

RENEW

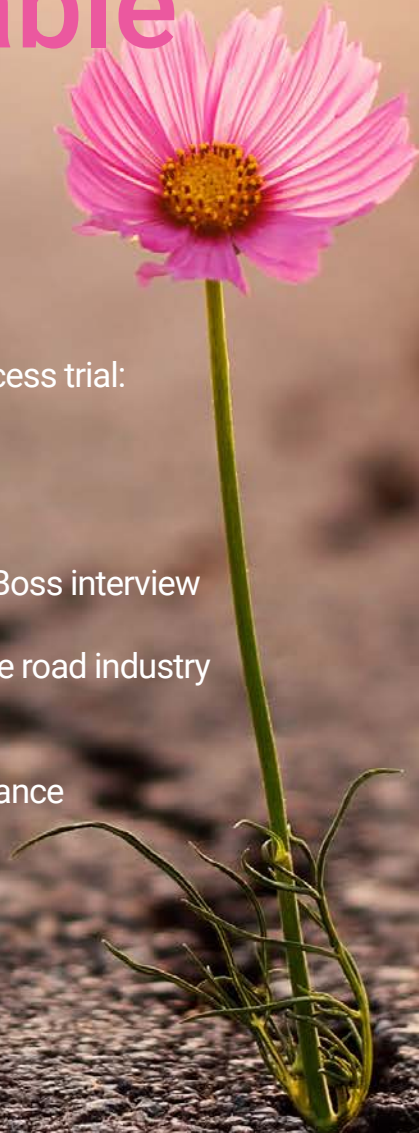
WINTER 2021 EDITION

LITE

Making the surface more sustainable

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editor's note

Paul Boss | CEO, RSTA



“ Welcome to our first Renew Winter edition, a lite version of the annual Spring Renew with interesting articles submitted by members. Our regular Spring edition will be back and included in delegate packs for our 2022 conference, along with being distributed with Highways Magazine.

After 2 years without a conference due to the pandemic, I know everyone booked is really looking forward to having members back together for the Association's annual extravaganza. As we look back on a busy year for the RSTA despite the barriers of the pandemic, particularly in the first 5 months of the year, it was disappointing to have to cancel the conference for a second year but we have achieved so much for the benefit of our members and the wider highways community.

The year began with the launch of our new website, providing easier access to information, document downloads and online booking for courses. We have been involved in a number of consultations and follow-ups that are important to members and the industry. The end of rebated fuel (Red Diesel) from 1 April next year will see the doubling of fuel costs for affected vehicles and how the transition will work, the potential requirement for operators, licenses for spray tankers and the review of permits and proposed street works reforms (for the latter of which we are still awaiting feedback from the Department for Transport).

We have formed and built on partnership agreements with like-minded institutions, associations and other bodies as we collaborate and join forces to achieve common goals. This is particularly in relation to education and training, sustainability and carbon reduction and ensuring the right treatments are specified at the right times for efficiency and to protect our planet by reducing the carbon generated from highway operations.

We have grown our membership, welcoming six new member companies to the association this year, bringing more expertise not just in those sectors traditionally related to the association, but also asset management survey and software systems providers. This completes the link between highway condition surveys, designing the right solutions, the supply chain (both suppliers and contractors) and undertaking works to the correct specification and standard before further surveys are performed to keep track of condition and help plan future works and budget requirements. The new BS 9228 for In-situ Road Recycling was launched and the new BS 8870 for High Friction Surfacing is nearing agreement for launch in the New Year.

Since the middle part of the year, it has been really good to regularly meet some members in person rather than on a laptop screen. Be that at sector committee meetings at the RSTA offices in Wolverhampton, at their premises or, in recent months, at industry events where we have also been involved making presentations to attendees and participating in round table type discussions on stage. Through our Training and Assessment Centre it has also been good to meet delegates taking their NVQs and learning about surface treatments through our Silver certificate CPD courses. Whilst we were forced to move online for the early part of the year, the late summer/autumn programme saw us deliver five in-house bespoke courses in addition to four open courses at various authorities and other venues around the country.

As we look forward to 2022, when we hope the effects of Covid will diminish to something we just learn to live with, it will be an exciting time as we now have 13 sectors, each with their own committee in addition to the SHE Committee and the Asset Management Group. We will continue to represent members and the industry at government level for the benefit of maintaining our highways sustainably, participating and presenting at major conferences and events where we hope to meet as many of you as possible, and continuing our education and training, including courses on skid policy management and asset management lifecycle planning.

From everyone here at the RSTA, we wish you all a very Merry Christmas and a prosperous 2022.



Cold In-Situ Recycling Process trial A1 Northumberland



PRINCIPAL CLIENT

National Highways

MAIN CONTRACTOR

Galliford Try

LOCATION

A1, Newton on the Moor, Northumberland

TREATMENT

In-situ foam mix recycling

TREATMENT AREA

38,157m²

CARBON SAVING

477 tonnes or 50% over traditional asphalt



The scheme is located on a dual carriageway APTR section of the A1(T), subject to the national speed limit, and located between Newton-on-the-Moor and West Cawledge. Situated approximately five miles south of Alnwick in Northumberland and located on the northbound carriageway over a length of 5.2km (10.4 lane kilometres).



The proposal was to undertake in-situ recycling of the existing binder/base layers. It was envisaged that a prior scheme, A1 West Moor to Newton on the Moor (210647), constructed in 2016 and covering the pavement for 4km immediately to the south of the proposed works would provide a benchmark for comparison.

The proposal was for a pilot scheme to trial the new draft SHW CI 949 'Cold In-situ Recycling Process'.

The development, design and delivery of the scheme was to be in collaboration with National Highways Asset Needs and Pavement SES. National Highways procured the services of a laboratory testing supplier to develop the mix design in collaboration with the pavement contract.

The existing pavement surface varied throughout the extent of the scheme. The carriageway consisted of a mixture of thin surface course, hot rolled asphalt and ageing base and binder courses. The sections of thin surface course were at the end of their design life. The carriageway had been deteriorating over time in the form of cracking and some carriageway depressions.

In addition, tar was located at a uniform depth of between 190mm and 250mm. The intention was to encapsulate the tar within the recycled layer thereby mitigating the hazard rather than it needing to be disposed of off site.

Before finalising the design proposal detail, sampling works were instructed and carried out in February 2021. In line with CD 226, the accuracy of sampling was ensured through the use of a Wirtgen 380Cri recycling machine to extract and pulverise the design samples since this latest generation cold recycler would be undertaking the delivery of the work.

The findings led to a final design involving a foamed bitumen bound recycled material constructed to 160mm and 180mm in depth. Depths were set in order to reach a minimum 15-20 year life and strengths of 5,500 MPa or 5.5GPa were required to achieve this.

The recycled layer was overlaid with a 40mm layer of Tarmac's Ultipave 10mm thin surfacing. The deeper 180mm recycling was carried out to the southern half of the site, then at 160mm to the north end of the works. The slightly deeper recycling was specified in order to capture a historical surface layer which, during

testing, had been identified as having failed and so needed to be included in the re-engineered material prior to being overlaid.

