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JULY/AUGUST 2023
Vol 31 No 7

NSC

Cover Image
The Range warehouse, Gateway 14, Stowmarkets
Main client: Jaynic
Architect: Frank Shaw Associates
Main contractor: Winvic Construction
Structural engineer: Richard Jackson
Steelwork contractor: Caunton Engineering
Steel tonnage: 3,730t

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SSDA shortlist shows strength of constructional steelwork

Nick Barrett - Editor

Another outstanding group of steel construction projects has been selected for the 2023 Structural Steel Design Awards shortlist, as you can read in News. The 21 that have made it to the shortlist are the pick of what was an outstanding crop in another bumper year for entries to the 55th annual awards, sponsored by the BCSA and Steel for Life, one of the longest established construction design-related award schemes and the only one for which judges actually visit the shortlisted projects.

If evidence is ever needed about the strength of the UK's steelwork design and construction skills, the SSDA shortlists are the place to start. The projects have been successfully completed throughout the UK and the Republic of Ireland, including London, Dublin, Glasgow, Birmingham, Swansea and Edinburgh. The variety of project is, as usual, striking, including the Battersea Power Station redevelopment, a stand at Fulham FC, a National Robotarium in Edinburgh, the Tropical Fruit Warehouse office development in Dublin and several bridges up and down the country.

What the respective construction teams will all have in common is an appreciation of the flexibility of steel to provide such a wide range of structural solutions to satisfy clients' needs, as well as of steel's cost-effectiveness despite recent inflation driven price rises affecting all construction materials. Increasingly of course, as BCSA Chief Executive Officer David Moore says in News, sustainability and the drive for net zero is still the focus of the industry, and we can be confident that all of the shortlisted structures have been designed and built with that in mind.

SSDA judges in recent years have been impressed by the efforts being made at all stages of the construction process by project teams keen to play their part in supporting the government's net-zero ambitions, and this year has seen the same drive towards ever improving sustainability of projects.

Delivering efficient, practical and flexible spaces and structures that are both aesthetically pleasing and cost-effective is not achieved by accident. It comes from increasingly collaborative efforts throughout the process, from project conception stage - with the best results being achieved by early engagement with steelwork contractors - and continues through detailed design into the steelwork contractors' workshops and on to site where the speedy erection process never fails to impress.

As David Moore says, credit has to be given to the constructional steelwork sector for the resilience and tenacity it has shown in what have been exceptionally challenging times, against the background of world raw materials price rises and soaring energy prices, in continuing to provide low carbon and high-quality structures. Credit also has to be given to the clients who have had the foresight and courage to shrug off short-term issues and press on with projects that will be needed for the future of the UK.

Since the launch of the SSDA in 1969, SSDA projects have demonstrated flexibility, sustainability, innovation, and excellent value for money against whatever challenging background has emerged. That can confidently be expected to continue.

SSDA shortlist announced

The shortlist for the 55th Structural Steel Design Awards (SSDA) jointly sponsored by the British Constructional Steelwork Association (BCSA) and Steel for Life, has been announced (see NSC page 13).

The Awards have again seen a strong number of submissions and the 21 shortlisted projects once again showcase steel's credentials, flexibility and versatility in a number of varying applications, spread across the UK and Republic of Ireland.

The winners will be announced at an evening reception in London on 28th September.

David Moore, Chief Executive Officer, British Constructional Steelwork Association said: "Sustainability and the drive for net zero is still the focus of the construction industry and structural steelwork is the original sustainable material that can be reused and recycled time and time again and still deliver efficient, practical, and flexible spaces that are both beautiful and cost-effective.

"The continuing conflict in Ukraine had a big impact on the cost of raw materials in 2022/23 with steel prices fluctuating over the past year and eventually stabilising. Yet, no sooner had the steel prices started to stabilize, then the energy price rises started to take hold, doubling, and tripling for some who had to renew contracts. However, credit is due to the constructional steelwork sector which showed resilience and tenacity in these challenging times and continued to provide low carbon, high-quality structures.

"Since the launch of the Structural Steel Design Awards in 1969, the winning projects have continued to demonstrate flexibility, sustainability, innovation, and excellent value for money in a world that has seen significant challenges. Once again, the entries submitted are exceptional and I would like to congratulate all the shortlisted project teams for providing such a variety of outstanding steel structures."

Structural Steel Design Awards Shortlist 2023

The SSDA 2023 shortlist is:

- Arbor, Bankside Yards, London
- Battersea Power Station, London
- Church of Oak Distillery, Ballykelly, Co. Kildare
- Clery's Quarter, Dublin
- Cody Dock Bridge, London
- Copr Bay Bridge, Swansea
- Dukes Meadows Footbridge, Chiswick
- Ed Sheeran Mathematics Tour
- Farringdon Crossrail Station, East & West Ticket Halls
- HYLO, London
- M8 Footbridge, Sighthill, Glasgow
- Montacute Yards, London
- New Riverside Stand at Fulham FC
- One Centenary Way, Birmingham
- SAS13 Bridge Replacement, Birmingham
- Shipbuilders of Port Glasgow
- Stockingfield Bridge, Glasgow
- The JJ Mack Building, London
- The National Robotarium, Edinburgh
- The Outernet, London
- Tropical Fruit Warehouse, Dublin

Steelwork starts on Manchester NHS mental health unit

A major milestone has been reached as the erection of the steel frame on Greater Manchester Mental Health NHS Foundation Trust's (GMMH) latest mental health unit has commenced.

Once completed, the unit, known as North View, will house a purpose-built Psychiatric Intensive Care Unit (PICU), eight adult acute wards and a treatment suite. The new development will see significant improvements to patient experience, with spacious single bedrooms, each with a private en-suite shower room, as well as a variety of indoor activity areas, meeting rooms for family visiting, multiple gardens, spaces for therapeutic artwork and a café.

IHP, a joint venture between Vinci Building and Sir Robert McAlpine has been appointed to build the state-of-the art development.

Leach Structural Steelwork is fabricating, supplying and erecting 1,100t of steelwork for the project.

Work on North View started in August 2022 with the new unit anticipated to be built and operational in 2024.

Work starts on latest phase at Paradise Birmingham

Main contractor Sir Robert McAlpine has begun work on Three Chamberlain Square, the latest commercial building at Paradise Birmingham.

Scheduled to open in 2025, the office block was awarded planning permission by Birmingham City Council in June 2022, and forms an integral part of the overall Paradise masterplan.

According to developer MEPC, it will help ensure a continued supply of Grade A office space for the city with an emphasis on sustainability and low energy, low carbon design as part of the drive to net zero for the entire scheme.

Designed by architects Feilden Clegg Bradley Studios, the 10-storey structure is targeting a BREEAM 'Outstanding' rating and will offer 17,500m² of floor space.

Ross Fittall, Director at MEPC said: "This announcement of moving ahead swiftly with Three Chamberlain Square underlines our ongoing commitment to the city and to bringing forward new buildings at Paradise that are at the cutting edge of building technology and sustainability."

BCSA makes new appointments at AGM


Left to right: Immediate Past President, Mark Denham; President, Gary Simmons; Deputy President, Chris Durand

At its recently held AGM, the British Constructional Steelwork Association (BCSA) elected Gary Simmons, Chief Engineer at William Hare as its new President (see NSC page 10) and Chris Durand of Severfield as Deputy President.

Speaking at the 44th National Dinner, which was held later the same day, outgoing BCSA President Mark Denham said: I'd like to wish Gary a successful Presidency and welcome Chris as the BCSA's new Deputy President.

"The Association is in more than safe hands with the Executive Board boasting three Chartered Engineers, two of which are Fellows of the Institution of Structural Engineers and two International Welding Engineers. The Process and Technical committee of the BCSA is in great shape to tackle the task of making sense of the impending new design codes.

"The last three years have probably been some of the most challenging years for the country, but I'm pleased to say that our constructional steelwork industry and the BCSA have met all these challenges and emerged stronger for it."

Gary Simmons said: "I am genuinely looking forward to my two years as President and I am honoured to be chosen to represent the BCSA and its membership. I hope that I can continue to help raise the profile of the organisation and its rightful place within the construction industry."

At the National Dinner and in memory of James Barrett of steel stockholders Barrett Steel, the BCSA raised £2,985 for Cancer Research UK.

Steel props aid construction of new Thames tunnel

A series of steel tubular props are being installed to aid the construction of the Silvertown Tunnel, which will provide a new road link under the River Thames between North Greenwich and east London.

A total of 247 CHS props, ranging in length from 9m to 41.5m, are being supplied by Severfield to support the 600m of access ramps at both ends of the tunnel. Overall, the company is fabricating and supplying 4,000t of steelwork for the project, including 600t of waler beams.

The 1.4km-long twin-bore tunnel is being delivered by a joint venture between Ferrovial Construction, BAM Nuttall and SK E&C.

