REINFORCED
NUCLEAR CAPACITY

BAR
BRITISH
ASSOCIATION OF
REINFORCEMENT
www.uk-bar.org

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The British Association of Reinforcement (BAR) is the trade association of UK manufacturers and fabricators of steel reinforcement products including cut and bent bar and mesh as well as suppliers of associated reinforcement products. BAR aims to add value to the UK reinforcement sector through promotion of good industry guidance, health and safety practice, market and product development, and forwarding the benefits of reinforced concrete.

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THE ENERGY CHALLENGE

The UK urgently needs new investment in energy infrastructure to replace old and polluting electricity generation sources. Since 2010, 26 power stations have closed. This represents 20% of the UK's electricity generation capacity. By 2030, a further 35% of existing generation capacity will close down.

To address this, the UK government has announced an ambitious programme to invest in nuclear energy with the objective being that it provides 24GW - 25% - of electricity production by 2050. Hinkley Point C in Somerset, currently under construction, will provide 7% of UK demand when it opens in 2030. In addition to this, the government has announced investment of £14.2 billion to build the Sizewell C plant is Suffolk and a £2.5 billion programme for smaller modular reactors.

CONCRETE CONSTRUCTION

The construction of nuclear plants that are safe and durable demands high quality concrete structures that have a high level of structural integrity in order to meet:

- Radioactive shielding and containment in addition to structural performance,
- Structural strength to resist seismic, thermal and other operating demands,
- Long-term strength and containment capacity beyond the operational life of the nuclear plant,
- Recognition that many of the concrete structures will be inaccessible once the plant becomes operational.

The above calls for construction that goes beyond the requirements of conventional reinforced concrete. Advanced types of concretes such as Self Compacting Concrete (SCC) and Radiation Shielding Ultra-High Performance Concrete (RS-UHPC) are utilised to provide optimal density and strength whilst the reinforcement must be of high-quality steel with the necessary mechanical properties and correct composition – for example, Boron steel should be avoided as it may become radioactive under neutron radiation.

Both the concrete and steel reinforcement should be of the highest assured quality and meet all the relevant standards and specifications that take full account of the additional stringent requirements for nuclear construction.

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NUCLEAR EXPERTISE

The International Atomic Energy Agency (IAEA) emphasises the importance of proactive management systems and quality assurance and the need for full compliance with regulations and certification schemes.

For nuclear reinforced concrete construction this requires a strong emphasis on pre-placement quality of design, product and delivery. Details such as specified cover and reinforcement position must be verified and all reinforcement must be correctly placed and secured before the concrete pour. 3D modelling assessment should be carried out to minimise reinforcement congestion and so ensure an efficient concrete pour.

Steel reinforcement, welding and fixings should have an assured quality and meet not only overall construction standards and certification but also those specific to the nuclear industry. Delivery schedules must forward efficiency and meet just-in-time programming. Above all, it must be remembered that construction of a nuclear plant has special considerations and that the design, delivery and placement of reinforced concrete is just one element of a rigorous programme of management procedures, project policies and documentation, design specification and quality assurance to ensure that all requirements and regulations are met.

RAISING THE NUCLEAR BAR

In the same way that nuclear construction contractors and materials must go beyond the conventional, so must the suppliers and contractors. Here, members of the British Association of Reinforcement aim to 'raise the bar' when it comes to the specification and supply of rebar and reinforcement accessories. They do that in a number of ways:

- Early Engagement

The ordering and placement of steel reinforcement is often on the critical path of the concrete construction process. Yet, often construction clients and their designers fail to fully engage with reinforcement manufacturers and fabricators. Early engagement by the client with the BAR manufacturer allows for a correct understanding of overall manufacturing capacity and of the ready availability of reinforcement items. Early engagement with the BAR fabricator capitalises on their experience and expertise of rationalised design for possible cost reductions, increased material efficiencies and the realisation of the potential for prefabricated repetition for faster and less labour-intensive installation.

Everyone on the project team should be working towards the common objective of achieving an efficient design that encompasses reduced waste, cost efficiencies and improve buildability. Early involvement with the steel reinforcement manufacturer and fabricator allows those objectives to be realised.

- Prefabrication

The construction industry is being driven by the need for greater cost efficiencies and increased sustainability. The use of reinforcement prefabrication can deliver both of these. Reinforcement prefabrication incorporates all of the benefits of Modern Methods of Construction (MMC) by providing a quality controlled, factory manufactured product that benefits from simplified detailing, is delivered to site on a just-in-time basis where it can be fixed simply and quickly. The result is reduced construction time, reduced on-site labour requirements and increased buildability with improved site planning and organisation. There is also the sustainability benefit of reducing waste that comes from the full involvement of the reinforcement fabricator at the design stage.

