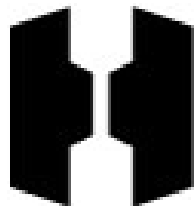


36th Annual
Utah Asphalt Conference
Seamless Asphalt Pavement
Preservation
Featuring



HEATWURX

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



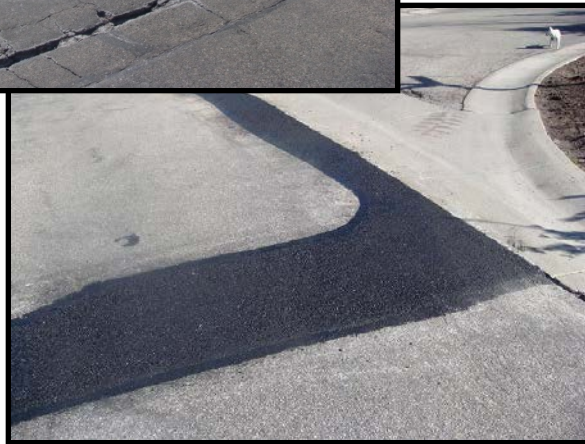
Heatwurx Process

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

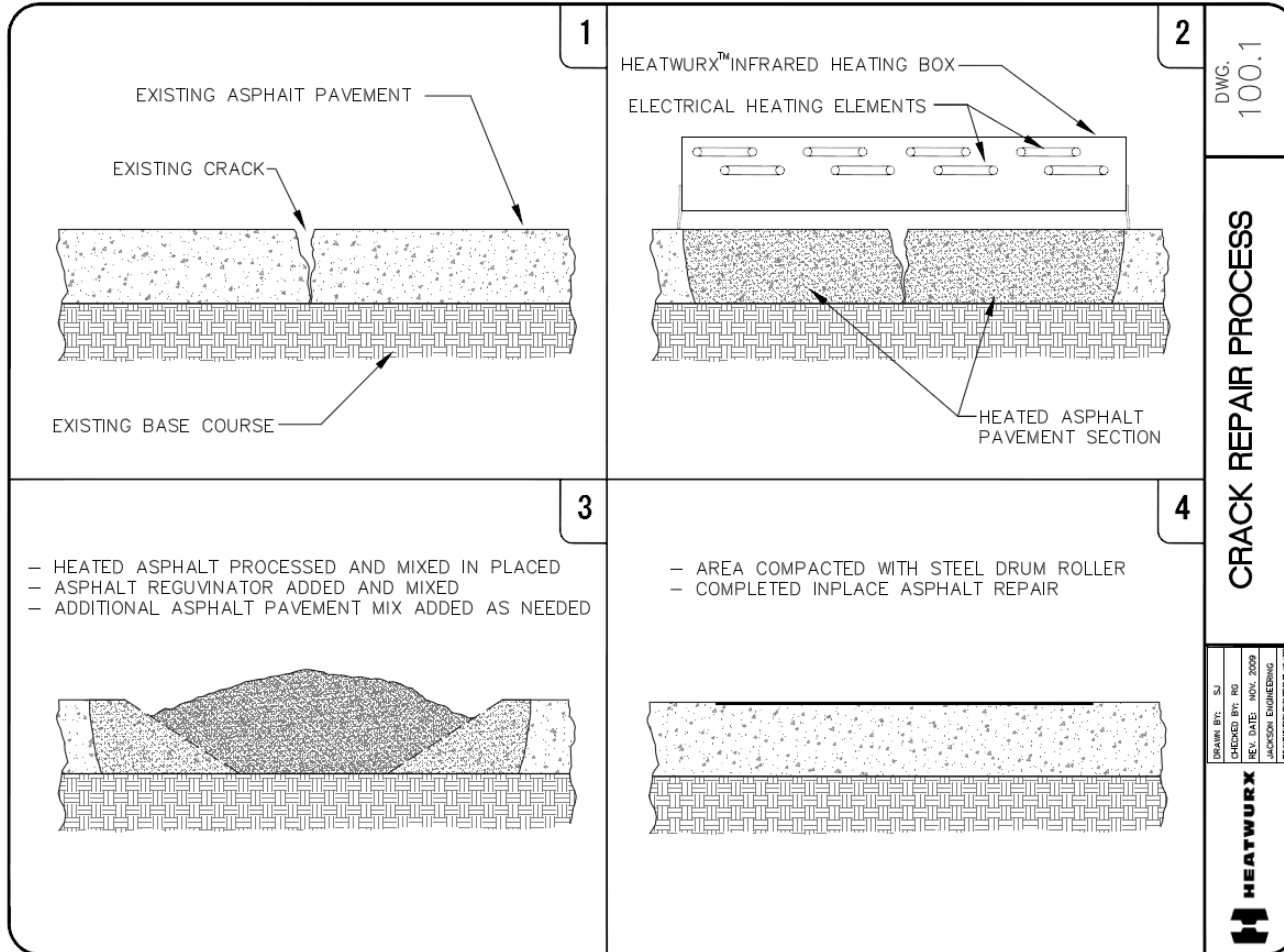


Heatwurx Process

- Compact processed area

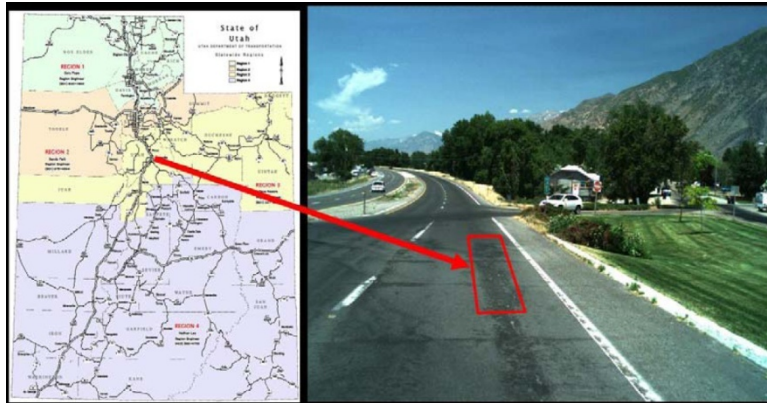


Repair Typical Detail

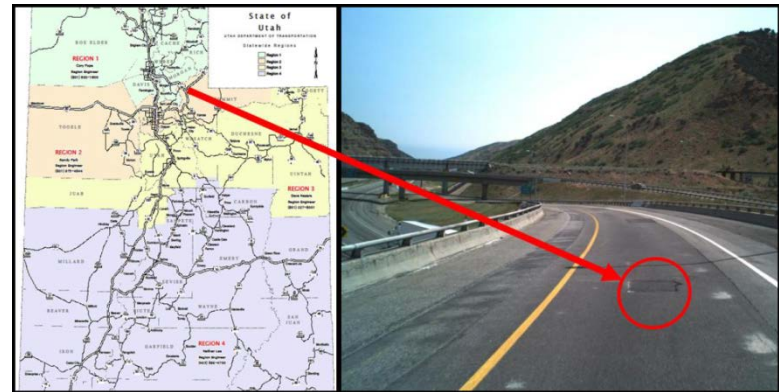


UDOT Test Projects

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

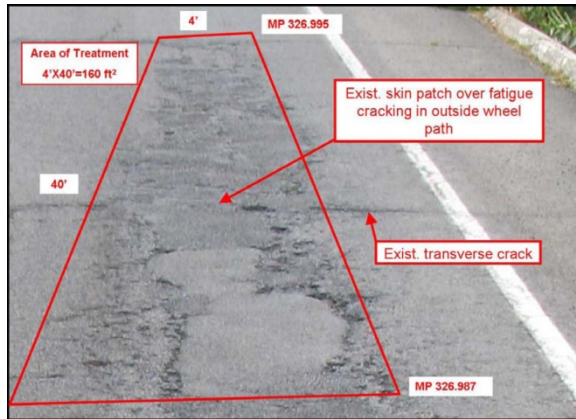
March 2010



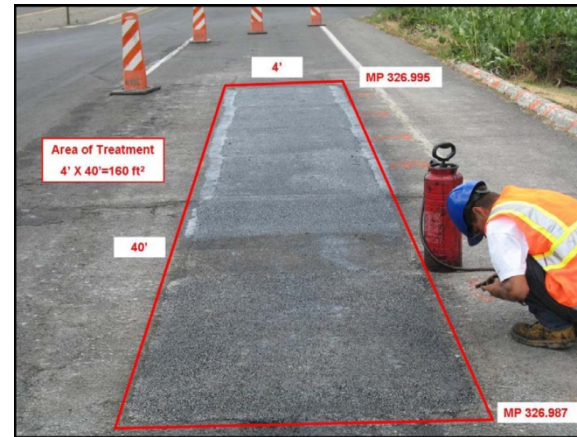
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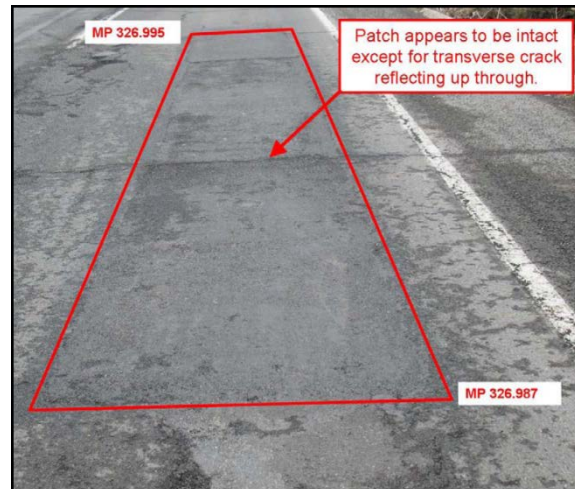
US-89 photos



Before



After



5 months later

