RENEW

2021 EDITION

The carbon reduction issue

How public and private are working together on reducing carbon and driving sustainability

THE BOSS SPEAKS OUT

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Save time and money before road trials

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RSTA

editor's note

Paul Boss | CEO, RSTA

> The past year may have been dominated by Covid-19, but the road surface treatments sector has been working harder than ever to ensure we are prepared for the much bigger and ongoing task of saving our planet for future generations.

Sustainability through carbon reduction has never been more important and for clients and the supply chain involved in highway asset management, the need to reduce the generation of carbon as a result of highway operations is second only to health and safety. This is good news for everyone. Experienced asset managers already know the efficiency and effectiveness of surface treatments, the reduced lifecycle costs, reduced disruption on the network and the prevention of potholes. But now we can demonstrate not only these advantages, but also how surface treatments and the preparations works required on many roads can be delivered with significant savings in carbon generation over traditional maintenance methods.

The continuous innovation from our industry is staggering and there is more to come as companies invest in the greener way forward and client authorities demand processes and treatments to ensure they maximise not just the use of their funding but going forwards the amount of incentivised funding they receive to maintain their networks and tackle their climate emergencies.

In this issue of Renew, the Road Surface Treatments Association and our members are proud to share with you how laboratory testing prior to road trials is enabling further investment into surface treatments, how some companies are on their way to achieving net zero, the CO_2 reduction benefits of road maintenance and how advances in Artificial Intelligence, carefully implemented will have positive effects on how road networks are effectively managed.

We also look at and respond to this year's AIA report and how surface and other treatments can lead to positive reports in the future.

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.

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ALARM SURVEY 2021

MAINTENANCE BUDGETS UP BUT INCONSISTENT FUNDING NOT A LONG TERM SOLUTION

Average highway maintenance budgets were up by 15% on average in England last year although were below the levels reported in 2019, citing a continued pattern of inconsistent levels of funding, making it difficult for councils to plan longer term, according to this year's Asphalt Industry Alliance ALARM Survey.

Welsh local authority budgets were up by 22% on average while London saw a small increase of 1.2%. As a result, more potholes were filled (13,298 for England) on average per local authority last year, with 3,967 filled on average in Wales and 2,634 in London. Local authorities have also worked hard to increase the amount of sustainable products used. The percentage of councils responding to the survey revealed that 61% had used warm mix asphalt, 82% were using recycled materials and 33% were choosing materials with the lowest initial carbon footprint, alongside 85% selecting surfacing materials with longer life.

The survey said however, that the bill to fix the backlog is still in excess of £10 billion, meaning roads are resurfaced once every 68 years on average. It said: "The increased number of potholes filled is a reflection of the reduced investment in programmed work, which has resulted in poorer road conditions. Filling potholes isn't a victory; it's a failure." According to the survey results, the Overall Road Condition Index showed that 60% roads were in green condition, 31% in amber and 9% in red against a target of 67% green, 25% amber and 8% red. Local authorities in England and Wales said that the ideal profile of road condition should be 73% green, 21% amber and 6% red.

From a structural point of view, overall, around 54% of the local road network is reported to be in good condition, with 29% adequate and 17% poor.

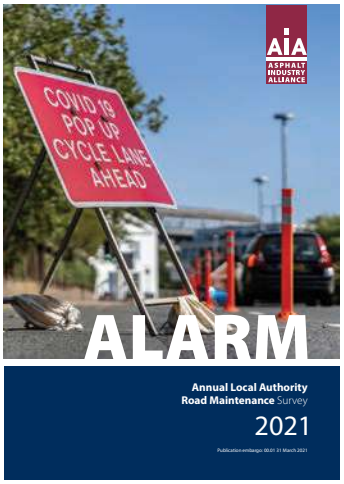
> Filling potholes is a symptom of a poorly maintained road in the first place

Speaking about the survey, Rick Green, Chair of the Asphalt Industry Alliance said: "With a lot of competing funding requirements in a year like no other, the fact that on average local authorities in England received 15% increases for their highway maintenance budgets should be applauded. But this funding was lower than 2019 and it is this constant changing of funding levels is part of the problem, leading to the fact that the local authorities basically have a significant shortfall in the amount of funding that they believe they require."

Rick Green

"We filled 1.7 million potholes, which is one every 19 seconds, but actually, filling potholes is a symptom of a poorly maintained road in the first place. They get expensive and they are wasteful. So, the fact that we've repaired more potholes is stopping people driving into them but actually, it's not a good indicator that the amount of potholes has gone up."

He also said that a more 'streamlined' competitive funding process would save local authorities time, money and resources on bidding. Mr Green also called for a five-year funding settlement that would enable highway authorities to plan more effectively. "A five-year Government funding package, similar to the commitment made to the strategic network in the two Roads Investment Strategy periods, would allow local authority highway asset managers to plan ahead, invest in, and implement a more sustainable, cost effective whole life approach to maintaining our local roads."



HEADLINES

HIGHWAYS MAINTENANCE BUDGETS (AVG)

↑ 15% ENGLAND

↑ 22% WALES

OVERALL ROAD CONDITION SURVEY

60%

31%

9%

1.7M POTHOLES FILLED | 1 EVERY *19* SECONDS

13,298 **POTHOLES** Filled per LA (in England, Avg)

Increased use of warm mix asphalt, recycled and lowest carbon footprint products and longer life surfacing materials

ALARM SURVEY 2021

The RSTA response

The amount of time and money spent on reactive and structural maintenance programmes could be significantly reduced if councils were to continue to increase use of a wider range of surface treatments at the right time in the lifecycle of the network.

This was the message from Paul Boss, Chief Executive of the Road Surface Treatments Association (RSTA), in his response to the results of the 26th ALARM Survey

He said, at a time when capital funding for maintenance is not being increased, this approach would also offer highway authorities added value and the chance to reduce the carbon associated with highway maintenance works even further. Even when longer term settlements are possible, the sustained use of surface treatments should be prioritised to ensure greater efficiency with least carbon generation.

Mr Boss went on to say that by using cost effective surface treatments at the right time in the right way as part of a progressive and proactive asset management strategy, the need for more reactive approaches would reduce and help limit the amount of potholes that are formed in the first place, by preventing the deterioration of the road surface.

Regular use of different types of surface treatments would also enable councils to refocus their investments on the roads that need the most attention, while the ones that are in better condition, could be held in that state for even longer, he added.

"It is great to see that highways maintenance budgets were up on average by 15% last year. But, while more investment for local authorities to spend on maintenance would of course always be welcome, it isn't just about the money," said Mr Boss. "The ALARM survey notes that the increased number of potholes filled is a reflection of the reduced investment in programmed work, which has resulted in poorer road conditions. Use of surface treatments as part of a toolbox of methods and treatments will help local roads from deteriorating, as well as keeping the roads in better condition for longer. Using the right treatments at the right time, backed up by available highways technology that provides more accurate detail on the road condition itself, would help the money that is available go further, for longer."

Commenting further, Mr Boss said there would always be a need for asphalt replacements, even if that is just as a surface course following 'institu' road recycling, but with the use of the right surface treatments, at the right time on roads in good and average condition, resurfacing roads every 68 years may not be a major issue. Where poor roads do have to be resurfaced with asphalt, low and medium temperature asphalts should be the road authorities default specified material.

"The survey shows well over a third have not used them and I suspect very few specify them as a default, nearly 20 years after the industry made them more widely available and they are now well tried and tested. The road surface treatments sector and asphalt industry have made great improvements to their products for the benefit of the economy and the environment. It's now up to asset managers and decision makers to fully embrace these if they are serious about efficiency and sustainability for the benefit of all," said Mr Boss.

> Using the right treatments at the right time, backed up by available highways technology...would help the money that is available go further, for longer

Research proves CO_2 reduction benefits of road maintenance

Late last year, RSTA consolidated wide-ranging research that found that keeping roads well maintained not only saves money but reduces traffic CO_2 emissions, reports Paul Boss, Chief Executive of the Road Surface Treatments Association (RSTA).

Implementing planned programmes of preventative road maintenance is far more cost effective than repairing potholes. It costs £3 to £5 per m^2 to surface dress and maintain a road but costs on average over £50 per m^2 to repair potholes. Savings for stretched highways budgets is not the only benefit. A wide pool of research proves that well[maintained roads can also help to reduce the carbon emissions of road traffic. With transport now accounting for the majority of UK emissions – 26% of all emissions – the contribution that a well-maintained road network can make towards their reduction should be recognised and pursued.

Research has found that this contribution can be significant. A technical report 'Analysis of the relationship between road pavement maintenance condition, fuel consumption and vehicle emissions' published earlier this year by the Brussels-based Smart Transport Alliance found that good road surface conditions result in reductions of fuel consumption and CO_2 emissions of up to 3.5% for light vehicles and 4% for heavy vehicles. Meanwhile, the European Automobile Manufacturers Association believes that maintaining the European road network with planned programmes of surface dressing could result in a CO_2 emission reduction of 5% by 2035.

Similar findings were reported by research led by the Department of Civil and Environmental Engineering at Rutgers University, New Brunswick. This found that the improved road surface condition resulting from preventative maintenance programmes can save highway authorities 10% to 30%, reduce greenhouse gases by up to 2%, and allow drivers to reduce their fuel consumption by 2% to 5%. Whilst a survey over 5,000 lane-miles of Virginia's interstate highway system by the Massachusetts Institute of Technology (MIT) Concrete Sustainability Hub (CSHub) found that the maintenance of just a few lane miles allows for significant performance improvement, along with lowered environmental impact, across the entire network. Maintaining just 1.5% of the roadway network would lead to a reduction of 10% in greenhouse gas emissions statewide.

The research carried out by a variety of universities emphasises how a road surface maintained in good condition promotes a smoother and more efficient ride and it is this that reduces fuel consumption and CO_2 emissions. This should be an important consideration for highway authorities for, in addition to meeting public expectations of improved environmental efficiency, local authorities have a statutory duty under their NI 185 and NI 186 obligations to reduce their carbon emissions. Implementing proactive programmes of road surfacing and road maintenance can help them meet those obligations.

> A road surface maintained in good condition promotes a smoother and more efficient ride and it is this that reduces fuel consumption and CO_2 emissions

THE VIEW FROM THE TOP

RSTA Chief Executive, Paul Boss, speaks to Renew

The last year may have been a challenge for the whole industry but the RSTA continues to grow on a number of levels. Here, our Chief Executive, Paul Boss, talks to Adrian Tatum about why surface treatments will continue to drive change on the network, how the RSTA will continue to support its members of the wider highways maintenance industry and why training is as important as ever.

Q The pandemic has affected every company and organisation in the industry in some small way, but on the positive side work has remained constant. What's your assessment of the last year and how do you see RSTA continuing to support its members and their clients as we recover?

Paul Boss (PB): The pandemic has had a major effect on all companies and clients. Whilst our industry has fared better than most with no forced shutdowns on work, the speed with which the pandemic took effect and the changes that had to be made with very little planning, were both costly and disruptive; moving some staff to working from home, providing mobile IT, Covid-19 Health and Safety policies, protective measures, accommodations closures, etc. On top of these, the first lockdown coincided with the beginning of the season for many of our members and initially some authorities just stopped all but emergency works.

