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Steel's secure supply chain supports developer confidence

Nick Barrett - Editor

Signs of growth in the commercial property and housebuilding markets are being seen, according to press reports, which will come as welcome news to a construction industry that saw project starts fall 30% last year.

Spring is a time when it is natural to look for new life of course, but there is more than the sight of daffodils to justify an optimistic outlook. Certainly developers seem to have the bit between their teeth, as can be seen with the multiple planning applications that have been made for City towers. Not all of these projects will be proceeded with, at least not in the time frame currently envisaged, and possibly not in exactly the shape that developers hoped for.

Planning delays seem to be an issue nationally, but developers know that they can take a slightly more sanguine view of delays from planning negotiations because steel contractors can respond quickly, even to changing designs, and ensure buildings are erected in the most timely fashion possible.

Figures released in March by Glenigan show that in London an incredible 230 high rise buildings of 20 storeys or more have been granted detailed consent since 2017, which equates to an average of over three a month. Approval has been given to 76 of them in the past two years.

In the City alone there are 26 towers of 75 metres or more either under construction, have been granted planning permission, or are confidently expected to receive it. New applications keep coming. We have reported previously on Brookfield Properties applying in March for permission to build a 54 storey, mostly offices building at 99 Bishopsgate. An application for a tower at One Undershaft in the City, almost as high as the Shard, is expected to be granted permission soon.

The development pipeline is said by City Corporation planners to be near the busiest they have ever seen. Perhaps not all of the space will be offices, employees these days expect to have much more than a desk made available on site, like gyms and coffee shops. Some commentators say we should think of these tall buildings as 'vertical villages', accommodating multiple uses.

Whatever the configuration required at the time of construction, or if changed later in line with regulatory or building occupier requirements, steel has unrivalled capabilities to accommodate new design ideas with minimum fuss. The trend towards repurposing existing buildings rather than demolish and build will provide a new range of proofs that flexible steel construction is the ideal solution for both new build as well as repurposing. Smart developers will spot the benefits of this flexibility, along with steel's many other sustainability and economic benefits.

London is still growing so demand for all kinds of commercial, leisure and residential space is likely to grow apace. Strength of demand for major and often iconic buildings is also seen in the regions, as surveys confirm. In February, the Deloitte Regional Crane Survey showed 20 schemes under construction including six that started last year in Belfast, 44 under construction in Birmingham with 20 starting last year, 16 projects started in Leeds and 61 projects under construction in Manchester.

These figures suggest that there is a lot of confidence in the market nationally. There is also a lot of justified confidence that steel's secure, tried and tested supply chain will play a major role in providing these buildings UK wide.

BCSA appoints new CEO

The British Constructional Steelwork Association (BCSA) has appointed Jonathan Clemens as its new CEO.

Mr Clemens was previously Tata Steel Europe's Head of Marketing, Construction & Infrastructure and Vice-Chair of Construct Steel, who represent the World Steel Organisation. From 2015 to 2023, he represented Tata Steel on the Director's Board of the Fabsec Joint Venture.

"I am excited and honoured to be joining the BCSA, which has been representing the UK structural steel sector for over a century. Through promoting and supporting the industry, and consistently raising standards, means we have a constructional steel industry that is a world leader," said Mr Clemens.

"It will be great to work with such a professional and engaged team and continue to build on such a fantastic heritage and success. I look forward to meeting Members over the next few months and building relationships with you all."

Dr David Moore, added: "After five years as BCSA's CEO, I will be stepping down, but I'm not leaving the BCSA. Instead, I will be taking up the position of part-time Deputy CEO and working two days a week to support Jonathan and provide help and support to BCSA's members and the wider constructional steelwork industry."

Steelwork tees-off at world-famous golf resort

The Belfry is in the middle of a major expansion that includes the construction of a 600-person capacity grand ballroom overlooking the signature tenth hole of the The Brabazon golf course.

The steel-framed building, which also includes kitchen facilities, features a series of 27m-long roof trusses, creating the open-plan and column-free space.

As the site is located on greenbelt land, the project's design has been developed to have minimal impact on the landscape, and utilises natural materials in order to blend into the surroundings.

Banquets, as well as social and media events such as celebrity golf tournaments, will be hosted in the new ballroom.

Located in Warwickshire, the resort has three golf courses and has hosted the Ryder Cup on four occasions.

Working on behalf of main contractor Vinci, Leach Structural Steelwork is fabricating, supplying and erecting the steelwork for the project.

Steel creates cathedral of whisky

Structural steelwork is nearing completion on the Ardgowan Distillery near Greenock, which has been described as a cathedral of whisky.

Working on behalf of Muir Construction, Hescott Engineering is fabricating, supplying and erecting 260t of steelwork for the project.

The distillery building is an eye-catching steel-framed structure with a steep pitched roof, which will on completion have the potential to produce up to two million litres of whisky a year.

The building's tall roof design will help create a light-filled environment for the state-of-the-art facility, which will use extensive heat recovery at each stage of the production process and CO_2 captured from fermentation in order to make the distillery carbon negative.

There will be a cooling tower to minimise the consumption of water and eliminate the discharge of hot water into the nearby Kip River.

The steel-frame will accommodate various areas within the main distillery building, such as milling, mash house, washback and stillhouse production areas.

Distillery CEO Martin McAdam, says: 'This project will be a major boost to the local economy – both during construction and in operation.

"Our goal is to build a world-class facility, which will attract tourists and bring economic and social benefits to Inverclyde."

UK steelwork exported for Guyana hospital project

Supported by the UKEF, the government's export credit agency, Severfield has landed a £4.5M deal to export structural steelwork to Guyana.

A total of 1,900t of steelwork has been sent to the South American nation for the construction of a hospital, by VAMED Engineering, in the capital Georgetown.

In 2021, UKEF helped the Guyanese government to finance the project by providing a €161M loan. The export credit agency supported the project on the condition that it involved UK suppliers, subsequently securing this opportunity for Severfield.

UKEF's guarantees and loans help overseas governments and businesses to secure financing for projects involving UK goods and services. The new announcement showcases the way in which this creates multimillion-pound contract opportunities for the domestic supply chain.

Lord Offord, Minister for Exports, said: "This government is backing the UK steel industry, and this deal, made possible by UKEF, is great news for Severfield which will support hundreds of jobs across the country.

Rob Evans, Divisional Managing Director of Severfield's Commercial & Industrial division, said: "We are delighted to be supplying the structural steelwork for the new paediatric and maternity

hospital in Guyana. With the invaluable support of UKEF, we are proud to add to our strong and varied history of delivering high quality, fabricated steelwork for use in overseas projects.

Upon completion, the hospital is expected to become a point of referral for high-risk cases from across the country and eventually the Caribbean. It will also work as a teaching hospital – the first institution of its kind available in Guyana.

Local MP endorses growing steelwork contractor

Steelwork contractor, Painter Brothers, has hosted Jesse Norman, MP for Hereford and South Herefordshire, to discuss industry concerns and plans for future growth.

Painter Brothers was founded in 1920, and since then it has grown to produce more than 8,000t of steelwork a year. The majority of its fabrication is for the rail industry, and the infrastructure for telecommunication masts and towers.

During his visit, Mr. Norman was given a tour of the company's 14-acre facility, where he discussed expansion plans, and more specifically investment in new machinery and possibilities for hiring more personnel.

Jesse Norman MP said: "Painter Brothers is a leading Herefordshire engineering business with an illustrious history. It was really good to meet the team and learn all about their very exciting plans for future growth and great new jobs in our city."

Martin Barnfield, Head of Manufacturing at Painter Brothers, said: "It was a pleasure to welcome Jesse to our facility to showcase our expertise and proud history in steel fabrication built over the last 100 years.

"During the visit, we highlighted the important role the steel industry has to play in driving both regional and national economic growth, as we build skills in the local community and help the UK Government achieve its Net Zero by 2050 commitment."

British Constructional Steelwork Association's Strategic Marketing Manager Zoe Williams, added: "We had a valuable discussion, and it's heartening to see policymakers like Jesse taking an active interest, in the constructional steelwork sector, which plays a vital role in our economy, and we must work together to address challenges and unlock its potential for further growth."

Investment confirmed for Teesside carbon capture gas-fired power station

Net Zero Teesside Power (NZT Power) and the Northern Endurance Partnership (NEP) have selected contractors for engineering, procurement, and construction contracts with a combined value of around £4bn for the world's first gas-fired power station with carbon capture and storage capability.

As well as creating up to 4,000 jobs, the project will help drive Teesside's aim to become the UK's first decarbonised industrial cluster as early as 2030.

The selection of leading specialist contractors, for the steel-framed main build, includes Balfour Beatty and Costain.

The proposed power station will generate up to 860 megawatts of low carbon electricity – enough to power up to 1.3 million UK homes.

Up to two million tonnes of CO^2 emissions from the power station will be captured each year – emissions which would otherwise be released into the atmosphere.

The captured CO^2 will then be transported by the NEP by pipeline to a geological storage site under the North Sea, where it will be permanently and safely stored.

Tees Valley Mayor Ben Houchen said: "We are delivering the highly-skilled well-paid jobs of the future as part of these world-leading developments that have established our area as a world-leading centre in the clean, green industries of the future.

"This would be the single biggest investment in Teesside since ICI. It cannot be understated the transformational economic impact this will have right across Teesside, Darlington and Hartlepool."

NEWS IN BRIEF

Non-league **Sheffield FC**, widely regarded as the world's oldest football club, and **Sheffield Eagles**, the city's professional rugby league club, have unveiled detailed plans for an innovative new 5,000-seater stadium. Located at the former Sheffield Transport Sports Club site at Meadowhead, it will also include a cricket pavilion, football museum and an indoor community sports hall.

Tungsten Properties has awarded **McLaren Construction** the £41M contract for Centurion Park, an industrial and logistics development in Colchester, Essex. Designed for light industrial, general industrial, storage and distribution uses. It will provide 11 units within 10 buildings, with a total floor area of 33,212m². On completion, the project will target BREEAM 'Excellent' and EPC A+ ratings.

Morgan Sindall Construction's North West team has been appointed on behalf of Newcastle-under-Lyme Borough Council to design and build a new £12M 450-space multi-storey car park. Forming part of a much wider regeneration scheme, the steel-framed structure will have five levels.

GMI Construction is set to build the luxury 118- room boutique Dakota hotel, which will transform the vacant St Anne's Wharf building in Newcastle-upon-Tyne. Scheduled for completion in Spring 2025, the development will generate 150 new jobs as well as creating an estimated £1.5M boost to the local economy.

Construction work to deliver a new flexible teaching space has begun at the **University of Worcester**. Located at the Severn Campus, the new three-storey building has been designed by Glancey Nicholls Architects. Locally-based contractor Speller Metcalfe is due to complete the scheme in February 2025.

PRESIDENT'S COLUMN

Until the construction industry develops zero-carbon materials, we all must applaud and recognise the current recommendations to "use less stuff" when designing our steel buildings.

Part of this current strategy is to design our buildings more efficiently by reducing the weight of the steel frame, which then requires less raw material and therefore results in lower greenhouse gas emissions at source. This approach satisfies Modules A1 and A2 in our carbon-footprint calculation tools, but often increases the manufacturing complexity due to the need for enhanced strengthening of the connection parts of the lighter steel components.

One other way to use "less stuff" is to design and specify more efficiently designed fabricated sections in place of standard rolled sections. However, this approach appears to have taken a backward step with the misconception that every current UK project can be delivered with steel sourced from Electric Arc Furnaces. In truth, the availability simply isn't there yet. But by adopting either approach are we paying enough attention to the other potential consequences on a lighter frame design, and are carbon reduction and cost inseparably linked?

Increased fabrication complexity usually involves the need for additional materials, such as stiffeners or strengthening plates. And while this may still result in a lighter overall frame weight, these fittings are generally ignored in the overall project calculations, and are almost certainly ignored when evaluating the project cost and programme.

Lighter steel members are more difficult to handle in the shop, which can result in the fabrication and use of temporary lifting aids such as spreader beams or strong-backs. And since these components are part of the manufacturing process, the impact of the raw materials to produce these temporary members is not included in the overall project carbon calculation and so we are in danger of misrepresenting the actual values.

Lighter steel members also require additional passive fire protection to meet the project safety standards but again, since the design and specification of the fire protection is usually the responsibility of the steelwork contractor, the full environmental impact is often not considered during the primary steel design phase.

The same logic that applies to the handling, lifting and turning of the individual steel members in the fabrication shop is repeated on site, with the need to procure and fabricate additional steel components to use as lifting frames or strong-backs. In addition, temporary props or restraints may be necessary to ensure stability and robustness during the construction period, and again, the impact of these additional components is generally ignored in the overall project carbon valuation.

Any argument for ignoring the inclusion of temporary site-works due to their availability for re-use on other projects can equally be countered by the need to provide safe and simple access to the temporary components. And the supply, installation and subsequently dismantling of the temporary works is usually one of the more costly features of any project.

Additionally, a lighter frame can result in more individual members due to shorter spans and the resulting additional columns. The more members there are, the bigger the impact on fabrication shop hours, transport, corrosion or fire protection, and construction duration. Which brings us back to our currently excluded components of time and cost.

None of us would be reckless enough to disregard the need to "use less stuff", but we must ensure that all the relevant "stuff" is being appropriately considered during the design.

Gary Simmons
BCSA President

Bridge alliance to drive forward international projects

Beaver Bridges has announced the launch of the International Bridge Alliance (IBA), a consortium of four bridge design, manufacture and installation specialists that have joined together to drive forward global infrastructure projects.

The inaugural meeting, between alliance partners Waagner Biro Bridge of Austria, US-based Bridge Brothers, Bridge IT of New Zealand and Beaver Bridges, was recently held in Dubai.

The IBA said its full turnkey solutions from 'Concept to Completion' with bridges manufactured from all material types will ensure that clients receive trusted buildability, advice and value engineering.

Commenting on the formation of this unique industry alliance, Beaver Bridges CEO, Henry Beaver said: "It took an unbelievable effort, in time and money, to get out to Dubai and have the character and conviction to collaborate with industry leading experts.

"We engaged honestly and openly and shared advice, support and knowledge about the global challenges in the bridging sector."

Taziker to repaint Clifton Suspension Bridge

Taziker Industrial has been awarded the multi-million-pound refurbishment contract for the iconic Grade I listed Clifton Suspension Bridge in Bristol.

The bridge will benefit from a new paint system to the suspension chain links, parapet stanchions, and lattice work, as well as the installation of a modern architectural lighting system.

