REINFORCE

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2023

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BAR
BRITISH ASSOCIATION OF REINFORCEMENT

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2023

Welcome

Innovation and collaboration are key for addressing the challenges facing today's construction industry. They are attributes that BAR and its members fully embrace as they aim to forward to UK reinforcement sector.

Examples of this is are covered in this issue of Reinforce. Both innovation and collaboration are prime drivers in the Cement 2 Zero UK-based demonstrator project that will trial the world's first zero-emissions cement on an industrial scale. They are behind the development of both new net zero initiatives and new reinforcement products.

Innovation and collaboration also key for delivering best health and safety practice, forwarding social value and being central for achieving the project cost and sustainability benefits that result from early engagement between client, main contractor and subcontractor.

Unsurprisingly, given their positive impact, the roles of innovation and collaboration will be examined at the 2023 BAR Industry Seminar, 'Forwarding UK Reinforcement'. To be held as part of UK Construction Week at the NEC in October, the seminar will hear from government and industry figures on what the industry is doing to address the challenges facing UK construction. Registration details are included within this issue. You are advised to book early.

Above all, innovation and collaboration help to realise the inherent benefits of reinforced concrete construction including reduced whole life CO2, built-in fire protection, unrivalled thermal efficiency and many more.

See you at UK Construction Week.

Stephen Elliott
Chairman of the British Association of Reinforcement

The British Association of Reinforcement (BAR) is the industry association for UK Manufacturers and fabricators of steel reinforcement products including cut-and-bent and mesh.

BAR aims to add value to the reinforcement industry via market and product development, the promotion of health and safety as well as social value and environmental best practice and providing a forum to help forward the reinforced concrete industry as a whole.

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NEW PLANNING GUIDANCE FOR BUILDINGS' WHOLE-LIFE ASSESSMENT **WELCOMED**

The City of London Corporation's new whole-life planning guidance has been welcomed by the British Association of Reinforcement.

Under the new planning guidance developers and their designs teams will have to submit specific information about the comparative carbon impact of a range of construction alternatives at the pre-application stage. Previously, major applications submitted to the City needed to achieve a minimum of BREAM "excellent" certification rating for sustainability and did not require a whole-life carbon assessment. The new guidance also calls for developers to consider refurbishing existing buildings rather than demolishing and replacing them.

The guidance will be included in the City's Whole Life-Cycle Carbon Optioneering Planning Advice Note and applies to major developments greater than 1,000msqm floorspace as well as smaller developments that involve demolishing most of an existing structure.

The new planning guidance goes beyond initial embodied construction carbon impact and calls for consideration of the whole-life impact. The need to reduce the embodied CO_2 resulting from construction material manufacture is essential but so is a full understanding and appreciation of the impact of a building's operational CO_2. A typical building's CO_2 is split between 20% embodied CO_2 to build it and 80% to run it.

The reinforcement and concrete sectors are actively delivering new manufacturing processes, developing new products and increasing the use of recycled wastes in order to reduce the CO2 impact of construction materials. For their part, developers and designers need to consider their long-term whole-life operational CO_2 impacts..

In terms of reduced whole-life CO_2 the inherent performance and operational benefits of concrete should be properly recognised. Reinforced concrete buildings offer longevity, low maintenance, fire and rot resistance, reduced sound and minimal vibration transmission without the need for additional finishes and materials – and all their additional CO_2. Furthermore, the inherent thermal efficiency of concrete allows for heating and air conditioning approaches that can considerably minimise a building's energy requirements.

Consideration should also be given to the locally sourced benefits of an UK industry that supplies 95% of the UK's concrete demand – compared with timber which imports 80% of required timber with most being imported by North America, Russia, China and Brazil with significant CO_2 shipping consequences – and the fact that the UK manufacture of reinforcement is from 98% scrap metal and uses Electric Arc Furnaces which has significantly reduced CO2 emissions compared to the Basic Oxygen Steelmaking process. In addition, cement producers are developing new manufacturing processes and new cements that are dramatically reducing CO_2 emissions.

Reinforced concrete buildings are often easier to re-use and re-configure for future change of use compared with lightweight timber and steel construction. At the end of life, reinforced concrete can be recycled for future use.

The new City of London Corporation planning guidance is to be welcomed as it does not CO_2 cherry-pick but calls for an holistic whole-life approach that takes account of construction, operation, maintenance, re-use and demolition of a building.

FIRE CHIEFS HAVE CONCERNS OVER **THE USE OF TIMBER CONSTRUCTION**

A recent position paper from the National Fire Chiefs Council (NFCC) sets out concerns over the use modern methods of construction (MCC) particularly the use of engineered mass timber products such as cross-laminated timber (CLT) and glue-laminate timber (Glulam).

The Modern Methods of Construction Policy Position Statement show that the fire chiefs concerns centre on a lack of understanding about the performance of MMC especially the lack of research and test data available to provide reassurance on fire performance. In addition, the NFCC is concerned about the structural stability of mass timber construction as a result of fire. It has called for tightened rules for the testing of MMC.

Whilst NFCC recognised the role that MMC can play in reducing the environmental impact of construction it said that "this must not be at the expense of safety."

NFCC chair Mark Hardingham said: "It is vitally important to make sure that products and technologies are safe for use, including their likely performance in a fire, before they are used in the built environment.

Stephen Elliott, chair of the British Association of Reinforcement, said: "Neither the fire nor long-term performance of engineered mass timber construction have been fully tested or proven. What is proven is that timber burns."

He continued: "Timber construction is designed to meet the 30 minutes fire resistance required by the Building Regulations. In comparison, concrete offers an inherent fire resistance of over four hours. This gives building occupants more time to escape and provides fire fighters with greater structural reassurance to allow them to fight and control the blaze.

Cross laminated timber is being touted as a structural option for multi-storey construction as a layer of charring is thought to prevent the structural component from burning. However, charring is burning and will have a significant impact on structural integrity. To say that charring is not burning is being disingenuous."

HOW TO CUT CARBON IN REINFORCEMENT

Steel contributes around a quarter of a concrete slab's embodied carbon. Fortunately, there is much that designers can do to reduce this environmental impact, says Emily Halliwell, senior structural engineer, at The Concrete Centre.

