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Thermal Road Repairs Process Overview

The Thermal Road Repair (TRR) process works by introducing controlled heat into failed or failing asphalt. At a specific desired temperature, asphalt becomes malleable. Our patented process pulses heat into a bituminous surface and can affect layers up to 125mm before the surface deteriorates further. This is due to our unique heat generation method, using a fan, biofuels, renewable electrical energy, and a superconductive alloy.

The underlying principle is to bring asphalt back to its original delivered state and recycle it in situ by levelling it and mixing it with a bonding agent. This negates the traditional method of breaking out around the defect and removing it from site. New asphalt is then added to the area to provide the final surface course.

Once a patch with a defect is heated, always to a minimum for 1m² in surface area, the heater is moved, and the patch is ready to be reworked. TRR work the entire patch to the depth of the actual defect or 40mm, whichever is greater. (See figure 1).

I have attached core reports undertaken by United Utilities to illustrate our patches meet the standards under the SROH. These reports also include the depth to which we have successfully affected the repairs. (Please see appendix 1).

As heat penetrates through the asphalt layers, before final compaction, additional material is added to fill in the defect and to compensate for the increased density of the material in the patch and the immediate sub strata. (See figure 2).

Figure 1.

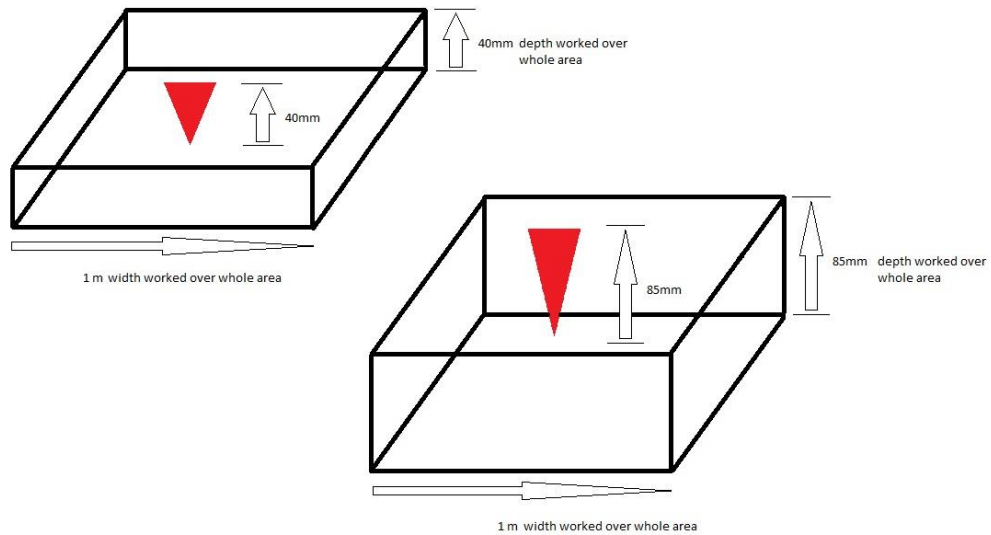
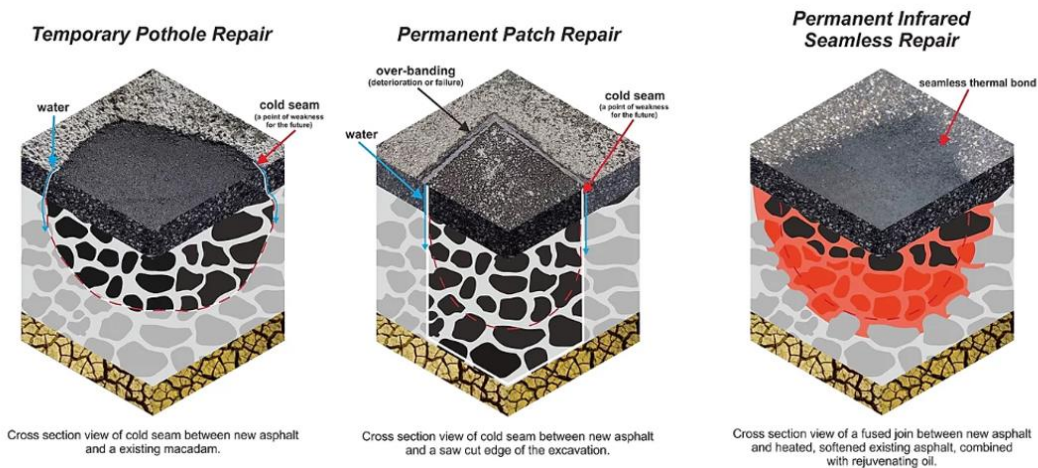


Figure 2.