The 1,500-tonne bridge was originally designed by Isambard Kingdom Brunel and is considered to be one of the engineering marvels of the 19th century. It remains a visible reminder of the Victorian engineer's prowess, standing tall and with most of its original features intact.

Neil Harrison, CEO, Taziker said: "We are delighted to be awarded such a prestigious project which will see this outstanding heritage structure continue to be enjoyed by future generations to come. It is a true testament of our reputation as conservation specialists to be trusted with a landmark that means so much to the public."

Trish Johnson, Bridgemaster, Clifton Suspension Bridge Trust said: "Protecting and maintaining Clifton Suspension Bridge for the years to come is crucial and the new paint system will provide protection from corrosion, as well as enhancements through the new lighting system. With Taziker's experience of bridge refurbishment projects, they are ideally suited to carry out this work, and we are very much looking forward to working together."

Work starts on major Swindon logistics park

Winvic Construction has been awarded the first contract in the redevelopment of the former Honda car plant, in Swindon, by Panattoni.

The works to be delivered by Winvic, comprise site-wide ground contamination investigations and the demolition of four main existing structures; a research and development building, an engine plant, two car plants and 12 ancillary buildings. The work commenced on 19 February 2024 and will be completed in January 2025.

Wider infrastructure works will follow the demolition and ground investigations, forming plateaus for the first seven of 11 net zero carbon buildings that will total 669,000m² of new advanced industrial space, fit for logistics, manufacturing and data centre uses.

Around 7,000 jobs will be created for the people of Swindon and surrounding communities, and 9,000 indirect jobs in the supply chain over the next 10 years.

Owen Follett, Project Delivery Director, Panattoni, said: "As well as creating an attractive location for businesses to locate and expand their operations, this will be a highly sustainable development with the demolition process for Panattoni Park Swindon recycling over 95 percent of onsite materials and achieving net zero carbon during construction."

Steel completes for Derby entertainment and conference venue

Project team members have celebrated a major milestone at the East Midland's newest performance venue with the completion of the steel frame.

Working on behalf of main contractor Bowmer + Kirkland (B+K), Shipley Structures fabricated, supplied and erected 1,200t of steelwork for the project. The heaviest single piece of steel weighs 3.5t and the longest member is 12.9m-long.

B+K North Midlands and Yorkshire Commercial Director, Gus Kedzior and Deputy Leader of Derby City Council, Cllr Nadine Peatfield (pictured with B+K Site Manager Joshua Bredenkamp) added their signatures to a piece of steel, which will be visible in the entrance concourse when the building is open to the public.

After starting on site in June last year and despite the very wet winter, the steel frame and the concrete tiered seating area are now in place.

Mr Kedzior said: "Today is a great day for all of the project team but also for Derby and the wider community. Completion of the steel frame now means that we can see the shape and size of the venue and in less than a year we will be handing the project over to Derby City Council."

Boasting a larger and more flexible space than the city centre has had in the past, the venue will complement the activities of Derby Arena – also built by B+K – to provide the best possible events programme for Derby and the surrounding area.

The venue is set to host over 200 cultural and commercial events each year, and expected to attract an additional 250,000 visitors to Derby. It is also expected to create over 200 new local jobs and provide the impetus to kick-start further investment in surrounding areas of the city centre.

Steelwork creating improved A12 junction

Steel beams, measuring 48m in length have been installed to create the new Marylands Bridge, which forms part of the ongoing M25 Junction 28 upgrade.

The bridge will form the new A12 eastbound exit slip, and take traffic over the new Grove Bridge and loop road that are currently under construction.

Working on behalf of main contractor GRAHAM and National Highways, Severfield fabricated, supplied and erected the steelwork.

As well as connecting the A12 to the M25, Junction 28 also provides access to Brentwood via the A1023. It has been estimated that up to 7,500 vehicles pass through the junction's roundabout at peak times.

The scheme's improvements will increase capacity and allow the projected 30% traffic increase, expected by 2037, to pass through the junction.

The work is expected to be complete by mid-2025.

Siemens Mobility to build state-of-the-art factory in Chippenham

Siemens Mobility is set to build a cutting-edge rail infrastructure manufacturing, digital engineering and research & development (R&D) centre in Chippenham, Wiltshire.

The company said the investment highlights its commitment to innovation, sustainability, excellence, and meeting the growing demand for rail infrastructure in Britain and worldwide.

The new facility, set to replace the existing factory in 2026, will be vital for Siemens Mobility's future projects in rail technology, providing an efficient site to build the next generation of conventional and digital rail signalling and control systems. The transition, including the transfer of all local staff, totalling approximately 800, will not cause any interruption in production.

"Siemens Mobility has been transforming rail, travel, and transport in Britain for over a century. We are pioneers in digital signalling technology, provide leading service solutions and every fourth passenger train in the UK is from Siemens

Mobility. Our dedicated team of 5,500 UK employees is committed to delivering top-quality transportation solutions, in Britain, for Britain", said Karl Blaim, Managing Director and Chief Financial Officer of Siemens Mobility."

Siemens Mobility's new Chippenham site, located south of Langley Park at SouthPoint Business Park, will feature an office built to a BREEAM 'Excellent' standard. The production and warehouse areas will meet strict sustainability criteria, evaluated across various categories including energy, water, waste, health, well-being, or materials. This promotes structures that are more sustainable and beneficial for society and the environment.

Diary

For SCI events contact SCI Education, tel: 01344 636500 email: *education@steel-sci.com* web: *https://portal.steel-sci.com/trainingcalendar.html*

Wednesday 24 April 2024
An Introduction to Steel Piling
Webinar (Free to all)
This 'Free to All' webinar will be presented by experts from the SCI's Steel Piling Group. It will give an introduction to steel piling, covering the specification and design of steel sheet and bearing piles. Other topics will include the installation and extraction of steel piles, and sustainability considerations. All attendees will receive a free PDF copy of P308 as part of their webinar handouts.

Tuesday 30 April and Thursday 2 May 2024
High Strength Steel Design
On-line Course
High strength steels (HSS) are increasingly being used in a range of applications in construction, particularly for heavy columns, transfer beams, trusses and bridge girders as their use can lead to substantial savings in structural weight and material costs. This course will introduce engineers to the design of structures made from high strength steel. It will lead designers through the stages of specification, design and execution for structures made of steels with strengths from S460 up to S700, in accordance with European product, design and execution standards.

Tuesday 7 May 2024
Fire Resistance of Light Steel Framing
Webinar
This webinar gives an introduction to the design for fire resistance of light steel framing which is the subject of a SCI publication P424. The webinar will introduce how light steel framed buildings should be designed and detailed to provide fire resistance in accordance with the Building Regulations. This includes calculation methods which may be used to extend the tested fire performance of a light steel wall or floor construction to a wider range of design parameters.

Moving forward

A pair of bridge girders being fabricated at Jamestown's facility.

Jamestown's UK Business Development Manager, Mark Stewart writes on how the company is progressing this year with a strong order book, containing even more challenging projects.

When I started with Jamestown in 2016, it's fair to say I was overwhelmed by the size of the company's facility. Covering 17 acres, there are few larger in the UK and Ireland.

The fabrication shops are up to 180m-long, meaning there are few challenging projects we cannot accommodate, whether it is bridge structures, crane structures or complex offshore and subsea fabrications.

However, we all know that if you stand still in this world, you get left behind and so 2024 sees Jamestown moving forward with a strong order book and even more challenging jobs.

So how do we meet these demands? Niall Fortune, Jamestown's General Manager, says we are constantly reviewing our workload and pipeline of new potential projects, in an endeavour to highlight work areas and personnel that need development and investment.

Working with steel every day, profiling in the early stages of the process is paramount. To this end, a new ESAB machine with a 5m-wide × 32m-long cutting bed, equipped with 13 oxy-fuel torches and one plasma bevel torch on two gantries, will be installed shortly.

A recent development at Jamestown has been the installation of the shotblast and painting halls. Customers have been incredibly interested in this, as they have learnt about the time and money that can be saved by having their finished product painted and then shipped direct to the end customer.

The entire Jamestown facility covers an area of 17 acres, with plenty of space for finished items.

Accordingly, our current facility will be expanded this year, from 560m² to an impressive 2,200m², much to the delight of Stephen George, Jamestown's Production Manager, who is constantly appealing for added capacity to meet growing customer demand.

Of course, a bigger facility will enable larger fabrications to be handled through the painting process and discussions are currently under way regarding the potential investment in a 100-tonne transporter. It would be capable of driving through the blast and paint hall, which will greatly assist with the blasting of weathering steel bridge sections and the throughput of painted products in general.

All of our projects start with steel. Many continue through the plate girder manufacturing process. However, in recent years, due to Brexit, Covid and the war in Ukraine, material supplies have been affected and, determined to maintain 100% support to our customers, we have continued to search and establish new relationships and collaborations with steel mills further afield.

Furthermore, we have continued requests from our customers for 'green' steel, manufactured using environmentally friendly and sustainable methods. To this end, we are pleased to report that we are currently producing 1,200t of plate girders, for a prestigious London project, using green and sustainable steel.

As the order book grows and investment continues in plant and equipment, Jamestown continues to recruit and strengthen its workforce as well as developing a new Apprenticeship Programme, helping us plan for tomorrow. As Mr Fortune explains, we are only as good as our people and at Jamestown, we have some of the best in the business. ■

Free prize draw for Structural Steel Design Awards tickets

A lucky respondent to our New Steel Construction Reader Survey can win two tickets to the Structural Steel Design Awards event in London on 26 September 2024. The survey is the first carried out for some years and is designed to confirm, among other things, the frequency and format readers would prefer to have the magazine, and the related weekly news email delivered in future.

Suggestions for improvements to the magazine are also being asked for. Just use the QR Code below to go to the survey site and answer a few quick questions to be entered in a prize draw to win the tickets to the exclusive, invitation only event, where the pick of the crop of this year's entries to the prestigious SSDA will be on display, and the award winners announced. The winner will be notified by 21 June.

A key issue for the BCSA is whether you would prefer to receive NSC by post or whether you would prefer to join an increasing number of sustainability conscious readers and opt to have it sent to you digitally, via an email with a link to a downloadable, reader-friendly pdf version. An email link is included for anyone who would like to opt for a digital only NSC.

In line with the steel sector's wider commitment to supporting the government's net-zero ambitions, the BCSA is examining all of its internal operations and external communications to look for ways of reducing our carbon footprint. Reducing the need for printing publications like NSC is a good example of a low-hanging fruit that can be easily plucked. We are sure more readers will support this carbon reducing initiative with just a little bit of prompting.

Please take a few minutes to respond to the survey and share your views with us about what you think we are getting right, and how you think NSC could be improved.

https://qrco.de/beuGIQ

The terms and conditions of the competition can be found at https://bcsa.org.uk/news/.

Prime City location gets makeover

Four tower cranes are used to erect the steel frame.

Forming part of a 10-year redevelopment of the Broadgate campus, structural steelwork is nearing completion on British Land's most energy efficient building to date. Martin Cooper reports from 1 Broadgate.

Originally built in the 1980s and located on the eastern fringe of the square mile, adjacent to Liverpool Street Station, the Broadgate campus is London's largest pedestrianised neighbourhood.

Occupied by a number of well-known and leading financial services companies, Broadgate, like much of the City, is a thriving hub of activity until the weekend, when traditionally most businesses are closed for a well-deserved two-day break.

This is all about to change, as a 10-year redevelopment of Broadgate is gradually converting the campus into a world class mixed-use destination, open seven days a week.

The fifth of six planned phases, 1 Broadgate is a 14-storey steel-framed structure, sat atop a three-level basement that will provide retail and leisure space on its lower floors with 46,306m² of modern open-plan offices above.

Enhancing the worker experience, the office levels from sixth floor upwards, have terraces, providing more than 4,434m² of amenity and green space for tenants.

As well as addressing rights to light for the surrounding properties, the terraces are predominantly on the building's north and east elevations, offering views across the City of London.

Furthermore, its green credentials are enhanced by the fact that 1 Broadgate is said to be British Land's most energy efficient building it has ever delivered. It is targeting a base build operational efficiency that is well ahead of the company's 2030 energy intensity targets for new developments. The building is also aiming for a BREEAM 'Outstanding' rating, as well as the WELL Platinum rating for wellbeing.

"This project will provide a best-in-class and highly sought-after addition to the Broadgate campus, so much so, we were pleased to announce that the offices were fully pre-let prior to the construction programme starting," says British Land Project Director Charles Horne.

Work on the 1 Broadgate project began in May 2021, with the demolition of the previous building.

"Replacing the existing structure with a new scheme was the only viable option for the site," explains Sir Robert McAlpine Project & Framework Director Mark Leeming.

"The old building was not suitable for a modern open-plan office scheme, it could not be efficiently refurbished and the existing one-level basement was too small."

To this end, a three-level concrete substructure was formed with the excavation of some 65,000m³ of earth. Prior to the steel frame erection beginning, a raft foundation was constructed across the site from which three concrete cores were built.

All of the cores provide structural stability to the steel frame as well as temporary support for the site's tower cranes. There is one crane positioned on top of each core.

"Using steelwork has provided us with a lightweight frame that allows the use of a raft foundation. A concrete frame would have required the more time-consuming and costly installation of piled foundations," explains AKT II Director Alex Widdison.

Because of the terrace set-backs, the building's office floorplates get smaller towards the top of the structure. Consequently, there is less need for a full complement of lifts on the upper levels, so only the west core extends to the full height of the building, with the east core topping out at level 10 and the south core at 8th floor.

Starting at lower ground floor level, the steel frame's columns are based around a 12m × 12m column grid pattern on the two retail floors, slightly decreasing to a 12m × 9m pattern for the office floorplates.

The long spans created by the steel frame throughout the building are an important detail, they offer flexibility for the retail units to be enlarged or subdivided in the future, while open-plan office spaces, with minimal columns is a prerequisite for modern commercial developments.

Future adaptability is also designed into the scheme, as alterations can be made. Tenants who wish to link their office floors could install staircases by creating openings in the metal decked flooring, a procedure that is much easier to achieve

FACT FILE
1 Broadgate, London
Main client: **British Land and GIC**
Architect:
Allford Hall Monaghan Morris [AHMM]
Main contractor: **Sir Robert McAlpine**
Structural engineer: **AKT II**
Steelwork contractor: **William Hare**
Steel tonnage: **7,000t**

than it would be with a precast or reinforced concrete structure.