As the construction industry seeks solutions for reducing the embodied carbon of concrete buildings, much of the focus has been on the concrete itself – on alternative cements and cement replacements, and on more material-efficient floor systems that use less concrete. But we cannot afford to ignore the reinforcement within the concrete. This contributes approximately 25% of the embodied carbon of a structural floor – a proportion that will become even more significant as the embodied carbon of concrete continues to fall.

However, there are opportunities to design out carbon from this often overlooked element. As with all carbon assessments, selecting the right data is essential, particularly with large variations in carbon factors due to different steel production routes. Additionally, designers have many options for both refining their designs to minimise material use and for specifying alternatives that can offer savings in reinforcement, concrete or both.

Understanding embodied carbon in reinforcement

When calculating the embodied carbon in a structure, it is important to use appropriate carbon factors from reliable sources. It is recommended to refer to environmental product declarations (EPDs), standardised documents that provide performance data for a given product or material. As there are many EPDs available, selecting the right one is important.

Table 1: Weighted average for the carbon footprint or rebar and mesh used in the UK

	2019	2020	2021
Cradle-to-gate carbon footprint ($kgCO_2e$/tonne)	742.13	667.51	844.55
	2019-21 mean value 751.39$kgCO_2e$/tonne		

Reinforcement is mainly manufactured either using an electric arc furnace (EAF), which often recycles scrap steel, or a basic oxygen furnace (BOF), which creates new or "virgin" steel. An EAF is powered by electricity whereas a BOF is generally fossil-fuel- fired. As such, reinforcement produced by EAF typically has much lower embodied carbon, and this may fall further as the grid decarbonises.

In Europe, the majority of reinforcement is produced in this way, but this is not necessarily the case elsewhere in the world. So, given the large variations in embodied carbon associated with different production methods, it is vital to understand where reinforcement is sourced from and to obtain EPDs from suppliers and manufacturers.

Where information is not available, or during the early stages of a project, guidance on embodied carbon factors for use in carbon calculations (such as Table 1, above) can be found in the reinforcement appendix to 'Specifying Sustainable Concrete', published by The Concrete Centre.

Modifying material factors

Embodied carbon is determined not only by the choice of materials in a building, but the quantity. There are many measures we can take to reduce the amount of reinforcement in a concrete structure. To calculate the design strength of a material, the characteristic strength is divided by a material partial factor – so the lower the partial factor, the higher the design strength.

For reinforced concrete structures, the relevant partial factors are set out in Eurocode 2 (EN 1992-1-1). These account for variability in the properties of concrete and reinforcing steel and for geometrical deviations in the structure. By applying a reduced partial factor for reinforcing steel, engineers can reduce the quantity of reinforcement without any impact on performance, lowering both the cost and embodied carbon of the structure.

When calculating the capacity of concrete structures in normal design situations, the recommended partial factor for reinforcing steel, γs, is 1.15 (from EN 1992-1-1 Table 2.1N). However, this is a Nationally Determined Parameter, allowing different countries to specify their own value, and a reliability study using UK CARES reinforcement data has shown that it is feasible to reduce the partial factor for reinforcing steel to 1.05 for bending.

This potentially reduces the area of steel required by 9.5%, although this may also be affected by other demands such as robustness or serviceability. More guidance on using a reduced partial factor can be found in The Concrete Centre's 'Reducing Carbon and Cost of Reinforcement'.

Saving through reinforcement detailing

Reinforcement detailing is a key process in the design of concrete structures. This involves taking the output from the structural design and turning it into an arrangement of bars that works with the geometry of the structure. There are practical limits on the length of reinforcement bars, both for delivery and installation, and so "laps" (or overlaps) are used to transfer bar forces in locations where it is not possible to use a continuous bar.

Additionally, in some locations reinforcing bars are required to transfer forces directly into the concrete, which means they must be anchored. The required reinforcement length for transferring forces between bars (lap length) or into the concrete (anchorage length) depends on the forces in the bars, as well as geometric parameters such as cover to reinforcement, whether there is a bend in the bar, and the arrangement of adjacent bars.

As the lap and anchorage lengths depend on many factors, conservative assumptions are typically made to simplify the process and avoid having to calculate lengths for each individual bar. This can, however, lead to more steel being used than is required, increasing the associated embodied carbon.

One common assumption is that a bar is carrying the maximum force for a bar of its size, rather than using the actual calculated force. This presents an opportunity to refine the design to reduce lap and anchorage lengths. As an alternative, couplers may be used in place of lap lengths to provide continuity, which can result in material savings, particularly for larger diameter bars. It is important that lap and anchorage lengths are communicated clearly on drawings so that detailers and installers understand the requirements, especially if these vary for different elements.

Avoid over-rationalising

Rationalising reinforcement layouts typically involves grouping elements, such as beams, and only designing for the worst case, such as the maximum load or longest span. This design is then used to develop reinforcement details for the whole group of elements. Rationalising reinforcement layouts is common practice because it simplifies design, checking and installation. However, it can lead to the use of significantly more material than a structural design requires.

There is a balance to be struck between ensuring reinforcement can be installed efficiently and accurately and avoiding unnecessary embodied carbon. A variety of tools are available to designers to assist with this, including in-built carbon calculators in structural modelling software and parametric design tools. Early discussions between the structural engineer and concrete contractor can assist with developing designs that are practical to install while offering embodied carbon savings.

References:

The above is an abridged version of the article 'How to cut carbon in reinforcement' carried in Concrete Quarterly, Winter 2022. To download the full version, visit: **www.concretecentre.com/Concrete-Quarterly-magazine.aspx**

The First Light Pavilion at Jodrell Bank in Cheshire, designed by Hassell. To realise the 50m-diameter concrete roof, structural engineers Atelier One and Roscoe used 3D modelling software to analyse the loads and develop a refined, more material- efficient reinforcement design. The dome comprises a 200mm-thick slab with eight discrete zones of rebar, which curves in both radial and circumferential directions.

CEMENT 2 ZERO

BAR member Celsa is a partner in Cement 2 Zero (C2Z), a UK-based demonstrator project to trial the world's first zero-emissions cement on an industrial scale.

The innovative project, which has secured £6.5 million of Government funding from UKRI as part of the Transforming Foundation Industries Challenge, aims to further advance the construction, cement and steel sectors' decarbonisation journey to net zero industries of the future, to help meet the UK Government's commitment of achieving Net Zero by 2050.

