ROAD SURFACE TREATMENTS ASSOCIATION - UK

Making the Case for Road Surface Dressing

Rory O'Connor CEng FCIHT FIHE FIAT FIQ
Chief Technical Officer RSTA

Road Surface Treatments Association. (RSTA)
A brief introduction.

Formed in 2008 – Over 90 Member Companies / Organisations.

Merger of three trade associations - dating back to 1942.

Members treat approx. 100 million m² of roads per annum.

Majority of works are completed on local authority roads.

Primarily represent the industry – material supply chain and contracting organisations.

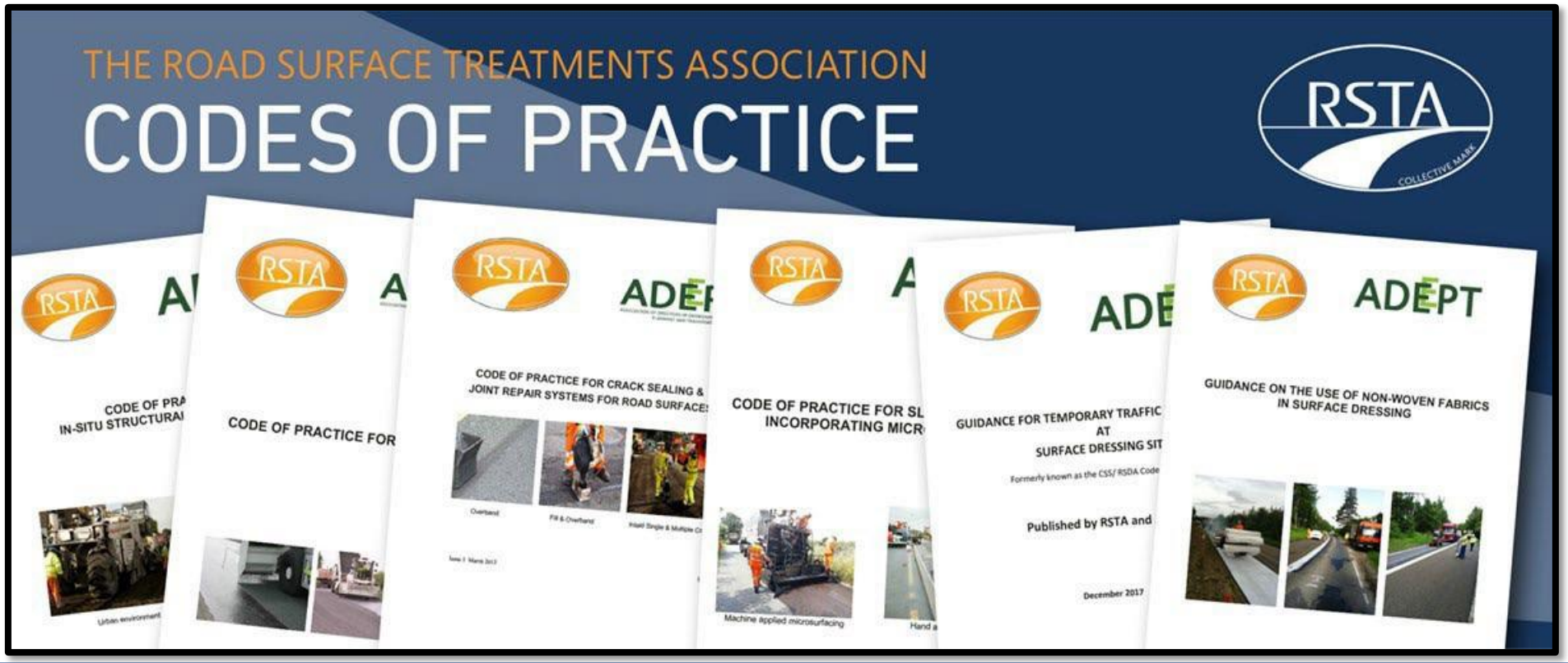
Approx. 1.5 million tonnes aggregates from UK quarries per annum.

Activities include stakeholder engagement, developing guidance, influencing standards & specifications, CPD Courses, training for engineers & managers, NVQ's (Level 1 to 6) for workforce & contracting staff.

RSTA Codes of Practice and Guidance.