Adding to the scheme's sustainability, steelwork contractor William Hare has sourced the majority of the rolled sections – mostly used for columns on this scheme – from Electric Arc Furnace (EAF) plants.

Amounting to 1,500t, the EAF steelwork is considered to be much greener and more efficient in terms of energy consumption for the production process, as it can utilise renewable energy from wind farms instead of carbon fuels such as oil and gas.

As well as the sustainable sourcing of the steelwork, the early engagement of William Hare into the project design team has also paid dividends. The close collaboration between team members has ensured the steel frame was fabricated and ready to be erected from the off, with all possible snags to this critical element already ironed-out via the shared BIM model.

Cellular beams, accommodating the building's services within bespoke openings, have been used throughout the scheme. These are a mixture of plate girders and rolled sections that support more than 57,000m² of metal decking, which along with a concrete topping, forms a composite flooring solution.

Creating the terraces, a transfer structure consisting of a double plate girder configuration has been used in some areas to meet the design's deflection criteria. Elsewhere, a single girder, with a thicker web and flange has been used to support the floors where the column line has been altered due to the outdoor space.

All of the project's steelwork is being installed via the four onsite tower cranes, with the heaviest item being an 18t beam. In total, more than 5,000 steel pieces will have been lifted into place when the steelwork completes.

When the building is finished, it will have a curtain walling cladding system. The cladding is a multi-coloured design, which reflects the pallet of materials used across the campus, commencing with dark red at the base and culminating in a light cream cladding at roof level.

The structural steelwork erection is due to finish and top-out this month (April), while the overall project is due for completion in summer 2025.

Once complete, the building will be fully integrated with the wider Broadgate campus, including the adjacent Broadgate Circle. The new retail zone, which will continue through to the adjacent 100 Liverpool Street, will provide a seamless public thoroughfare that will also connect to Finsbury Avenue Square (another steel-framed project that has recently begun). ■

"Using steelwork has provided us with a lightweight frame that allows the use of a raft foundation."

The completed building will be linked to the adjacent Broadgate Circle retail and restaurant mall.

Long span cellular beams, accommodating services, have been used throughout the scheme.

Steel beams, supporting metal decking, form a composite flooring solution for 1 Broadgate.

Trusses span academia

Two 30m-long trusses form two adjacent classrooms.

A series of steel trusses have been installed to create some extra-large and flexible teaching spaces for a new centrepiece educational building in Bristol.

One of the UK's largest city centre regeneration schemes is transforming a long-derelict brownfield site into a new campus for the University of Bristol. Known as the Temple Quarter Enterprise Campus, the project sits adjacent to the city's main railway station - Temple Meads - on a site previously occupied by a Royal Mail sorting office and before that by a cattle market.

The campus will create 22,000 new jobs, 10,000 new homes and new purpose built student accommodation developed by third party providers. It will also introduce more inclusive routes into education and bring £1.6 billion a year to the city's economy. With a refurbished Bristol Temple Meads station at its heart, the area will become a world-class gateway to Bristol and the West of England. A new station entrance, currently under construction, will open directly onto the campus and join the city centre to the east of Bristol with new walking and cycling paths.

The centrepiece of the development is the 38,500m² Academic Building, which will be home to the University's Business School, digital engineering research groups, Centre for Entrepreneurship and Innovation, and the Quantum Technologies Innovation Centre, while providing dedicated facilities for enterprise and community partners.

Visualisation of the completed project.

The campus will strengthen the data science, digital innovation, creative industries, cyber and quantum technology sectors that are already flourishing in Bristol and the west of England.

Professor Evelyn Welch, Vice-Chancellor and President of the University of Bristol, says: "The Temple Quarter Campus has been designed to meet the needs and nurture the aspirations of our students, staff and partners across the city and the wider region. It provides outstanding facilities to build on our collective strengths in research, innovation, learning and societal change."

A hybrid design has been used for this important building. Although the Academic Building is predominantly a concrete framed structure, structural steelwork is also playing a significant role, as the material is providing the scheme with some large open-plan areas as well as important rooftop elements.

The six-storey building, which is founded on 512m × 26m-deep piled foundations, has a double height ground floor. With a 6.6m floor-to-ceiling height, this level contains the main entrance, as well as a host of classes and teaching spaces.

Creating some larger and more flexible ground floor teaching areas, a series of steel trusses have been installed at this level. Supported on steel


The trusses form long-span flexible teaching spaces.

FACT FILE
Temple Quarter Enterprise Campus, Bristol
Main Client: **University of Bristol**
Architect: **Feilden Clegg Bradley Studios**
Main contractor: **Sir Robert McAlpine**
Structural engineer: **Buro Happold**
Steelwork contractor: **Elland Steel Structures**
Steel tonnage: **650t**

"...the university wanted to have some larger flexible teaching spaces and in order to accommodate the deflections the most efficient solution was to install a series of steel transfer structures."


Two trusses, which are not connected, are positioned either side of a movement joint.

columns that are concrete encased, in order to fit-in with the remainder of the project's aesthetic, the 2.2m-deep trusses also support the first-floor concrete columns that have been omitted from the lowest level.

The building's concrete frame is based around a 7.5m grid pattern, but in the areas below the trusses, the ground floor has a much larger 15m span.

"Initially, the building was designed around a 15m × 15m column grid pattern, but after a value engineering exercise the smaller grid was chosen and it provided a significant carbon saving for the project," says Buro Happold Project Engineer Jane Pengelly.

"However, the university still wanted to have some larger flexible teaching spaces and in order to accommodate the deflections, the most efficient solution was to install a series of steel transfer structures."

Positioned towards the middle of the building, 30m-long trusses form a pair of adjacent teaching spaces. They are supported at either end by columns positioned within partition walls, as well as a central support located in the dividing wall between the two spaces.

Working on behalf of main contractor Sir Robert McAlpine (SRM), Elland Steel Structures (ESS) are fabricating, supplying and erecting the main steel package for the project. The initial 30m-long trusses were delivered to site in three pieces, with their supporting columns, assembled on the ground and then lifted into place as a complete unit using a 220t-capacity mobile crane.

"When the initial trusses were being installed, the steelwork team had most of the site to themselves. This allowed them to assemble and erect the trusses quickly, which in turn enabled the connected and surrounding concrete frame to begin on time," says SRM Project Director Peter Munn.

As well as creating the desired open-plan spaces, the trusses also accommodate building services within their depth and in the completed scheme, much of the steelwork will remain exposed as an architectural feature.

Elsewhere on the ground floor, further steel trusses form another single teaching space in the northern corner of the building.

Because this space sits adjacent to one of the building's four movement joints, there are in fact three 15m-long × 2.2m-deep trusses forming this space. A truss is positioned at one end of the space, while at the other end – either side of the movement joint – there are two trusses, located next to each other, but not connected, and supported on their own set of columns.

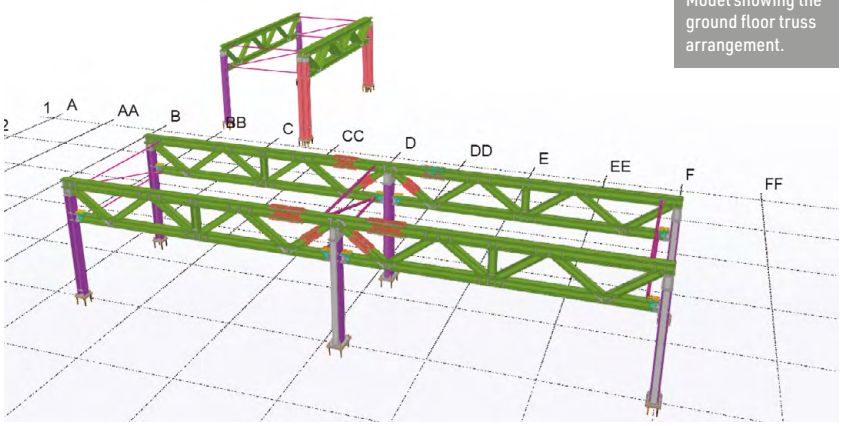
The third space is another single classroom space, formed with two further 15m-long trusses. This area is located on the ground floor mezzanine with the trusses supporting the underside of the second floor, as well as two column lines that are omitted from the space below. The trusses forming the two single classroom spaces are also supported by concrete encased steel columns.

As well as creating the lower level column-free teaching spaces, further structural steelwork will also be erected on the building's roof.

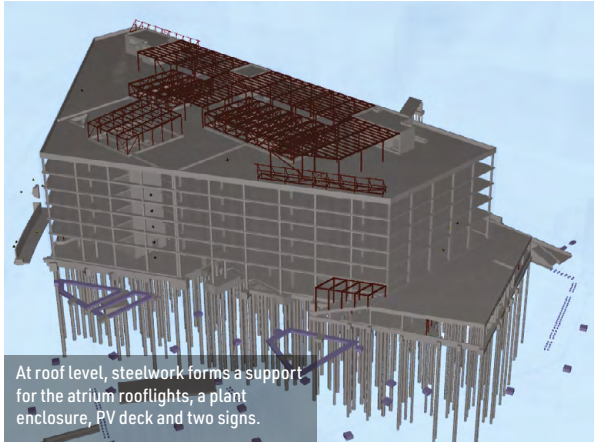
This high-level steelwork will be erected by ESS once the main frame has been completed. This part of the package includes a series of 12m-long trusses that span two atrium spaces, creating rooflights with an attached unitised glazing system.

A steel-framed plant enclosure is also located on the roof, alongside a PV deck that wraps around the building's three concrete cores and two signs, with the building's name on them.

The Temple Quarter Academic Building is due to complete by 2026. ■



Model showing the ground floor truss arrangement.


At roof level, steelwork forms a support for the atrium rooflights, a plant enclosure, PV deck and two signs.

Steel spans motorway junction upgrade

Helping to create better connections and smoother traffic flows, steel bridges and gantries are an essential component of the M25 Junction 10 improvement works.

Circling London, the M25 is the UK's busiest motorway, providing an essential transportation link for not just the south east of England, but the country as a whole. A huge volume of traffic uses the road every day, with Junction 10, the A3 interchange at Wisley in Surrey, one of the most used stretches of the highway.

According to National Highways, 270,000 drivers use the junction every day, causing large queues and heavy congestion on a daily basis. It also has one of the highest recorded collision rates across England's motorway and major A road network.

To alleviate these problems, a £317M improvement scheme began in 2022. The project will improve safety and journey times, reduce congestion and increase capacity.

The improvements to the junction include four dedicated free-flowing left turn slip roads to reduce queuing between the M25 and the A3, widening the M25 from three to four lanes through the junction, widening the A3 from three to four lanes either side of Junction 10, and providing better routes for pedestrians, cyclists and horse riders.

The scheme also features some of the most extensive environmental work ever carried out by National Highways, restoring over 25 hectares of heathland as well as planting new woodland.

Roads Minister Richard Holden, says: "Our road network is a vital component of our economy and investing in this major upgrade will create hundreds of high-quality jobs, significantly reduce congestion at one of the busiest intersections of the strategic road network and enhance safety for thousands of motorists each day.

"These improvements will boost links to major economic hubs like Heathrow or the ports in Kent, making it easier for businesses moving goods across the country, as well as small businesses across Surrey and the South East and families going on holiday too."

Providing an essential element to the overall scheme, structural steelwork is being used to construct three vital bridges and a number of gantries [see box]. In total, there are eight new bridges being constructed for the scheme. Steelwork is being used for the three longest span bridges, as the material is quicker to assemble and erect, thereby minimising the disruption.

Working on behalf of main contractor Balfour Beatty, Kent-based Nusteel Structures is fabricating, supplying and installing the steelwork package.

The first steel bridge structure to be installed was the Sandpit Hill footbridge, which spans the M25 and will improve links between Chatley Wood and Ockham Common for pedestrians, cyclists, and horse riders.

Said to be one of the longest footbridges on the M25, the 91m-long structure was fabricated and then delivered to site as two 45.5m-long Warren trusses, each weighing 47t. The trusses each span a separate carriageway and are supported by an abutment on either side of the motorway, as well as a central pier.

In order to keep traffic disruption to a minimum, the bridge was installed during two separate weekend motorway closures. Brought to site as two complete bridge sections, each Warren truss was installed using a 450t mobile crane.

The installed structure is the first footbridge to be built at this location and forms part of National Highways commitment to create a new 5km route that will connect with many existing paths, tracks, and bridleway.

Jonathan Wade, National Highways Senior Project Manager for the M25 J10 upgrade, says: "We're keen to make sure that our scheme benefits the local community as well as motorists, and this new footbridge will make crossing the M25 much safer and easier for pedestrians, cyclists, and horse riders.

"The opening of the footbridge will be a key milestone for the project."

The Sandpit Hill Footbridge is due to open this coming Autumn once work to the surrounding embankments is finished.

A super-span portal gantry being fabricated in Nusteel Structures' facility.

"Assembling the bridge offsite and then using SPMTs to transport and install the complete structure is the quickest method. We will only need to close this section of the M25 for one day."

Located a few hundred metres away, another similar structure is due to be installed this Summer. Spanning the A3, 400m north of the Junction 10, the Redhill Road Bridleway Bridge is also a Warren truss structure, which is also being fabricated and supplied in four sections, each up to 30m-long.

The third bridge Nusteel Stuctures will be installing is the Clearmount Overbridge, which will span the M25, west of Junction 10. Replacing an existing bridge, the new structure is required as it will also span the junction's extended slip roads.

The bridge, which will primarily be used as a foot, cycle and bridleway, will also be used by light vehicles, as the structure serves a number of private properties either side of the motorway.

Fabricated from weathering steel, which develops a rust-like aesthetic after several years' exposure to weather and eliminates the need for painting, the bridge has an overall length of 61m.

The bridge is formed with two 2.5m-deep plate girders, weighing 62t each, which are connected by a series of cross beams.

The girders will be delivered to site in three sections and the bridge will then be fully-assembled in a yard located close to the structure's final position.

Once the steelwork is fully assembled and the concrete deck installed, the entire bridge, which will weigh 500t, will be transported and jacked into its final positioned using SPMTs.

"One of the project's main challenges is to keep disruption to a minimum, even though the bridges and gantries require motorway closures when they are being installed," says Balfour Beatty Project Director Howard Williams.

