RSTA Greener Roads Ahead Technical Training Day 16th September 2025 Cardiff

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RMS LOW CARBON SOLUTIONS

SPL

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Croeso
Chair's Welcome

Andy Jones, RSTA Chair
Road Surface Treatments Association

Changing the narrative…



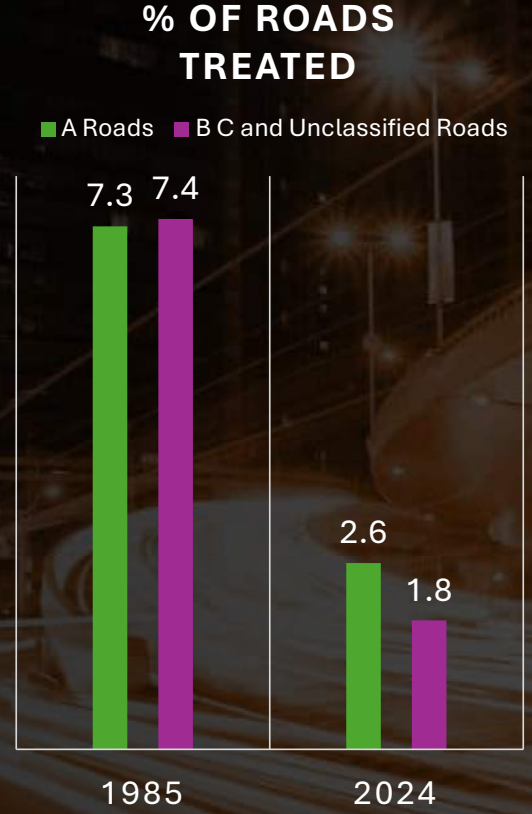


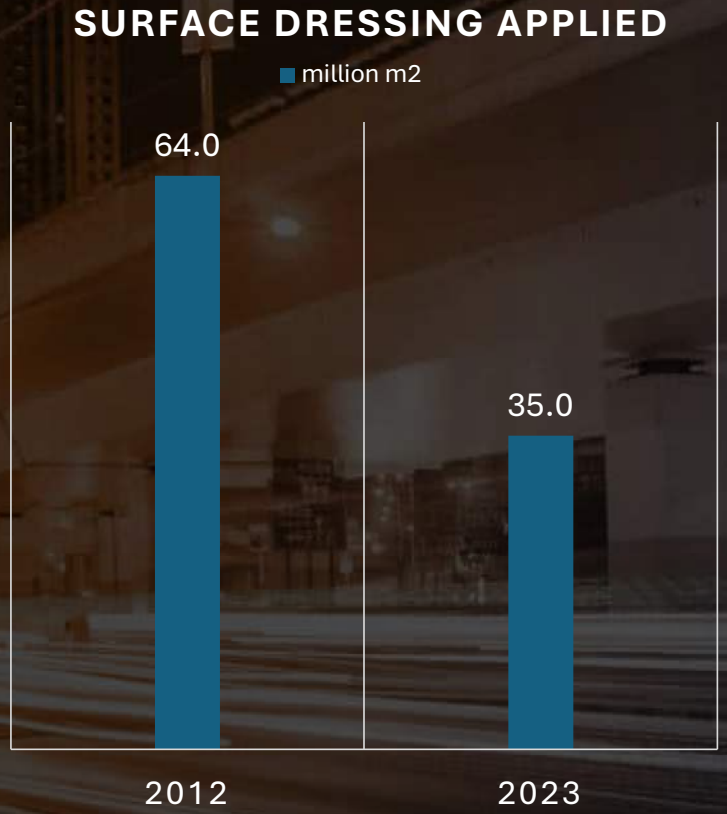


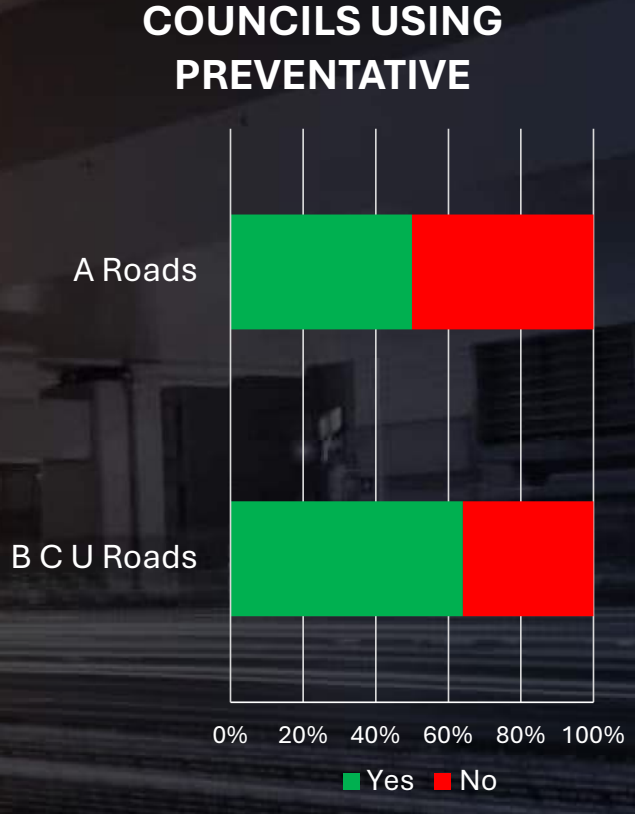




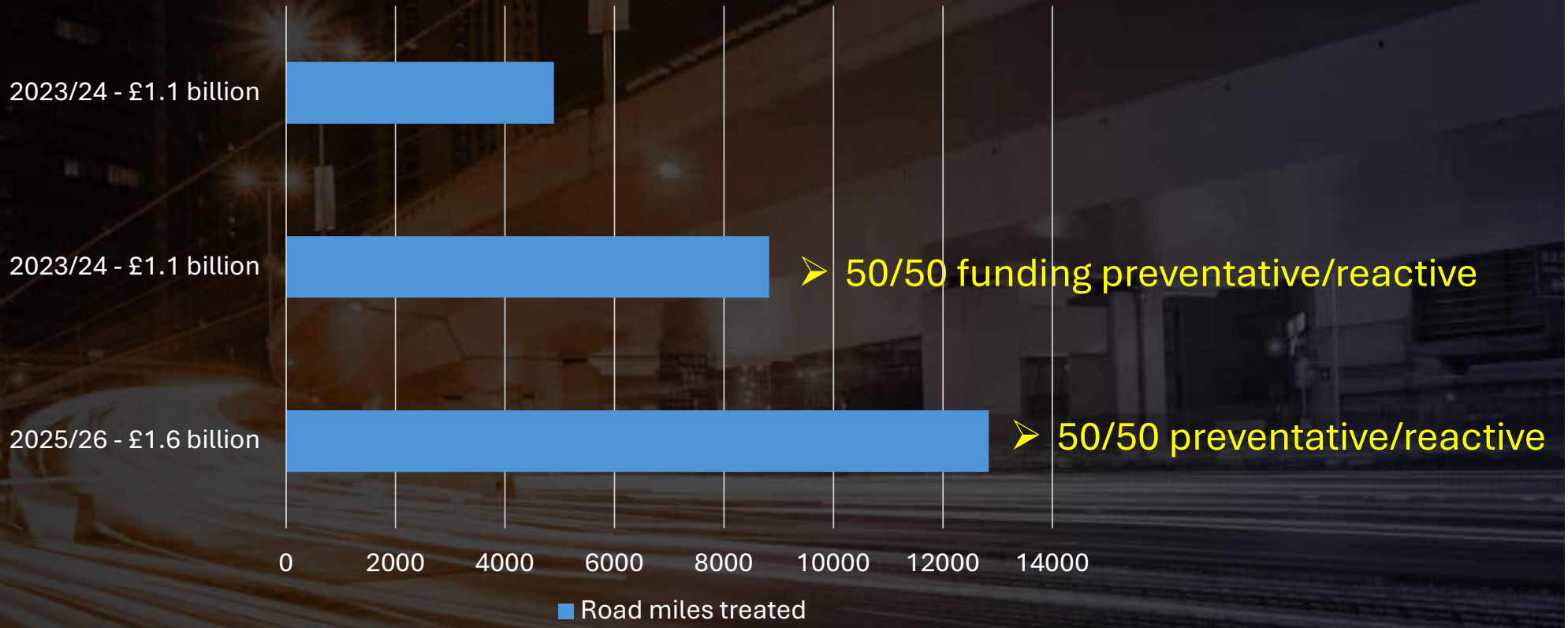
Decline in Preventative Maintenance





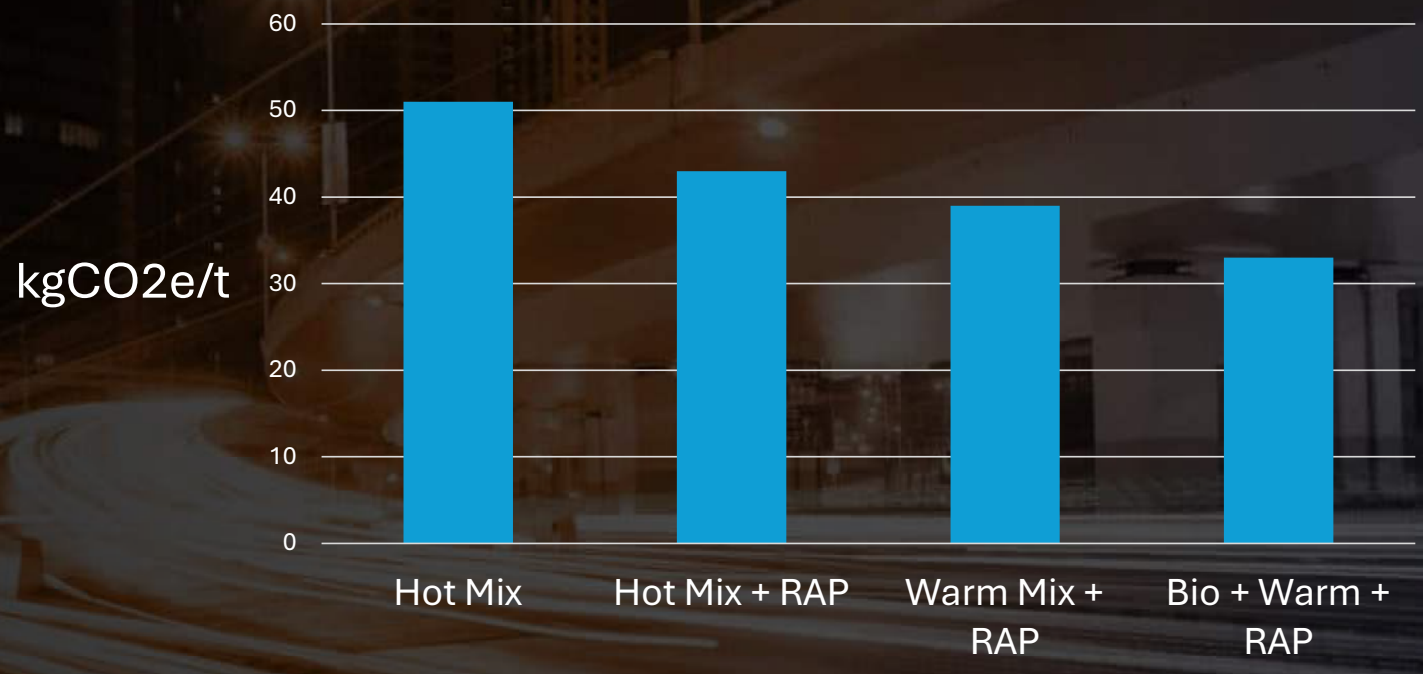


Reducing the backlog (£16.8 billion)

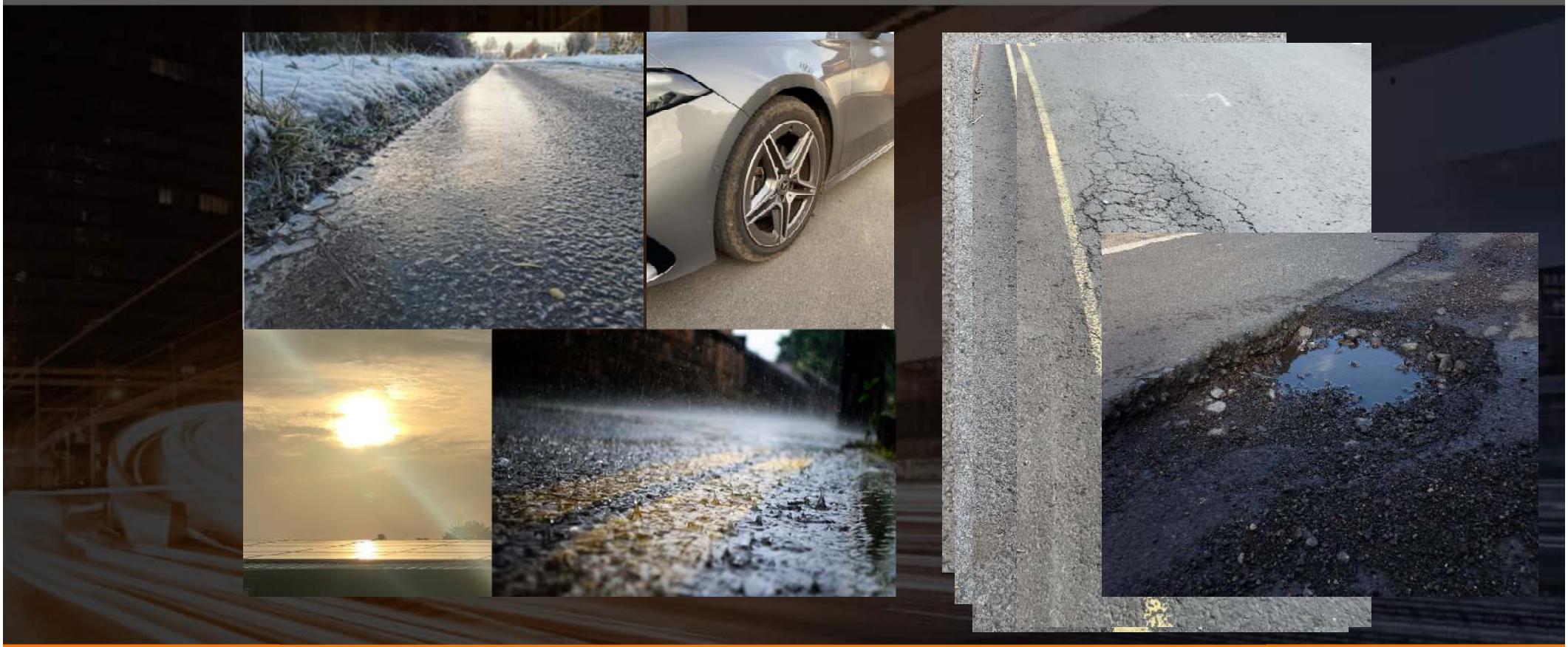


- 50/50 funding preventative/reactive
- 50/50 preventative/reactive

Carbon footprint of Asphalt



Life of an untreated road



...right treatment, right place, right time...

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Keynote Speaker
Gareth Day, Welsh Government
www.rsta-uk.org

Greener Roads Ahead

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Welsh Government

www.cymru.gov.uk

Gareth Day BEng (Hons) CEng FICE

Pennaeth Gweithrediadau – Head of Operations

Llywodraeth Cymru - Welsh Government

Is-adran y Rhwydwaith Ffyrdd Strategol - Strategic Road Network Division (SRN)



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Welsh Government

Right Here Right Now

Fatboy Slim



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Playlist for Today!

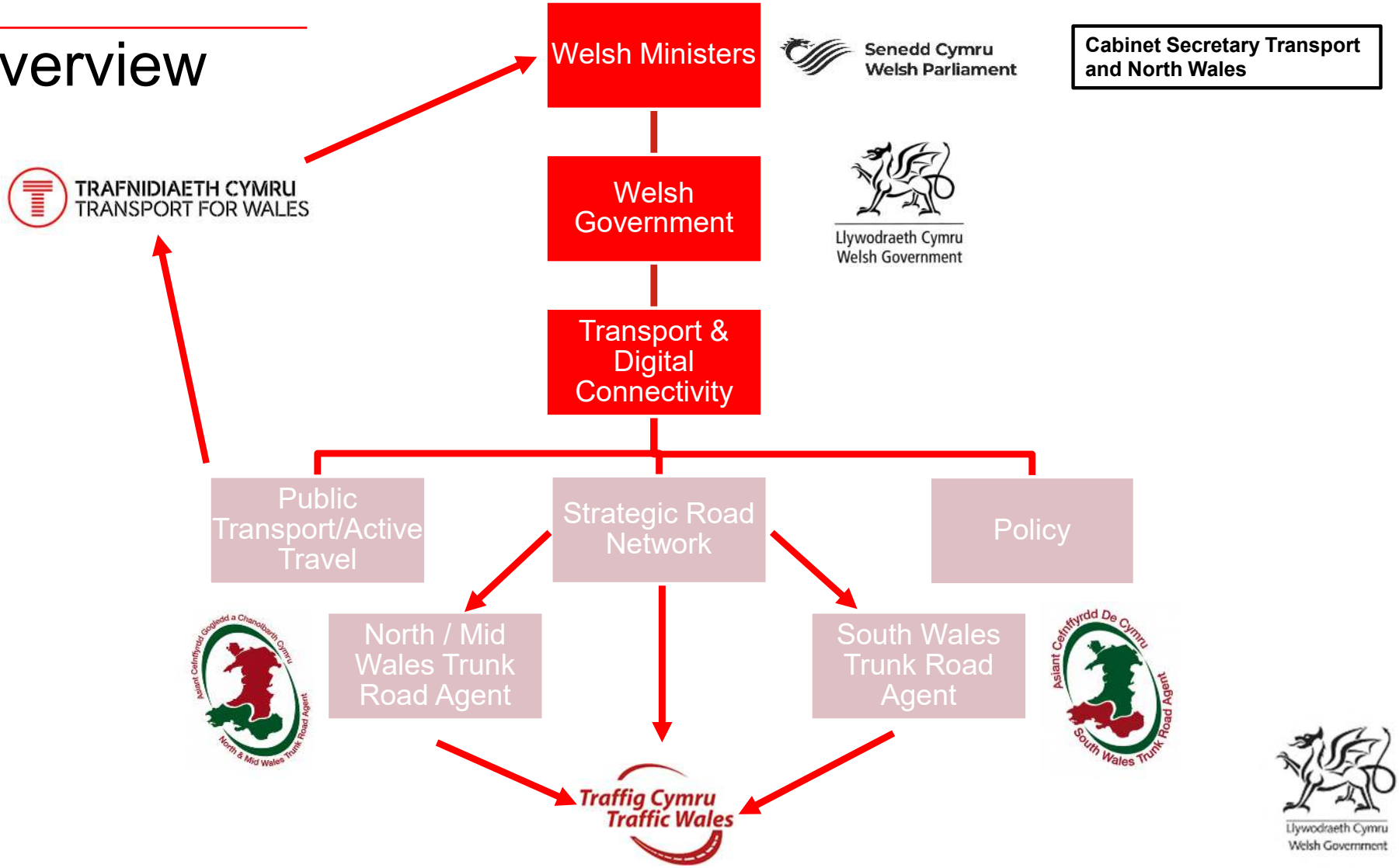
- Track 1: Bus Stop Please
- Track 2: Weapon of Choice
- Track 3: Eat Sleep Rave Repeat
- Track 4: Better Living Through Chemistry
- Track 5: Halfway Between the Gutter and the Stars

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Track 1: Bus Stop Please

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Overview


Welsh Ministers
Senedd Cymru
Welsh Parliament
Cabinet Secretary Transport and North Wales
TRAFNIDIAETH CYMRU
TRANSPORT FOR WALES
Welsh Government
Llywodraeth Cymru
Welsh Government
Transport & Digital Connectivity
Public Transport/Active Travel
Strategic Road Network
Policy
North / Mid Wales Trunk Road Agent
South Wales Trunk Road Agent
Traffig Cymru
Traffic Wales
Llywodraeth Cymru
Welsh Government

Trunk Road Agents







Trunk Road Agent Operations

Responsible for the preparation, implementation and review of policies and procedures in accordance with the delegated functions agreed with Welsh Government. These include :

- Network Contingency Planning
- Incident Response 365days 24/7
- Traffic Officer Service
- Control Room Operations
- Winter Service response
- Road space Coordination
- Abnormal Load Routing
- Tunnel Management





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Traffic Management Control Rooms

- The South Wales Traffic Management Centre (SWTMC) @ Coryton
- The North Wales Traffic Management Centre (NWTMC) @ Conwy







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Welsh Government Traffic Officers

- Managed and employed by South & North Mid Wales Trunk Road Agent.

- Traffic Officers present the public face of the Welsh Government on the Highway and play an essential role in the safety of the roads. 7am to 7pm on the mor major SRN roads.

- Promote and build good working relationships with all key stakeholders and to ensure that the common goals of reducing incident related congestion is achieved.



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Capital Delivery

- £185m 2025/26 budget.
- Approximately £25m is for WG Major Projects
- £160m for SRN Capital Maintenance and Refurbishment



A465 Glynneath - Reprofiling
Resurfacing works South Wales



A55 J2 Overbridge Holyhead: Active Travel Improvements.
Junction improvements North Wales



M4 J33 Parapet Repairs & Drainage Alterations
Resurfacing works South Wales

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Revenue

- £117m 2025/26 budget.
- Approximately £57m is for Contracts and Commitments
- £60m for Routine Maintenance and Operations



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Traffic Wales

- Traffic Wales is the bilingual traffic information service for motorways and trunk roads in Wales.
- ‘Political’ comms handled by Welsh Government
- Comms campaigns and promote projects
- 07:00hrs to 19:00hrs with out of hours service.

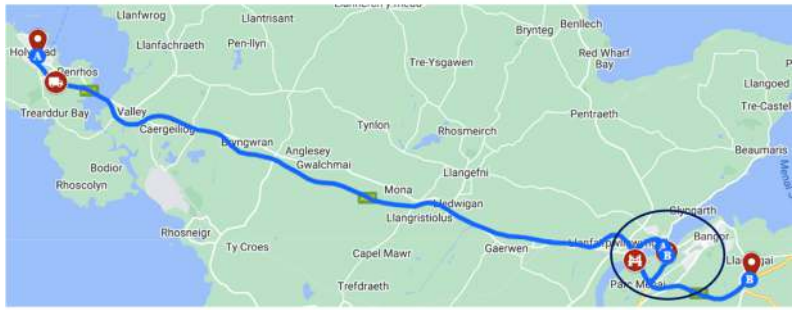
Traffig Cymru
Traffic Wales

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DBFO and MIM Contracts

- UK Highways A55 DBFO Ltd – A55 Junction 1 to Junction 11 including the A5 Menai loop – expires 2028

A55 DBFO J1-11 (including Menai Loop)



- A465 Section 5 and 6 – Future Valleys MIM – 30 year term - 2025-2055



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Transport for Wales

- Transport for Wales (TfW) was set up by the Welsh Government to change the way Wales travels (2016).

- Whether it's public transport, walking, wheeling or cycling, TfW want to make sustainable travel not only the right thing to do, but also an easier thing to do.
- Rail and Bus Operator
- Core Valley Lines
- Metro one ticket pricing
- **Not** SRN or Roads



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Track 2: Weapon of choice

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What are we doing in Transport?

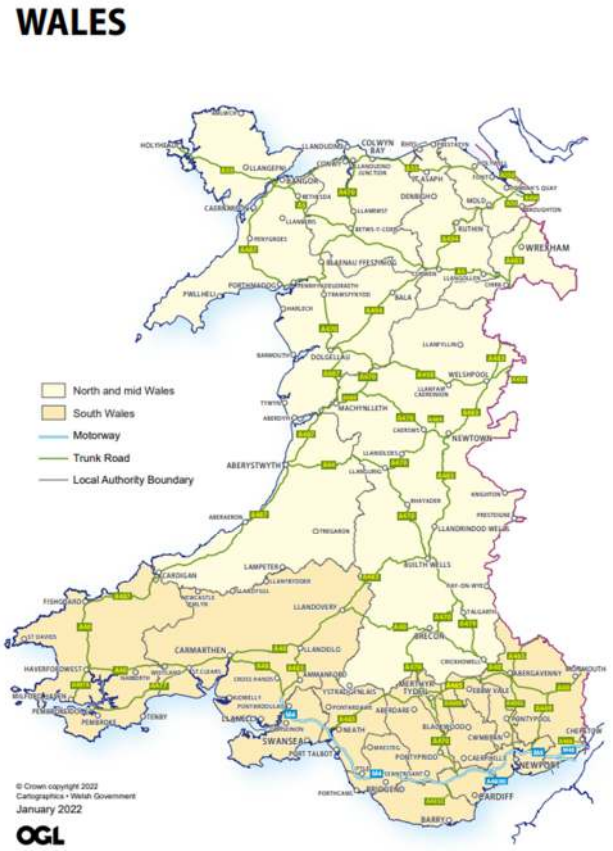
- 2015 - Wellbeing of Future Generations (Wales) Act 2015
- 2021 - Llwybr Newydd: The Wales Transport Strategy
- 2022 - The future of road investment in Wales
- 2022 – National Transport Delivery Plan
- 2023 – Lugg Review



What are we doing in Transport?

- 2023 – Updated the Welsh Government Trunk Road Maintenance Manual

- 2025 – Updating the Welsh Ministers Managing Agent Agreement (WMMAA)



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What are we doing for Net Zero?

- PAS 2080 roll out to agents and supply chains
- Fleet – Gritters, WGTOs, Agent Pool Cars/Inspectors
- Chargers
- Depot refurbishment – Solar
- Looking for all opportunities to help reduce carbon in what we do and how we operate the SRN across Wales





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Track 3: Eat Sleep Rave Repeat



Funding over the years

Early 2010s to Mid-2010s: Traditional Investment Focus

During this period, road funding was largely focused on **capacity expansion**, **maintenance**, and **economic development**.