A trial of graphene inclusion was also to be undertaken into the recycled material over a specific length of carriageway in Lane 2 at a depth of 160mm. The graphene was introduced to the recycled material suspended in the blended cement – expectations are that it has the potential to improve the strength and durability of the pavement and forms part of an ongoing study in the use of graphene in pavement applications. Monitoring of the performance and strengths in this area are ongoing.

Work began on site on 25th September with pre-planing carried out at 60mm in order to accommodate the new surface material depth of 40mm as well as the potential bulking from the recycling process. The Wirtgen 380CRI was deployed and mixed pre-spread blended PFA/cement and introduced foamed bitumen within the mixing chamber to create the recycled foundation.

The final mix contained 90.5% recycled carriageway, 5% pulverised fuel ash (PFA), 2% Ordinary Portland Cement and 2.5% foamed bitumen. As a result of the PFA



COLD IN-SITU RECYCLING

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EXPERIENCE

UK's No.1 working with Local Authorities nationally for over 20 years



PROCESS

Taking place on-site, specialist machines recycle the existing road with minimal deliveries to site



PRODUCTS

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SAVING CO₂

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TONNES**
of asphalt
cold-recycled on site

90%
of existing carriageway
recycled in-situ

 **1,400**
truck movements saved totalling
56,000 road miles

 **477
TONNES**
of CO₂ saved

increase, gradings were suitably adapted to compliant zones in order to optimise the impact of the foam and provide a long-lasting flexible pavement layer able to achieve an indirect tensile stiffness modulus of between 3.1 GPa (min) and 6.5 GPa (max).

SPL's 380 cold recycling train produced on average 1,184 tonnes of recycled

material per shift over a total of 12 shifts. This equates to just over 38,000m² at an average of 170mm depth. The greater outputs clearly resulting in less time onsite, less disruption to the travelling public as well as less carbon generated both on and around the site due to the reduced construction activity and lorry movements respectively.

In line with National Highways' sustained action towards decarbonising England's motorways and A-roads, this project has brought significant benefits to motorists, communities and businesses. Through recycling 90% of the existing carriageway in-situ, around 1,400 lorry movements were not required to transport materials approximately 40km to and from the site. At a challenging time for logistical operations in terms of both labour and material shortages, this was another benefit of re-engineering materials on and in the road.

CLIENT COMMENT

Graeme Watt, Asset Needs Manager, Yorkshire & North East region at National Highways said:

"National Highways alongside SPL, GEIC, PTS and many other key supply chain partners carried out a world's first by adding graphene directly into an in-situ recycled material; producing an end product like no other. This is the first step in a long journey to yield the significant carbon benefits in-situ recycling brings with an enhanced end product only achievable with graphene. Over the coming months we will be assessing many other in-situ recycling locations and working to make this process the norm instead of the exception.

It has been a long (and sometimes frustrating) journey so far ... thank you to everyone internally and externally for getting this to site. It truly is a team effort and a demonstration of what we can achieve working as one."

Using technology and innovation, SPL continues to make efforts to help push towards Britain's net zero future and we acknowledge the importance of measuring our carbon expenditure in order to effectively manage and improve our processes. The 477 tonnes of carbon saved on this site over traditional asphalt solutions is heading the right way and for perspective is the equivalent of CO₂ emissions from burning 240 tonnes of coal or driving 1.2 million miles in an average sized passenger vehicle.

Through further collaboration alongside like-minded partners as seen here, SPL hopes to continue to build and enhance these achievements and make this approach to highway maintenance a bit less extraordinary.





IKO ROAD OPENS A ROUTE TO LONGER-TERM, COST-EFFECTIVE SURFACE REPAIR

IKO has collated its high-performance range of road, bridge and ironwork repair solutions into a singular point-of-service division.



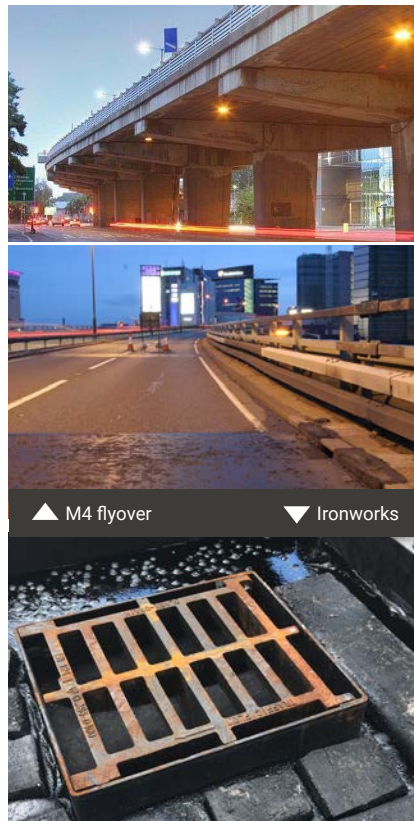
Formerly known as IKO Highways & Civils, its success has led to its growth and the launch of IKO Road, which has much to offer the world of road surface repair and maintenance.

With more than 50 years' expertise in mastic asphalt surfacing, IKO Road is testament to the excellent reputation the company's road surface repair and maintenance materials have gained throughout the highways industry.

IKO's success story dates back to the use of its mastic asphalt surfacing on some of the UK's major bridges such as the original Severn Bridge and Forth Road Bridge but it wasn't until 2013 that IKO Highways & Civils became a division dedicated to the use of mastic asphalt on highways.

The emergence of IKO Permatrack H Bridge Joint system in the early years consolidated the company's reputation as an innovator in mastic asphalt materials and as the product's profile grew, so did the prominence of the applications it was specified for, particularly the Permatrack H inlaid crack repair system. The range of Permatrack mastic asphalt refurbishment installations also increased. Hence, as part of IKO's Highways & Civils offering, they were put to effective use on projects at Southampton Docks (2013), an elevated section of the M4 motorway at Chiswick (2014), and numerous bridge joints and concrete bay joints on the M25 Motorway network in recent years (2018, 2019, 2020).

As the Permatrack brand grew into other fields of road and ironwork repairs, IKO thought it practical to amalgamate its materials into one all-encompassing offering. The expanded service now includes bridge joints, inlaid crack repairs, patching, bridge surfacing and in a range that is as wide as anything the highway repair and maintenance sector has to offer, IKO Road's provision also includes ironwork reinstatement.




Why IKO Road is the ideal surface repair solution.

What's so special about IKO Road products? Well, they mainly consist of a mastic asphalt composition which is unlike traditional road asphalt repair solutions. Traditional road asphalts are generally based on the principle of an aggregate that is coated with a bitumen binder, whereas mastic asphalt is a blend of coarse and fine aggregates filled with bitumen binder. This makes the product virtually void-less and when installed to surfaces, ensures roads are less susceptible to damage caused by water pressures and freeze-thaw cycles. It's why IKO Road materials are a long-term cost effective surface repair: they eliminate the need for repeat works on the same repair.

