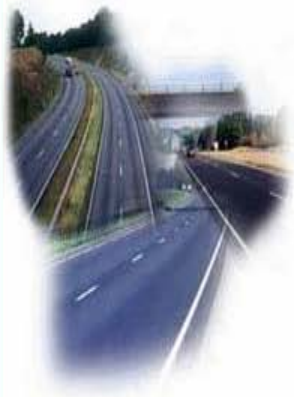
"Providing resources to advance knowledge for managing and preserving pavements"

Last Update: October 11, 2006

Welcome to the Foundation for Pavement Preservation Web Site!



The Foundation is a non-profit organization supported by the pavement preservation industry; contractors, material suppliers, equipment manufacturers, consulting engineers, and academia.

The Foundation supporters are passionate about advocating the importance of protecting and preserving the huge investment in pavements throughout the United States of America and the world.

Read About the 2006 FP^2 Awards

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"Providing resources to advance knowledge for managing and preserving pavements"

Last Update:
October 11, 2006

Evaluation of Emulsified Sealer/Binders used for Evaluating the Life of Asphalt Pavements

S-R Pilot Field Testing Program
SR-87 Chip Seal Experimental Design
Spray Applied Sealers/Rejuvenators by State
Winslow Pilot Testing Work Plan

Internet

Results of New Pavement Preservation & Resurfacing Techniques on Nashville Streets & Roads

OUR AUDITORS TO US: GET WITH THE PROGRAM

- Metro Public Works underwent a performance audit by Maximus in May 2002.
- Auditors said traditional paving is old-school; use slurry seal to increase pavement life.
- Auditors were forward-thinking, but slurry seal is not a cure-all.
- Luckily, we had official sources of relevant research (LTPP, SHRP, FP^2) to learn from.

NASHVILLE GETS WITH THE PROGRAM

- Nashville reviewed the findings of LTPP, SHRP, and FP^2.
- Conduct product testing under real conditions.
- Applied various treatments according to vendor specs – *with the vendor rep on-site in each case*.
- Established a 500’ test surface just outside the Public Works offices.

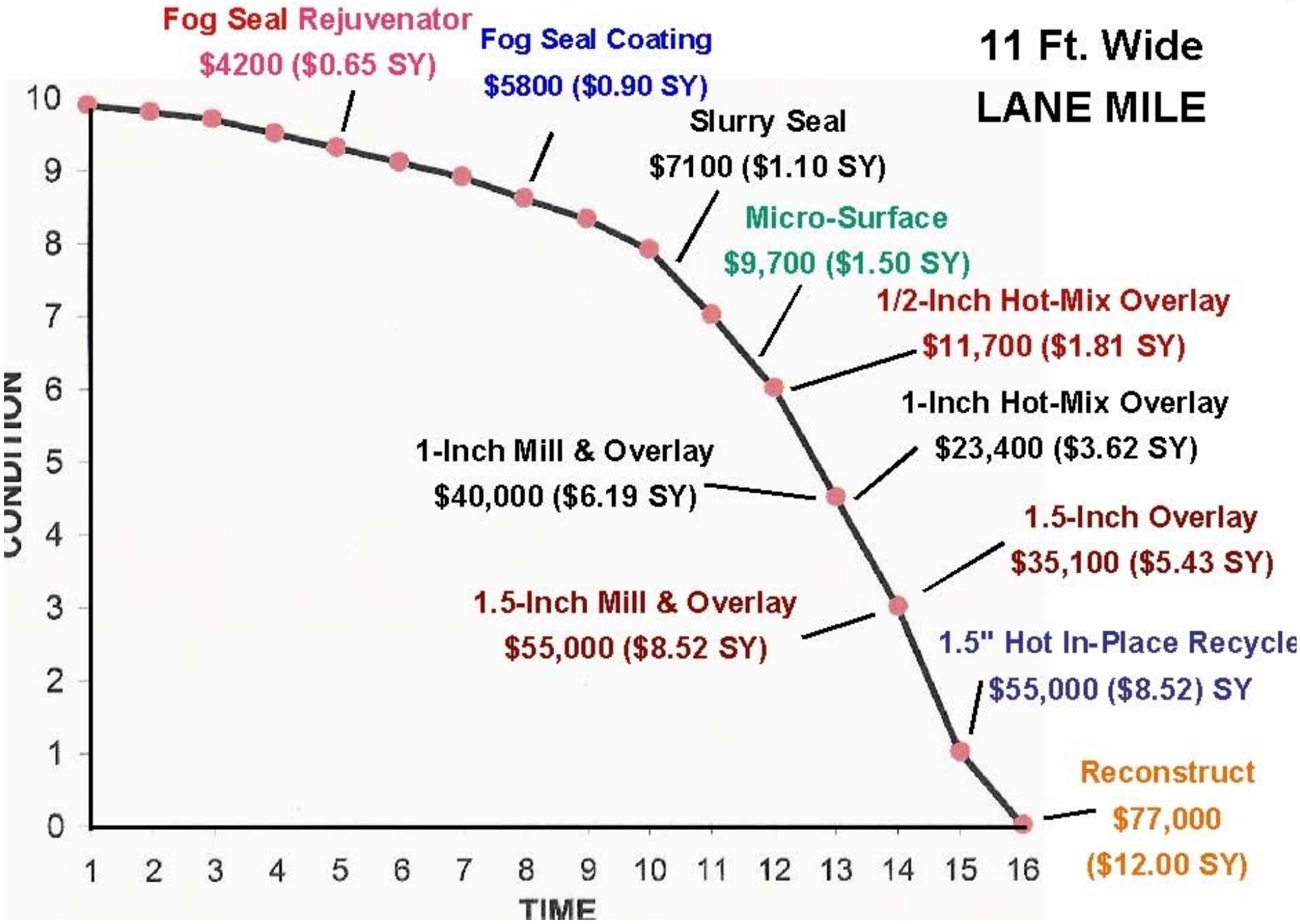
Also testing various treatments and techniques on other segments across Nashville according to factors like:

- Type of surface
- Average traffic volume/speed
- Type & severity of surface defects
  - Pop-outs
  - Alligator cracking
  - Shoving
  - Joint separation
  - Raveling
- Last-paved date
- Public impact, safety, project coordination, etc.

MULTIPLE TREATMENT TYPES EXIST FOR VARYING ROAD CONDITIONS

- Industry experts recommend a phased approach.
- Use the treatment type that is appropriate for the location, pavement age, traffic, etc.
- These treatments can elevate the overall condition rating of a road, extending its life until resurfacing is a real requirement.
- The trick is to understand which treatments are available, how they work, and when to use them.
- This is why Nashville is doing its own research!

2007 ESTIMATED COST TO BRING A PAVEMENT BACK TO EXCELLENT CONDITION



PROPER PAVEMENT PRESERVATION IS AN ONGOING PROCESS

- Review of treatment performance is ongoing, with useful results so far about a variety of surface treatments.

- “Your mileage may vary”, but maybe our results can help you in your own pavement preservation program.

PRODUCT TESTING IN NASHVILLE, TN

- Reclamite
- Crack Seal
- GSB 88
- GSB-Restore
- Rejuvaseal
- Slurry / Micro
- PASS
- Joint Bond
- Re-Play (Soy)
- Infrared Patching
- NovaChip
- Warm Mix
- Polymer-Modified Asphalt Geogrid

INNOVATIVE PAVEMENT REJUVENATION & PRESERVATION TECHNIQUES

RECLAMITE – The Marketing Blurb

- Made from the same light oils and resins used in making asphalt, many of which are burned off due to the heat required for applying AC.
- A one-step method for restoring plasticity and durability of the asphalt binder.
- Used on newly constructed pavements (0-3 years) to improve durability of the mix, while providing an in-depth seal to reduce permeability.
- On older pavements (3-5 years), it will reverse the effects of aging due to environmental damage from sunlight and water intrusion.

RECLAMITE – Our Experience

- Pink surface while curing; color fades away within 24 hours.
- Requires aggregate (sand or slag) to be spread to retain skid resistance. This material coating can affect the visual appearance of the road.
- Nashville has adopted the use of pavement rejuvenators like Reclamite to protect pavement that is 3-5 years old.


Nashville - Oaklawn Ave.
CANTRELL AV
STOP
ROAD CLOSED
FRESH OIL
RECLAMITE Application
5-10-05


Oaklawn Ave. - Reclamite Just Applied
STOP

CRACK SEAL – The Marketing Blurb

Crack sealing is the most common maintenance option used to help protect the pavement structure.

First, the cracks are cleaned and dried using a hot compressed air heat lance. Then, the cracks are filled with hot poured rubberized joint and crack sealant.

It is often placed in advance of overlays and surface treatments to improve performance.

CRACK SEAL – Our Experience

- Joint separation is biggest failure on roadway.
- Crack sealant does just what its name implies.
- Nashville has adopted crack sealing.