Codes of Practice for all types of Road Surface Treatments with Guidance Documents for free download:

www.rsta-uk.org



What is Surface Dressing?

a-uk.org

- The process involves spraying a bitumen emulsion binder onto a prepared road surface then dressing the binder with chippings
- ***Sounds simple, but it is a designed process with lots of parameters that need to be controlled to achieve a successful outcome***

Why do we need Surface Dressing?

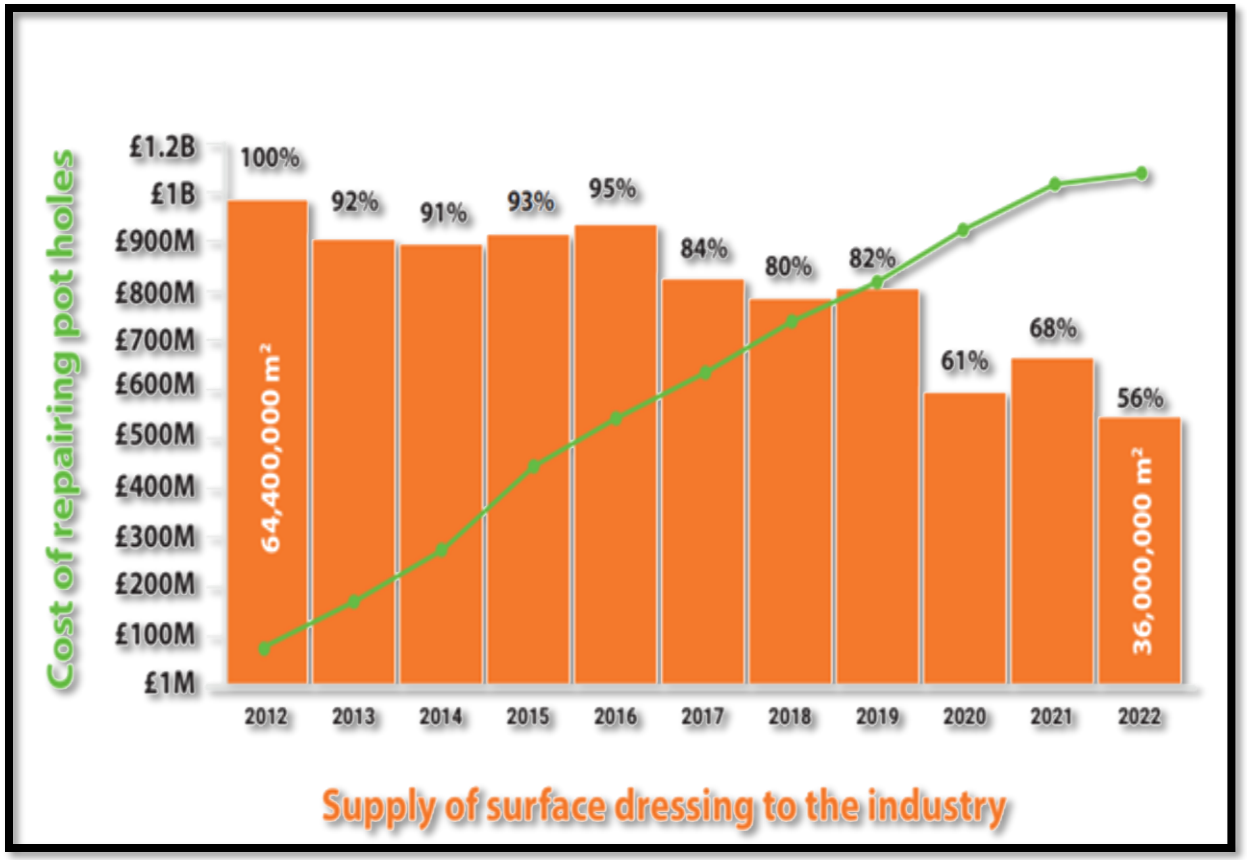
- Surface dressing accounted for 49% of existing surfaces on the principal 'A' local authority road network and 70% of all treatments on the minor road network in England in 2021/22.
- (Local authority roads – Non SRN roads)

THE DECLINE OF SURFACE DRESSING TREATMENTS

According to statistics from the Department for Transport the percentage of roads (A, B & C) receiving Surface Dressing treatment has DECLINED 30% since 2016.

This is mirrored by feedback from REA Members who report a 44% DECLINE in the application of Surface Dressing over the 10-year period from 2012 to 2022.

As the DECLINE in Surface Dressing continues, the AMOUNT and cumulative COST of fixing potholes over the 10-year period HAS RISEN significantly.