Our industry has a good starting point for the recovery and the association will be here to support members and clients with the challenges of operating in a different environment. There will need to be an understanding of permitting and how this accommodates weather dependent mobile works, with clients and members working together to ensure road users are kept informed where works are taking place with the flexibility to ensure these works can be undertaken efficiently. Whilst permits were mandatory from last July, the pandemic and lack of travel meant waivers were commonplace. This year will see information and permits being implemented and we have to ensure everything is proportionate, keeping road users informed but without stifling efficient and sustainable working. The use of rebated fuel (Red Diesel) in a lot of members' plant will be banned from April 2022, increasing costs that unfortunately will have to be met by clients. Sustainable highway asset management will require many clients to change the way they approach maintenance, but ultimately this will help their finance go further whilst improving their highway networks. The RSTA will be here to support all clients and members with carbon calculators, example decision making processes and to answer any other questions they may have.

Q How would you evaluate the surface treatments sector right now and the wider development in the highway maintenance industry?

PB: The surface treatments sector is already recognised as an integral part of effective and efficient highway asset management, but we are on the cusp of expansion as the need to reduce carbon generation and make finance work harder than ever will see increased use of surface treatments, particularly in those authorities who are only beginning to see the advantages. Preservation treatments will become widely used on the network and complement the already wider use of surface dressings and Slurry Microsurfacing. Innovations across preparation works for surface treatments and other repair works will continue at a fast pace and whilst there will always be a need for asphalt, with advances in medium and deep recycling, along with surface treatments, the traditional cycle of asphalt resurfacing will become the exception rather than the norm.

Q Tell us about the RSTA three-year strategy. What has been delivered already and what are the priorities moving forward?

PB: The three-year strategy was initially agreed at the end of 2019, before Covid-19 was really heard of and some months before I joined the RSTA. The priorities were reviewed but the purpose of the association remains the same, to be the trusted voice of the UK Highways industry on surface treatment solutions. Clients need to have confidence with our Codes of Practice and Guidance documents and know that RSTA members are appropriately trained to deliver treatments on their networks.

It was clear to me that the priorities were the development of the new website that went live in early January and the appointment of a new PR and marketing team that fully understood the priorities of the association and the direction it needed to go in the future. H2H Marketing Services was appointed and began working with the RSTA in January. In tandem with both the website and the new marketing team, the ongoing priority was always to increase the membership and form closer partnerships with other organisations in our industry. When I joined the association in July there were 81 members. Due to increased marketing and promotion of the benefits of joining the RSTA, along with the hard work of our CTO, we currently have 88 members and are regularly receiving further enquires.

In addition, we have agreed formal partnerships with LCRIG, IHE and Safer Highways, whilst renewing our association with CIHT. Membership, training and increasing membership benefits will continue to be the priority going forwards. That means working closely with the HE, BSI and others in the industry including the DfT and devolved governments to assist them with policy development and reviews for the benefit of highway authorities and our members, particularly in terms of sustainability and carbon reduction. This is an absolute requirement if the UK is to reach its carbon reduction targets

and clients are to maximise their self-assessment incentive funding.

Q How do you intend to increase membership engagement and provide value for money for your members?

PB: We have sectors with committees and eight sub-committees that meet to continually review standards and other documents, ensuring these are up to date and continue to be fit for purpose. At these committees and throughout the year many consultations are undertaken with members. The association also represents them by bringing external consultations to their attention, listening to their feedback and then actively representing their informed views.

We launched a members e-newsletter last year to provide further information and encourage engagement and have continued to increase our training and assessment offerings. Whilst virtual meetings have ensured the engagement with members and the work of the association has continued, when it is safe to do so we will be back around the table, meeting face to face and continuing discussion before and after meetings, and during breaks.

When conferences and other industry events resume, we will be promoting the work of our members and meeting more of them in person. After cancellation of our own conference in 2020 and again this year, we are already well on the way to organising our 2022 conference on the 7th April next year at The Belfry and know our members and guests are already looking forward to it.

Q In the last year, RSTA's membership has not only grown but attracted a wider range of companies from testing services, to road condition software and data, etc...why do you think this is?

PB: There is an enormous synergy between surface treatments, testing, and survey and software companies. Surveys help plan future programmes of maintenance and, particularly with preventative works, the surveys provide information that cannot always be seen with the human eye. With surface treatments being an integral and increasingly major part of highway asset management, the triggers that require them have to be built into the asset management planning systems, providing informed costed future programmes of maintenance for asset managers and decision makers. When the treatments

are then being laid, proper testing is vital to ensure quality of materials and laying to ensure the optimum planned lifecycles are realised and can be relied upon. We now have 3 member companies dedicated to these services with the other main suppliers in the process of submitting applications or considering membership.

Q Training is one thing that has had to change drastically during the last years. How have you managed to adapt the RSTA training as a result. And how does your assessment centre fit into this?

PB: The Assessment Centre relies on site working assessments as an integral part of the NVQs and have continued throughout the pandemic with Covid-19 safety precautions in place. More of the initial meetings have had to take place outdoors and assessment numbers were reduced last year.

CPD courses planned for last spring were postponed until the autumn 2020 when unfortunately, the second wave started hitting and then these too were cancelled. This year we moved CPD training online using a webinar training platform, beginning with a half day course, then a day and recently a 2 day course. Although successful, I believe the experience for the delegates and trainers will never replicate being in a room with face to face contact.

We will continue to offer on line courses for as long as is necessary to protect all involved and may continue with them for delegates who cannot travel, particularly from other countries, but as far as possible we will take the courses to the delegates to ensure they can always get the most out of their training. CPD is exactly that, continuing professional development and anyone who has attended one of our courses can contact us anytime afterwards for help with any questions or other technical or practical information they require.

Q The highways maintenance and surface treatments sector moves at such a fast pace and as it changes, so does the need for different skills and people to come into the sector. How will the RSTA training offer change to match these needs in the future?

PB: We have reviewed our current training and assessment offerings and following changes to existing courses, we are developing new ones for all surface treatments covered by the National Highway Sector Scheme 13. This will be an ongoing process to keep up with changes to and the development of new standards. As more and more innovations become the norm, we will continue to adapt our offerings. In terms of the Assessment Centre, we are now offering a wider range of NVQs and assessments up to NVQ Level 6.

Q Surface treatments have been in the news a lot since the start of the year. Why do you think this is and how will you help support the sector by keeping them at the forefront of the industry?

PB: The treatments continue to improve and with the need to reduce carbon and make highway operations more sustainable, it's not just the efficiency and effectiveness of surface treatments that is making the headlines. Their reduced carbon generation over the lifecycle of a road is unquestionable, making them a win-win on all accounts. Even those who already used them as part of their highway asset management are considering and / or using further treatments, not just for prevention, but also extending the life of

already worn out carriageways with some of the semi-structural Microasphalt and other innovative products now available. As national policy and targets demand reduced carbon generation, the use of surface treatments will continue to rise, with all the added benefits that they already bring.

Q While the use of surface treatments is on the rise there is still quite a high proportion of road operators and local authorities that do not use them. What is the plan to change this?

PB: Whilst the continued need for efficiency and sustainability will force those local authorities that are not already using them to do so, we have a duty to educate asset managers and decision makers of the benefits of using surface treatments to improve their highway networks and reduce disruption to road users, for the benefit of the UK. We will do this by publicising the standards of the products through media, conferences, exhibitions and webinars. Buy in from those stewards of our highway networks will bring real advantages with reduced effects on the environment, lower costs and less disruption for road users.

Q Funding has definitely improved for highway maintenance over the last decade but is still inconsistent at times. How can local authorities, for example, still plan surface treatments in their asset management strategies?

PB: Local authorities receive indicative funding settlements that help them to plan their surface treatments as part of their asset management strategy. Early planning with their supply chain can itself significantly reduce costs as they benefit from the efficiencies they can offer their contractors. There will always need to be changes as a result of overspends, underspends, co-ordination with other works, accelerated deterioration and extreme weather events, but if 70-80% can be planned, other changes can be accommodated. The DfT is currently putting a comprehensive business case for funding together that will hopefully lead to medium term certainty of funding from 2022/23 onwards. Certainty of funding will enable authorities to plan their medium-term programmes earlier, but tentative programmes should be available based on current conditions, lifecycles and estimates of future funding.

Q Changes to self-assessment questions in 2022 suggest more of a leaning towards sustainability. Surely that presents a good opportunity for members moving forward?

PB: Yes, the non-scorable fact finding sustainability and biodiversity questions included with this year's DfT self-assessment questionnaire are seen as the forerunner to scorable questions being included from 2022, following the review of the self-assessment and incentivised funding process due this year. These are likely to require local highway authorities to evidence they have the processes in place to ensure the most sustainable treatment options are chosen, reducing carbon generation over the life of the asset. A level 3 or equivalent will likely require evidence the processes have led to changes on the ground with the increased use of lower lifecycle carbon treatments. This is good for our members as the market will increase but it is also good for our environment, taxpayers and road users. We all benefit from cleaner air, lower overall maintenance costs and reduced disruption due to both better planned works of shorter duration and far less potholes.

Q If you look forward five years plus, where do you see the condition of roads nationally?

PB: With the introduction of scorable self-assessment sustainability questions linked to funding and the ongoing demand for reducing damage to our environment, the increased use of surface treatments will see our road conditions improve over time. There is still a backlog that has to be tackled but the increased use of surface extension treatments, insitu recycling and gradual savings in reactive maintenance will help clear this. The savings will come as a result of using more preventative surface treatments and better targeting of reactive maintenance through the use of automated inspection innovations. There will be further clearance of this backlog as fewer sites in each authority will require the more expensive treatments and we have fewer sites downgraded from green to amber, and amber to red.

CORMAC TAKES BIOMETHANE PROJECT TO THE NEXT LEVEL

Cormac is a company that wants to keep on developing and using innovative ideas to help drive change on the road network. One example is its on-going biomethane project which the company hopes will lead to it having a 100% ULEV vehicle fleet by 2030.

CORMAC

PART OF THE CORSERV GROUP
A CORNWALL COUNCIL COMPANY

The company now has over 1,000 vehicles in its fleet but it is only possible for the smaller ones (<2.4t) to be fully electric in the near term with the larger ones unlikely to be because of technology and financial restraints.

This is one of the reasons behind Cormac investigating alternative fuel types to help maintain its part in aiding the highways sector to become more sustainable. It also supports Cornwall Council's ambition to reduce its emissions, the catalyst for its decision to declare a climate emergency. But the project has also been about collaboration. Cormac has partnered with a small local Cornish company, Bennamann, to explore a renewable and zero carbon biomethane product produced from diary farm slurry.

Usually, methane is a harmful greenhouse gas but research has found that it is possible to capture it before entering the atmosphere and used as a fuel instead.

"We believe this innovative trial may have been the first of its kind in the country, which helps to demonstrate that there are viable sustainable energy options for large construction vehicles and equipment that are traditionally powered by fossil fuels. We are now planning for wider adoption of this fuel type across our fleet and other business functions," says Al Hoare, Group Services Director.

This £1.58 million pilot will see Bennamann collect and upgrade the biogas produced at the farms, before delivering it to Cormac to fuel a fleet of 77 converted road maintenance trucks. Cormac has estimated that each biomethane vehicle will save roughly six tonnes of carbon per year with each converted asphalt 'hot box' saving around five tonnes annually.

Cormac's first trial with biomethane started at the end of 2019, where it successfully tested biomethane-fuelled equipment to fill potholes and help repair the network across Cornwall.