IKO Road lives up to the company's mantra, that in terms of a road maintenance programme, it is crucial to 'do it once and do it right'. This not only helps to minimise project time and expense, it reduces the need to implement longer-than-necessary road closures, which are a bane for motorists and a strain on the national economy. According to an independent survey carried out by the Asphalt Industry Alliance, the average cost of repairing the backlog of maintenance work on local roads in England and Wales is £10.24 bn, thus highlighting the need for surface solutions which facilitate prompt, effective road repair.

Availability is another decisive benefit of the IKO Road range. At a time when the





In a five-year period, IKO has offset 9,264.69 tonnes of CO₂ – the equivalent of 4,343 return flights to New York

UK construction sector is falling prey to supply chain issues and the logistical challenges of importing goods from Europe and further afield, IKO's advanced mastic asphalt waterproofing systems are British-made in manufacturing-sites across the UK. This drives down lead times, enables better quality control and lower transportation costs.

Furthermore, it is far more sustainable to choose suppliers which manufacture their products in the UK rather than import from abroad. Fewer transport miles result in materials with lower carbon emissions. It's an approach that aligns with National Highways, the new-look builder and operator of the country's motorways and major roads which aims to bring road maintenance and construction to net-zero emissions by 2040.

Sustainability has long been a vital aspect of the IKO business model. The company continually strives to minimise its carbon footprint as far as possible and since January 2015 has been involved in a number of emission offsetting projects that contribute to the CarbonZero™ programme run by CO2balance. In a five-year period, IKO has offset 9,264.69 tonnes of CO₂ – the equivalent of 4,343 return flights to New York - through its involvement in an energy efficient stove project in Kenya and a bore hole rehabilitation project in Uganda, activities which reduce CO₂ emissions from the burning of firewood.

How IKO Road systems are applied

All materials within the IKO Road range are hot-applied. For repairs involving cracks between lanes on a traditional asphalt surfacing on a motorway for example, it means planing out the defective area and forming a rebate in the carriageway. This will generally be completed to a 160mm width and a 40mm depth. IKO Quick Dry Bitumen Primer is then applied to all surfaces, followed by an approximate 5mm-thick layer of IKO Permatrack PSB; a flexible, rubberised bitumen which penetrates, seals and bonds the final infill of Permatrack H (ICR) – a mastic asphalt inlaid crack repair. The result is a relatively quick installation and long-lasting repair.

IKO Road mastic asphalt material properties make it a user-friendly option for applicators. The material's fluid, void-less consistency eliminates the need for compaction with heavy industrialised equipment such as handheld compactors, which are known to cause debilitating stresses on the joints of handlers continually exposed to the machine's powerful vibrations. Mastic asphalt is easily poured into a trench, spread by means of a suitable float, levelled off to the existing road surface and whilst still hot, broadcast with suitable aggregate to provide the required skid resistance.

IKO's quality ironwork reinstatement material Pacopatch is another mastic asphalt product. Among its many benefits is its ability to negate the use of heavy

machinery which also risks damaging the repair itself. Part of the IKO Road range, IKO Pacopatch system includes IKO Pacopatch Grout, IKO Pacopatch Brick and pre-coated chippings to provide a void-free high-performance ironwork repair solution for drains, gullies, manholes and inspection chambers.

IKO Road – certified quality

Mastic asphalt's versatility makes IKO Road an exceptional option for a wide range of surface repairs, which are carried out by contractors signed-up to the company's registered installer programme.

This assures clients that repair projects are in the hands of a professional team which meets IKO'S strict standards. As for the products themselves, IKO Permatrack Inlaid Crack Repair system has BBA HAPAS certification, IKO Permatrack Bridge Joint is Highways England-certified whilst the mastic asphalt element is manufactured to BS EN 13108-6:2016, the European Standard that specifies the requirements for mastic asphalt mixtures on roads, airfields and other trafficked areas.

IKO Road represents another forward step on the company's quest to advance its surface repair systems to even greater levels of performance by innovating the design and manufacturing processes used to create them.



As RSTA members review the last surface treatment season and look towards the next, Renew magazine caught up with RSTA Chief Executive, Paul Boss.



Renew (R): So, the 2021 season has come to an end for most member companies involved in surface treatment works. How has this season gone?

Paul Boss (PB): The feedback I have received generally is 2021 has been better than 2020 but still down on previous years.

It still amazes me that with the financial and sustainable positives for using surface treatments, local authority clients continue to put so much finance into reactive maintenance, primarily potholes. I understand potholes dominate theirs and their members' inboxes and postbags, but if you always do what you always did you always get what you always got.

The reality is the only way out of this is to preserve roads and footways in good and average condition using the appropriate surface treatments to prevent potholes forming in the first place. This should enable authorities to reduce as far as possible the number of sites joining the backlog queue and in an ideal world they will have some finance left to undertake a few structural maintenance schemes each year.

Reactive maintenance should be recorded and actioned on a risk basis, with only the potholes and other reactive jobs picked up on inspections that present a real risk being repaired.

R: There have been several stories about member companies involved in carbon reduction schemes. How is the RSTA supporting those companies with that moving forward?

PB: The Association holds the vice-chair position on the UKRLG/ADEPT Asset Management Board. The Board developed non-scorable sustainability and biodiversity questions that went out with the incentive funding self-assessment questionnaire this year. The questions were equally about fact finding on what authorities needed to help them meet their carbon reduction duties. Also to let them know this is coming as part of the

review of the self-assessment incentivised funding process.

The Board will be using the feedback to develop tools where they do not already exist. In the first instance, simple quantum can be used before moving onto detailed carbon calculators for each individual scheme.

Members are quite rightly doing their own research and quantifying carbon with universities, etc but we would like average carbon outputs for each of the surface treatments to be established for use by highways authorities. If members then have something better this can be used for comparisons on individual schemes.

R: Funding has been on the agenda after the recent CSR/Budget with less money available to local authorities to maintain the local network. What is your thinking on this?

PB: Within the UKRLG/ADEPT Asset Management Board we put a lot of work into developing a Comprehensive Funding Business Case for highway asset management, with required funding options, with DfT, for DfT to submit to HM Treasury and Government for consideration as part of the CSR.

Whilst providing the required funding to enable planned maintenance for a steady state or even improving the condition of the highway network would have required further Government borrowing, the funding case showed how this would be much more efficient in the longer term and contribute to the health and socio-economics of the nation. A pound invested in highway maintenance returns several times the investment in real terms, not to mention the carbon reductions achieved using planned lifecycle maintenance.

It was therefore disappointing that although certainty of funding was given with a 3 year settlement, the funding provided represents a 5% cut and not even enough for a planned managed decline in the condition of the networks. There will

therefore be a reliance on local authorities committing their own additional finance into maintaining their networks but they are already struggling to balance the books and highways will be competing with social care and other priorities.

R: Less money doesn't always mean that less gets done though does it?