A successful **local government borrowing initiative (2012–2014)** enabled councils to improve roads, pavements, and bridges across

SRN Team was split into two

Major Projects £100m's – new build cut the ribbon projects

Network Management - £70m-£100m combined (Rev and Cap)

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Funding over the years

2021–2023: Strategic Shift Toward Sustainability

In 2021, the Welsh Government paused new road construction and launched the Roads Review Panel to reassess schemes against climate and sustainability goals

The review found that **31** out of **48** schemes were inconsistent with new policy directions, particularly those that increased road capacity or carbon emissions.

The panel recommended future road investments focus on:

Climate adaptation

Access to development sites

Casualty reduction

Modal shift to sustainable transport

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Funding over the years

SRN Team was developed further

Major Projects £10m's – finish off projects/develop MAR

Network Management - £100-120m (Cap)
£70-80m (Rev)

More smaller maintenance projects taking place.....

Combined 2025/26 budget of £300m

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Funding over the years

Next year we are in discussion on budgets but look set to remain very similar to this year…….

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Track 4: Better Living Through Chemistry

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Surfacing Treatments

Temporary Repairs – ‘Pot Holes’ and Patching – last resort

Preventative Maintenance – CAUTS – first port of call

Major Maintenance – Resurfacing – if CAUTS is not suitable

Pavement Team in Welsh Government keen to discuss and review various options……..

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Track 5: Halfway Between the Gutter and the Stars

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Fixing Roads - £25m SRN and £120m LAs

2023–2025: Funding Reprioritisation and New Initiatives

A **£1.2 billion** programme was announced for Transport/Road schemes.

Additional investments included:

£58 million for active travel infrastructure

£120 million borrowing initiative for local councils to repair roads (2025–2027)

£25 million for resurfacing 100km of strategic roads and fixing ~30,000 defects

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In summary - Right Here Right Now - Road Investment

Shift from expansion to sustainability:

The focus has moved from building new roads to maintaining existing infrastructure and supporting low-carbon transport.

Increased scrutiny:

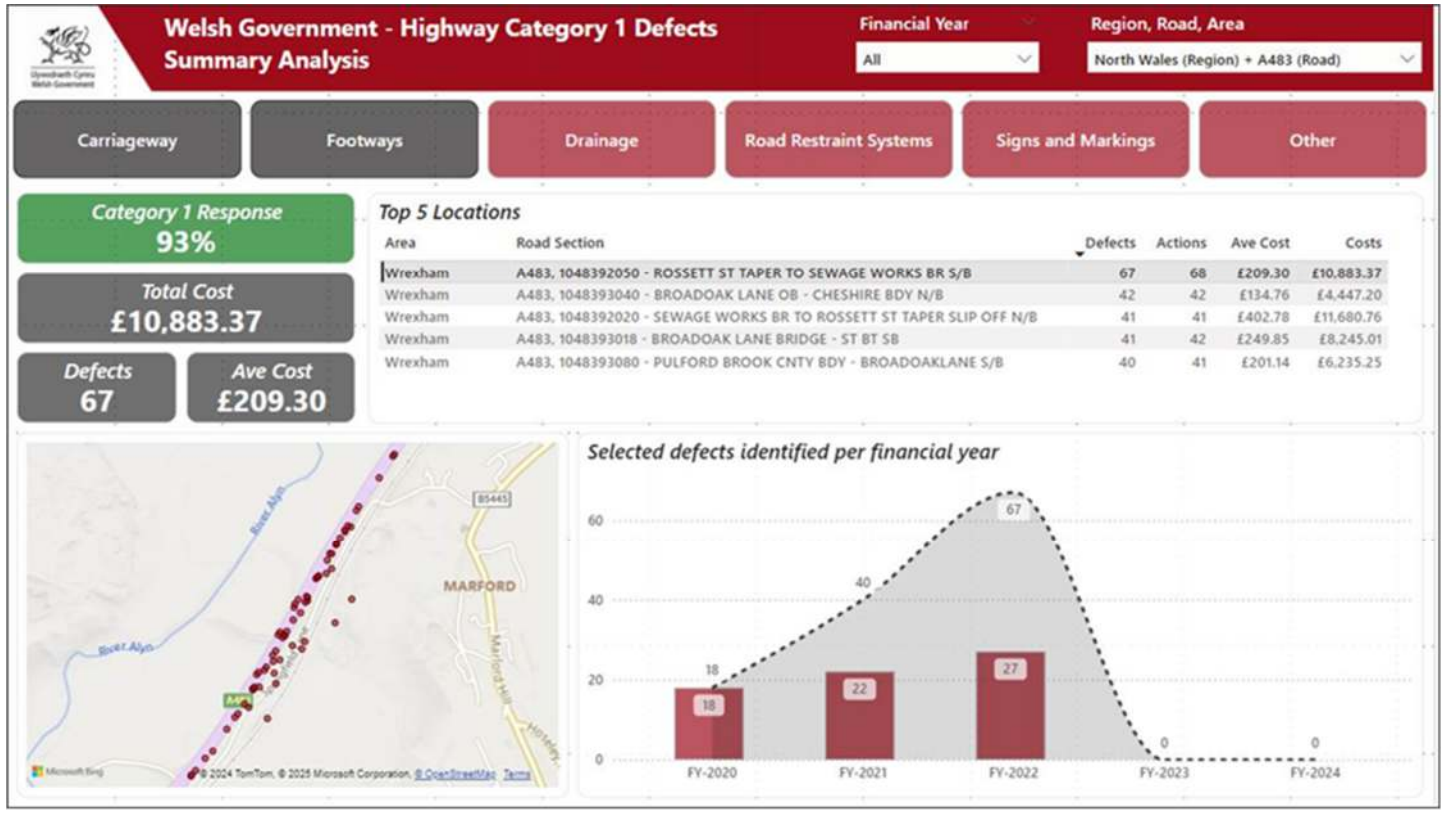
Projects now undergo rigorous appraisal for carbon impact, ecological sensitivity, and alignment with Net Zero goals.

Local empowerment:

Councils have been given more tools (e.g., borrowing schemes) to address local road issues.

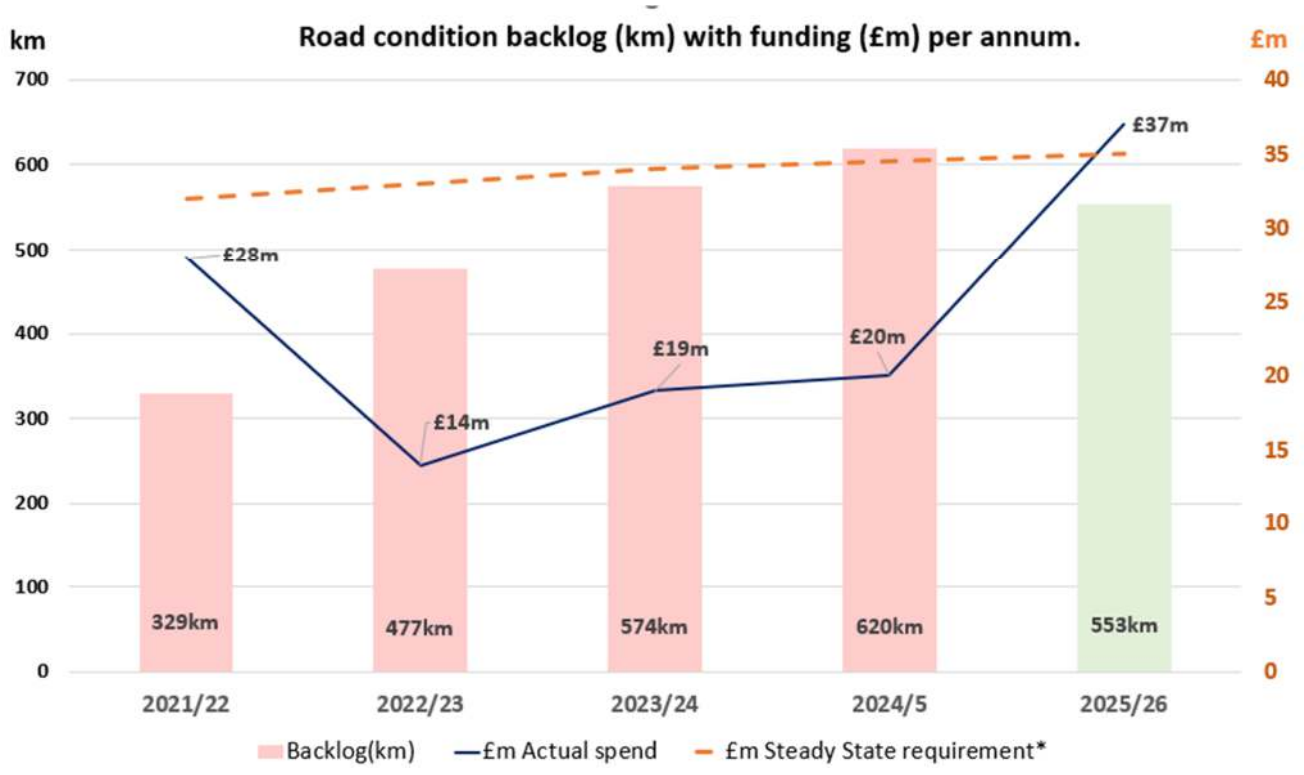
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Road Investment to greener roads ahead….



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Road Investment to greener roads ahead….



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Road Investment to greener roads ahead….

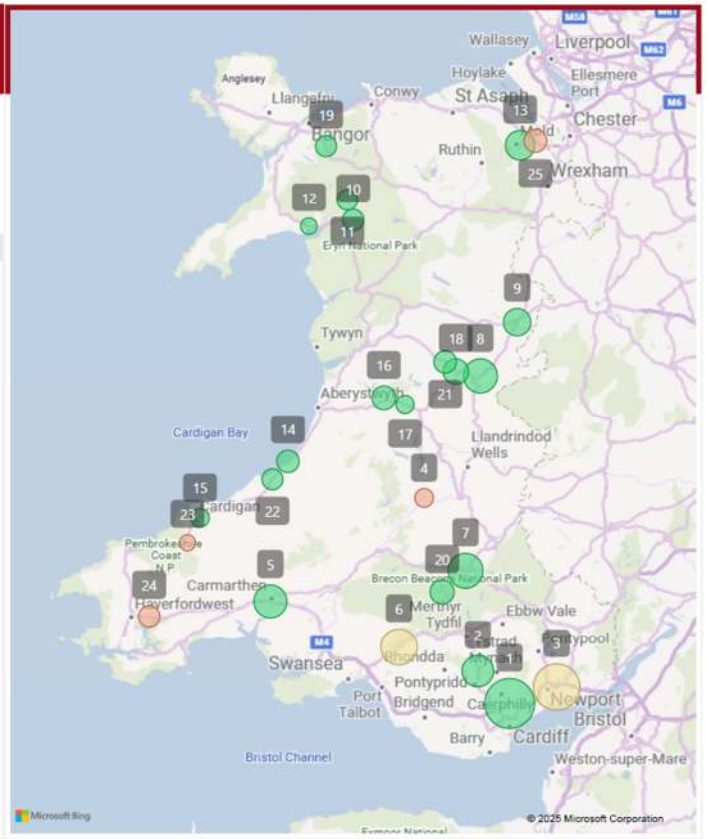
Welsh Government Pothole Prevention Additional Funding
2025/26 - Carriageway Improvements
(Week Commencing - 8th September 2025)

Regional Summary

Region	Schemes	Miles	Schemes Complete	Miles Improved	Daily Traffic	Estimated Cost	Potholes Fixed	Potholes Prevented
NMWTRA	18	33.56	16	31.01	132600	£6,583,186	623	16446
SWTRA	7	33.50	3	17.84	218963	£14,875,000	1101	16038
Total	25	67.06	19	48.85	351563	£21,458,186	1724	32484

Full Carriageway Works Breakdown

ID	Scheme Name	Daily Traffic	Miles	Potholes fixed	Potholes prevented	Est Start	Est End	Works Status
1	M4 - Jcts 30-32	67395	10.25	111	4942	24/06/2025	22/08/2025	Complete
2	A470 - Pontypridd to Abercynon	46644	3.60	136	1348	28/07/2025	01/09/2025	Complete
3	M4 - Jct 26 Malpas to Jct 24 Coldra	52094	8.70	257	4468	26/08/2025	24/09/2025	Works in Progress
4	A483 - Beulah	2829	0.93	109	556	15/09/2025	12/10/2025	In Programme
5	A40 - Camarthen Bypass	26943	3.98	189	1920	19/06/2025	24/07/2025	Complete
6	A465 - Concrete Repairs	12258	4.97	350	2400	01/09/2025	17/10/2025	Works in Progress
7	A40/A470 - Brecon Bypass	9433	4.54	11	2138	28/06/2025	02/07/2025	Complete
8	A483 - Newtown Bypass	15009	4.29	28	2031	24/06/2025	01/07/2025	Complete
9	A483 - Welshpool Bypass	4788	2.55	13	1215	23/06/2025	25/06/2025	Complete
10	A470 - Cae Iago to Llan Ffestiniog	601	1.37	21	655	18/06/2025	01/07/2025	Complete
11	A470 - Blaenau Ffestiniog to County Bdry	601	1.24	47	628	17/06/2025	27/06/2025	Complete
12	A487 - Porthmadog Bypass	19039	0.68	13	348	19/06/2025	28/06/2025	Complete
13	A494 - Mold Bypass	11846	3.05	24	1446	13/06/2025	22/06/2025	Complete
14	A487 - North of Aberarth	8395	1.55	15	769	24/06/2025	01/07/2025	Complete
15	A487 - B4548 Traffic Lights to Warren Farm	7491	0.93	36	485	26/06/2025	02/07/2025	Complete
16	A44 - Eisteddfa Gurig to East of Ponterwyd	3384	1.80	16	873	24/06/2025	03/07/2025	Complete
17	A44 - Llanifyny to Pengwaith	3384	0.87	16	456	23/06/2025	04/07/2025	Complete
18	A470 - Caersws	1570	2.11	38	1056	01/07/2025	13/07/2025	Complete
19	A5 - Nant Francon	7469	1.31	88	730	19/06/2025	02/07/2025	Complete
20	A470 - North of Storey Arms	9433	1.86	23	900	29/06/2025	11/07/2025	Complete
21	A470 - Oerffrwd / Clatter to Ty Coch	1570	1.55	16	750	03/07/2025	28/07/2025	Complete
22	A487 - Llanarth to Llwyncelyn	7491	1.31	71	630	25/06/2025	01/07/2025	Complete
23	A487 - Egwyswrw	7396	0.62	17	300	01/01/2026	31/03/2026	In Programme
24	A40 - Arnold's Hill	6233	1.37	41	660	01/01/2026	31/03/2026	In Programme
25	A55 - Dobbs Hill to Ewloe	18267	1.62	38	780	01/01/2026	31/03/2026	In Programme



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Welsh Government

Thank you for Listening

Praise You!

Gareth Day

gareth.day@gov.wales

0300 0256486





Considering Whole Life Carbon to Reach Net Zero

Emma Pye, Director, PYE Management

Carbon Footprint



Greenhouse Gases

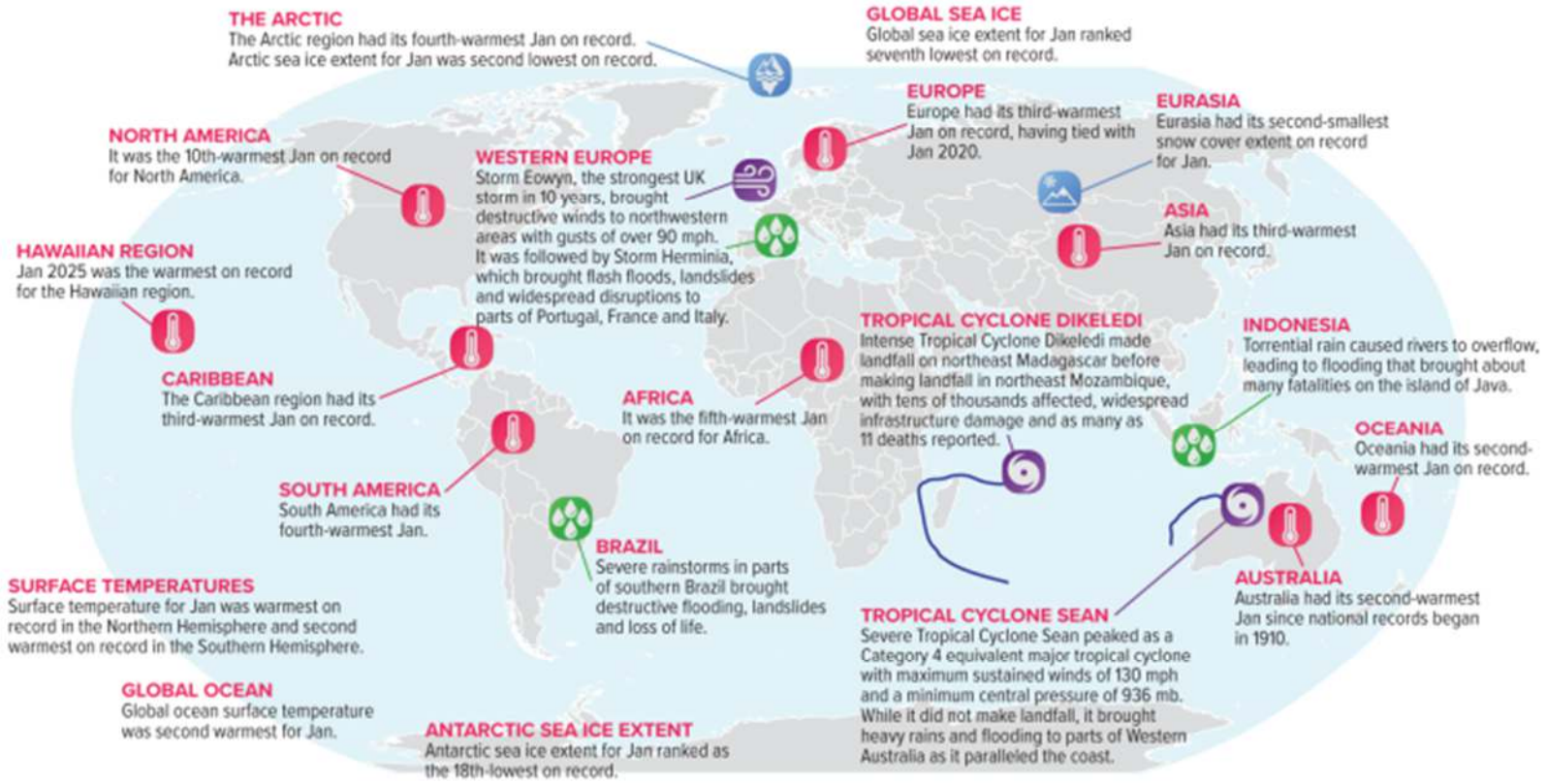
Global Warming Potential (GWP)

Kg CO_2 Equivalent ($KgCO_2e$)

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SUSTAINABILITY CONSULTANTS

Selected Significant Climate Anomalies and Events: January 2025

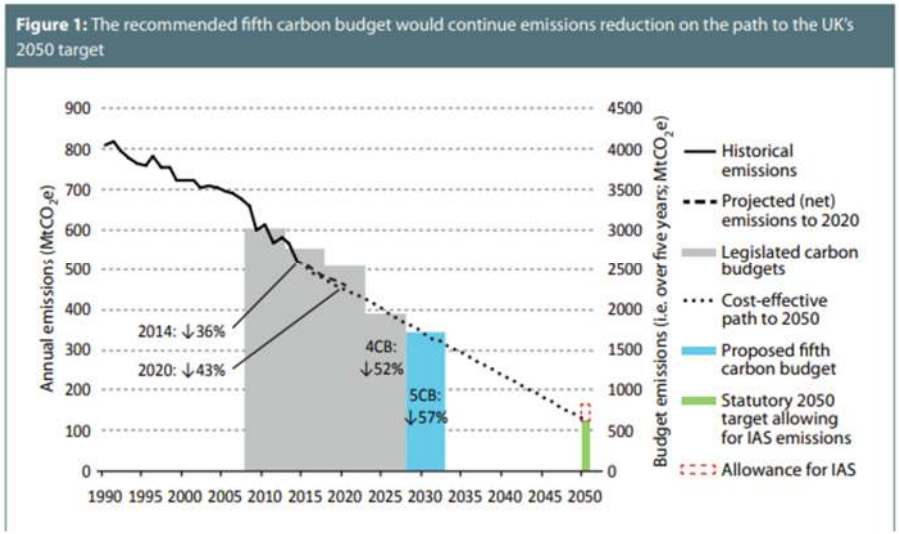
GLOBAL AVERAGE TEMPERATURE
Jan 2025 global surface temperature ranked warmest since global records began in 1850.



Please note: Material provided in this map was compiled from NOAA's State of the Climate Reports. For more information please visit: https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/

What are we doing about it?

The UK's Climate Change Act, 2008



Committee on Climate Change

Climate Change Act 2008





Our Highway Network

- National Highways – Net Zero for Maintenance and Construction by 2040: Efforts include using low-carbon materials and construction methods.

- 308/409 (75%) of District, County, Single-Tier Councils and Combined Authorities have declared a Climate Emergency to date – November 2021

- Annual Local Authority Road Maintenance (ALARM) report - More than half of the road network (52%) – around 106,000 miles – is reported to have less than 15 years structural life remaining.



MAINTENANCE & CONSTRUCTION EMISSIONS

Net zero by 2040

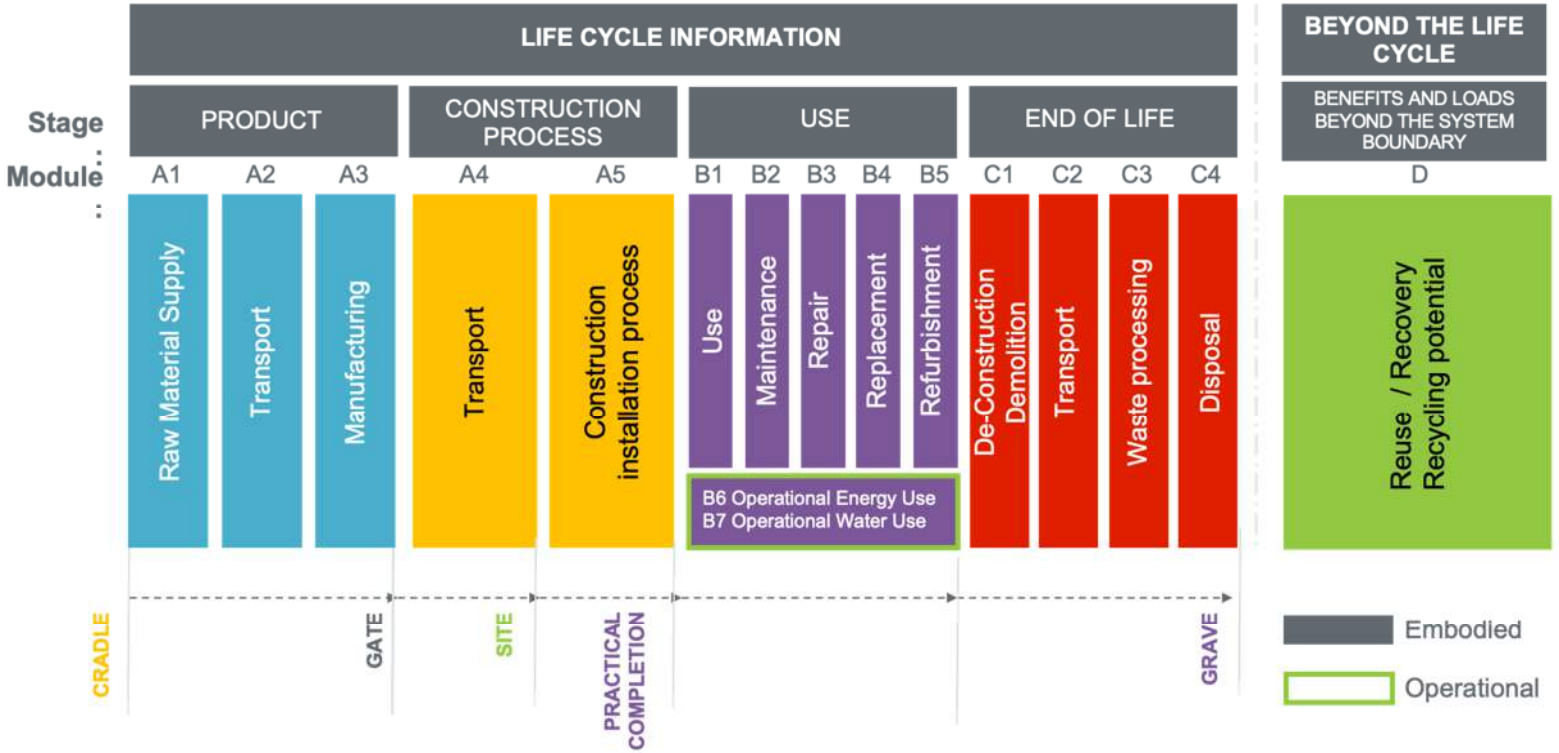
CLIMATE EMERGENCY UK

Highway Maintenance - Carbon life cycle

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ROAD
CLOSED

Highway Maintenance – Carbon life cycle



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Carbon Lifecycle

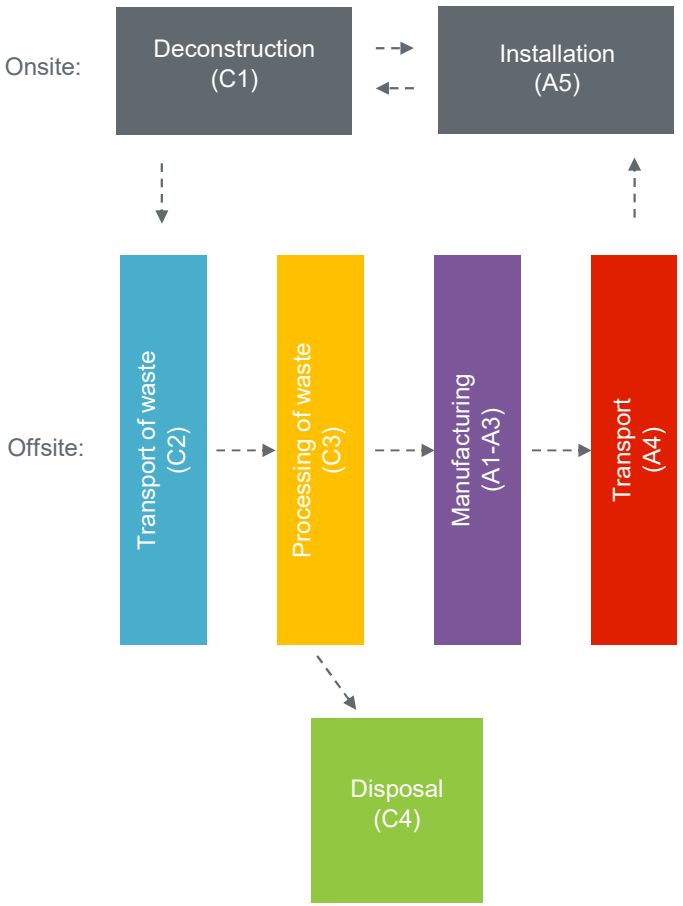
- Vital we think about the lifecycle as continuous
- Circularity is key



Where does highway maintenance fit in BS EN 15804?