"Assembling the bridge offsite and then using SPMTs to transport and install the complete structure is the quickest method. We will only need to close this section of the M25 for one day." ■

FACT FILE
M25 Junction 10 Improvement Scheme
Main client: **National Highways**
Main contractor: **Balfour Beatty**
Structural engineer: **Atkins**
Steelwork contractor: **Nusteel Structures**
Steel tonnage: **1,800t**

The Sandpit Hill footbridge, which consists of two Warren trusses, was installed over two weekends.

Junction 10 steel gantries

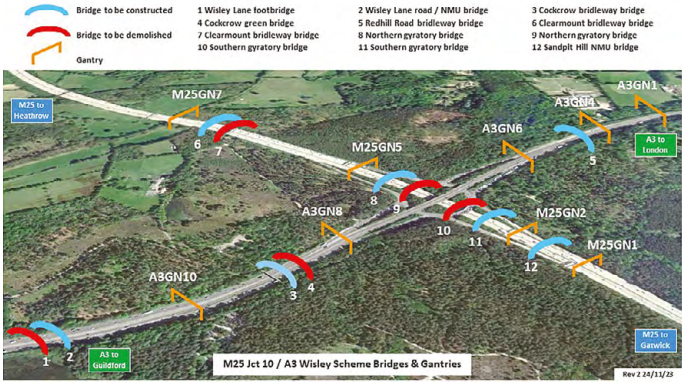
Nusteel Structures is fabricating, supplying and erecting 19 gantries for the Junction 10 scheme. Due to their size and overall design requirements, steelwork is the most economical solution for the structures.

There are 11 portal gantries in the package, four of which are super-span structures measuring 66m-long and weighing 150t each. These gantries will span the entire width of the widened M25 or A3, supporting an array of signage.

Supported by 5m-high twin leg trestles and fabricated from box sections, the gantries are designed as 1.2m-wide trusses, with each side connected via cross members that also support a steel access deck. Both sides of the truss have a top and bottom chord, which are connected by a series of cross bracings.

Fully painted at the Nusteel facility and with signage bracketry welded in place, the super-span portal gantries are being delivered to site in three sections. These are then assembled onsite before the complete unit is lifted into place with a mobile crane during an overnight road closure.

The company is also supplying a further seven smaller portal gantries, as



well as eight cantilever gantries. The latter are supported by a single 1,219mm-diameter CHS column and will consist of four access structures (containing a walkway), three non-access gantries (no walkway) and an Advanced Directional Sign structure. ■

Sandpit Hill is one of the longest footbridges to be built over the M25.

See a video of the new junction design here

Sustainable redevelopment

New steel-framed floors, incorporating reused steel sections, are helping a well-known Dublin city centre building to be reimagined into a 21st Century workspace.

Originally built in 1946, a former factory in central Dublin is undergoing its second make-over as it gets converted into a 21st Century low-carbon commercial workspace.

Located on Grand Canal Street in the city's Docklands area, the building was once the main factory for Boland's Bakery, producing bread, biscuits, cakes and confectionery for what was at the time, Dublin's largest baker.

By the 1970s, the company had merged with another firm and production was moved elsewhere. During the 1980s, the steel-framed structure underwent its first redevelopment when it was converted into an office block and renamed the Treasury Building.

Fast forward to the current century, and another major refurbishment scheme has now commenced. The works involve main contractor PJ Hegarty & Sons adding two new office floors to the top of the structure, constructing mezzanine levels within the ground and first floor levels, and creating an additional bay around the 1980s-built atrium that is attached to the eastern end of the building. All-in-all, the redevelopment will provide more than 7,500m² of additional office floor space, within a new eight-storey building.

According to project architect Allford Hall Monaghan Morris (AHMM), the vision for the new building is to provide the end-user with the most sustainable and intelligent digital building to date in Ireland. There is an aspiration to operate on 100% renewable electric energy and to use no fossil fuels on site.

Steel construction is playing an integral role in the scheme, as the new floors and mezzanines are all being constructed with steel beams and columns that support metal decking and a concrete topping. This flooring method was chosen as it provided the quickest and lightest solution.

Steelwork has provided the quickest solution for the project's structural additions.

FACT FILE
Treasury Building, Dublin
Architect: **Allford Hall Monaghan Morris**
Main contractor: **PJ Hegarty & Sons**
Structural engineer: **CORA Consulting Engineers**
Steelwork contractor: **Steel & Roofing Systems**
Steel tonnage: **1,300t**

The redevelopment will create a new sustainable city centre office block.

"On this scheme, the new upper floors demanded a carbon-friendly lightweight design solution without compromising the intricate service requirements, and we're pleased the Westoks hit the mark to satisfy these demands."

Westok cellular beams have been used to satisfy the project's service requirements.

Weight was an important issue, as the new floors exert additional loadings on the existing steel frame and its foundations.

"We have the original drawings from the 1940s and so we have been able to ascertain where and if there is any capacity for additional loads," explains CORA Consulting Engineers Director John Casey.

"As well as reusing the existing foundations, we have additionally transferred the new loads from existing columns to a series of new mini piles via a welded corbel, flat jacks and steel transfer beams."

Working in conjunction with the foundations, many of the existing columns have had to be strengthened, to take the additional loads, with steel plates and parallel flange channels.

In order to install these new steel elements, the concrete encasement, which is present throughout the structure has had to be ▸20

"As well as reusing the existing foundations, we have additionally transferred the new loads from existing columns to a series of new mini piles via a welded corbel, flat jacks and steel transfer beams."

CGI of the completed eight-storey building.

▸19 stripped from the columns.

The exposed steel columns will be left on show within the new building, complementing the new steel-framed areas, to provide a modern industrial-looking office environment for the completed scheme.

Elsewhere, the two new upper steel floors follow the existing 7m × 6.7m column grid pattern.

These floors have been formed with a series of Westok cellular beams that accommodate the building's services within their depth.

Westok Design Team Manager John Callanan comments: "The Treasury Building is one of a number of key city-centre refurbishment/extension projects we have ongoing at present. The climate emergency is pressing everyone in our industry to make best use of the available building stock.

"On this scheme, the new upper floors demanded a carbon-friendly lightweight design solution without compromising the intricate service requirements, and we're pleased the Westoks hit the mark to satisfy these demands."

Steel erection for the new upper floors, begins at the western end of the building.

Above the new upper floors, steelwork has also been used to form a new rooftop plant deck. Adding to the scheme's sustainability, a quantity of reused steelwork has been integrated into the design of this area.

Approximately 80t of steelwork, installed during the 1980s was removed from the structure's façade and other locations. It formed a setback at the top of the building, a feature that no longer exists in the new scheme, while other members were removed from the ground floor.

The project's steelwork contractor, Steel & Roofing Systems (SRS), removed the old sections, and inspected and tested them to verify the dimensional and mechanical properties in accordance with SCI Publication P427. This reused steelwork has an embodied carbon of less than 50kgCO2e/tonne.

"The steelwork was then shot-blasted to remove the coatings and then refabricated, so it could be reused and incorporated into the new redevelopment project in locations specified by CORA," says SRS Managing Director Conor Whelan.

The client and CORA Consulting Engineers wanted the majority of new steel sections that were specified for the project to have the lowest embodied carbon possible. So, X-Carb steel from Arcelor Mittal was specified, which has an embodied carbon of 330kgCO^2e/tonne. This is approximately 20% of the usual embodied carbon for most steel used in the UK and Ireland.

As well as the two upper floors and the plant deck, SRS has installed two new mezzanines within the ground and first floor levels. Part of the building's original industrial design, the two lowest floors of the structure – areas once used for production – have higher floor-to-ceiling heights, and consequently have space for the extra floors. The mezzanines cover approximately 75% of the building's footprint.

From street level, the most visible addition to the scheme is the extra bay of steelwork that has been added to the atrium. Constructed with reinforced concrete, the atrium was added to the eastern end of the building during the 1980s refit.

This retained feature allows natural light to penetrate the building's interior and also accommodates circulation zones and a staircase for the offices. The alteration required the original exterior glazing to be removed, which allowed the installation of the new 7m-wide bay of steelwork that extends to the full eight-storey height of the structure. As well as creating a larger internal space, the new steelwork also supports a new glazed façade.

The Treasury Building redevelopment is due to be complete by early 2025. ■

Light weight, reused, low embodied carbon – an endorsement for structural steelwork.

David Brown of the SCI comments on the use of steelwork at the Treasury Building

Dublin is well-known for leading the way in structural steelwork. The Guinness Storehouse is said to be the first multi-storey steel-framed building to be built in the British Isles, completed in 1904. The Treasury Building continues that fine tradition, demonstrating some of the advantages of steel construction, brought right up-to-date with the emphasis on minimising embodied carbon.

All readers should be aware of the drive to minimise embodied carbon. The IStructE hierarchy of opportunities to reduce embodied carbon should be essential reading for all designers. Towards the top of the hierarchy is the recommendation to repurpose and refurbish, which is the opportunity taken with the Treasury Building. Adding two floors and internal mezzanines will give a new lease of life to the building, rather than demolition and new construction.

The advantage of steelwork's light weight is demonstrated by the opportunity to add new floors to the existing structure. The new steelwork has substantial web openings, minimising weight but also allowing the incorporation of services within the construction depth. The use of highly utilised structures is lower in the IStructE hierarchy (it has less impact on carbon than not building at all, or by repurposing existing buildings), but is still a significant contribution to a low carbon solution.

The opportunity to readily strengthen steelwork is also demonstrated in the Treasury Building project. This fits with a further recommendation for a low carbon solution – don't pre-empt what changes might happen in the future and overdesign, but design for current requirements and strengthen if change is needed. Some careful design is needed when strengthening the existing structure. Unless the load is entirely removed, members will have some level of stress (so an accurate assessment of the permanent actions is important). Strengthening with plates or PFC will produce a compound section with a new stress distribution to be superimposed on the old.

Reusing steel members is starting to become commonplace – another feature of the Treasury Building. P427 and P440, its supplement for older steelwork, have become "go-to" guidance widely accepted in the UK – and are the model for a new European guidance document under preparation. 2024 should see the completion of further important guidance from BCSA and SCI on the design of low embodied carbon steel buildings, emphasising the designer's role in a transition to a zero carbon future. ■

BCSA

Make sure your Steelwork Contractor is RQSC approved

Image courtesy of William Hare Limited

Specify an approved company from the Register of Qualified Steelwork Contractors for Buildings, to ensure your project meets the Building Safety Act requirements. As of October 3rd 2023 it will become mandatory in the NSSS 7th edition, 1st Revision that all Steelwork Contractors are RQSC approved.

Tel: 020 7839 8566
Email: postroom@bcsa.org.uk
Web: www.bcsa.org.uk/buildings-directory

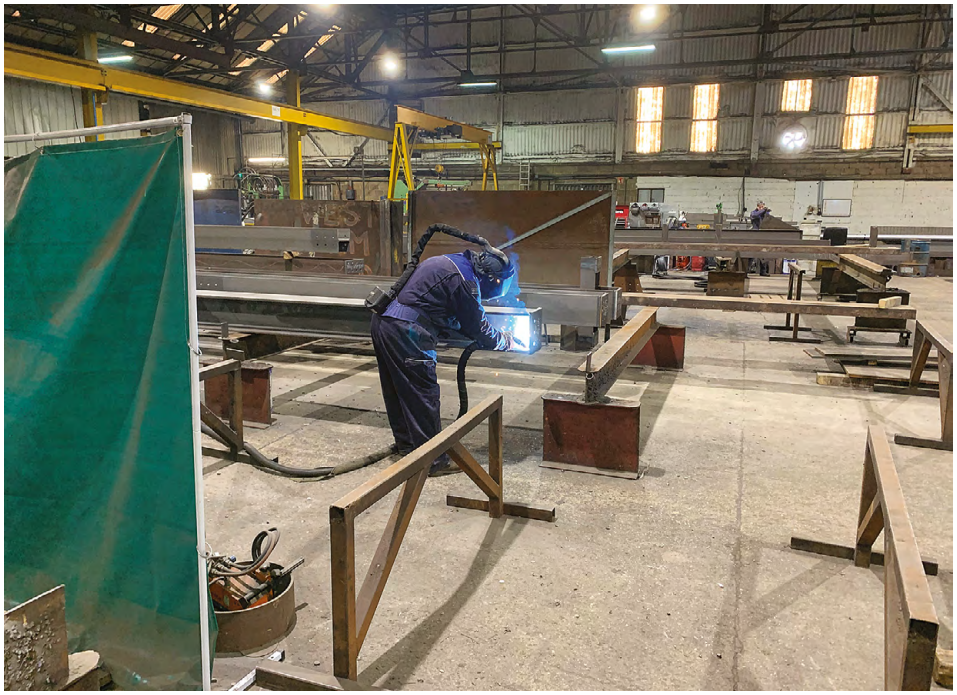
RQSC

The Register of Qualified Steelwork Contractor **Buildings**

CE Marking of fabricated constructional steelwork is a legal requirement – **are you at risk?**

In this article, NSC explains when CE marking will end in the UK and when it will be superseded as a legal requirement by UKCA marking.

In recent months, there has been some confusion over CE and UKCA marking, in particular which one is required and when the transition period for CE marking ends. Construction products, such as fabricated constructional steelwork, fall within the Department for Levelling Up, Housing and Communities (DLUHC) remit, and they have mandated that CE marking will end in the UK on 30th June 2025 and be replaced by UKCA marking.



Why the confusion?

The Department for Business and Trade (DfBT) is responsible for the CE Marking of products that fall within 18 different regulations from toys to low voltage electrical equipment. However, none of these regulations include constructional steelwork because this is a construction product, and such items are the responsibility of DLUHC. On the 1st August 2023, DfBT announced the extension of the use of CE marking for the products it manages beyond the December 2024 deadline for 18 product types that fall within its remit. This announcement did not apply to construction products including constructional steelwork.

What is the difference between CE and UKCA Marking?

CE marking is required for any product that is covered by either a harmonised standard or or an European Technical Standard (ETA) that is placed on the EU market and four of the European Free Trade Association (EFTA) countries. For Construction products such as constructional steelwork, CE marked products may be placed on the UK market until 30th June 2025. UKCA marking is required for any product that is covered by a designated standard that is placed on the UK market. The requirements for Northern Ireland are different from the rest of the UK and here CE marking and UKCA marking may be used indefinitely.

Why do we need to UKCA/CE Mark Structural Steelwork?

The Constructional Products Regulation (CPR) legally required steelwork contractors to CE/UKCA Mark their fabricated steelwork to BS EN 1090-1 and put in place a Factory Production Control (FPC) system that controls the quality of fabrication. Furthermore, constructional steelwork products are deemed safety critical by the Construction Products Regulations, so fabricators have their FPC processes audited by an Approved or Notified body which will award an FPC certification, stating which execution class the fabricator has achieved.