For the construction of nuclear plant, prefabrication offers an assured pre-placement MMC that reduces wastes, increases construction on-site health and safety and reduces labour requitements.

- Welding

Competent and high quality welding is an absolute essential for prefabricated reinforcement. All BAR members provide assurance that their prefabricated reinforcement is fully certified to CARES Technical Appendices 11 and 12 which cover welding to the International Standard ISO 1766 and British Standard BS 8548-2017 'Guidance for the arc welding of

reinforcing steel'. BAR fabricators have made considerable investment in welding training and procedures to ensure that the meet the requirements of the relevant standards. These include having a rigorous programme of tensile and shear tests, regular production tests plus weld procedure and welder qualification tests. In additional, BAR fabricators meet the requirements for designated welding co-ordinators.

- Trust

Trust is fundamental to successful business relationships. There must be trust that a service or product meets the right standards and delivers the necessary quality. All BAR members are committed to ensuring that their customers can have the utmost trust in the steel reinforcement products and services being provided.

This includes ensuring that all reinforcement products they offer meet and conform to all relevant UK and international standards. BAR members are fully signed-up to recognised industry certification schemes. This accreditation provides external recognition of consistent product quality and adherence to standards that is underlined by regular, independent auditing. They are also committed to reducing their environmental impact and increasing their sustainability credentials. Reinforcement steel is produced using recycled steel via the Electric Arc Furnace (EAF) method, giving a 98% recycled content to the finished product. Producing steel by this method can reduce its carbon footprint by nearly four times when compared to the Basic Oxygen Steelmaking (BOS) process. All members actively address key issues such as waste management, recycling, reduction of water and energy usage and reduction of transport emissions and are accredited to recognised sustainable certification schemes such as EcoReinforcement, the CARES Sustainable Construction Steels scheme and standards such as BES6001 and ISO14001.

In addition, BAR members are fully signed-up to comprehensive health and safety programmes, anti-human slavery and equality policies, and the implementation of robust supply chain traceability and corporate accountability.

BAR MEMBER CASE STUDIES

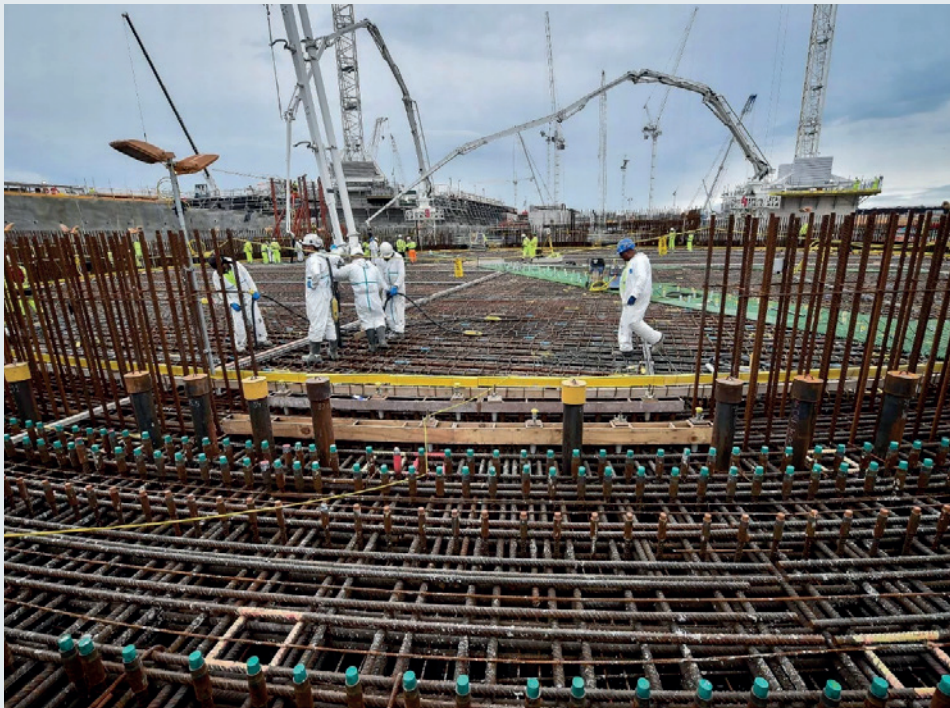
EXPRESS REINFORCEMENTS

BAR member Express Reinforcements is supplying over 230,000 tonnes of cut and bent reinforcing steel for the Hinkley Point C nuclear power station in Somerset. All the steel reinforcement is responsibly sourced and meets the high quality sustainability standards of Eco-Reinforcement and BES 6001. The contract is with the mains civils contractor BYLOR, a joint venture between Bouygues TP and Laing O'Rourke.