CRAFCO
11 1:21PM


11 1:59PM


11 1:38PM


11 1:48PM

GSB 88 – The Marketing Blurb

GSB Rejuvenating Sealant Binder is a low cost method to keep pavements in good condition longer by slowing the oxidation/deterioration process of your roads.

Gilsonite - a natural, unrefined asphalt ore that's rich in resins to help replenish the pavement's surface where oxidation first starts.

Sealer - very resistant to oxidation; keeps water out and pavement oils and flexibility in.

Binder -"glues" in an asphalt pavement's fines to help stop ravel and premature cracking.

Army Corp of Engineers found it to be four times more effective in holding a pavement's surface together than the leading saturate oil rejuvenator.

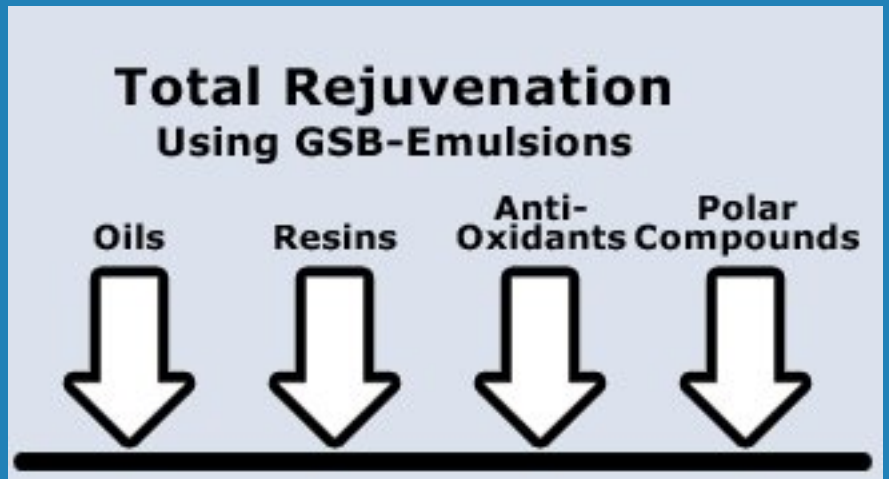
GSB 88 – Our Experience

- Very tacky. Cure time not conducive to quick traffic-readiness.
- Thin material composition – high water content in emulsion.
- Metro Nashville pursuing alternative methods more aggressively.