Road Emulsion Association Limited

Whole carbon and cost lifecycle planning and implementation.

- We are all trying to extend road asset life with limited funding, while pressing for more funding to get the asset up to a standard from which life extension is possible and viable.

- Our customers - national road authorities and local authorities, are struggling to afford even the lowest cost solutions - at the best time for intervention - let alone 'rescue' the assets that have been 'sweated' for so long with zero intervention.

- In the future, we may be shifting to a position of protecting the cost and carbon investment. as well as the asset itself, as very soon they will be even more intrinsically linked.

A LONG-TERM APPROACH IS WHAT IS NEEDED…

Pothole repairs are extremely EXPENSIVE and DISRUPTIVE to the UK taxpayer.

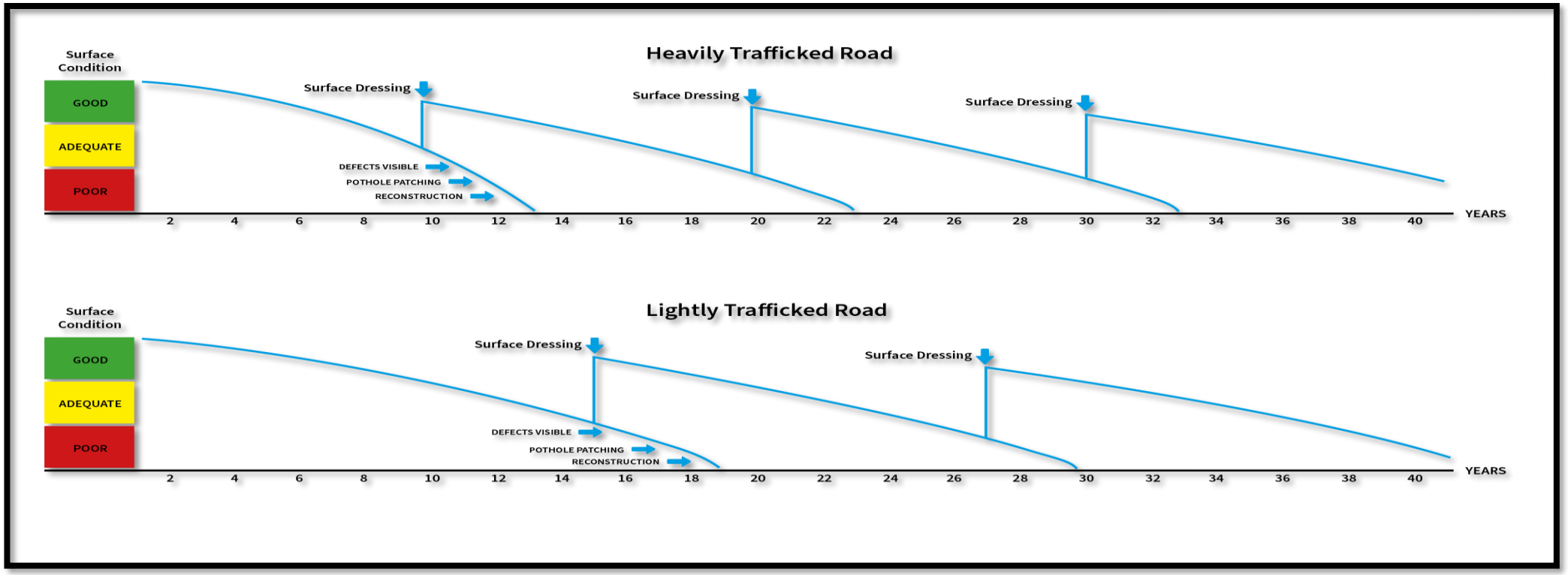
In 2021/22, a pothole was filled every 19 seconds, with a total annual cost of £107m– the highest cost since 2015/16*

Repairing a significant number of potholes is not a sign of success, but a sign of failure.

*** Source: AIA Alarm Survey 2022**

THE CASE FOR ROAD SURFACE DRESSING.

The application of Surface Dressing at the correct intervention periods is the most COST-EFFECTIVE method, FINANCIALLY and ENVIRONMENTALLY to IMPROVE skid resistance and SEAL the road surface. It will stop the INGRESS of water and help to PREVENT pothole formation.



Questions for Local Authorities to answer.