Following a similar route to the alignment of the Emirates Air Line cable car, the project has been designed to ease congestion around the adjacent and existing Blackwall Tunnel.

Only one tunnel boring machine (TBM), with a diameter of approximately 12m, is being used to bore both tunnels through geology including alluvium, London clay and the Lambeth Group. Launched in Silvertown, the TBM has completed the first tunnel and, having been rotated in North Greenwich, it is now working on the return second tunnel.

Overall, the construction team will manage a total excavation of 600,000m³ and 100% of the suitable excavated material will be transported away from site by river, minimising the impact of construction traffic for neighbouring communities and routes.

The project is expected to be completed in 2025.

PLP secures planning for huge Milton Keynes logistics centre

Developer Peel L&P (PLP) has been granted detailed planning consent for a single cross-dock unit of approximately 93,000m², which the company said makes it the largest immediately deliverable logistics building in the UK.

The 44-acre second phase of PLP MK, is said to be the only fully consented, fully serviced and plateaued site in the southern M1 corridor that can deliver a facility of this scale.

The development boasts a delivery period of only 9 months from construction start. PLP are hoping to start construction in the near future on a pre-let or speculative basis.

This state-of-the-art industrial and logistics facility will follow PLP's Carbon Net Zero (CNZ) framework, combining CNZ construction with CNZ ready design, adhering to the UK Green Building Council's Net Zero Buildings Framework. This standard will enable future customers to achieve CNZ operation by utilising built-in renewable energy features and by procuring appropriate renewable energy supplies.

NEWS IN BRIEF

Severfield has reported an underlying profit before tax of £32.5M for the year ending 25 March 2023, up 20 per cent from £27.1M in the previous 12 months, while revenue also increased to £491.8M from £403.6M. The company's UK and Europe order book stood at £510M on 1 June 2023, compared to £464M on 1 November 2022, and includes new industrial and distribution, film studio, commercial offices and nuclear orders.

Cardiff Council has put forward plans for a multi-million-pound renovation of its historic Central Market. The Council said the scheme would protect, preserve and future-proof the Grade II* Listed building, restoring original design features, and introducing a new ground floor seated area for food.

Kier Construction has been appointed to deliver the new Carew Academy, a special educational needs and disability school for pupils in the London Borough of Sutton. The project is funded by the Department for Education and the new school will be managed by Orchard Hill College and Academy Trust. It will replace the current academy and will extend the provision for additional and complex learning by offering 246 places for children and young people.

Glencar has been confirmed as main contractor for a 17,700m² speculative warehouse at Rula Developments' Fulwood Park in Nottingham. The development will comprise a state-of-the-art distribution centre and offices, complete with car park, 50m-wide service yard, site access and associated external services. Construction of the BREEAM 'Excellent' rated facility is expected to take 46 weeks with the development expected to be available for occupation by the start of April 2024.

Gateshead Council has approved plans for a nine-storey hotel to be built by main contractor Russell WBHO during a two-year build programme. Designed by AHR Architects the hotel will feature restaurants, bars and business meeting rooms as well.

PRESIDENT'S COLUMN

Welcome to my first President's column.

In each edition, I want to discuss topical issues that are important to the industry and to the BCSA Membership, so if there is a subject that you think is worthy of discussion, then please contact the BCSA and we will endeavour to include it as best we can.

This month the focus is on what is available to you, as BCSA members, in relation to training and competency.

A recent CROSS safety newsletter reported on the incorrect installation of tension control bolts during the construction of a new highway bridge over a railway. Fortunately, this error was identified and corrected prior to completion of the works, but we shouldn't need to rely on post-construction inspections to correct these potentially serious errors.

The BCSA run a series of training courses including one on Bolting Competency, which includes a specific section on preloaded bolt installation. Other training courses include Welding, Temporary Works, Painting and Steel Decking Installation.

So, to ensure that your staff are fully competent and are able to carry out their work in a safe environment, check out the new BCSA website and make use of either the in-house or e-learning training packages that are available to both members and non-members.

In addition to the physical training courses that the BCSA run, we are also here to provide technical advice on matters of design and fabrication, and also offer support on contractual and legal issues to our members. So again, please continue to use the facilities that your BCSA membership entitles you to.

If you attended the BCSA Annual Dinner in June this year, you will know that one of my aspirations during my term as President is to raise the profile of the Steelwork Contractor / Fabricator within the larger project delivery team. Despite our expertise and experience across a wide range of disciplines, our input into the structural design of the buildings and structures that we deliver is often restricted to a subcontractor role where we are unable to influence the decisions on (for example) materials, complexity and sustainability.

With a much earlier appointment and invitation to the design table, I believe that we can add both commercial and practical value to the design process, something that I have witnessed and have personal experience of on many projects.

The whole steelwork construction industry is working towards a more carbon neutral and sustainable world, and as the people responsible for delivering this goal, I believe that our involvement needs to be on an equal footing to that of the Architect and the Structural Engineer. This isn't a difficult concept to understand, but it is one that challenges the traditions and structure of the UK construction industry, but one that I believe is worthy of major discussion.

Finally, to conclude my first column, I want to remind you of the BCSA's Steel Construction Sustainability Charter that is available to all members. Simple registration and demonstration of your environmental credentials will gain you the appropriate Charter Level that can be used to validate your position on sustainable construction during the project tender period. This charter is now becoming widely specified within the Structural Engineer's project specification to ensure sustainable construction, so if you haven't already done so, I would advise you to apply and register as soon as possible.

Gary Simmons
BCSA President

Steel sections handbook unveiled by Barnshaws

Specifically compiled as a comprehensive resource for structural engineering, Barnshaws Group has made available *The British & European Steel Sections Handbook*.

The company said it designed the publication for engineers, architects, and construction professionals involved with steel construction.

Focused on British and European standards, the handbook serves as a guide to steel sections, including universal beams, columns, channels, angles and hollow sections.

It offers a detailed overview of their dimensions, weight per metre and moment of inertia, which allows precise calculations of the load capacity and stability of the structure. In addition, the handbook provides vital data on the flexural, compression and torsional strength of steel profiles, enabling engineers to identify the most suitable profiles for specific applications.

According to Barnshaws, the publication is set to become an invaluable tool for creating safe, efficient, and sustainable steel structures.

To receive a complimentary copy, email: *Wioleta.pater@barnshaws.com*

Pre-let agreement signed at Sheffield's Bessemer Park phase two

A pre-let agreement has been agreed with ITM Power for a 7,732m² warehouse at Bessemer Park, Sheffield.

ITM Power, who design and manufacture hydrogen generation systems, has already leased a 12,500m² unit that was completed during Phase 1 of development.

The deal is the first letting at the second phase of development currently under construction. It consists of four units totalling 56,250m² with completion targeted from October 2023.

Located close to J34 of the M1 motorway, the site is said to offer excellent connections to the entire country, with 90% of the UK population within a 4.5-hour drive. PLP Bessemer Park is a four-minute drive to Meadowhall shopping centre and Meadowhall Interchange Rail Station.

Working on behalf of main contractor Winvic Construction, Caunton Engineering are designing, supplying and erecting more than 2,000t of steelwork for the project.

The scheme will achieve carbon net zero (CNZ) status and will adhere to the UK Green Building Council's Net Zero Buildings Framework.

New warehouse facility for Port of Liverpool

Glencar has been appointed by Peel Ports to construct a new 22,296m² warehouse facility at Alexandra Docks, within Peel Ports' Port of Liverpool development in Bootle.

The new £28M facility, which constitutes the biggest single investment in warehousing at the Port of Liverpool over the last six years, will span the length of five football pitches (400m) and will be used for the handling and storage of cargo at the port.

With its own quay and cranes, the warehouse will be able to store a variety of commodities, both unitised and non-unitised, requiring indoor storage.

As well as the design and construction of the single-span warehouse, the scope of Glencar's works includes piling, foundations, push walls, cladding and roof lights.

The warehouse is due to be complete by March 2024.

Work starts on academy expansion in Sunderland

Following a turf-cutting ceremony, BAM Construction has started work on a brand-new school building at Sunderland's Farringdon Community Academy.

The £35M project will include state-of-the-art classrooms, including those specialised for more vocational qualifications such as engineering, and design and technology.

The ground floor will incorporate an open-plan design with a large library facility, main hall and dining area. There will also be a new swimming pool and a specialist learning area adapted for vulnerable children and those with special educational needs and disabilities.

Farringdon Community Academy Acting Principal, Jordan Bedford said: "I'm really excited to be here at this celebration of the construction of our new school. We are working out of a 1960s building at the moment. It has served its purpose, but there is a time that comes when everyone needs a new build.

"The new building is going to have state-of-the-art technology and we will no longer have to be working on a split site. We are over the moon that we will be able to open this new building for pupils by September 2024."