During the trial, operatives Simon Sweet and Paul Matthews used the converted pothole repair trailer to heat the asphalt to around 130-140°C, the same temperature they usually use to ready the materials to repair the surface of the road. Powering the trailer's hot box with biomethane allowed it to retain its temperature during transportation and successfully patch several road surfaces. The trials with biomethane continue.

In January 2019, Cornwall Council declared a 'Climate Emergency', recognising the need for urgent action to address the climate crisis. Cormac has been closely working with the council to identify, investigate and pursue key opportunities for energy efficiency and emission reduction. The company says it recognises that it has a leading role to play and that by facilitating positive organisational change it can help Cornwall to achieve 'net carbon neutrality' ahead of the UK government's 2050 target. This will give the region its best chance of keeping global warming below the critical +1.5°C 'tipping point' threshold for ecosystems, human health and well-being, it added.

Cormac Business Development Manager Jason Peel, says: "Cormac is undertaking dynamic and innovative new working practices in the drive to achieve Carbon Zero. These case studies are the building block to creating a sustainable environment across the South West region, benefitting our industries, economy, visitors and local communities.

"We have embraced significant work and invested in new group protocols to measure our social value, and stand well placed to demonstrate ongoing, sustainable value over the coming years"

Another sustainability example is Cormac's development of its own internal recycling operations. Cormac has now established five aggregate

£1.58m
invested in biofuel scheme

77
trucks converted to run on biofuel

6 TONNES
of CO_2 saved per vehicle per year

WARM MIX ASPHALT
169T
of CO_2 saved per year

recycling sites throughout Cornwall, where its wastes such as concrete and asphalt generated from highway construction and maintenance activities and processes it into quality, affordable and sustainable secondary aggregate products. Each year the company recycles around 35,000 tonnes of construction waste, which over the last three years (105,000t) is the equivalent weight to two Titanics, according to Cormac.

"By transforming waste back into a valuable resource, we have been able to: significantly reduce the volume of construction waste sent to landfill, reduce costs, increase our operational efficiency and reduce demand for the extraction, processing and transportation of raw construction materials (lowering carbon emissions and limiting other adverse environmental impacts). By keeping materials in use for longer, we are supporting a regional 'circular economy' for construction materials," says Stuart Wright, Group Environmental Manager.

The company's aggregate recycling team has also recently invested in a new mobile aggregate crusher and screener – 'Rubble Master - RM 90GO!'. This is a 'highly versatile machine which produces a higher quality, higher value final grade product with built-in dust suppression. It also produces less low-loader movements due to no independent screen requirement, has a lower fuel consumption and produces less noise compared to other alternatives.

As Cornwall begins its journey to a green recovery, it has never been more important for the construction industry to adopt more sustainable ways of working.

Castle Quarry, managed by Cormac on behalf of Cornwall Council, is embracing a new low energy approach to producing the materials used to build and repair Cornwall's roads. Warm Mix Asphalt (WMA) is produced and applied at a temperature up to 50°C lower than an equivalent traditional Hot Mix Asphalt, therefore requiring less energy to manufacture and significantly reducing greenhouse gas emissions.

Producing this new sustainable material should not compromise the performance and lifespan of road surfaces. The lower temperature also has the added benefit of enabling maintenance teams to open roads sooner, minimising disruption to traffic - which will become increasingly important as people start to travel again after the Covid-19 restrictions have eased.

The advantage of reduced energy in production means that fuel consumption and its associated costs and carbon emissions can be minimised. It is estimated that producing WMA will save Cormac at least 169t of CO2e per year. This is equivalent to 34 hot air balloons in volume and, according to some estimates, comparable to the average annual emissions of 20 UK citizens.

Ian Bounsall, Cormac Business Director for Regional Business and Surfacing, said: "We are excited to develop our own range of environmentally sustainable materials that we use on Cornwall's roads. This new mix of warm asphalt brings the environmental benefits of energy saving and lower emissions, while at the same time enhancing the durability of the road surface.

There are other technical advantages to using this warm-mix asphalt, such as being easier to compact when we are out laying it on the road surface in cold weather. This means we can minimise waste of any material and get the roads back open quickly.

We will continue to innovate to find ways where we can reduce our carbon emissions. We are proud to be working towards a future where warm-mix asphalt becomes the go-to product for all road surfacing, along with our recycled asphalt planings," he added.

With carbon reduction at the centre of the Government's 'Build Back Better' strategy and many local authorities working to achieve net zero targets by 2050, finding solutions that can deliver the same, or improved, quality but release fewer emissions will benefit road users, communities and the environment.

think exceptional

Thinking Sustainability

Protecting the planet, supporting our communities and delivering sustainable value is at the heart of all our business decisions.

Protecting The Planet is exceptionally important to us and our aim is for a beautiful, healthy and clean environment to be enjoyed for generations to come. Our innovative culture, helped us develop systems and tools to understand and then reduce both our operational and product carbon footprint, demonstrated by our groupwide Carbon Trust Certificate and independent validation by Lucideon for our products.

We aim to be a beacon for our sector to help realise a sustainable future for all.

WJ deliver road marking products and services nationally and regionally:

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- Temporary markings
- Road studs
- Surface preparation
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PREDICTING THE PERFORMANCE OF ROAD SURFACING PRODUCTS PRIOR TO ROAD TRIALS

Products intended for use on UK road networks are required to go through certification processes prior to permanent installation. Certification processes typically include the installation of a road trial. They are intended to give confidence that products will meet end-use performance criteria as set out in relevant industry standards, specifications and guidance documents.

The main driver behind product certification assessments in the UK and Europe is the Construction Products Regulations (CPR) implemented in 2013. The CPR allows a manufacturer to give a declaration of performance for a product based on conformity assessments which results in the product receiving a CE marking.

Examples of product certification processes that require road trials in the UK are: the BBA HAPAS assessment and certification of asphalt thin surfacing systems and high friction surfacing (HFS) systems; the BSI road safety materials performance certification scheme for road markings; and Type Approval Installation Trials (TAITs) for surface dressing and microsurfacing. BS 8870, expected to be published in 2021, sets out requirements for performance and control procedures for HFS products which will also require the installation of a TAIT.

Road trials typically last up to 2 years during which they are monitored, and a certificate of compliance or non-compliance is then issued to the manufacturer. Although road trials are extremely important for ensuring products fit-for-purpose are installed on road networks, they can be expensive and time consuming. A manufacturer may have to wait up to 2 years and incur significant costs before realising that their product cannot be put on the market for certain applications.

Manufacturers may lose market share and competitive advantage as a result of having to go through a cycle of product development and further road trials until their product meets specified criteria. Having a means of quickly predicting performance in the laboratory is a way to mitigate against the risks associated with road trials. The Road Test Machine (RTM) located at Ulster University offers such a solution (Figure 1).

The RTM consists of a 2.1m diameter table that rotates at 10 rpm or 1.1 m/s. Up to ten 305mm x 305mm x 50mm slab specimens or core specimens can be mounted on the table. Two vertically mounted 195/70R14 full-size tyres run freely on the table, applying a load of approximately 5 kN on the test specimens from each tyre and simulating real trafficking.

FIGURE 1
Road test machine

During testing, the tyres track back-and-forth transversely across the width of the test specimen, generating extra stressing within the contact patch (Figure 2).

The RTM is enclosed in a temperature-controlled room where testing is carried out at 10 ± 20°C. The number of rotations and temperature are recorded automatically. The RTM can be programmed to stop after a specified number of rotations.

FIGURE 2
Tyres track back-and-forth transversely across the width of the test specimen

The RTM was built by what is now known as the Transport Research Laboratory (TRL) in the 1930s to research the properties of asphalt road materials. The equipment was relocated from TRL to Ulster University where it underwent significant upgrading. It has been used to assess the wear characteristics of HFS systems for BBA HAPAS accreditation. The TRL Report 176 Appendix H Wear test method for HFS requires test values before testing begins and after 100,000 wheel passes, i.e., 50,000 rotations of the table. However, test values at the start and finish of accelerated testing do not adequately show what happens during the period of simulated trafficking.

Understanding what happens during this period of 100,000 wheel passes offers improved insight into time related changes of a product which relate to in-service trafficking conditions. Simulated trafficking is typically stopped at regular intervals to measure changes in properties such as skid resistance, texture depth, material erosion, retro-reflectivity, tyre/surface enveloping etc. Each test specimen can be photographed or scanned for visual assessment and 3D modelling.

The RTM is used as a tool for PhD and industrial collaborative research to investigate how properties of surfacing materials develop and change over time. This has allowed the Ulster University highways laboratory, under the stewardship of Dr David Woodward, to build and develop technical experience,

knowledge and expertise in road surfacing materials over the last three decades. This technical experience, knowledge and expertise is now being commercialised by R3 Ltd in partnership with Ulster University.

Figure 3 shows laboratory-measured wet skid resistance (PTV) for a range of surfacing materials subjected to 100,000 wheel passes on the RTM. This dataset, which contains 110 different surfacing specimens, was produced by R3's Dr Shaun Friel during his PhD, which considered the early life variation in friction properties for a wide range of surfacing materials used on roads in the British Isles.

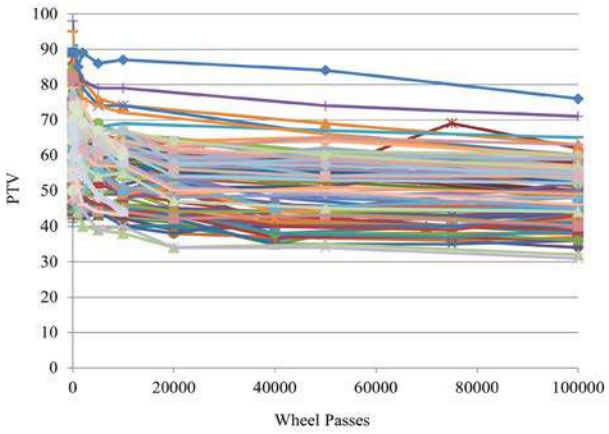


FIGURE 3
RTM dataset showing wet skid resistance for 110 different surfacing materials up to 100,000 wheel passes

The dataset includes different stone size mixes of hot rolled asphalt, asphalt concrete, stone mastic asphalt, proprietary thin surfacing systems, porous asphalt and HFS systems. All these materials incorporated different types of aggregate used on British roads including limestone, sandstone, greywacke, granite, basalt and calcined bauxite. The figure shows a range of wet skid resistance values from 30 to 76 after 100,000 wheel passes. The lowest being limestone and the highest being calcined bauxite. The test specimens made using a wide range of other rock types fell between this range. This data shows how wet skid resistance can be predicted to perform in the laboratory for different surfacing mixes using different combinations of aggregate type and size. It highlights the possibility of selecting the correct rock type and surfacing mixture for a particular site based on local conditions.

By using two full scale pneumatic tyres to simulate trafficking, the RTM offers a means of assessing changes in surfacing properties close to what may be happening in a real road surface. The RTM is an aggressive test and any weakness in the integrity of a material will be exploited and result in failures such as differential wear of aggregate particles, chipping loss, ravelling or premature erosion. The loading and stressing conditions allow for the assessment of changes in properties such as skid resistance, texture depth and tyre/surface enveloping. The test specimens can be conditioned prior to testing and offer the potential for quantifying product durability. This is of particular importance given the growing concern over the impact of climate change and extreme weather on the road materials now used in the UK.