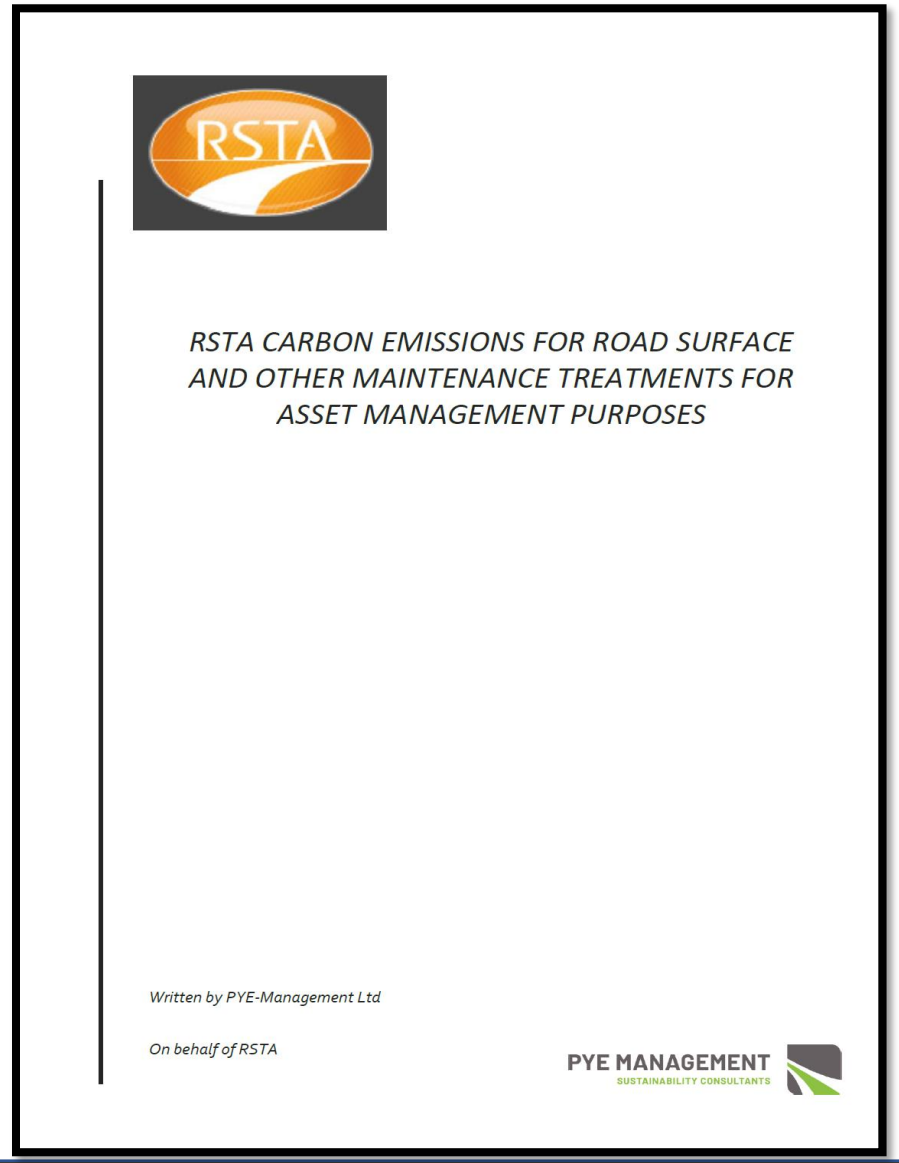
Have we got too much money?

Have we declared a climate emergency?

Would we like to make better use of our allocated finance?

Would we like to reduce carbon emissions in our road maintenance operations?

RSTA Carbon Emissions Report and Guidance.



