36th Annual Utah Asphalt Conference
Seamless Asphalt Pavement Preservation
Featuring
Types of asphalt failure

- Alligator cracking
- Joint cracking
- Raveling
- Rutting
- Potholes
Typical Repair Approaches

• Sawcut, removal, and replacement
  • Separates sawcut area from surrounding mat

• Crack seal
  • Temporary, repeated treatments, cracks remain

• Mill with overlay
  • May include treatment of serviceable pavement

• Cold patch/Perma-patch
  • Throw and Go
A New Approach…

Seamless Pavement Preservation
Heatwurx™ Process Description

Heatwurx™ is a proprietary process using patented technology for in-place pavement rehabilitation. The primary steps for completing a rehabilitation effort are as follows:

1. Place the HWX-30 Electric Infrared Heater on asphalt area to be treated. This proprietary equipment uses infrared heating coils to heat the existing asphalt full depth.

2. Once heated, the asphalt is now workable in place. Using the HWX-AP40 Asphalt Processor attachment to a skid steer till and mix the existing asphalt. The width of the tilled area is to be narrower than the heated area. The tiller is specially designed to cut existing asphalt at a beveled angle. If additional material is needed for a repair area, recycled asphalt or hot mix asphalt can be added.

3. Following the second pass using the HWX-AP40, add HWX-R55 Rejuvenating Oil to achieve needed oil content followed by two additional passes with the HWX-AP40.

4. Adjust the HWX-AP40 attachment to the screed position and pass over treated area to prepare the asphalt for compaction.

5. Compact the treated area with a vibratory drum roller compactor. During compaction the reworked asphalt area and the undisturbed heated asphalt are compacted together along the beveled edges creating a seamless repair area. The area with previous crack or pothole is now a contiguous, jointless, seamless section of asphalt pavement.
Heatwurx Process

- Apply heat to area to be treated
Heatwurx Process

- Process heated area
- Add RAP and rejuvenator
- Process and mix
- Level processed asphalt to desired depth for compaction
Heatwurx Process

- Compact processed area
Repair Typical Detail

1. **Heatwurx® Infrared Heating Box**
   - Electrical Heating Elements

2. **Heated Asphalt Pavement Section**

3. - Heated Asphalt Processed and Mixed in Placed
   - Asphalt Recuminator Added and Mixed
   - Additional Asphalt Pavement Mix Added as Needed

4. - Area Compacted with Steel Drum Roller
   - Completed Inplace Asphalt Repair
UDOT Test Projects

US-89 in Region 3 Northbound, MP 327, Springville, UT

I-84 in Region 2 Eastbound, MP119.72, Echo Jct, UT
Report No. MS-09.14

Heatwurx™ Asphalt Pavement Repair Demonstrations on US-89 in Region 3 and on I-84 in Region 2

Methods Study No. M(09)14

CONSTRUCTION REPORT

Prepared for
Utah Department of Transportation,
Central Maintenance Division

Submitted by:
Ken Berg, P.E., Maintenance Planning Engineer

Authored by:
Ken Berg, P.E., Maintenance Planning Engineer

March 2010

US-89 photos

Before

5 months later

After
I-84 photos

Before

After

71 days later
Report Conclusions

...based on empirical observation, this process appears to provide a better fusing of the repaired area to the surrounding pavement than conventional patching procedures. This process may provide a more durable solution in problem areas that normally require several applications in cold, wet weather, such as on bridge decks...
Bid Document Specification

2.1 ADDITIONAL MATERIAL
A. UDOT maintenance personnel have any additional material required for rejuvenating agent, asphaltic concrete sealant.

3.1 CLEAN REPAIR AREA
A. Thoroughly sweep the general area and debris to remove any surfacings, concrete, or other debris. Use moisture for dust control and distance for traffic.

3.2 MARK AND MEASURE REPAIR AREA
A. Mark and measure the specific area to be repaired by Department's representative.

3.3 CONSTRUCTION
A. Heat area to be repaired to a sufficient temperature to allow reming of the asphalt mix. Do not exceed a surface temperature of 500°F (260°C).