FLEMING'S
MARKET

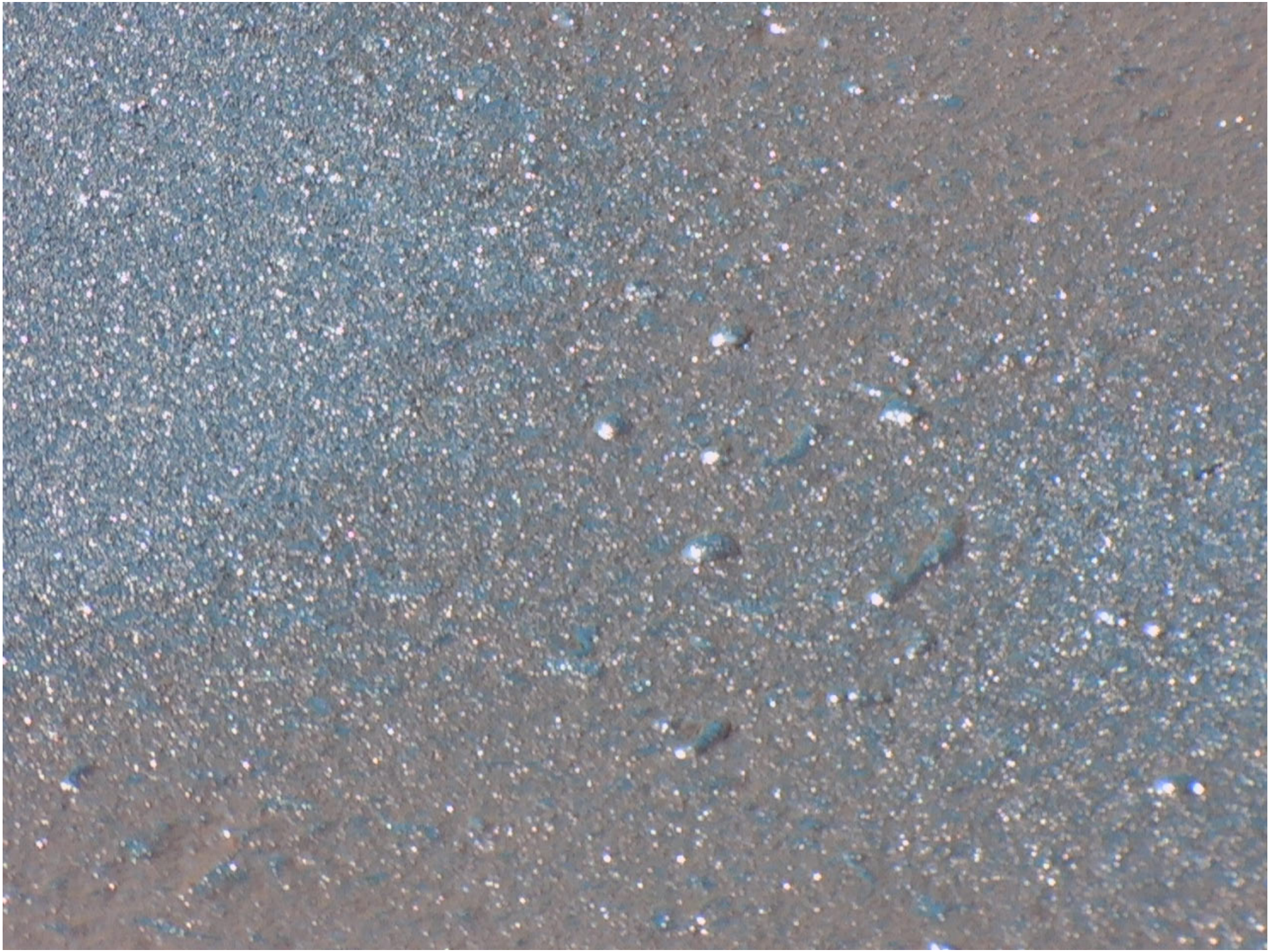
GSB-RESTORE – The Marketing Blurb

Use on asphalt pavements within the first few years of their existence to provide many of the elements lost to asphalt cement during the refining process, and as a preservative in retarding the natural oxidation process. Also effective in solving specific pavement problems such as raveling and oxidation.



GSB-RESTORE – Our Experience

- Greater material composition than GSB-88. Less watery.
- Penetrates better than GSB-88.
- Asphalt “clogs” were left on our on finished surface during our test section.
- Outperforms GSB-88, but Metro still undecided on its use within Nashville.



REJUVASEAL – The Marketing Blurb

- Seals, protects, and revitalizes asphalt pavement.
- Penetrates the surface of asphalt; becomes integral part of the binder.
- Reduces viscosity and brittleness in the top 3/8” of asphalt while significantly increasing ductility and flexibility.
- Asphalt surfaces treated with RejuvaSeal are fuel, water, and chemical resistant.

REJUVASEAL – Our Experience

- Strong coal-tar smell calls attention to itself, caused unfavorable public perception.
- Nashville's opinion is that the smell is too strong for application on residential streets.

SLURRY / MICRO-SURFACE – The Marketing Blurb

- Slurry seal is a mixture of emulsified asphalt oil, rock, water, and additives such as aluminum sulfate, Portland cement, lime, latex or carbon black. Which additives are used depends on many factors including location, condition of surface, and the type of surface.
- Micro-Surface = Slurry Seal + Additional Aggregate to increase skid resistance, color contrast, surface restoration, and service life to high-speed, heavy-traffic roadways.

MICRO-SURFACE – More Marketing

- Micro-Surfacing creates a thin, restorative surface course on urban arterials and heavy traffic intersections does not alter drainage, and there's no loss of curb reveal.
- Applied to roads or runways to eliminate hydroplaning problems that occur during periods of rain. The Micro-Surfacing restores the proper surface profile and makes the area safe for use.
- Micro-Surfacing creates a new, stable surface that is resistant to rutting and shoving in summer and to cracking in winter.

MICRO-SURFACE – Our Experience

- A step up from slurry seal.
- Finish looks rough; highly textured.
- Finished surface is thin and brittle.
- Reflective cracking soon comes through.

PASS – The Marketing Blurb

- Polymer-modified Asphalt Surface Sealer, a type of fog seal.
- Rejuvenates and seals worn asphalt.
- Fills cracks; adds durable membrane to resist reflective cracking.
- It's got substance: 50% asphalt; 20% rejuvenator; 3% polymer. (Remaining composition is emulsifier + water.)