Who does this apply to?

There are three main 'actors' in the process, each of which have a legal responsibility to ensure that their goods are CE/UKCA marked and have appropriate documentation for traceability. The three 'actors' with reference to the constructional steelwork supply chain are described below.

- Manufacturers - this includes steelmakers such as Tata Steel and British Steel, constructional steelwork contractors and distributors who also operate as service centres
- Distributors – also known as steel stockholders
- Importers of structural steel

To keep on the right side of law and to mitigate any penalties, a CE marking certificate and a Declaration of Performance (DoP) must be provided to clients when the product is placed on the market.

What are the implications of Structural Steelwork without CE/UKCA Marking?

As stated, it is a legal requirement to CE/UKCA mark constructional steelwork when it's placed on the market and to provide both a CE/UKCA Marking certificate and a DoP. There are a several bodies that enforce CE/UKCA Marking to ensure that the legislation is not applied incorrectly and that the products meet safety requirements. For the construction products market, surveillance is carried out by Trade Standards in the UK and district councils in Northern Ireland. A company found to be supplying fabricated steelwork which does not meet legal requirements can be forced to take the product off the market or face a fine of £5,000. In more serious instances where the 'controlling mind' is identified, the person can be tried and sent to prison, with all products removed from the market and the company closed.

Building Safety Act 2022

In light of the Building Safety Act 2022 and the new legislation, which is being shaped and released, as well as new Regulating Bodies being formed; it can only be assumed that this will be policed even more, given constructional steelwork is deemed safety critical. So, make sure you only use suppliers who have the right stamp of quality and proof of safety to give you assurance that you are not breaking the law.

BCSA Register of Qualified Steelwork Contractors

The British Constructional Steelwork Association (BCSA) holds the Register of Qualified Steelwork Contractors, who are all vetted and undertake an annual assessment by 3rd party assessors. Safety, competency and quality is paramount in the industry, so if a company wishes to join the register and does not have a FPC and Welding certification, they cannot start the assessment process until they achieve one. ■

Critical temperatures for fire design: Part 2 – Columns

Part 1 of this article discussed the calculation of critical temperatures for beams, presented by ASFP and in the UK NA to BS EN 1993-1-2. In this second part, David Brown considers the information provided for columns.

Calculation process

The calculation of critical temperatures for columns is more involved than the process for beams, but is not so complicated that it should be avoided. According to BS EN 1993-1-2, clause 4.2.3.2, the resistance of a column at elevated temperature is given by:

$$N_{b,fi,t,Rd} = \frac{\chi_{fi} A k_{y,\theta} f_y}{\gamma_{M,fi}}$$

χ_{fi} is a reduction factor, which at least looks familiar to anyone who has designed a column.

$k_{y,\theta}$ is the reduction factor for yield strength, taken from Table 3.1 of BS EN 1993-1-2.

t relates to time – the temperature increases with time, so the value of $k_{y,\theta}$ reduces and therefore also the buckling resistance.

The expressions for χ_{fi} are very similar to those used at ambient temperature and presented in the same format:

$$\chi_{fi} = \frac{1}{\varphi_\theta + \sqrt{\varphi_\theta^2 - \bar{\lambda}_\theta^2}}$$

and

$$\varphi_\theta = \tfrac{1}{2}\left[1 + \alpha\bar{\lambda}_\theta + \bar{\lambda}_\theta^2\right] \text{ with } \alpha = 0.65\sqrt{235 / f_y}$$

The final modification is that the non-dimensional slenderness is adjusted to reflect the fire condition:

$$\bar{\lambda}_\theta = \bar{\lambda}\left[k_{y,\theta} / k_{E,\theta}\right]^{0.5}$$

$k_{E,\theta}$ is an adjustment to the modulus of elasticity (Young's modulus), which changes with temperature and like $k_{y,\theta}$, is taken from Table 3.1 of BS EN 1993-1-2.

Buckling length

The most drama is associated with the buckling lengths to be assumed in the fire condition. BS EN 1993-1-2 specifies that for braced frames (the bracing could be a core, shear walls or bracing), the buckling lengths are to be taken as:

- 0.7L for the top storey
- 0.5L for all intermediate storeys

Identical guidance is given in BS EN 1994-1-2, but in that standard the buckling lengths are made a Nationally Determined Parameter. The UK NA to BS EN 1994-1-2 is more cautious than the code and specifies 0.85L for the top storey and 0.7L for all intermediate storeys. There is no opportunity for national choice in BS EN 1993-1-2 with respect to the buckling lengths, leading to an "interesting" difference in assumed behaviour between bare steel and composite columns – composite columns have a longer buckling length than their bare steel cousins.

Tabulated critical temperatures

Just like for beams, both ASFP and the UK NA to BS EN 1993-1-2 present critical temperatures for columns. The presentation is markedly different – the UK NA has a matrix of non-dimensional slenderness and utilisation, whilst the ASFP has values for UC sections and hollow sections in different building types. The ASFP table has no reference to slenderness or utilisation; the UK NA makes no distinction between section types. The following sections demonstrate how the tabulated temperatures have been determined.

ASFP critical temperatures

The relevant part of the ASFP table for Eurocode design is reproduced below (temperatures in °C).

Building type	Hot rolled H section columns in compression	Hot finished/formed structural hollow sections
Office/domestic	536	547
Storage	530	512
Shopping / congregational / car park	539	521

The ASFP temperatures are stated to be based on:

- 60% utilisation in fire (but this is not true);
- S275 steel;
- A "mid-range" UC section;
- Storey height of 3.5 m;
- A top storey column.

The actual utilisations adopted by ASFP, together with the Q_k:G_k ratios are:

- For office loading, Q_k:G_k = 1:1 and η_{fi} = 0.546
- For storage loading, Q_k:G_k = 2:1 and η_{fi} = 0.644
- For shopping loading, Q_k:G_k = 1:1 and η_{fi} = 0.618

The analysis that led to the ASFP critical temperatures considered section sizes between 203 UC 46 and 305 UC 283, in S275 and S355, with some averaging of intermediate values. It was found that the lower steel grade was the more critical, which is the basis for the ASFP values.

The ASFP methodology always uses the more conservative reduced buckling length of 0.7L.

Due to the averaging of intermediate values, the quoted temperatures will not be correct for any particular situation, but should be conservative. The following example shows the calculation process.

254 UC 73, in S275, 3.5 m long, in an office environment.

At ambient temperature, $N_{b,Rd,z}$ = 1977 kN (quoted to three significant figures as 1980 kN in the Blue Book). The non-dimension slenderness is 0.622

Assuming the column was fully utilised at ambient temperature, the reduction in design effects is due only to η_{fi}, given above as 0.546

The critical temperature of 563°C will be satisfactory if the reduced resistance at this temperature is equal to or more than 0.546 of the "cold" resistance.

Interpolating Table 3.1 of BS EN 1993-1-2, for θ = 563°C, then:

$k_{y,\theta}$ = 0.585 and $k_{E,\theta}$=0.417

The modified slenderness, including the reduced buckling length of 0.7L, is given by:

$$\bar{\lambda}_\theta = \bar{\lambda}\left[k_{y,\theta} / k_{E,\theta}\right]^{0.5} = 0.7 \times 0.622 \times \left[0.585/0.417\right]^{0.5} = 0.516$$

$$\alpha = 0.65\sqrt{235 / f_y} = 0.65 \times \sqrt{235 / 275} = 0.6$$

▸26

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BCSA

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▸24

$$\varphi_\theta = \tfrac{1}{2}\left[1 + \alpha\bar{\lambda}_\theta + \bar{\lambda}_\theta^2\right] = \tfrac{1}{2}\left[1 + 0.6 \times 0.516 + 0.516^2\right] = 0.788$$

$$\chi_{fi} = \frac{1}{\varphi_0 + \sqrt{\varphi_0^2 - \bar{\lambda}_0^2}} = \frac{1}{0.788 + \sqrt{0.788^2 - 0.516^2}} = 0.723$$

$$N_{b,fi,t,Rd} = \frac{\chi_{fi} A k_{y,\theta} f_y}{\gamma_{M,fi}} = \frac{0.723 \times 9310 \times 0.585 \times 275}{1.0 \times 10^3} = 1083 \text{ kN}$$

1083/1977 = 0.548, so at 563°C the column has slightly more resistance that required – the critical temperature is satisfactory.

In S355, the ratio is 0.576, showing that ASFP values are conservative for S355 and S460. The ASFP temperatures are conservative for column lengths above 3.5 m. If the column length is less than 3.5 m, the values are not conservative, but only by a trivial amount.

As the ASFP temperatures are generally conservative, higher temperatures will be calculated if the *actual* design situation is assessed. The following are examples, all using the same 254 UC 73:

245 UC 73, S355, 4.5 m long, Office loading, 100% utilised at ambient: $\theta_{a,cr}$ = 581°C

245 UC 73, S460, 4.5 m long, Office loading, 100% utilised at ambient: $\theta_{a,cr}$ = 592°C

245 UC 73, S355, 4.5 m long, Office loading, 80% utilised at ambient: $\theta_{a,cr}$ = 616°C

245 UC 73, S355, 4.5 m long, Office loading, 60% utilised at ambient: $\theta_{a,cr}$ = 659°C

ASFP provide different temperatures for hollow sections. This is because at ambient temperatures the imperfection factor for UC sections was taken as 0.49 in all cases. For hollow sections the value was taken as 0.21.

180 × 180 × 8 SHS, in S355, 3.5 m long, in an office environment.

At ambient temperature, $N_{b,Rd,z}$ = 1676 kN (quoted to three significant figures as 1680 kN in the Blue Book). The non-dimension slenderness is 0.655

Assuming the column was fully utilised at ambient temperature, the reduction in design effects is due only to η_{fi}, given above as 0.546

The critical temperature of 547°C will be satisfactory if the reduced resistance at this temperature is equal to or more than 0.546 of the "cold" resistance.

Interpolating Table 3.1 of BS EN 1993-1-2, for θ = 547°C, then:

$k_{y,\theta}$ = 0.634 and $k_{E,\theta}$ = 0.464

The modified slenderness, including the reduced buckling length of 0.7*L*, is given by:

$$\bar{\lambda}_\theta = \bar{\lambda}\left[k_{y,\theta}/k_{E,\theta}\right]^{0.5} = 0.7 \times 0.655 \times \left[0.634/0.464\right]^{0.5} = 0.536$$

$$\alpha = 0.65\sqrt{235/f_y} = 0.65 \times \sqrt{235/355} = 0.529$$

$$\varphi_\theta = \tfrac{1}{2}\left[1 + \alpha\bar{\lambda}_\theta + \bar{\lambda}_\theta^2\right] = \tfrac{1}{2}\left[1 + 0.529 \times 0.561 + 0.536^2\right] = 0.786$$

$$\chi_{fi} = \frac{1}{\varphi_0 + \sqrt{\varphi_0^2 - \bar{\lambda}_0^2}} = \frac{1}{0.786 + \sqrt{0.786^2 - 0.536^2}} = 0.735$$

$$N_{b,fi,t,Rd} = \frac{\chi_{fi} A k_{y,\theta} f_y}{\gamma_{M,fi}} = \frac{0.735 \times 5440 \times 0.634 \times 355}{1.0 \times 10^3} = 900 \text{ kN}$$

900/1676 = 0.537 , so at 547°C the column has slightly lower resistance that required – the critical temperature is (just) unsatisfactory. The correct critical temperature is 544°C, which is not considered to be a significant difference.

UK NA Critical temperatures

The relevant part of the UK NA table is shown on p27.

In contrast to ASFP, the values of critical temperatures for columns in the UK NA are based on S355 steel and do not apply the reduction to the buckling length.

For a non-dimensional slenderness of 0.8, the reduction factor at ambient temperature can be calculated as 0.663

For those interested, an alternative way to calculate the reduction factor without any reference to the section is to use the following expressions:

Non-dimensional slenderness	Critical temperature (°C) for utilisation factor μ_0					
	0.7	0.6	0.5	0.4	0.3	0.2
$\bar{\lambda}$ = 0.4	485	526	562	598	646	694
$\bar{\lambda}$ = 0.6	470	548	554	590	637	686
$\bar{\lambda}$ = 0.8	451	510	546	583	627	678
$\bar{\lambda}$ = 0.10	434	505	541	577	619	672
$\bar{\lambda}$ = 0.12	422	502	538	573	614	668
$\bar{\lambda}$ = 0.14	415	500	536	572	611	666
$\bar{\lambda}$ = 0.16	411	500	535	571	620	665

$$\chi = \frac{T_1 - T_2}{2\bar{\lambda}^2}$$

Where $T_1 = 2\phi$ and $T_2 = (T_1^2 - 4\bar{\lambda}^2)^{0.5}$

Using these expressions with $\bar{\lambda}$ = 0.8 and α = 0.49, then ϕ = 0.967

$T_1 = 2 \times 0.967 = 1.934$

$T_2 = (1.934^2 - 4 \times 0.8^2)^{0.5} = 1.086$

$$\chi = \frac{1.934 - 1.086}{2 \times 0.8^2} = 0.663 \text{ as above}$$

The buckling stress at ambient temperature is therefore 0.663 × 355 = 235 N/mm²

If the utilisation in the fire condition was 0.6, the buckling stress in the fire condition would be 0.6 × 235 = 141 N/mm²

The objective then is to determine at what temperature the buckling stress is 141 N/mm² – the UK NA states this to be 510°C. Following the same process as demonstrated for the ASFP values (but omitting the 0.7*L* reduction in buckling length), the steps are shown below.