B1	Use	N/A
B2	Maintenance	Programmed maintenance i.e. surface treatments (preservation, surface dressing).
B3	Repair	Reactive maintenance i.e. pot hole filling
B4	Replacement	Programmed maintenance i.e. resurfacing
B5	Refurbishment	Programmed maintenance i.e. reconstruction



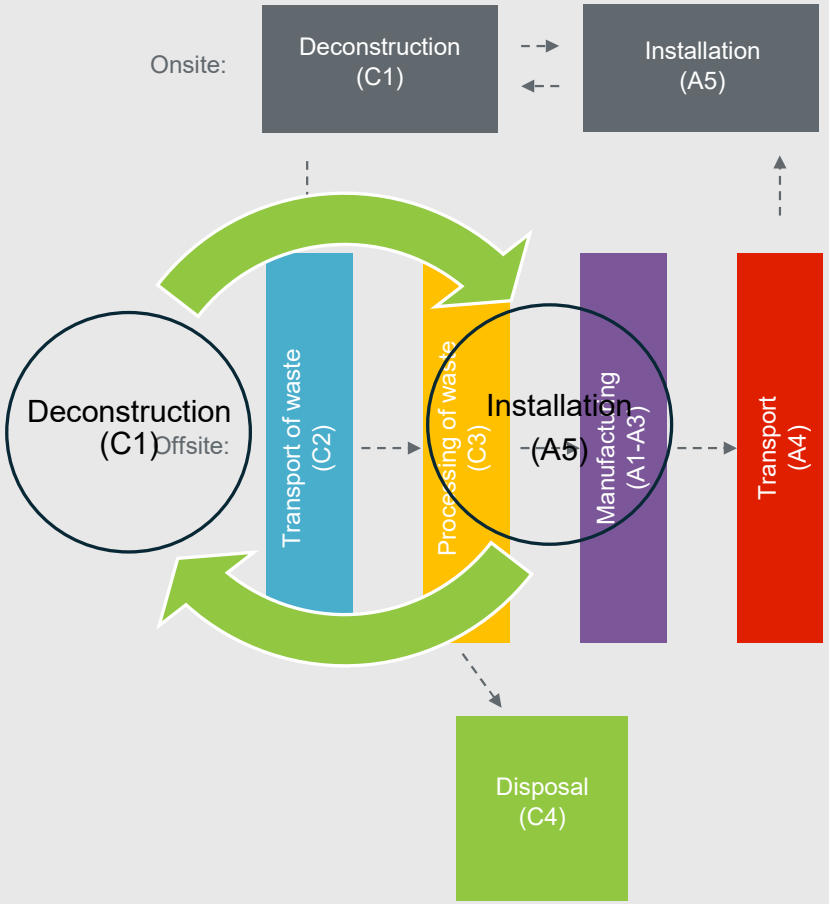


Where does highway maintenance fit in BS EN 15804?

- Deconstruction – Emissions associated with the deconstruction of current materials i.e. C1 (End of life) of the materials currently in place i.e. any waste asphalt
- Transport to waste processing of previous waste i.e. C2
- Waste processing i.e. C3
- Disposal of waste (if applicable) i.e. C4
- A1-A3 (Product) of the materials required for installation
- A4 (Transport) for the transportation for the material and plant
- A5 (Construction) for the installation

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It's all about circularity



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RSTA Carbon Emissions 2nd Ed

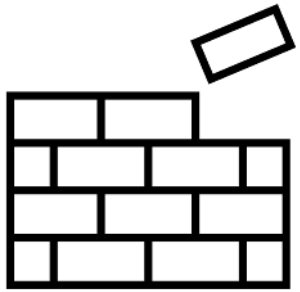
Published April 2025

Net Zero is within reach….



The results

Treatment	Units	A1-A3	A4	A5	A1-A5 (Total)	B
Rejuvenation (under 40mph)	$kgCO_2e/m^2$	0.0268	0.0061	0.0014	0.0343	0.0645
Rejuvenation (over 40mph)	$kgCO_2e/m^2$	0.0268	0.0049	0.0001	0.0328	0.0328
Preservation – penetrative	$kgCO_2e/m^2$	0.2458	0.0152	0.0657	0.3266	0.3278
Preservation – non -penetrative	$kgCO_2e/m^2$	0.2392	0.0356	0.0010	0.2758	0.2767
Surface Dressing – Single layer Carriageway	$kgCO_2e/m^2$	0.6059	0.1865	0.0128	0.8052	0.8135
Surface Dressing – Double Layer (Racked In) Carriageway	$kgCO_2e/m^2$	0.7974	0.1654	0.0175	0.9803	0.9836
Surface Dressing – Double 10mm	$kgCO_2e/m^2$	0.8941	0.2668	0.0220	1.1828	1.1959
Surface Dressing – Double 14mm	$kgCO_2e/m^2$	0.9400	0.2777	0.0364	1.2540	1.2556
Surface Dressing – Decorative	$kgCO_2e/m^2$	0.8395	0.5258	0.0212	1.3866	1.3915
Surface Dressing – Footway	$kgCO_2e/m^2$	0.7485	0.1124	0.0149	0.8759	0.8856
Surface Dressing – encapsulation	$kgCO_2e/m^2$	-	-	-	0.2457	0.2513
Microsurfacing	$kgCO_2e/m^2$	1.4394	0.2709	0.0539	1.7642	1.7892
Geosynthetics*	$kgCO_2e/m^2$	1.3703	0.0296	0.1084	1.5080	-
Crack and Joint repairs	$kgCO_2e/m^2$	4.5325	-	-	-	-
Spray Injection Patching	$kgCO_2e/m^2$	1.8594	0.2445	0.9791	3.0830	3.0830
Retexturing - Waterblasting	$kgCO_2e/m^2$	See A1-A5 Total			0.3118	0.3118
Retexturing - shotblasting	$kgCO_2e/m^2$	See A1-A5 Total			0.3573	0.3853
In-situ recycling - 150mm	$kgCO_2e/m^2$	3.9798	0.0257	0.7750	4.7805	4.7805
In-situ recycling - 250mm	$kgCO_2e/m^2$	10.4018	0.0642	1.2775	11.7435	13.2778
In-situ recycling - 250mm (Calcined clay)	$kgCO_2e/m^2$	4.9500	0.0642	1.2775	6.2918	7.8261
Thermal patching	$kgCO_2e/m^2$	1.4200	0.6412	0.6317	2.6929	2.6929
PMMA Patching	$kgCO_2e/m^2$	3.9807	0.6407	1.3007	5.9221	5.9221
Permanent Patching	$kgCO_2e/m^2$	6.0301	1.8449	0.1005	7.9755	9.7402
Ironworks – reinstatement systems	$kgCO_2e/m^2$	8.6452	-	-	-	-
Retread with 30mm SMA	$kgCO_2e/m^2$	6.7614	3.0717	4.1583	13.9913	13.9913
Retread with Surface dressing	$kgCO_2e/m^2$	2.3614	0.5167	0.2595	3.1375	3.1375



The results – Resurfacing and Surface Dressing

Year	0	10	20	30	40	50	Total number of years	Total ($kgCO_2e/m^2$)
Resurface	New road (100mm)	Surface course	Surface course	Binder and surface course renewal	Surface Course	Surface course	60	
$kgCO_2e/m2$	17.4123	7.2471	7.2471	17.4123	7.2471	7.2471		63.8129
Surface dressing - double racked	New road (100mm)	Surface dressing	surface dressing	Surface course	Surface dressing	Surface dressing	60	
$kgCO_2e/m^2$	17.4123	0.9836	0.9836	7.2471	0.9836	0.9836		28.5938

PYE MANAGEMENT
SUSTAINABILITY CONSULTANTS

The results – Preservation and rejuvenation

Year		0	5	10	15	20	25	Total number of years	Total ($kgCO_2e/m^2$)
Asphalt Preservation/ Rejuvenation/ SD	New road (100mm)	Rejuvenation	Preservation	Preservation	Preservation	Surface dressing (double racked)	Repeat	60	
$kgCO_2e/m^2$	17.4123	0.0645	0.3278	0.3278	0.3278	0.9836			38.8876

PYE MANAGEMENT
SUSTAINABILITY CONSULTANTS

The results - Geosynthetics

Year	0	5	10	15	20	25	35	45	55	Total number of years	Total ($kgCO_2e/m^2$)
Traditional resurface + geosynthetic	New road (100mm)	Rejuvenation	Rejuvenation	Rejuvenation	Retexture (shot) + Rejuvenation	Retexture (shot) + Rejuvenation	Surface dressing	Surface dressing	Surface dressing	60	
$kgCO_2e/m^2$	18.9206	0.0645	0.0645	0.0645	0.4181	0.4181	0.9836	0.9836	0.9836		22.9011
Traditional resurface + geosynthetic	New road (100mm)	Preservation	Preservation	Preservation	Retexture (water) + Preservation	Retexture (water) + Preservation	Surface dressing	Surface dressing	Surface dressing	60	
$kgCO_2e/m^2$	18.9206	0.3278	0.3278	0.3278	0.4677	0.4677	0.9834	0.9836	0.9836		23.7901

PYE MANAGEMENT
SUSTAINABILITY CONSULTANTS

The results – In-situ (retread), Surface dressing and Micro

Year	0	2	17	32	47	Total number of years	Total ($KgCO_2e/m^2$)
In-situ recycle 80mm retread + double dressing	New recycled road	Surface dressing	Surface dressing	Surface course	Surface dressing	60	
$KgCO_2e/m^2$	3.1523	0.9836	0.9836	7.2471	0.9836		13.3502
In-situ recycle 80mm retread + double dressing	New recycled road	Micro surface	Micro surface	Surface course	Micro	60	
$KgCO_2e/m^2$	3.1523	1.7892	1.7892	7.2471	1.7892		15.7667

PYE MANAGEMENT
SUSTAINABILITY CONSULTANTS

The results – In-situ

Year	0	1	10	20		Total number of years	Total ($KgCO_2e/m^2$)
In-situ recycle 150mm + double dress	New recycled road	Single surface dress	Surface dress	Surface dress	Repeat	60	
$KgCO_2e/m^2$	5.7641	0.8135	0.9836	0.9836			17.0896

PYE MANAGEMENT
SUSTAINABILITY CONSULTANTS



Greenwashing

The GCC (Green Claims Code) is based on six overarching principles. Environmental claims must:

- 1. be truthful and accurate
- 2. be clear and unambiguous
- 3. not omit or hide important information
- 4. be substantiated,
- 5. consider the product or service's full life cycle, and
- 6. comparisons must be fair and meaningful

PYE MANAGEMENT
SUSTAINABILITY CONSULTANTS



Local Highway Authority Perspective

Matthew Ings Dorset Council

www.rsta-uk.org

Dorset Council

DELIVERING A LOW CARBON ASSET PLAN

Implementing a Sustainable Structural Maintenance Programme.

Matt Ings - Dorset Council





INTRODUCTION

Dorset Council is committed to tackling climate change and supporting our natural environment. Since Declaring a climate emergency in 2019 Dorset Council has put tackling climate change and supporting our natural environment as a core priority

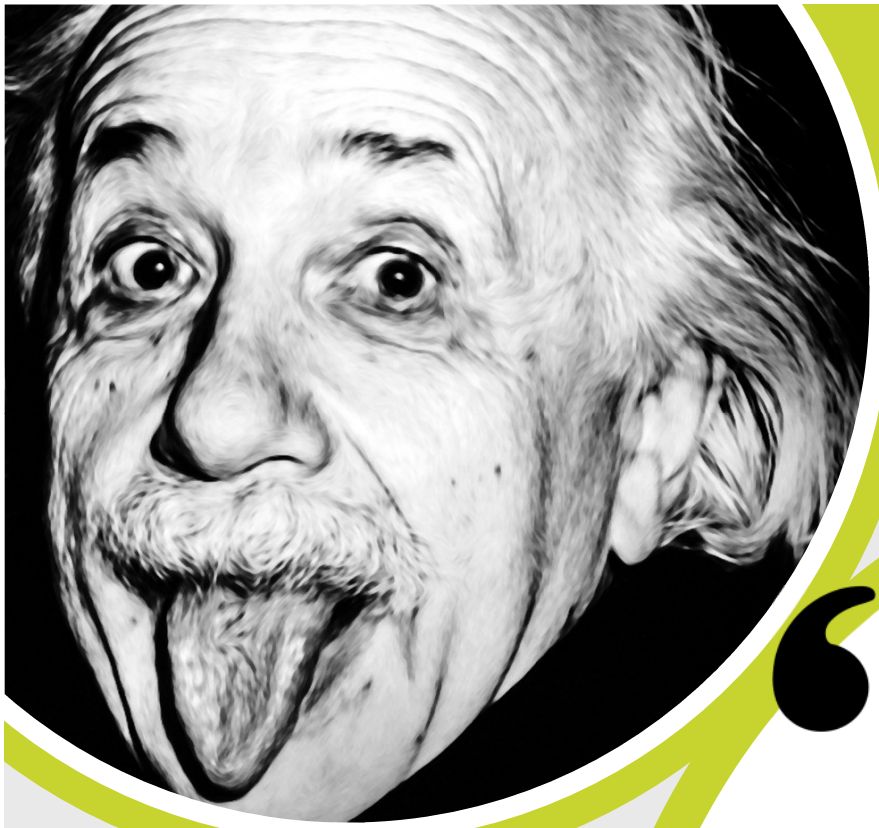
Our vision is for a resilient, carbon neutral, nature positive Dorset. This includes becoming a carbon-neutral council by 2040, and helping the whole of Dorset become carbon-neutral by 2050 (at the latest)

CHALLENGES






CHALLENGES
Overloading by farm equipment and trucks can lead to rapid deterioration
Extreme weather events i.e. heavy rainfall, flooding, snow, and droughts
Limited Funding and Budget Constraints
Rural road maintenance is often reactive rather than proactive, leading to higher costs over time.
The network is made up predominantly of rural roads where the structure and foundation has evolved over the years
Dorset Council has 3,795kms of carriageway which is used every day by residents, businesses and visitors to the county.



INNOVATION

“ INSANITY

doing the same thing

over and over again

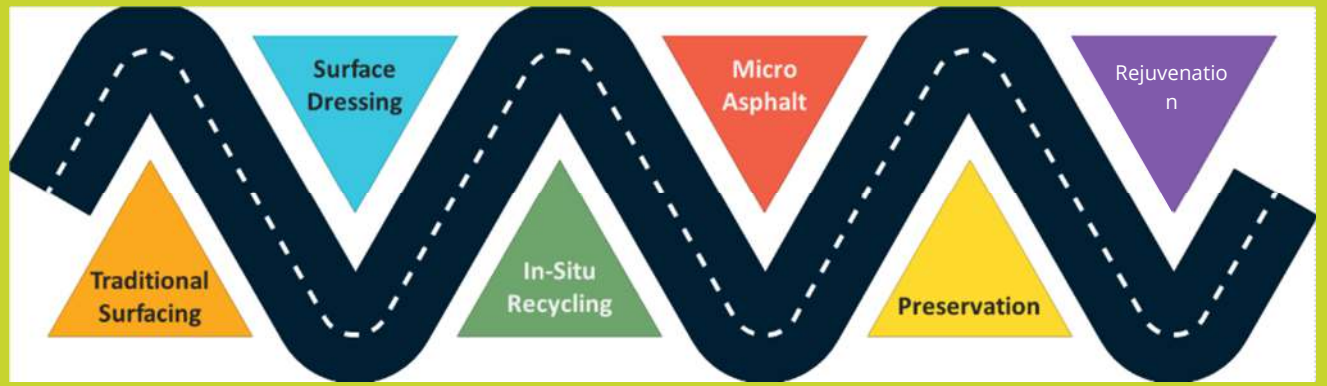
AND EXPECTING

different

”

DESIGNERS TOOLKIT

WHEN





MAKING THE RIGHT DECISION AT THE RIGHT TIME

IN-SITU ROAD RECYCLING











Focusing on reducing waste, reusing materials, is essential for a sustainable environment. The In Situ Recycling process minimizes waste, conserves natural resources, and reduces pollution.

Premium aggregates/materials have been imported to site over time and its these materials that we should be using rather than exporting to replace with materials of similar quality.

BEFORE

IN-SITU ROAD RECYCLING

Recycling
Reducing
Reusing
2025
45,000
m2

Throughout the operation the materials are trimmed, graded and compacted to return the recycled layer back to required finish levels before an asphalt surfacing or surface dressing is applied.







COMPLETED

TAR BOUND MATERIAL
WASTE MANAGEMENT



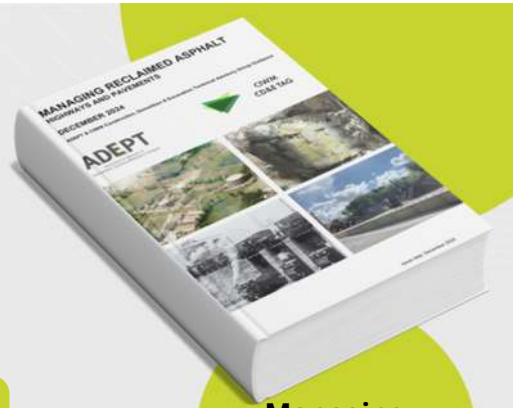




Early identification of coal tar-containing sites has allowed us to:

- Develop recycling programs early to encapsulate the hazardous material.
- Prevent costly landfill disposal.
- Decrease carbon usage.

Successful importing tar-bound planings into projects ahead of the recycling process has further reduced landfill waste while enhancing the quality of aggregates in the existing structure.



Managing Reclaimed Asphalt 2024

Road Tar could have been used in all pavement layers including surface dressings up until the mid-late 1980s



REJUVENATION









A spray applied treatment which penetrates and chemically modifies the binder, reversing the detrimental effects caused by oxidation and weathering, preventing the formation of cracks and defects, and prolonging the life of the asphalt
it restores the original properties of the bitumen with no need to adjust ironworks or refresh line markings



SURFACE DRESSING & ENCAPSULATION











- Improves skid resistance
- Helps to make a road waterproof
- Protects the road against frost and water damage

Encapsulation

Binder enhances the appearance of the new surface to a deep, uniform black which is comparative to a new asphalt surface.
No Complaints!

COLD APPLIED ULTRA THIN SURFACING (CAUTS)











- An advanced Micro Surfacing
- High PSV aggregates, unique Polymer Modified Bitumen emlusion
- BBA HAPAS approved product

The process represents an economic way to regenerate roadway surface characteristics in both rural and urban areas, where its low thickness eliminates the need to raise the level of joints, kerbs and most manholes
two-coat process capable of regulating carriageway undulations and some delaminated surfaces, requiring minimal patching which in turn lowers costs and reduces disruption to local stakeholders



MICRO ASPHALT



Micro Surfacing is a fast, effective and economical way to preserve and protect the road surface and is a cost-effective road surface treatment solution that is applied to worn carriageways. Micro Surfacing improves skid resistance and protects existing carriageways from water ingress while improving ride quality and reduces road noise

two-coat process capable of regulating carriageway undulations and some delaminated surfaces, requiring minimal patching which in turn lowers costs and reduces disruption to local stakeholders







PROCUREMENT OPTIONS

Local highway authorities face several challenges when procuring works, including;

Budget Constraints and Cost Pressures

Limited funding and budget reductions can make it difficult to balance quality with cost-effectiveness. Cheap doesn't necessarily mean best. Selection of a quality contractor needs to be at the forefront of vetting and selection process.

Procurement Process Complexity

Lengthy and bureaucratic procurement processes, which can delay project delivery.



Dynamic Purchasing System



LCRIG IPS



Direct award Trial



Competitive Tender

THE FUTURE.....

AI? “In-Situ Road Recycling”



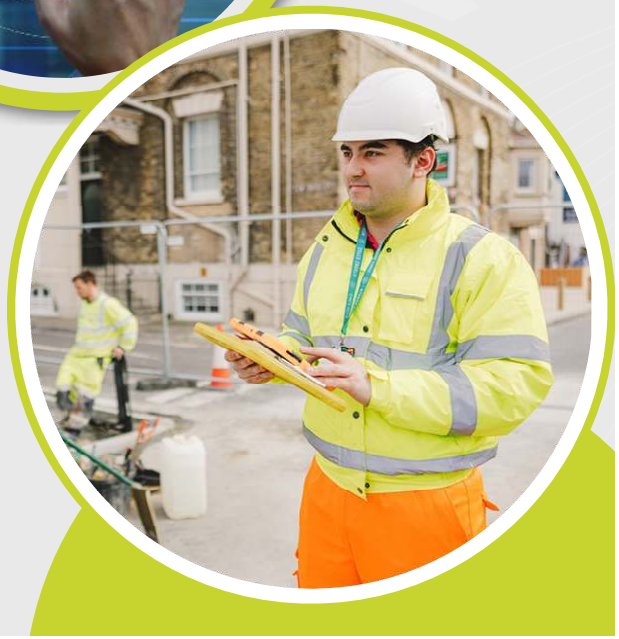


THE FUTURE.....

“In-Situ Road Recycling in DORSET”







Dorset Council

THANK YOU
FOR YOUR ATTENTION

(01305) 228135

Matthew.Ings@DorsetCouncil.gov.uk





First Intervention Opportunity - Preservation or Rejuvenation

Simon Fyfe, RMS

Keeping Good Condition Roads, in Good Condition



This presentation will cover....

- Asphalt non penetrative preservation treatments
- Asphalt penetrative preservation treatments
- Asphalt rejuvenation treatments



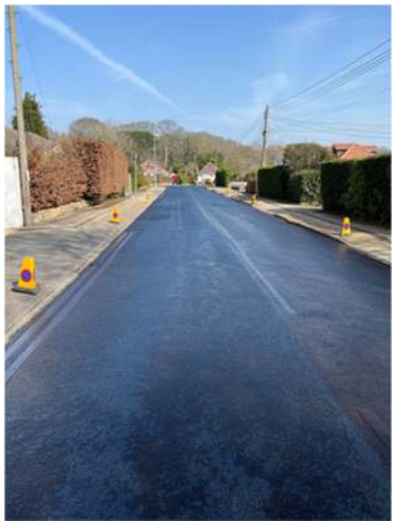


Non Penetrative Preservations Treatments

These are typically unmodified cold spray-applied bitumen emulsion sealants.

Their purpose is to seal the surface against water ingress, thereby protecting the road from environmental exposure and extending the life of the surface course.

- Commonly applied on low-speed roads, with or without grit.
- Target rate of spread is up to 0.3 litres/m^2 of 50% solids emulsion, leaving 0.15 litres/m^2 of residual binder.
- Cures by water evaporation, forming a surface film.
- Not generally used on high-speed roads
- Application from April to October
- Application during the daytime
- Extends asset life and prevents potholes forming







Penetrative Asphalt Preservation Treatments

These are designed to penetrate into the surface course and are the most widely used treatment in the UK, suitable for all road classes and airfields.

