BRITPAVENEWS

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What's in store for the infrastructure sector?

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The British Cementitious Paving Association

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CHAIRMAN'S WELCOME

Welcome to the Winter 2020 issue of Britpave News.

This has been interesting year to put it mildly. However, despite the challenges that have faced our industry there are reasons to look forward to 2021. Not least of which are the growth predictions for the infrastructure sector which some industry forecasters believe could be up to 20% next year. Also of interest is how the restructuring of construction sites and the adoption of COVID-19 protocols could have long-term health-and-safety best practice benefits and increased emphasis on better communication between members of the supply chain.

The recently announced Spending Review and National Infrastructure Strategy focused on infrastructure investment as a way to help deliver the economic recovery post-COVID 19. They offer confirmation of government commitment to investment and provided the construction industry with a pipeline of projects. We and our members welcome the opportunity to provide the concrete solutions that will provide the long-term efficient infrastructure the country needs in order to move forward.

Indeed, throughout the year, Britpave members have continued to forward the benefits of cementitious solutions whether through the development of new environmentally cements, innovative construction solutions and more efficient site processes. This issue of Britpave News highlights some of those projects and developments. It also highlights the generic advantages of concrete delivers resilient high-performance, long-term, low maintenance infrastructure with unmatched whole life cost benefits.

This year has undoubtedly been a challenging one. Working together we will convert those challenges into concrete opportunities.

Joe Quirke
Britpave Chairman and Engineering Manager, VolkerFitzpatrick

Britpave, the British In-situ Cementitious Paving Association, promotes the better and greater use of concrete and insitu cementitious infrastructure solutions. Its members include major contractors, specialist equipment and material suppliers, consulting engineers and interested trade associations. Together, they provide a single voice for the insitu concrete paving industry.

Britpave News is published regularly by Britpave with the aim of keeping members up to date on Association matters, industry developments and member company news and views. Please help keep us in the picture on all of this by sending us any relevant information that you feel may be of interest to the membership.

WHAT'S IN STORE FOR THE INFRASTRUCTURE SECTOR?

The Covid-19 pandemic and subsequent lockdowns of much the UK economy had a significant negative impact on the construction industry. However, industry forecasters are predicting that the infrastructure sector will recover and grow faster than other construction sectors.

The latest 'UK Construction Industry Forecast 2021-2022' from Glenigans reports that civil engineering will see workloads increase by 17% in 2020 and a further 2% in 2022. The Government has pledged to significantly increase investment in the UK's infrastructure. Additional public sector funding is potentially available in areas such as roads. Major infrastructure schemes, including Thames Tideway, HS2 and Hinckley Point, will be important drivers for sector.

Construction Products Association's (CPA) Autumn Scenarios expect a tick-shaped economic recovery for the construction industry with output for construction rising by 13.5% in 2021. Along with private housing, CPA expects the infrastructure sector to be critical for growth. With output not falling as sharply this year as in other sectors due to larger sites making social distancing easier, next year's growth will capture the start of main works on HS2, plus ongoing work on major projects such as offshore wind, Thames Tideway and Hinkley Point C. Only airports within the infrastructure sector are expected to see a decline in activity over the next few years, given sharp declines in airline passenger numbers as a result of the pandemic.

The Acardis analysis 'A long way back' predicts that construction is likely to temporarily become a two-speed industry with high growth rates in infrastructure set against sluggishness in industrial and commercial sectors. Regulated industries are obliged to keep spending on infrastructure: AMP7 in the water sector, CP6 in rail, Highways England's RIS2. Arcadis predicts these are setting infrastructure up for a growth rate of almost 30% in 2021. Meanwhile the building sector is proving far less resilient, with the industrial and commercial sub-sectors not expected to recover to 2019 levels until 2022, and public sector workload at risk because of the cancellation of the three-year comprehensive spending review.

GOVERNMENT PLANS WELCOMED

Britpave welcomed the Chancellor's focus on infrastructure investment as a way to help deliver the economic recovery post-COVID 19. The government's one-year Spending Review and multi-year National Infrastructure Strategy committed to £27 billion investment in the road network until 2024, £23 billion for HS2 until 2025 and a £4 billion 'levelling up' up to allow regions to bid for direct funding of local projects. A new national investment bank to co-invest together with the private sector in infrastructure projects is also to be set-up

Joe Quirke, Britpave Chairman, said: "The Spending Review and National Infrastructure Strategy demonstrate that the government understands how investment in infrastructure can deliver the recovery following the economic fall-out of dealing with the COVID-19 pandemic. Such investment is key for delivering growth and creating jobs.

He continued: "The publication of the long-awaited National Infrastructure Strategy provides the construction industry with a pipeline of projects. We and our members welcome the opportunity to provide the concrete solutions that will provide the long-term efficient infrastructure the country needs in order to move forward."

Al McDermid, Chair of the Britpave Soil Stabilisation Task Group, added: "The Spending Review confirmed that in addition to the Brownfield Housing Fund announced at the March 2020 Budget to allow Mayoral Combined Authorities to unlock land for up 26,000 new homes there would be an additional £100 million in 2021-22 to support housing delivery and regeneration including unlocking brownfield sites. Much of this land could be sustainably and cost-effectively developed by using soil stabilisation techniques and so provide a viable alternative to greenfield sites."