Interpolating Table 3.1 of BS EN 1993-1-2, for θ = 510°C, then:

$k_{y,\theta}$ = 0.749 and $k_{E,\theta}$ = 0.571

The modified slenderness is given by:

$\lambda_\theta = \lambda [k_{y,\theta}/k_{E,\theta}]^{0.5} = 0.8 \times [0.749/0.571]^{0.5} = 0.916$

$\alpha = 0.65\sqrt{235/f_y} = 0.65 \times \sqrt{235/355} = 0.529$

$\varphi_\theta = ½ [1 + \alpha\bar{\lambda}_\theta + \bar{\lambda}_\theta^2] = ½ [1 + 0.529 \times 0.916 + 0.916^2] = 1.162$

$T_1 = 2 \times 1.162 = 2.324$

$T_2 = (2.324^2 - 4 \times 0.916^2)^{0.5} = 1.430$

$$k_{y,\theta}\chi = 0.749 \times \frac{2.324 - 1.430}{2 \times 0.916^2} = 0.399$$

The buckling stress at the temperature of 510°C is therefore 0.399 × 355 = 142 N/mm²

The UK NA is not conservative for columns in S275 steel. The largest difference is at highly utilised sections and large slenderness (for example μ_0 = 0.7; $\bar{\lambda}$ = 1.6, where the difference is about 6%)

Comparison between ASFP and UK NA for columns

The calculation process is identical, although the results are presented in quite different formats. The UK NA does not apply the 0.7*L* reduction in buckling length, so for a given utilisation will be more conservative. If the ASFP approach is applied to a 254 UC 73 in S355, 3.5 m long, fully utilised at ambient temperatures, in an office loading condition, the critical temperature is 572°C. The UK NA approach would show a more onerous critical temperature of 534°C, simply because of the longer buckling length.

The UK NA has the advantage that actual utilisations can be calculated, including the 0.5*L* or 0.7*L* buckling length reduction and allowing for surplus resistance in the ambient condition. ■

AD 527:
Hybrid connections with bolts and welds

SCI's Advisory service occasionally receives questions about connections where load is to be shared between bolts and welds. This AD explains the code requirements and why hybrid connections are generally not recommended.

So-called hybrid connections, where load might be shared between bolts and welds are covered by clause 3.9.3 of BS EN 1993-1-8. The clause permits Category C bolts (non-slip at ULS) to share load with welds, provided the final tightening of the bolts is carried out after welding is complete.

Non-preloaded bolts transfer load in shear and bearing. The bearing deformation and the movement in clearance holes mean that if this category of fixing were used in a hybrid connection, all the load would actually be carried by the welds, since the welds prevent movement. The same principle applies for hybrid connections using Category B bolts, as these are assumed to slip between SLS and ULS.

Using Category C bolts, preloaded after completion of the welding, precludes slip, so it can be assumed that the welds and Category C bolts share the load.

SCI is not aware of any guidance on how the force might be shared between the bolts and welds. The situation is unlikely to be simple as it will depend on the stress distribution through the connection, which will be affected by the arrangement of bolts and welds. Owens and Cheal[1] point out that the strength and stiffness of fillet welds vary substantially with the direction of the applied load. A second comment is that an elastic analysis based on a single value of weld stiffness cannot be accurate; the limited ductility of the weld precludes the use of simple plastic analysis. It may be possible to undertake a finite element analysis (FEA) of a hybrid connection, though SCI's experience is that FEA is often not straightforward.

The guidance on hybrid connections is not new – identical guidance is given in clause 6.1.1 of BS 5950, but SCI's advice is that hybrid connections should not adopted without very careful consideration of the force distribution within the connection.

[1] Owens, Graham W.; and Cheal, Brian D. 1989. *Structural steelwork connections*, Butterworth & Co. Ltd, London, UK

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New and revised codes and standards

From BSI Updates March 2024

BRITISH STANDARDS UNDER REVIEW

BS EN 1011-3:2018
Welding. Recommendations for welding of metallic materials. Arc welding of stainless steels.

BS EN 1011-6:2018
Welding. Recommendation for welding of metallic materials. Laser beam welding.

BS EN 1365-3:2000
Fire resistance tests for loadbearing elements. Beams.

BS EN 1365-4:1999
Fire resistance tests for loadbearing elements. Columns.

BS EN 10058:2018
Hot rolled flat steel bars and steel wide flats for general purposes. Dimensions and tolerances on shape and dimensions.

BS EN 10164:2018
Steel products with improved deformation properties perpendicular to the surface of the product. Technical delivery conditions.

BS EN 15804:2012+A2:2019
Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.

BS EN ISO 2553:2019
Welding and allied processes. Symbolic representation on drawings. Welded joints.

BS ISO 1891:2009
Fasteners. Terminology.

BS ISO 5952:2019
Steel sheet, hot-rolled, of structural quality with improved atmospheric corrosion resistance.

BRITISH STANDARDS WITHDRAWN

BS EN ISO 15611:2003
Specification and qualification of welding procedures for metallic materials. Qualification based on previous welding experience.

CEN EUROPEAN STANDARDS

EN ISO 15611:2024
Specification and qualification of welding procedures for metallic materials. Qualification based on previous welding experience.

DRAFT BRITISH STANDARDS FOR PUBLIC COMMENT

24/30482380 DC
BS EN ISO 14344 Welding consumables. Procurement of filler materials and fluxes.
Comments for the above document are required by 17 March, 2024

24/30482425 DC
BS EN ISO 544 Welding consumables. Technical delivery conditions for filler materials and fluxes. Type of product, dimensions, tolerances and markings.
Comments for the above document are required by 19 March, 2024

ISO PUBLICATIONS

ISO 14373:2024
Resistance welding. Procedure for spot welding of uncoated and coated low-carbon steels.

NEW WORK STARTED

EN ISO 8502-5
Preparation of steel substrates before application of paints and related products. Tests for the assessment of surface cleanliness. Measurement of chloride on steel surfaces prepared for painting (ion detection tube method).

EN ISO 11126-10
Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast-cleaning abrasives. Almandite garnet.

EN ISO 18203
Steel. Determination of the thickness of surface-hardened layers.

EN ISO 29481-1
Building information models. Information delivery manual. Methodology and format.

EN ISO 29481-2
Building information models. Information delivery manual. Interaction framework.

PUBLISHED DOCUMENTS

PD CEN/TS 19102:2023
Design of tensioned membrane structures.

UPDATED BRITISH STANDARDS

BS 8000-0:2014+A1:2024
Workmanship on construction sites. Introduction and general principles

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Key Theatre

FROM
Building with Steel
March 1974

One of the latest additions to the growing number of theatres throughout the UK is the Key Theatre at Peterborough. Steel plays an important role in its structure and these notes by Joseph Robotham of Mathew Robotham Associates describe its main features. In addition the structural engineers, Space Structures Research Ltd, have added further information on the roof.

In 1967 a group of theatre enthusiasts met to discuss how they could bring back live theatre to Peterborough. They represented a very wide range of interests and included housewives, local councillors, the city librarian, representatives of drama and music groups and the writer. The thought common to them all was that no town could claim to be truly civilised without some form of theatre.

Peterborough, standing on the edge of the Fens, undecided whether to be part of East Anglia or the East Midlands; a cathedral city of 70,000 people had a good theatre tradition. Since the eighteenth century there had been at least one and often two or more theatres, sometimes in buildings which had to serve other purposes too; but always theatre in some form or other. In 1959 this tradition was finally broken when the Theatre Royal, a pleasant Edwardian theatre, was demolished to make way for a department store. This was in a period when the new television had swept the country and theatres. large and small, went down like ninepins. But even while this was happening a new breed of theatre was beginning to emerge. It came from the grassroots and was quite unlike the old dying commercial theatres. An example of this new kind of community theatre was near-hand at Boston, a small fenland port, with a population of only 20,000. A small group of people raised sufficient money to build an intimate theatre within the ruins of a medieval priory, right in the heart of the town. As well as the theatre itself the scheme provided meeting rooms, a bar, and exhibition space and was used by both professional and amateur companies. This was the model on which this group of people in Peterborough founded their own aims and what is more a strong stimulus - the feeling that surely if a small town like Boston could do it we could too!

First of all the aim was modest and this was to find a building suitable for conversion to a small theatre seating about 150 to 200 people. But no such building could be found so the aim expanded and we set about looking for a suitable site for a new building. It was a long search and when we eventually found the ideal site on the north bank of the River Nene there followed protracted and frustrating battles to persuade the city council to donate it to Peterborough Arts Theatre Limited which was a non-profit-making charity. The difficulties were mainly planning and there was much talk of emigration and more fruitful things like gardening, but we stuck it out and the council finally, in 1969, agreed to lease the site at a peppercorn rent.

Setting aside the small matter of raising the money a brief was drawn up. The overall guiding aim was to provide a place suitable for all the arts, a building for all the community, young and old and a place to generate its own social activities. At the centre of the auditorium and stage, a single room concept to provide an intimate, exciting 'theatre' atmosphere, to encourage experiment in production and yet not inhibit more conventional theatre forms such as 'box' sets. The stage was to be as large as possible without a fly tower and the auditorium a single rake, seating 350-400 people with no seat further than 40ft from the stage. A spacious foyer/bar, suitable for exhibitions of paintings and making the most of the riverside and cathedral views. An entrance foyer with booking and manager's offices, a coffee bar and a general purpose meeting cum rehearsal room. Backstage dressing rooms and a small scene dock but no workshops or administrative offices because it had been decided that the theatre policy would be to take in professional touring companies, amateur groups and to house a Regional Film Theatre. Later whilst the building was being constructed this policy was changed.

Because of the difficulties over the site, fund raising did not begin until 1969 when public response was tested by asking people to 'promise' to covenant or donate money to the project. The test was positive with an overwhelming and enthusiastic response and the committee decided that it was feasible to raise about £100,000. As both the quantity surveyor and the architect were members of the committee and joined the intrepid bunch of people who, every week, knocked on people's doors asking for money it was made only too clear to us that economy of means was all.

The design was prepared, closely following the brief, treading warily between the many conflicting 'expert' theatre specialist views and opinions. The internal spaces, construction and finishes had to be as simple as possible and it was not feasible to be as lavish with space as one would have wished particularly in the front of house public spaces. An additional constraint was the free-standing nature of the building, set in an open park space with no back and nothing that could be hidden away as the public would have access to all sides of the building.

We had the courage (or we were foolish enough) to agree to start working drawings whilst fund raising carried on and the cost plan which had been prepared on the basis of the design drawings was strictly enforced. The site was made ground over the old river bed and the foundations were piled to a depth of about 27ft onto a rock bed. It was decided to use load-bearing brickwork generally, supported on a network of reinforced concrete ground beams supported on pile caps. The exceptions were the public areas where it was wished to 'open up' the building so that the activities inside would act as an advertisement and a sort of magnet for the theatre and here the structure is supported on r.c. columns.

Ground-floor slabs are reinforced, generally 8/9in thick and tying in the ground beams, the first floor and roof slab to the main public areas are insitu concrete 'waffle' slabs using GKN plastic moulds and these are left exposed; the first floor to the dressing rooms is in p.c. concrete beams hollow pot; the stepped auditorium floor is in-situ concrete using relatively thin 'L' shaped steps spanning between raking beams and the roof to the dressing rooms, scene dock and plant room in timber joists with a lightweight decking.

Steelwork was the obvious choice for the auditorium/stage roof structure, although at one point timber was investigated in a further attempt to reduce costs, but it was just not feasible. From the design point of view it was felt that the roof structure should 'honestly' form a part of the theatre interior and steel, with its elegant possibilities, could do this economically. In addition, the roof had to accommodate the lighting catwalks and over the stage the grid for the support of lighting barrels, curtain tracks and scenic equipment. At the same time it had to be lightweight with the minimum amount of thrust on the 15½in brick walls which were 24ft high. Several designs were enthusiastically prepared by the consultant Wittold Stepien (whose axiom was that 'this is not a cowshed but a theatre' and perfection was the point at which one stopped) using various forms of space frames but though they would have undoubtedly looked very elegant great difficulties were experienced in fitting in the lighting catwalks and too we felt that we were stretching the medium too far; so they were reluctantly abandoned. The design eventually agreed was a series of very straightforward and simple trusses, in r.h.s. sections, assimilating all the technical requirements and impeccably put together. The roof decking is in lightweight p.c. concrete units, finished outside with blue/black asbestos cement slates.

Final choice of 7ft deep tubular steel trusses for the octagonal heaped roof for Peterborough Arts Theatre was dictated by the position of the stage spotlights which were to be fixed to the catwalk railings and the run of large circular exhaust and heating ducts over the stage and on both sides of the auditorium, which had to be incorporated in the depth of the roof structure.

In addition to these requirements the steelwork above the stage had to carry the suspension system for the curtains, scenery and cyclorama, allowing equipment to be slid by pulleys to any position on the stage. As the steelwork would be exposed to public view it was necessary to design the structure in a simple form to combine the dual function of supporting the roof cover and theatre equipment on single members of uniform appearance. Therefore the top booms of the trusses, tubular purlins on the sloping side of the roof and the joists over the stage are all 4 x 4in sections and the corner hip purlins are back to back 4 x 2in RHS or channels.

Great care had to be taken to incorporate all bolt connections inside of tubes and to cover openings with plates welded on site. On the joists and channels, stud bolts were welded to sections. Studs were welded to channels and angles for connections with the lags welded to main trusses, thus obscuring nuts to view.

A trial erection of the roof structure and the catwalks was arranged at the factory beforehand in order to ensure proper alignment of the connections and to facilitate erection on site. This was carried out in four days with the assistance of a 15-tonne hydraulic crane with 15ft jib.

I was apprehensive that when the theatre was opened there would be a lot of criticism of the exposed roof structure because of associations with industrial-type buildings and the fact that theatres are still connected with an Edwardian-type elegance and luxury. But in fact not a word of condemnation. The intricate shapes formed by the members of the trusses, with the catwalks (with their stage light fittings) and red tubular ventilation ducts, the dark blue of the roof in fact seem to heighten the excitement and theatre atmosphere of the auditorium. In addition, the fact that the steel roof structure can be seen to pass over the stage helps enormously to unify the auditorium with the stage - one of the most important aims of modern theatre design.

Finishes

External: Generally hand-made facing bricks, lead facias and cladding, blue/black asbestos slate roof, patent glazing with anti-sun brown tinted glass, hardwood windows and doors.

Inside: Walls generally common brickwork painted and hand-made facing bricks. Floors: Carpet, brick paviors, hardwood blocks, vinyl-asbestos tiles.

Ceilings: Waffle slabs painted, suspended slatted s/w, lightweight concrete units painted.

Concrete columns and main stair: Bush hammered finish.

Total cost: £142,000 initial tender £128,000 but shortage of funds forced building in two consecutive stages with subsequent increase in costs.