Led by the Materials Processing Institute, supported by the University of Cambridge (UoC), and in collaboration with key players in the supply chain, Cement 2 Zero is the first collaborative trial of its kind, to address the global construction industry's biggest challenge of decarbonisation, in response to the climate emergency.

Concrete is the most widely used material on earth, after water, and it is fundamental to our way of life, our economy and shaping our world. However, the chemical and thermal combustion processes involved in the production of cement are a significant source of carbon dioxide (CO_2) emissions – with more than 4 billion t of cement produced each year, accounting for around seven per cent of global CO_2 emissions, according to the Global Cement and Concrete Association (GCCA). In the UK, concrete and cement account for 1.5 per cent of UK carbon dioxide emissions.

The Cement 2 Zero project will demonstrate an economically viable route to advancing the decarbonisation journey of the cement industry by eliminating emissions derived from cement production. This will have a positive impact on world net-zero targets.

The first phase of trial melts was carried out by the Materials Processing Institute, initially in a 250 kg induction furnace, before being scaled up to 6 t in an Electric Arc Furnace (EAF). Once the process has been substantially trialled, developed and de-risked effectively, industrial scale melts will follow in CELSA's EAF steel mill in Cardiff.

The two-year industrial trial will test each stage of the production process and brings together the expertise of the Materials Processing Institute, the University of Cambridge and key supply chain partners – Atkins, Balfour Beatty, CELSA, Day Aggregates and Tarmac – before using the innovative product in a live UK construction project.

Eoin Bailey, Celsa UK Innovation Manager said: "We are delighted to be part of this important project which could not only further advance the cement, steel and construction industries, but influence how we recycle, construct and maintain our built environment and transport infrastructure. Cement 2 Zero embraces Celsa's determination to create high-value construction products from recycled waste."

He continued: "The Cement 2 Zero project shows how the UK research base and business are working together to address the important challenges that we face in building a sustainable future."

The project is based on the Cambridge Electric Cement research project at the University of Cambridge. There, Dr Cyrille Dunant, Professor Julian Allwood and Dr Philippa Horton, invented a process that converts construction and demolition waste to cement over molten steel, using an Electric Arc Furnace (EAF), which is used to recycle scrap steel. The Cement 2 Zero project aims to demonstrate that concrete can be recycled to create a Slag Forming addition which could, when cooled rapidly, replace Portland cement.

The research team discovered that the chemical composition of used cement is virtually identical to that of the lime-flux used in the conventional EAF steel recycling process. The CEC process combines the production of steel and cement and transforms a by-product of steel recycling into a valuable material, in one zero emission process.

Traditional Portland clinker, one of the main ingredients in cement, is produced by firing limestone and other minerals in a kiln at extremely high temperatures (1,450 degrees Celsius), a process which accounts for more than 50 per cent of the cement sectors' emissions.

By contrast, Cement 2 Zero will use recycled cement as the flux in the electric steel recycling process (EAF powered by renewables), the by-product of which, when cooled and ground, produces Portland cement clinker, which is then blended to make 'zero-emissions' cement.

Therefore, this innovative cement product (CEC) could be made in a virtuous recycling loop, that not only eliminates the significant emissions of cement and steel production, but also saves raw materials,

Dr Dunant of University of Cambridge and Cambridge Electric Cement said: "This breakthrough offers a positive move in cement production and will support the industry response to the UK's legally binding commitment to bring all greenhouse gas emissions to net zero by 2050."

Professor Julian Allwood, University of Cambridge and Cambridge Electric Cement, explained: "By combining steel and cement recycling in a single process powered by renewable electricity, we could supplement the global supply of the basic construction materials to support the infrastructure of a zero emissions world and to enable economic development where it is most needed."

Dr Philippa Horton, University of Cambridge, who created the project consortium, said: "If Cambridge Electric Cement lives up to the promise it has shown in early laboratory trials, when combined with other innovative technologies, it could be a pivotal point in the journey to a zero-emissions society. The Cement 2 Zero project is an invaluable opportunity to collaborate across the entire construction supply chain, to expand CEC from the laboratory to its first commercial application."

The Cement 2 Zero project will investigate both the technical and commercial aspects of upscaling Cambridge Electric Cement (CEC) production to produce 20 t of the world's first zero emissions cement. Alongside other industry developments, the project will contribute to change cement production CO_2 emissions. Cement 2 Zero aims to transform the cement and steel industries, creating a zero-emission supply chain from demolition to construction.

The CELSA Group has reduced CO_2 emissions (scope 1 and 2) from its production plants by 22% since it began its decarbonization plans in 2015 and placed them in 2021 at 263 kg of CO_2/t of steel, 36.8% below the average for the European Union steel sector. The CELSA Group has set the time horizon of 2050 to be a Net Positive company and 2030 to achieve a reduction in CO_2 emissions (scope 1 and 2) by 50% (compared to 2019 in CO_2 intensity). Regarding its circularity objectives, CELSA Group aims to reach 98% circularity by 2030 and complete circularity and be a Zero Waste company in 2050.

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CONSTRUCTION BUZZ

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BAR INDUSTRY SEMINAR AT

UK CONSTRUCTION WEEK

BAR INDUSTRY SEMINAR 2023:

FORWARDING UK REINFORCEMENT

The British Association of Reinforcement is holding its annual industry seminar Wednesday 4th October 2023 at Construction Week, NEC Birmingham. Entitled 'Forwarding UK Reinforcement', the seminar will examine how the sector is addressing the challenges of CO2 reduction via collaboration and innovation.

In particular, the seminar will include presentations from:

- the Department for Transport Supply Chain Management with an update on the UK steel sector engagement programme,
- Celsa on the Cement 2 Zero project – an exciting collaboration project aimed a large scale net-zero cement manufacture,
- ArcelorMittal on innovative carbon reduced reinforcement manufacturing,
- Express Reinforcement on the reinforcement carbon reduction and efficient benefits of early engagement,
- The Concrete Centre on how to design for sustainable reinforced concrete.

The seminar will be held from 12.30 to 15.30hrs in Piazza Suite One, located in the North Garden between Halls 1 - 5. A pre-seminar networking lunch is included.

Attendance is free but registration is required. To register use: http://www.bit.ly/44rZzmH

Or use the QR code:

For details of Construction Week see the opposite page.