Redesign revealed for Manchester waterpark

Having gained planning approval in 2020, Therme Manchester has revised its design from a single building with a full glass roof to a more 'pavilion-style' concept, with a number of interconnected structures.

Billed as a one-of-a-kind destination, the 28-acre Therme Manchester is expected to become one of the top three all-season water-based facilities in the world.

Located close to TraffordCity and with its own dedicated tram stop, it will contain 25 pools, 35 waterslides, 30 sauna and steam rooms, a 10,000m² wellbeing garden, an indoor beach, as well as host of eating and dining areas.

The redesign features a number of glazed pavilions that will offer a more accessible experience for all. Three main entrances will connect to a new green central boulevard and the main changing area.

According to Therme Manchester, all entrance buildings have been considered within the urban environment to focus on connectivity and to enhance the beauty of the surrounding landscaped areas.

With a construction programme of around two years, work on the site could begin later this year.

New station set to arrive at Darlington

Willmott Dixon has won a £30M contract from Tees Valley Combined Authority to transform the entrance to Darlington Station as part of Network Rail's £140M masterplan to deliver extra train capacity and better passenger facilities at the station.

The work also includes a new multi-storey car park integrated within the larger entrance area. Network Rail will start work later this summer on creating two new platforms to improve rail connections both within the Tees Valley and beyond via the East Coast Main Line.

Tees Valley Mayor Ben Houchen said: "With hundreds of Government jobs coming to Darlington, the town and its people deserve a modern and vibrant station to provide a gateway to the rest of the great developments on their way. This is another significant milestone and I'm thrilled the station project is steaming ahead."

Cllr Stephen Harker, Leader of Darlington Borough Council and Tees Valley Combined Authority Cabinet Member, said: "I am delighted that work is progressing on this project to transform the station to improve access to Darlington for business and leisure travellers. It will also create much better access into the wider Tees Valley. Upgrading the station will allow us to continue attracting investment to Darlington."

The station overhaul will be completed in 2025 in time for the Stockton and Darlington Railway bicentennial celebrations.

Diary

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

Tue 5 September 2023
Acoustics
Webinar, SCI/BSCA Members only
This webinar will provide an introduction to the sound and acoustic performance of steel-framed buildings. It will include background information on sound and implications for acoustic detailing, regulations and requirements. Presented by Andrew Way from the Steel Construction Institute.

Mon 18 & Wed 20 September 2023
Fire Resistant Design of Steel Structures
Online
This short course will cover the essentials of structural fire design of steelwork, from the Building Regulations to the resistance of beams and columns at elevated temperatures. It will cover only the so-called simple calculation models (which are complicated enough!), involving the calculation of reduced design loads, the time-temperature curve and modified material properties. An introduction to the protection of members with web openings and the special rules for portal frames in boundary conditions will also be presented.

Tue 3 October 2023
Fatigue Design to EC3
Webinar, SCI/BSCA Members only
The webinar will cover the fatigue phenomenon and the assessment of fatigue life. Fatigue loading and Miner's summation of fatigue damage and how it is dealt with by EN 1993-1-9 will be addressed.Presented by Richard Henderson, SCI

From drawing board to Main Board

Spreading the message about the high level of design and engineering capability provided by steelwork contractors will be a key driver of new BCSA President Gary Simmons' term of office. He will also be a high-profile advert for the apprenticeship route to success, as Nick Barrett explains.

Gary helped design composite columns for 52 Lime Street - an Award winner at SSDA 2020.

New BCSA President Gary Simmons has enjoyed a highly successful career in constructional steelwork; rising to the main board of leading steelwork contractor William Hare Limited (WHL) as the director in charge of engineering design would be regarded as a huge career achievement by anyone in the industry.

His route to the top didn't have the conventional start that might be expected however, as he is the first of the company's apprentices to reach Board status. Not only that, but despite being one of the country's leading structural steelwork experts he didn't even come to the company from a structural engineering background.

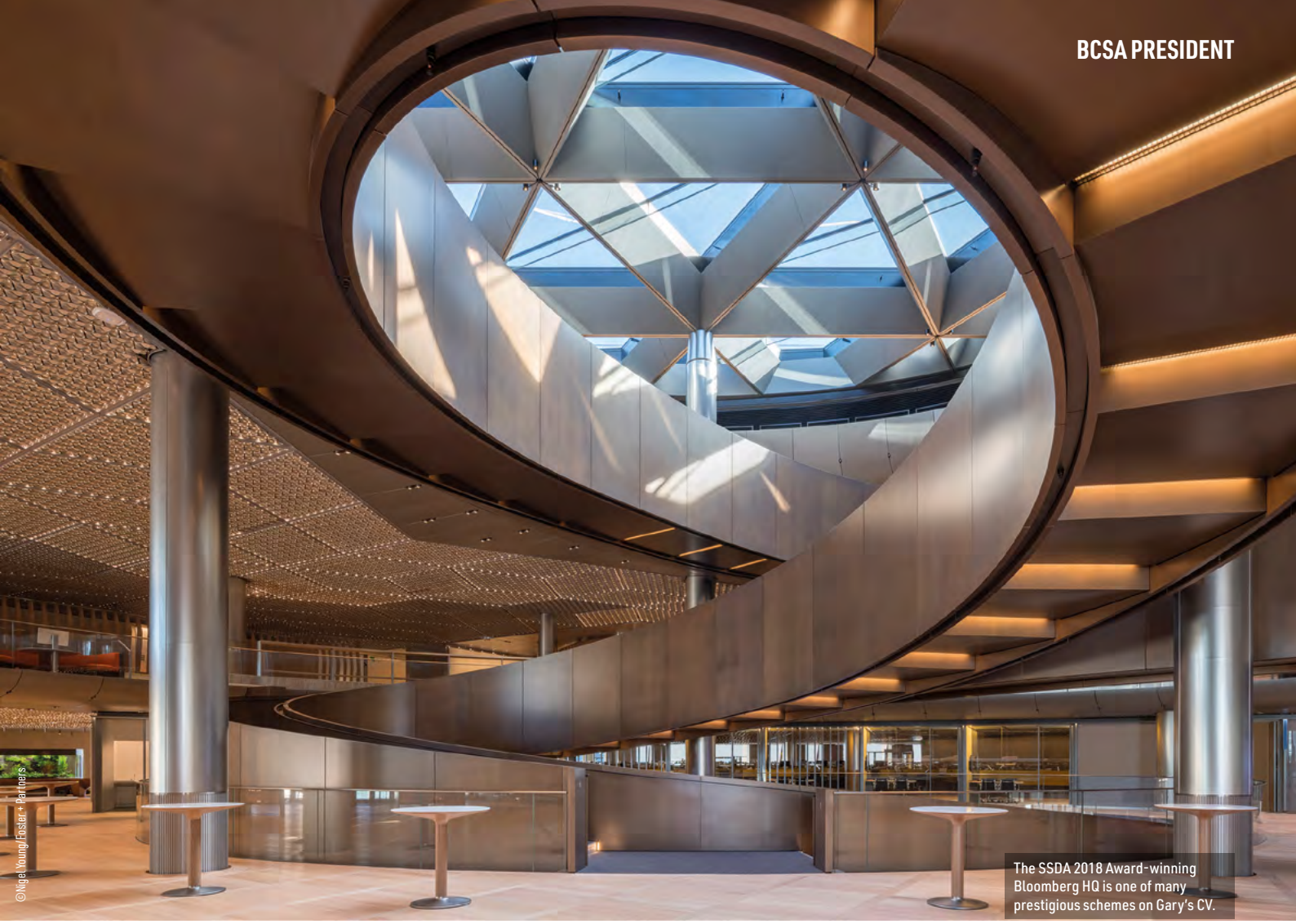
"I came into the industry on a drawing board, starting straight from school as an apprentice draughtsman in the general drawing office. Hares provided a great apprenticeship, and it is a route that I would happily recommend to anyone these days.

"Almost everything I have learned I learned at Hares, and all the hard work I put in has been recognised by the company, by owners David and Susan Hodgkiss in particular. I have many colleagues at Hare to thank for their friendship and guidance over the years and, as the old cliché goes, 'I really wouldn't be here without them'".

Lancashire born and raised Grammar schoolboy Gary had planned to go to university, but family circumstances prevented that, so the apprenticeship route it had to be. "I started in 1977 at the princely sum of £27 a week, which was decent for an apprentice at that time, with the first pay-packet handed over unopened to my mother, as we did in those days. I got five pounds back and I was happy with that."

Undiscouraged by not getting to university, the young Gary hadn't given up hopes of advancement and at his interview asked if he could have Friday afternoons off so he could continue with A-level studies at college. "Mostly that meant copying down all of my friend's notes for the lessons I missed because I was working." With that capacity for hard work, he unsurprisingly was awarded the Apprentice of the Year in 1979, and earned A-levels in History, Geography and Economics, which would have been enough to get him onto his degree course of choice.