Structural consultants: Stirling; Maynard and Partners in association with J. H. Haisle & Partners

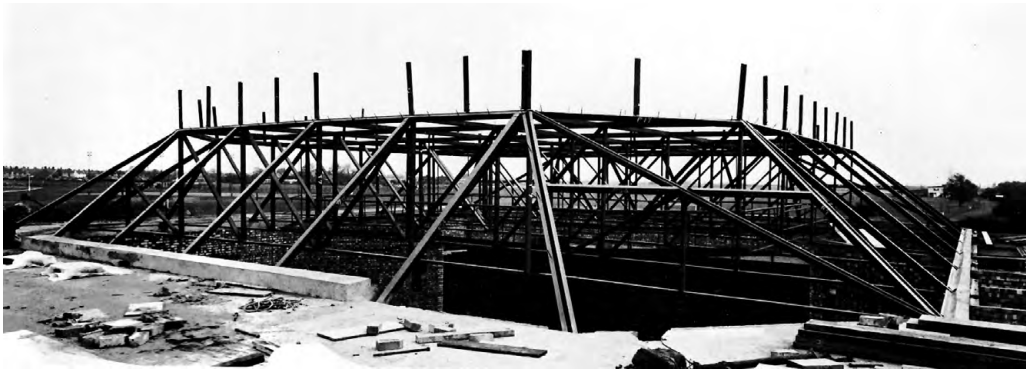
Roof structure only: Space Structures Research Ltd

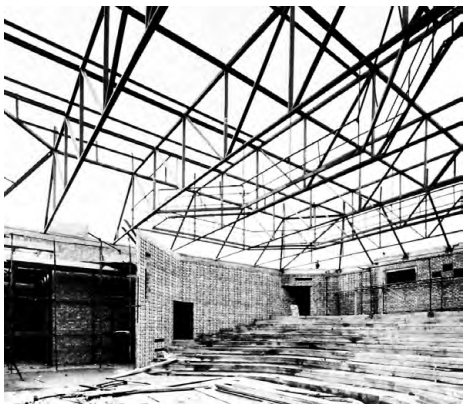
Quantity surveyor: C. E. Smart and Partners

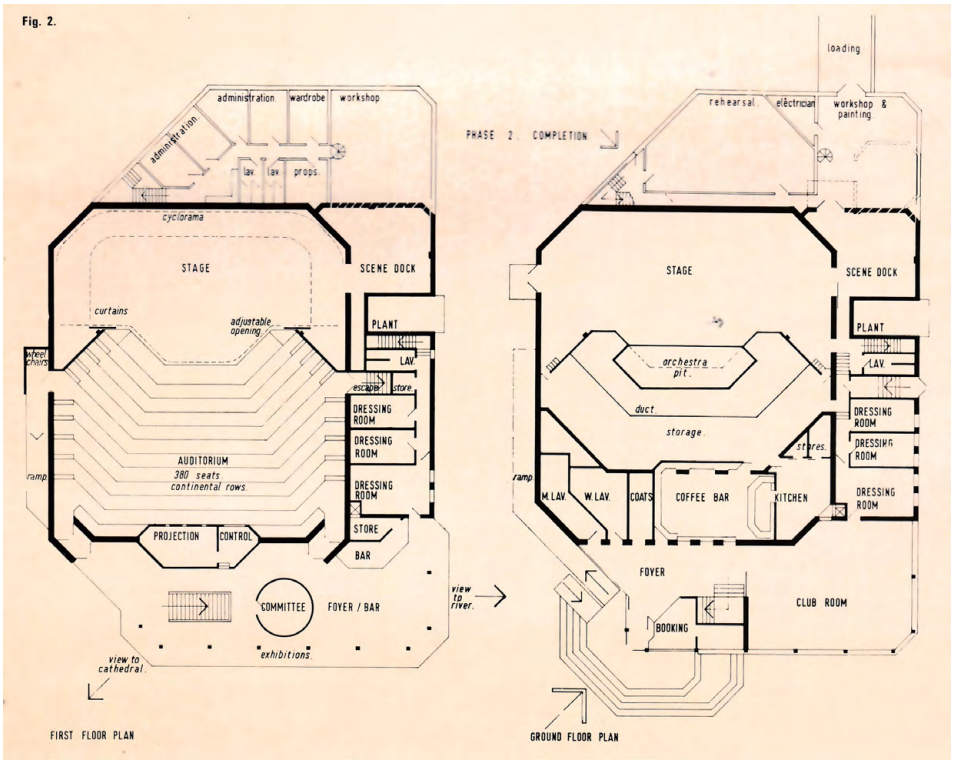
General contractor: E. Bowman and Sons Limited

Building started: September 1971

Completed: October 1973







RQSC | The Register of Qualified Steelwork Contractors Scheme **Buildings**

Steelwork contractors for buildings

BCSA

The Register of Qualified Steelwork Contractors Scheme for Buildings (RQSC – Buildings) is open to any Steelwork Contractor who has a fabrication facility within the UK or European Union.

Applicants may be registered in one or more Buildings category to undertake the fabrication and the responsibility for any design and erection of:

- **C** Heavy industrial platework for plant structures, bunkers, hoppers, silos etc
- **D** High rise buildings (offices etc over 15 storeys)
- **E** Large span portals (over 30m)
- **F** Medium/small span portals (up to 30m) and low rise buildings (up to 4 storeys)
- **G** Medium rise buildings (from 5 to 15 storeys)
- **H** Large span trusswork (over 20m)
- **J** Tubular steelwork where tubular construction forms a major part of the structure
- **K** Towers and masts
- **L** Architectural steelwork for staircases, balconies, canopies etc
- **M** Frames for machinery, supports for plant and conveyors
- **N** Large grandstands and stadia (over 5000 persons)
- **Q** Specialist fabrication services (eg bending, cellular/castellated beams, plate girders)
- **R** Refurbishment
- **S** Lighter fabrications including fire escapes, ladders and catwalks

FPC Factory Production Control certification to BS EN 1090-1
1 – Execution Class 1 2 – Execution Class 2
3 – Execution Class 3 4 – Execution Class 4

BIM BIM Level 2 assessed

QM Quality management certification to ISO 9001

SCM Steel Construction Sustainability Charter
● = Gold ● = Silver, ● = Bronze, ● = Certificate

Notes
(1) Contracts which are primarily steelwork but which may include associated works. The steelwork contract value for which a company is pre-qualified under the Scheme is intended to give guidance on the size of steelwork contract that can be undertaken; where a project lasts longer than a year, the value is the proportion of the steelwork contract to be undertaken within a 12 month period.

Where an asterisk (*) appears against any company's classification number, this indicates that the assets required for this classification level are those of the parent company.

BCSA steelwork contractor member	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	BIM	SCM	Guide Contract Value (1)
A C Bacon Engineering Ltd	01953 850611			●	●	●	●				●			●		✔	2			Up to £5,000,000
Adey Steel Ltd	01509 556677	●		●	●	●	●	●	●	●	●			●	●	✔	3		●	Up to £3,400,000
Adstone Construction Ltd	01905 794561			●	●	●	●							●		✔	2	✔	●	Up to £3,400,000
AJ Engineering & Construction Services Ltd	01309 671919			●	●		●		●	●	●			●	●	✔	4		●	Up to £3,400,000
Angle Ring Company Ltd	0121 557 7241												●			✔	4			Up to £1,200,000
Arminhall Engineering Ltd	01799 524510	●			●	●		●		●	●			●	●	✔	2			Up to £2,400,000
Arromax Structures Ltd	01623 747466			●	●	●	●	●	●	●	●				●		2			Up to £1,200,000
ASME Engineering Ltd	020 8966 7150	●		●	●	●		●	●	●	●		●	●	●	✔	4		●	Up to £5,000,000
Atlasco Constructional Engineers Ltd	01782 564711			●	●	●	●			●	●			●	●	✔	2			Up to £1,200,000
B D Structures Ltd	01942 817770			●	●	●	●				●	●		●	●	✔	2	✔	●	Up to £2,400,000
Ballykine Structural Engineers Ltd	028 9756 2560			●	●	●	●	●				●				✔	4	✔	●	Up to £2,400,000
Barnshaw Section Benders Ltd	0121 557 8261												●			✔	4			Up to £1,200,000
BHC Ltd	01555 840006	●	●	●	●	●	●	●	●	●	●	●		●	●	✔	4	✔	●	Above £10,000,000
Billington Structures Ltd	01226 340666		●	●	●	●	●	●		●		●	●	●		✔	4	✔	●	Above £10,000,000
Bourne Group Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £10,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●		●	●	●	✔	4		●	Up to £10,000,000
Cairnhill Structures Ltd	01236 449393	●			●	●	●	●	●						●	✔	4		●	Up to £6,500,000
Caunton Engineering Ltd	01773 531111		●	●	●	●	●	●		●	●	●		●	●	✔	4	✔	●	Above £10,000,000
Cementation Fabrications	0300 105 0135	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	3		●	Up to £10,000,000
CMF Ltd	020 8844 0940				●		●	●		●	●				●	✔	4			Up to £6,500,000
Coventry Construction Ltd	024 7646 4484			●	●	●	●		●	●	●			●	●	✔	4			Up to £1,200,000
D H Structures Ltd	01785 246269			●	●		●				●						2			Up to £500,000
Duggan Steel	00 353 29 70072	●	●	●	●	●	●	●	●		●				●	✔	4			Up to £10,000,000
D Hughes Welding & Fabrication Ltd	01248 421104				●	●	●	●	●	●	●		●	●	●	✔	4			Up to £1,200,000
ECS Engineering Services Ltd	01773 860001	●		●	●	●	●	●	●	●	●			●	●	✔	4		●	Up to £5,000,000
Elland Steel Structures Ltd	01422 380262		●	●	●	●	●	●	●	●	●	●		●	●	✔	4	✔	●	Up to £10,000,000
EvadX Ltd	01745 336413		●	●	●	●	●	●		●	●	●			●	✔	3		●	Up to £3,400,000
Four Bay Structures Ltd	01603 758141			●	●	●	●	●		●	●			●	●		2			Up to £1,200,000
Four-Tees Engineers Ltd	01489 885899	●		●	●		●	●	●	●	●		●	●	●	✔	3		●	Up to £2,400,000
G.R. Carr (Essex) Ltd	01286 535501	●		●	●			●			●			●	●	✔	4			Up to £1,200,000
H Young Structures Ltd	01953 601881			●	●	●	●	●			●			●	●	✔	4	✔	●	Up to £5,000,000
BCSA steelwork contractor member	**Tel**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**Q**	**R**	**S**	**QM**	**FPC**	**BIM**	**SCM**	Guide Contract Value (1)

BCSA steelwork contractor member	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	BIM	SCM	Guide Contract Value (1)
Had Fab Ltd	01875 611711				●		●	●	●	●	●			●	●	✔	4			Up to £6,500,000
HBE Services Ltd	01525 854110				●	●				●				●	●	✔	2			Up to £1,200,000
Hescott Engineering Company Ltd	01324 556610			●	●	●	●			●				●	●	✔	2			Up to £3,400,000
Hillcrest Structural Steel Ltd	023 8064 1373			●	●	●	●	●		●	●			●	●	✔	3		●	Up to £3,400,000*
Integrated Water Services Ltd	01282 777739									●	●			●	●	✔	2			Up to £1,200,000
Intersteels Ltd	01322 337766	●			●	●	●	●	●				●	●	●	✔	3	✔		Up to £5,000,000
Jamestown Manufacturing Ltd	00 353 45 434 288		●	●	●	●	●	●	●	●		●	●			✔	4			Up to £10,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445			●	●	●	●	●		●	●	●	●	●	●	✔	4	✔	●	Above £10,000,000
Kloeckner Metals UK Westok	0113 205 5270												●			✔	4		●	Up to £6,500,000
Leach Structural Steelwork Ltd	01995 642000			●	●	●	●	●			●					✔	3		●	Up to £6,500,000
Legge Steel (Fabrications) Ltd	01592 205320			●	●					●	●			●	●		2			Up to £600,000
Littleton Steel Ltd	01934 311670			●	●	●				●	●			●	●	✔	3			Up to £1,200,000
M Hasson & Sons Ltd	028 2957 1281			●	●	●	●	●	●	●	●			●	●	✔	4		●	Up to £1,400,000
M&S Engineering Ltd	01461 40111				●				●	●	●				●	✔	3			Up to £2,400,000
Mackay Steelwork & Cladding Ltd	01862 843910			●	●		●			●	●			●	●	✔	4		●	Up to £2,400,000
Maldon Marine Ltd	01621 859000				●				●	●	●			●	●	✔	3			Up to £600,000
Midland Structures Limited	01384 411201				●	●	●	●	●	●	●		●	●	●		2			Up to £5,000,000
Murphy International Ltd	00 353 45 431384	●		●	●	●	●	●	●	●	●			●	●	✔	4			Up to £6,500,000
Nationwide Structures Ltd	01924365883			●	●	●	●				●					✔	4			Up to £10,000,000
Newbridge Engineering Ltd	01429 866722	●	●	●	●	●	●	●			●	●				✔	4		●	Up to £2,400,000
North Lincs Structures	01724 855512			●	●					●					●		2			Up to £600,000
Painter Brothers Ltd	01432 374400				●				●	●	●			●	●		3			Up to £5,000,000*
Peter Marshall (Steel Stairs) Ltd	0113 307 6730				●	●				●	●				●	✔	3			Up to £2,400,000*
PMS Fabrications Ltd	01228 599090			●	●	●	●		●	●	●			●	●		3			Up to £2,400,000
REIDsteel	01202 483333			●	●	●	●		●			●			●	✔	4		●	Up to £10,000,000
SAH Luton Ltd	01582 805741			●	●	●				●				●	●		2			Up to £600,000
SDM Fabrication Ltd	01354 660895	●	●	●	●	●	●			●	●			●	●	✔	4			Up to £3,400,000
Severfield plc	01845 577896	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £10,000,000
Shaun Hodgson Engineering Ltd	01553 766499	●		●	●		●			●	●			●	●	✔	3			Up to £1,200,000
Shipley Structures Ltd	01400 251480			●	●	●	●		●	●	●			●	●	✔	3			Up to £2,400,000
Snashall Steel Fabrications Co Ltd	01300 345588			●	●	●	●	●			●				●		3	✔		Up to £3,400,000
Southern Fabrications (Sussex) Ltd	01243 649000				●	●				●	●			●	●	✔	2			Up to £1,200,000
Stage One	01423 358001				●		●	●	●	●					●	✔	2			Up to £6,500,000
Steel & Roofing Systems	00 353 56 444 1855	●		●	●	●	●				●	●		●	●	✔	4			Up to £10,000,000
Taziker Industrial Ltd	01204 468080	●		●	●		●	●		●	●		●	●	●	✔	3		●	Above £10,000,000
Temple Mill Fabrications Ltd	01623 741720			●	●					●	●				●	✔	2			Up to £600,000
TSI Structures Ltd	01603 720031			●	●	●	●	●			●			●			2	✔		Up to £3,400,000
W I G Engineering Ltd	01869 320515				●					●	●			●	●	✔	2		●	Up to £600,000
Walter Watson Ltd	028 4377 8711			●	●	●	●	●				●				✔	4		●	Above £10,000,000
Westbury Park Engineering Ltd	01373 825500	●		●	●	●	●	●	●	●	●				●	✔	4		●	Up to £1,200,000
William Haley Engineering Ltd	01278 760591			●	●	●	●				●		●			✔	4			Up to £5,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £10,000,000

Non member	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	BIM	SCM	Guide Contract Value (1)
Eden Fabrications	02825 821000			●	●	●	●	●		●	●		●		●	✔	3			Up to £1,200,000

| Non member | Tel | C | D | E | F | G | H | J | K | L | M | N | Q | R | S | QM | FPC | BIM | SCM | Guide Contract Value (1) |

RQSC | The Register of Qualified Steelwork Contractors Scheme **Bridgeworks**

Steelwork contractors for bridgeworks

BCSA

The Register of Qualified Steelwork Contractors Scheme for Bridgeworks (RQSC – Bridgeworks) is open to any Steelwork Contractor who has a fabrication facility within the UK or European Union.