PB: No. It is now more important than ever that highway authorities utilise what allocations they do have to prevent further deterioration of their networks with planned preventative maintenance. This will ensure they keep their networks in a reasonable to good condition overall and minimise those sites that require structural maintenance in the future. Even those that do require structural maintenance can be delivered more efficiently, quickly and with much less carbon generation if they can utilise in-situ recycling.

R: Tell us about what has been going on internally at RSTA to continue to provide value for members?

PB: Following a members consultation over the summer, at the meeting of the Executive Committee in September it was agreed to make all sub-sectors of the Specialist Treatments sector into sectors in their own right and with their own committee with effect from the 1st January next year. This recognises the number of members in each new sector and that each sector now has its own Code of Practice, some with further guidance documents.

The Specialist Treatments sector will therefore cease on the 1st January and the current sectors, Surface Dressing, Slurry Microsurfacing, High Friction Surfacing, and Geosynthetics & Steel Meshes will be joined by Asphalt Preservation & Rejuvenation, Bond Coats, Maintenance of Concrete Pavements, Crack Sealing & Joint Repairs, Grouted Macadams, Ironwork Installation and Refurbishment, Patch Repairs, and Road Recycling. We will also continue to have the Safety, Health and Environment Committee and

the Asset Management Group, the latter also being open to non-member local authorities.

The Executive Committee will also increase in number from 20 to 25 at the AGM in April, to ensure each of the sector committee chairs have a place on the Executive Committee whilst still ensuring there are further electable seats on the committee. The change also reflects the growing membership of the Association and the need to ensure all sectors are fairly represented.

We also continue to be involved in Government consultations, reflecting the views of members for the benefit of the industry.

R: Your training has been successful in the past...what sort of training do we expect to see in the future?

PB: The majority of CPD training to date has been for Surface Dressing and Slurry Microsurfacing. We began CPD training in Spray Injection Patching this year and will be reviewing and developing training for all other surface treatments under the National Highway Sector Scheme 13.

We have also added a further two NVQs to our already extensive NVQ offerings, now being approved for Level 2 NVQ Certification in Roadbuilding and Maintenance (Construction) – Excavation and Reinstatement, and Level 2 NVQ Diploma in Construction and Civil Engineering Operations – Excavation and Reinstatement, both in accordance with the requirements of National Highways Sector Scheme 16.

We will also be delivering skid management courses with Xais and are currently developing an Asset Management Lifecycle Planning course with Xais that will also be jointly delivered.

R: Tell us about your new three year strategy?

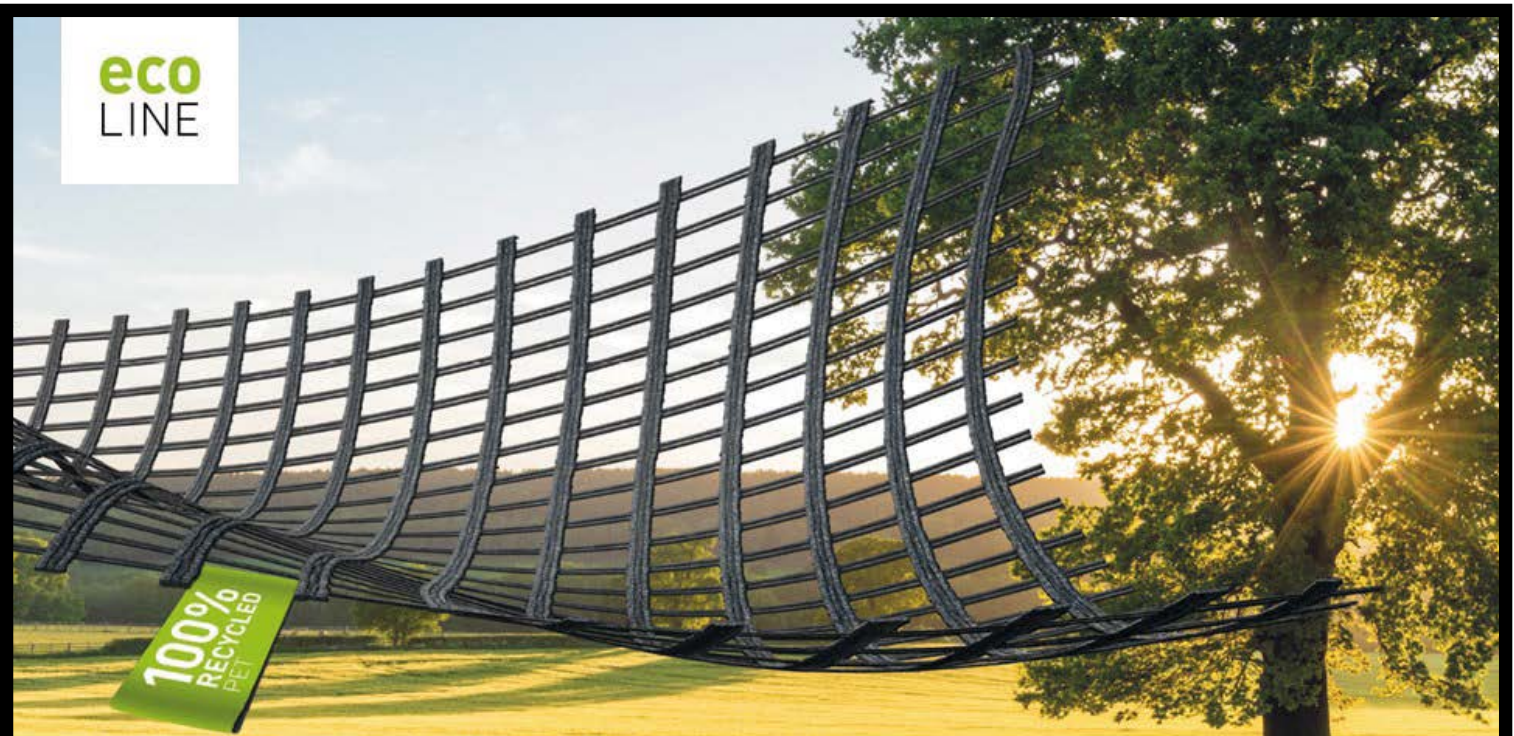
PB: Our new RSTA Strategy 2022–2024, *A Sustainable Membership for a Sustainable Planet*, sets out the vision and roadmap for the Association over the next three years.

The Strategy has members at its heart with emphasis on training for all levels. A big feature is also collaboration with

other associations and bodies, building on the collaborative and partnership agreements we already had in place and those we have made over the last year or so. Working together with like-minded organisations we can combine our efforts and achieve more for the sector.

We are about improving education for clients and ensuring the most efficient and sustainable options are clear for those planning and designing highway maintenance schemes.

The Strategy also sets out how we will be working with the devolved Governments and helping clients and members to fulfil their sustainability responsibilities. Progress against the strategy will be reported at the end of each year, with annual reviews.



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Micro-particles... should the UK road industry be worried?

Matthew Walker and David Woodward



David Attenborough and the Blue Planet series made the world aware of the devastating impact of waste and discarded plastic. It was hard to watch as sea creatures became tangled in discarded nets or poisoned by ingesting plastics.