PASS – Our Experience

- Cures to black appearance in 2-3 hours, allowing traffic back onto roadway.
- Little impact on residents:
  - Requires no aggregate coating
  - Little or no odor
- PASS works well to stop raveling, seal out water, fill small cracks, and extend the lifetime of roadways that were last paved 7-10 years ago.
- Requires re-striping.
- Metro Nashville has adopted the use of polymer-modified asphalt surface sealants like PASS.

PASS – Adopted by Metro Nashville

- Using PASS costs us about $0.60-$0.70 per sq yard.
- Traditional mill & fill costs us about $6.00 per sq yard.

(Numbers assume 1.5” overlay, and do not include striping/marking costs.)

- Using PASS lets Metro Nashville extend a roadway’s lifetime by about 5 years before resurfacing is needed.

PASS – Relative Costs

ROAD NAME	ACTUAL SQ YDS	LAST PAVED DATE	FOG SEAL COST	OVERLAY COST	MILLING COST	SAVINGS: FOG SEAL vs MILL & FILL
SHERIDAN RD	6443	1994	$3,801.37	$31,167.37	$10,147.73	$37,513.72
AUTUMNRIDGE DR	7251	1995	$4,278.09	$35,075.99	$11,420.33	$42,218.22
HINKLE DR	7336	1992	$4,328.24	$35,487.17	$11,554.20	$42,713.13
GWYNNWOOD DR	7768	1993	$4,583.12	$37,576.92	$12,234.60	$45,228.40
CHESAPEAKE DR	10232	1992	$6,036.88	$49,496.28	$16,115.40	$59,574.80
IVY POINT	27646	1995	$16,311.14	$133,734.76		$117,423.62
RIDGEWOOD RD	32289	1992	$19,050.51	$156,194.81		$137,144.30
GREENBRIER RD	33710	1994	$19,888.90	$163,068.75		$143,179.85
OLD HICKORY BLVD	36372	1995	$21,459.48	$175,945.91		$154,486.43
GREER ROAD	66186	1992	$39,049.74	$320,168.16		$281,118.42
			$138,787.47	**$1,137,916.11**	**$61,472.25**	**$1,060,600.89**

Applying PASS to these 10 example streets costs around 1/8 the cost of traditional resurfacing.

PASS = $139K where MILL & FILL = $1.1M


14 10:10AM


4 12:29PM


13 1:56PM

JOINT BOND – The Marketing Blurb

- To be applied just after resurfacing, while the pavement is new.
- Forms a strong construction joint if applied prior to initial separation.
- Prevents water from penetrating construction joints.

JOINT BOND – Our Experience

- Currently testing on 1, 2, and 3 year-old roadways.
- Will evaluate for 2-3 more years before making a decision on its adoption.


6 9:22AM


SPEED LIMIT
15
6 9:22AM

RE-PLAY – The Marketing Blurb

- Soy-based sealant product.
- Light odor; not unpleasant.
- More environmentally friendly than most options.

$ INVESTING CHECKOFF DOLLARS

Soybeans Help Protect Asphalt

by Jamie Mossbarger

Soybeans are probably not the first thing someone thinks of when driving down an asphalt road. But thanks to soybeans and the soybean checkoff, it really could be the "miracle bean" protecting the roads of Ohio and elsewhere.

BioSpan Technologies, a St Louis based company, has developed RePlay, a specialty product made from soybean oil that is used to restore aging asphalt roads. Locally, Asphalt Systems of Ohio, located in Sidney, has been testing RePlay for several years and is impressed with its remarkable results.

"RePlay worked really well and we are able to seal a lot faster and before water is able to penetrate."

Bill Knasel
Franklin Township trustee.

RePlay is a clear product applied to asphalts as a preventative, extending the life of the road and ultimately reducing resurfacing costs.

"Historically, asphalt roads have had a tendency to start cracking and breaking down within months of being laid," says Michael Freistihler, president of Asphalt Systems, Inc. "RePlay has proven to help asphalt resist this aging process as well as reverse the oxidation of older pavements. It should extend the life of roads four to five years and permeability testing on core samples of treated roads shows that RePlay reduces the water entering the pavement by 98 percent."

Soybean oil makes up nearly 40 percent of RePlay and, in addition to extending the life of the road; it also helps seal small cracks in asphalt.

Freistihler said that using the soybean derivative "can save 25-30 percent in long term costs" for roads and he has "seen some cracks actually narrow where vehicle traffic goes over them" as a result of using RePlay.

Township trustees from Franklin Township in Shelby County have applied RePlay to several township roads and are pleased with the results.