Applicants may be registered in one or more category to undertake the fabrication and the responsibility for any design and erection of:

- **FB** Footbridges
- **CF** Complex footbridges
- **SG** Sign gantries
- **PG** Bridges made principally from plate girders
- **TW** Bridges made principally from trusswork
- **BA** Bridges with stiffened complex platework (eg in decks, box girders or arch boxes)
- **CM** Cable-supported bridges (eg cable-stayed or suspension) and other major structures (eg 100 metre span)
- **MB** Moving bridges
- **SRF** Site-based bridge refurbishment
- **FRF** Factory-based bridge refurbishment
- **AS** Ancilliary structures in steel associated with bridges, footbridges or sign gantries (eg grillages, purpose-made temporary works)
- **QM** Quality management certification to ISO 9001
- **FPC** Factory Production Control certification to BS EN 1090-1
  1 – Execution Class 1 2 – Execution Class 2
  3 – Execution Class 3 4 – Execution Class 4
- **BIM** BIM Level 2 compliant
- **SCM** Steel Construction Sustainability Charter
  ● = Gold ● = Silver ● = Bronze ● = Certificate

Notes

(1) Contracts which are primarily steelwork but which may include associated works. The steelwork contract value for which a company is pre-qualified under the Scheme is intended to give guidance on the size of steelwork contract that can be undertaken; where a project lasts longer than a year, the value is the proportion of the steelwork contract to be undertaken within a 12 month period.

Where an asterisk (*) appears against any company's classification number, this indicates that the assets required for this classification level are those of the parent company.

BCSA steelwork contractor member	Tel	FB	CF	SG	PG	TW	BA	CM	MB	SRF	FRF	AS	QM	FPC	BIM	NHSS 19A	NHSS 20	SCM	Guide Contract Value (1)
Adey Steel Ltd	01509 556677	●	●	●	●	●	●			●	●	●	✓	3			✓	●	Up to £3,400,000
AJ Engineering & Construction Services Ltd	01309 671919	●		●	●	●	●	●	●	●	●	●	✓	4				●	Up to £3,400,000
Beaver Bridges Ltd	01204 668773	●		●	●	●	●	●	●	●	●	●	✓	4					Up to £3,400,000
Billington Structures Ltd	01226 340666	●		●	●	●	●					●	✓	4	✓	✓	✓	●	Above £10,000,000
Bourne Group Ltd	01202 746666	●		●	●	●				●		●	✓	4	✓		✓	●	Above £10,000,000
Briton Fabricators Ltd	0115 963 2901	●	●	●	●	●	●	●	●	●	●	●	✓	4			✓	●	Up to £10,000,000
Cairnhill Structures Ltd	01236 449393	●	●	●	●	●	●	●		●	●	●	✓	4			✓	●	Up to £6,500,000
Cementation Fabrications	0300 105 0135	●	●	●	●	●	●	●	●	●	●	●	✓	3			✓	●	Up to £10,000,000
Centregreat Engineering Ltd	02920 226088	●		●	●	●	●	●	●	●	●	●	✓	4		✓			Up to £3,400,000
D Hughes Welding & Fabrication Ltd	01248 421104	●		●		●			●	●	●	●	✓	4			✓		Up to £1,200,000
ECS Engineering Services Ltd	01773 860001	●		●	●	●	●		●			●	✓	4				●	Up to £5,000,000
Four-Tees Engineers Ltd	01489 885899	●	●	●	●	●	●		●	●	●	●	✓	3			✓	●	Up to £2,400,000
Jamestown Manufacturing Ltd	00 353 45 434 288	●	●	●	●	●	●					●	✓	4			✓		Up to £10,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445	●		●	●	●						●	✓	4	✓		✓	●	Above £10,000,000
M&S Engineering Ltd	01461 40111	●		●		●	●	●		●	●	●	✓	3					Up to £2,400,000
M Hasson & Sons Ltd	028 2957 1281	●	●	●	●	●	●	●	●	●	●	●	✓	4			✓	●	Up to £1,400,000
Millar Callaghan Engineering Services Ltd	01294 217711	●	●	●	●	●	●	●	●	●	●	●	✓	4			✓		Up to £1,400,000
Murphy International Ltd	00 353 45 431384	●	●	●	●	●	●			●	●	●	✓	4			✓		Up to £6,500,000
Nusteel Structures Ltd	01303 268112	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Up to £6,500,000
REIDsteel	01202 483333	●			●	●	●		●			●	✓	4				●	Up to £10,000,000
Severfield plc	01845 577896	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓	✓	✓	●	Above £10,000,000
Taziker Industrial Ltd	01204 468080	●	●	●	●	●	●	●	●	●	●	●	✓	3		✓	✓	●	Above £10,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓	✓	✓	●	Above £10,000,000
Non-BCSA member																			
Allerton Steel Ltd	01609 774471	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓		✓	●	Up to £5,000,000
AmcoGiffen	01226 243413	●	●	●	●	●	●		●	●	●	●	✓	4			✓		Up to £1,200,000
Carver Engineering Services Ltd	01302 751900	●		●	●	●	●		●	●	●	●	✓	4			✓		Up to £5,000,000
Cimolai SpA	01223 836299	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £10,000,000
CTS Bridges Ltd	01484 606416	●	●	●	●	●	●	●	●		●	●	✓	4			✓		Up to £600,000
Donyal Engineering Ltd	01207 270909	●		●						●	●	●	✓	3		✓	✓		Up to £2,400,000
Eiffage Metal	07511 177815	●	●		●	●	●	●	●	●	●	●	✓	4			✓		Above £10,000,000
Harrisons Engineering (Lancashire) Ltd	01254 823993	●	●	●	●	●	●	●	●	●	●	●	✓	3		✓	✓		Up to £3,400,000
Hollandia Infra BV	00 31 180 540 540	●	●	●	●	●	●	●	●	●	●	●	✓	4					Above £10,000,000*
HS Carlsteel Engineering Ltd	020 8312 1879			●						●	●	●	✓	3			✓		Up to £1,200,000
J&D Pierce Contracts Ltd	01505 683724	●	●		●	●	●	●	●			●	✓	4			✓		Above £10,000,000
Kelly's Welders & Blacksmiths Ltd	01383 512 517											●	✓	2			✓		Up to £350,000
Lanarkshire Welding Company Limited	01698 264271	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓		Up to £5,000,000
North View Engineering Solutions Ltd	01325 464558											●	✓	3					Up to £1,200,000
Shaw Manufacturing Ltd	01642 210716			●						●	●	●	✓	4			✓		Up to £1,200,000
Smulders Projects UK Ltd	0191 295 8700	●	●	●	●	●	●	●	●	●	●	●	✓	4					Above £10,000,000
Total Steelwork & Fabrication Ltd	01925 234320	●		●		●				●	●	●	✓	4			✓		Up to £5,000,000
Victor Buyck Steel Construction	00 32 9 376 2211	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £10,000,000

BCSA

Corporate Members

Corporate Members are clients, professional offices, educational establishments etc which support the development of national specifications, quality, fabrication and erection techniques, overall industry efficiency and good practice.

Company name	Tel
Bonham and Brook North Ltd	020 3523 9125
Gene Mathers	0115 974 7831
Griffiths & Armour	0151 236 5656
Highways England Company Ltd	0300 123 5000

Company name	Tel
Keiths Welding Limited	07791 432 078
Magna Inspections Ltd	01377 229632
MMCEngineer Ltd	01423 855939
Paul Hulme Engineering Ltd	07801 216858

Company name	Tel
Sandberg LLP	020 7565 7000
Solent Commercial Management Limited	07852 309104
Structural & Weld Testing Services Ltd	01795 420264
SUM ADR Ltd	07960 775772

Industry Members

Industry Members are those principal companies involved in the direct supply to all or some Steelwork Contractor Members of components, materials or products. Industry member companies must have a registered office within the United Kingdom or Republic of Ireland.

QM Quality management certification to ISO 9001
FPC Factory Production Control certification to BS EN 1090-1
1 Execution class 1 2 Execution class 2
3 Execution class 3 4 Execution class 4
NHSS National Highway Sector Scheme

CA Conformity Assessment
UKCA and/or CE Marking compliant, where relevant:
M manufacturer (products UKCA and/or CE Marked)
D/I distributor/importer (systems comply with the CPR)
N/A CPR not applicable

SCM
Steel Construction Sustainability Charter
● = Gold ● = Silver
● = Bronze ● = Certificate

SfL
Steel for Life Sponsor

Structural components

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
Albion Sections Ltd	0121 553 1877	✓	M	4			
Cellbeam Ltd	01937 840600	✓	M	4	20		
Composite Profiles UK Ltd	01202 659237		D/I				
Construction Metal Forming Ltd	01495 761080	✓	M	3			
Daver Steels Ltd	0114 261 1999	✓	M	3			
Farrat Isolevel	0161 924 1600	✓	N/A				
Hadley Industries Plc	0121 555 1342	✓	M	4		●	
Hi-Span Ltd	01953 603081	✓	M	4		●	
Kingspan Structural Products	01944 712000	✓	M	4		●	
MSW UK Ltd	0115 946 2316		D/I				
Prodeck-Fixing Ltd	01278 780586	✓	D/I				
Structural Metal Decks Ltd	01202 718898	✓	M	4			
Stud-Deck Services Ltd	01335 390069		D/I				
Tata Steel – ComFlor	01244 892199	✓	M	4			
voestalpine Metsec plc	**0121 601 6000**	✓	**M**	4		●	**Gold**

Computer software

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
Autodesk Ltd	01252456600		N/A				
Fabsec Ltd	01937 840641		N/A				
IDEA StatiCa UK Ltd	**02035 799397**		**N/A**				**Silver**
StruMIS Ltd	01332 545800		N/A				
Trimble UK Limited	0113 887 9790		N/A				

Steel producers

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
British Steel Ltd	01724 404040	✓	M		3B		
Tata Steel – Tubes	01536 402121	✓	M		3B		

Manufacturing equipment

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
Behringer Ltd	01296 668259		N/A				
Cutmaster Machines (UK) Ltd	**07799 740191**		**N/A**				**Silver**
Ficep (UK) Ltd	**01924 223530**		**N/A**				**Silver**
Kaltenbach Ltd	01234 213201		N/A				
Lincoln Electric (UK) Ltd	0114 287 2401	✓	N/A				
Peddinghaus Corporation UK Ltd	01952 200377		N/A				

Membership services

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
Deconstruct UK Ltd	02035 799397	✓	N/A				
Keltbray Holdings Ltd	0207 643 1000	✓	N/A				

Protective systems

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
Forward Protective Coatings Ltd	01623 748323	✓	N/A				
Hempel UK Ltd	**01633 874024**	✓	**N/A**				**Silver**
Highland Metals Ltd	01343 548855	✓	N/A				
International Paint Ltd	0191 469 6111	✓	N/A				
Jack Tighe Ltd	01302 880360	✓	N/A		19A		
Joseph Ash Galvanizing	**01246 854650**	✓	**N/A**				**Silver**
PPG Architectural Coatings UK & Ireland	01924 354233	✓	N/A				
Sherwin-Williams UK Ltd	01204 521771	✓	N/A			●	
Vale Protective Coatings Ltd	01949 869784		N/A				
Wedge Group Galvanizing Ltd	**01902 601944**	✓	**N/A**				**Gold**

Safety systems

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
Easi-Edge Ltd	01777 870901	✓	N/A				
TRAD Hire & Sales Ltd	01614 304666	✓	N/A				

Steel stockholders

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
AJN Steelstock Ltd	01638 555500	✓	M	4			
Arcelor Mittal Distribution - Scunthorpe	**01724 810810**	✓	**D/I**	**4**	**3B**		**Headline**
Barrett Steel Services Limited	**01274 682281**	✓	**M**	**4**	**3B**		**Headline**
British Steel Distribution	01642 405040	✓	D/I	4	3B		
Cleveland Steel & Tubes Ltd	**01845 577789**	✓	**M**	**3**	**3B**		**Gold**
Dent Steel Services (Yorkshire) Ltd	01274 607070	✓	M	4	3B		
Dillinger Hutte U.K. Limited	01724 231176	✓	D/I	4		●	
Duggan Profiles & Steel Service Centre Ltd	00 353 567722485	✓	M	4			
European Metal Recycling Ltd	01925 715400	✓	N/A				
Kloeckner Metals UK	0113 254 0711	✓	D/I	4	3B	●	
Murray Plate Group Ltd	0161 866 0266	✓	D/I	4	3B		
NationalTube Stockholders Ltd	**01845 577440**	✓	**D/I**	**4**	**3B**		**Gold**
Rainham Steel Co Ltd	01708 522311	✓	D/I	4	3B		
The Alternative Steel Co Ltd	01942 826677	✓	D/I				

Structural fasteners

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
Advanced Bolting Solutions Limited	0116 251 2251	✓					
BAPP Group Ltd	01226 383824	✓	M		3		
Cooper & Turner Ltd	0114 256 0057	✓	M		3		
Lindapter International	01274 521444	✓	M				

Welding equipment and consumables

Company name	Tel	QM	CA	FPC	NHSS	SCM	SfL
Air Products PLC	01270 614167		N/A				

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