Figure 4 shows a 3D model of an SMA 14 asphalt specimen after 100,000 wheel passes of simulated trafficking on the RTM. The model shows evidence of wear and opening texture on the

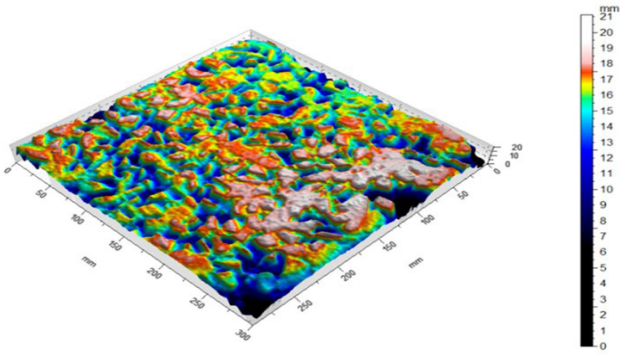


FIGURE 4
3D model of SMA 14 asphalt specimen subjected to 100,000 wheel passes on the RTM

specimen. This type of 3D modelling allows in-depth analysis and visualisation of materials and offers a means of explaining the causes of material failures.

The principle of enveloping at the tyre/surface interface plays a fundamental role in the development of road surface parameters such as noise, rolling resistance and skid resistance. Enveloping helps explain how aggregate particles embed into tyre rubber and how the tyre deforms into the space between particles.

Figure 5 shows an example of enveloping for an asphalt test specimen. This has been created by painting a 305 x 305 x 50 mm asphalt slab with blue paint and then subjecting it to 100,000 wheel passes of simulated trafficking on the RTM. The removal of paint shows the tyre/asphalt envelope. It shows how the two full-size treaded test tyres have interfaced with the surface texture of the asphalt test specimen. For this type of asphalt, the tyre/asphalt interface essentially consists of isolated islands surrounded by blue paint denoting paths where water may either be trapped or dispersed.

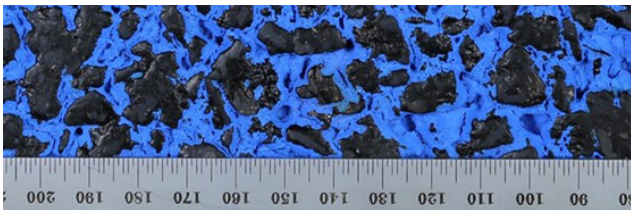


FIGURE 5
An example of tyre enveloping for an asphalt test specimen

Closer inspection shows areas where simulated trafficking has totally removed the bitumen to expose the tops of polished aggregate particles. At lower depth into the surface texture the bitumen coatings remain until a critical depth is reached at which there is only blue paint. Similar patterns occur for most in-service asphalt mixes and change during the earlier stages of their life until equilibrium is reached.

The RTM is used to test and develop a wide range of surfacing materials including asphalt, road markings, concrete, anti-skid surface treatments and utility manhole covers. A typical RTM testing program followed by data analysis and reporting of results takes approximately 2 weeks to complete. After this relatively short period of time, and for a fraction of the cost of a road trial, a manufacturer would have gained considerable insight about how their product would potentially perform during a road trial. The decision to proceed to a road trial would therefore be based on empirical data and experience which would give greater confidence of their product's likely performance and chances of success during a road trial.

WJ makes award-winning start on its journey to meeting Net Zero

WJ Group is on a journey to Net Zero by working to reduce carbon emissions in all aspects of its business with a full commitment to play a part and help deal with the challenges of climate change. Here's some insight into how WJ started that journey.

Climate change is in fact the defining issue of our times. The increasing use of fossil fuels has resulted in the release of billions of tons of heat trapping greenhouse gasses into the earth's atmosphere, far more than nature can reabsorb. This has resulted in an ever-increasing temperature rise of the Earth, and large-scale shifts to our planet's climate.

The disastrous effects can already be seen with extreme weather events occurring more often, affecting the lives of many around the planet. As time goes on, we will begin to see these effects impact everywhere, including the Highways industry, as supply chains are disrupted, and adverse weather conditions affect project delivery.

The UK government has set into law the aim to become Net Zero by 2050, as per the Paris Agreement. However, it has been widely acknowledged that those that can achieve Net Zero faster, must. WJ has announced its aim is to become Net Zero by 2032, based on its overall sustainability strategy.

Highways England recently presented WJ Group with the 'Excellence in Environment and Sustainability Award" for its exceptional approach to sustainable service delivery. The judges really liked the development and implementation of its carbon footprint model to underpin changes in the business and develop company culture and focus.

WJ Group Sustainability Director, Paul Aldridge, explained their approach "The first challenge was understanding our emissions. As a result, we worked collaboratively with a number of organisations to understand best practice in carbon management and begin our journey towards Net Zero. We started by regularly monitoring and targeting our emissions for reduction, with a focus on two fundamental areas that we could measure, verify and reduce, our operational and our product carbon footprint."

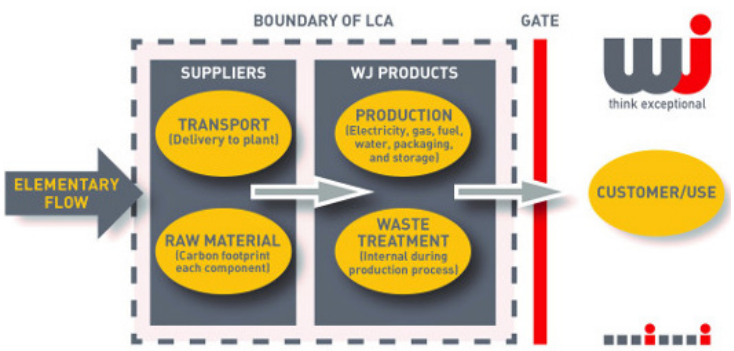
For its operational carbon footprint, WJ collected data on electricity consumption and fuel usage, before creating groupwide monitoring and real-time recording.

Laboratory development of WJ low carbon innovative product formulation

Working collaboratively with the Carbon Trust, WJ identified fleet diesel consumption as their main source of emissions from their 220 trucks. It addressed carbon reduction in several ways including new vehicle design, extensive driver training and the use of telematics to monitor safe and fuel-efficient driving with a driver reward scheme to incentivise continual improvements. Further reductions were achieved thanks to recycling initiatives, switching to electric cars, LED lighting and solar panels.

As a result, they saw consistent reductions in emissions relative to turnover and mileage over a number of years, achieving a Group Wide Carbon Trust certificate.

In terms of its products, WJ manufactures vast amounts of road marking materials each year, creating an emissions hot spot and environmental challenge. In describing their efforts to reduce emissions, Paul Aldridge commented "Undoubtedly, one of the most significant steps we have



taken is the development of our Carbon Footprint Model, which means we can now accurately measure all embodied carbon within our thermoplastic products. This research project was a huge undertaking for us to understand the true carbon footprint of each raw material, including transport and the energy used in our own factory production of the end product."

The Cradle to Gate Life Cycle Assessment Model provides quick, efficient, and reliable at-scale carbon foot printing for all current and future hot applied products, independently verified to PAS 2050:2011 and ISO14067 (2018) by Lucideon, meeting the specifications and standards requirements for quantifying and reporting.

> This initiative will help us reach Net Zero well before the 2050 date set by the government...and eventually we will be able to remove all the carbon we have ever emitted.

These initiatives helped WJ make huge strides to lower its emissions, and it has stated going forward that it will continue to explore further ways reduce their emissions, including further training; the viability of alternative fuels; more electric vehicles; diverting waste from landfill; developing more lower carbon products; and using more solar powered heating and lighting.

However, based on current technology and customer needs, WJ acknowledge that Net Zero does not mean emitting no carbon at all. Consequently, the company is planning to remove as much carbon as it emits, using nature to balance its emissions. It now owns over 900 acres of land at the head of the Glenshee in Scotland, with plans underway for a scheme to plant over half a million trees. This will remove huge amounts of CO_2, whilst also helping restore biodiversity and bring ecological benefits to the area.

WJ Group Managing Director Wayne Johnston said "I'm delighted to announce our commitment to addressing climate change with help from the WJ Forest. We recognised that rather than continuing to talk about the issue, we needed to make a radical move. This initiative will help us reach net zero well before the 2050 date set by the government and as we move forward, we will look to continue to bring through more sustainable innovations and eventually we will be able to remove all the carbon we have ever emitted."

WANT THE BEST RESULTS FROM YOUR SURFACE DRESSING? IT'S ALL ABOUT THE PREPARATION

Trevor Thompson, Business Manager from Roadtechs, discusses why giving more attention to pre-surface dressing will help yield good results from your asset management programmes.

Surface dressings have been used as a maintenance technique on all classes of road since the late nineteenth century. Approximately 80 million m² of surface dressing are installed on the UK highway network each year, primarily on the secondary network.

It remains a cost-effective way of maintaining a road. It restores skid resistance and seals the road surface to prevent water ingress, but preparation of the road before the process starts, is just as important as the dressing itself.

You may have your programme of works and sites selected for the year, your surveys complete, your contractor briefed and ready to go, but is the surface of the road ready for the surface dressing to start?

As with all highway maintenance operations, the end result will be determined by the quality of the planning at the beginning and pre-surface dressing work is an essential part of this to ensure the surface dressing works effectively over the longer-term.

Often, sections of the network require some maintenance to bring them up to the required condition before surface dressing starts. This enables the local authority to maximise the value from the surface dressing activities and to help support the contractor in delivering effective works. If damage isn't repaired before dressing is applied the issues underneath the surface will still cause problems, sooner rather than later.

Effective pre-surface dressing removes the need to revisit sections once the dressing has been applied, saving time on remedials, traffic management and disruption for the travelling public.

roadtechs

TECHSCREED

BENEFITS

- Edges are sealed - no overbanding required
- No compaction required
- Excellent adhesion
- Typically, Techscreed applied at a depth of 5mm to 10mm so no need to adjust ironworks
- Reduction in noise pollution as no material is broken out

Roadtechs offers a survey to installation service to ensure that local authorities get the best possible results. The company's material Techscreed, which is a hot-applied BBA HAPAS approved repair, is an important part of the pre-surface dressing preparation. It is also environmentally friendly, helping councils cut the amount of carbon associated with their highway maintenance works.

Techscreed is a bituminous fill and overband crack repair system for the repairing of 5mm to 40mm cracks. It is particularly suitable for sealing cracks on existing pavements that are to be overlaid by asphalt, thereby helping to alleviate reflective cracking, and as a consequence, prolonging the serviceable life of the surface. In addition, Techscreed can be used to repair both asphalt and concrete surfaces and provides excellent anti-skid properties.

In its molten state, it has excellent flow properties ensuring total penetration of the crack without voids or air pockets. Following cooling it sets to a tough, resilient repair which maintains its flexibility through a wide range of temperatures.

Techscreed can be used for pothole repair and patching and is ideal to help solve problems with surface ravelling, rutting, chipping loss, stress cracking and lane joints.

The process is quick which means traffic management costs are much lower. Only a small crew is needed to apply it and the road can be opened just 30 mins after application which also means it can be surface dressed within a week after treatment. It is also very versatile and can be applied to 100mm wide to full lane widths.

Techscreed helps provide a solution for excellent pre-surface dressing because it doesn't bleed through the surface. As part of the process, the edges are sealed so no overbanding or compaction is required. Typically, it is applied at a depth of 8mm to 10mm so there is no need to adjust ironworks.

The quick process means repairs can be made as the maintenance vehicle moves along the road. Techscreed has been successfully used for pre-surface dressing in Gloucestershire, Hampshire, Oxfordshire, Kent, East Sussex, Wales and many other locations.