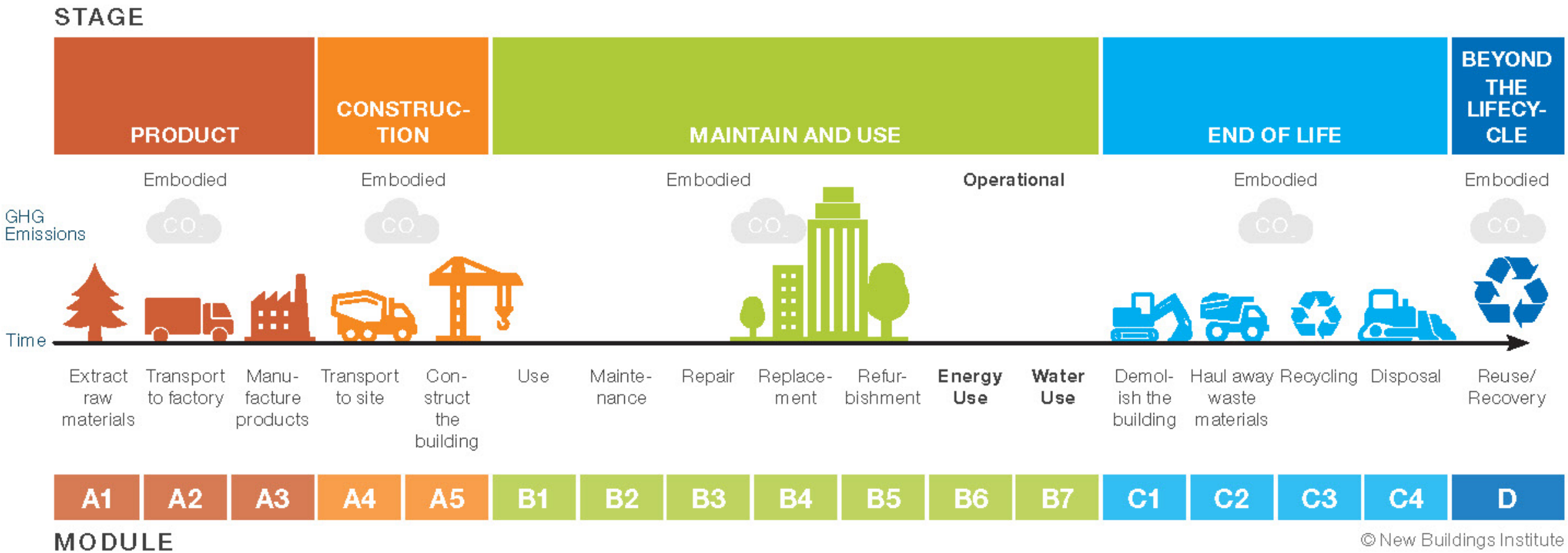
RSTA Carbon Emissions Report and Guidance.

- Pye Management – Environmental Consultants.
- Figures for CO^2e from Cradle to Practical Completion.
- Comprehensive Guidance for Local and National Road Authorities.
- Calculations and Evaluations in accordance with the CEN Standards:

  (prEN 17392-1:2020) (EN 15804 A1-A5) (NH 1-7)
- Covers all Road Surface Treatments, Insitu Recycling and conventional asphalts in one single source.
- Example carbon generation comparisons for sample of schemes.
- Available for free download from the RSTA website:
- **www.rsta-uk.org/rsta-carbon-emissions-report-and-guidance-launched**
- Will be reviewed at least every 3 years.

FIGURE 1: LIFECYCLE STAGES

Data source: BS EN 15978:2011



$KgCO_2e$ / m2 Figures for Road Surface Treatments.

Treatment	Units	A1 – A3	A4	A5	Overall total
Rejuvenation	$kgCO_2e/m^2$	0.023	0.016	0.015	0.054
Preservation	$kgCO_2e/m^2$	0.361	0.013	0.066	0.440
Surface Dressing – Single layer Carriageway	$kgCO_2e/m^2$	0.497	0.195	0.023	0.715
Surface Dressing – Double Layer (Racked In) Carriageway	$kgCO_2e/m^2$	0.729	0.188	0.021	0.938
Surface dressing – Decorative	$kgCO_2e/m^2$	0.729	0.134	0.018	0.881
Surface dressing – Footway	$kgCO_2e/m^2$	0.319	0.057	0.007	0.383
Microsurfacing	$kgCO_2e/m^2$	0.761	0.034	0.012	0.807
Geosynthetics	$kgCO_2e/m^2$	0.890	0.021	0.104	1.015
Crack and Joint repairs	$kgCO_2e/m^2$	7.035	n/a	n/a	n/a
Spray Injection Patching	$kgCO_2e/m^2$	1.123	0.845	1.455	3.423
Retexturing - Waterblasting	$kgCO_2e/m^2$	0.00059	0.185	0.127	0.313
Retexturing - shotblasting	$kgCO_2e/m^2$	0.039	0.169	0.149	0.357
In-situ recycling *	$kgCO_2e/m^2$	6.4198	0.6168	0.880	7.917
Thermal patching	$kgCO_2e/m^2$	0.368	1.189	1.108	2.665
Ironworks – reinstatement systems	$kgCO_2e/m^2$	1.061	n/a	n/a	n/a

Table 1: CO_2e figures for treatments

*Please note that this figure has been calculated on emissions from a 200mm depth in-situ recycling example and excludes the 40mm surface course. Figures may vary for different depths.