NEW REPORT FINDS BENEFITS FROM COVID-19 IMPACT

New research from Loughborough University into the impact of COVID-19 on the construction industry has found a number of potential long-term benefits. The research, 'COVID-19 and construction: early lessons for a new normal?' was supported by Balfour Beatty, GKR Scaffolding, Kier, Mace, Morgan Sindall and Skanska.

Based on six major construction and infrastructure projects, the research explored the industry's response to the challenges of the pandemic and the potential long-term benefits arising from embracing and extending new working practices.

The report highlights how site layouts and working practices have seen substantial changes in a short space of time and that these changes have been successful and generally well-received. There is emerging evidence of additional benefits to worker effectiveness and productivity and a perception of improved safety and health. More time is spent planning work tasks; with frontline workers typically deployed in smaller groups than usual and trades working in sequence rather than side-by-side. This has led to increased worker effectiveness and productivity, and improved housekeeping on most sites that has helped to mitigate project challenges arising from other COVID-19 impacts, such as a reduced workforce and problems with material supply. There may well be long-term gains from maintaining these ways of working.

Changes made to induction processes and to welfare and hygiene arrangements were reported and have the potential to improve the safety, wellbeing and motivation of the workforce if maintained longer term.

At the same time, there have been very high demands on many of the staff involved in managing or re-planning sites and projects, with adverse impacts on wellbeing for some. It is important that relevant employees have time and opportunity to recover and regroup, particularly as a 'second wave' of COVID-19 could make further demands. There have been increased expectations on the supply chain, particularly, with increased responsibility for worker engagement; and increased communication between trades to facilitate safe working. This highlights the long-term importance of supporting and developing these individuals and the responsibility on Tier 1 contractors to help their supply chains develop.

The way in which the construction sector has adapted to the challenges of COVID-19 has highlighted its flexibility, resilience, and ability to solve problems. It has enabled several projects to move forward with innovations which might otherwise have taken several years to embed. It has also inspired many to raise their game and has challenged some conventional thinking about the ways in which projects are planned and undertaken. There is, however, a high potential for things to drift back towards 'business as usual' as COVID-19 related constraints are relaxed and as commercial pressures once again come to the fore.

It is strongly recommended that individual companies and projects conduct a 'lessons learned' review before long to capture the changes made and ensure that positive changes are captured and embedded.

To download the report visit: **https://bit.ly/3oRkMCD**

BALFOUR BEATTY BREAKS FINAL ONSHORE TUNNEL AT HINKLEY POINT C

Britpave member Balfour Beatty, alongside EDF, celebrated a major milestone on its Hinkley Point C tunnelling and marine project in October. The team successfully completed the breakthrough of the longest and final onshore cooling-water tunnel, at the UK's landmark nuclear power station, Hinkley Point C.

This momentous milestone marks the completion of Balfour Beatty's sprayed concrete lining works, a well-established method for large diameter tunnel construction using mechanical excavation and the application of sprayed concrete to provide ground support.

Excavating through 600 metres of ground to create the tunnels, the team worked safely and swiftly to spray the ground with 9000m3 of concrete in order to stabilise the recently formed underground structures. In total, the process required over 1.6 million hours across the tunnels, with the programme of works completed to schedule. The five onshore tunnels will undergo secondary lining works, installing a number of reinforced rebar concrete structures to further stabilise the sprayed concrete. In total, the team have successfully completed all five onshore tunnels which will play an essential role in the critical cooling water system for the nuclear power station, responsible for transferring over 120,000 litres of water per second to Hinkley Point C from the Bristol Channel.

The same team have prepared three portals to facilitate the launch of the Tunnel Boring Machines (TBM) which will excavate the tunnels for the main cooling water system. Alistair Geddes, Balfour Beatty Project Director for Hinkley Point C's tunnelling and marine project, said: "This is a significant step forward in the successful delivery of the first new nuclear power station in the UK for over 20 years. Achieving this incredible milestone is testament to Balfour Beatty's unrivalled expertise in delivering projects of this scale and complexity."

On completion, Hinkley Point C will supply safe, secure, low carbon electricity to around six million homes. Balfour Beatty is contracted to three major packages of works at Hinkley Point C. It was first appointed to deliver the electrical package in a joint venture in 2015, the tunnelling and marine package in 2017 and most recently the 400kV overhead line project on behalf of National Grid in 2019.

HEAVIER LORRIES WILL NEED A STRONGER ROAD NETWORK

The Department for Transport (DfT) is to undertake a consultation on increasing the current load weight of lorries from 44 to 48 tonnes and trailer lengths from 13.6 to 15.6 metres. The proposals are aimed at reducing the number of journeys needed to transport goods, and therefore, the resultant CO2 emissions. The consultation is open until 4th January 2021.

Whilst welcoming any proposal to reduce transport CO2 emissions, Britpave warns that the additional proposed load weight will underline the need for a long-term construction solution for the strategic road network. Joe Quirke, Britpave chairman, said: "What is needed is a construction solution that can successfully meet the demands being placed upon it. The way forward is to design specific truck lanes where the road is specifically constructed to meet the demands of heavy traffic loads."

Quirke pointed out that where the main structural component is concrete and where adequate maintenance has been carried out, pavements have been proven to last beyond their design life and can cope with ever-increasing traffic loads.