AI is moving to another level, but will it still need humans in the future to help shape the condition of our networks?

Blink and you'll miss its work. The processing of millions of rows of data in seconds makes Artificial Intelligence (AI) one of the most useful technologies to have emerged in the last decade.

Despite already proving its worth to some extent, AI still has massive potential to help shape the way infrastructure is planned, constructed, and maintained in the future, alongside its ability to help predict traffic flow and movements in real-time as well as creating a safer network.

Highways technology company, Gaist, is passionate about utilising the power of data and machine learning technology to help it with its ambitious mission to build the world's deepest, most sophisticated understanding of the whole roadscape environment'. That's why the company has its own AI Innovation Hub where in-house computer scientists and research specialists work closely with the University of York to deploy the latest deep learning research techniques, accelerating the development of Gaist's tools, techniques and intellectual property.

As an example of the power of Gaist's capability, in 2019 it was involved in a Department for Transport (DfT) project where AI was used to develop the most thorough understanding ever of road markings in England. 100,000 miles of road was surveyed and analysed to help build up a detailed picture of where and what level of investment is needed.

But it was the technology that was behind this project that was more fascinating. Over 146 million high-definition road images from Gaist's national databank and cutting-edge AI technology were used to assess over 100,000 miles of classified roads as part of this project. It was the largest exercise in assessing road marking condition ever undertaken in England.

It could be argued that without AI this project would not have been possible, because the scale of the analysis task would have been too onerous for humans and too expensive for the client. This project demonstrates that AI is really opening up new insight into our road network.

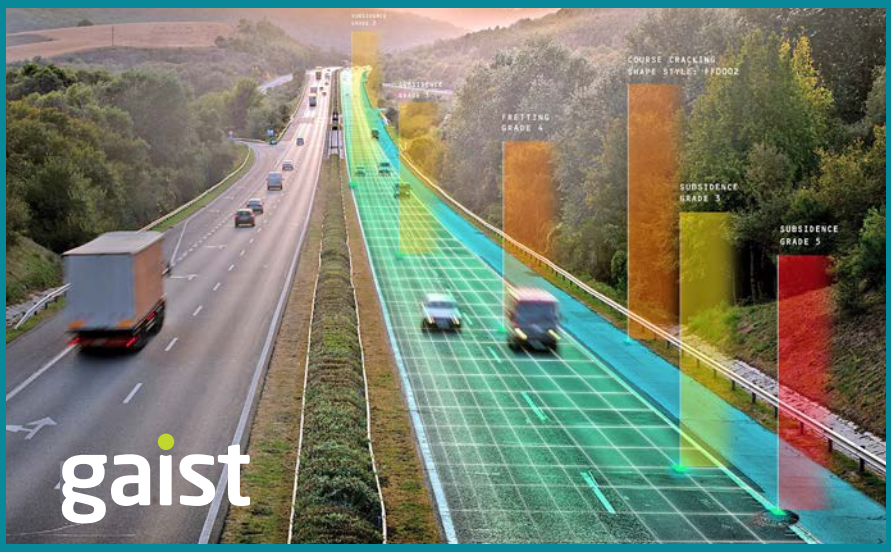
But just what does AI now offer us in terms of capability?

What tasks can AI be trusted to do?

How much automation can we drive out of AI?

Will it ever be ready for 100% responsibility given the potential consequences of getting it wrong?

In this article, Gaist's Chief Executive, Steve Birdsall, and Chief Technology Officer, Dr Stephen Remde, discuss their philosophy and their technology, talking openly about the role of AI, not only for Gaist's own developments but for the future of the wider highways sector. They also cover understanding why the role of AI is becoming vital and why it is important to know its limits.



Q How is Gaist currently making best use of AI?

Steve Birdsall (SB): In general, the capability of our AI applications are continuing to rapidly grow along with the company, and it has a huge role in helping support us and our increasing customer base both here in the UK and in our global roll-out in different countries around the world as far away as Chile, Japan, Brazil and Mexico. It is allowing us to do more and more for less. This allows us to stay competitive despite the large investment into Research and Development.

Dr Stephen Remde (SR): AI is a big part of the future for us. We continue to invest at a significant rate to help support our technical developments that will help provide information to road operators ensuring they can make the best decisions. AI has to be trained in the right way to work consistently and accurately. Our AI is getting closer and closer to the accuracy of humans, and even beating them at certain tasks. Where it's not so strong, we are strategising and creating training data. The better the training data, the better the outcome will be. The old saying "garbage in – garbage out" is still just as true with AI.

SB: A lot of our focus with AI so far has been based around the automated location of assets and defects and the extents of different damage types across a range of highways assets.

AI is allowing us to analyse ever larger volumes of data much more quickly than we could before, allowing our teams to focus on quality checking the data we deliver. This ensures that we can deliver more and more accurate data without increasing the cost.

And it cannot be stressed enough that quality checking is paramount to developing systems around AI. We still need humans 'in the loop' to provide the very high accuracy rates that Gaist has a reputation for.

Q What is AI good at and what is AI not good at?

SR: Artificial Intelligence is a very broad subject that has been studied for decades. We are mostly speaking about a subset of artificial intelligence, which we call Machine Learning. In the past decade, there have been amazing advances in hardware which have allowed some sophisticated image analysis techniques to be developed.

SB: It is important to understand what is meant by 'intelligence'. The intelligence in Machine Learning is actually describing how the system 'learns' and builds up a capability to recognise objects, patterns and features. The outputs from AI are not intelligent! At best AI produces the same kind of data that humans can produce but mostly the outputs are much more simplistic than data produced by humans. And that should come as no surprise, as humans are actually intelligent beings, whereas the 'artificial intelligence' we are describing is 'relatively simple machine logic' and despite recent technological advances there is still a massive capability gap between the two.

But AI is a lot quicker at simple tasks and handles data at a scale that humans would find hard, if not impossible.

So I should declare now that I think the name Artificial Intelligence is misleading to many who don't actually know how these systems work.

SR: Gaist captures between 40-60 million images per month, and at a peak provides access to over 70,000 images per minute. Any automation we can provide at that level is beneficial.

One of the problems that occurs when organisations like ours process millions of rows of data on a regular basis for several customers, is you can sometimes get a bottleneck and that can lead to costly and inconvenient time lags. The data processing speed of AI is therefore a major advantage. We have used AI to speed up this process, reduce those bottlenecks and give us the opportunity to create a lot more insightful data.

As good as this is, AI is still only as good as the information you give it to learn from. If you give it erroneous or uninformed data, it will make bad decisions. Thankfully, our AI is being trained by our own inspectors, some of whom have been surveying roads for several years. Even so, we are not at the point yet where we can just leave it to make decisions for us, especially for example, in the context of safety on the highway network.

As a company we support our customers with safety inspection with our SafetyView service, where we use our imagery systems to identify safety critical defects on a daily basis. Many defects in the highway have the potential to cause serious harm or worse. Given the limitations of AI that exist today, there is no way we could responsibly deploy a fully automated highway inspection with AI algorithms.

SB: Network operators have a duty of care and it would be negligent to replace human perception that comes from millions of years of evolution for an algorithm that is known to be least effective at spotting irregular features.

The implications of rushing to use AI in tasks such as safety inspections when it is nowhere near being proven as accurate enough for that task could be tragic and the legal ramifications are huge and costly.

SR: A deficiency of AI is that it has a limited awareness of context, which is important as the location and surroundings can make a defect more or less of a risk. Currently, AI that is being employed on highways surveying is essentially doing a relatively simple image recognition task, identifying and categorising lots of objects and features. Categorisation like that is also not 'intelligent'. There is a long way to go before AI can understand the implications and

remedial actions necessary, or prioritise actions based on risk.

Q Is AI being hyped and what are the implications if it is?

SB: Sadly, there is a huge amount of hype and 'headline grabbing' when it comes to the subject of AI. Companies that are in a rush to launch the latest AI product often skim over the limitations we have discussed. Unfortunately, that doesn't serve anyone's best interest and builds false expectation of this new capability.

I am worried that 'over-hyping' of AI will lead to a mistrust of the technology and hamper companies like our own that are 'quietly' developing groundbreaking technology that capitalises on the advantages of AI whilst leveraging the real intelligence of human beings in the system to bring safe and accurate information to our customers.

I would urge anyone buying into AI-based technology to always consider 'Does this solve my problem?' Just because a system uses AI, it does not mean it is good AI or gives you the solution to your problem.

SR: I think it is important to keep reminding ourselves that AI is making some fantastic advances, but as Steve said, we shouldn't just rely on AI or indeed either approach as being definitive. When developing an output it is always good for AI to be led by a human but the combination of both means we can be constantly developing accurate, effective outputs that change the way we live, work and travel.

Q What questions should local authorities ask when considering the purchase of a system using artificial intelligence?

SB: It is really important that before you employ an AI-based system or any other system for that matter, you should understand exactly what problem you are trying to solve.

If, for example, you are interested in quick approximation of the condition of your network and are happy with coarse, simplistic data then a simple AI app may help you. However, if you need to develop something like a 3 year programme of works for example, with accurate financial models, an understand of the return on that investment, volumes of different materials and deterioration rates, then AI-derived data on it's own will not come close to delivering that level of insight.

Before you buy any system, check the accuracy of the outputs. This is important because AI does not in itself guarantee accurate consistent data outputs. More often than not they are far less accurate than human derived data.

It should also be considered that most AI systems used to analyse road condition require a camera. If the system uses a poor quality camera then the detail in the image can easily be lost, due to low light, blur, glare, etc. If the algorithm cannot see the features, then the algorithm is powerless and the results will be poor and inconsistent. Therefore, the system loses its value and the client gets poor results. There is no point buying a very clever system to give you vague results.

This is why Gaist uses the highest quality professional 360 degree cameras possible to ensure high quality outputs in all conditions, ensuring our accuracy is very close to 100%.

My advice is always: Don't be too distracted by the science'. It is better to come to companies like ours with problems and we will take care of what technology is needed to give you a cost effective solution that exactly meets your needs.

Q Can you give any idea of how AI might benefit the highways industry in the future?

SB: It will definitely bring benefits in a big way. It will reach into every aspect of what we do, from designing material and helping assess the safety of sites and the equipment on them, to inspecting roads and performance monitoring. Systems 'supported' by AI will improve efficiency in all these tasks. But actually it is the data that AI systems are fed that will enable the biggest advances. As we have pointed out, AI is simply a data processing method, the new data that will come from new sensors, etc. will be the real accelerant of change. That is why Gaist is concentrating on developing increasingly better data because AI without good data is like a light bulb without electricity.

Over the years, we have truly transformed what our customers know about their networks. But the really exciting transformation is just about to begin!

In our labs we are now working with data gathered from sensors that will be feeding back information about the performance of the entire UK road network on a minute by minute basis.

We will soon be able to tell our customers absolutely everything they need to know about the behaviour of the roads such as; the performance of materials under every type of condition, the deterioration in different locations, the effectiveness of winter maintenance, etc.

We will be providing data back into the industry that will be used to drive the development of new materials and see when and where different defects have formed and under what conditions.

AI is being used to provide non-stop analysis, consistently crunching through extraordinary volumes of data to produce insight that is going to promote a tremendous leap forward in understanding for the global road maintenance industry and we at Gaist are incredibly proud to be leading this information revolution.