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

State of Utah Bid DOT110059TW

F. Sand should be evenly distributed and absorb excess sealant if surface sealant is applied.

3.4 FINAL CLEAN UP

A. Sweep up and dispose of excess material from the Department's representative.

3.5 OPEN TO TRAFFIC

A. Allow the repaired area to cool to 100 degrees Fahrenheit before opening to traffic.

3.6 LIMITATIONS

A. Repair any damage caused by the Department.

END OF SECTION

Infrared Bituminous Pavement Repair
00856 - 3 of 3

Aug 4, 2010 8:44:33 AM MDT

State of Utah Bid DOT110059TW

2.1 ADDITIONAL MATERIAL

A. UDOT maintenance personnel have determined that no additional material is required for this repair.

B. Additional material may include, but is not limited to, rejuvenating agent, asphaltic concrete sealant.

PART 3 EXECUTION

3.1 CLEAN REPAIR AREA

A. Thoroughly sweep the general area of debris. Use moisture for dust control at a distance for traffic.

3.2 MARK AND MEASURE REPAIR AREA

A. Mark and measure the specific area to be repaired by the Department's representative.

3.3 CONSTRUCTION

A. Heat area to be repaired to a sufficient temperature to allow remixing of the asphalt binder. Do not exceed a surface temperature of 300 degrees Fahrenheit.

B. Using a mechanical tiller, scarify and remove the existing surface to a depth of 2 inches.

C. Add additional bituminous material as directed by Department's representative to the repair area and to allow material to cure.

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

E. Compact surface as soon as possible in towards center, to the full repair depth. Surface should be smooth, tight, and free of voids.