There are a number of long-term, minimum maintenance concrete road options including continuously reinforced concrete pavement with exposed aggregate and Next Generation Concrete Surface that offers the long-term performance of concrete with significant traffic noise reduction.

In addition, Quirke explained that low carbon concretes, 100% recyclability and evidence that concrete rolling resistance can reduce fuel consumption offers further CO2 reduction benefits of concrete roads. These and the superior whole life performance of concrete roads should be more widely recognised and considered by the DfT.

CONCRETE ROADS COULD EAT TRAFFIC POLLUTANTS

Highways England is keen to reduce elevated levels of traffic exhaust emissions. The answer could be at their feet.

There are increased concerns about the elevated levels of nitrogen dioxide (NO2) from increased traffic levels which on motorways have increased by almost a quarter over the last 20 years. Possible solutions include a network of 9m high pollution barriers installed at key locations across the strategic road network or the use of temporary 60 mph speed limits at peak times. However, there may be less visually intrusive answer than 9m high barriers.

"Highways England may well want to look at new concrete technology developments that offer the exciting possibility of concrete roads that absorb NO2 pollutants," said Joe Quirke, Britpave chairman. "The addition of titanium dioxide to concrete means the concrete actually eats pollutants."

Titanium dioxide (TiO2) is a photocatalytic material that reacts in sunlight to absorb nitrate oxides and convert them into harmless nitrates. It is increasingly available as a pavement spray or as an additive to concrete and adds 5 – 10% to the cost of a concrete road.

Quirke points to research carried out by the Eindhoven University of Technology in the Netherlands that found NO2 reduction of 35-40% in areas paved in concrete featuring TiO2. Researchers at the Public University of Navarre, Spain, are developing a nanoparticle coating for concrete uses photocatalytic reaction to reduce up to 90% of nitrogen oxides, 80% of hydrocarbons and 75% of carbon monoxides. In Segrete, Italy, a road treated by Essroc Italcementi with a TiO2 pavement spray resulted in a NO2 reduction of 60%.

Pollutant eating concrete roads may sound like science fiction but they are a very real solution that should be considered", said Quirke. "Plus they are the not the only environmental benefit of concrete roads. In addition, concrete roads can also be self-heating to reduce ice and snow-build-up, self-healing to reduce the need for repair and maintenance and energy conductive for easy wireless charging of electric vehicles as they travel over them. Plus, their thinner pavements, longer performance life and reduced maintenance means a reduced life cycle carbon footprint."

CONCRETE PRESERVATION: HEARING FROM THE EXPERTS

EUPAVE's recent concrete preservation webinar heard from six experts in concrete paving who forwarded the concepts, practicalities and processes of concrete pavement presentation.

The webinar was opened by Luc Rens, Eupave's Managing Director with a presentation on the definition, concepts and strategies of concrete pavement preservation (CPP). He defined CPP as *"a strategy of extending concrete pavement service life as long as possible by arresting, greatly diminishing or avoiding the pavement deterioration process"*. He explained that this strategy can be achieved:

- Designing and constructing durable long-life concrete pavements (LLCP structurally adequate and relatively distress-free throughout a long service life),
- Overlays (asphalt or concrete) as a preservation treatment,
- Maintaining serviceability of the existing concrete pavement using CPR (restoration) treatments.

The presentation then examined surface restoration techniques for CPP including: diamond grinding; Next Generation Concrete Surface; fine-milling; micro-milling.

Anne Beeldens, owner and consulting engineer at AB-Roads, continued the webinar with a presentation entitled: 'Road Auscultation and Condition Assessment'. The presentation provided a number of practice case studies that addressed the following issues:

- Evaluating structural adequacy: ability to withstand repeated structural loading,
- Assessing the durability of the pavement materials: ability to withstand environmental deterioration,
- Assessing the functional adequacy of the pavement in terms of smoothness, noise and skid resistance.

There followed two presentations on maintenance and repair techniques for concrete slabs given by Pascal Buys, manager director of Robuco, and Tim Alte-Teigeler, head of research and development at Otto Alte-Teigeler GmbH. Buys examined the different options for joint maintenance and crack repair and presented the benefits of dowel bar retrofit using a case study of the N44 in Belgium. Restoring the load transfer between slab can extend the service life of an old concrete road (over 50 years in this case) by at least ten years. Alte-Teigeler focused on cross stitching, partial depth repair, lifting and stabilizing of slabs and full depth repair. He stressed the importance to choose the suitable repair technique for any pattern of damage. In order to ensure the long service life of concrete

pavements, repair measures have to be applied on short notice after damages occur.

Didier Snoek, researcher at Magnel-Vandepitte Laboratory for Structural Engineering and Building Materials at Ghent University presented 'Self-healing concrete by means of superabsorbent polymers'. The presentation included information on hydrogels, microstructure, self-sealing and seal-healing. This innovative development is a promising solution for concrete pavement preservation in the future. Field tests are already going on in some projects, confirming the laboratory results.

Finally, Elia Boonen, researcher at the Belgian Road Research Centre, talked about 'Durable repair and rehabilitation of CRCP'. The principles for continuously reinforced concrete are different compared to jointed plain concrete. In the first place, the continuity of the longitudinal steel always needs to be restored in case of repairs. Different repair techniques were presented as well as some larger rehabilitation projects.