Waste plastic is everywhere. It is in the oceans, being washed up on the remotest beaches and wrapped around trees in the middle of deserts.

What does this devastating view of a damaged planet have to do with UK roads?

Most people will probably have never heard of micro-particles or micro-plastics.

They may not be aware that they are being generated around us everyday by people using our roads.

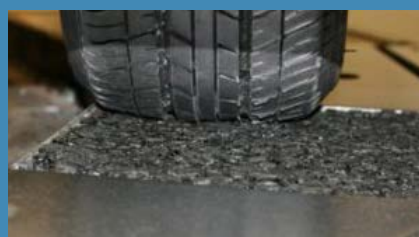
Micro-particles, or micro-plastics may become the subject of the next Blue Planet type block buster that makes us all think as they have the potential to be harmful not only to the environment but also to us.

As the term implies they are micro-sized particles that are created by tyres passing over our roads and other surfaces. On a race-track we see much larger versions of these particles accumulating along the track during a race as the tyres degrade and wear often creating a thrilling end to the race.

Each time a passenger aircraft lands it will loose kilogrammes of rubber from its tyres. Some will accumulate on the runway on touch-down, the rest becomes a cloud of micro-particles and smoke.

New research at Ulster University has just started to look at micro-particles from the perspective of the road surface. Why is this research looking at the road surface?

The simple answer is although the issue of micro-particles has been investigated by the tire companies for some years the studies have not adequately considered the roads industry.



Similar to vehicle and tyre companies, the UK roads industry has for many years been developing products to ensure safety of the driving public. It has some of the most comprehensive and highest standards in the world that form the basis of an extensive highway asset management programme.

Developed over many years the UK skidding standards are based on the principles of using specific products which resist the polishing effects caused by vehicle tyres.

The highest standard of aggregate that

is used mostly belong to what is termed the gritstone group with sandstone and greywacke rock types being extensively used in the surfacing of UK roads.

They are grouped under the generic term gritstone because they are formed from grains of sediment which gives each stone particle a sand-paper roughness or micro-texture.

Similar to the different tread patterns found on tyres, different types of road surface asphalt can be made by varying the size and proportions of different aggregate sizes.

The commonly used asphalt products include proprietary Thin Surface Course and High Friction Systems, Stone Mastic Asphalt, Asphalt Concrete and Hot Rolled Asphalt.

All of these different types of asphalt rely on the use of aggregates with higher skid resistance. Due to the underlying geology it is possible to source these aggregates in the UK unlike other parts of Europe or around the world where these rocks do not exist.

So why specifically research UK asphalt mixes for micro-particles?

The reasons are quite simple and need

to be explored. Does reliance on the use of high skid resistance aggregate and asphalt mixes developed over many years to improve safety inadvertently create a problem that may impact our environment and ultimately our health?

Being micro-particles they can be breathed into the lungs or travel long distances suspended in water. Does the use of aggregate with a sand-paper like micro-texture create more micro-particles compared to aggregate with less micro-texture?

If micro-particles are present then what are they composed of? Are they based on the many constituents that are combined to make the tyre or are they fragments of the silica grains in the sandstones and greywackes?

Are they continuously generated throughout the life of an asphalt road surfacing, or are they more prevalent during early or towards end of life?

Simple questions that we don't really know the answers to. The research will take the lead from the motorsport industry

that considers rubber depositing on the racetrack as an essential requirement for racing. Tyres designed to last a few laps are very different to those of the standard road car or lorry where long life is more important.

Combining track and road environments will create a better overview of the processes involved. It will show how micro-particles are created and what they consist of.

The research will include laboratory experimentation with asphalt mixes created of different aggregate/bitumen/asphalt mixes. These will be subjected to accelerated trafficking and monitored to determine what if any micro-particles are created and what they are composed of i.e. the bitumen, the aggregate or the tyre; or a combination of all three.

As the research has just started it is unknown what impact, if any, the findings may have on the UK roads industry. The research may find that the amount of micro-particles may increase due to the use of higher skid resistance products. It may become the next Blue Planet-buster and if so then the UK roads industry will need to rethink its impact.



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TAKING FORWARD THE LASR APPROACH TO SKID RESISTANCE



XAIS
Asset Management



Derby City Council

Measuring skid resistance has always divided opinion. However, a recent collaboration between RSTA members XAIS Asset Management, The Road Safety Trust, Derby City Council and Enodamus has seen a detailed report showcasing its research into developing a new methodology for prioritising Local Authority Skid Resistance, bringing more certainty to how skid resistance can be measured and managed on the local network.

Part funded by the Road Safety Trust, the idea was to develop a simple model of the relationship between skid resistance and collision risk for a typical local authority road network.

The intention was to improve the knowledge available to highway engineers and practitioners managing the skid resistance of their networks - knowledge that is essential to adopt a true risk-based approach to asset management.

Before the report, many authorities base their approach and skid resistance thresholds on those adopted for the Strategic Road Network. In the absence of other information, it is assumed that these values are applicable to local roads, despite the differences in road geometries, junction types, traffic speeds and traffic flow.

The models outlined in the new report are based solely on local authority data. Using the XA[®] Asset Management system from XAIS, the project team created a dataset including road attributes, skid resistance, collision history (injury collisions from STATS19) and traffic flow.

Alongside Derby City Council, data was supplied by 10 other local authorities.

The new model can provide the basis to estimate the benefit of maintenance treatment to improve skid resistance, giving evidence for highway engineers to justify treatment and to aid in the prioritisation of maintenance funding.

The analysis suggests new thresholds for four site categories. With the changes in thresholds, the proposed approach will:

- reduce the number of sites needing investigation
- target treatments at the sites more likely to deliver safety benefits - prioritising roundabouts and de-prioritising junctions, including pedestrian crossings
- require lower skid resistance (except for roundabouts) so different treatments may be possible.

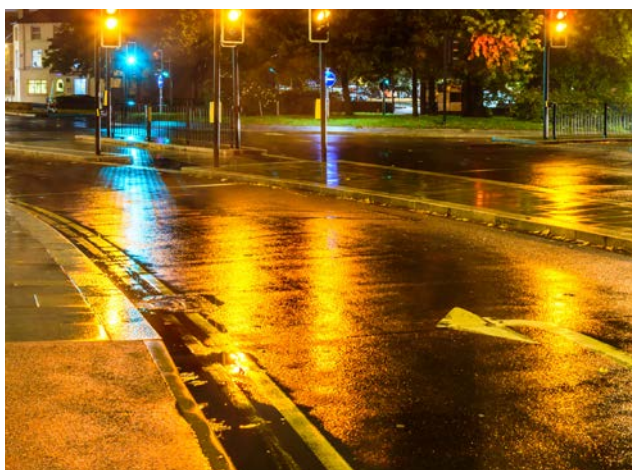
The research project saw the XA[®] Pavement Management System provided by XAIS used to assemble a dataset including road attributes, skid resistance, collision history (injury collisions from STATS19) and traffic flow. The mean collision rate was calculated for different bands of skid resistance, showing significant increases for lengths with low skid resistance (below CSC 0.3) and high skid resistance (above CSC 0.6). The percentage of collisions recorded as occurring on wet roads also increases as the skid resistance decreases. Although there are challenges with recording 'wet' collisions, the primary influence of improving skid resistance is expected to be on those collisions. (On dry road surfaces, free from contamination, the friction available to drivers is high and not very dependent on the nature of the surface whereas, in wet conditions, the friction can be significantly reduced, particularly on surfaces that have become polished.)