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Original, Authentic, Trusted asphalt preservation

PROTECT & PRESERVE

By not replacing the asphalt, we are helping drive up the carbon savings by over 94% compared to resurfacing as well as significantly slowing down deterioration of the road network by stopping potholes and other defects forming in the first place.

- Meets requirements of Clause 950 in the Specification for Highway Works and carries a HAPAS certificate and UKCA/CE Mark
- Keeps 'green' and 'light amber' roads in better condition for longer
- As well as roads, it is also ideal for all types of bridges as well as airports and test tracks, in fact – any asphalt surface will benefit
- Reduces the demand for reactive maintenance
- 'Invisible' and safe working-fewer operatives working next to live traffic and less traffic management-most roads are open within two hours of treatment.

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Why surface treatments like asphalt preservation can make a difference to the surfaces of roads and bridges

This year's ALARM Survey revealed that while the sector is filling potholes faster than ever, more needs to be done, when funding allows, to stop them forming in the first place.

The survey report showed that the average proportion of the carriageway maintenance budget spent on reactive maintenance was 21% in England, 25% in London and 30% in Wales.

After the drop in the total number of potholes filled in last year's report, this year's figure has jumped again to 1.7 million (2019/20: 1.5m; 2018/19: 1.9m) – the equivalent of one pothole being repaired every 19 seconds in England (including London) and Wales. The disparity in cost between filling potholes as part of a planned programme of carriageway repairs, and as a reactive repair is again apparent. Taking the average cost for filling a pothole across each region to be £55.90, the total amount spent in England and Wales last year is estimated at £93.6 million, up 8% from the £86.4 million reported in ALARM 2020.

By using surface treatments, such as RHiNOPHALT asphalt preservation, as part of a proactive asset management strategy, the deterioration of roads can be reduced significantly. Roads that are in green and light amber condition, can be kept that way for longer in a cost-effective way, also helping road operators to achieve more than 90% carbon savings compared to resurfacing.

"With preservation you are actually keeping the asphalt surface in better condition for longer, so the aggregates are retained in place for longer, not disturbing them or replacing them. So, at a time when local authorities and other road operators are being asked to make substantial carbon savings, it is one of the most sustainable treatments for keeping roads in better condition for longer. Quick, efficient and safe night-time working means roads can re-open within a few hours of application," says Dr Howard Robinson, Managing Director of ASI Solutions and Chair of the Road Surface Treatments Association (RSTA).

Speaking about early intervention approaches such as asphalt preservation for an article for Highways Magazine, Michael Hansford, Highways Asset Manager at Dorset Council, says: "We've changed our strategy, in that as well as condition monitoring, we've established treatment intervention predictions, based on known construction data such as the date of construction, material type, knowledge/experience of deterioration of the said materials, primarily on our strategic network at this stage.

This just prompts us to start looking at the need for early life treatments. Through condition data monitoring alone, we would often find that by the time they were amber, some materials had gone too far for any form of surface treatment, much to our frustration. By planning preservation techniques, we are getting to the surfaces in the early stages of deterioration. This is when it's just starting to look a little 'hungry' but before it starts to open up and certainly before any cracks begin to form, or any chip loss has occurred," he adds.

RHiNOPHALT can double the asphalt surface course service life of a road for half the cost compared to resurfacing, therefore reducing the demand for reactive maintenance, with fewer potholes and less claims. It preserves, protects and extends the life of the asphalt infrastructure and is proven to withstand all extreme weather conditions. RHiNOPHALT contains a natural bitumen called Gilsonite which is much tougher than normal paving grade bitumen. As well as being used on all types of roads, including the M40, RHiNOPHALT has also been successfully applied to bridges, airports and test tracks around the world.

RHiNOPHALT is particularly suitable for treating asphalt on bridges, many of which are just an extension of the road network anyway. "This means that the process and outcome in terms of treating the surface of the bridge deck is just the same as it would be with any other road, with the added benefit of RHiNOPHALT sealing the surface, thus limiting any water ingress and helping to waterproof the bridge,," adds Dr Robinson.

Bridges make up less than 1% of the surface area of the UK road network. However, the defects in asphalt paving over bridges is disproportionately higher on bridge decks than on the adjacent carriageway. In addition, the impact of asphalt defects on bridges can also be disproportionate, as bridges usually form a critical link in an area, and diversionary routes may be long and inconvenient for motorists. Narrow widths on the bridge may not be conducive to safe single lane working.

So why do we tend to see increased numbers of defects on bridge decks?

Water is the answer. Many bridge decks have excellent long term protection to the bridge deck provided by modern, high performance bridge deck waterproofing materials. These are effective at keeping water and chlorides away from the

Rhinophalt treatment - Hangzhou Bay Bridge, Shanghai, China

concrete and steel components of the deck and ensure that the long design lives of bridges are achieved. However, it is an unavoidable consequence of waterproofing that any water that is in the asphalt may be trapped in the surfacing layers, as it is difficult for the water to escape. Of course, some bridges have bridge deck drainage below the asphalt layers which should alleviate the situation, but such deck drains can be difficult to maintain and may become less effective over time. Drainage kerbs can take the water away at both the carriageway and deck level, where the water drains effectively to the edges of the road. In addition, bridges have expansion joints at either end of the bridge, or at either end of individual bridge deck units. A bridge expansion joint performs two main functions; to continue the waterproofing effectively across the bridge expansion gap, and to support the wheel loads of the traffic over the expansion gap. The installation of joints necessitates a watertight installation, and so transverse bridge joints prevent water draining longitudinally. So, even in a well-designed, well-constructed bridge, waterproofed to the highest international standards, the surfacing above the waterproofing and bounded by the expansion joints, may effectively form a tanked area from which water may find it difficult to escape. This is not a criticism of current design practice, but an unavoidable consequence of good practice.

The lowest cost, least disruptive and most sustainable option is to reduce the hydraulic conductivity of the asphalt surface course, whilst maintaining its properties, by using a surface treatment. Asphalt preservation can be effectively used to treat all types of asphalt surfacing on bridge decks.

RHiNOPHALT is one such treatment. Its primary purpose is to extend the service life of asphalt pavements, increasing the interval between major resurfacing interventions. It does this by reducing the degradation processes of asphalt, by penetrating deep into the asphalt, to fill micro cracks and interconnecting voids and prevent further oxidation or UV damage to the surface course.

This has resulted in some remarkable increases in the life span of asphalt surfaces on roads, where the life of an asphalt pavement has been routinely extended from typically 10 years to 25 years following three treatments at 5-year intervals, with regular intervention with RHiNOPHALT. There are examples in the UK of SMA thin surface course on a major motorway, which is still in safe and serviceable condition after 22 years, which is typically double the lifespan expected of SMA under these conditions.

One benefit of the RHiNOPHALT treatment is that the porosity of the asphalt surface course is significantly reduced. Initial hydraulic conductivity testing on newly treated asphalts have demonstrated a porosity reduction of over 95% when compared to the untreated pavement, and when repeated six years later the results are still showing more than 80%. This helps prevent the ingress of water into the asphalt layers, and therefore can reduce the effects of water trapped in the asphalt layers on bridge decks. The result is fewer incidences of localised failures (potholes) on bridge decks compared to untreated bridge decks. The full length of the M40 has been treated twice with RHiNOPHALT since 2007, including 15 underbridges, and over that time has required very little reactive maintenance for localised defects.

Recently, ASI entered into a new manufacturing agreement with Jobling Purser to supply RHiNOPHALT. This means local authorities and road operators will now benefit from an improved continuity of supply of this market leading BBA HAPAS certified preservation product.

The move comes as ASI looks to expand its supply base due to increased demand for RHiNOPHALT both in the UK and around the world as asphalt preservation becomes more popular. This new agreement forms a key part a of two-year strategic review of the market to enable ASI to expand and grow in the UK and the rest of world.

The deal between ASI and Jobling Purser, will enable more value to be passed through the whole supply chain, according to ASI Solutions and the new partnership will further highlight the UK expertise in asphalt preservation which has been passed around the globe with over 19 million sqm of RHiNOPHALT already applied.

This comes at a time when the use of RHiNOPHALT asphalt preservation is on the rise in the UK with many local authorities using it to keep their green and light amber roads in better condition for longer. RHiNOPHALT also provides an ideal solution for councils as sustainability challenges remain at the forefront of their agendas, with it providing more than 90% in carbon savings compared to traditional resurfacing. ASI Solutions remains committed to helping local government and all road operators to reduce carbon as part of their asset management strategies.

Jobling Purser develop and produce a wide range of British Standard products which are used all around the world. As specialists in producing highway maintenance solutions it applies its knowledge of bitumen formulating to a wide range of industry applications. Its high-quality products make roads safer and have played a crucial part in a diverse range of manufacturing sectors since the 1830's as part of a family owned business.

MEMBER PROFILE

New RSTA member JM Clark tells Renew about its business and how it is supporting the road surface treatments sector

Q How would you best describe what your organisation does?

If you are looking for operated, mechanical plant hire and professional cleaning services throughout the UK – JM Clark is the company for you. We operate a fleet of Breining-Secmair Combi Sprayers for all your surfacing support requirements. Our bitumen emulsion spraying and joint sealant services are available 24/7 for individual or business use. Alongside these services we also provide vehicle lifting and vehicle relocation, mechanical road sweeping, compact road sweeping and diesel-powered bowser jet washer units. Our services cater for various industries on a contractual or one-off basis. Highly trained, experienced and fully qualified operators dressed in full PPE at all times.

Q Why is what you do important for the road surface treatments industry?

JM Clark offers reliable surfacing support services. Our reactive maintenance helps ensure that main contractors can complete their projects on time. We play a vital part in safer, well-maintained roads, an important factor in accident reduction and national growth and development. Traffic volumes continue to grow significantly, developing an increased need for road maintenance and large infrastructure. We work alongside small and large surfacing companies to ensure maintenance is kept on top of. Well-maintained roads mean safer roads, resulting in fewer collisions, fewer injuries and a lower risk of fatalities.

Q What are your plans for 2021?

Our plan for 2021 is to invest heavily in the latest technological machinery. We want to grow our brand with all stakeholders, and develop our fleet and team. JM Clark will be moving head office later this year which means we will be able to provide additional employment opportunities and branch out further across the UK giving us the opportunity to support many more national surfacing contractors.

Q Why was becoming a member of the RSTA important to your organisation?

We knew the RSTA would be great platform for us to share our success and be recognised widely within the road surfacing industry. The RSTA fits with the accreditations JM Clark currently holds: FORS Gold, CHAS, Constructionline, Avetta. Our main goal is to work alongside and be recognised in the road surfacing industry. We believe the RSTA can really help JM Clark advance and develop within the sector, and aid us in achieving great brand recognition.

Q If you could change one thing in the sector, what would it be?

We know road surfacing isn't considered the most environmentally friendly industry. We would love to change this, by making the roads more eco-friendly and less pollutive, all with the use of 100% recycled materials.

Q If you were presented with an opportunity to start a new research project to help the sector, where would you invest that money?

We would invest in technology and health and safety innovation. We believe that the more efficient and advanced that technology becomes within the surfacing sector, the safer the environment will become for contractors and the public.

> "Our main goal is to work alongside and be recognised within the road surfacing industry.
>
> We believe the RSTA can really help JM Clark advance and develop within the sector, and aid us in achieving great brand recognition.