- Solvent-based and applied cold at ambient temperature.
- Initially marketed as “rejuvenators,” which caused confusion still lingering today.
- Preserve and protect, but do not alter the chemical makeup
- Typical application rates: 0.5 litres/m^2 on highways; 0.4–0.8 litres/m^2 on airfields.
- Performance depends on surface type (e.g., dense Marshall asphalt vs. porous friction course).
- Often modified with natural or refined bitumen (e.g., gilsonite).
- Penetration depth is up to 30mm
- Applied with grit to restore grip and skid resistance, post treatment (discuss with contractor)
- Protection typically lasts 3–5 years; secondary treatments may be applied thereafter.
- Single pass application treating up to 30,000m2 in a shift
- Application day and night at ambient temperatures +5 and rising
- Rapid drying time between 30 minutes and 2 hours - requires a road closure



Penetrative Asphalt Preservation Treatments

Benefits

- Sealing microcracks and interconnecting voids, improving aggregate retention
- Provides a hard seal, preventing ingress of water,
- Protects against exposure to elements, UV light, trafficking, salts and contaminants
- Improves wear resistance, reduces binder oxidation,
- Extends asphalt life, prevents potholes
- Improves aesthetics initially – does dull down over time
- No detrimental change to surface course characteristics
- (retained negative texture – DEFRA Noise Regs)
- Significantly reduced operating interruption

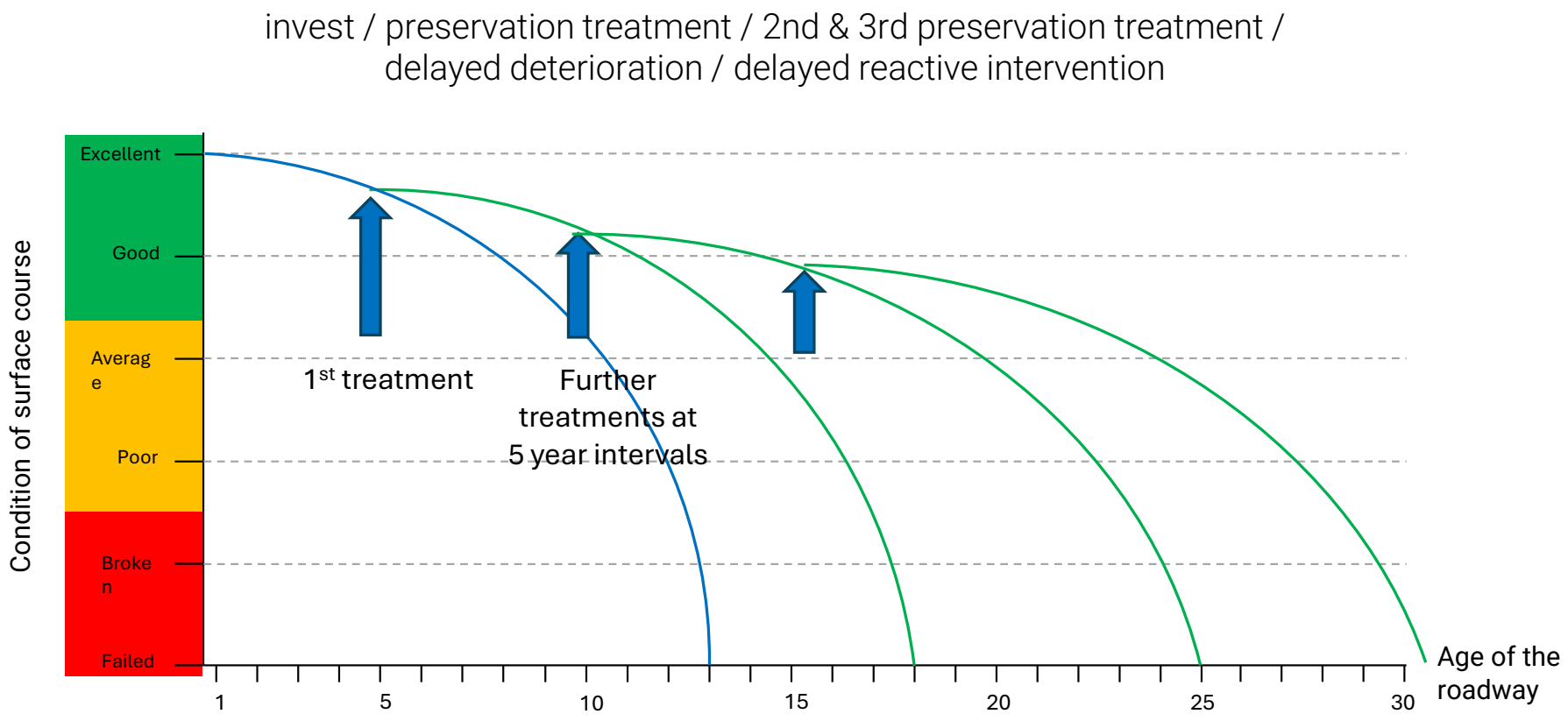


Preservation - Standards



- SHW Clause 950, (CC204/3), ISO9001 (product owner is QA assured, ensure quality and consistency of product)
- CE / CA Marked
- Contractor NHSS13 Registered
- HAPAS certificate

Preservation - Life Cycle Planning Approach



For an area of 120,000m²

New asphalt surface course

34 ROAD/LANE CLOSURES

12,000 TONNES OF ASPHALT

68 TRAFFIC MANAGEMENT MOVEMENTS

1,200 HGV MOVEMENTS

873,000 Carbon emissions ($kgCO_2e/m^2$)

Asphalt Preservation

4 ROAD/LANE CLOSURES

52 EQUIVALENT TONNES OF ASPHALT PRESERVATIVE

8 TRAFFIC MANAGEMENT MOVEMENTS

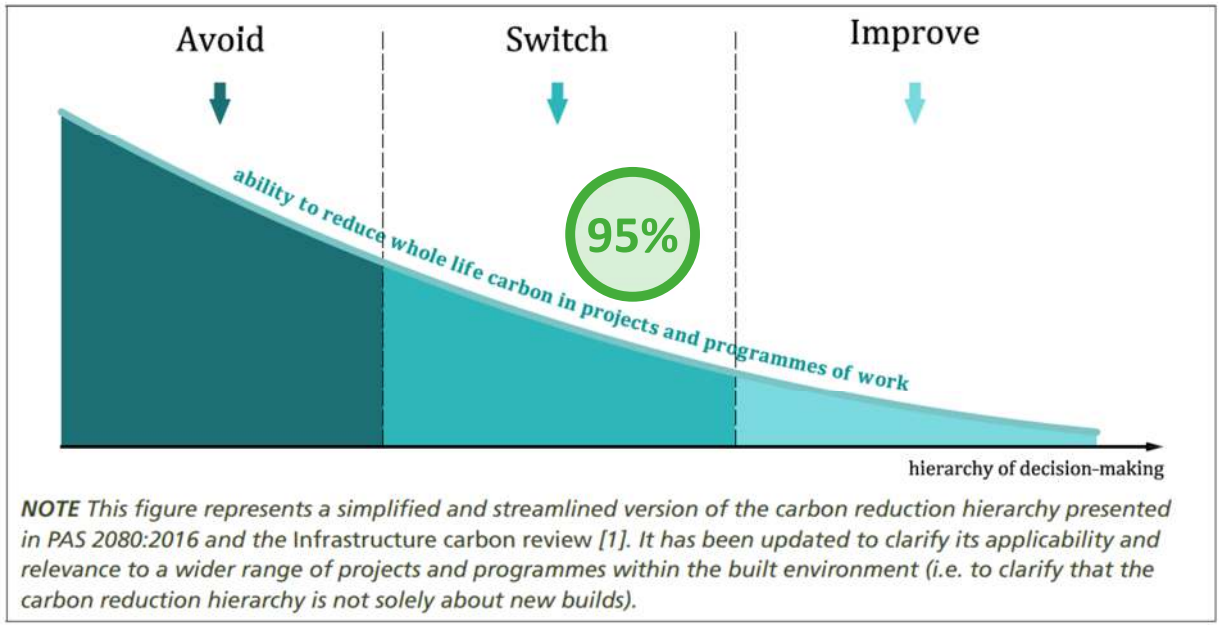
6 HGV MOVEMENTS

39,000 Carbon emissions ($kgCO_2e/m^2$)

PAS 2080 – Reduce **Whole Life Emissions**

- Penetrative Asphalt Preservation = **0.34 $kgCO_2e/m^2$**
- Non penetrative asphalt Preservation = **0.27 $kg/CO_2e/m^2$**
- Asphalt Resurfacing = **7.2 $kgCO_2e/m^2$**

Figure 5 – Carbon reduction hierarchy



NOTE *This figure represents a simplified and streamlined version of the carbon reduction hierarchy presented in PAS 2080:2016 and the* Infrastructure carbon review *[1]. It has been updated to clarify its applicability and relevance to a wider range of projects and programmes within the built environment (i.e. to clarify that the carbon reduction hierarchy is not solely about new builds).*

Avoid
Avoid the need for carbon emitting interventions

Switch
Substitute for a lower carbon alternative

Improve
Reduce the carbon intensity the process

Major infrastructure



M40
- Treatment since 2005
- 3rd application completed in 2019



Hangzhou Bay Bridge, China
- 35Km length
- Without increasing mass on the structure

Dual carriageway - Preservation



A421
- Treated in 2017



A50
- Treated in 2008, 2013 & 2018

Asphalt Rejuvenation

These are either bitumen emulsion or oil-based products used to restore surface properties.

- Two main types:
  - Cationic emulsion (used on highways; HAPAS approved)
  - Anionic emulsion (preferred on airfields; not HAPAS approved)
- Spray application penetrates and rejuvenates the bitumen
- Cationic emulsions break by chemical reaction; anionic emulsions cure by evaporation.
- Highways version is a diluted concentrate, applied at ~0.3 litres/m^2
- Heavier applications on porous or drainage asphalt in airfields may be required
- Spray applied, generally with sand or fine dust, post treatment
- BBA/HAPAS approval certification



© The Road Surface Treatments Association

Asphalt Rejuvenation

Benefits:
Restores the chemical elements (maltenes) lost in the bitumen through the aging and oxidation processes.

Penetrates through the voids in the asphalt surface, strengthening the aggregate bond and rejuvenating the bitumen, restoring the asphalt back to its original properties

Extending the life of the carriageway at minimum cost, reduces reactive maintenance & associated costs

Keeps roads in good condition for longer, preventing future potholes

Leaves material that has been paid for in the network, for longer



© The Road Surface Treatments Association

Rejuvenation - 20 year old SMA

- Surface was 7 years old when first treated with rejuvenation in 2012
- Now 20 years old
- Has been treated three times
- Remains serviceable
- Untreated area is visually more ‘open’, evidence of chip loss
- Untreated are has since had surface dressing applied due to deterioration in the surface condition



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Images of Before and After - Rejuvenation

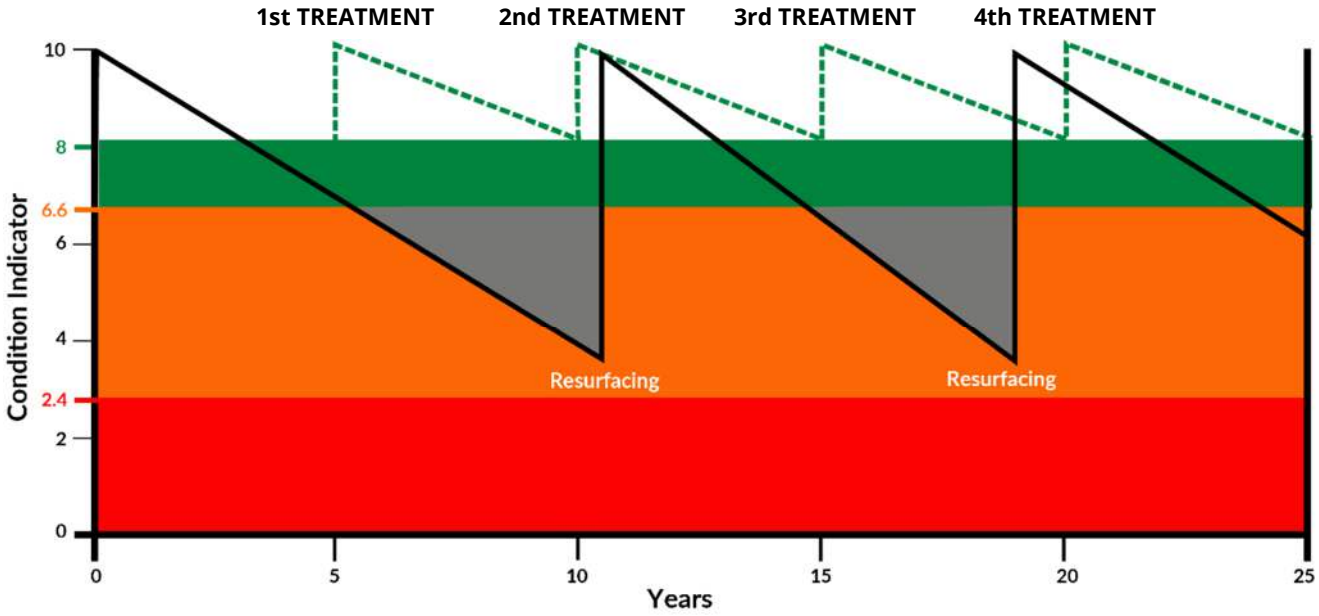




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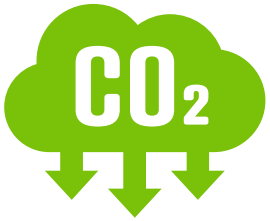
REJUVENATATION LIFECYCLE ASSET MANAGEMENT

Benefits of early intervention





CARBON BENEFITS



Rejuvenation has a carbon value of **0.034kgCO_2e/m²** which is the **lowest value per m²** of any surface treatment in the UK (RSTA Edition 2 Carbon Guidance report April 2025.)

Based on 100,000m² of carriageway the carbon value for **Rejuvenation is 3.4TCo_2e**.

The carbon value of SMA (40mm plane out and replace) is **7.207702kgCO_2/m²** (National Highways & MPA mineral products association figures) giving a carbon value of **720.770TCo_2e.**

Using Rejuvenation produces a **reduction of 717.37TCo_2e**. A reduction in the carbon footprint of **99.5%.**

A1270 BROADLAND NORTHWAY, NORFOLK

Rejuvenation

- **20km -**225,000m^2 of highspeed dual carriageway.
- The liability for this section of the network remains with Norfolk County Council for the first 20 years of its life. Offering best value, sustainability and longevity a repeat programme of rejuvenation has been implemented.

The first treatment of rejuvenation was in **2021.** Since that time there has been **zero unplanned reactive** maintenance works reported.

The second application is planned for 2026.



Rejuvenation

A299 THANET WAY, KENT

- A major arterial carriageway to the coast and linking into the M2.
- **6.7km** 84,000m^2 treated over 6 shifts in 2024.
- A further 8km, 110,000m^2 to be treated in 2025.

AECOM Report – in collaboration with Amey, Kent County Council and National Highways SES an assessment on the performance of Reclamite was completed.





Rejuvenation - AECOM Report Key Points

KEY FINDINGS

- Rejuvenation treatment was **proven** to have rejuvenated the binder.
- Rejuvenation samples exhibited a trend of **lowering the air voids** compared to control samples.
- The stiffness modulus values of the Rejuvenation sample were found to be lower than the control sample, reflecting the impact of the interactions between the existing asphalt mixture and the asphalt rejuvenator.
- The water sensitivity test results of control and rejuvenation samples showed **retained strengths of 72% and 111%** respectively. Suggesting that the improvement in the resistance to moisture damage of the asphalt mixtures after being treated by asphalt rejuvenator.
- The results from binder analysis showed that the binder was softened after the application of Rejuvenation, suggesting that **rejuvenation had taken place** and signs of lesser hardening and reducing of fretting.

Road treatment brings long-term benefits to Norfolk

Norfolk County Council 15 August 2025

Norfolk County Council, in partnership with Roadtechs Group, has successfully completed a record-breaking road rejuvenation project on the A1066 near Thetford - delivering long-term benefits for local communities, businesses, and the environment.

In just under five hours, over 9km of the A1066 was treated with Reclamite, a sustainable asphalt rejuvenator that extends the life of road surfaces and helps prevent potholes. This marks the largest area of highway ever to be treated with Reclamite in a single shift in the UK.



Photograph courtesy of Roadtechs

When to Apply Preservation or Rejuvenation – Site Suitability

- Plan first treatment from the date of construction (don't wait for cracks to form, aggregate loss)
- Roads typically from 4-5 years from date of construction/surfacing, but still no visual defects and structurally sound
- Roads still in 'green condition' or 'very low ambers' or end of condition band 1 (under PAS2161) – ie no deterioration, or possibly band 2 - that are about 2-3 years away from typical intervention (crack sealing / patching)
- Carry out any minor localised patching prior to, and crack and joint seal before, during or after
- Sites with good texture (ie above investigatory level) - sites with low texture / skid resistance can be retextured, prior to treatment



DIOLCH AM WRANDO THANK YOU FOR LISTENING

Asphalt Preservation and Rejuvenation Committee Members























www.joblingpurser.com



Crack & Joint Seal

Daniel Carroll, SwarcoHitex

MAIN EVENT SPONSORS:

www.rsta-uk.org

Modern Treatments for Crack and Joint Repair

The problem – fretted joints

Root causes:

- Cold joints
- Lack of compaction
- Lack of sealing
- Overbanding discontinued

Decay mechanism

- Wateringress
- Freeze thaw
- Hydraulic pumping

Typically

- Old HRA surfaces
- "Not very old" thin surfacing



Fretted Joints





What is Crack and Joint Repair?

MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS
VOLUME 1 SPECIFICATION FOR HIGHWAY WORKS

711 (02/16) Overband and Inlaid Crack Sealing Systems

Specified in the MCHW

GUIDELINES DOCUMENT FOR THE ASSESSMENT AND CERTIFICATION OF CRACK SEALING SYSTEMS FOR HIGHWAYS

Process types & materials covered through BBA HAPAS approval process

RSTA/ADEPT approved Code of Practice

RSTA/ADEPT approved Code of Practice

BBA HAPAS – What it Covers

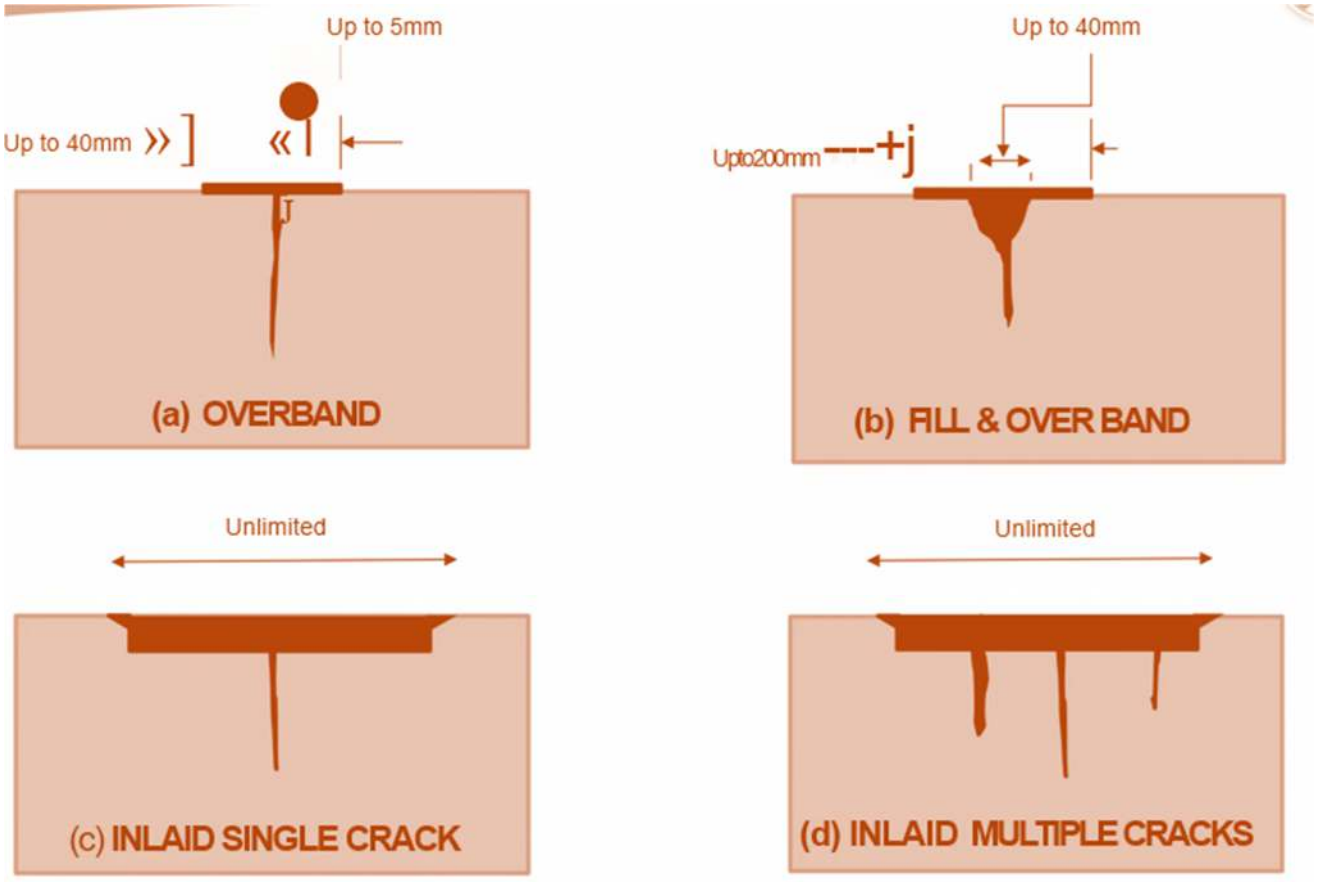
Details 4 Repair Types

Performance Based Certification:

- Skid Resistance
- Texture Depth
- Rut Resistance

GUIDELINES DOCUMENT FOR THE ASSESSMENT AND CERTIFICATION OF CRACK SEALING SYSTEMS FOR HIGHWAYS

BBA Types


Up to 5mm
Up to 40mm
(a) OVERBAND
Up to 40mm
Upto200mm
(b) FILL & OVER BAND
Unlimited
(c) INLAID SINGLE CRACK
Unlimited
(d) INLAID MULTIPLE CRACKS

Types of Approved System

THERMOPLASTIC OR HOT APPLIED

"capable of softening or fusing when heated and hardening again when cooled"

Source - Merriam-Webster on line dictionary

A **REVERSIBLE** change

THERMOSET OR COLD APPLIED

"capable of becoming permanently rigid when cured"

Source -- Merriam-Webster on line dictionary

An **IRREVERSIBLE** change

Essential Requirements for Overbanding

- Typically used on narrow cracks or 'new' joints
- Crack widths up to 5mm
- Overband up to 40mm wide & 3mm thick
- Seal & Prevents Water Ingress
- Initial skid resistance > 60 SRV
- Retained skid resistance > 50 SRV



Types of Overband

Tape (hot)



Bitumen (hot)



Resin (cold)



Essential Requirements for Fill and Overband

- Typically used on fretted joints
- Crack widths up to 40mm
- Overband up to 200mm wide & 3mm thick
- Seal & Prevents Water Ingress
- Initial skid resistance > 60 SRV
- Retained skid resistance >50 SRV
- Initial Texture Depth of 1.5mm



Fill and Overband





Types of Fill and Overband

Hot Applied





Cold Applied

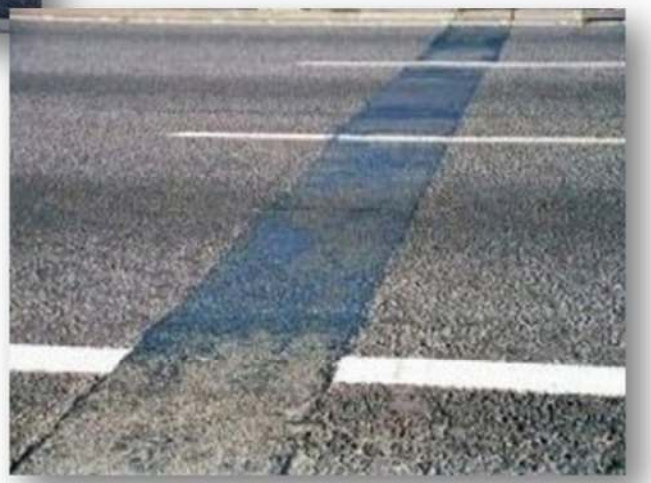


Inlaid - Single or Multiple Cracks

Suitable for unlimited width crack repair

- Flush Road Surface Finish
- Greater 'body' of repair to accommodate underlying movement
- Often used in situations involving concrete in the carriageway
- Repairs pitted, spalling or broken surfaces/ edges





Inlaid - Single or Multiple Cracks

Suitable for both Concrete & Asphalt Repairs





Material Durability

	Overband	Fill & Overband	Inlaid
Thermoplastic Hot Applied	3 Years	3 Years	5 Years
Thermoset Cold Applied	5 Years	5 Years	5 Years

Years= Expected Duration of System taken from BBA HAPAS Certificates

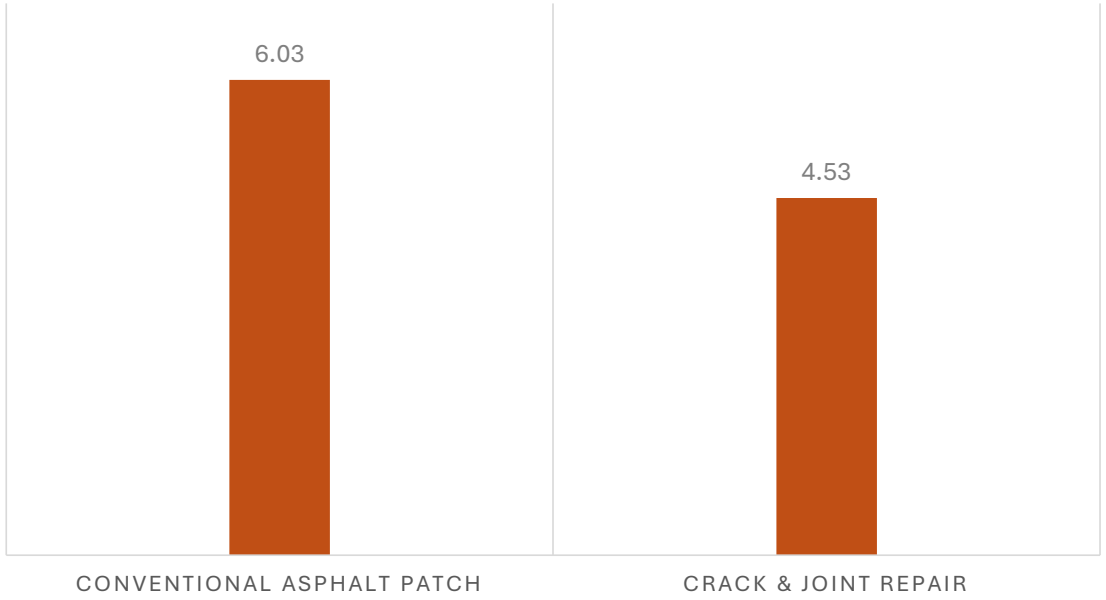
Joint Repair - A Specialist Trade

- New Materials & Specifications
- Different Types of Joint Failure
- Existing Markings & Studs
- Qualified Workforce & Training



Traditional Patch Vs Joint Repair

Crack & Joint Repair – Carbon Comparison (kg CO_2e/m^2) for A1-A3



RSTA Edition 2 Carbon Guidance Document

Final Thoughts.....