A novel approach has been developed whereby the road lengths with the highest skid resistance in each authority (those with CSC values between 0.5 and 0.6) provide a baseline percentage

of 'wet' collisions. This baseline, 24% overall, with some variation between authorities, represents what might be expected on roads with good skid resistance. For roads with lower skid resistance, the number of wet collisions expected was calculated from the total number of collisions using this baseline. Comparing the expected and actual values showed there to be a threshold level of skid resistance below which the observed wet collision rate increases above the expected level, leading to the concept of "excess wet collision rate". It is proposed that reducing this excess wet collision rate could be achievable through treatment to improve the skid resistance.

Previous work has shown different relationships between collision risk and skid resistance for different types of roads. Here, four site categories were identified, which are largely consistent with the established approach. None of the other factors studied provided a better division, or a conclusive subdivision within these site categories, although a larger data set would permit a more granular analysis:

- Non-event lengths
- Bends and gradients
- Junctions (including junction approaches and pedestrian crossings)
- Roundabouts.



For each site category, the threshold at which the excess collision rate increases, and the rate at which it increases provide a way to predict the reduction in wet collisions from improving the skid resistance. This provides the average benefit that might be expected if a site behaves in accordance with the trends observed in this work and has been used to predict the benefit-to-cost ratio (BCR) of treatment to improve skid resistance.

It is also desirable to assess the collision history at each site, since a high proportion of wet collisions could indicate a possible skid resistance problem.

This is unreliable due to the small number of collisions typically observed for individual sites. Nevertheless, a way to include the collision history in the decision process has been developed, based on the observation that lengths with the lowest skid resistance are associated with a higher percentage of wet collisions. It uses basic probability concepts to estimate the relative likelihood (RL) of there being an elevated risk of wet collisions at any site.

A predicted BCR and an RL value were calculated for each analysis length created from the Derby City 2020 skid resistance survey and were combined to produce a ranked list of sites. These were grouped into priority bands, with the top three bands

being included in the detailed site investigations carried out following the established policy:

Priority 1

Lengths with $BCR \geq 2.0$ and $RL > 50$

These sites have a positive economic justification (the average benefit of treatment exceeds the cost by a factor of two or more) combined with an elevated likelihood of wet collisions.

Priority 2

Lengths with $0 < BCR < 2.0$ and $RL > 50$

These sites have low skid resistance combined with an elevated likelihood of wet collisions but the BCR values suggest the benefit for treating these lengths is lower, on average, in relation to treatment costs.

Priority 3

Lengths with $BCR \geq 2.0$ and $RL \leq 50$

The collision data suggests these sites have not, to date, exhibited an elevated likelihood of wet collisions. The BCR values suggest there to be an economic case for treating them on a preventive basis.

Priority 4

Lengths with $BCR = 0$ and $RL > 50$

These sites have skid resistance above the thresholds, and so the BCR value is zero because the data predict no benefit to be obtained from improvement. Since the likelihood values are high, it is recommended these lengths be reviewed since they could indicate areas where the skid resistance thresholds should be increased.

Priority 5

All other lengths, with $BCR = 0$ and $RL \leq 50$

These have no economic case for improvement and the collision data suggests there has not, to date, been an elevated likelihood of wet collisions.

In summary, the project has now:

- Assembled and analysed a dataset covering 11 local authorities
- Proposed site categories and thresholds based on the trends observed
- Developed the concept of 'excess wet collision rate' and used this as the basis for assessing the BCR for treatments to improve skid resistance
- Developed a new approach for assessing collision history, which provides the relative likelihood (RL) of specific sites exhibiting elevated wet collisions
- Combined the BCR and RL into a prioritisation method which has been tested using Derby City 2020 SCRIM data and compared with the current approach.

This new approach has been received well by local authority and industry partners, according to James Wallis, Managing Director of XAIS: "This research and new approach to managing skid resistance has been welcomed by local authorities and road operators. It takes research on this to another level with the aim of providing councils with the best possible research on skid resistance with a model they can use effectively to make their roads safer."

Phase two of the project will work towards more detail on how treatments can be applied to gain optimum skid resistance using the new model as well as ideally creating a national standard for skid resistance that will help protect local authorities against any legal claims.

Uniquely in the UK sector, XAIS is combining this automated data capture and intelligent analysis with full iRAP accreditation

for its team and systems.

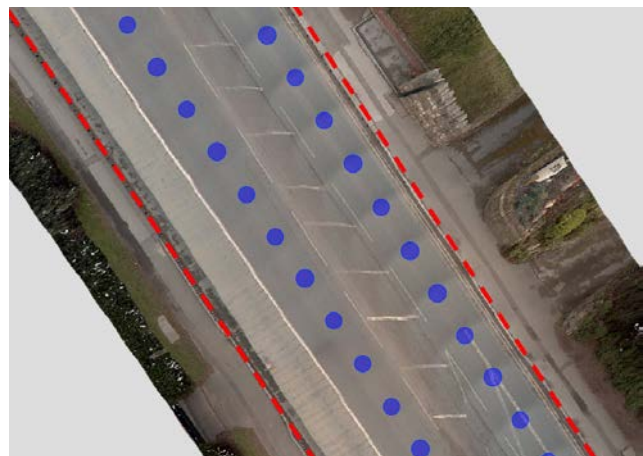
The International Road Assessment Programme (iRAP) is the umbrella programme for Road Assessment Programmes (RAPs) worldwide that are working to save lives.

iRAP assessments are an internationally recognised approach to managing road safety risk and use road data to produce Star Ratings – a simple and objective measure of the level of safety which is ‘built-in’ to the road for vehicle occupants, motorcyclists, bicyclists and pedestrians.

Undergoing iRAP Accreditation allows XAIS to present a cost-effective and intelligent system aiming to seamlessly collect, code, analyse and present data from an authority’s principal or classified road network (or any other individual road sections) – to provide a range of critical asset management information including full iRAP Star Ratings.

XAIS Infrastructure Vision (XAIS Iv) means the company is able to offer the latest in high-tech 360-degree HD image surveys with carriageway defects extracted automatically using advanced artificial intelligence (AI).

Using a vehicle-mounted GNSS/INS system, 360° panoramic camera and LiDAR scanner, XAIS can capture visual infrastructure assets and condition data in unprecedented detail.



As the vehicle travels across the authority’s network, it continuously records high-definition panoramic imagery, orthophotos, GPS and LiDAR point cloud data allowing engineer site visits to be minimised.

Cutting-edge artificial intelligence technology is applied to detect, measure, and visualise surface defects on the network and the CVI-equivalent data is automatically uploaded into the authority’s XA® Asset Management System.