To view/download a presentation visit:

1. Luc Rens; EUPAVE BP Workshop: Introduction to concrete pavement. See: https://bit.ly/3kT6X49
2. Anne Beeldens; Road auscultation and condition assessment. See: https://bit.ly/325jKch
3. Pascal Buys; Maintenance repair technology for concrete slabs. See: https://bit.ly/32860hb
4. Tim Alte-Teigeler; Maintenance repair technology for concrete slabs. See: https://bit.ly/35XdyEr
5. Didier Snoeck; Self-healing concrete. See: https://bit.ly/34MCWNP
6. Elia Boonen; CRCP repair. See: https://bit.ly/3egF97s

BLUE PHOENIX NEW IBAA FACILITY

The new Blue Phoenix UK located at the Ferrybridge Power Station, Knottingley, West Yorkshire, is the largest Blue Phoenix UK operation and processes over 300,000 tonnes of Incinerator Bottom Ash (IBA) per year. Ferrybridge is one of 12 Blue Phoenix UK sites.

The use of Energy from Waste (EfW) plants is a key UK Government strategic solution for dealing with municipal solid waste in an environmentally friendly manner. The major residue from EfW's is IBA. Blue Phoenix processes this into Incinerator Bottom Ash Aggregate (IBAA).

IBAA has been used for over 20 years as a cost effective, low carbon and sustainable alternative to traditional materials. IBAA can be used in all layers of a construction platform for building industrial units to highways construction and complies with the Specification for Highway Works (SHW) 600 and 800 series for Class 1A, Class 6F Capping material and Type 1 sub-base. IBAA can also be used in Cement and other Hydraulically Bound Mixtures (HBM) such as CBGM and SBM, these are just two materials that can benefit from the use of IBAA and its properties: the relatively low aggregate density, the mild pozzolanic properties and close proximity to market.

The BPUK construction of the Ferrybridge site underlines the benefits of using IBAA. The main yard area was built up of a 570mm capping layer, with a 230mm thick CBGM Sub base and 200mm thick RCC surface slab. The sub-base consisted of 230mm thick Cement Bound Granular Mixtures A (CBGM A) using IBAA aggregate to the Specification for Highway Works Clause 821, strength C8/10. The surface slab consisted of 200mm thick Roller Compacted Concrete (RCC) C40/50 to the Specification for Highway Works Clauses 1051 to 1061 with wet formed crack inducement at 5m centres and wax curing membrane. RCC is used on all of BPUK sites for building the main product storage areas due to its ease of construction, high strength, and durability.

IBAA CASE STUDY

Starting in April this year, main contractor NMCN have specified IBAA for the £6m upgrade of the A6195 at Wombwell, Barnsley for Barnsley Metropolitan Borough Council, BPUK have supplied 36,000t of IBAA into the construction platform with 600mm of Class 6N placed beneath 300mm of SHW Clause 803 Type 1, surfaced with asphalt. NMCN summed up the benefits of IBAA: "It's an extremely cost-effective material when compared to other construction aggregates. There are advantages logistically when using IBAA due to the low density of the material allowing for fewer vehicle movements giving 20% volumetric advantages over primary materials."

USING THE CLOUD TO FORWARD GREENER DELIVERY OF INFRASTRUCTURE

Pushing the pace on digitisation and innovation to drive better, faster and greener delivery of infrastructure, Costain has worked together with key partner SAP as well as a consortium of industry leading enterprises, such as Transport for London (TfL), East West Rail Company, HS2 and Network Rail, called the 'Transport Infrastructure Efficiency Strategy Living Lab' (TIES Living Lab) to create a demonstrator for a new cloud-based digital platform called the Intelligent Infrastructure Control Centre (IICC). The IICC will harmonise the vast quantities of intelligence that UK infrastructure projects generate and drive greater productivity and resilience through the capture of efficiency and innovation. This will contribute to a radical culture change in how the industry designs and delivers projects and will offer a completely different way of managing operations that will save money and time.

The IICC takes comprehensive operational data from an infrastructure project portfolio and then synthesises the information onto one platform. At a project level this data is essential to effectively manage operations. At an enterprise level it informs numerous processes including budgeting, talent acquisition and external reporting. For organisations with responsibility for national infrastructure across the UK, complete visibility of enterprise performance is a fundamental the IICC system can deliver.

To learn more about the new IICC platform, listen to the Engineering Matters podcast #74 Weaving a New Data Fabric for Infrastructure, see: **https://bit.ly/39goZuj** or watch the SAP webinar discussing Digital Disruption of the Infrastructure Industry, see: **https://bit.ly/3lcNlap**

AGGREGATE INDUSTRIES LAUNCHES NEW ECOPACT

Aggregate Industries has launched a new ECOPact range of concretes. ECOPact comes with a range of formulae offering different levels of carbon dioxide savings, from 30% to 70% compared to standard (CEM I) concrete. The range includes:

- Regular ECOPact uses a blended cement to give 30-50% CO2 reduction compared to a standard concrete (CEM I) mix.
- ECOPact Prime is described as an engineered low carbon concrete using higher blends of cements using ground granulated blast furnace slag (GGBS) and FlyAsh substitutes. This delivers between 50-70% CO2 reduction compared to a standard concrete (CEM I) mix, it is claimed.
- ECOPact Max uses cement alternatives such as geopolymers and alkaline activators to reduce CO2 content by at least 70%.