B. Using a mechanical tiller, scarf the edge of the repair area to a depth of 2 inches.

C. Add additional bituminous material as directed by Department's representative to prepare the pavement surface and to allow movement of the asphalt mix.

D. Reshape repair area by hand to match existing grade.

E. Compact surface as soon as possible in the area to be repaired so that the entire repair area surface should be smooth, tight, and pavement.

PART 2 PRODUCTS
Infrared Bituminous Pavement Repair
00856 - 1 of 3
June 24, 2010
AASHTO TIG Nomination

11. Have other organizations used this technology? Please check one:  Yes  No
If yes, list organizations and contact:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Name</th>
<th>Contact Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDS Church</td>
<td>Larry Paul</td>
<td></td>
</tr>
<tr>
<td>Union Pacific</td>
<td>Steve Jackson</td>
<td></td>
</tr>
<tr>
<td>WYDOT</td>
<td>Rick Collins</td>
<td></td>
</tr>
</tbody>
</table>

12. How does the technology meet customer organizations that have used it? This technology has a seamless repair, without having to remove the entire area, and can be used for minor repairs or full-scale reconstruction.

Pay-as-you-go definition as the commitment to the results of a significant benefit or advantage over other currently available technologies.

<table>
<thead>
<tr>
<th>Pay-as-you-go</th>
<th>Definition</th>
<th>Technology</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pay-as-you-go</td>
<td>Significant benefit</td>
</tr>
</tbody>
</table>

13. The TIG selection process is one that can be adopted with a reasonable amount of effort and cost commensurate with the payas-you-go potential.

14. What is the estimated cost, effort, and is another organization? Other organizations applying the technology.
“Our receipt of this information is very timely as we are currently in the process of establishing program priorities for our infrastructure research and technology activities for the next several years.

Having been made aware of Heatwurx, we can consider it as we develop specific plans to address priority needs.”
American Association of State Highway & Transportation Officials (AASHTO)
Nominated by UDOT for TIG (Technology Implementation Group). AASHTO selects technologies on a yearly basis from around the country. Once selected ASSHTO will market the technology on a national level to state DOT’S.

Federal Highway Administration (FHA)
Chris Newman over-sees the pavement preservation group and is looking at ways to implement Heatwurx on a national level, one of the options is through the FHA Highways for life program. This program is similar to the AASHTO TIG program in that once accepted, Federal highways will market this technology to state DOTs on a national level and within the National Parks system.

Utah Department of Transportation (UDOT)
UDOT implemented written specifications for the repair UDOT roadways with the Heatwurx Pavement Preservation Process. UDOT has entered into a statewide maintenance contract with Heatwurx for pavement preservation work. Orange Book pilot projects are being explored as part of the UDOT Pavement Preservation program. Heatwurx was presented as part of the 2010 UDOT Engineering Conference.

Texas Department of Transportation (TxDOT)
TxDOT has completed a pilot program in association with Texas Transportation Institute (TTI). TxDOT is in the process of developing a specification for use of Heatwurx Pavement Preservation Process for TxDOT roadways.
Utah Local Technical Assistance Program (LTAP)

The funding for this program comes from Federal Highways & local DOT. Utah LTAP has identified the Heatwurx pavement preservation process as a technology of interest and is including the process in it’s presentations and to Utah municipalities and agencies. Heatwurx was presented as part of the LTAP 2011 asphalt conference. Heatwurx will be presented at LTAP Road School April 2011.

Union Pacific Railroad (UPRR)

UPRR has incorporated a specification for us of Hearwurx Pavement Preservation Process for UPRR intermodal facilities pavement management program.

Utah Transit Authority (UTA)

UTA will utilize Heatwurx Pavement Preservation Process to the pavement management program for all park and ride facilities.