Just because we have always done it that way.....

Asset management = new thinking about what we do

New materials can enable new repair and prevention techniques

Real change starts with a change of mind ....



Diolch am wrando Thank you for listening
Crack and Joint Repair Committee















Retexturing
Restoring Skid Resistance without Costing the Earth

Gerald Byrne, WJ

Types of Retexturing

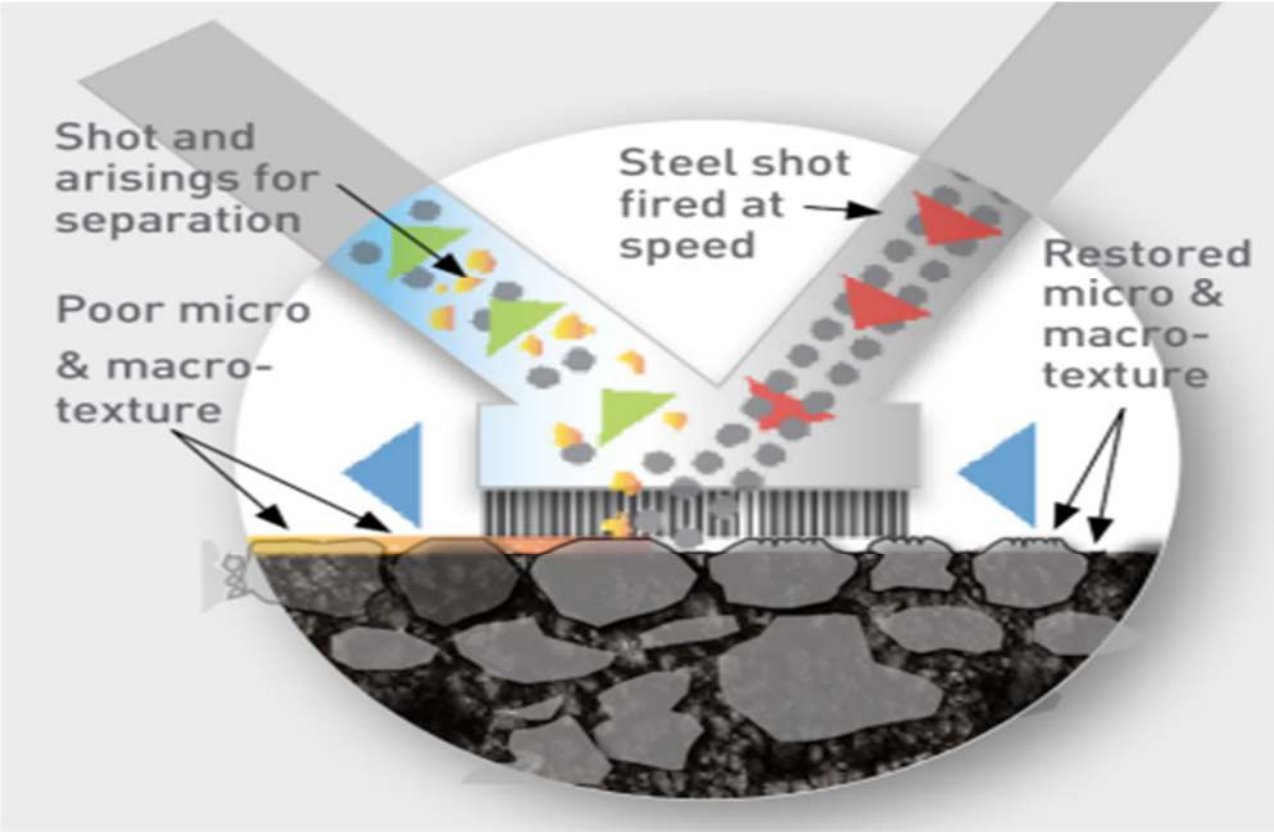
1. Captive Shot Blast



2. Hydro



Captive Shot Blast Retexturing



Retexturing

Captive Shot Blast system

Attached head or ride on machines

Recycled Steel Shot fired into the aggregate

Shot recycled using magnets, ensures no loss

Aggregate exposed and abraded

Skid resistance of the road restored

Micro and Macro texture reprofiled

Detritus from the process collected in waste tank

All waste collected and returned for recycling

Carriageway reopened immediately after treatment reducing delays to the public



Surface Prep bridge decks /Thin overlays

Captive shotblast

No beam sweepers

No dust

No damage to joints

Rapid outputs



Retexturing Concrete /Captive Shotblast .

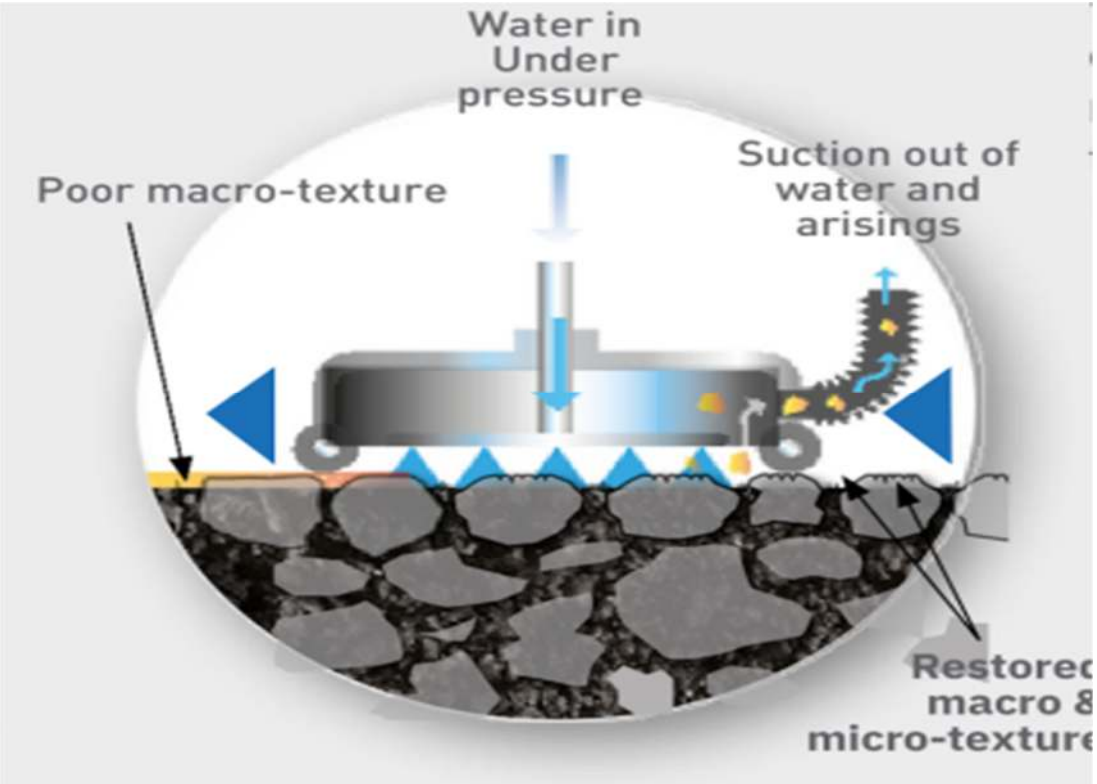
No sweeping

No damaged joints

Rapid Outputs



Hydro Retexturing







Reporting & Testing





Test Results

Textureblast Limited
HIGHWAY CONTRACTORS

TO:

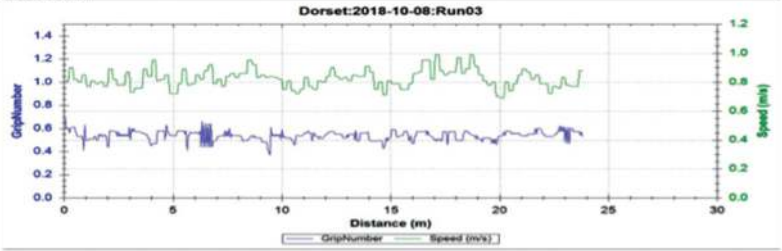
Tremayne House
Westpark
Wellington
Somerset, TA21 9AD
Tel: 01903 716358
Email: info@textureblast.net
Website: www.textureblast.net
Registered in England No. 5675801
VAT No. 878 6337 65

TEST LOCATION: Site
ROAD SURFACE: HRA
PRE TEST DATE: Monday, 8 October
POST TEST DATE: Monday, 8 October

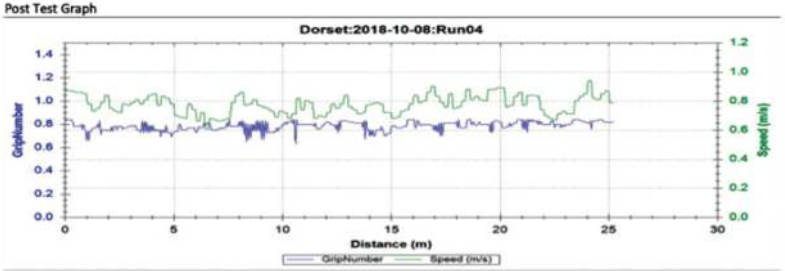
Determination of Skid Resistance on Wet Surface Using Findlay Irvine Micro GT Griptester

Distance (M)	Latitude	Longitude	Grip No.	Grip No.	Percentage Increase
0	050:55.7324N	002:30.6038W	0.60	0.85	41.67%
5	050:55.7298N	002:30.6026W	0.55	0.75	36.36%
10	050:55.7273N	002:30.6018W	0.52	0.80	53.85%
15	050:55.7246N	002:30.6014W	0.60	0.80	33.33%
20	050:55.7222N	002:30.6013W	0.55	0.85	54.55%
25	050:55.7198N	002:30.6014W	0.53	0.86	62.26%
		Average	**0.56**	**0.82**	**46.57%**

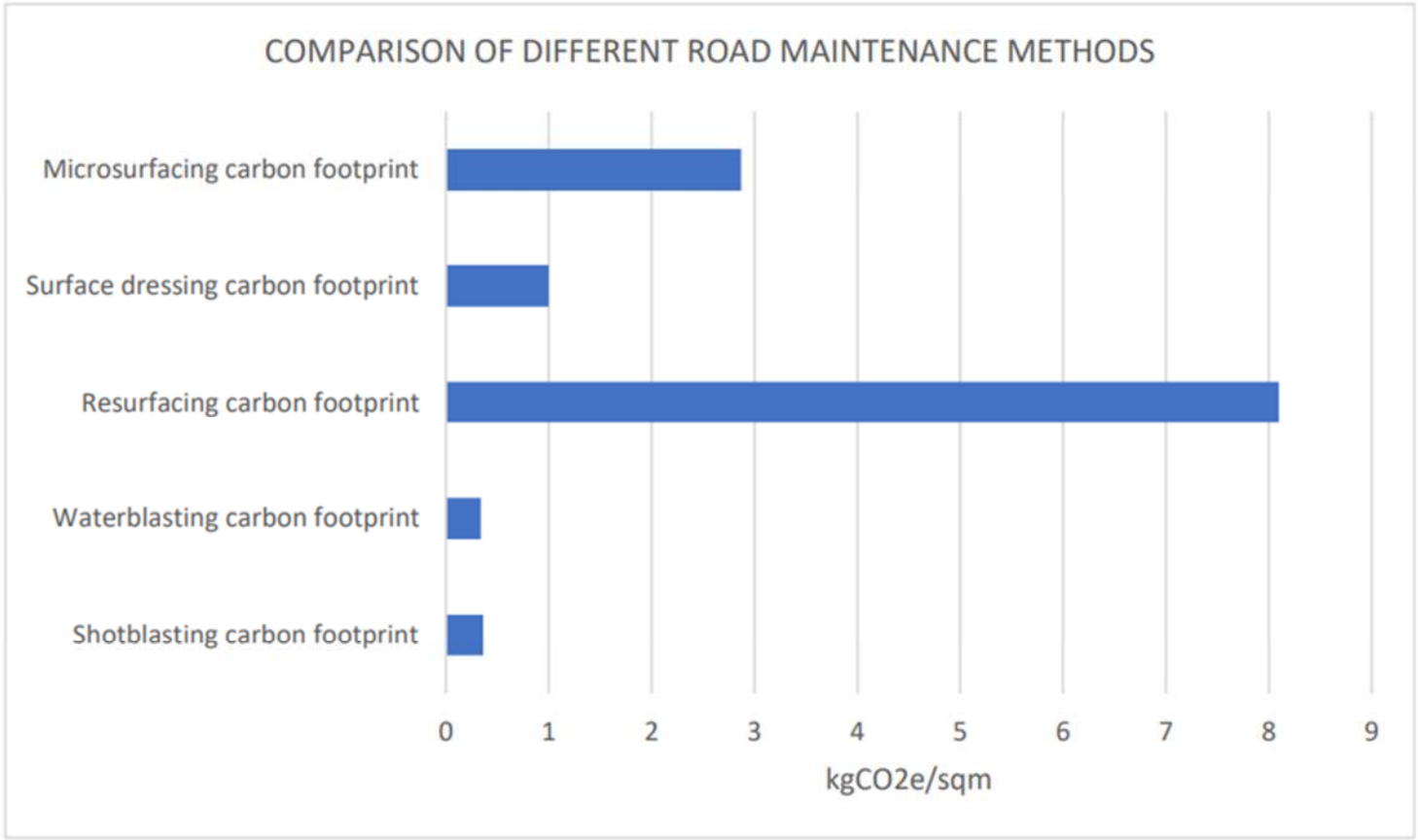
Pre Test Graph



Post Test Graph



Carbon Footprint Comparison



Effectiveness of Retexturing

- On average retexturing reduced TS SCRIM prioritisation score (often enough to remove the need for investigation)
- Benefits can last 2 - 4 years
- Site category doesn't appear to be strong influence on performance
- From limited data original PSV has influence
- Retexturing is a lower carbon option than resurfacing (RSTA 0.357/ SD 0.825/ resurface 4.567)
- Asphaltic materials respond better than surface dressing

Retexturing v Resurfacing comparisons NH network 2018-2023 including DBFO

1.2 million sqm 40mm plane and resurface /retexturing

Shotblasting – 432 tonnes of CO2 produced.

Resurfacing would have produced 5.480 tonnes of CO2 (RSTA carbon calculator published April 2023 of this year) plus milling and laying.

50% of the shifts compared to resurfacing.

£ 6 million to retexture - £54 million to resurface.

Immediately makes the unsafe sections of carriageway safe .







Mid life roads - Surface dressing / Microsurfacing

Dave Rigby, RMS

Mid Life Roads – Fair Condition



Table 2 – Road condition categories

Category	Description	Potential maintenance treatment option
1	No deterioration	Pavement is not considered for maintenance
2	Minor (and/or aesthetic) deterioration	Light maintenance (e.g. minor patching)
3	Moderate deterioration	Localized intervention or mid-life preventative maintenance (e.g. surface dressing, patching, crack sealing)
4	Moderate to severe deterioration	Rehabilitative maintenance, perhaps full carriageway (e.g. resurfacing with thin overlay/surface dressing and multiple patching, edge haunching)
5	Severe deterioration	Structural maintenance (e.g. full carriageway resurfacing or reconstruction)

Surface Dressing



Application of a thin layer of bitumen emulsion to the existing road surface,

followed by a single or double layer of chippings

Chippings are then rolled, road opened to slow moving traffic to achieve embedment

Swept after 24-48 hours to remove non embedded chippings

When to Apply Surface Dressing



Roads in good to fair condition, or with poor texture/skid resistance

Roads with minor cracking and crazing but structurally sound

Good profile – surface dressing follows existing road profile

Any more extensive surface damage will need to be pre-patched

Can be used on strategic roads (including dual carriageways), right down to urban and rural unclassified roads

Used to seal in situ recycled roads

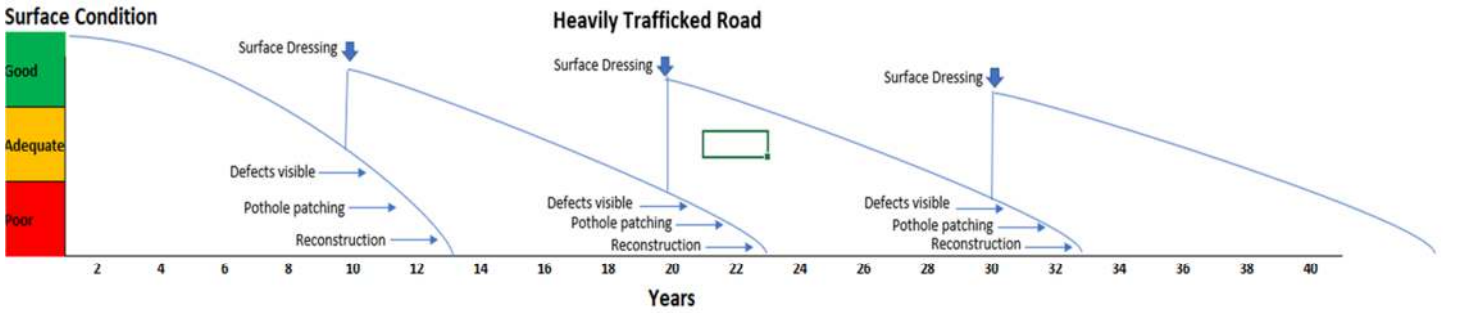
Act early – Apply surface dressings at the top of the road condition curve (7/8-15 years).

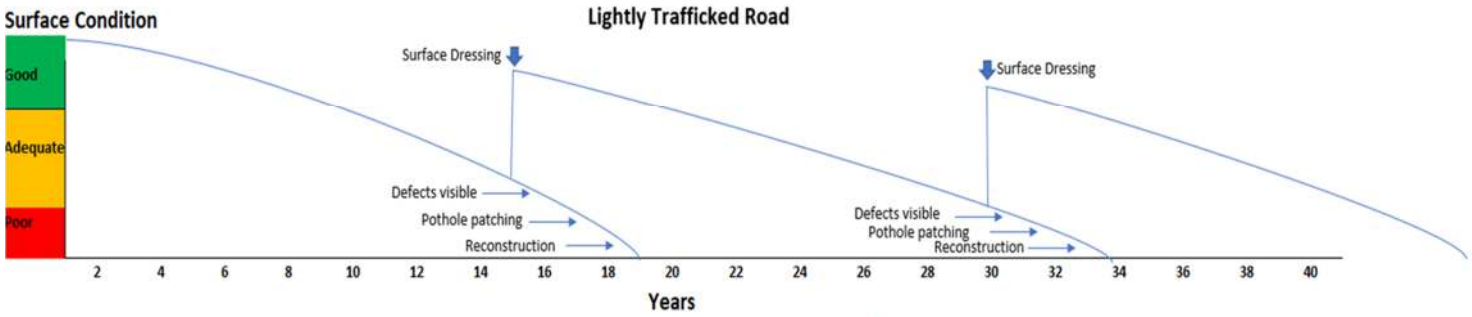
Benefits of Surface Dressing



- Seals the road surface to prevent water ingress and stand up to the hydro pressures
- Acts as a barrier to the elements and therefore further oxidisation
- Extends road life, preventing the formation of potholes
- Restore skid resistance by improving both micro and macro texture
- Fast installation – up to 40,000 sq.m. / day. Minimises traffic disruption

Asset Management Interventions





Source data: ADEPT / RSTA: *The Surface Life of Road Treatments for Asset Management Purposes. T1 Page 3, 2nd Edition July 2017.*

Surface Dressing – Considerations

- Will not reprofile or strengthen the site
- May increase noise levels (positive texture)
- Potential short term inconvenience from loose chippings
- Not always suitable for high-stress/heavy trafficked locations
- May not be suitable for highly populated pedestrian areas

Surface Dressing Design





TRL Road Note 39 is a technical guide for the design of surface dressings throughout the UK.

Written by a committee of members from - RSTA, ADEPT, REA, National Highways, TAG Mouchel, EBUK, Transport Scotland, Mineral Products Association.

7TH Edition – legal updates and changes in environmental conditions.

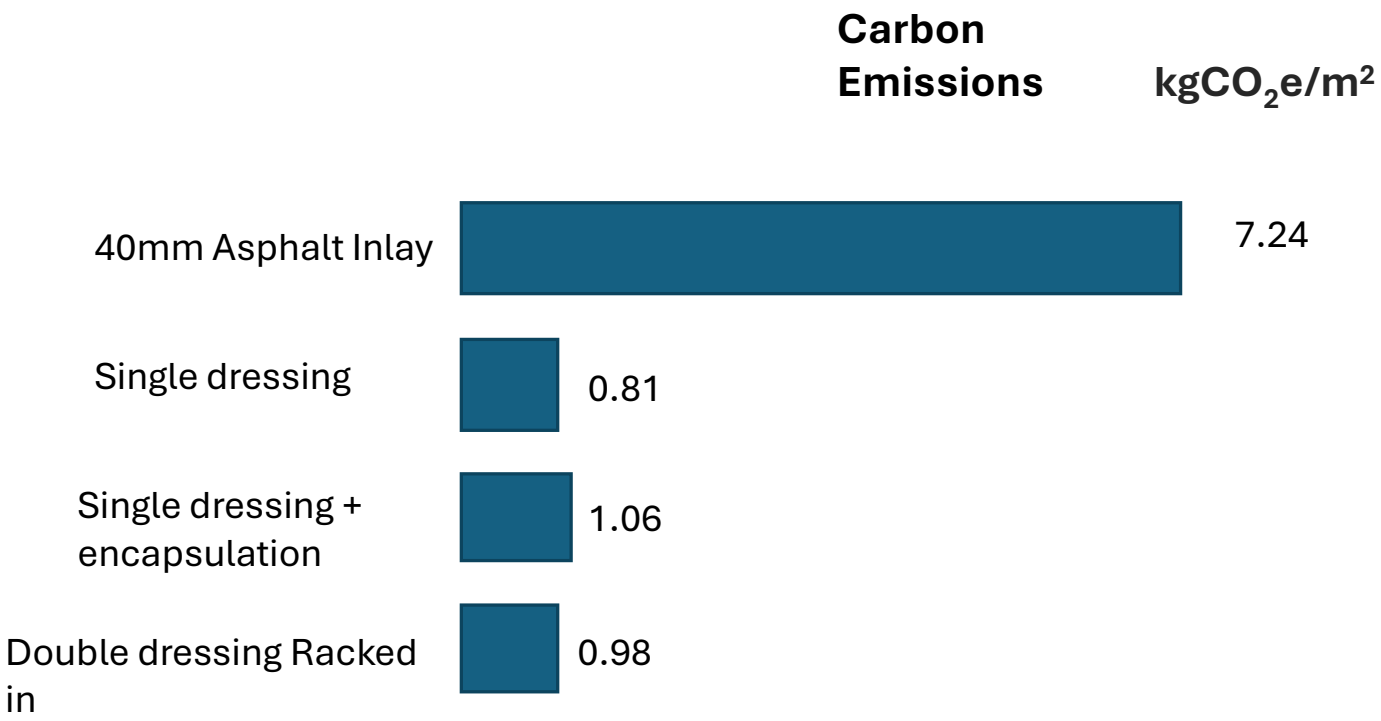
Road Note 39 is not a specification in itself. It is a guidance towards specification.

Because every site is different!