Infrared Bituminous Pavement Repair
00856 - 2 of 3

Aug 4, 2010 8:44:33 AM MDT

State of Utah Bid DOT110059TW

Maintenance Specification

SECTION 00856

ELECTRIC INFRARED BITUMINOUS PAVEMENT REPAIR

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products, procedures and equipment to provide a seamless repair of bituminous pavement by the application of evenly distributed electric infrared heat to aid in the reworking and remixing of the existing asphalt mix.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES Not Used

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Provide manufacturer's product data, equipment specifications and material specifications as part of the bid package. Failure to do so will constitute a non responsive bid and the bid will be rejected.

1.6 ACCEPTANCE

A. Repair area to match existing grade, be tightly compacted, have a skid resistant surface, and tightly bonded to the existing adjacent pavement.

1.7 MEASUREMENT

A. Square foot of the accepted repaired area at the measured depth of repair.

1.8 PAYMENT

A. Accepted repaired quantities paid for at the contract unit price per square foot at the measured depth of repair per Attachment D.

PART 2 PRODUCTS

Infrared Bituminous Pavement Repair
00856 - 1 of 3


June 24, 2010

Aug 4, 2010 8:44:33 AM MDT

p. 8



Heatwurx State Contract

 <p>STATE OF UTAH CONTRACT</p>	<p>13120</p> <p>Contract # 13017</p>												
<p>1. This agreement is between the following agency of the State of Utah:</p> <p>DEPARTMENT OF TRANSPORTATION 810 Procurement/All Regions to be referred to as State and the following supplier to be referred to as Contractor:</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Wurx Construction 6300 Sagewood Dr, Suite 400 Park City, Ut, 84098</p> </td> <td style="width: 50%; vertical-align: top;"> <p>Contact Person: Rich Giles Phone Number: 435-640-4870 Fax Number: N/A e-mail address: rich@heatwurx.com Commodity Code(s): 74507, 91371 Vendor Code: 144306</p> </td> </tr> </table>		<p>Wurx Construction 6300 Sagewood Dr, Suite 400 Park City, Ut, 84098</p>	<p>Contact Person: Rich Giles Phone Number: 435-640-4870 Fax Number: N/A e-mail address: rich@heatwurx.com Commodity Code(s): 74507, 91371 Vendor Code: 144306</p>										
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<p>LEGAL STATUS OF CONTRACTOR: <input type="checkbox"/> Sole Proprietor <input type="checkbox"/> Non-Profit Corporation <input checked="" type="checkbox"/> For Profit Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Government Agency</p>													
<p>2. CONTRACT TYPE & PURPOSE: <input checked="" type="checkbox"/> Requirements <input type="checkbox"/> Firm-fixed price <input type="checkbox"/> Time & Materials <input type="checkbox"/> Other: To provide Electric Infrared Bituminous Pavement Repair throughout Utah.</p>													
<p>3. PROCUREMENT: This contract is entered into as a result of the Procurement process on Bid # DOT1100597W PSO Requisition # 2011_0059, FY 2011.</p>													
<p>4. CONTRACT PERIOD: Effective date: 08/30/2010 Termination date: 08/29/2011 Contract will expire on this date unless terminated early or extended in accordance with the terms of this contract. <input checked="" type="checkbox"/> Renewal Options: (1) one-year renewal options. Renewable through: 2012</p>													
<p>5. CONTRACT COSTS: See Attachment D for itemized pricing. <input checked="" type="checkbox"/> No maximum allowance has been pre-set for requirements contracts.</p>													
<p>6. ATTACHMENT A: Division of Purchasing's Standard Terms & Conditions ATTACHMENT B: Specifications ATTACHMENT C: Special Terms and Conditions ATTACHMENT D: Pricing</p> <p>Any conflicts between Attachment A and other attachments will be resolved in favor of Attachment A.</p>													
<p>7. DOCUMENTS INCORPORATED INTO THIS CONTRACT BY REFERENCE BUT NOT ATTACHED: A. All other governmental laws, regulations or actions applicable to the goods and/or services authorized by this contract. B. Utah State Procurement Code, Procurement Rules and Contractor's responses to Bid# DOT1100597W, dated 08/04/2010.</p>													
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AASHTO TIG Nomination