Aggregate Industries also promises to give the extra money paid by customers with a conscience to its offsetting partner, Circular Ecology, who will then fund projects such as tree planting, clean water projects and investment in renewable energy. Chief executive Guy Edwards said: "We are delighted to launch the ECOPact range of low carbon concretes in the UK, and we cannot wait for our customers to reap the benefits."

For further information, visit:
www.aggregate.con/ecopact

TECHJOINT JOINS BRITPAVE

Britpave is delighted to welcome Techjoint as a new member. Techjoint is a leading specialist in highways repair and bridgedeck waterproofing solutions including rapid overnight full and part concrete bay replacements and inlaid crack repair.

As an approved applicator of Matacryl and IKO Permatrack, Techjoint provide a quick, durable, cost effective liquid waterproofing solutions that provide seamless protection to concrete and steel surfaces as well as highway maintenance to include manhole replacement and asphaltic plug joints repair and installation.

Mark Healy, Techjoint Director said: "Joining Britpave will enable us to share information on effective road and bridge repair. We look forward to working with other members on forwarding cost-effective infrastructure solutions." In response, Joe Quirke, Britpave Chairman said: "Having Techjoint as a member further widens the pool of experience and expertise that Britpave members represent. We are delighted to welcome them as members."

See: **www.techjoint.co.uk**

NEW LOOK FOR NORDER

At the start of 2020, Britpave member Norder determined to develop a new brand and positioning in order to capture how the company has evolved into the business that it is today: a forward-thinking provider of engineering and architectural services, continually pushing the boundaries to discover the optimum solution for every project.

The branding journey helped to define exactly what it is that makes Norder different: it's innovative culture. Since 1975, the company's focus on design innovation has been delivered across an ever-expanding range of sector specialisms. As the company has developed, so has its portfolio of services.

This insight provided the inspiration for the new positioning and resulted in the development of the new positioning line: Engineers. Architects. Innovators.

The visual development of the new brand is influenced by an engineering and architectural context, taking the Norder characters and re-imagining them in a 3D wire framestyle format, reminiscent of design drawings. Here, the intricacy of the lettering aims to reflect the consistent focus on precision and solution interrogation which define the Norder approach.

See: **www.norder.co.uk**

Norder

COLLABORATION DELIVERS HS2 CONTRACT 1 EARTHWORKS

Combined Soil Stabilisation undertook the treatment of over 400,000m3 of soil treatment on the HS2 C1 construction contract. CSSL worked as a subcontractor to Roadbridge UK who in turn are provided the earthworks for the Align JV.

HS2 C1 consists of 21.6km of high-speed rail infrastructure. This includes a 3.37km viaduct, 16.04km twin-bored tunnel and five vent shafts handling both intervention and tunnel ventilation facilities.

In order to start the two tunnel boring machines the earthworks for the launch pad required excavation of over 160,000m3 of material and this volume along with other cuttings on the main line have been placed and treated to provide working platforms for precast concrete batching and storage, tunnel spoil handling, soil nailing operations as well as offices and parking. Stabilisation was also used as a capping replacement, reducing the need for imported stone which benefits the environment through fewer lorry movements.

In addition to the working platforms, the chalk and head materials were placed and engineered in below ground treatments and rail embankment fill, all in accordance with the detailed HS2 earthworks specification to achieve a high quality robust embankment. Soil treatment to ensure that the treated material met the specification both in the short and long term life of the embankment. CSSL's first involvement was for the embankment trial in August 2019 and the company's technical expertise and experience was used to assist the development of the project.

At the peak of the works CSSL had four mixers working on the project. The mixers used all met the HS2 stringent emissions standards. They were supported by a mixture of self-propelled and tractor towed binder spreader units with capacities ranging from 10 to 19 cubic metres. The binders used for the treatment of the soil were a combination of lime only or lime and cement. In addition to the mixing of the binder into the soil, CSSL also undertook the compaction of the material.

The success of the works resulted from the collaborative attitude throughout the supply chain, with all involved from designers to subcontractors working together to achieve the quality required first time.

DATA IS KEY TO UNLOCKING BROWNFIELD SITES

A new report published by Atkins, a member of the SNC-Lavalin Group, shows how data can be used to provide a better understanding of brownfield sites and so make it easier to bring them forward for development. It discusses the findings of a discovery project undertaken by Atkins and the Open Data Institute and funded by Lloyds Register Foundation which examined how much information current open datasets give on brownfield sites, particularly concerning land contamination, where the gaps are and where those gaps could be filled by other 'closed' datasets.

Dr Caroline Paradise, head of design research at Atkins, said: "There are over 1.1 million households in England on the social housing waiting list, even though we have enough brownfield land to build an estimated 1 million homes, as per a report by Atkins' housing development arm EDAROTH. Bringing this land forward for development is imperative, but we can't do that without data. This report identifies some key areas where we are missing data and, crucially, where that data already exists – if we are willing to share it."

One of the blockers in developing these sites is unknown ground conditions, especially where there is the potential for land contamination. The Atkins' report shows that some important datasets used in land contamination risk assessment are only available from non-open data sources. This impacts the risk assessment outcomes for a site. Opening these datasets could help improve decision making and reduce the costs associated with developing brownfield sites.