ArcelorMittal

XCARB STEEL REINFORCEMENT IS EPD APPROVED

XCarb® steel reinforcement now has an Environmental Production Declaration (EPD) and is available from ArcelorMittal Kent Wire.

The EPD provides a life-cycle assessment detailing the complete environmental footprint of reinforcing steel in bars sold under ArcelorMittal's XCarb® recycled and renewable products produced using a certified supply of renewable electricity. It certifies a global warming potential of 300 kg CO_2 per tonne of finished steel, which is far below the average carbon footprint of other rebars available on the market. The EPD has been issued by Germany's Institut Bauen und Umwelt (IBU), according to international standards.

The ArcelorMittal XCarb initiative consists of three principles focused on reducing the emissions to net zero by 2050. The three principles consist of:

- XCarb Innovation funds

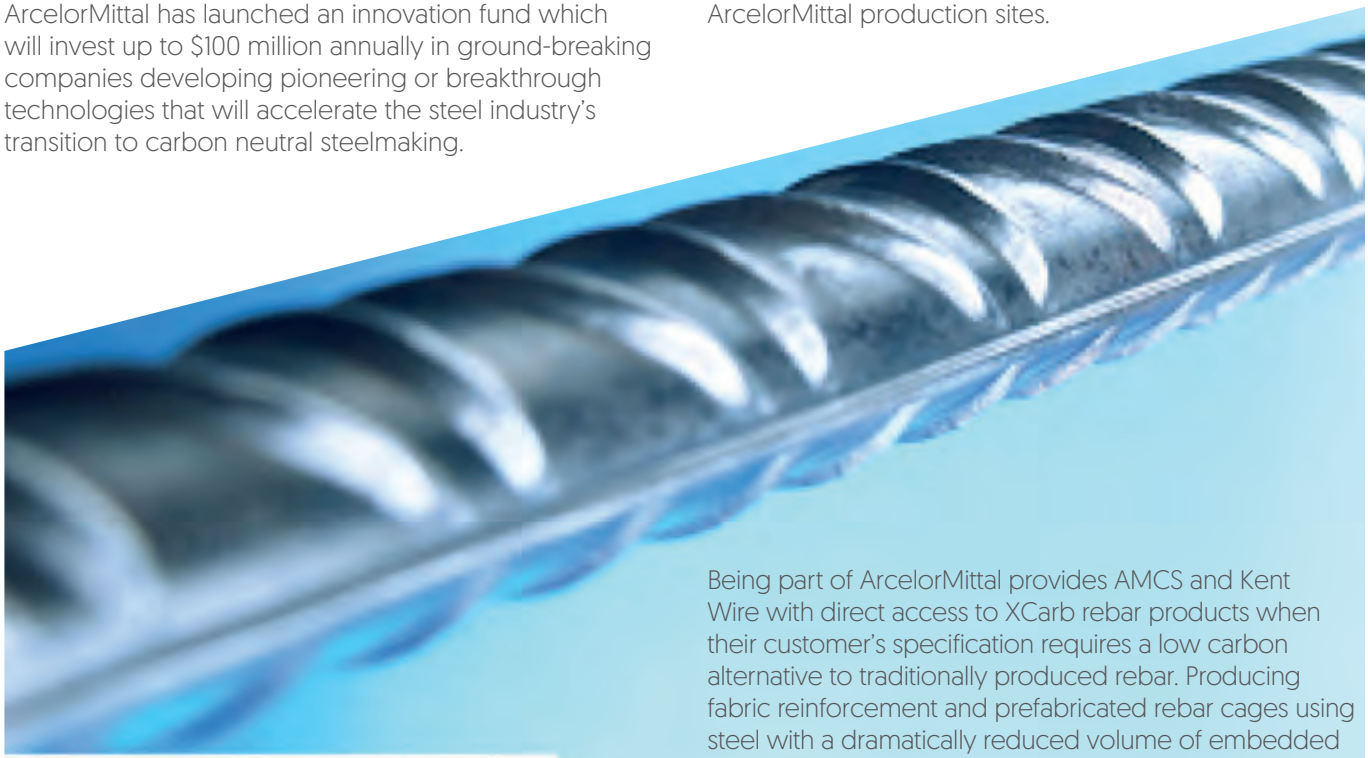
ArcelorMittal has launched an innovation fund which will invest up to $100 million annually in ground-breaking companies developing pioneering or breakthrough technologies that will accelerate the steel industry's transition to carbon neutral steelmaking.

- XCarb Green Steel certificates

The certificates use a conversion factor that represents the average CO2 intensity of integrated steelmaking in Europe. This offer customers the opportunity to buy certificates attached to their physical orders of steel, enabling them to report a reduction in their Scope 3 carbon emissions in accordance with the GHG Protocol Corporate Accounting and Reporting Standard.

- XCarb recycled and renewable products

XCarb® recycled and renewably produced steel uses up to 100% scrap. All the electricity needed comes from certified renewable sources such as solar and wind power. The energy is provided by suppliers who are connected to the same grid as the ArcelorMittal production sites.



XCarb®
Recycled and renewably produced

Being part of ArcelorMittal provides AMCS and Kent Wire with direct access to XCarb rebar products when their customer's specification requires a low carbon alternative to traditionally produced rebar. Producing fabric reinforcement and prefabricated rebar cages using steel with a dramatically reduced volume of embedded carbon is easily achievable for both businesses.

Phil Taylor, ArcelorMittal Kent Wire chief executive said: "The EPD data allows for informed procurement decisions when determining the carbon emissions resulting from a product's manufacture. Having an EPD provides an independently certified and comparable way to see a product's CO_2 impact. We are delighted to be able to work with and assist our clients in achieving CO_2 reduction objectives."