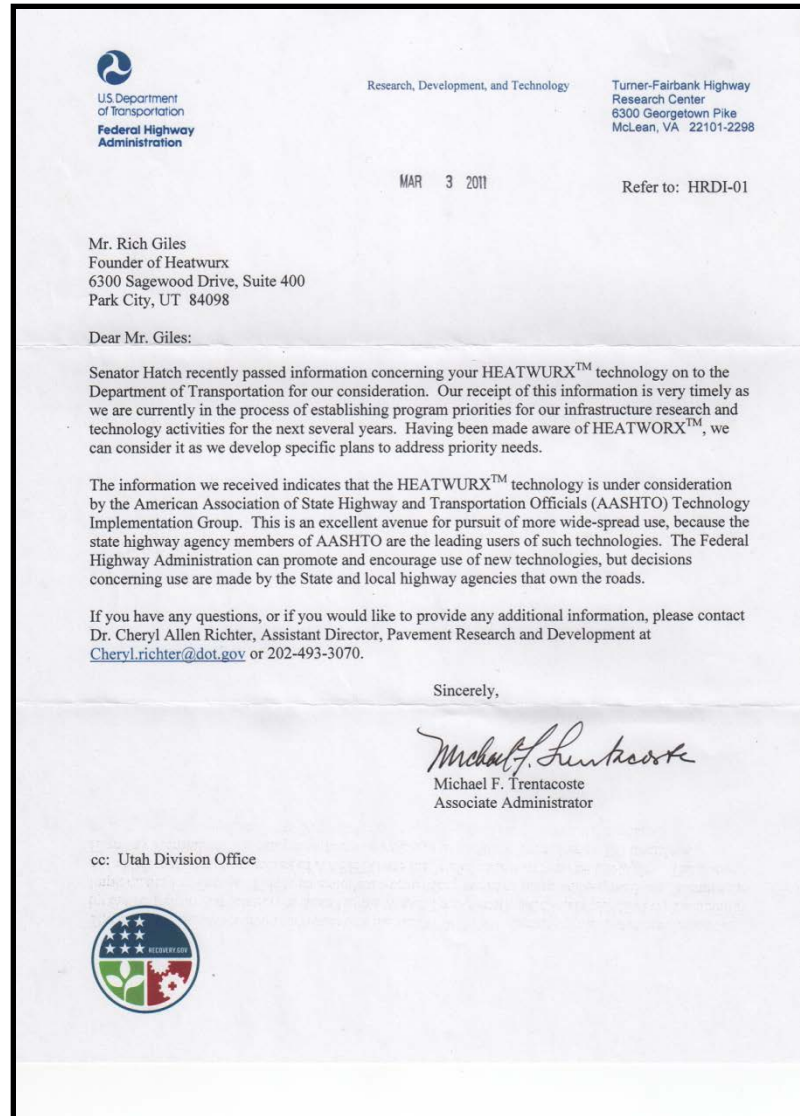
<p>17. What resources—such as technical specifications, training materials, and user guides—are already available to assist deployment? UDOT has the technical specification written, training materials and user guide with a step by step process video is being developed. (See attached)</p> <p>18. What organizations currently supply Heatwux and Caterpillar Dealers, as well as</p> <p>19. Please describe any legal, environmental or other factors that might affect ease of implementation. None</p> <p>Submit Completed form to http://transportation.org</p>	<p>11. Have other organizations used this technology? Please check one: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If so, please list organizations and contacts.</p> <table border="1"> <thead> <tr> <th>Organization</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>LDS Church</td> <td>Larry Rust</td> </tr> <tr> <td>Innovative Excavating</td> <td>Darrin Loertscher</td> </tr> <tr> <td>Union Pacific</td> <td>Steve Jackson</td> </tr> <tr> <td>Hill Airforce Base</td> <td>Todd Sorensen</td> </tr> <tr> <td>TxDOT</td> <td>Rick Collins</td> </tr> </tbody> </table>	Organization	Name	LDS Church	Larry Rust	Innovative Excavating	Darrin Loertscher	Union Pacific	Steve Jackson	Hill Airforce Base	Todd Sorensen	TxDOT	Rick Collins	<p>12. How does the technology meet customer needs? Heatwux addresses the needs of maintenance organizations that have used it? This technology is used in areas with a seamless repair, without having to stop traffic. 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7. If appropriate, please attach photographs, diagrams, or other images illustrating the appearance or functionality of the technology. (If electronic, please provide a separate file.) Please check one: <input checked="" type="checkbox"/> Yes, images are attached. <input type="checkbox"/> No images are attached.																																																									
8. Please describe the history of the technology's development. Heatwux came to UDOT Research in 2008. Region 2 did a pilot project using this technology to pothole patch and bituminous pavement repair. We have also used it to eliminate cold joint getting more density on or near the joints. Utah has cold temperatures and many freeze thaw cycles and traditional repairs are costly with little success. This technology was evaluated over a season in the harshest climate with major truck traffic. It was found to be very successful. Since then the manufacturer has evolved into a better processor and a larger infrared electric heater to be able to repair a larger section. Udot maintenance crews are very excited about this new technology because their cost to repair bituminous pavement is lower and lasts longer and they are using the technology to keep their roads in operational condition without having to remove and replace the entire road. Currently Heatwux is working with TxDOT to share UDOT's Specification for their Research and working on a pilot project with them.																																																									