Progress through the drawing and design offices at Hares was fast, and he was soon taking a leading design role on key projects in the commercial,



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The SSDA 2018 Award-winning Bloomberg HQ is one of many prestigious schemes on Gary's CV.

industrial and nuclear sectors. After a few years in the general drawing office, he was transferred to a smaller and more specialised drawing office at Gin Pit Village, Astley, to work on international oil and gas projects.

"In the mid-1980's the WHL design office consisted of just two people, and that was where I moved to next, which was where my training as a steelwork connection designer started. My teachers, Alan Walker and Alan Gillette, taught me not only the fundamental principles of steelwork design but also the practicalities of 'good' design, which means understanding the challenges of fabrication and construction when determining the design form."

This was a time of constant and rapid expansion at WHL and when a new Engineering Office was formed at the California workshop in Bury, Gary was invited to join it by early mentor Ken Crook. He eventually became the sole design engineer responsible for all the major projects undertaken at that site.

Many careers would have happily settled there, but a thirst for broadening his experience led Gary to join consulting engineer White Young Green to work alongside British Nuclear Fuels Limited at Risley, Warrington. He was part of the Structural Steelwork Division working on various projects at the Thermal Oxide Reprocessing Plant (THORP) at Sellafield, quickly progressing to a senior position within the team, responsible for both production of design calculations and the independent checking of other works.

The pull of steelwork contracting proved strong however and after two years Gary was attracted back to WHL as a Senior Designer. He progressed through the business to be appointed the Main Board Director responsible for the Group Engineering Department, which he oversaw developing over 20 years to include over 300 technical staff in offices as far apart as the UK, United Arab Emirates, Portugal, the Philippines and India.

By the mid 1990's WHL accounted for some 50% of all fabricated steel exported internationally by BCSA members. Projects Gary has on his CV include the Airbus A380 Wing Production Facility at Broughton, Chester; the London Olympic Stadium Roof Transformation; the M6 Thelwall Viaduct Bridge Crossing at Warrington; 20 Fenchurch Street (the Walkie Talkie) in London; Bloomberg HQ in London; and Hinkley Point C Nuclear Power Station.

The project he regards as his favourite though is the 120m-tall, diagrid Aldar HQ - The Pearl - at Al Raha Beach, Abu Dhabi, the first circular building of its type in the Middle East. Steel certainly showed its benefits here, with advanced 3D modelling deployed to bring the project in within a very tight time frame to be ready for the 2009 Formula 1 Grand Prix.

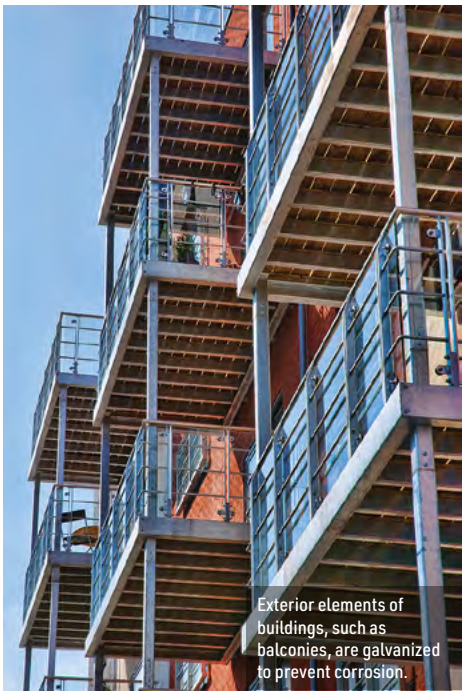
Gary also held responsibility for Technical Research & Development at WHL and has been behind several innovations that improved the supply and safe construction of structural steelwork, such as the concept design and introduction of a proprietary building edge protection system. While sitting on a train journey he worked out the concept of the design for a moveable track to allow ease of use of Mobile Elevating Work Platforms (MEWPs) for steel frame construction. Other ideas that have arisen on train journeys include a type of composite column used at Hares' 52 Lime Street project, often referred to as Lancashire Columns.

A theme of his Presidency will be getting across to clients and the rest of the construction team that steelwork contractors make an invaluable contribution to projects that is often under appreciated. "We don't just design connections, we contribute a lot more than that, and with the increasing complexity of iconic structures we are often faced with engineering challenges that have no existing design rules, so we need to develop our own methodology, and in effect write our own piece of design code.

"Providing that level of skill and expertise justifies steelwork contractors being at the top table and involved in projects from the earliest design stages. It will save clients time and money and allow more sustainable, efficient designs to be created, which will be of national significance as we strive towards net zero carbon."

Gary can point to a host of examples where the steelwork contractor's input has produced the benefits he is talking about. "We need to raise knowledge of the benefits of the high level of design and engineering capability steelwork contractors have. If I can make a positive contribution to that over my two years as President, I'll regard it as time well spent." ■

Structures such as sheds and warehouses are often built with galvanized steelwork in order to ensure maximum longevity.



Exterior elements of buildings, such as balconies, are galvanized to prevent corrosion.

Galvanizing the foundations of the construction Industry

First introduced in the mid-1700s, galvanizing is used worldwide within the construction industry.

Numerous industries, including the construction sector, make use of galvanized steelwork, due to its many benefits, such as longevity, durability, and sustainability.

Andy Harrison, Sales and Marketing Director at Wedge Group Galvanizing - the UK's largest hot-dip galvanizing organisation across the construction industry, says: "Hot-dip galvanizing protects steel – everything from large-scale infrastructure through to small nuts and bolts – from corrosion. After a chemical clean to remove existing surface rust or oils, the item is completely immersed in a bath of molten zinc at temperatures around 450°C, allowing a metallurgic bonded coating to be formed.

"The immersive process enables the steel to be entirely coated – inside and out (and even awkward corners or narrow gaps), providing a finish which can protect steel for over 70 years - even in harsh environments and when exposed to corrosive elements, such as rain and snow, marine locations, or industrial and chemical processes."

What are the benefits of galvanizing?

"Sustainability is certainly a hot topic right now. Customers are increasingly interested in how environmentally-friendly brands and businesses are, and there are continually evolving government regulations and targets that mean organisations are required to consider their eco-credentials more than ever before. The galvanizing process creates minimal waste, as any unused zinc can remain in the bath for the next project, without any changes to its physical or chemical properties. Plus, galvanized steel can be recycled along with scrap steel, or stripped, regalvanized and reused," says Mr Harrison.

"At Wedge Group Galvanizing, we're aware of our impact on the environment, and are committed to improving our sustainability, and that of the overall galvanizing process.

"We've invested across our 14 plants to enhance operations and implement innovative procedures, including an introduction of high-velocity 'smart' furnaces, fume extraction units, and heat recovery systems. Plus, our bespoke rainwater collection and harvesting system helps to reduce waste and recycle rainwater back into the galvanizing process, and our specialist inverters have provided significant savings in power consumption."

Longevity is another benefit as Mr Harrison explains: "Another fantastic benefit of galvanizing is its long-lasting protection. Most galvanized items will last for at least 70 years – even longer if in the right conditions – without need for maintenance or downtime. This allows for overall lifecycle costs to remain low, as it significantly saves time, labour, and resources, which is particularly attractive for companies seeking economic benefits.

"Galvanizing's metallurgic bonding is totally unique, as no other coating can do this. As the product is entirely and evenly coated, a tough, durable, and permanent finish is applied. As a result, galvanized steel has the greatest resistance to mechanical damage during transport, storage or installation, ensuring the appearance and preservation of the item is a priority. Galvanizing provides such a tough coating that, should it be required, it can only be removed by professionals using abrasive blasting or specialist chemicals."

Galvanized coatings also protect in three unique ways; Firstly, the coating weathers at a very slow rate, giving a long and predictable life. Secondly, the coating corrodes preferentially to provide cathodic (sacrificial) protection to any small areas of steel exposed through drilling, cutting or accidental damage. Scratches are sealed by weathering products from the zinc. Finally, if the damaged area is larger, the sacrificial protection prevents the sideways creep of rust which can undermine paint coatings.

"One of the few metal finishes defined by a British Standard, hot-dip galvanizing is uniform and consistent. Thanks to this, it's a relatively simple and predictable process meaning it can have short turnaround times," says Mr Harrison.

"Galvanizing is also one of the most hygienic finishes, with galvanized items able to be wiped and cleaned down with ease, without impacting their properties or ability to provide rust-free protection.

"With many construction professionals regularly looking to genuinely enhance their sustainability credentials, hot-dip galvanizing continues to be a perfect partner to this industry. Boasting an abundance of benefits to ultimately save businesses valuable time, costs, and resources, it also provides a long-term, practical, and durable solution for projects across the globe." ■

SSDA Shortlist 2023

The shortlist for the 55th Structural Steel Design Awards (SSDA), jointly sponsored by BCSA and Steel for Life, has been announced.