Importantly, XA® and XAIS iv not only collectively generate and present road safety data in line with the iRAP specifications but are also able to integrate this data with other established and award nominated processes including LASR crash modelling and the scheme building functions developed with the XA® Scheme Assembler.

About the RSTA

The Road Surface Treatments Association (RSTA) aims to raise awareness of the benefits of road surface treatments and promote workforce competence and safe working practices.

Membership covers the whole supply chain and includes large national and regional contracting companies, Local Authority Direct Labour Services Organisations, materials and equipment suppliers, test houses and consultants.

Members are required to be registered with the National Highway Sector Scheme 13 or HAPAS Product Certification and Approved Installers Schemes where applicable.

For further information on the RSTA, its objectives, membership and programme of industry initiatives and training visit www.rsta-uk.org.



Follow us on Twitter, LinkedIn and YouTube




roadtechs

BRINGING LIFE BACK TO THE SURFACE

RSTA member Roadtechs has been busy delivering a variety of road surface treatment projects across the UK. Its Business Manager, Trevor Thompson, caught up with Renew to talk about how the season went.

Renew (R): This year's surface treatments season has just ended. Tell us how it has gone for Roadtechs?

TREVOR THOMPSON (TT): The 2021 season has been a great success for Roadtechs. It included one of the largest works in the UK this year on the A1270 Northern Broadway near Norwich, for Norfolk County Council, as well as other highways sector projects, coupled with some interesting non-highway projects including some within the automobile manufacturing and testing industry.

We got the impression this year, with increased interest in carbon footprint reduction and whole life cost savings, people are seeing surface extension treatments, and in particular rejuvenators such as Reclamite, as highly effective and cost efficient tools to assist in their future asset management plans/forecasts

R: Give us an idea of some of the projects you have been involved with this year?

TT: The A1270 project was over 300,000m² and involved treating the 20km long bypass that was approximately five years old. Norfolk County Council has included the use of our penetrative bitumen rejuvenator as part of its surface maintenance activity for the last seven years.

Reclamite is the only BBA HAPAS certified

penetrative bitumen rejuvenator in the UK. It is suitable for most asphalt surfaces and works by restoring the original properties of the bitumen lost through the aging and oxidation process. If the ironwork and line markings are in good condition, there is no need to adjust them which saves time, minimises disruption and enables maintenance budgets to go further.

Right now, with local authorities under pressure to address carbon emissions and climate change, the use of Reclamite provides a carbon footprint reduction of over 90% compared to other traditional methods and, in addition, no landfill is produced. Reclamite is proven to reduce future defects in the wearing course. There is also no loss of kerb face, which is important in urban areas.

Also, this year, a major European motor manufacturer which uses its proving ground to help develop the cars of the future, came to us to provide a solution to help extend the life of the surface of the track which was five years old. The key objective of this was to ensure that the characteristics of the surface remained identical post treatment. This was important because the surface is used to carry out a range of scientific tests and if the characteristics were to change, then the existing test data could be invalidated. To solve this, we successfully installed test patches and a couple of months

afterwards returned to install the main works. Over two shifts, we installed over 106,000m².

Back in the highways sector, we were pleased to collaborate with Cormac this year to deliver a range of surface extension treatments across Cornwall. Here, Reclamite was also used along with CRF. CRF provides a flexible and resilient cold spray bitumen emulsion solution to create a sealed surface and provide an economical alternative to conventional wear course seals. The CRF Surface Sealant fills the voids in the surface which also improves road user experience and reduces noise pollution. It can be applied to pavements with early-stage deterioration such as ravelling, loss of aggregate or brittleness. Just like Reclamite, there is no need to adjust the ironworks which saves further time and additional disruption. There is also no loss of kerb face in urban areas.

R: As local authorities search for more sustainable maintenance treatments, what role do you think surface treatments will play as part of an effective asset management strategy in the future?

TT: Surface extension treatments will play an increasingly effective role as part of the asset management strategy today and more so in the future for the following reasons:

- It is important that the asset manager

has plans that makes the carriageway last as long as possible, the material has already been paid for in their network – keep it there as long as possible.

- From an environmental aspect they really help to reduce the carbon footprint as roads are not being planed up and landfill is not produced as the materials are staying in the network for longer. The process involves only three vehicles, and it offers a reduction in carbon footprint of at least 90% compared to traditional maintenance techniques. There is no landfill produced.
- Viewing surface treatments on a whole life cost basis is vital for any local authority to ensure that surface treatments are delivering real value. When the pavement life is extended the local authority is not treating the surface with additional materials. When using Reclamite this results in an improvement in the whole life cost of 40%. With the regular application of Reclamite the need for other materials will not be necessary. This will save money, reducing the level of maintenance required in the long term as long as the treatment is repeated as part of the regular cycle.
- Laboratory tests have proven that when Reclamite is added to the binder it is taken back to nearer its original state at the point of installation. This means that there will be less reactive maintenance, fewer potholes and defects and less disruption for the public.
- With ongoing pressure on budgets, the use of surface treatments where possible will enable the asset manager to get more value for his available spend.

R: There has been a focus on repairing the roads when they are in a bad state rather than preserving and protecting them, preventing potholes and cracks appearing in the first place, should or could there be more of a balanced approach to this?

TT: The old fashioned 'sweat the asset' approach, where the asset is left to deteriorate to such an extent that the only solution is to remove and replace it, has been closely linked to the 'worst first' approach. This involves the maintenance budget being spent on the areas that



require the most attention. The problem with this is the limited factor of only continuing to do what you always did and then this becomes difficult to break away from.

But, protecting and preserving the network fits with the Roadtechs ethos to repair rather than replace where it is economically beneficial to do so.

By the asset manager taking the decision to use surface treatments, they will start to change how their network will be maintained. By applying a surface extension treatment at the right point in the lifecycle it will prevent potholes and cracks appearing in the first place. Also, it is important to remember that the application of the surface treatment is repeatable if the condition of the carriageway means it will benefit from a further application.

R: How can we help local authorities and other road operators educate the public on why we use surface treatments?

TT: It is simple. It is down to explaining to members of the public why we are doing what we are doing and what the benefits are. I think that the local authorities underestimate the ability of their residents to understand why their road is being treated.

On all the sites that we have treated up and down the country we have always found that members of the public understand and appreciate what is being done and why. When we return to apply a further treatment on a site they will often remember us from the previous visit. Roadtechs is able to assist local authorities by working closely with their communications teams to tailor the message to ensure that the works will be successful from that perspective.

R: What is Roadtechs doing internally and externally to ensure the opportunity to reduce carbon is being maximised?

TT: Internally, due to the nature of our business, repair rather than replace has been the core principle of the business since its inception more than 20 years ago. Put simply, if the life span of a carriageway can be increased by the use of Roadtechs' highway repair products then the carbon footprint of said carriageway can be massively reduced. When surface extension treatments, such as the Reclamite asphalt rejuvenator, are brought into the picture then even more significant impacts can be made with regard to carbon reduction and whole life cost savings.