9. For how long and in approximately how many applications has your State DOT used this technology? The state of Utah has used this technology since the end of 2008, 2009, and now in 2010. UDOT has written a specification around this technology so that we can use it as another tool in our toolbox to do pavement maintenance and pavement preservation at a lesser cost. This new technology is imperative to the budget shortfalls in operations due to the economy. UDOT has used this technology in 6 different jobs successfully. The LDS church has used this technology in 35 of their parking lots. Wyoming has also repaired their pavements with great success.																																																									
10. What additional development is necessary to enable routine deployment of the technology? Every time they do a project their has been some tweaking of the equipment so that they can get closer to the curb or narrow enough to heat the cold joint etc. but the technology is developed and sound. Training is essential for any one who will purchase equipment and use it to repair asphalt. Heatwux is currently working on developing a training video. The training that is completed is the step by step process on how to make sure the recycled mix is a perfectly formulated for the target area. (Please see attached)																																																									
<p>Payoff Potential (30 points)</p> <p>Payoff is defined as the combination of broad applicability and significant benefit or advantage over other currently available technologies.</p>	<p>15. What actions would another organization take to implement this technology? UDOT has tried this in the harshest climate and gets a lot of snow and plowing. It is bought through Caterpillar dealers. Train Maintenance supervisors and crews would inspect their roads to determine the area to ultimately realize the full benefit of Heatwux.</p>	<p>16. What is the estimated cost, effort, and time to implement this technology? Other organizations can immediately. If they wanted to buy the equipment to purchase the equipment and have private contractors to provide service for a project which may cost \$ 50 to \$75K depending on equipment was purchased or service was contracted.</p>	<p>State of Development (30 points)</p> <p>Technologies must be successfully deployed in at least one State DOT. The TIG selection process will favor technologies that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.</p>																																																						
<p>Market Readiness (30 points)</p> <p>The TIG selection process will favor technologies that can be adopted with a reasonable amount of effort and cost commensurate with the payoff potential.</p>	<p>17. What resources—such as technical specifications, training materials, and user guides—are already available to assist deployment? UDOT has the technical specification written, training materials and user guide with a step by step process video is being developed. (See attached)</p>	<p>18. What organizations currently supply Heatwux and Caterpillar Dealers, as well as</p>	<p>19. Please describe any legal, environmental or other factors that might affect ease of implementation. None</p>																																																						