Jeni Tennison, Vice President at the ODI, said: "The UK's new National Data Strategy highlights the importance of increasing data availability, and the Geospatial Strategy emphasises the power of location data. This work shows these principles in action: how open data could speed up the development of brownfield sites and help meet the UK's housing needs. This is a great opportunity for industry and government to collaborate and unlock the potential of location data."

In addition to helping the UK tackle its housing crisis, open data used in land contamination risk assessment would also help deliver the ambitions in the UK's Geospatial Data Strategy.

The report introduces an inventory of data currently used in land contamination risk assessment, as well as case studies into open and closed datasets. It also creates a framework to encourage increased sharing of data on land contamination.

The report is part of Lloyd's Register Foundation and the ODI's stimulus fund for projects that increase access to data and drive innovation in the engineering sector

To download the report visit: **https://bit.ly/32hd7E2**

POWERING AT SILVERWOODS

Powerbetter was contracted to undertake soil stabilisation works for the Silverwoods Park mixed development at Kidderminster. The 30,000m3 stabilisation works included removing historic uncontrolled backfilled lagoons and replacing with re-engineered soil and were carried out during the period between 2nd March 2020 to 21st May 2020.

Powerbetter's prior testing confirmed that the materials encountered on this site could be treated. Materials included soft organic clay 'fill' & predominantly granular materials containing variable quantities of fines from 4% to 38% (average 18%) – up to 4m deep. Lime and cement were both used for comparison in the prior testing, but the standard industry specification, 'HA74/07 Treatment of Fill & Capping Materials Using Either Lime or Cement or Both', recommends an upper liquid limit of 45, an upper Plasticity Index [PI] of 20 applies for material selected for improvement with cement, and a lower Plasticity Index of 10 and above, for materials selected for improvement using lime.

Testing carried out prior to the works gave Plastic Indices [PI] between Non-Plastic [NP] - 16, which if NP was zero the average PI would be 5; based on this and that the cement obtained more robust results, cement was chosen as the binding agent. The percentage cement spread was calculated on the materials dry density and was adjusted daily to the conditions encountered; the percentage spread ranged from 1% - 5%, with the average being 3% cement used throughout the project. The specification was to achieve a bearing pressure of 80kN/m2 with <13mm settlement in the fill and 110kN/m2 with <5mm settlement at formation as well as CBR's >5%. Compaction throughout was to achieve >95%.

The works enabled the client to eliminate circa 7,500 lorry movements from the local roads without needing to remove and replace the unsuitable materials, as well as producing a working platform as part of the infrastructure for the future development works.

EXAMINING THE POTENTIAL OF HYDROGEN FOR LIME MANUFACTURE

A research project to determine the potential to use hydrogen as an alternative fuel for high calcium lime manufacturing is being funded by the Department for Business, Energy and Industrial Strategy (BEIS) Energy Innovation Programme. The project is managed by the Mineral Products Association (MPA) and the British Lime Association (BLA). BLA members Tarmac, Singleton Birch and Lhoist are all providing support for the project with Tarmac providing the demonstration site.

All lime is manufactured through high temperature kiln processes whereby calcium carbonate - from limestones or chalk - is heated to drive off carbon dioxide. This chemical reaction occurs at about 1,000oC and is known as calcination. The residence time of the stone in a kiln varies depending on the type of kiln and the type of final product required, and can be anything between six hours and two days.

In the UK, high purity limes are required to service diverse markets, such as in soil stabilisation, mortars and renders, steel and metals manufacturing, emissions control, water and wastewater treatment, as well as pharmaceuticals and cosmetics. UK lime is manufactured from high purity limestone or chalk. Natural gas is the preferred fuel as it introduces few impurities and is readily available through the gas transmission system. It also has lower carbon emissions compared to solid fuel alternatives such as coal or lignite. There are no examples of replacement gaseous fuels for natural gas that would ensure maintenance of the quality of the high calcium lime product required in the UK.

In the UK, lime is manufactured using two types of gas-fired kiln: vertical shaft kilns and parallel flow regenerating (PFR) kilns. Key challenges to convert vertical shaft and PFR kilns to hydrogen include:

gas density/calorific value, combustion stoichiometry, flame speed and temperature and the impact on kiln performance and product quality. Further issues are NOx, other emissions to air and exhaust gas moisture content, including the formation of emission products in the kiln, and the impact on emissions control systems. As well as the long term embrittlement and degradation of materials in kiln systems, including damage to refractories.

As lime manufacturing is permitted under the Environmental Permitting Regulations, demonstration of hydrogen fuel in lime manufacturing offers an environmentally robust means to assess technology feasibility within the sector.

By delivering projects through the BLA, the outcomes can be shared widely across the sector. The BLA is a member of the European Lime Association (EuLA) and the International Lime Association (ILA) ensuring that UK technologies and best practice will have the widest possible reach.