The Awards have again seen a strong number of submissions with the 21 shortlisted projects showcasing steel's sustainability credentials, flexibility and versatility in a number of different and varying applications.

The shortlist also reflects the wide geographical spread of steel's appeal for a variety of projects ranging from industrial and education buildings to retail and residential buildings, with entries also received for a variety of bridges, commercial developments and leisure facilities across the UK.

The winners will be announced at an evening reception in London on 28 September.

© Aerial Essex

Dukes Meadows Footbridge, Chiswick

Architect: Moxon Architects
Structural engineer: COWI (detailed design and construction engineering), Campbell Reith (concept design)
Main contractor: Knights Brown Construction Ltd
Client: London Borough of Hounslow

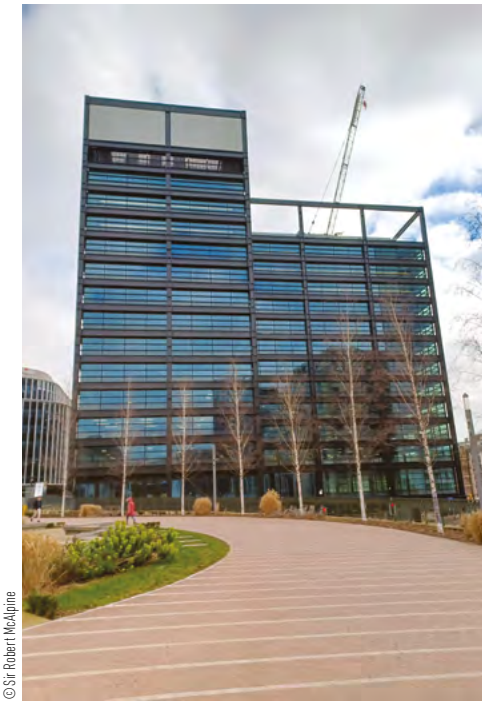
Shipbuilders of Port Glasgow

Sculptor: John McKenna Sculptor Ltd
Structural engineer: Narro
Main contractor: John McKenna Sculptor Ltd
Client: Inverclyde Council

© CentralPhotography.com

Arbor, Bankside Yards, London

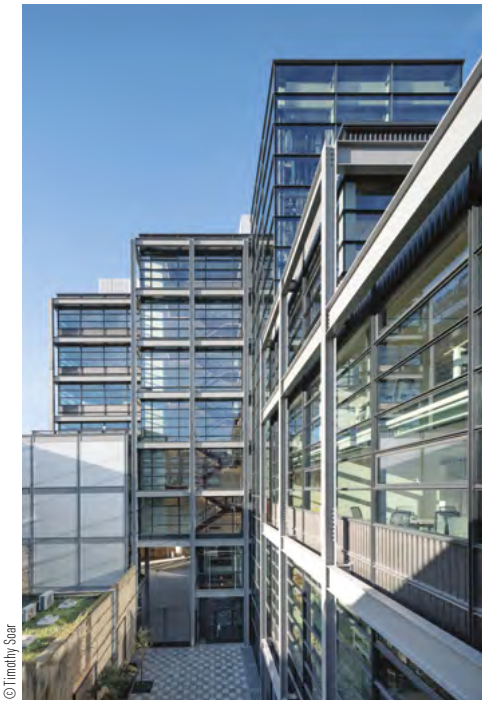
Architect: PLP Architecture
Structural engineer: AKT II
Steelwork contractor: Severfield
Main contractor: Multiplex Construction Europe Limited
Client: Native Land



© Sir Robert McAlpine

One Centenary Way, Birmingham

Architect: Glenn Howells Architects
Structural engineer: Ramboll
Steelwork contractor: BHC Ltd
Main contractor: Sir Robert McAlpine Ltd
Client: MEPC



© Timothy Soar

Montacute Yards, London

Architect: Allford Hall Monaghan Morris
Structural engineer: Heyne Tillett Steel
Main contractor: ISG Limited
Client: Brockton Everlast

© John Sturrock

Battersea Power Station, London

Architect : WilkinsonEyre
Structural engineer: Buro Happold
Principal Structural Steelwork Contractor: William Hare
Architectural Structural Steelwork Contractor: CMF Ltd
Main contractor: Mace
Client: Battersea Power Station Development Corporation

Church of Oak Distillery, Ballykelly, Co. Kildare

Architect: ODOS Architects
Structural engineer: J. J. Campbell & Associates
Steelwork contractor: Steel & Roofing Systems
Main contractor: Ormonde Construction
Client: Oakmount

Clery's Quarter, Dublin

Architect: Henry J Lyons
Structural engineer: Waterman Moylan
Steelwork contractor: Kiernan Structural Steel Ltd
Main contractor: Glenbrier Construction
Client: Oakmount

© Guy Archard

Cody Dock Bridge, London

Architect: Thomas Randall-Page
Structural engineer: Price & Myers
Main contractor: Gasworks Dock Partnership
Client: Gasworks Dock Partnership

© Hufton & Crow

Copr Bay Bridge, Swansea

Architect: ACME
Structural engineer: Ney & Partners
Steelwork contractor: S H Structures Ltd
Main contractor: Buckingham Group Contracting Ltd
Client: City & County of Swansea

© Cundall

Ed Sheeran Mathematics Tour

Architects: Mark Cunniffe Ltd and WonderWorks
Structural engineer: Cundall
Steelwork contractor: Stage One Creative Services Ltd
Main contractor: Stage One Creative Services Ltd
Client: 1325 Productions

© Morley von Sternberg

Farringdon Crossrail Station, East & West Ticket Halls

Architect: Aedas
Structural engineer: AECOM
Steelwork contractor: Bourne Group Ltd
Main contractor: BAM Ferrovial Kier JV
Client: TfL (Crossrail)

HYLO, London

Architect: HCL Architects
Structural engineer: AKT II
Steelwork contractor: Bourne Group Ltd
Main contractor: Mace
Client: CIT Group

© Peter Devlin

M8 Footbridge, Sighthill, Glasgow

Structural engineer: Jacobs
Steelwork contractor: Severfield
Main contractor: BAM Nuttall
Client: Glasgow City Council

© Dave Shopland/Shutterstock

New Riverside Stand at Fulham FC

Architect: Populous
Structural engineer: WSP
Steelwork contractor: Severfield
Main contractor: Buckingham Group Contracting Ltd
Client: Fulham FC

© Andrew Parish

SAS13 Bridge Replacement, Birmingham

Structural engineer: Tony Gee & Partners LLP
Steelwork contractor: Severfield
Main contractor: Skanska UK
Client: Network Rail

Stockingfield Bridge, Glasgow

Structural engineer: Jacobs
Steelwork contractor: S H Structures Ltd
Main contractor: Balfour Beatty
Client: Scottish Canals

The JJ Mack Building, London

Architect: Lifschutz Davidson Sandilands
Structural engineer: AKT II
Steelwork contractor: William Hare
Main contractor: Mace
Client: Helical plc

© Robertson

The National Robotarium, Edinburgh

Architect: Michael Laird Architects
Structural engineer: Tetra Tech
Steelwork contractor: BHC Ltd
Main contractor: Ratho Park One
Client: Heriot-Watt University

The Outernet, London

Architect: Orms
Structural engineer: Engenuiti
Steelwork contractor: Severfield
Main contractor: Skanska UK
Client: Consolidated Developments Ltd

© Enda Cavanagh

Tropical Fruit Warehouse, Dublin

Architect: Henry J Lyons
Structural engineer: Torque Consulting Engineers
Steelwork contractor: Steel & Roofing Systems
Main contractor: P.J. Hegarty & Sons
Client: IPUT Real Estate

Steel solution for Welsh viaduct

Forming part of the wider Heads of the Valley scheme, steel construction is playing an integral role in the widening and strengthening of the Taf Fechan Viaduct.

One of South Wales' key transport links is in the midst of a vital upgrade programme aiming to combat a high accident rate, severe congestion and poor journey time reliability.

The A465 Heads of the Valleys road is recognised by the Welsh Government as a strategically important national route, and internationally it is part of the Trans European Transport Network.

This reflects its significance as a key link to the Midlands, South West Wales and as an alternative to the M4. Locally it connects communities between Abergavenny and Neath.

Much of this highway was a three-lane carriageway and unsuitable for modern traffic volumes. To combat this problem, the road has been steadily converted into a dual carriageway over the past 20 years, with one of the final pieces of work being the 17.7km-long stretch between Dowlais Top, Merthyr Tydfil and Hirwaun, which is currently under construction.

This part of the A465 is known as the Heads of the Valleys, and traverses one of the most distinctive areas in Wales, known for its rich industrial heritage, stunning landscape and close-knit communities.

However, it is an area of high economic deprivation with low employment rates and a lack of private investment. The Welsh Government believes the upgraded highway will be a boost to the region, giving businesses and commuters better connectivity with the rest of South Wales and the UK.