Surface Dressing – Standards and Guidance

- Road Note 39 (7th Edition)
- RSTA / ADEPT Codes of Practice for Surface Dressing (No.s 1 – 11?)
- BS EN 12271/2 Series (Surface Dressing Specifications)
- BS EN 1707 (Bitumen sprayer distribution testing)
- PD 6689:2009 (published document guidance note to above)
- NHSS13 (Quality Management Document)
- MCHW Volume 1; Specification for Highway Works Series 900

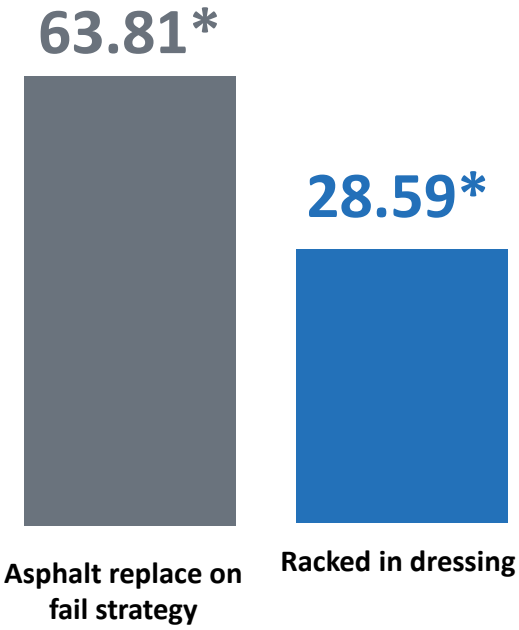
Surface Dressing – Carbon Comparison



*RSTA Edition 2 Carbon Guidance

Surface Dressing – 60 year Hypothetical Lifecyle Comparison

Carbon Emissions $kgCO_2e/m^2$



55%

Reduction in carbon

Cost £

54%

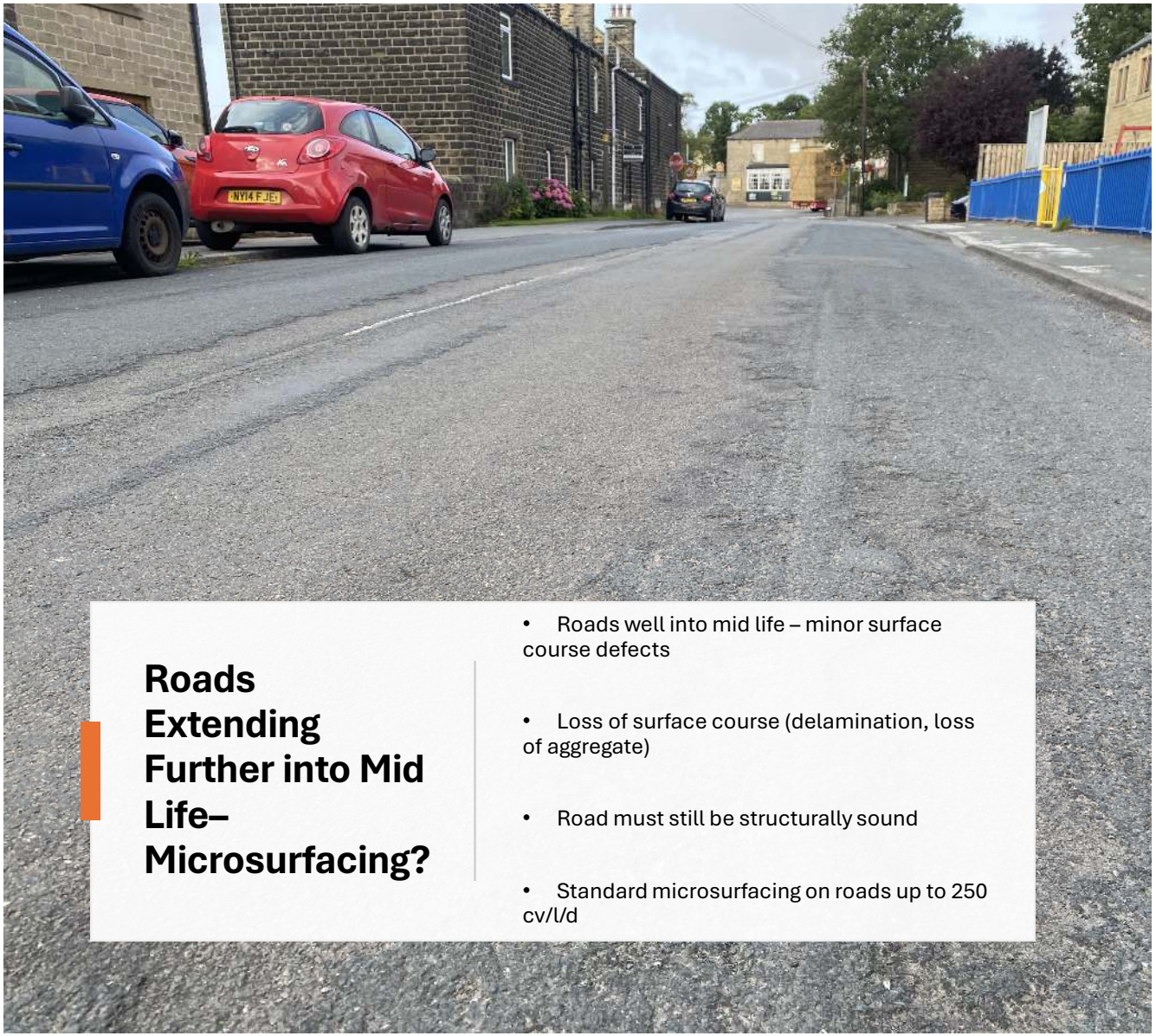
CASHABLE SAVING

*RSTA Edition 2 Carbon Guidance
Dressing scenario assumes a plane off and replace 40mm surface course after two dressing applications



ENCAPSULATION - A MODERN APPROACH...

- Encapsulation is a spray applied treatment, providing a double seal
- Techniques such as **ENCAPSULATION** enables surface dressing chippings to be **LOCKED** into the surface
- Removes issue of loose chippings
- Gives the dressing more **RESILIENCE** (high stress areas, tree canopies)
- Helps with **APPEARANCE,** improving public perception









Roads Extending Further into Mid Life– Microsurfacing?

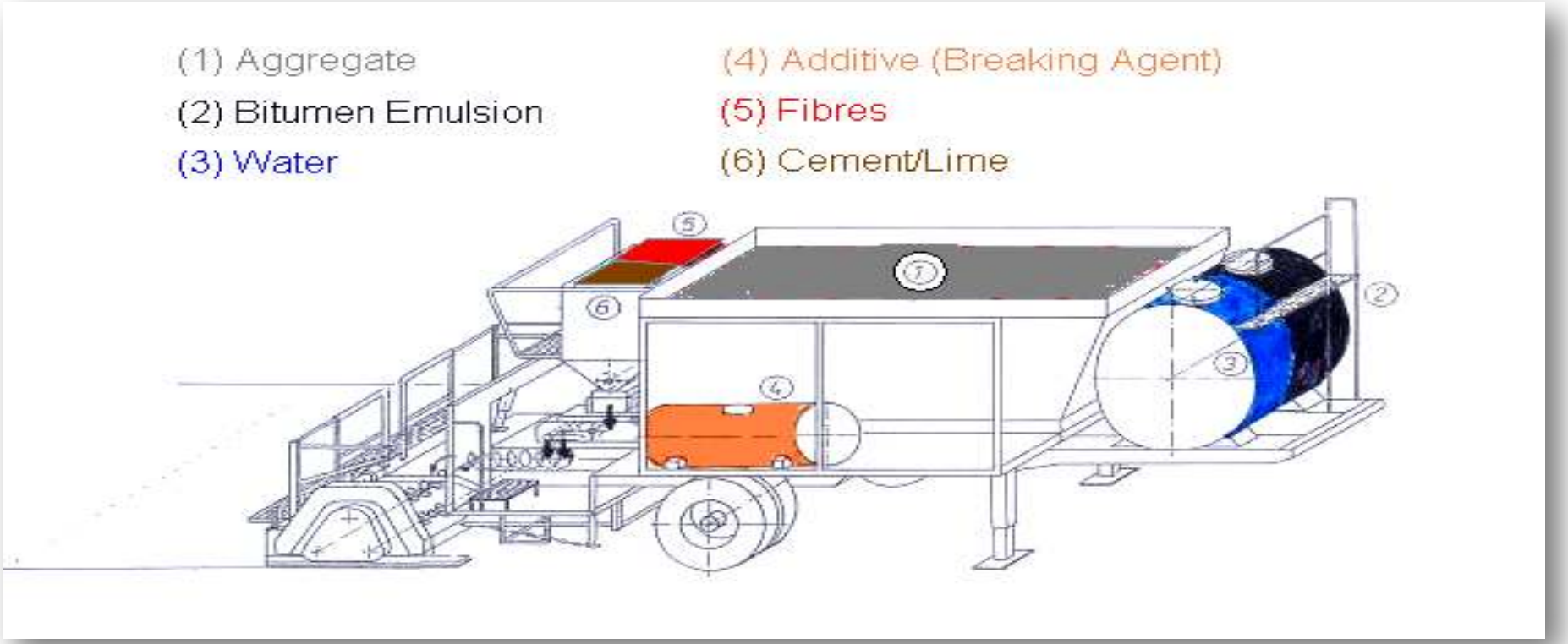
- Roads well into mid life – minor surface course defects
- Loss of surface course (delamination, loss of aggregate)
- Road must still be structurally sound
- Standard microsurfacing on roads up to 250 cv/l/d

Micro-Surfacing - What is it?



Machine applied products
<8mm graded aggregates
Mineralogy crucial
Uncoated aggregates reduce durability
2 layer (15mm nominal thickness)
Regulate & re-profile
Dense surface, texture, & skid resistance

Slurry Micro-Surfacing



Slurry Micro-Surfacing

Under ideal circumstances:

- Trafficked in 20 minutes (seasonal variations)
- Sweep after 24 hours (minimal loose chippings)
- Raise ironwork next day (machine strike plate)
- Lining after 3 days to allow moisture to escape





Microsurfacing – Benefits

- Regulates out minor surface course defects, profile (does have a limit)
- Seals the roads surface, preventing water ingress
- Regularising the road surface
- Restores surface texture – making roads safer
- Extends service life of the road
- Suitable for urban and rural roads
- 10-15 year service life if done properly
- Cold mix – low environmental impact
- Efficient & cost effective operation (5000m2/day)
- Minimal disruption to traffic flow

Urban or Rural Solution







Slurry Micro-Surfacing: Material specification

- **BS EN 12273: 2008**: Harmonised EU standard
- **PD 6689: 2009:** UK guidance document
- **Contractors:** ISO 9001, FPC, TAIT's, & DoP
- **Manual of Contract documents for Highway Works (MCHW) volume 1, Specification for Highways Works (SHW), clause 918:** Specifies how to execute the works

Slurry Micro-Surfacing: Constituent specification

BS EN 13043: 2013 & PD 6682-2: 2009: Aggregates
BS EN 13808: 2005: Bitumen emulsions
BS EN 197-1: 2011: Cement

Cold Applied Ultra Thin Surfacing (CAUTS)

Some products have a Product Acceptance Scheme (PAS) certificate (HAPAS or PTS) which enable use on roads carrying 250> cv/l/d

These fall under the following Specification:

SHW Clause 923 - Cold Applied Ultra-Thin Surfacing (CAUTS) – NEW SHW CC204/

“CAUTS to be certified under a product acceptance scheme as detailed in sub-Clauses 104.15 and 104.16”



Cold Applied Ultra Thin Surfacing (CAUTS)





Cold Applied Ultra Thin Surfacing (CAUTS)





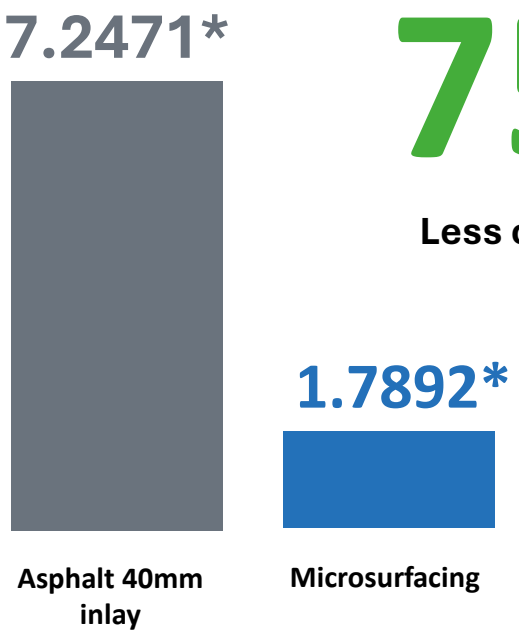
Can be used to restore texture to fatted surface dressing



National Highways Networks - A421

Microsurfacing – Comparisons

Carbon Emissions $kgCO_2e/m^2$



75%

Less carbon per m²

*RSTA Edition 2 Carbon Guidance

Cost

Up to approx 75% Cashable saving per m2, compared to 40mm asphalt inlay

Diolch am wrando Thank you for listening
Surface Dressing Committee Members



Diolch am wrando Thank you for listening

Slurry Microsurfacing Committee Members







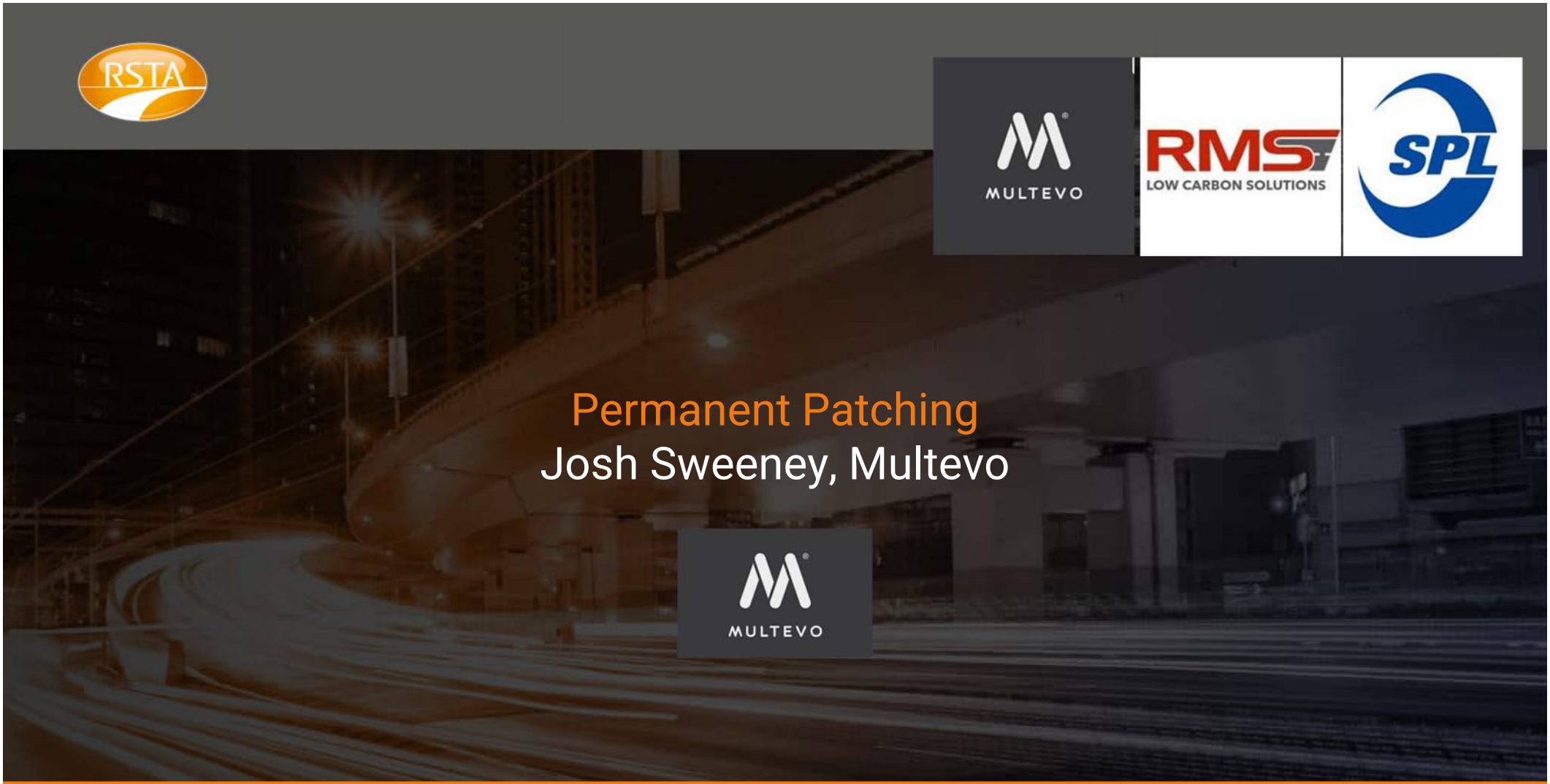











RSTA
MULTEVO
RMS
LOW CARBON SOLUTIONS
SPL
Permanent Patching
Josh Sweeney, Multevo
MULTEVO
www.rsta-uk.org

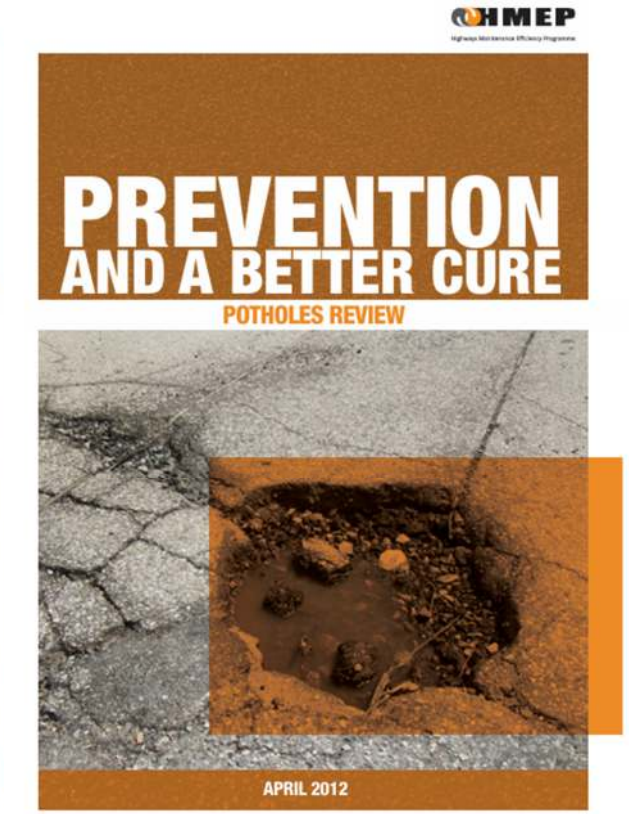
Prevention Better than Cure

Recommendation 6 - Prevention is Better than Cure
LHAs should adopt the principle that 'prevention is better than cure' in determining the balance between structural, preventative and reactive maintenance activities

Recommendation 7 - Informed Choices
LHAs should ensure that appropriate competencies are available to make the right choices

Recommendation 10 Permanent Repairs Policy

THEME: RIGHT FIRST TIME
Recommendation 14 Quality of Repairs and Reinstatements



Temporary Vs Permanent Repairs



15 individual repairs/visits (Reactive repair - ALARM survey - £81.62 to 106.52 per repair) so cumulatively would have cost **£1,224 - £1,597** with further costs likely to be required on this site
(**108 kgCO2e/m^2**)



A planned patched repair for that entire area (approx 5m x 1.5) would be (based on £54.25 -57.87 per m^2 – Planned repair ALARM survey) costing **£406 - £434. (20-25 kgCO2e/m^2 - based on Thermal, Spray Injection, PMMA patching)**



Shropshire Council

April 2021-Present

Patching best practice

RSTA

Patching progress

2021

- 90% temporary repairs
- Over 8,500 potholes
- More than 19,000 defects
- Increasing repeat visits
- Soaring repair costs

2022

- Fix first time approach with 9,000m² permanent repairs completed per month
- Less than 2,000 potholes
- Eradicated repeat visits
- Reduced repair costs
- 0.2% remedials

2025

- Council analysts predict without this method intervention defects would have surged to 96,000

Shropshire Successes

Implementing a fix-first-time permanent patching programme delivered significant improvements to highways in Shropshire

- 75% Reduction in cost of repairs
- Saved £1.4M per annum
- From 90% temporary to over 90% fix-first-time
- Potholes down from 8,567 to 2,122
- NHT Public satisfaction increased by 25%
- DfT Special Recognition Award Winners!







Patching – Conventional

Benefits:

- Very productive (avg 150m^2 per shift hand lay)
- Less impacted by weather conditions (more uptime)
- Addresses structural issues to prevent repeat failures
- Tried and tested permanent solution with warranty guarantees
- Road planings are recyclable and low carbon materials are now available
- Can repair any shape and size of defect without limitations
- Electric and low carbon plant and equipment reduces carbon

Spray Injection Patching

Spray injection patching is a product for undertaking permanent and temporary repairs to potholes and small scale pavement repairs on local and strategic roads and as a pore patching method for surface dressing and microsurfacing.

Benefits:

Cost effective alternative to conventional patching (up to 69% cashable saving)

Quick solution to meet repair times

Defects sealed to prevent water ingress and further damage

Carbon savings as all materials mixed at site with no was

Mobile works







RSTA-UK.ORG

© The Road Surface Treatments Association

Spray Injection Patching

High volume low pressure air to clean the road surface defect

before sealing with bond coat



Aggregate is then propelled, using high volume air at low pressure, before mixing it with the bitumen emulsion moments befo it is compacted as it is placed in the patch



© The Road Surface Treatments Association

Thermal Patching

Thermal patching is the p*rocess of heating the surface using specialist infrared heaters*

Reaches 70-100^{O}C deg so it can be agitated / worked (raked)

Heats to a depth of approx. 50mm

Addition of binder, asphalt as required

Compacted to produce a seamless joint repa



Thermal Patching – The Process







Polymer Modified Mastic Asphalt- Screed Patching

What is it:

How flowing rubberised mastic asphalt liquid, containing aggregates (some products include recycled materials)

Applied directly onto defective road surface as a patch - non-intrusive

Any deeper potholes filled with asphalt first

Patch may be taped off prior to application

Applied using a shoe or poured onto the surface, which is then spread across the required area manually using mastic floats





© The Road Surface Treatments Association

Polymer Modified Mastic Asphalt Patching – Grouted inlay

Used around ironwork

And inlay patches

Dense grouted material

Pre coated aggregates then applied







© The Road Surface Treatments Association

Cold, In Situ Recycling

NEW Insitu recycling patch repair system

Recycles existing carriageway surface course insitu to create a long-lasting low carbon repair







Core Sample - 30 days after restoration



Recycled asphalt layer

Pre-existing binde layer

2-3 years after initial Insitu repair



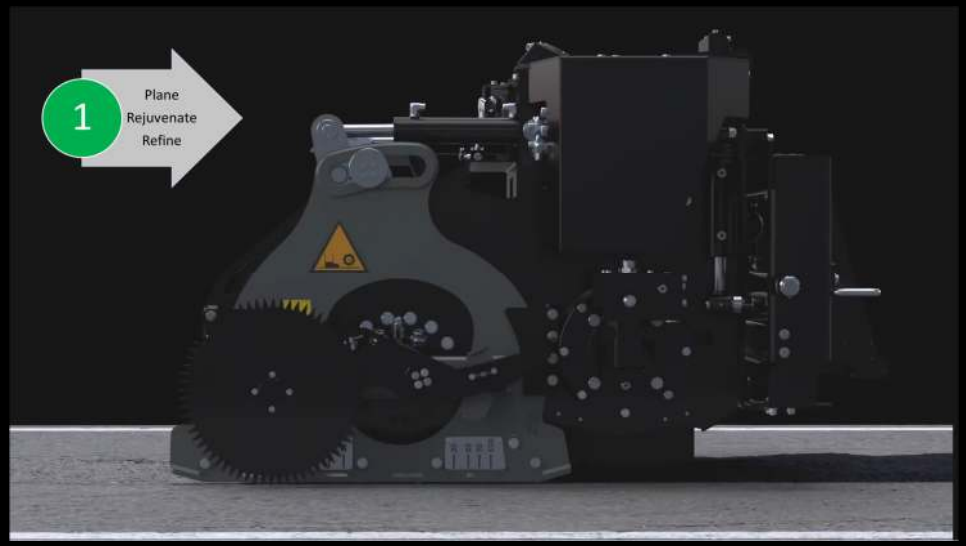
MULTEVO®

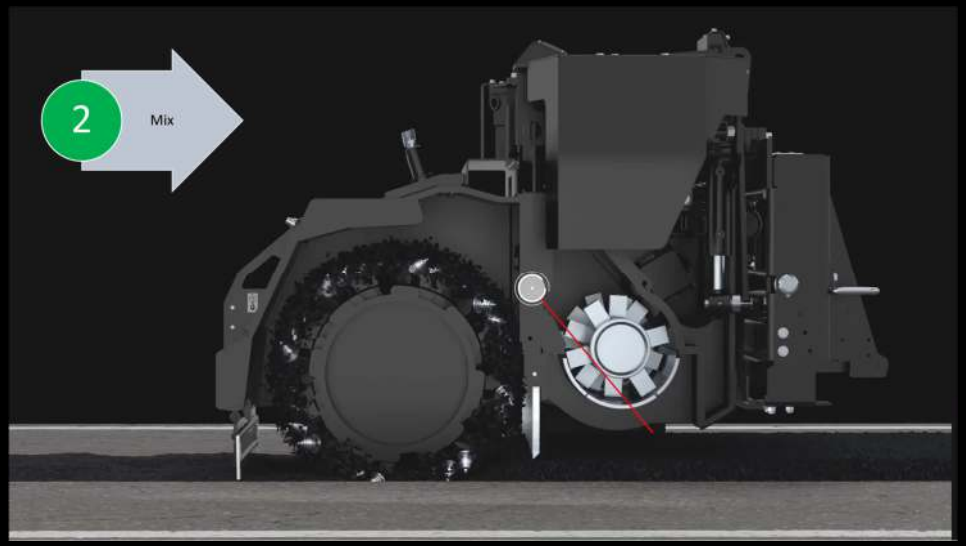
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MULTEVO®

A UK FIRST: In-situ recycled patch repairs





Near net zero

- ✓ 100% cold recycling
- ✓ No virgin asphalt
- ✓ Zero waste
- ✓ Less transport
- ✓ Only 0.05 kqC02e/m²

More productive

- ✓ Less disruption
- ✓ No permits needed
- ✓ Faster repair
- ✓ No excavation
- ✓ Open to traffic instantly
- ✓ 150m² average output

Safer

- ✓ Less plant & vehicles
- ✓ Less people at risk
- ✓ No manual handling
- ✓ No hot materials
- ✓ Uses less road space

More Efficient

- ✓ One machine solution
- ✓ Lower cost
- ✓ Ideal for PSDP & planned patching
- ✓ Ideal for reactive pothole repair