Spray Injection Patching v Traditional Asphalt Patching.

4.2. Treatments and traditional

Table 2 below looks at an example project of an average days work filling 20mm depth patches and travelling 200 miles in total.

Please note that the figures do not include break out or removal of existing road surface.

Treatment	Units	A1 - A3	A4	A5	A1-A5 Total
Spray Injection Patching	$kgCO_2e/m^2$	1.123	0.845	1.455	3.423
20mm SMA (Warm mix, straight run bitumen, 0% recycled content)	$kgCO_2e/m^2$	2.200	2.555	1.911	6.666
20MM SMA (Warm mix, PMB, 0% recycled content)	$kgCO_2e/m^2$	2.393	2.555	1.911	6.859
20mm SMA (Hot mix, straight run bitumen, 10% recycled content)	$kgCO_2e/m^2$	2.155	2.555	1.911	6.621

Table 2: Project example - 20mm depth patch

Infra-red Thermal Patching v Traditional Asphalt Patching.

Table 3 below looks at an example project of an average days work filling 30-40mm depth patches and travelling 200 miles in total.

Please note that the figures do not include break out or removal of existing road surface.

Treatment	Units	A1 - A3	A4	A5	A1-A5 Total
Thermal patching (40mm)	$kgCO_2e/m^2$	0.368	1.189	1.108	2.665
30mm SMA* (Warm mix, straight run bitumen, 0% recycled content)	$kgCO_2e/m^2$	4.400	2.555	3.884	10.839
30mm SMA* (Warm mix, PMB, 0% recycled content)	$kgCO_2e/m^2$	4.787	2.555	3.884	11.226
30mm SMA* (Hot mix, straight run bitumen, 10% recycled content)	$kgCO_2e/m^2$	4.310	2.555	3.884	10.749

Table 3: Project example – 30-40mm depth patch

*SMA specified to be laid at 30mm

Road Surface Treatments v Traditional Asphalt Patching.

Table 4 below looks at an example project of 30-40mm depth, 30,000m² and travelling 200 miles in total.

Please note that the figures do not include break out or removal of existing road surface.

Treatment/resurface	Units	A1 – A3	A4	A5	Total (A1-A5)
Rejuvenation	$kgCO_2e/m^2$	0.023	0.016	0.015	0.054
Preservation	$kgCO_2e/m^2$	0.361	0.013	0.066	0.440
Surface Dressing	$kgCO_2e/m^2$	0.497	0.195	0.023	0.715
Microsurfacing	$kgCO_2e/m^2$	0.760	0.034	0.012	0.806
Geosynthetics	$kgCO_2e/m^2$	0.890	0.021	0.104	1.015
30mm SMA (Warm mix, Straight run bitumen, 10% recycled content)	$kgCO_2e/m^2$	3.680	0.495	0.392	4.567
30mm SMA (Warm mix, PMB, 10% recycled content.	$kgCO_2e/m^2$	3.996	0.495	0.392	4.883
40mm HRA	$kgCO_2e/m^2$	5.11	0.594	0.588	6.292

Table 4: Project example – 30mm to 40mm depth

4.3. In-situ recycling

Table 6 below shows an example of in-situ recycling against a conventional re-surface at a depth of 200mm, 38,157 m^2 and travelling 100 miles to site, and 100 miles return.

Please note that the figures for 200mm resurface do not include break out or removal of existing road surface.

Treatment		Units	A1 - A3	A4	A5	Line Total	Overall total
210mm in-situ recycling	40mm SMA	$kgCO_2e/m^2$	3.680	0.495	0.392	4.567	12.483
	170mm in-situ recycling	$kgCO_2e/m^2$	6.4198	0.6168	0.880	7.917	
200mm resurface	40mm SMA	$kgCO_2e/m^2$	3.680	0.495	0.392	4.567	24.308
	60mm Binder	$kgCO_2e/m^2$	5.878	0.990	0.782	7.650	
	100mm Base	$kgCO_2e/m^2$	12.091			12.091	

Table 6: In-situ recycling vs traditional resurfacing

Table 5 below looks at an example resurfacing project of 100mm depth, 30,000m² and travelling 200 miles in total.

Please note that the figures do not include break out or removal of existing road surface.