The work, which began in 2021, is being carried out by Future Valleys Construction (FVC), which is part of international construction company FCC Construcción.

One of the most integral elements of the scheme is the Taf Fechan Viaduct, which is just north of Merthyr Tydfil. Built in the 1960s to carry the three-lane A465 over the Fechan Gorge, the concrete open spandrel arch viaduct is being widened and strengthened to allow it to accommodate four traffic lanes and a footpath.

A steelwork solution has been chosen for the work as this method is said to allow prefabricated elements to be rapidly assembled onsite, with minimal temporary works.

According to the main contractor, a number of other considerations also had to be taken into account when choosing the construction methodology. The Taf Fechan Gorge is a Site of Special Scientific Interest, and so the widening of the structure has been carefully planned and designed so as not to disturb this historic and protected landscape. The existing carriageway is also an important strategic route, which needs to stay open, with the exception of limited overnight and weekend closures.

An FVC project spokesperson adds: "As the site is confined, the valley protected, and the road has to stay open, a full replacement would have been extremely complex. The visual strategy for the scheme wanted to maintain the appearance of the arch. Demolishing the existing bridge could cause additional environmental concerns, in addition to the increase in the carbon footprint had a completely new bridge been required."

To this end, widening and strengthening the concrete structure's deck was the best option and this process involves steelwork contractor, Taziker Industrial fabricating, supplying and installing 380t of steelwork to the existing viaduct.

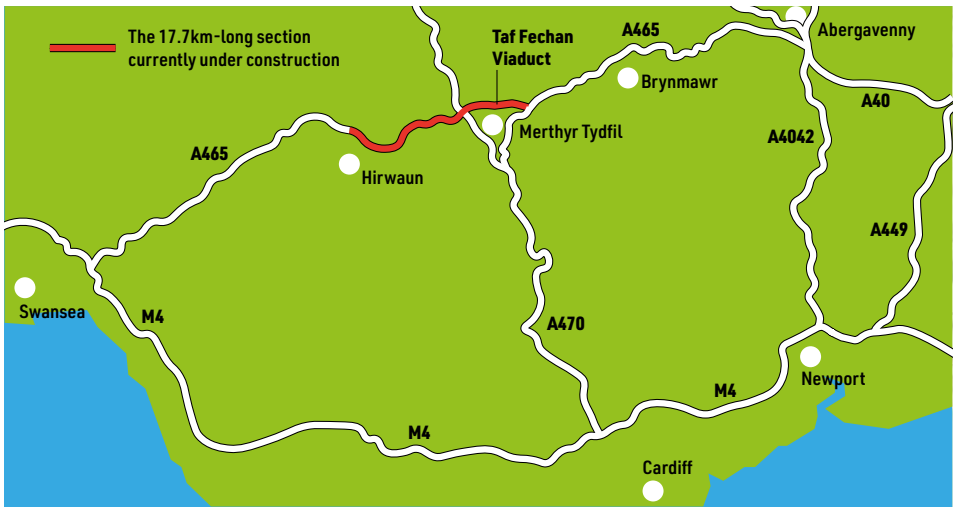
Weathering steel beams and columns are being installed to widen the viaduct.

In order to minimise future maintenance and reduce the health and safety risk of working at height, the majority of the project's steelwork has been specified as weathering steel. This grade of steelwork forms a protective rust patina that inhibits further corrosion, looks architecturally-pleasing and can achieve a 120-year design life with little or no required maintenance.

The viaduct's original concrete arch and road deck are being maintained, while the vertical walls supporting the deck are all being replaced with steel columns and beams. At either end of the structure, the new columns are in the form of portal frames, sitting on new mini piled foundations. Over the central arch, they are in the form of braced pairs, supporting a new cross beam.

A series of 18 steel beams, each 25m long, are being bolted to the underside of the viaduct to help form new 7.5m-wide sections to either side of the bridge.

Spaced at 6m intervals, along the entire length of the viaduct, the beams are fabricated as two 12.5m-long pieces that are assembled onsite into complete sections.



FACT FILE
Taf Fechan Viaduct, Merthyr Tydfil
Main client: **The Welsh Government**
Architect: **Atkins**
Main contractor: **Future Valleys Construction**
Structural engineer: **Atkins**
Steelwork contractor: **Taziker Industrial**
Steel tonnage: **380t**

The steelwork package has been divided into three phases, with each one installing six complete beams. The initial phase involved the centre of the viaduct.

With the temporary works in place, hung beneath the existing deck, the first phase and the subsequent second phase, which consisted of the steelwork on the eastern end of the viaduct, used a crane positioned on the bridge to lift the beams into place.

In order to allow the existing viaduct to remain in use in the busy daytime hours, the majority of the steelwork erection has been completed during a series of night-time road closures.

The beams for phase one differ to the other steel sections, as these members are designed like giant tuning forks, with a central portion missing, allowing them to be threaded under the bridge deck and around an existing concrete wall.

Connecting the beam halves required the sections to be positioned on temporary works, while a welded connection was made.

The beams are 1m-deep sections, with 60mm flanges and 25mm webs, with each complete beam weighing approximately 25t.

Phase two also required the beams to be site welded, although these members do not have the tuning-fork design. These beams are complete sections that are positioned adjacent to the existing concrete structure and supported on new steel columns.

Positioned on the sloping river embankment, the columns vary in height from 1.5m-high to the tallest at 9m-high.

Phase three, which consists of the six beams on the western end of the viaduct, was installed using a crane positioned adjacent to the viaduct. These beams have a bolted connection, instead of the welded option used on the earlier phases, as there is better access to make onsite connections. ■

In the middle of the viaduct, a series of tuning fork style steel beams are threaded through the existing structure.

Ready for take-off

Farnborough Airport is set to significantly increase its available hangar space with the construction of a large sustainably-designed steel-framed structure.

FACT FILE
Farnborough Airport Domus III hangar
Main client: **Farnborough Airport**
Architect: **Gebler Tooth**
Main contractor: **McLaughlin & Harvey**
Structural engineer: **Hydrock**
Steelwork contractor: **BHC**
Steel tonnage: **1,080t**

Known as the birthplace of British aviation, Farnborough Airport has a long and distinguished history dating back to the early 20th Century.

Initially, the home of a military balloon factory, set up to counter the German Zeppelin threat, the airport was also the site for the UK's first powered flight in 1908, when Samuel Cody took off in his British Army Aeroplane No.1.

Today, the facility is recognised as one of Europe's leading business aviation airports, a position it is set to maintain with the construction of a new steel-framed hangar. Known as Domus III, the £55M 16,250m² structure will increase the available hangar space in preparation for the next generation of business jets. It is centrally located in a prime position adjacent to the airport's two main taxiways and it is said to complement the existing award-winning architecture and state-of-the-art facilities.

Farnborough was the first airport of its kind to be carbon neutral accredited in 2018 and the design of the hangar is set to be an iconic continuation of the airport's pioneering spirit. One of the most significant design features will be the translucent automated doors, which will stretch the entire length of the building. The design also aims to optimise natural light inside the hangar and reduce lighting usage. The extensive unhindered access provided by the door design will improve aircraft

As well as the construction of the hangar, the works also include associated hard-standing aprons.

"Domus III has been meticulously designed to incorporate the latest state-of-the-art technology to drive environmental performance, advancing our goal to be a global showcase for airport sustainability."

manoeuvrability and help mitigate unnecessary emissions from aircraft handling activities.

Farnborough Airport's CEO Simon Geere, says: "As one of the most modern and progressive aviation projects in the south-east of England, the transformation of our hangar space seals Farnborough Airport's future as a thriving hub of international connectivity and the investment will provide a substantial boost for employment and economic growth in the region. Not to mention Domus III has been meticulously designed to incorporate the latest state-of-the-art technology to drive environmental performance, advancing our goal to be a global showcase for airport sustainability."

As well as the hangar structure, the construction work also includes the installation of a high-specification 275mm-thick concrete floor, while externally, the project's package incorporates associated airport hard-standing apron works.

A series of trusses along one elevation form the four bays, while secondary trusses create the column-free interior of the hangar.

Aircraft hangars need large column-free internal spaces and a steel-framed design is recognised as the best, and possibly the only solution, to create these large structures.

The Domus III project has an impressively large steel frame that measures 300m-long × 50m-wide, reaching a maximum height of 18m.

Highlighting that the project is being constructed within a fully functioning airport, all the steelwork for the job, as well as all other materials and the site personnel, have to get to site by crossing a taxiway.

"We are an island site, surrounded by an operational airport," explains McLaughlin & Harvey Project Director James West. "We constantly liaise with the airport over aircraft movements, to access our site as we cross a live taxiway some 60-70 times a day. Installation plant, such as cranes, have aerodrome restrictions and must not over-sail the project footprint or stray into the OLS Zone (Obstacle Limitation Surfaces). So, to install steelwork and sheeting, the radar must be withdrawn from operations and turned off, which takes some planning."