UK-LIME RESEARCH SYMPOSIUM 2021

Postponed due to Covid 19, the UK-Lime Research Symposium will now be held on 13th October 2021. As originally planned, the event will be held at the University of Northumbria in Newcastle upon Tyne with prizes for the best presentations and posters by students and early career researchers. This free-to-attend Symposium provides an opportunity for students and early-career professionals to report on their research work to the industry, specifiers and customers, and will be supported by published proceedings. Papers on lime for soil improvement, treatment and stabilisation are welcomed, including papers from industry. For more information visit: www.britishlime.org/news/Symposium2021.php

CALL FOR PAPERS ON ADVANCES IN THE USE OF LIME

The peer reviewed scientific journal 'Materials' is to publish a special issue focused on advances in lime and lime-based materials. This includes lime used for applications such as in soil stabilisation, asphalt, or pollutant removals in waste-streams. Deadline for submission of papers is 31st July 2021. For a full description of the aim of this issue, the list of topics of interest and details on how to submit a paper visit: https://www.mdpi.com/journal/materials/special_issues/Lime_Materials

OPTIMISED CONCRETE HARDSTANDING DESIGNS WITHOUT MESH

Moving away from traditional mesh reinforcement provided significant project time and cost savings for the concrete hardstanding service yards for the new Next Plc Distribution Centre, South Elmsall, West Yorkshire.

Adept Consulting Engineers structural design for the external service yard concrete pavements initially opted for traditional mesh reinforcement. However, conversations with Danley concerning possible optimisation of materials and labour resulted in a rethink and the decision to use Danley's Strategic Reinforcement Design. This value engineered solution offered potential installation cost savings of over 15%, increased productivity and a more sustainable solution.

Although proven and used overseas for over 20 years. the Next project is a first for the UK. The strategy combines ground supported flatwork designs incorporating Danley tapered plate dowels including PD3 dowel cradles for sawn-free movement joints and Danley dowels for construction joints.

Martin Langan, Technical Consultant at Adept Consulting Engineers, said: "In the UK, mesh reinforcement is the most common method used to reinforce concrete service yard slabs. However, following a technical seminar from Danley we were intrigued about the possible benefits of a method widely used in North American that omits the use of mesh."

The approach involves removing the steel from the mid-panel and putting it at the joints, the strategic controlling of cracks can maintain the structural integrity of concrete slabs and the use of tapered plate dowels allows for slab shrinkage and lateral movement. The long-term serviceability and durability of concrete ground supported slabs is delivered most effectively through management of the natural behaviour of concrete. As most failures and deterioration of concrete slabs occur at the joints, Danley's Strategic Reinforcement Design optimises materials and labour by creating a joint design layout for the specific application, and placing steel where it provides the most benefit, which is at the joints for reliable load transfer. Therefore, all mid-panel reinforcement is eliminated. The result is superior long-term joint stability with minimised joint spalling and reduced out-of-joint panel cracks.

Langan continued: "Impressed by the potential performance, sustainability and cost saving benefits, we decided to trial the Strategic Reinforcement Design on the high bay extension at Next, South Elmsall."

The original specification detailed a 200mm C35A concrete slab with mesh throughout and joints spaced at 7m x 5m panels. At the contraction joints, H16mm diameter dowel bars at 300mm centres were proposed. The Danley design specified thinner 165mm PAV2 concrete slabs, no mesh, and joints spaced on a 4m x 4m grid. The smaller panels allow more controlled cracking of the concrete within the joints to relieve shrinkage stresses that develop during the curing process. 10mm thick Danley dowels were used at the construction joints and 10mm thick PD3 dowel cradles used at the sawn contraction joints. The combined effect of smaller panels and the superior load transfer efficiency of the tapered plate dowels with free movement at the joints minimises stresses within the concrete. In comparison to the original specification, this resulted in 17.5% less concrete by volume, contributing to reduced costs, improved concrete delivery logistics, and the reduction of CO_2 emissions.

Paul Turner, Director at QED Construction, commented: "When Adept informed us of their decision to use the Danley Strategic Reinforcement Design, this method was very new to us. I have been in the trade for a long time and this is the first time I had heard of it. However, it was clear that this was going to offer us huge benefits in terms of faster and easier installation, improving performance whilst lowering cost.

The elimination of mesh meant that we required one less labourer and that we didn't need to set up the day before. It also meant less steel to use and less load to carry. For every 120 - 150m^2, we saved around half a day's work. On the first day of the job, we set up the PD3 Dowel Cradles and Danley® Dowels following the issued designs issued. The installation was fast, easy and straightforward, and it was simple to use the PD3 cradles as a cutting guide to saw the joints."

QED Construction realised an installed cost saving of 17%. The reduced slab thickness for this project resulted in eight fewer deliveries and there was an 80% reduction in steel by weight, further reducing carbon emissions.

"We were particularly impressed by the Danley Dowels," continued Turner. "It eliminates the need for drilling or processing of timber formwork that is required with traditional steel dowel bars, and the plastic sleeves made stripping off the formwork much easier, saving us a couple of hours each pour. We also found it easier to keep the dowels level upon installation. We now use Danley dowels as standard across all of our current projects, the time-saving and performance benefits are exceptional. For projects that we have tendered for, we now propose the Strategic Reinforcement Design to the structural engineers."

Matt Craven, Project Manager at Harris CM, the main contractor on the project, said: "At the beginning, the main concern for all parties was the elimination of the traditional mesh. For us, it's about finding the right solution for the client and the warranty it comes with. Danley took us through the whole process, were very hands-on and observed all of the work while the project was ongoing."