WHY TARGETED AND EARLY INTERVENTION IS THE SOLUTION TO SOLVING THE POTHOLE PROBLEM

By Stephen Williams, Chairman, Henry Williams & Son

Recently the RAC revealed a 37% year-on-year rise in pothole-related breakdowns in the first three months of 2021. The RAC said this three-fold increase in the number of pothole-related breakdowns compared with the last quarter of 2020 (1,461) was the largest rise between quarters the RAC has ever seen. The motoring organisation described the figures as a 'watershed' moment for authorities, with the AA also previously saying the cost of fixing potholes was now over £1 million a month.

While these figures may be startling for anyone reading them, the reality is that many local authorities will never be able to afford to 'beat the maintenance backlog', even though there has been more money dedicated towards fixing potholes over the last decade, supported by the recent Pothole Fund that has enabled even more work to be completed.

So, as a result of more potholes forming, our industry is fixing potholes faster than ever. While that job is at times a thankless task for our dedicated operatives, who deserve all the praise possible, we shouldn't be congratulating ourselves. Every pothole formed should really be seen as a failure. More has to be done to stop them forming in the first place, and a change in strategy doesn't always have to mean lots more money.

Firstly, every pound that is spent on our road networks shouldn't be seen as a cost but an investment. By far, the road network still remains the biggest asset we have to protect and look after. Any maybe 'protect' is the key word we need to focus on from now on?

Potholes are created for a number of reasons and the weakening of the surface of the network significantly adds to the chance of them being created. That might be because of poor compaction, maybe because it is the end or beginning of a machine lane run or where the pave stops for deliveries etc., or there isn't enough compaction around the ironworks, or even a weakening of the surface where the white lines have been burnt off.

Utility trenches have been a massive problem in the past and while the introduction of the New Roads & Streetworks Act (NRSWA) in the early 1990s moved us away from temporary reinstatements towards a 'first time pass' approach, and improved operatives and supervisor training has brought great benefits. Is it now time, on its 30-year anniversary, to review and revise the NRSWA?

Under the Act, utility companies are required to guarantee their reinstatements for a two-year period from the completion of the permanent reinstatement, or three years in the case of deep openings, after which they become the responsibility of the highways authority and ultimately the tax payer. Design life of the carriageway may be 20-30 years. Is this something that needs to be reconsidered? Should utility companies be responsible for their work for longer periods and would this result in increased durability of reinstatements and reduced potholing?

The NRSWA specification states that joints should be floor-sawn to provide smooth vertical joints (not staggered) along the edge of reinstatements. This results in a vertical weak plane from the top surface down to the sub-base which allows expansion and contraction, cracking, water ingress and pothole formation. A return to 75mm stepped joints between courses on larger reinstatements would reduce or remove this issue.

Whether compacting a NRSWA utility trench or machine-laying a full carriageway, it is often evident that poor joint compaction has resulted in joint fretting and potholing. The failure (or inability) of the roller operatives to 'nip' the first 50mm of the new surfacing into the joint when compacting a new surface course often leads to fretting and edge failures.

↑37%

breakdowns caused by pothole damage (Q1 2020 vs Q1 2021, RAC)

£1 Million

per month spent on fixing potholes (AA)

> Every pothole formed should be really seen as a failure.
>
> More has to be done to stop them forming in the first place.

'Nipping' the joint during compaction

This simple and inexpensive technique can significantly improve compaction along the edge of reinstatements and reduce potholing. However, in defence of the roller operatives, it is not always possible to carry out this technique without road closures or temporary red/red lane closures as it is often necessary for the roller driver to run in the adjacent traffic lane.

Target dressing operations from the driver's perspective

More work is needed to understand why adequate compaction is not being achieved across our networks. Despite the rapid development in machinery used to treat our roads, highlighted by our own investment in plant and equipment over the last five years, I have never quite understood why we don't compact asphalt surface courses with pneumatic tyred rollers (PTR's) in this country. This is used to good effect on the continent and in my opinion, the independently sprung compaction tyres provide excellent differential compaction across the carriageway surface, especially around gully or ironworks.

Highway engineers inspecting a carriageway surface as it dries after a rain shower can easily identify the areas of poor compaction (residual damp areas) and establish the location of potholes over the following 3-5 years.

But whether it is slight policy shifts or investment in new technology, surely the answer to our pothole problems is adopting a more forward-thinking approach to our strategies? It is time to treat the root cause of this challenge and early intervention has to part of the solution; using a wide range of surface treatments to deliver this as part of a more proactive asset management strategy.

The good news is that many local authorities have taken this approach with some now prioritising keeping the network in better condition for longer, protecting and preserving it, delaying further deterioration.

This has been helped by the accelerated and impressive development of more advanced road condition surveys that enable local authorities to understand the condition of every part of their road in more detail. This can help lead to more targeted treatment, rather than a potentially wasteful broad-brush approach to treating a whole road when often many parts of it are still in good condition. Some councils have also established treatment intervention predictions, based on known construction data such as the date of construction, material type, knowledge/experience of deterioration of the materials. This helps with deciding the need for early life treatments and getting to the surface of the road at the point of the earliest signs of deterioration.

In turn, this has seen a rise in interest in targeted surface dressing and asphalt preservation. We are supporting more local authorities who are interested in this approach. Using our in-cab computer software our combination sprayer can apply surface dressing or asphalt preservation to the selected areas of the carriageway that need treating, saving resources, time, and money.

Target dressing is definitely an approach that backs up the 'prevention is better than cure' philosophy. It helps seal and protect all the joints, is a fast-movable application that is less disruptive, including less traffic management and fewer operatives working next to live traffic. Trenches from as narrow as 200mm wide to a full width of 4.5 metres wide can be treated. This allows treatment of longitudinal and/or transverse NRSWA reinstatements and seals all cracks, joints and weaknesses in a carriageway surface.

In most cases, target dressing and/or asphalt preservation, can be less than 20% of the cost of remedial action or plane and patching, which means this sort of approach could be carried out five times for the same cost, offering local authorities significant cost savings compared to treating the whole road.

While this targeted approach might be more expensive in the first year (bringing the road condition up to an acceptable condition), subsequent return visits to the same sites will require significantly less treatment, the road conditions will be maintained in a green or light amber condition and pothole formation will be significantly reduced (or hopefully eliminated entirely).

Target dressing and asphalt preservation goes a long way towards helping drive up carbon savings as well. The use of Rhinophalt, for example, can deliver more than 90% carbon savings compared to resurfacing.

We would welcome the chance to prove target dressing and preservation is really effective by working with any interested authorities to undertake an ongoing trial to enable us to demonstrate the numerous benefits of this approach compared to others. We see this as a vital part of our work to help authorities deliver value for money and move to more proactive and environmentally sustainable treatments.

> Every pound that is spent on our road networks shouldn't be seen as a cost but an investment.

Miles Macadam and Shropshire Council in partnership to achieve Carbon Neutrality

Miles Macadam was awarded Carbon Neutral status in July 2020. Whilst progress is being made in lowering emissions, Miles Macadam recognises the vital need to maintain and operate the road network, and the importance of acknowledging and addressing the effect this has on the environment.

In collaboration with Miles Macadam, WSP and Kier, Shropshire Council is delivering a £1m carbon neutral surfacing improvement scheme - a first for any Local Authority and paving the way for future schemes.

Miles Macadam has developed its own bespoke Carbon Calculator to measure the overall carbon footprint of any individual surfacing project. By comparing its own manufactured grouted macadams with conventional materials, Miles Macadam can demonstrate how their products are produced using a lower mixing temperature, a lower energy resource use, and a lower bitumen content, whilst delivering greater durability than conventional materials.

Working with Shropshire's engineering consultants, WSP, and delivery partner, Kier, Miles Macadam was appointed to deliver a new road improvement programme across Shropshire's Local Area Network. The company's manufactured grouted macadam, Milepave™, has been specified as a low carbon warm mix material and the embodied carbon footprint of the whole scheme is to be offset through Miles Macadam's verified carbon reduction programme. In addition, Shropshire will mirror the total carbon offset through its own 'Community Tree Scheme Initiative' which will involve planting a variety of British woodland trees throughout the county to sequester the equivalent total embodied CO_2.

Kit Ebben from Miles Macadam commented, "Our aim is to reduce the overall carbon footprint of road improvement schemes. Shropshire has broken the mould, engaged their supply chain, and built a sustainable model for delivering Carbon Neutral projects. This is a great achievement and creates a blueprint for future schemes."

Steve Davenport, Shropshire Council's Cabinet member for highways and transport, said: "Whilst there is a lot more to be done, this is a positive step forward, especially for an industry that is heavily reliant on the use of natural resources. By working with highways specialists, Shropshire Council's highways team and their partners will have delivered the first carbon neutral, routine highways maintenance programme in the UK, setting an example for the rest to follow."

Dean Carroll, Shropshire Council's Cabinet member for adult social care, public health & climate change, said: "This is a great initiative. We've always said we wanted Shropshire Council to be at the cutting edge of the fight against climate change and this is yet another example of how the council is leading the way."

> Shropshire has broken the mould, engaged their supply chain, and built a sustainable model for delivering Carbon Neutral projects

VELOCITY HELPS TO REDUCE POTHOLE BACKLOG AND CARBON

Road repair and maintenance specialists, Velocity, are helping local authorities throughout the UK to reduce their pothole backlog, prevent defects occurring and meet the challenge of the climate emergency.

The spray-injection patching technique pioneered by the company significantly reduces the carbon emissions associated with pothole repairs. With a carbon output 25 times smaller than traditional techniques, this saving adds up to a significant amount.

Velocity adopted the ProTECT tools system, a joint project with the University of Nottingham. The tool was developed to enable Velocity to identify the impact of operations, generating a carbon footprint on a contract basis. This information is reported back to clients alongside operational data – a mandatory requirement of ISO 14001 - allowing them to substantiate the benefit of the technique using a tool compliant to PAS 2050.

The tool takes into account emissions generated by plant, materials and mobilisation. Velocity's spray-injection patching technique was determined to be the lowest contributor to the carbon footprint of all surface treatment methods, with an output of just 1.904 kg of carbon per square metre.

A number of initiatives designed into Velocity's procedures have contributed to this performance: machine design, planning optimisation and operational efficiency.