Divided in half, by an internal partition wall and a movement joint, each half of the hangar contains two bays, each one accommodating a door. The bays are 75m wide and formed with 4m-deep primary trusses, that run the length of the building, spanning between columns situated on either side of the four automated door frames.

Project steelwork contractor BHC fabricated and delivered the primary trusses to the site in transportable pieces, including 25m-long top and bottom chords with welded nodes to connect to the internal members. With bolted connections, each of the 4.2m-deep primary trusses was assembled on the ground (three sections for each 75m-long bay) and lifted into place using one mobile crane.

A series of temporary steel towers were used to support the trusses during the erection programme, and they were not removed until the truss steelwork was complete and stability had been achieved.

Connected to the primary trusses are a series of 40m-long secondary trusses, that span the width of the structure and help form the roof of the hangar and the important column-free internal space. Delivered to site in two 20m-long sections, the 4.2m-deep secondary trusses were assembled on the ground and then lifted into place by two mobile cranes carrying out a series of tandem lifts.

"The trusses have been designed and optimised to be as efficient and lightweight as possible," explains Hydrock Senior Structural Engineer Sam Garrett. "With such large openings in the structure to accommodate the doors, wind loadings have to be taken into account. Bracings within the trusses have been optimised to restrain the top and bottom ▸20

Visualisation of the completed £55M Domus III hangar.

▸19 chords while ensuring the structure is sufficiently stabilised against wind loadings."

Running along the entire elevation opposite the main hangar doors, the building has a 10m-wide two-storey mixed-use area, the roof of which is formed with a series of curved columns that connect to the secondary trusses as well as a straight perimeter column, creating a rounded architectural finish.

The ground floor of the mixed-use area will provide storage and plant equipment space, while the upper level will accommodate offices and further storage for the clients using the hangar. The first floor has a composite design, with steel beams supporting 2,200m² of metal decking and a concrete topping.

Within the hangar's overall braced design, the mixed-use area has further bracings, working in two directions, providing the structure with more stability.

Speaking upon Farnborough Airport's announcement of Domus III in August last year, Councillor David Clifford, Leader of Rushmoor Borough Council said: "Around 80% of Farnborough Airport's staff live within a 10-mile radius. This investment in Domus III is very much an investment into the Borough, demonstrating how important the airport is as a significant employer for the region both today and going forward, supporting the growth of Rushmoor's economy, and furthering our ambitions to tackle climate change."

The Domus III hangar is scheduled to be completed in early 2024. ■

Long-span Steel Structures

Long-span steel structures are often utilised to create unobstructed, column-free spaces, such as the new steel-framed hangar at Farnborough Airport. Socrates Angelides of the SCI discusses some of the main design considerations for long-span steel structures.

A series of trusses spanning the entire building width are an obvious feature of the new Farnborough Airport hangar. Trusses are often utilised when long-span structures are required, as these offer a more efficient structural solution in terms of material use, compared to standard beam cross-sections. In trusses, the large bending moment generated under gravity loading at large spans is primarily resisted by axial forces. This results in smaller cross-section members for both the chords and diagonals, reducing the overall weight of the structure.

One of the five available questions for selection in each membership exam of The Institution of Structural Engineers typically refers to a long-span structure, so the issues of transport, onsite connections and temporary supports described for the Farnborough hanger are valuable pointers. Such exam questions may involve the structural design of an airship hangar (Question 4 / September 2022), airport main terminal (Question 2 / September 2021) or warehouse unit (Question 2 / March 2022). Examiners are looking for sound structural designs, but also for proposed schemes with economical and sustainable solutions. It is therefore expected that for such questions, prospective candidates should propose a structural steel solution. Furthermore, the candidates should evaluate various suitable long-span options, such as trusses, plate girders and arches.

For the purposes of such examinations that are restricted to hand calculations, truss systems are often a safe choice for candidates, as the preliminary sizing of the cross-section members is relatively straight forward. The starting point is often to select a suitable span-to-depth ratio, typically ranging from 10 to 25. However, the selected truss depth should not violate any floor-to-floor height restrictions or transportation limitations (typical maximum height for transport is 4.65m). Following the definition of the truss depth, the chord members can then be easily sized, by decomposing the bending moment into compression and tension forces. For the compression chord, typically the top for simply-supported trusses under gravity loading, suitable bracing should be provided for the minor axis. Subsequently, the diagonals can be sized from the shear force by applying the methods of joints. Finally, the candidates should also consider holistically the structural design of long-span structures, such as accounting for thermal expansion joints and the load path following the large reaction forces at the supports of the truss that need to be transferred by columns to the foundations.

Further guidance on the design of trusses is given in the Steel Designers' Manual. ■

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 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**

Steel provides a range of benefits

Due to be completed in 39-weeks, a vast steel-framed distribution centre has kicked-off construction of a new business and logistics park, which will provide thousands of new jobs for the locality.

Set to deliver a significant economic boost to the mid-Suffolk region, the first building on the Gateway 14 development is under construction and due to be complete in November.

Located on the outskirts of Stowmarket, adjacent to Junction 50 of the A14, Gateway 14 is said to be the largest business, innovation and logistics park in East Anglia, with plans in place for a variety of other units.

Being developed by Gateway 14 Ltd (wholly owned by Mid Suffolk District Council) and Jaynic, the initial building on the site is being constructed as a distribution centre for garden and leisure retailer The Range.

Sir Christopher Haworth, Chair of Gateway 14 Ltd, says the project is very good news for the region with the economic benefits and employment it will generate in the area in the coming years.

As with most distribution warehouses, the project is a steel-framed design, comprising a seven-span portal measuring 408m-long × 269m-wide.

Speed is of the essence for all construction projects and this one is no exception. Starting onsite in January, main contractor Winvic Construction will complete the entire project, which not only includes the main building but also preliminary groundworks, concreting forecourts and landscaping, in 39 weeks.

This impressively fast programme has been helped by the steel erection package, which Caunton Engineering will complete in nine weeks.

Prior to work commencing on the steel frame, Winvic's early work included levelling the previously sloping site that had a 1 in 60 gradient, from north to south. The southern end of the plot was raised by 6.2m, involving a 350,000m³ cut and fill operation.

"The service road feeding the site had already been completed by the developer so access to the site was no problem, but in order to create and safe and clean environment for the subcontractors we also concreted the service yards that surround the building's footprint," explains Winvic Construction Operations Manager Dave Roberts.

"This gave Caunton a flat and sound surface for their MEWPs to operate from, helping with their fast programme, while ensuring the areas where steelwork and other materials such as cladding would be stored, were dry and clear of any mud."

Using up to five mobile cranes, with capacities ranging from 50t up to 80t, the steel frame erection began with the installation of the internal three-storey office block.

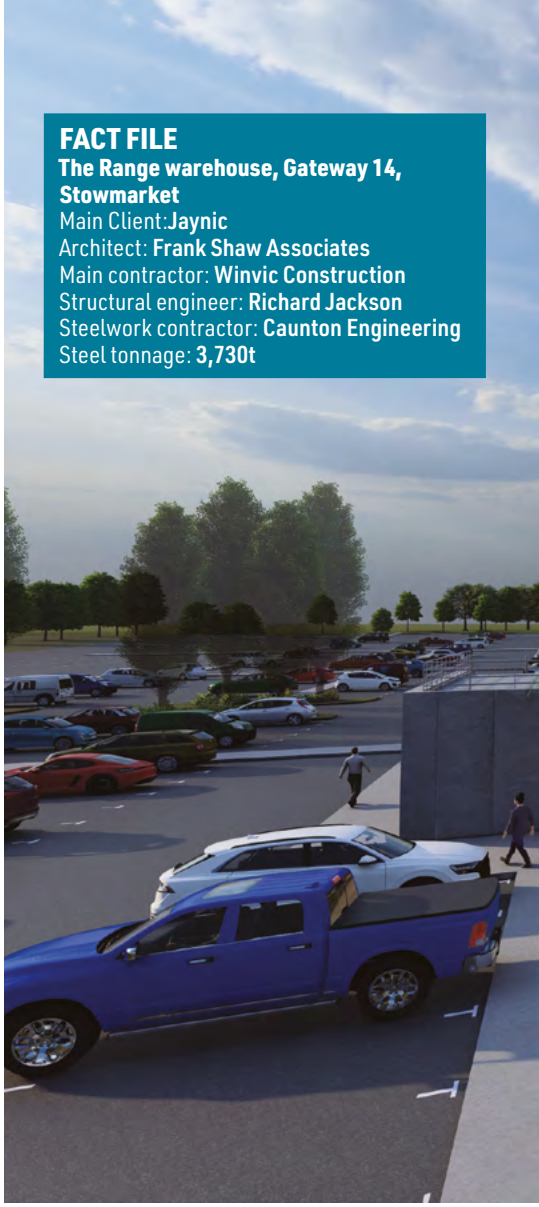
Containing internal bracing, the office block's upper floors are compositely designed with steel beams supporting metal decking and concrete topping.