The Results

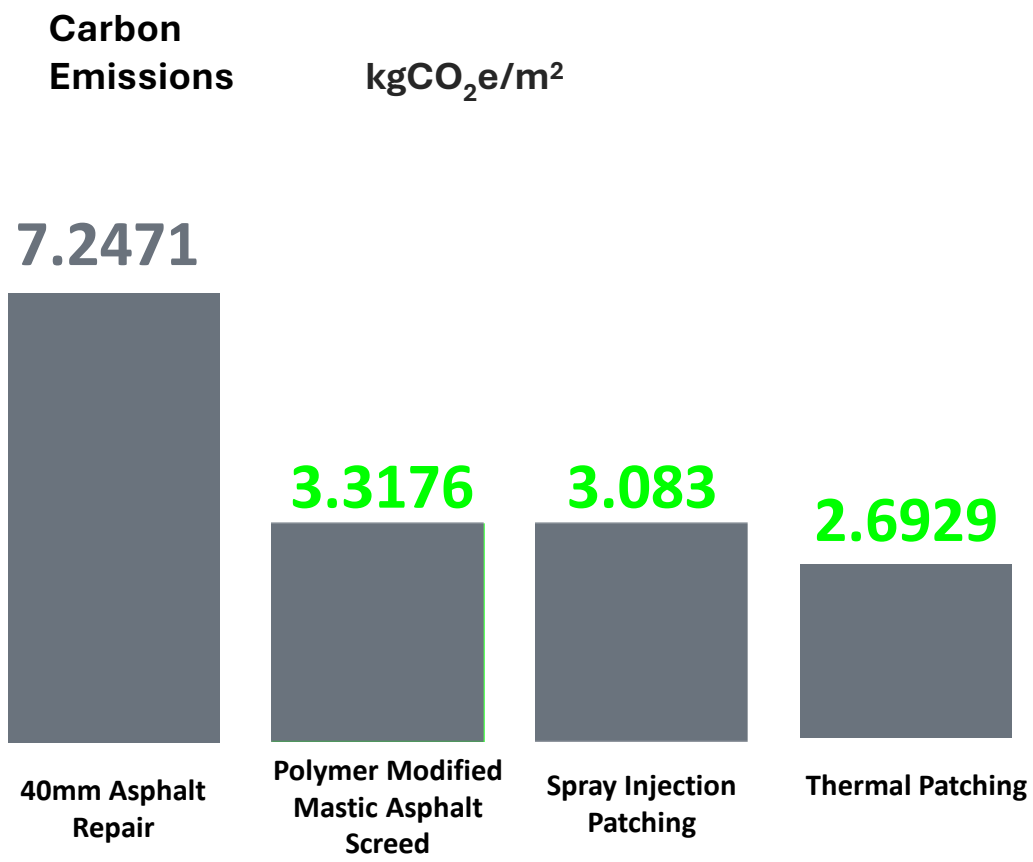






MULTEVO®

Carbon Comparison



Diolch am wrando Thank you for listening

Patching Committee

























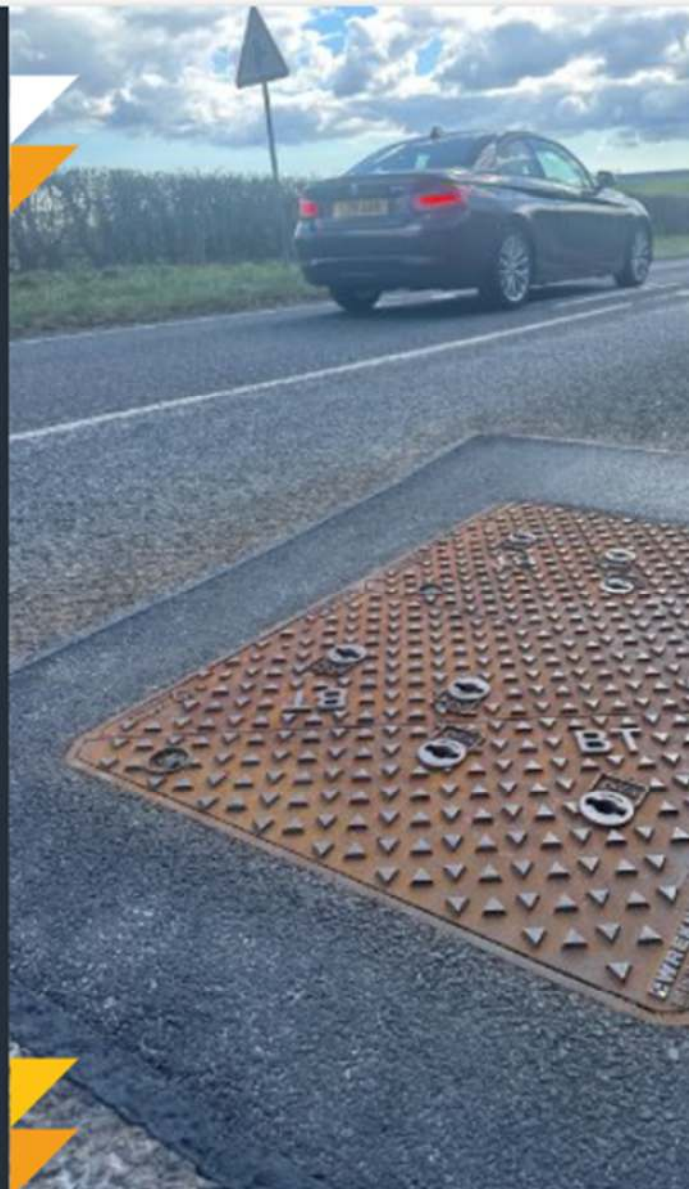
© The Road Surface Treatments Association



Decarbonising Ironwork
Increasing resilience. Reducing carbon

Paul Thomson, Wrekin

Ductile iron access covers & gully gratings are an integral part of UK infrastructure networks









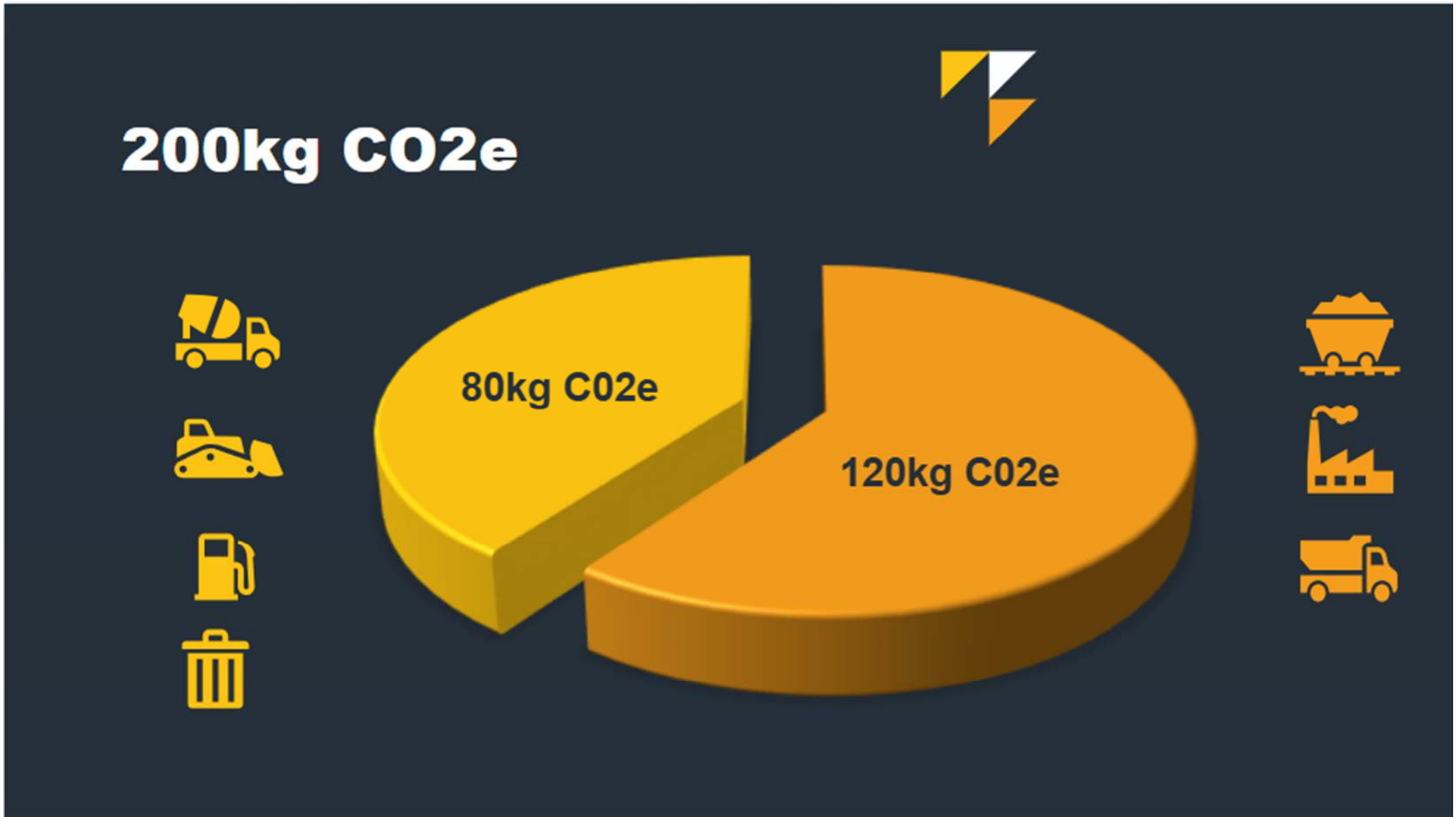











200kg CO2e
80kg C02e
120kg C02e

It's a simple equation!



What causes failure?

52%
of covers in the carriageway suffer from seating wear

44%
suffer from failure of the paved surround

30%
exhibit symptoms that indicate either failure of the bedding material or failure of the structure

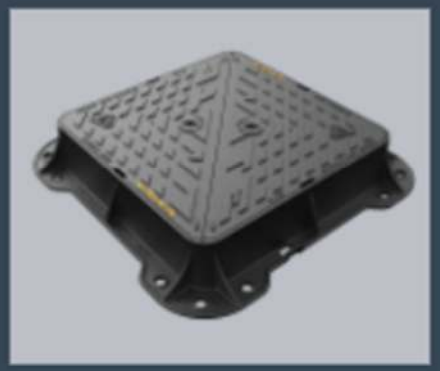
wrc





How can failures be avoided?

You need a combination of factors for a longstanding installation; it's a harmony of:



Correctly designed & specified ironwork



High performance materials



Work practices



Chamber condition and stable foundation

... AN IRONWORK SYSTEM!



GROUP 1
CLASS A15 - MINIMUM
Access covers capable of withstanding a 1.5 tonne test load. For use in areas which can only be used by pedestrians and cyclists.

GROUP 2
CLASS B125 - MINIMUM
Access covers capable of withstanding a 12.5 tonne test load. For use in footways, pedestrian areas and comparable areas such as car parks.

GROUP 3
CLASS C250 - MINIMUM
Access covers capable of withstanding a 25 tonne test load. For installation no more than 500mm from the kerb face into the carriageway.

GROUP 4
CLASS D400 - MINIMUM
Access covers capable of withstanding a 40 tonne test load. For use in areas where pneumatic-tyred cars and lorries have access.

GROUP 5
CLASS E600 - MINIMUM
Access covers capable of withstanding a 60-tonne test load. For use in areas with heavy wheel or high point loads from pneumatic and non-pneumatictyred vehicles.

GROUP 6
CLASS F900 - MINIMUM
Access covers capable of withstanding a 90-tonne test load. For use in areas with very heavy wheel or high point loads from pneumatic and non-pneumatic-tyred vehicles

NATIONAL HIGHWAYS CD 534 v0.1.0

- CD 534 is part of Standards for Highways Design Manual for Roads and Bridges
- It provides guidance of correct product specification based on location
- It ensures product designs provide an adequate area to distribute the load, without over-stressing the bedding material.






Design Manual for Roads and Bridges

national highways | Infrastructure | TRANSPORT SCOTLAND | Llywodraeth Cymru Welsh Government

Drainage
Design

CD 534

Chamber tops and gully tops for road drainage and services

(formerly HA 104/09, IAN 196/17, IAN 197/17)

Version 0.1.0

Summary

This document contains the requirements for road chamber top and gully top installations on motorway and all-purpose trunk roads.

Application by Overseeing Organisations

Any specific requirements for Overseeing Organisations alternative or supplementary to those given in this document are given in National Application Annexes to this document.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated National Highways team. The email address for all enquiries and feedback is Standards_Enquiries@highwaysengland.co.uk

This is a controlled document.

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Department for Transport

Specification for the Reinstatement of Openings in Highways

Fourth edition



May 2020

RSTA ADEPT Code of Practice for Ironwork Systems Installation and Refurbishment

RSTA ADEPT highways england

CODE OF PRACTICE

FOR IRONWORK SYSTEMS INSTALLATION AND REFURBISHMENT



May 2017

BS 7903:2020



BSI Standards Publication

Selection and installation of manhole tops and gully tops within the highway — Guide

bsi.

Materials

Paragraph 24 of Section 507 within MCHW Specification for Highway Works Series 500

- Chamber tops and gully tops shall be bedded upon material which has the following properties:
  - non-shrinkable;
  - a minimum workable life of **15 minutes**;
  - a compressive strength that **exceeds 30N/mm² within 3 hours of placing**; and,
  - a tensile strength that **exceeds 5N/mm2 within three hours of placing.**



Chamber condition

Clean & dry but textured chamber top surface

Chamber top height to allow sufficient bedding depth

Chamber top to be incompressible and robust, free from loose or compromised brickwork etc.

Chamber opening is compatible with ironwork size

Sufficient bedding area (50mm past the edge of flange)





Time! Opening the road too soon



Inadequate chamber top preparation and support



Damaging tamping/ compaction techniques

“Incorrect work practices and the use of inappropriate bedding materials accelerate the rate of failure of cover installations.”



Insufficient and inappropriate reinstatement materials



Incorrect ironwork alignment to chamber opening

wrc


120kg CO_2e
80kg CO_2e
Carbon Emissions ∝ Resilience × Durability / Failure Rate

DIOLCH AM WRANDO
THANK YOU FOR LISTENING
Ironwork Committee Members



















End of Life Roads – Recycling
Recourse Recovery

Justin Osborne, Stabilised Pavements Limited (SPL)

How long do you continue to fix potholed roads at end of life?





End of Life Roads

- A permanent repair solution is required - as opposed to ongoing unpredictable and expensive reactive maintenance

- Larger upfront cost, but will save money in the longer term



Asset Recovery

Option of repurposing materials you have already bought and paid for, to form the construction of the new road

Suitable for roads with limited, or failing construction

Roads with extensive structural failures / end of life

Evolved local roads, right up to strategic roads



In Situ Recycling

The existing pavement is milled and pulverised with specialist equipment,

Material (can include asphalt or granular material) is then mixed in situ with binding agents such as a bituminous emulsion, foam, or cement,

To create a recycled, mixed, bound layer

This bound layer is then sealed with an appropriate surface which might be a surface dressing for lightly trafficked roads, or conventional asphalt surface course for busier roads.



In Situ Recycling

In situ recycling includes the following depths:

- Shallow (Retread) recycling 75-125mm
- Medium depth recycling nominal 150mm - referred to as Regen
- Deep recycling 150-325mm when the base and subgrade, is recycled

Design will be determined through trial pits, test mixes



The Carbon benefits

- Recycles 100% of your existing road asset
- Cold process – Tar Encapsulation
- New binder addition can be as low as 2%
- Reduction in lorries: 1km of road
  - In-Situ 🚚🚚🚚 17 Lorry Movements
  - Ex-Situ 🚚🚚🚚🚚🚚🚚🚚🚚🚚🚚🚚🚚🚚🚚 336 Lorry Movements
- Faster build times
- Less disruption/wear & tear on network

Fuel saved = Carbon Saved



Faster construction…Wurtgen 380 Cri



- Higher Outputs: 3.2m mixing drum in single pass
- Precise level control through Paver
- ‘Down-Cut’ process optimises material grading
- Computer control mixing and binder additions

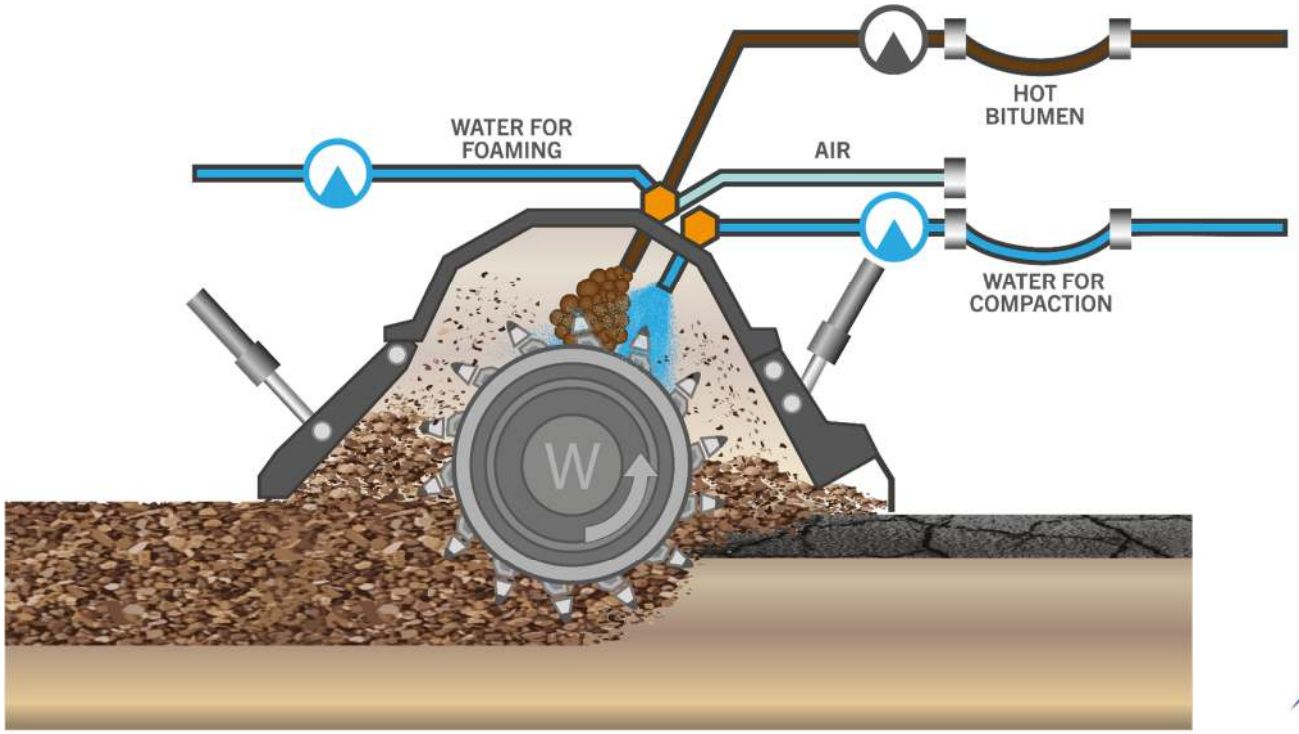
Case Study…Wissington



B1160 College Road, Norfolk

Deep recycling with geogrid installed below material

In-Situ Foam Mix



Twenty-year design life with in-situ Foam



Design: 300mm Deep Foam Bitumen with Double Surface Dressing

OXFORDSHIRE COUNTY COUNCIL

- 2km of road
- Saved 227 tonnes CO2 (71% reduction)
- Saved 564 lorry movements
- 8 days faster than deep asphalt patching

Cement Substitute Trial Sites

Norfolk County Council

Cambridgeshire County Council



Hoffmann Green's H-EVA Sol
CALCINED CLAY technology
Reduces CO2 by 56%* v CEM2

- ✓ Standard in-situ equipment
- ✓ Equivalent 2% binder addition
- ✓ Equivalent water consumption
- ✓ No reduction in outputs

*CEM2 604kg v H-EVA 272kg CO2eq/t

Ex Situ Recycling



Ex-Situ Recycling - What is it?

- Asset Recovery as per In Situ but Recycled off-site
- Classified as CRBM - Cold Recycle Bound Material
- Fully complaint with SHW900 series Cl948, TSIA 52 and BS9228
- **Asphalt Waste Containing Coal Tar (AWCCT)**

- Re-engineering uses both cementitious and or bituminous binders



Ex Situ Recycling –Considerations

- Need for **temporary stockpiling or site for processing**, which requires space, planning and management.
- **Transport costs/Haulage** for moving material to/from the processing plant. If distances are long, may reduce some of the benefits.
- **Setting times / binder behaviour**: Some binders used require certain conditions; delays can affect material quality.
- **Risk of exposing** lower layers of the road to weather during excavation
- **Proving long-term performance**, especially for newer methods or when using recycled material with “non-standard” properties (e.g. reclaimed asphalt containing tar binders).



Ex Situ Recycling – Benefits

- **Quality control** may be preferable (since material is processed under controlled conditions)
- **Materials reuse** reduces the need for new (virgin) materials and reduces disposal of old pavement materials.
- **Potential cost savings** in material supply and transport, especially if the plant is relatively near the site.
- **Environmental benefits**: Less quarrying for new aggregate; fewer lorry-movements for bringing in new material; lower embodied carbon compared to full import of new materials.



Recycling – Client Design Briefs

Could we be doing more to consider recycling as a first option?

Example: Client briefs prompting design engineers to consider :

- Recycling as a first option
- Comparing design options by cost (recycling vs conventional methods)
- Comparing carbon

Greener Roads, Leaner Costs

Importance of (early) Term Maintenance Contractor Engagement and their supply chain specialists



Diolch am wrando Thank you for listening

Geosynthetics & Steel Meshes Committee Members



















Diolch am wrando Thank you for listening

Recycling of Road and Footways Committee Members




















RSTA
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Geosynthetics & Steel Meshes
Tony Roe, Bekaert
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better together
www.rsta-uk.org

Geosynthetics and steel meshes

- What are they?
- What do they do?
- Where/when to use!
- What benefits do they provide?
  - Financial
  - Carbon Footprint reduction
  - Whole life circular economy
- Guidance on their use and installation
- New innovation for reinforced paving fabrics/grids in surface dressing application

Geosynthetics and steel meshes: What are they?

Essentially a variety of products typical incorporated between asphalt layers

- Steel Meshes
- Polymeric grids
- Glass fibre grids
- Composite materials (typical combination of polymeric/glass grids on non-woven geotextile
- Non-woven geotextiles



Geosynthetics and steel meshes: What they do

- Incorporated between asphalt layers typical to retard /mitigate reflective cracking
  - from cracks in existing base
  - on carriageway widening schemes
  - at seams between paver passes
  - above the location service trench excavation
  - above expansion joints in concrete pavements









Geosynthetics and steel meshes: What they do

- **What do they do?**
- Propagation of reflective cracking
- Dynamic effects
- Temporal effects





Shear action +



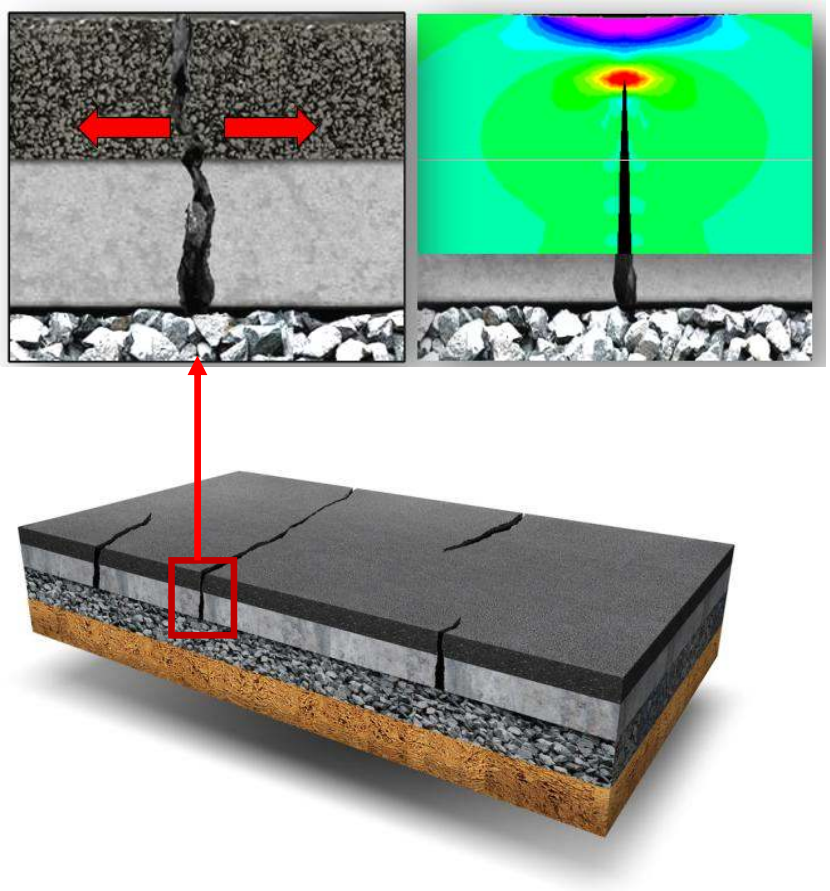
Bending action



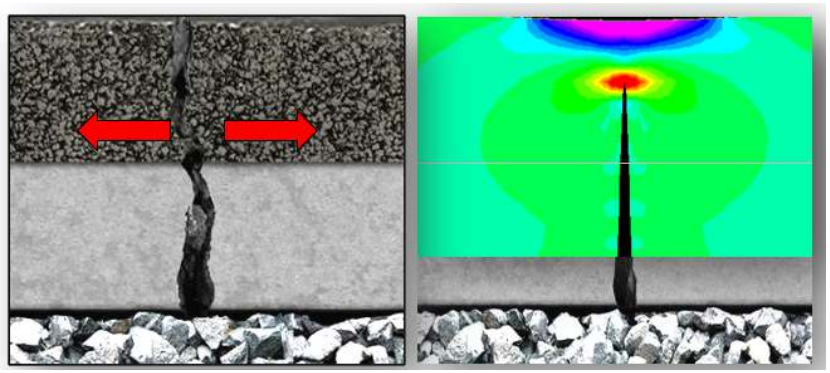
Shear action -

Geosynthetics and steel meshes: What they do

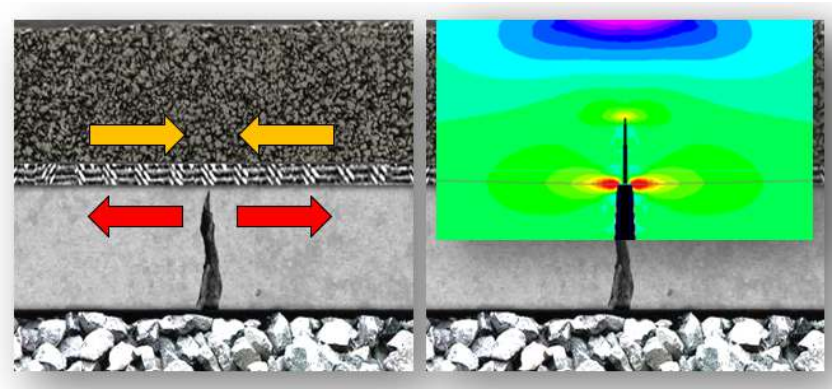
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- Propagation of reflective cracking
- Dynamic effects
- Temporal effects
- Crack growth due to high tension at crack tip