SPLICED REBAR

COLLABORATION AND INNOVATION

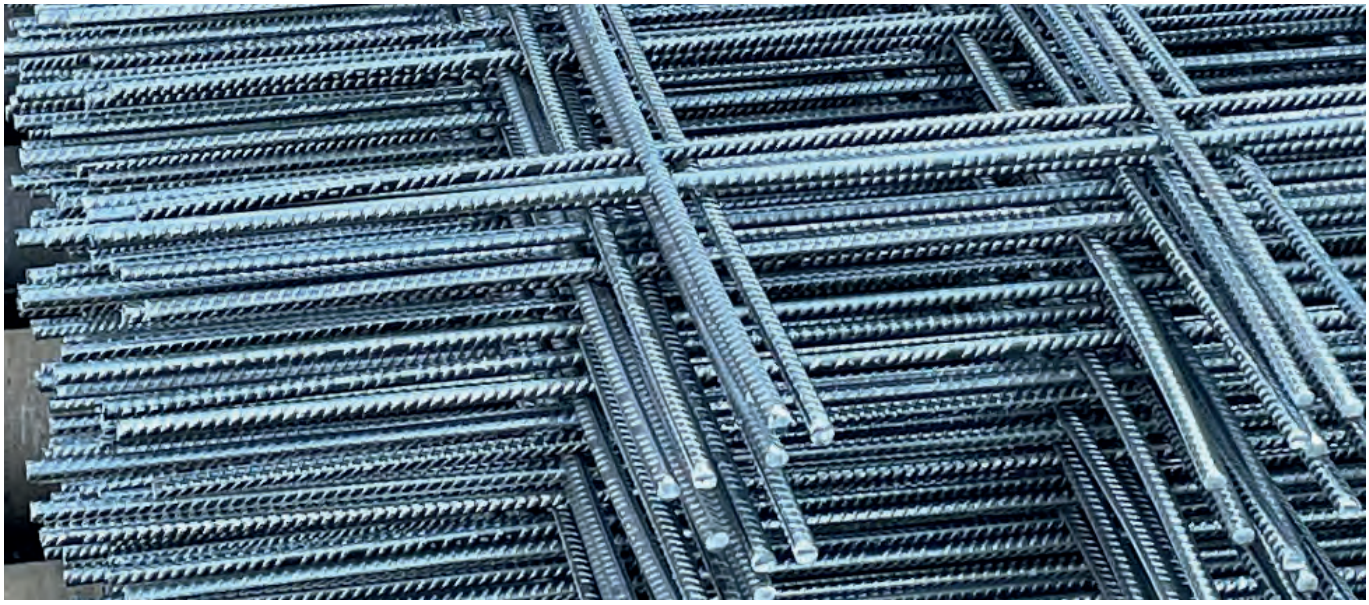
A new Zip-Clip system for prefabricated reinforcement pile cages has been developed following collaboration between reinforcement fabricator ArcelorMittal Construction Solutions (AMCS), a member of the British Association of Reinforcement (BAR), and wire suspension and bracing specialists Zip-Clip. AMCS is the sole UK distributor for Zip-Splice+.

Zip-Splice+ is a heavy-duty splicing system purpose-designed for the joining of prefabricated piling reinforcement cages. It offers quick and easy installation and, fundamentally, eliminates the need for operatives to put their hands inside the cage during installation.

Each Splice+ connector features a special dual-channel locking device, manufactured using a one-piece injection moulded zinc-alloy body, housed within a steel bracket, and a predetermined length of high-tensile galvanised mild steel wire rope. Each Zip-Splice+ system is supplied with three connectors that are used to join pile cage sections together when positioned around the splicing bands found at both their upper and lower ends. The system is designed to fit with spliced piling cages and offers integral adjustment to suit 50 mm, 60 mm and 80 mm bands and has been designed to provide integral adjustment to suit the differing cage band widths. The system has been proof-tested for loads in excess of 1,700kg.

Matt Brooks, AMCS Operations Manager, said: "Zip-Splice+ is the successful result of a practical collaboration that brought together the wide experience of a reinforcement fabricator with the innovation of an industry specialist. It offers a solution that increases both safety and efficiency."

Commenting on the new system, Steve Goldsworthy, Joint CEO of Zip-Clip said: "We welcomed the opportunity to work in close partnership with specialist reinforcement fabricator AMSC on this project. It allowed us to harness the expertise of both businesses, with one key objective, to solve an inherent problem in the piling industry experienced when installing reinforcement cages. Health and Safety is critical on any project and this innovative solution safeguards operatives as well as offering the added benefit of increased installation efficiency. Zip-Splice+ will enhance the benefits of using prefabricated pile cages right across the reinforcement sector."



NOT ALL MESH IS THE SAME

Not all reinforcement mesh is the same warns the British Association of Reinforcement which has produced new guidance on the difference between standard mesh and eco mesh.

Steel reinforcement mesh – also known as reinforcement fabric or fabric mesh – is a premade lattice of steel reinforcement bars used to reinforce structural integrity by increasing the tensile strength of concrete. The mesh is embedded within the laid concrete to control cracking and aid with the effective distribution of loadings, as well as prevent general structural weakening. Predominately used to reinforce concrete slabs and pavements, reinforcement mesh offers an efficient alternative to traditional steel reinforcement bars by being more portable and easier to shape. The amount of mesh required within the slab depends on numerous aspects of the design criteria and specification of the slab, for example, the profile type, slab depth, spans, temporary propping, fire rating and loadings. All of these will have an effect on the amount of mesh reinforcement required in the slab.

In recent years Eco mesh has been introduced to the market. Eco mesh was originally developed by BAR member UK fabricator Rom Ltd to provide an increased efficiency engineered solution for reinforced concrete floors by saving a reinforcement wire on each lap of the mesh sheet. The success of eco mesh saw other companies copying and providing similar mesh products. However, not all mesh is the same. Despite the claims of some mesh providers, eco mesh may not be used in lieu of standard mesh. It is not the same as standard mesh and may not be appropriate for all reinforced concrete slab applications.

Eco mesh has the same centres as standard fabric mesh with the exception of the external overhangs which are 200mm compared to 100mm, for A meshes and 250mm compared with 50mm for B meshes. It should be noted that B mesh should be classed as a special/detail mesh rather than a standard product and is not advised for structural applications.

The difference in overhang between eco mesh and A and B meshes has project implications. For example, if a standard mesh sheet is at the slab edge with 50mm cover the distance from the edge to the first wire would be 150mm. If an Eco mesh sheet is used, then the distance between the edge and the first wire would be 250mm.

This may be an issue for long-strip construction. Furthermore, if the customer has not been explicitly informed that he has eco mesh (standard and eco mesh look similar) and laps this in the same way as standard mesh then they will lose 200mm on every lap leaving the mesh short at the end of the job.