Federal Highway Administration

“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 AASHTO 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 Heatwux 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 Heatwux Pavement Preservation Process. UDOT has entered into a statewide maintenance contract with Heatwux for pavement preservation work. Orange Book pilot projects are being explored as part of the UDOT Pavement Preservation program. Heatwux 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 Heatwux 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 Heatwux pavement preservation process as a technology of interest and is including the process in it's presentations and to Utah municipalities and agencies. Heatwux was presented as part of the LTAP 2011 asphalt conference. Heatwux will be presented at LTAP Road School April 2011.

Union Pacific Railroad (UPRR)

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

Utah Transit Authority (UTA)

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

American Public Works Association (APWA)

Heatwux will be included as part of the APWA Utah 2012 Specifications



Cost Comparisons

<u>Owner</u>	<u>Traditional</u>		<u>Heatwurx</u>	
Hill Air Force Base	Remove and replace 4" asphalt roadway		Re-heat and add additional material as needed to establish proper grade and drainage	
	13,853 sf	\$82,546	2,477 sf	\$23,328
University of Utah	Remove and replace 4" of asphalt parking area		Repair cracking, re-heat and add material to establish proper grade and drainage	
	50,625 sf	\$151,875	18,985 sf	\$97,200
UDOT SR - 224	3" roto-mill and placement of new 3" asphalt		Repair all cracks ¼" wide, re-heat and add material to establish proper grade and drainage	
	1,636,140 sf	\$2,265,806	247,632 sf	\$817,186



Pavement Preservation

- Extend useable 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



HWX-30

TECHNICAL SPECS

WEIGHT - 2550 LBS

REPAIR AREA- 30 S/F

GENERATOR REQUIREMENT - 45 KW

ELEMENTS - 9

CYCLE TIMES 15 - 30 MINUTES DEPENDING ON DEPTH

FUEL CONSUMPTION APPROXIMATELY 2.8 GPH

HEAVY DUTY 4X3X.125 FRAME

TOP WIND 7000 LBS. JACKS

6" HEAT RESISTANCE INSULATION

HEAVY DUTY POWDER COATED FINISH FOR MAXIMUM DURABILITY & VISIBILITY

3/8" VERSATILE ATTACHMENT PLATE FOR SKIDSTEERS OR FORKLIFTS



PATENT PENDING



6300 Sagewood Drive | Suite 400
Park City, Utah 84098
[435] 640-4870
www.heatwurx.com

HWX-115

TECHNICAL SPECS

WEIGHT - 14,500 LBS

REPAIR AREA 115 S/F

SEAM REPAIR AREA 62.5 S/F

GENERATOR REQUIREMENT - 150 KW

CYCLE TIMES 15 - 30 MINUTES DEPENDING ON DEPTH

SEAM HEAT CYCLE TIMES- UP TO 30 FOOT PER MINUTE

GENERATOR FUEL CONSUMPTION 12.3 GPH

TRANSPORTER

KUBOTA D905D 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



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HEATWURX™

ASPHALT PROCESSOR



PATENT PENDING



TECHNICAL SPECS

1" WEAR PLATE WITH ABILITY TO ADJUST TO DESIRED DEPTH

5/16" PROCESSING BLADES

BEVELED TOOLING TO MAXIMIZE ASPHALT BONDING

12 GAUGE WINGS TO FUNNEL MATERIAL INTO DESIRED LOCATION



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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

Headlines

- [UDOT Writes Specifications For HEATWURX™ Process](#)
- [UDOT Awards State-Wide Contract For HEATWURX™ Technology/Process](#)
- [TxDOT Requests UDOT Specifications for HEATWURX™ Technology/Process](#)
- [AASHTO Reviews HEATWURX™ for 2011 TIG Award](#)



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 86% less than traditional methods.

[More →](#)



Eco-Friendly Process

Instead of mixing new asphalt, the HEATWURX™ method reheats existing asphalt for remixing, rejuvenating and recompact.

[More →](#)