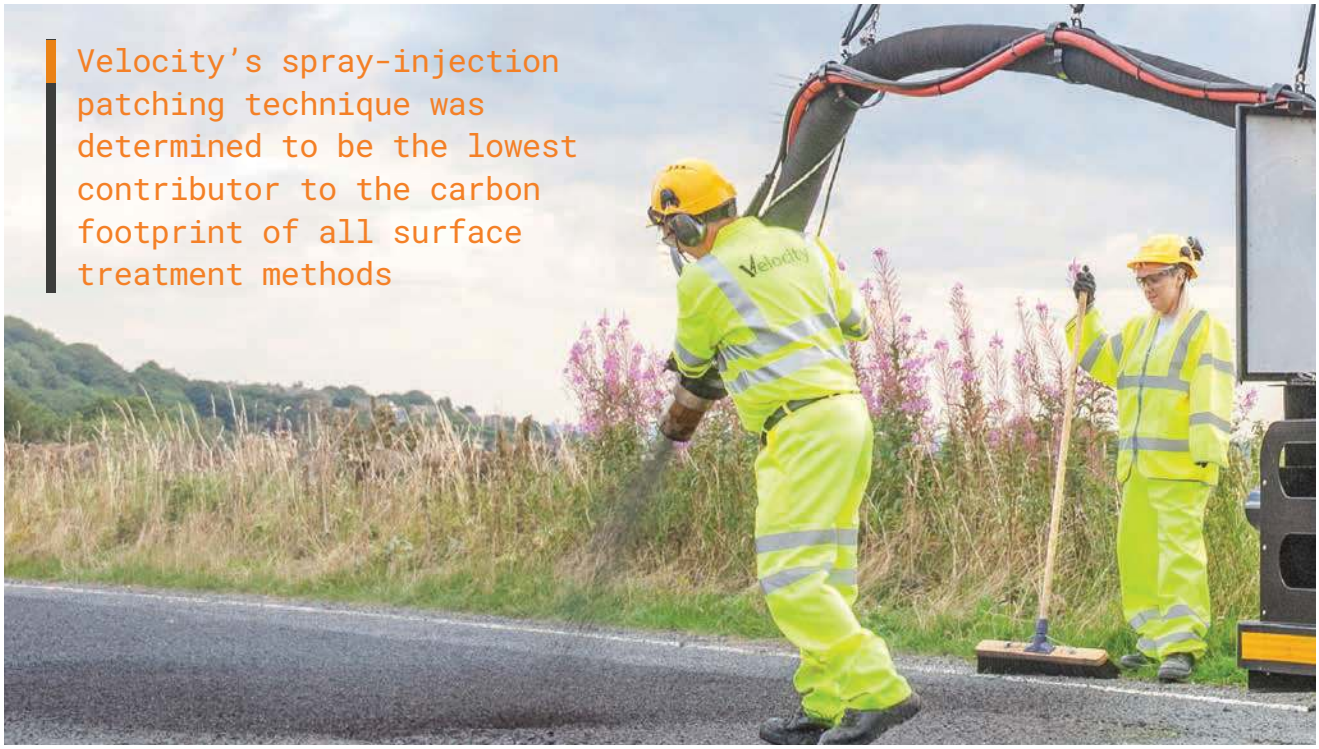
The intelligent use of light-weight materials, fuel efficient engines and control systems reduces the consumption of the machines that Velocity designs and builds in-house. Effective planning in collaboration with clients maximises efficiency and reduces fuel usage, in turn reducing carbon output and cost.

As a fully integrated self-contained unit, the Velocity Patching operation only requires one vehicle to carry out repairs versus the several needed for traditional techniques to move plant, materials and operators, generating an immediate saving.

No excavation is required, eliminating emissions generated by transporting materials and generating zero waste to landfill.

As an example of the carbon savings achieved, on a recent contract in London over 25,000 defects were repaired saving over 1,600,000 kg CO_2, equivalent to over 720 cars.

The speed of the process allows for up to 200 defects per day to be permanently repaired per machine and crew, resulting in cost savings in excess of two-thirds compared to traditional methods.



On a recent contract in London over 25,000 defects were repaired saving over 1,600,000kg CO_2

25x
smaller carbon output than traditional techniques

15 YEARS
potential life span extension of SMA pavement with spray injection treatment

90%+
carbon savings by preserving road surfaces compared to repair/resurfacing

Velocity operates the largest fleet of spray-injection patching machines in the UK, and is certified to the Fleet Operations Recognition Scheme (FORS). This includes the requirement to train staff on the environmental impacts associated with driving, including air quality and fuel efficiency, efficient driving techniques, and checks and maintenance to reduce emissions and journey planning.

As well as improving roads that are in Red or Amber condition using Velocity Patching, the company recently introduced a new service, Velocity Preservation, using RHiNOPHALT.

Developed by ASI Solutions, RHiNOPHALT is a unique product that has been applied to assets around the world for 22 years. Containing Gilsonite, a naturally occurring bitumen, the product is a resin that is applied onto the road surface, penetrating to depths of over 30mm. RHiNOPHALT sets hard in any microcracks and air voids, creating a very tough surface that prevents deterioration for a period of up to five years.

Treated again on a five-year cycle, the condition of the road is 'locked-in', maintaining the surface for 15 years without the need for costly reactive maintenance. Consequently, an eight-year old SMA can be stretched out to 23-24 years life before it needs to be resurfaced.

By preserving the condition of roads, the carbon emissions associated with repairs and resurfacing are reduced, resulting in carbon savings in excess of 90%.

Craig Lawrie, QSHE manager at Velocity said: "We are fully committed to reducing our own environmental impact, as well as helping to deliver significant cost and carbon savings for our clients.

"By carefully measuring and managing our operations, service emissions generated by Velocity will be reduced by 30% this year versus the 2009/10 baseline, and we are on track to reach a 50% target by 2030, contributing to the UK national goal of reducing carbon emissions by 80% by 2050."

Velocity actively contribute to industry standards, most recently representing the industry on the new British Standard for Spray-Injection Patching, BS10947:2019.

Dominic Gardner, Velocity's Managing Director, said: "We are proud to work to the highest standards, be that protecting the environment via ISO 14001, or working to BS10947:2019 and NHSS 13.

"These standards bring tangible benefits to our customers, giving them assurance of the quality of work delivered and helping them achieve their goals."

> "We are fully committed to reducing our own environmental impact, as well as helping to deliver significant cost and carbon savings for our clients
>
> **CRAIG LAWRIE**
> QSHE manager, Velocity

A VERSATILE APPROACH PROVIDES PRUDENT PREP PRIOR TO SURFACE TREATMENT IN ESSEX

Multevo has helped Essex Highways achieve more efficient patching and preparation works prior to surface treatment application, as part of a new trial.

Essex Highways faced the challenge of getting its conventional conventional patching and preparation equipment onto certain rural parts of the county for preparation of several sites in the Wethersfield and Langham areas of the county. These areas were also overgrown, with hedges overhanging the single lane sites and verge creep protruding the carriageway. This needed to be sided out before work started. Some of the sites had also suffered from flooding and surface water run off, causing the carriageway to be immersed in spoil which required scraping.

Multevo were tasked with preparing the site and were up against a tight schedule of works to allow surface treatments to commence as soon as possible. Using the company's Multihog and its multi-skilled team, Multevo were able to deal with the spoil using the Multihog's front bucket before sweeping, and the siding out and sweeping were carried out in a single visit. The swift delivery helped to minimise disruption and improve the efficiency of the project.. Instead of using larger 1m planers, the Multevo team could access areas by self-driving the Multihog 400mm planer, only removing the required defective areas and reducing waste. The team subsequently switched to the front-mounted road planer with dust suppression attachments to plane down to a depth of 100mm and then permanently repair patches.

There were 81 patch repairs totalling 657.19 sqm on the project. Multevo independently programmed the works and recorded progress via the Multevo app, allowing the team to monitor progress and undertake quality site and vehicle audits. These reports were also shared with Essex Highways in real-time so they could also see progress.

Using conventional equipment, this work would have required several contractors working with different equipment at different stages of the process.

Andrew Vale, Senior Engineer and Team Leader for Surface Treatments at Essex Highways said: "This was an impressive performance by the Multevo team who completed a number of jobs in one single visit using the Multihog machine. The jobs were not easy, with access being tight as well as the time. There was minimal disruption and only a small amount of traffic management required. This proved that this sort of approach, using equipment that can carry out multiple tasks at once, has provided us with value in terms of improving the quality and output of our preparation works before surface treatments were started. The patching work was quick, efficient and competitively priced, and we had real-time information on the progress of the job which has proved useful."

Essex Highways is a long-term partnership between Ringway Jacobs and Essex County Council, one of the largest non-metropolitan ('shire') counties in England, stretching for 60 miles from coastal Harwich, via rural countryside to suburban London. It has a population of 1.4m and over 5,000 miles of road.

Multevo is the UK distributor of the versatile Multihog product range which is a road legal articulated compact multi-purpose vehicle designed to accept different attachments to the front and rear. Each attachment is designed bespoke to the Multihog to outperform the equipment it replaces, enabling the machine to be utilised for a wide variety of different highway maintenance applications instantaneously to maximise productivity and efficiency on site.

> Using equipment that can carry out multiple tasks at once has proven to provide value

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WE PROVIDE A HYBRID HIGHWAYS SOLUTION

Utilising the Multihog Method in order to fix potholes, defects and patches on site in a single visit for a cost-effective m² rate

WHAT WE DO

01

PRE-SITE SURVEY

02

PROGRAMME OPTIMISATION

03

BASIC CHAPTER 8 TRAFFIC MANAGEMENT

04

MULTIHOG METHOD ROAD PLANING

05

MECHANICAL SWEEPING

06

REINSTATE AND COMPACT TO SPECIFICATION

07

BEFORE, DURING AND AFTER IMAGES PER JOB

08

REAL-TIME REPORTING AND WEEKLY SUMMARY

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MULTEVO®

Hitex Traffic Safety continues to look towards the future with its sustainable approach to high friction surface treatment

Hitex Traffic Safety have recently completed a cradle-to-the-gate assessment of several of their popular thermoplastic products. The assessments are a useful tool for calculating the total environmental impact of a product, from its initial extraction (raw material), to the gates of the factory (finished product). The audit was completed by an external assessor with the help of Hitex International Group's SHEQ Advisor (Safety, Health, Environment, and Quality).

The audit itself was commissioned by the team at Hitex International Group in a bid to continue its sustainable approach toward the future of the Group and the industry. Hitex Traffic Safety Managing Director, John Lloyd said: "Managing our carbon footprint is a crucial step towards a sustainable future for both Hitex Traffic Safety and the rest of the Group. Maintaining this approach will not only aid the company long term but also help minimise our impact on the environment. Hitex has consistently looked at ways to reduce its environmental impact throughout the years, whether that be through using bio-based (Rosin Ester) products in our material or conducting cradle-to-the-gate assessments".

Hitex Traffic Safety also remains the only high friction surfacing treatment manufacturer to offer a range of HAPAS-approved binder systems with a choice of thermoplastic, epoxy, and PUMA binders. Suitable for all clients and applicator preferences and requirements.

During the audit, in-depth research was carried out on the 'emissions per process (kg CO2e)' for several of their popular surfacing products. With factors such as raw materials, packaging materials, transport, production, and disposal of packaging being considered to compile a total emission per tonne figure for each product respectively. This new system will form the catalyst of future research on the Group's total emissions output going forward.

Hitex Traffic Safety has been utilising bio-based (Rosin Ester) binders since the company's formation over 15 years ago, long before many of their competitors implemented this approach. Using a plant-based resin also means that one raw material is completely carbon sequestrated, resulting in the end product having far less of a carbon footprint. This recent study indicated that the continued use of bio-based binders, rather than hydrocarbon resins, accounted for a carbon reduction of up to 88% in some of the products assessed in their latest study.

The Group has outlined intentions to carry out further assessments for not only the remaining range of products at Hitex Traffic Safety but also the contracting and equipment side of the company to ensure the Group moves forward together in a sustainable manner.

HITEX
Traffic Safety Materials

The hope is that further work like this can be completed to continue the Group's active approach towards a carbon-neutral future ahead of the UK Government's target of net-zero greenhouse gas emissions by the year 2050. Hitex International Group SHEQ Advisor, Robert Delahunt said: "All members of the group, whether that be Hitex Traffic Safety, L&R Roadlines, or Somerford Equipment, continue to actively work together to ensure a sustainable future. Assessments such as these are vital to meeting the UK Government's 2050 vision and this latest assessment is just the start of things to come. Our hope is that other companies in the industry will follow us in turning a corner in the sustainability of this industry".

> Use of bio-based binders, rather than hydrocarbon resins, accounted for a carbon reduction of up to 88%

RSTA

WWW.RSTA-UK.ORG