The standard BS 4483 is currently being reviewed and changed to ensure that mesh products are clearly labelled as being standard or eco. The new standard should be available in 2023. Until then, BAR strongly recommends that mesh suppliers must clearly state whether the mesh is standard or Eco whilst the customer should ensure that they receive the right mesh for the job. Remember: Not all mesh is the same."

To download a copy of the BAR guidance note on eco mesh visit: **www.uk-bar.org**

RAISING THE BAR FOR SOCIAL VALUE

For the construction industry, social value involves demonstrating how a project provides added value in terms of society, local community, economic and environmental benefits. A new BAR report 'Reinforced Insight: Social Value' shows how the delivery of social value has been fully embraced by BAR members.

The provision of social value is a mandatory requirement called for by government procurement policies. The Public Services (Social Value) Act 2012 placed a requirement on relevant contracting authorities to consider how the economic, environmental and social well-being of the local area may be improved by what is being procured. It places social value at the heart of the procurement process for public contracts and this, in turn, places a requirement for contractors – and subsequently their supply chain – to demonstrate the social value of their operations. Whilst, the Social Value Act applies to the public sector, many private sector clients now take in account social benefits when awarding construction contracts.

From January 2021, under the Procurement Policy Note 06/20, central government furthered the requirements set up by the Social Value Act. Government departments must now adopt a social value model that:

- Supports Covid 19 recovery, including helping local communities manage and recover from the pandemic impact,
- Tackles economic inequality including creating new businesses, jobs and skills,
- Reduces waste and climate change
- Drives equal opportunities including reducing the disability employment gap, tacking workforce inequality and promoting community integration.

Application of the new social value model will be mandatory for central government procurement and its impact – as with the Social Value Act 2012 – is expected to be reflected in the procurement policies of local government and the private sector.

The need for 2nd tier contractors and for the construction supply chains to fully embrace the delivery of social value is underlined by a number of Tier One main contractors signing up to the SCAPE, the public sector partnership organisation, Community Legacy Mission Statement. These contractors are committed to supporting local supply chains, increasing local employment and training opportunities and promoting STEM in schools to inspire the next generation. This is alongside forwarding the sustainability objectives of the SCAPE procurement frameworks.

The evidence of the benefits of forwarding social value is underlined by the annual Social Value in Construction Benchmarking Report compiled by the Social Value Portal and SCAPE. Its 2022 report found that in the previous year the UK construction industry had delivered over £1bn of economic, social and environmental improvements, a 14% increase over 2020.

Just as reinforcement is embedded within concrete to provide greater strength and performance, the delivery of social value is firmly embedded within the business culture of BAR reinforcement manufacturer and fabricator members. It is a case where altruism make good business sense.

To download a copy of 'Reinforced Insight: Social Value' visit: **www.uk-bar.org**

THE BENEFITS OF **REINFORCED EARLY INVOLVEMENT**

Early contractor involvement (ECI) has been widely embraced by clients and their main contractors to encourage collaboration and innovation for increased efficiencies and reduced costs. The same reasoning should be used by main contractors for the early involvement of specialist reinforcement subcontractors.

On traditional construction contracts, the client first appoints consultants to design the project in detail and then a contractor is appointed to construct to works. This approach often results in a fragmented and adversarial construction process, where the contractor is unable to contribute to the development of the design that they are required to construct.

The development of non-procurement routes that embrace early contractor involvement (ECI) offers an alternative, whereby the contractor's skills and knowledge are introduced early in the design stage in order to increase buildability, cost and material efficiencies. The early involvement increases collaboration, improves management of risk mitigation and health and safety plus allows better planning and implementation of the construction process.

For similar reasons, the main contractor should embrace and realise the potential of early subcontractor involvement (ESCI). This is especially so for steel reinforcement. The placement of reinforcement is often on the critical path of the construction process. To involve the specialist reinforcement fabricator fully at the early design stage will capitalise on its experience and expertise of rationalised design, possible cost reduction, increased material efficiencies and realise the potential of prefabricated repetition for faster and less labour-intensive installation. This will have subsequent added-value benefits for the construction project as a whole.

There are a number of key considerations for successful ESCI with the reinforcement fabricator. These include realising that the earlier the fabricator is involved, the greater the potential benefits that it can bring, engagement with the fabricator should be fully committed and not perfunctorily, and ensuring that the fabricator chosen has the technical expertise, the resource capacity, is fully UK accredited and complies with the latest British Standards to provide an assured quality product.

Get those considerations right and the resultant reinforcement benefits include incentivised fabricators ready to commit to invest in additional resource capacity, the introduction of effective innovation based on expertise and experience, and the delivery of reinforcement solutions that are rational and efficient.

It is the final benefit – the provision of rational and efficient reinforcement solutions – that has the most resultant impact in terms of simplified detailing, checking and scheduling. For reinforcement fabrication it ensures that stock reinforcement lengths and available fabrication plant are fully used. For the construction site, it ensures efficient installation that is faster and requires fewer operative hours.

Embracing ESCI is particularly effective for efficient prefabricated reinforcement. The use of prefabrication offers significantly increased on-site productivity benefits not least of which are reduced skilled labour requirements. With the construction industry, like many other sectors, facing a skills shortage, this is increasingly important. Prefabricated reinforcement can be used for a range of structural elements, including floors, columns, beams and walls. Accordingly, it is available in various forms, including reinforcement pile and column cages, ground beams and floor mats. They are quality-controlled, factory manufactured products that are delivered to site, ready to install on a just-in-time basis.