"RePlay worked really well and we are able to seal a lot faster and before water is able to penetrate," says Bill Knasel Franklin Township trustee. "It also lasts longer and is clear so the roads are able to be lined before it is applied."

Another advantage of RePlay is that once applied to the road, it cures within 30 minutes, reducing the time motorists would have to refrain from driving on the surface.

"By being a farming community, we are using something farmers produce, and in the long run, saving money," says Knasel.

The difference between untreated (left) and treated (right) roads clearly demonstrates the effect an application of RePlay, an agricultural oil road treatment, has on asphalt. The product is available through ASI, 2323 Campbell Road, Sidney, Ohio 45365. For more information on how this soybean derivative can help asphalt surfaces, call ASI at (800) 729-8094.

RE-PLAY – Our Experience

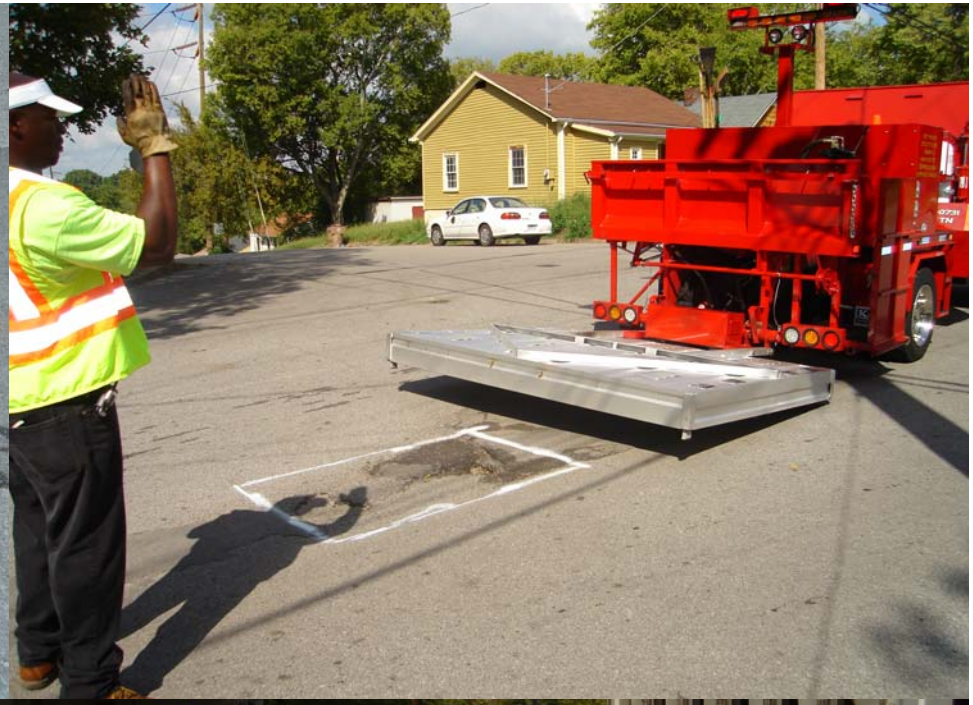
- Currently under testing.
- Not enough experience with it yet to gauge its value to our program.

INFRARED PATCHING – The Marketing Blurb

- Uses infrared to heat existing blacktop; blends new blacktop to create a joint-free integral patch.
- The machine is capable of heating the existing blacktop to a depth of approximately two inches without oxidation or burning.
- No flame in direct contact with the existing blacktop surface.

INFRARED PATCHING – Our Experience

- Infrared patching seems to work very well.
- New enough that there is not enough competition for bidding.
- Machinery is advancing quickly for ease of application.
- Newer units perform scoring via automated means – no more raking.
- Need experienced contractors to level the playing field.



OUR PLAN TO CONTINUE PRESERVING PAVEMENT

- Pave streets that need it.
- Use products like Reclamite on streets 0-3 years old, while they are in good condition.
- Use products like PASS on streets that were last paved 7-10 years ago, that are severely raveled and have little or no cracking.
- Crack seal streets that have severe construction joint separation.
- Continue to learn from the research of the experts, investigate new technologies, and test treatments on our own roadways.

Using the Right Treatment – At the Right Place – At the Right Time

Nashville is actively researching ways to effectively manage the pavement on its roadways, and it is paying off.

We are doing our homework to ensure we are
USING THE RIGHT TREATMENT
AT THE RIGHT PLACE
AT THE RIGHT TIME.

QUESTIONS?

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