Treatment		Units	A1 – A3	A4	A5	Line Total	Overall Total
Rejuvenation		$kgCO_2e/m^2$	0.023	0.016	0.015	0.054	0.054
Preservation		$kgCO_2e/m^2$	0.361	0.013	0.066	0.440	0.440
Surface dressing		$kgCO_2e/m^2$	0.497	0.195	0.023	0.715	0.715
Microsurfacing		$kgCO_2e/m^2$	0.761	0.034	0.012	0.807	0.807
100mm resurface	40mm HRA	$kgCO_2e/m^2$	5.110	0.594	0.588	6.292	14.35
	60mm Binder (Hot Mix, 20% recycled content)	$kgCO_2e/m^2$	6.287	0.990	0.783	8.060	
100mm resurface	40mm HRA	$kgCO_2e/m^2$	5.110	0.594	0.588	6.292	13.93
	60mm Binder (Warm mix, 20% recycled content)	$kgCO_2e/m^2$	5.879	0.990	0.783	7.651	
90mm resurface	30mm SMA (Warm mix, straight run bitumen 10% recycled content)	$kgCO_2e/m^2$	3.680	0.495	0.392	4.567	12.22
	60mm Binder (Warm mix, 20% recycled content)	$kgCO_2e/m^2$	5.878	0.990	0.783	7.651	
90mm resurface	30mm SMA (Warm mix, PMB 10% recycled content)	$kgCO_2e/m^2$	3.996	0.495	0.392	4.883	12.88
	60mm Binder (Warm mix, 0% recycled content)	$kgCO_2e/m^2$	6.225	0.990	0.783	7.998	

Table 5: Example project – 100mm depth

Financial Cost, Carbon Cost and Sustainability.

- Carriageway - Lifecycle Cost and Whole Life Cycle – Financial Cost.
- Carriageway - Lifecycle Carbon Cost and Whole Life Cycle - Carbon Cost.

Surface Dressing / Asphalt Surfacing Costs.

- Racked In Surface Dressing £5.00 / m2
- Asphalt (SMA) Surface Course £19.00 / m2
- Asphalt Binder/Surface (SMA) £40.00 / m2

**ADEPT Service Life - For Asset Management Purposes - Asphalt Materials.*

**ADEPT Service Life - For Asset Management Purposes - Road Surface Treatments.*

Treatment Type	Heavily Trafficked ('A' & 'B' Class)	Lightly Trafficked ('C' & 'U' Class)
Asphalt (SMA) Surface Course	10 Yrs	15 Yrs
Binder/ (SMA) Surface Course	15 Yrs	30 Yrs
Racked In Surface Dressing	10 Yrs	15 Yrs

Carriageway Lifecycle – Financial Cost.

Treatment Type	Heavily Trafficked ('A' &'B' Class)	Lightly Trafficked ('C' & 'U' Class)	Cost (£/m2)
New Road/Renewal	10 Yrs	15 Yrs	
Surface Course	10 Yrs	15 Yrs	19
Surface Course	10 Yrs	15 Yrs	19
Surface Course	10 Yrs	15 Yrs	19
Surface Course	10 Yrs	15 Yrs	19
Surface Course	10 Yrs	15 Yrs	19
	60 Yrs	90 Yrs	£95

Carriageway Lifecycle Whole Lifecycle – Financial Cost.

Treatment Type	Heavily Trafficked ('A' &'B' Class)	Lightly Trafficked ('C' & 'U' Class)	Cost (£/m2)
New Road/Renewal	10 Yrs	15 Yrs	
Surface Dressing	10 Yrs	15 Yrs	5
Surface Dressing	10 Yrs	15 Yrs	5
Asphalt Surface Course	10 Yrs	15 Yrs	19
Surface Dressing	10 Yrs	15 Yrs	5
Surface Dressing	10 Yrs	15 Yrs	5
Total	60 Yrs	90 Yrs	£39

Treatments - Cradle to Practical Completion - CO^2 Emissions.

- Asphalt Preservation = 0.440 kg/m2
- Racked In Surface Dressing = 0.938 kg/m2
- Microsurfacing (CAUTS) = 0.773 kg/m2
- 40mm Warm Mix Asphalt Surface Course = 6.292 kg/m2

Carriageway Lifecycle – Carbon Cost.