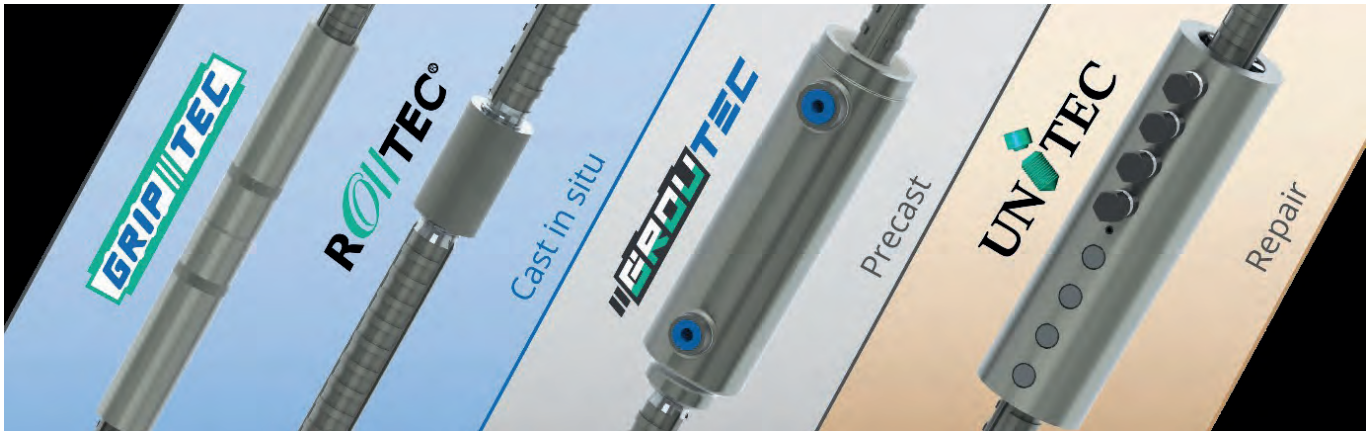
Early involvement and meaningful engagement with the reinforcement fabricator means that the full benefits of repetitive prefabrication where all the advantages of rationalisation and economies of scale are realised. It means that the most efficient prefabricated unit is designed, manufactured and delivered to site ready for fast installation.

Key to the collaboration and team working resulting from ESCI is trust. For there to be trust, all parties must be fully committed to ensuring that early involvement delivers the required outcomes.

For their part, fabricators must ensure that they meet and conform to all relevant UK and international Standards and are fully signed up to recognised UK industry certification and sustainability schemes. For the main contractor's part, early involvement calls for a commitment to meaningful and ongoing engagement. Provision of that will provide the reinforcement fabricator with the incentive to plan for and invest in any additional labour resource and required fabrication plant.

The manufacture, delivery and installation of steel reinforcement is on the critical path to the success of a concrete construction project. Early involvement of the fabricator can ensure that the reinforcement element of that path is smooth, rational and efficient.

To download a copy of the BAR guide SUCCESSFUL REINFORCED EARLY INVOLVEMENT visit: **www.uk-bar.org**



DEXTRA: 40 YEARS OF **EXPERIENCE AND QUALITY**

2023 marks the 40th anniversary of Dextra, a global manufacturing company that specializes in providing mechanical rebar coupler systems and other high-quality construction solutions.

Dextra's commitment to quality, safety, and service has been the foundation of its success and Dextra is now proud to be the first manufacturer of products for civil works construction whose quality management system is ISO 19443 certified.

This new standard covers "Specific requirements for the application of the ISO 9001 standard by organizations in the supply chain of the nuclear energy sector supplying products and services important to nuclear safety."

Having supplied rebar couplers for the construction of over 50 nuclear projects during the past 20 years, quality and nuclear safety have always been Dextra's priority.

Not only is Dextra ISO 19443 certified, but Dextra's Griptec rebar couplers are also certified for use in the UK by CARES, under the CARES schemes TA1-A, TA1-B and TA1-C. Griptec is therefore suitable for building applications, applications requiring a high level of fatigue performance and nuclear applications. Griptec TA1-C approval is to the highest performance class - Class A, meaning that it is a high strength, high ductility "bar break" rebar coupler system.

40 YEARS ANNIVERSARY
1983 - 2023

Dextra

NUCLEAR CERTIFIED
ISO 19443
DEXTRA MANUFACTURING

ROM

LOOKING GOOD ON LINKEDIN

BAR member ROM has launched a series of visual posts on the Linkedin platform on both the benefits of UK steel reinforcement and on the range of expertise offered by the company. For more eye-catching posts, search Rom Group Ltd on Linkedin.

REINFORCED HEALTH AND SAFETY

The health and safety of employees in the steel reinforcement sector is a key priority for the British Association of Reinforcement and its members. Together, the members collaborate and share best practice and experience in order raise the bar for health and safety across the reinforcement sector. This is achieved by BAR providing a forum where members can exchange information on potential health and safety problems and how best to address and negate those risks. It is also achieved BAR's publication and dissemination of health and safety best practice guides.

Individually, BAR members develop and implement health and safety programmes and initiatives aimed at achieving zero health and safety incidents. This includes full engagement and communication with employees and the ongoing development and improvement of health and safety protocols and initiatives. The over-riding objective is the establishment of a health and safety culture that is embraced by all from management to those on the mill and fabricator factory floor.

A new publication from BAR 'Reinforced Insight: Health and Safety' outlines why health and safety must be integral to a company's operations and not be an add-on. It also provides member best practice examples.

ArcelorMittal Kent Wire Health and Safety Day 2023

Arcelor Mittal Kent Wire, member of the British Association of Reinforcement, raised the bar for health and safety at its recent annual Health and Safety Day.

The event is aimed at ensuring that all employees are engaged with and focused on forwarding safe working practices as part of the company's Journey to Zero – an ongoing health and safety programme with the objective of achieving zero fatalities and severe lost time injuries.

The day started with the showing of a new corporate health and safety video. This was followed by a number of activities including practical, hands-on training sessions, such as first aid training, manual handling and work equipment use as well as presentations health, lifting and slinging, and forklift truck use and hazard awareness. In addition, there was a range of mindfulness activities to help employees learn techniques to reduce stress and maintain their well-being while at work.

Employees were divided into eight groups. A well-managed programme ensured that all were able to partake in each activity and attend each presentation. Employee feedback has been positive with the need to follow health and safety guidelines and protocols firmly engaged with. Kevin Shipp, ArcelorMittal Kent Wire's QHSE Manager, said: "Health and safety should always be more than just a box ticking exercise. It should be the number priority for both employers and employees. The annual Health and Safety Day allows all of us at ArcelorMittal to refocus and recommit to making the workplace safe."