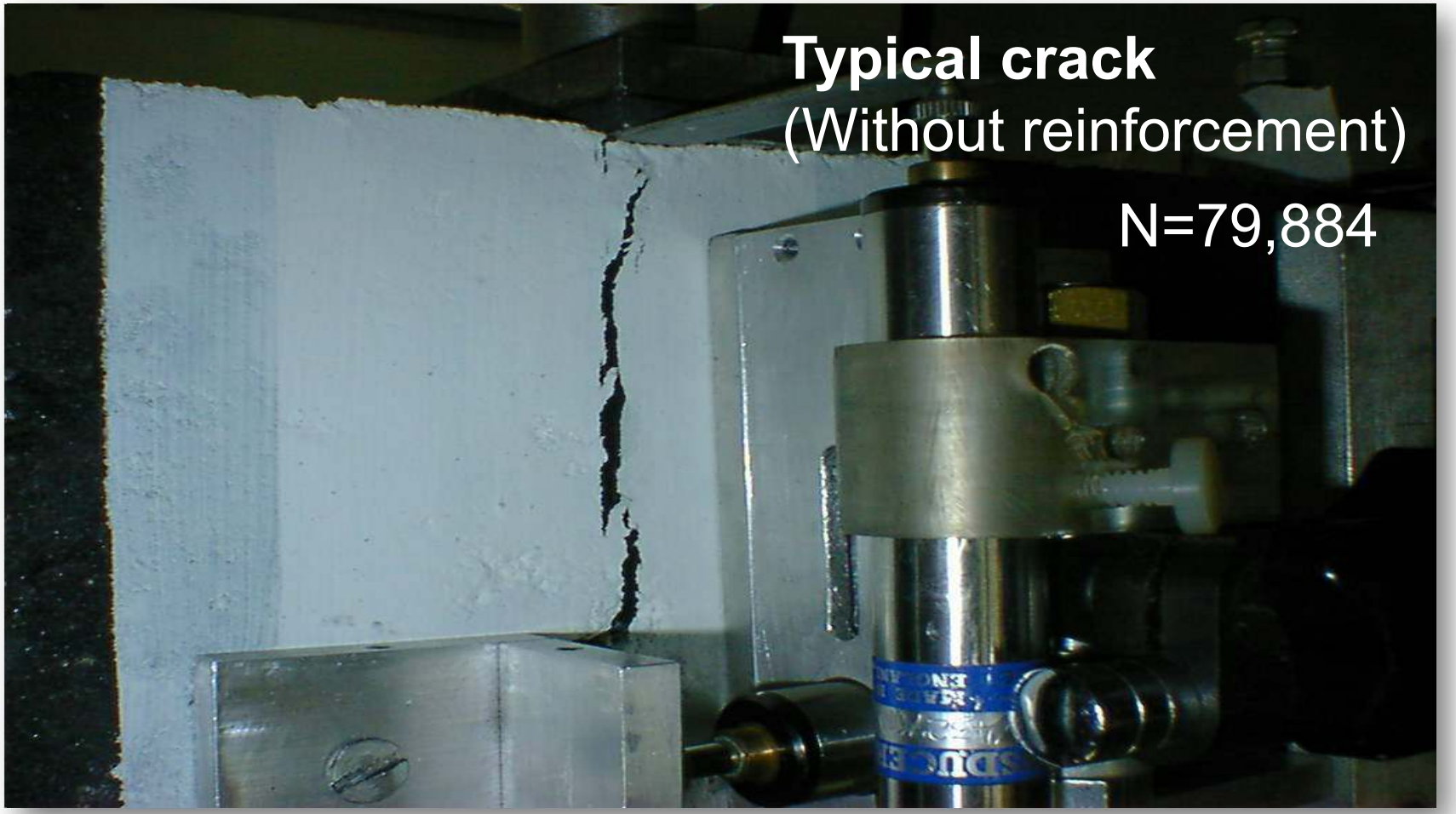
Geosynthetics and steel meshes: What they do



- **What do they do?**
- Propagation of reflective cracking
- Dynamic effects
- Temporal effects
- Crack growth due to high tension at crack tip
- Depending on loading/size of crack etc. could reappear 1.5 to 4 years in new 40/50mm overlay
- Significantly reduced growth of reflective cracks, as the reinforcement grid absorbs and distributes the strain
- Typical improvement factor of approx. 4



Without Reinforcement

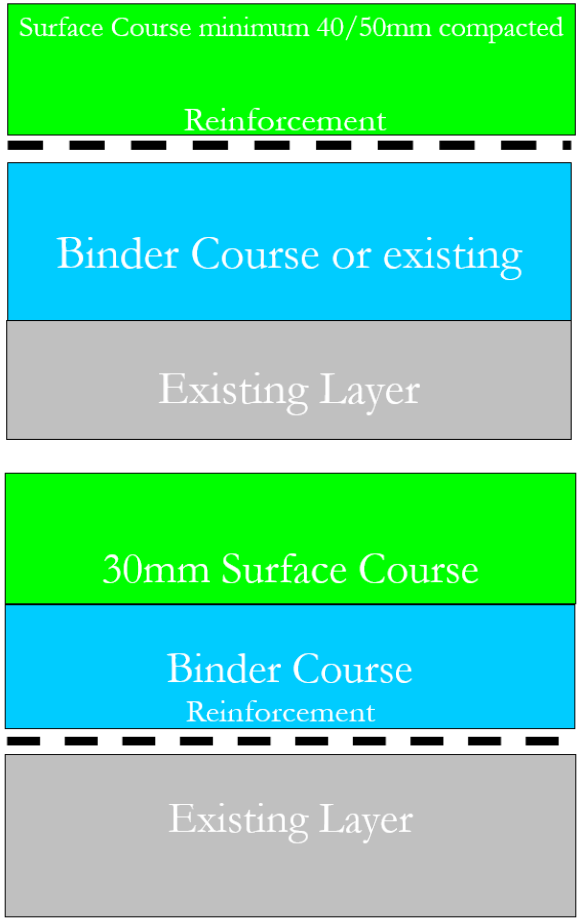


With HaTelit Reinforcment



Geosynthetics and steel meshes: When/ where to use

- When/where to incorporate!
- Below surface course (for polymeric and Glass fibre grids: minimum cover 40/50mm compacted
- Below binder course



Case study : Countess of Chester

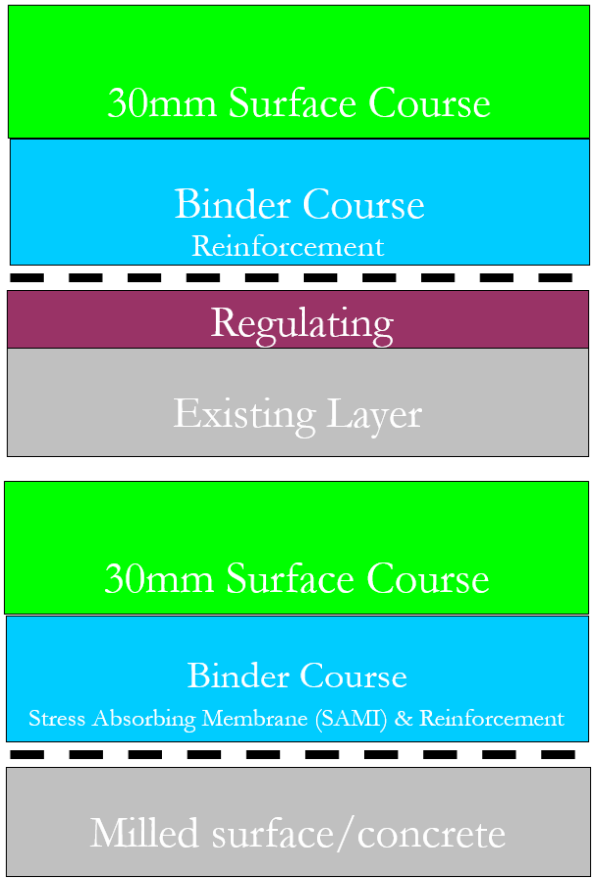







Geosynthetics and steel meshes: When/where to use

- When/where to incorporate!
- Below surface course (for polymeric and Glass fibre grids: minimum cover 40/50mm compacted
- Below binder course
- Base of road /milled surface on regulating course
- Directly onto a milled surface or concrete pavement incorporate Stress absorbing membrane (SAMI)



Reference: Knock Airport, Ireland

Case study : Knock Airport Apron

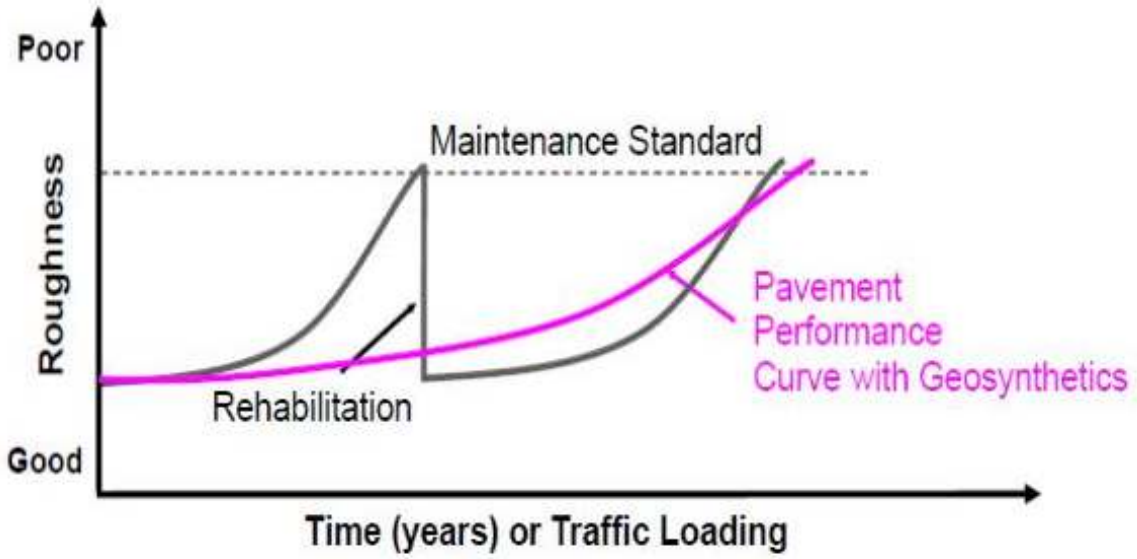






Geosynthetics and steel meshes: What benefits do they provide

- **What benefits do they provide?**
- Up to 4 times better retardation of reflective cracks
  - Even with improvement factor as low as 2-3
- Extension of rehabilitation intervals
- Extension of service life
- Reduction of maintenance costs
- Reduction in indirect costs and disruption



Geosynthetics and steel meshes: What benefits do they provide?

- **What benefits do they provide?**
- Reduced Carbon Footprint
- Guidance determines the Embodied energy of different processes (from A1-A5): Cradle to Practical Completion

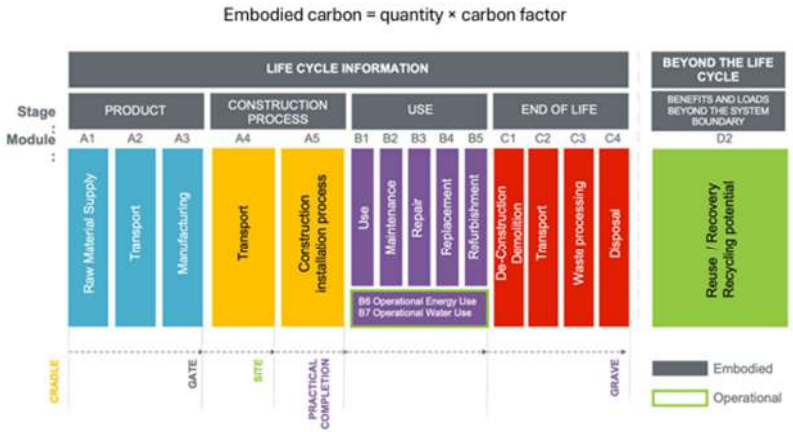
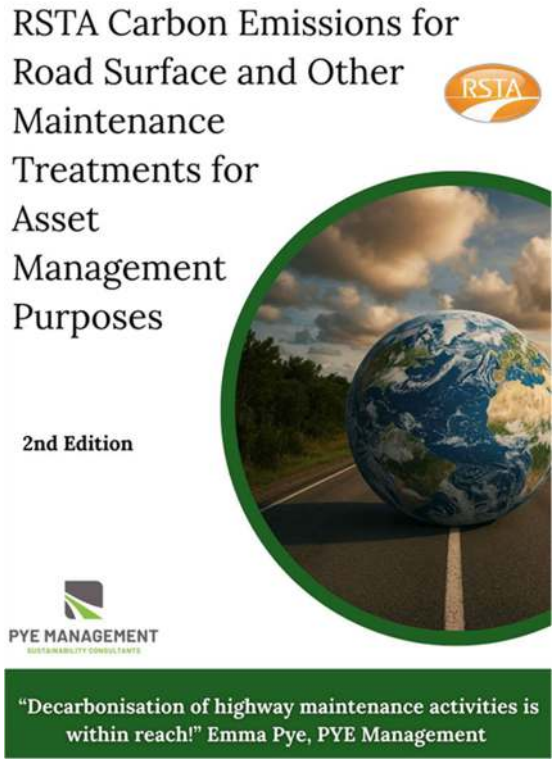
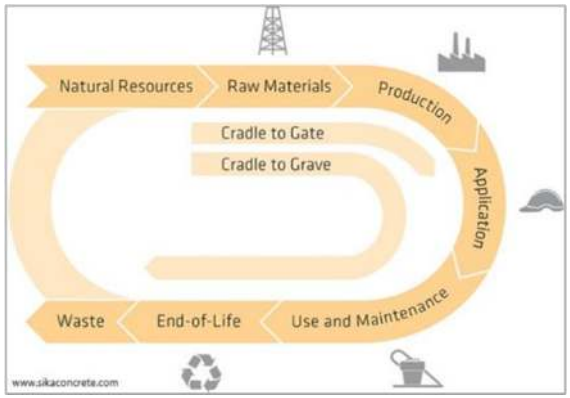


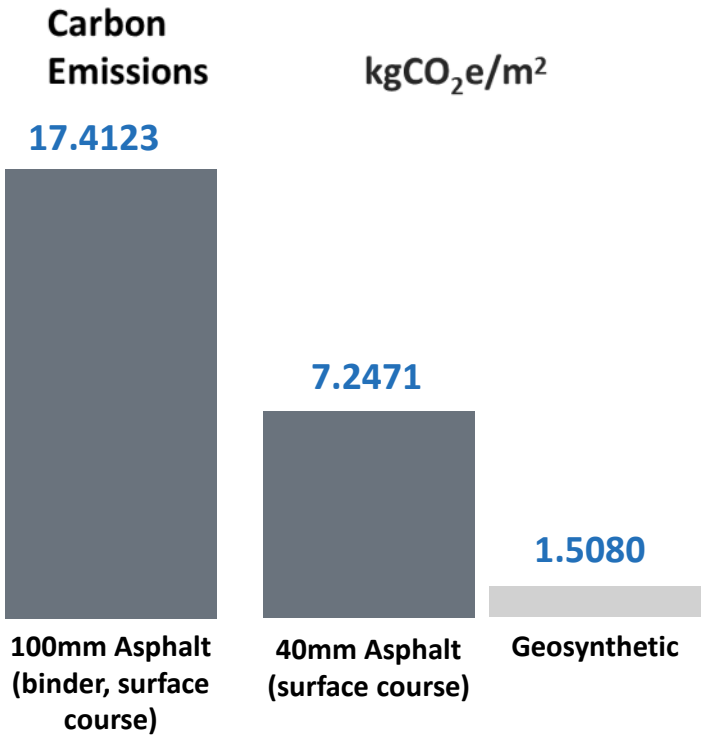
Figure 1: Lifecycle stages and modules



Geosynthetics and steel meshes: What benefits do they provide

- **What benefits do they provide?**
- Reduced Carbon Footprint – RSTA Carbon Guidance Edition2
- Guidance determines the Embodied energy of different processes (from A to B) Cradle to Replacement
- Some member companies also have Independent Environmental Product Declaration (EPD's) cradle to end of life)
- Considering complete life cycle and circular economy some manufacturers started to use recycled fibres for production of grids
- Polyester from recycled bottles can produce virgin quality yarn.
- Supporting aims of being a circular economy





Geosynthetics and steel meshes: Guidance on use & installation

936 (07/19) **Geosynthetics and Steel Meshes: Installation and End Product Performance**

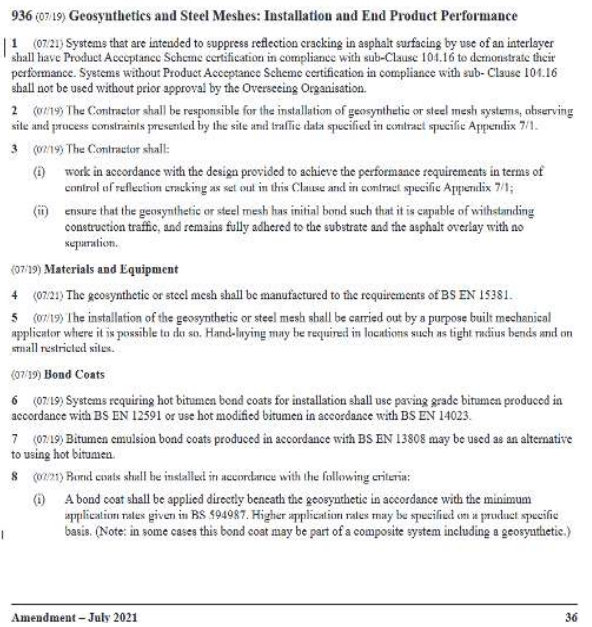
1 (07/21) Systems that are intended to suppress reflection cracking in asphalt surfacing by use of an interlayer shall have Product Acceptance Scheme certification in compliance with sub-Clause 104.16 to demonstrate their performance. Systems without Product Acceptance Scheme certification in compliance with sub- Clause 104.16 shall not be used without prior approval by the Overseeing Organisation.

PTS PAVEMENT TESTING SERVICES A PHENNA GROUP COMPANY

PTS PAVEMENT TESTING SERVICES PRODUCT ASSESSMENT CERTIFICATION

PTS Product Assessment Certificate

Product Acceptance Scheme in accordance with Manual for Contract Documents for Highway Works, Specification for Highway Works (MCHW SHW) Volume 1 Sub-Clause 104.15 and 104.16



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2 (07/19) The Contractor shall be responsible for the installation of geosynthetic or steel mesh systems, observing site and process constraints presented by the site and traffic data specified in contract specific Appendix 7/1.

3 (07/19) The Contractor shall:

(i) work in accordance with the design provided to achieve the performance requirements in terms of control of reflection cracking as set out in this Clause and in contract specific Appendix 7/1;

(ii) ensure that the geosynthetic or steel mesh has initial bond such that it is capable of withstanding construction traffic, and remains fully adhered to the substrate and the asphalt overlay with no separation.

(07/19) **Materials and Equipment**

4 (07/21) The geosynthetic or steel mesh shall be manufactured to the requirements of BS EN 15381.

5 (07/19) The installation of the geosynthetic or steel mesh shall be carried out by a purpose built mechanical applicator where it is possible to do so. Hand-laying may be required in locations such as tight radius bends and on small restricted sites.

(07/19) **Bond Coats**

6 (07/19) Systems requiring hot bitumen bond coats for installation shall use paving grade bitumen produced in accordance with BS EN 12591 or use hot modified bitumen in accordance with BS EN 14023.

7 (07/19) Bitumen emulsion bond coats produced in accordance with BS EN 13808 may be used as an alternative to using hot bitumen.

8 (07/21) Bond coats shall be installed in accordance with the following criteria:

(i) A bond coat shall be applied directly beneath the geosynthetic in accordance with the minimum application rates given in BS 594987. Higher application rates may be specified on a product specific basis. (Note: in some cases this bond coat may be part of a composite system including a geosynthetic.)

Amendment – July 2021 **36**

New SHW CC205/22 Geosynthetics and Steel Meshes

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Geosynthetics and Steel Meshes: Guidance on use & installation

RSTA ADEPT Code of Practice for Geosynthetics and Steel Meshes
for Asphalt Reinforcement (Interlayers) 2022

**CODE OF PRACTICE FOR
GEOSYNTHETICS AND STEEL MESH
FOR ASPHALT REINFORCEMENT (INTERLAYERS)**



Issue 3 October 2022 1

National Highways Sector Schemes
for Quality Management in Highway
Works

13
For the supply and application of surface treatments
to road surfaces

**Published by the Sector Scheme Advisory Committee for
Surface Treatments (SSACST)**

April 2011 ■ Issue 1 Page 1 of 50 NHSS 13

UKAS, 21-47 High Street, Feltham, Middlesex, TW13 4UN
Tel: 020 8917 8400 ■ Fax: 020 8917 8500 ■ Website www.ukas.com

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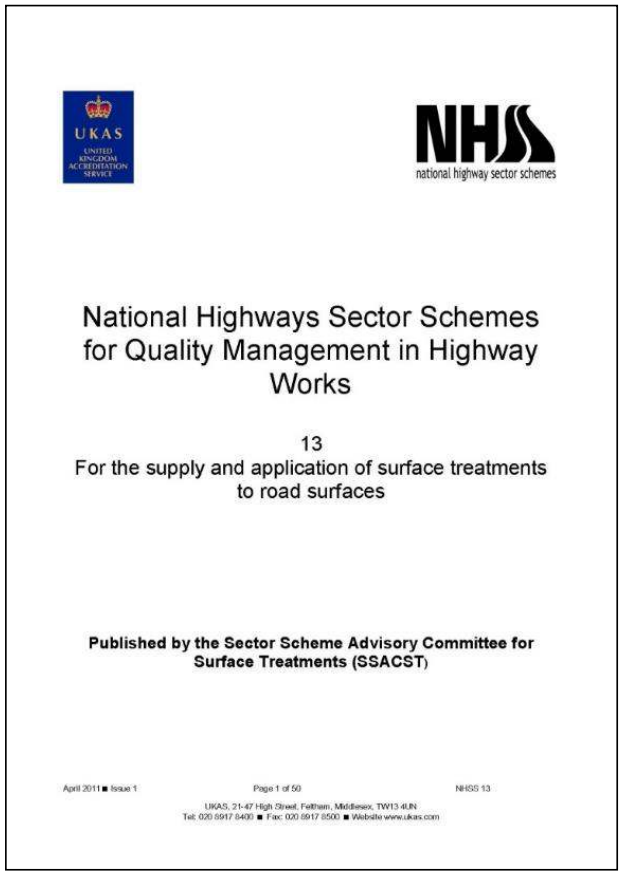
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Amendment – July 2021 **36**

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Geosynthetics and steel meshes: Guidance on use & installation

- **The quality of the completed installation is dependent upon the skill and care of the operatives**
- NHSS13 defines minimum qualifications and competency for all personnel involved in design, supervision, and installation
- The Association feel that a competent qualified workforce is essential to achieving high quality work


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NHSS
national highway sector schemes

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Site preparation

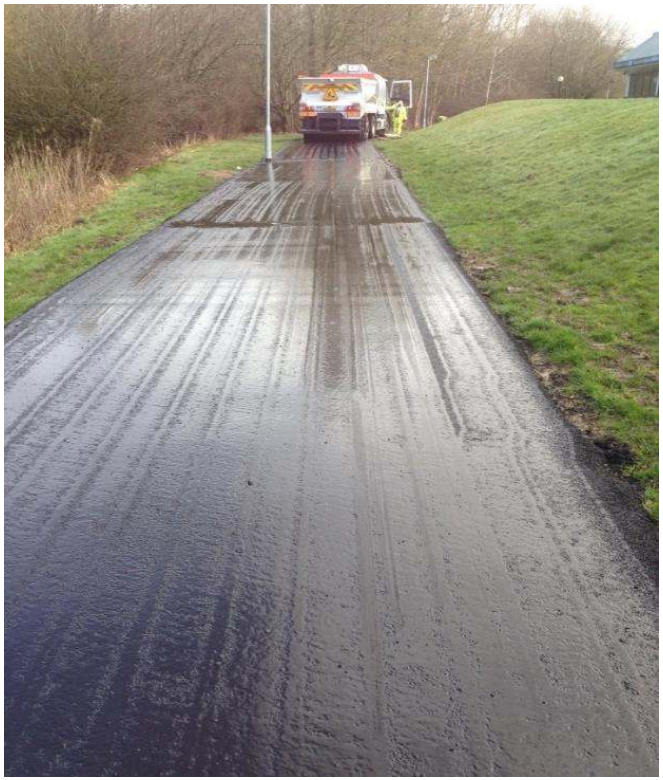






Bond Coat Application







Lay reinforcement/Sami



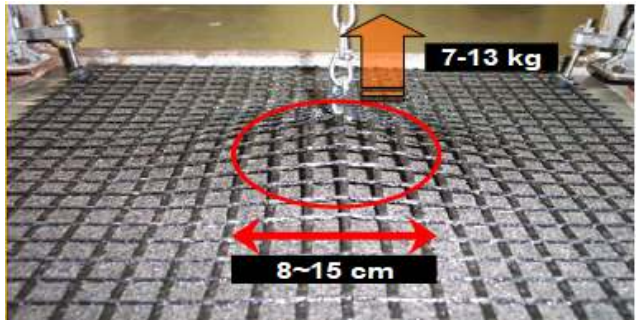








Check Adhesion before trafficking









Install Asphalt layer











Laying Steel Meshes









- Unrolling
  - Blinding method
  - Nailing Method
  - Slurry Method



Diolch am wrando Thank you for listening

Geosynthetics & Steel Meshes Committee Members

