Treatment Type	Heavily Trafficked ('A' &'B' Class)	Lightly Trafficked ('C' & 'U' Class)	Carbon ($Kg/CO_2e/m2$)
New Road/Renewal	10 Yrs	15 Yrs	
Surface Course	10 Yrs	15 Yrs	6.292
Surface Course	10 Yrs	15 Yrs	6.292
Surface Course	10 Yrs	15 Yrs	6.292
Surface Course	10 Yrs	15 Yrs	6.292
Surface Course	10 Yrs	15 Yrs	6.292
Total	60 Yrs	90 Yrs	31.460

Carriageway Lifecycle – Carbon Cost.

Treatment Type	Heavily Trafficked ('A' &'B' Class)	Lightly Trafficked ('C' & 'U' Class)	Carbon (Kg $CO_2e/m2$)
New Road/Renewal	10 Yrs	15 Yrs	
Surface Dressing	10 Yrs	15 Yrs	0.938
Surface Dressing	10 Yrs	15 Yrs	0.938
Asphalt Surface Course	10 Yrs	15 Yrs	6.292
Surface Dressing	10 Yrs	15 Yrs	0.938
Surface Dressing	10 Yrs	15 Yrs	0.938
Total	60 Yrs	90 Yrs	10.028

Cost v Carbon

Carriageway Lifecycle Financial Cost = £95 / m2

Carriageway Lifecycle Carbon Cost = 31.460 kg CO_2e / m2

Carriageway Whole Lifecycle Financial Cost = £39 / m2

Carriageway Whole Lifecycle Carbon = 10.028 kg CO_2e / m2

The **pothole pandemic** grows each year resulting in damage to vehicles travelling over them.

However, we have **sustainable surface treatments** that can prevent pothole formation.

SO WHY ARE WE LOOKING FOR A POTHOLE SOLUTION WHEN WE HAVE SURFACE TREATMENTS THAT CAN SUCCESSFULLY TREAT THE PROBLEM?

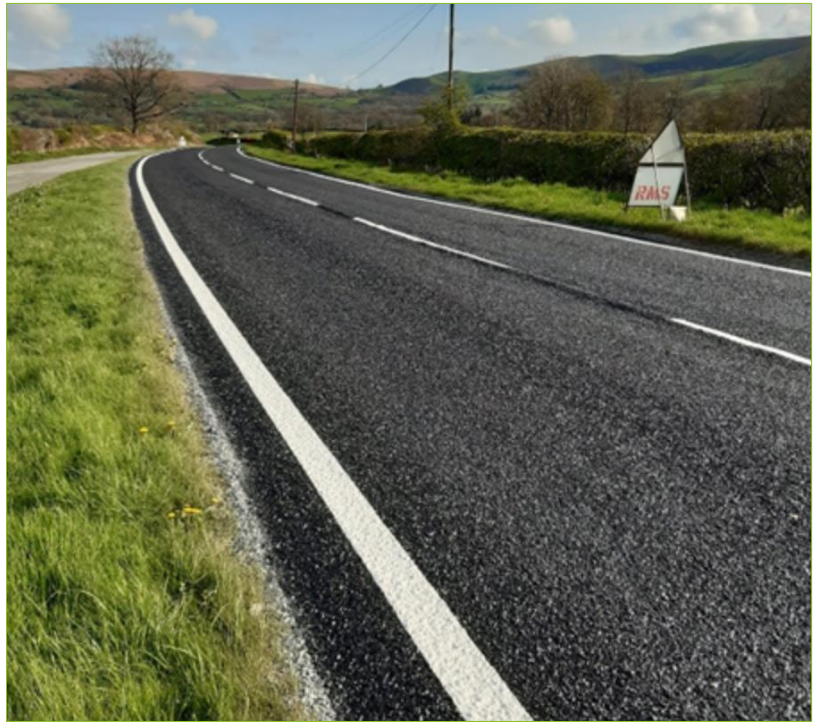
Road Emulsion Association Limited

FINALLY

The application of SUSTAINABLE, low-carbon, Surface Dressing systems on some of the "Amber" and "Green" local authority roads, will further EXTEND the life of that road.

It will result in FEWER potholes and prevent these routes from becoming "Red" thus resulting in COSTLY and DISRUPTIVE repairs.

Taking the appropriate decisions by adopting LONGER TERM strategies for the future, together with early intervention to PREVENT rather than cure road defects, local authorities can achieve significant financial AND CARBON FOOTPRINT advantages.



Go raibh maith agat.
Thank you.

rory@rsta-uk.org

enquiries@rsta-uk.org