To download a copy of Reinforced Health and Safety, visit: **www.uk-bar.org**

SILVERTOWN EXPRESS

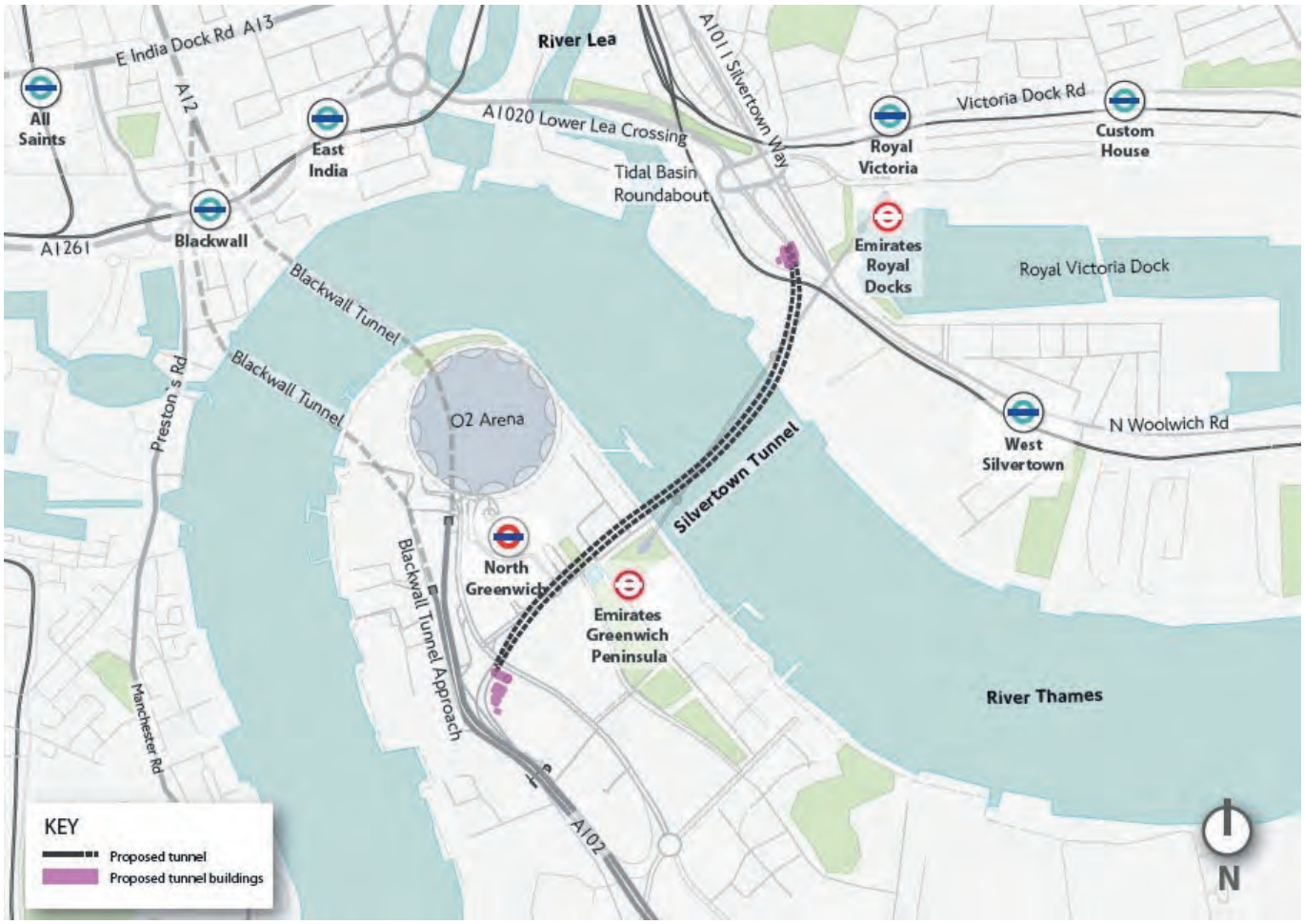
BAR member Express Reinforcements will have delivered over 9,000 tonnes of steel reinforcement for the Silvertown Tunnel project by the end of 2023.

The new tunnel will connect the London's Greenwich peninsula and Silvertown district. The contract is worth more than £1 billion (circa €1.4 billion), and design and construction of the project will be delivered by a joint venture with Ferrovial Construction, BAM Nuttall and SK E&C.

The design includes a 1.4-kilometre twin-bore road tunnel under the River Thames as well as 0.6-kilometres of access ramps. It will connect south of the River Thames with the access to the existing Blackwall Tunnel and north of the River Thames with the Tidal Basin Roundabout, in Silvertown, easing traffic congestion in this key London location.

The new infrastructure will serve as an alternative to the Blackwall Tunnel, improving traffic flows not only under the River Thames but also in the approaches between Docklands / East London and Southeast London.

The Silvertown Tunnel Project comprises a 1.4 km twin bore road tunnel which will be built under the River Thames. It follows a similar route to the alignment of the Emirates Air Line cable car and connects Silvertown and Greenwich. Only one tunnel boring machine (TBM), with a diameter of approximately 12m, will be used to bore both tunnels through geology including alluvium, London clay and Lambeth. The TBM will be launched in Silvertown to bore the first tunnel, rotate in North Greenwich and then return to Silvertown to bore the second tunnel. The project also comprises 600m of access ramps, maintenance buildings and sections of road above the ground including a highway bridge and a footbridge for pedestrians. The works are expected to be completed in 2025.



BAR: THE BUSINESS BENEFITS

BAR has published a new leaflet that underlines the benefits of membership. In addition, to forwarding the reinforcement sector via the provision of an industry forum, the input to British Standards and regulations and the publication of best practices guidance, BAR membership provides specific business benefits. These include:

- Access to and liaison with key industry organisations such as UK Steel, the Mineral Products Association, CONSTRUCT, The Concrete Centre, British Board of Agrement. Such liaison is not limited to the UK but is being developed internationally, for example with the Steel Reinforcement Institution of Australia,
- Free editorial promotion of member projects, products and services and raising of business profile via the BAR Reinforce annual magazine which is disseminated widely to the construction industry as well as placement of member project and product case studies on its website and linkedin platforms,
- Opportunities to present at the BAR annual industry seminar specific to the UK reinforcement sector.

All of the above are aimed at providing BAR members with the platforms to help raise their business profiles with potential customers and employees.

To find out more and request a BAR membership form, use the BAR contact form at:
https://www.uk-bar.org/Contact-Us

BAR
BRITISH
ASSOCIATION OF
REINFORCEMENT

www.**uk-bar**.org

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