American Public Works Association (APWA)

Heatwurx will be included as part of the APWA Utah 2012 Specifications
<table>
<thead>
<tr>
<th>Owner</th>
<th>Traditional</th>
<th>Heatwurx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hill Air Force Base</td>
<td>Remove and replace 4” asphalt roadway</td>
<td>Re-heat and add additional material as needed to establish proper grade and drainage</td>
</tr>
<tr>
<td></td>
<td>13,853 sf</td>
<td>2,477 sf</td>
</tr>
<tr>
<td></td>
<td>$82,546</td>
<td>$23,328</td>
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<tr>
<td>University of Utah</td>
<td>Remove and replace 4” of asphalt parking area</td>
<td>Repair cracking, re-heat and add material to establish proper grade and drainage</td>
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<tr>
<td></td>
<td>50,625 sf</td>
<td>18,985 sf</td>
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<tr>
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<td>$151,875</td>
<td>$97,200</td>
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<tr>
<td>UDOT SR - 224</td>
<td>3” roto-mill and placement of new 3” asphalt</td>
<td>Repair all cracks ¼” wide, re-heat and add material to establish proper grade and drainage</td>
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<tr>
<td></td>
<td>1,636,140 sf</td>
<td>247,632 sf</td>
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<tr>
<td></td>
<td>$2,265,806</td>
<td>$817,186</td>
</tr>
</tbody>
</table>
Pavement Preservation

- Extend usable life of pavement
- Extend available budget dollars
- Seamless rehabilitation
- No repeated treatments
- Use on-site, in-place materials
- Specifications and Permitting
- Environmentally friendly
Availability of Technology

• Equipment is manufactured in Utah
• Contract work
• Purchase of equipment
• Lease or rent equipment
**Technical Specs**

- **Weight**: 2550 LBS
- **Repair Area**: 30 sq ft
- **Generator Requirement**: 45 kW
- **Elements**: 9
- **Cycle Time**: 15 - 30 minutes depending on depth
- **Fuel Consumption**: Approximately 2.8 GPH
- **Heavy Duty 4x3x125 Frame**
- **Top Wind 7000 Lbs. Jacks**
- **5” Heat Resistance Insulation**
- **Heavy Duty Powder Coated Finish for Maximum Durability & Visibility**
- **3/8” Versatile Attachment Plate for Skidsteers or Forklifts**

**HeatWurx**

6100 Sagewood Drive | Suite 400
Park City, Utah 84098
[435] 640-4070
www.heatwurx.com
Technical Specs

WEIGHT - 14,500 lbs
REPAIR AREA 115 ft²
SEAM REPAIR AREA 62.5 ft²
GENERATOR REQUIREMENT - 100 KVA
CYCLE TIMES 15 - 30 MINUTES DEPENDING ON DEPTH
SEAM HEAT CYCLE TIMES - UP TO 30 FOOT PER MINUTE
GENERATOR FUEL CONSUMPTION 19.3 GPH

Transporter

KUBOTA D9050 DIESEL
GATES HOSE
NON SLIP TOP DECK WITH SAFETY RAIL
3/4 MAIN FRAME WITH ABILITY TO ADJUST
4 X 15 MAIN HEATER WITH 4' X 5' DETACHABLE WINGS
2 HYDRAULIC PUMPS
REMOTE PLATFORM CONTROLS
TWO SPEED CONTROLS
TWO SPEED DRIVE
8" INSULATION

Patent Pending
HEATWURX®

ASPHALT PROCESSOR

Technical Specs

1" Wear Plate with ability to adjust to desired depth
5-1/2" Processing Blades
Beveled Tooling to maximize asphalt bonding
1/2 gauge Wings to funnel material into desired location

HEATWURX®

6900 Sagemwood Drive | Suite 140
Park City, Utah 84098
(425) 600-4670/www.heatwurx.com
HEATWURX is an eco-friendly and innovative asphalt repair technology that provides increased durability for any asphalt road or parking lot at a much lower cost than traditional repair methods. Our infrared heating system reheats existing asphalt that allows cracks and holes to seamlessly fuse together. The results are immediate, beautiful and durable.

See us on Inside Business Report with Fred Thompson

See it in action
See how the HEATWURX method seamlessly fuses together holes and cracks in asphalt, using existing HMA pavement structure.

Cost Savings
The HEATWURX method costs approximately 65% less than traditional methods.

Eco-Friendly Process
Instead of mixing new asphalt, the HEATWURX method refines existing asphalt for removing, re-paving, and re-compacting.

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www.heatwurx.com