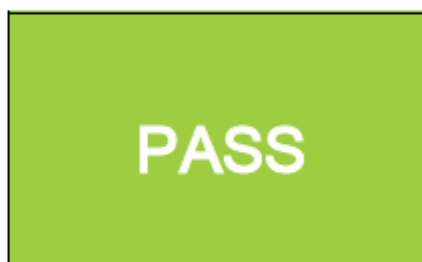


Appendix 1.



CERTIFICATE OF TEST
Reinstatement of Openings in Highways

Site Job No.	4667052108202001
Lab Sample I.D	10266
Site	O/S 6
Address	BUTTERMERE ROAD
Town	CHEADLE
Highway Authority	STOCKPORT
Promoter Ref	520002070887-0020
Work Stream	HZ101 - Water



Location Type	Footway
Location Classification	Footway 1
Reinstatement Length (m)	1.00
Reinstatement Width (m)	1.00
Reinstatement area (m ²)	1.00
Reinstatement Date	01/08/2020
Core Sample Date	21/08/2020 08:11:17
SROH version	SROH 3

Comments
NP thermal trial

Core Depth						
Layer	Measure A (mm)	Measure B (mm)	Measure C (mm)	Measure D (mm)	Average (mm)	Compliance
Surface Course	65	68	71	73	69	Pass
Binder Course					0	NA
Overall Depth	65	68	71	73	69	Pass

Layer	Mass of Dry Specimen (g)	Sealing Material	Test Temperature (°C)
Surface Course	1462.9	Wax	21.5
Binder Course			

Air Void						
Layer	Sample Depth (mm)	Aggregate Size & Material Type	Bulk Density (Mg/m ³)	Maximum Density (Mg/m ³)	% Air Void	Compliance
Surface Course	69	AC 6mm DSC	2.226	2.503	11.1	Pass
Binder Course	0	NA				NA
Overall Depth	69					

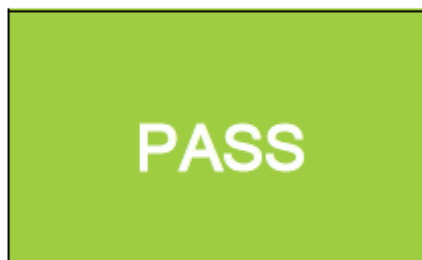
Certificate Date: 08 September 2020

Core sample extracted by: United Utilities
 Core depth determined by: United Utilities
 Bulk Density determined by: United Utilities
 Max density determined by: United Utilities
 % Air Void determined by: United Utilities

Core Sample extracted in accordance with BS EN12697-27: 2001: Procedure 4.7
 Core Depth determined in accordance with BS EN12697-36: 2009: Procedure 4
 Bulk Density determined in accordance with BS EN 12697-8: 2012: Procedure C
 Maximum Density determined in accordance with BS EN 12697-5: 2009: Procedure A
 % Air Void determined in accordance with BS EN 12697-8: 2003

CERTIFICATE OF TEST
Reinstatement of Openings in Highways

Site Job No.	4667052108202004
Lab Sample I.D	10269
Site	O/S 13
Address	PRINCESS AVENUE
Town	CHEADLE HULME
Highway Authority	STOCKPORT
Promoter Ref	520000978872-0020
Work Stream	HZ101 - Water



Location Type	Footway
Location Classification	Footway
Reinstatement Length (m)	1.00
Reinstatement Width (m)	1.00
Reinstatement area (m²)	1.00
Reinstatement Date	01/08/2020
Core Sample Date	21/08/2020 09:35:16
SROH version	SROH 3

Comments

Core Depth						
Layer	Measure A (mm)	Measure B (mm)	Measure C (mm)	Measure D (mm)	Average (mm)	Compliance
Surface Course	84	86	88	84	86	Pass
Binder Course					0	NA
Overall Depth	84	86	88	84	86	Pass

Layer	Mass of Dry Specimen (g)	Sealing Material	Test Temperature (°C)
Surface Course	1639.1	Wax	21.4
Binder Course			

Air Void						
Layer	Sample Depth (mm)	Aggregate Size & Material Type	Bulk Density (Mg/m³)	Maximum Density (Mg/m³)	% Air Void	Compliance
Surface Course	86	AC 6mm DSC	2.173	2.467	11.9	Pass
Binder Course	0	NA				NA
Overall Depth	86					

Certificate Date: 08 September 2020

Core sample extracted by: United Utilities
 Core depth determined by: United Utilities
 Bulk Density determined by: United Utilities
 Max density determined by: United Utilities
 % Air Void determined by: United Utilities

Core Sample extracted in accordance with BS EN12697-27: 2001: Procedure 4.7
 Core Depth determined in accordance with BS EN12697-38: 2009: Procedure 4
 Bulk Density determined in accordance with BS EN 12697-6: 2012: Procedure C
 Maximum Density determined in accordance with BS EN 12697-5: 2009: Procedure A
 % Air Void determined in accordance with BS EN 12697-8: 2003