By effective communication from the design stage, through site selection and survey, right up to installation with our external clients, both existing and new, we can assist them in maximising their assets, increasing their lifespan and so reducing that assets impact on the environment.

A new asphalt carriageway costs a lot in terms of both money and its impact on the planet, therefore it makes sense to get the maximum out of that carriageway.



Miles Macadam helps Reading to deliver a carbon neutral maintenance scheme

**PRINCIPAL CLIENT**

Reading Borough Council

MAIN CONTRACTOR

Miles Macadam

LOCATION

Reading

TREATMENT

Milepave™ grouted macadam

TREATMENT AREA

35,695m²

CARBON SAVING

129t CO₂ saving over hot mix material



Reading
Borough Council
Working better with you

It has been another successful year for Miles Macadam. Recently, its carbon neutral surfacing scheme with Shropshire Council won the Net Zero Innovation Project of the Year award at LCRIG's Strictly Highways Awards. The company was also shortlisted for the final of the National Highways Awards as a recipient of the Environmental Sustainability Award.

THE CONTRACT

Miles Macadam's most recent carbon neutral surfacing scheme was delivered in collaboration with Reading Borough Council.

Reading Borough Council's Carbon Plan for 2020-25, approved in November 2020, aims for an 85% reduction in emissions by 2025 and net zero carbon target by 2030. Miles Macadam's ability to deliver a carbon neutral surfacing scheme ensured no indirect emissions were attributable to the authority, supporting this objective.

The scheme involved resurfacing several concrete residential roadways in their maintenance programme with our unique Milepave™ grouted macadam system for concrete carriageways. This is specifically designed to address the issues of current and future concrete joint failure and water ingress, eradicate these problems and ensure long term successful contract performance. Milepave™ is a reduced carbon surfacing process, using lower mixing temperatures, lower energy resources and a lower bitumen content than conventional products.

**DELIVERED PROGRAMME OF WORK**

- 35,695m² of surfacing
- 3,062 tonnes of 40mm Milepave and 383 tonnes of binder course
- 213 tonnes CO₂ total emissions, including sub-contractors Scope 3 transport.

ENVIRONMENTAL SAVING

- Savings of 830 tonnes in aggregates and 60 tonnes in straight run bitumen over conventional materials
- 129t CO₂ saving over a conventional hot mix material and a non-carbon neutral surfacing contractor (the equivalent of

400,000 car miles)

- Increased performance and subsequent lower whole life carbon costs.

FINANCIAL SAVING:

- Designed system to last longer, address specific issues and ensure lower whole life cost.

Miles Macadam and Milepave™ offer significant benefits over conventional approaches and through our direct emission reduction, carbon neutral certification and carbon reduction strategy, the scheme is certified as achieving net zero carbon emissions.



We are delighted to have delivered Reading Borough Councils' first carbon neutral surfacing scheme and to facilitate their commitment to climate change.

830
TONNES
of aggregate saved

60
TONNES
of bitumen saved

400,000
car road miles equivalent saved

 **129**
TONNES
of CO₂ saved



Multevo leads on sustainable highway maintenance



Digital innovation and dual-fuel hydrogen technology aids the nationwide contractor to deliver a low carbon service.

Multevo works with local authorities and tier-one contractors to deliver highways, civils, and vegetation maintenance as well as traffic management, as a reliable, sustainable and ethical one-stop-shop.

Since 2010 the company has been the exclusive UK distributor for the Multihog range of multi-purpose compact tractors and sweepers with a hire fleet of over 55 machines.

Josh Sweeney, Director of Marketing & Growth explains why he believes Multevo has been well placed to implement low carbon initiatives early on: "Because of the nature of working with an innovative multi-purpose machine, our ethos has always been to identify better ways of working by utilising less equipment more effectively which has helped us progress our sustainability agenda into our service offering. We are experienced in using one machine for several applications on site and this has helped strengthen our approach."

The Multihog accepts different attachments to the front and rear which can be changed over in under two minutes allowing the kit to be utilised for a diverse range of tasks quickly.



Multevo operates the machines with much success on the strategic network arriving within a closure with a range of attachments to undertake verge and barrier mowing as well as edging or siding out in addition to heavy duty mulching or arb applications.

Most of Multevo's Multihogs operate on the local highways network for carriageway and footway repairs utilising the proven planer attachment whilst many council customers also use the machines for winter resilience or flood water pumping to name but a few other functions.

The growth aspirations of the company are built around continuous innovation with has led to the development of a new

dual-fuel hydrogen and diesel technology system that can be applied to the Multihogs to further reduce their impact on the environment, as Josh continues: "Whilst using a multi-purpose tool helps to deliver significant advantages from an efficiency point of view, we identified early on that our machines are typically engaged 75% of the time whilst on site compared to 30% as an industry average for plant. By integrating our dual-fuel technology onto the existing Multihog chassis we have now been able to displace diesel consumption by 40% which is another huge step in achieving improved sustainability in our operations."

In addition to fleet fuel-efficiency optimisation through cutting edge technology, Multevo has also been a paper-free contractor since 2018 through the development of their own App which has greatly reduced their carbon footprint.

When Multevo set up a contracting division five years ago, their aim was to be an exemplar in the industry and embracing digital innovation has allowed the business to streamline its processes to manage quality, safety, productivity, and the efficiency of their operations.



The Multevo App provides a transparent audit trail for Multevo's customers, recording critical information such as road repair outputs and quality, HAVS exposure, pre-use checks as well as HSEQ audits and accident statistics. The information is then fed into a real-time custom report dashboard which can be accessed by management and customers at all times.

Multevo's Head of Compliance and Sustainability, Stuart Allen comments: "The App enables us to continue to maximise our service through digital innovation, that delivers smarter, more efficient working on the front line and data analytics that allow us to make better more informed decisions, so we can concentrate our resources on what matters most – bringing added value to our customers."



Get in touch

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WORKING TOGETHER FOR LONGER LASTING PAVEMENTS WITH REDUCED MAINTENANCE

THE ASPHALT GROUP'S MISSION IS TO HELP YOU IMPROVE THE IN-SERVICE PERFORMANCE OF ASPHALT PAVEMENTS FROM DESIGN TO INSTALLATION BY EXTENDING PAVEMENT LIFE AND REDUCING THE DEMAND FOR REACTIVE MAINTENANCE.

OUR GROUP COMPANIES PROVIDE A RANGE OF SERVICES.

ASPHALT REINFORCEMENT

GlasGrid® - the sustainable solution to reflective cracking is designed to extend pavement life to ensure authorities can maintain their Highway Infrastructure as efficiently as possible, reducing maintenance intervals and costs.

ASPHALT SURFACE DRESSING

Good asset management is vital to maintaining the local highway network and surface dressing is a cost-effective solution extending the life of a pavement and increasing intervals between major maintenance interventions.

ASPHALT PRESERVATION

We provide preventative solutions that preserve, protect and extend the life of our roads thus saving wasted time, money and damage to our environment.



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PERFORMANCE
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