To date (July 2025), the company has supplied 30,758,00 reinforcement bars and has had 80,000 Quality Release Certificates issued. The 2025 Contract KPI is equally impressive meeting the 'on time and in full' criteria with 99.3% and 99.8% respectively.

Express Reinforcements has been a supplier for a wide range of key infrastructure projects including Crossrail and Heathrow Terminal 5. This proven track record of experience and expertise has allowed the company to demonstrate its ability to be a key supplier for the construction of nuclear plants in terms of the delivery a high quality building material that meets international standards, is fabricated offsite by a skilled, certified workforce and delivered as-and-when required.

Image credit: EDF



DEXTRA GROUP

The Hinkley Point C project integrates advanced reinforcement technologies from BAR member Dextra, under contract with Express Reinforcements, including the high-performance Griptec rebar coupler system and Pressed Connection (PC) Headed Bars the use of which allowed for a significant reduction of steel usage, rebar fixing time and rebar congestion. This supports the project's cost-efficiency and sustainability goals.

- Griptec is a mechanical rebar splicing system recognized for its 100% proof-load testing, ensuring every connection is verified for quality and performance. The system is quick and easy to install, helping reduce construction time and labour while maintaining strict safety and quality standards.
- Pressed Connection Headed Bars (Headed Bar PC) provide an effective solution for reinforcement anchorage in heavily congested concrete zones. By eliminating the need for hooked bars, they improve buildability and optimize structural performance while reducing raw material wastage.

Image credit: EDF

Both Griptec and Headed Bars PC are independently certified to CARES TA1-C (Class A), confirming that the bar will fail outside the influence of the connection — a critical requirement in nuclear design. In addition, Griptec meets the requirements of ISO 15835 Classes F (fatigue) and S (seismic), and Headed Bars PC meets the requirements of ISO 15698 for categories B3 and S (seismic). Continuous production testing ensures consistent quality throughout manufacturing.

Dextra's commitment to the nuclear sector is demonstrated by its certifications to both ISO 19443 and the ASME Boiler and Pressure Vessel Code (BPVC), Section III, Division 2, which governs materials and components used in nuclear construction. Furthermore:

- ISO 19443: Dextra is the only rebar coupler manufacturer certified to ISO 19443. This nuclear-specific standard builds on ISO 9001 and applies to suppliers of items and services important to nuclear safety (ITNS). It includes enhanced traceability, process control, and risk management tailored to nuclear requirements.
- ASME BPVC III Div. 2: This globally recognized code outlines strict rules for the design and construction of nuclear facility components, reinforcing Dextra's capability to deliver safe, high-integrity reinforcement solutions.

Together, these certifications ensure a comprehensive nuclear-quality assurance framework, offering customers the highest levels of confidence in safety, performance, and regulatory compliance.

With more than 60 nuclear projects delivered worldwide over the past 40 years, Dextra has established itself as a trusted partner in the nuclear industry.

CONCLUSION

The manufacture, fabrication and delivery high quality steel reinforcement is critical for the reinforced concrete construction of nuclear facilities. Steel reinforcement fortifies concrete structures providing them with the necessary durability and resilience to meet all of the challenges that comes with the construction and operation of nuclear plants.

With such a central role for structural integrity and safety it is essential that steel reinforcement meets the additional specialised and rigorous regulations of the nuclear industry. This includes the composition and the quality of the steel used and the delivery of the highest possible offsite fabrication.

BAR members with their experience of large infrastructure projects and, more specifically, of nuclear projects, are fully able to work with the nuclear industry to deliver the next generation of nuclear plants to meet future energy requirements.

FURTHER READING

The British Association of Reinforcement has a number of publications that underline the benefits of reinforced concrete and the benefits of using a BAR member. These include:

- Successful Reinforced Early Involvement
- Reducing Reinforcement Carbon Emissions
- The Benefits of Reinforced Prefabrication
- Regulating Fire Safety: A Concrete Overview
- Reinforced Health and Safety
- The Safe Off-loading of Reinforcement Fabric
- The Safe Off-loading of Cut and Bent Reinforcement
- Welding Ventilation Guide

All of the above are available as free downloads.
Visit: **www.uk-bar.org/publications**

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