The Strategic Reinforcement™ Design complies with Concrete Society TR66 Rev 1: External in-situ Concrete Paving, ACI 330.2R-17: Guide for the Design and Construction of Concrete Site Paving for Industrial and Trucking Facilities and ACI 360-R-10: Guide to Design of Slabs-on-Ground.

For more information about Danley® and its Strategic Reinforcement™ Design, visit **www.danley.co.uk** or for any enquiries, email **mbolle@danley.co.uk**

MEMBERS' NEWS

SLIPFORMING SUCCESS ON M4

Work continues on turning 32 miles of the M4, from junction 3 to junction 12 into a smart motorway. PJ Davidson is carrying out slipformed Davidson's Concrete Barrier (DCB), central reserve and hard shoulder slot drainage works on behalf of the main contractor joint venture Balfour Beatty/ Vinci (BBV). Tight working envelopes require regular technical and operational consultations between PJ Davidson and BBV to ensure efficient delivery of the barrier and drains. To further facilitate this, PJ Davidson has deployed its own CEMCO batching plant to the project, establishing a BSi accredited concrete source adjacent to the works with the ability to supply all the required concrete. PJ Davidson is the UK's largest installer of rigid concrete barriers having installed over 1 million linear metres.

RPS LAUNCHES NET ZERO CARBON PROGRESS CHECK

RPS has launched a Net Zero Carbon Progress Check to allow businesses to review their current position and determine how likely they are to achieve their carbon reduction targets before the 2050 deadline. The free, online tool is quick and easy to use, taking users through a series of questions looking at their individual business, strategy and goals. Once complete they are given a score which gives a high-level indication of their business' progress. It then provides useful information to help point them in the right direction for the next step on their journey which, when combined with bespoke advice from our team, can identify the next actions to take to reach their sustainability goals. "Our progress check tool can be used by any business where carbon reduction is on the agenda", advised Dan Smyth, Senior Director at RPS. "Whether they have a strategy in place already or are just starting to think about the changes they can make, our tool can help businesses when considering their next steps". To view the Check visit: https://bit.ly/2TQJJjs

INSPIRATION AT GREAT YARMOUTH CHARTER ACADEMY

Great Yarmouth Charter Academy is part of the Inspiration Trust, a multi-academy trust of academies and free schools in East Anglia. Now complete, the new development by Britpave member Morgan Sindall Construction has increased the academy's capacity from 750 to 1,350, and created an additional 150 places for sixth form students. The new project included the construction of a brand new multi-use games area (MUGA), hard play area and extra space for bicycle and car parking. Britpave member Smith Construction were delighted to have been selected by Morgan Sindall for the design and construction of the all-weather sports surfaces and have completed them on time and within budget. The sports facilities can be seen as part of the overall project in this great film from Morgan Sindall- just click on the link https://youtu.be/N4CD5IPObOo

BRITPAVE MEMBERS

As the focal point for in situ concrete and cementitious infrastructure solutions, Britpave offers its members a recognised industry voice, market sector development and beneficial industry networking opportunities. Britpave members include clients, consultants and engineers, contractors, material and plant suppliers and academia.

AECOM Ltd - www.aecom.com

Aggregate Industries - www.aggregate.com

Allied Infrastructure Management Ltd - www.alliedinfrastructure.co.uk

Atkins Ltd - www.atkinsglobal.com

Balfour Beatty Ltd - www.balfourbeatty.com

Ballast Phoenix Ltd - www.ballastphoenix.co.uk

Barton Plant Ltd - www.barton-plant.co.uk

British Lime Association - www.britishlime.org

Cambrian-UK – www.cambrian-uk.com

CEMEX UK - www.cemex.co.uk

CH2M - www.jacobs.com

Colas Ltd - www.colas.co.uk

Combined Soil Stabilisation Ltd - www.combinedssl.co.uk

Complete Design Partnership Ltd - www.cdpbroms.co.uk

Costain Ltd - www.costain.com

Danley Ltd – www.danley.co.uk

Dyer & Butler – www.dyerandbutler.co.uk

Geofirma Soil Engineering Ltd - www.geofirma.co.uk

Gill Civil Engineering Ltd - www.gillgrouphouse.com

Gomaco International Ltd - www.gomaco.com

Hanson UK Ltd - www.hanson.biz

Lagan Aviation and Infrastructure - www.laganaviation.com

Mick George Ltd - www.mickgeorge.co.uk

Morgan Sindall Construction and Infrastructure Ltd - www.morgansindall.com

Norder Design Associates Ltd - www.norder.co.uk

PJ Davidson (UK) Ltd - www.pjd.uk.net

Power Better Soil Solutions – www.powerbetter.biz

RJT Excavations Ltd - www.rjtexcavations.co.uk

Roadgrip Ltd - www.roadgrip.co.uk

RPS Group plc - www.rpsgroup.com

SGE - www.sgeworks.co.uk

Smith Construction (Heckington) Ltd - www.smithsportscivils.co.uk

Tarmac Ltd - www.tarmac.com

Tata Steel Shapfell - www.tatasteeleurope.com

Techjoint Ltd www.techjoint.co.uk

TKL Earthworks - www.thetklgroup.co.uk

TR Stabilisation - www.trstabilisation.co.uk

VolkerFitzpatrick Ltd - www.volkerfitzpatrick.co.uk