"Completing the 1,981m² offices first, gave us a stable core from which to start our work," says Caunton Engineering Site Manager Robert Aitman. "We then erected the main building in a phased programme, with the central spans going up first, followed by the outer spans."

Each of the seven spans is 38m-wide and supported by columns arranged at 8m centres. The columns are 19m-high, weighing up to 4.3t, with the biggest member being an 838 x 292 x 176UC member.

The seven-span warehouse will be completed in 39 weeks.

FACT FILE
The Range warehouse, Gateway 14, Stowmarket
Main Client:**Jaynic**
Architect: **Frank Shaw Associates**
Main contractor: **Winvic Construction**
Structural engineer: **Richard Jackson**
Steelwork contractor: **Caunton Engineering**
Steel tonnage: **3,730t**



The rafters, forming the seven spans, are fabricated in three equal pieces. Brought to site, they were assembled on the ground before being lifted into place as complete rafters, weighing 3.9t. Each of the spans has a barrel-vault roof design, which is created by the rafters, as the two outer sections are cranked and connected to a horizontal central piece.

Creating more than 111,000m² of floorspace, the distribution centre also includes a couple of two-storey transport hubs and an external recycling refuse unit. The latter is a 18m-wide × 45m-long steel-framed structure positioned adjacent to the western elevation of the main warehouse.

The steel erection programme was completed in July, but long before completion, the follow-on trades were already close behind, installing the facility's twin-skin roof and wall cladding systems.

The overall Gateway 14 development is committed to meeting a BREEAM rating of 'Very Good', while The Range distribution facility is designed to achieve a BREEAM 'Excellent' rating.

Sustainability is also at the heart of the project as a significant percentage of the 3,730t steel tonnage was produced from recycled steel.

The project's sustainability features will include EV charging points, LED lighting, solar PV, smart energy systems and rainwater harvesting.

Around the warehouse, and within the wider Gateway 14 development, accessibility will be a key feature with significant walking and cycling

The completed Range warehouse will provide a significant boost to the mid-Suffolk economy.

routes to be integrated along with access to public transport links and local amenities.

Biodiversity on the site is also a priority, with high-quality landscaping, green corridors and nesting boxes all being introduced across the site to support not only the wildlife and ecology, but also to create a vibrant, attractive, and healthy working environment for employees.

Summing up, The Range's Alex Simpkin says: "This a major landmark in the expansion of The Range with an eastern region distribution hub with a particular focus on the creation of a sustainable warehouse building together with 1,650 jobs for the region. We look forward to the opening of the building."

Jaynic's Development Director Ben Oughton says: "This project highlights the strength of demand for this prime location adjacent to Junction 50 of the A14 and is the culmination of several year's work to deliver a modern and innovative business park for the area." ■

The steel erection was completed using 50t-capacity and 80t-capacity mobile cranes.

Steel aids quicker programme

Steelwork erection progresses on schedule for the goods-in and picking building phase two.

Lessons learnt from the first phase of construction at NewCold's latest cold storage facility have helped make the second steelwork programme even more efficient.

Located in what has been termed as the Logistics Triangle, NewCold's cold storage facility in Corby is currently constructing its second phase, which will nearly double the site's capacity.

Conveniently positioned in the East Midlands, close to a number of major trunk roads and motorways, as well as the port of Felixstowe, the NewCold cold storage facility opened for business at the end of last year (2022).

Reaching a maximum height of 45m and containing 75,600 pallet positions and eight automated stacker-cranes, the facility has recently been given BRC Storage and Distribution certification. This globally-recognised standard reflects the company's commitment to best practice in food safety management.

Of Dutch origin, NewCold is a global market leader in advanced food logistics and this latest facility joins its sister cold storage site in Wakefield.

With the Corby facility up-and-running, a second phase of construction is now underway. Similar in design and construction to the first phase, the new build consists of a 133m-long goods-in and picking building, with an attached high-bay pallet storage structure.

The goods-in area is located on the ground floor of the 20m-high two-storey structure. This floor has a row of docking bays for delivery trucks, while internally it will contain a conveyor system and automated mono-rail to dispatch frozen food items around the warehouse and into the adjoining high-bay pallet storage building.

The high-bay pallet storage building is constructed from a lightweight steel clad-rack solution that combines the overall structure and the internal automated racking system.

This latest building programme is located adjacent to the first phase, and although it consists of two new structurally-independent structures, they will be linked internally, once the work is complete.

Working on behalf of main contractor TSL, steelwork contractor Billington Structures has been appointed to undertake a design and build contract for the second phase's goods-in and picking building.

FACT FILE
Cold storage facility, Corby
Main client: **NewCold**
Architect: **Ashton Smith Associates**
Main contractor: **TSL**
Structural engineer: **Jubb**
Steelwork contractor: **Billington Structures**
Steel tonnage: **660t**

"The columns were all concrete filled offsite, which has significantly speeded up the erection programme,"

Before the steelwork started onsite, preliminary work included the installation of piled foundations, which are up to 8m-deep. As well as supporting the steel-framed structure, piles also support the slab for the high-bay pallet storage building that is being constructed simultaneously.

Giving the project an interesting steel-related backstory, the NewCold site is on land that was once part of the Tata Steel works. The brownfield plot was, before phase one began, remediated and some existing buildings were demolished.

Although smaller than it once was, the steelworks are still an ongoing business and much of the works are located close to the NewCold site. Coordination between the neighbours has been a key part of the project, as getting some construction materials to site has involved the construction team getting permission to create a temporary crossing over a Tata Steel railway line.

The steel-framed braced structure that forms the goods-in and picking building - being delivered by Billington Structures - has three internal spans; two at 15m-wide and one at 6m.

Set at 5m centres, both perimeter and internal columns for the building are Square Hollow Sections (SHS). All of these columns, with the exception of one line forming docking bays, are sat on thermal breaks that ensure the column base connection has sufficient insulation, as the completed structure will be temperature controlled.

Brought to site in two pieces, the lower parts of the SHS columns are 300mm × 300mm sections that support the first floor and surround the goods-in area. They are all concrete-filled, to aid their thermal qualities. Spliced to the top of each column is another smaller 250mm × 250mm SHS section, which takes each member to the building's 20m full height.

"The columns were all concrete filled offsite, which has significantly speeded up the erection programme," explains NewCold Construction Manager Pieter Le Roux.

"It's an important lesson we've learnt from the first phase, where we poured the concrete onsite and had to wait until each column was cured before we could connect the upper sections."

Billington Structures constructed a purpose-built grillage at its Wombwell fabrication yard, that enabled the columns to be stood upright while they were filled with concrete.

The interior of the second phase will look similar to the up-and-running first phase building

The steel-framed structure has three internal spans and a compositely-formed first floor.

In total, there are 175 concrete-filled columns, each weighing 3t. In order to not exceed their transport trailers 25t-capacity, the columns were delivered to site in groups of eight.

Speed of construction is of upmost importance to this scheme, as a number of follow-on trades, such as cladding, work directly behind the steel erection team.

In order to make the steel programme as quick and efficient as possible, another lesson learnt from the initial phase is the flooring solution used in this latest building. Billington has erected a steel frame that supports a compositely formed first floor with metal decking and a concrete topping.

"We've found this method of floor construction to be much quicker than the precast plank method we used in the first building," adds Mr Le Roux.

Billington erected the entire steel frame in 20 weeks, and used a single 90t-capacity mobile crane for the majority of the work. Starting with the column line that abuts the existing building, the steelwork was installed in seven phases, with each one completed to the full height of the structure.

Separated from the rest of the new structure by an internal wall, the last phase of the steel package consisted of the erection of a two-storey office block.

Erected around a precast lift and stair core, the office block's floors, which include two intermediate mezzanine levels, are also compositely-formed.

The second phase of the NewCold Corby facility is due to be operational in 2024. ■

Making spaces

Structural steelwork is playing a leading role in the construction of a new multi-storey car park for staff at Stoke-on-Trent's main NHS hospital

Forming part of the wider Project Star, University Hospitals of the North Midlands NHS Trust's scheme to improve local health services and regenerate a large area of Stoke-on-Trent, a new multi-storey car park (MSCP) is under construction.

Spread over five levels, the MSCP is being built on land previously occupied by hospital workers' housing. Once complete, it will provide 1,700 car parking spaces for staff working at the adjacent Royal Stoke University Hospital.

Measuring 116m-long x 66m-wide, the steel-framed MSCP has been designed with perimeter columns spaced at 5.5m centres, while internally, there are 16m-long spans. Above ground level, the MSCP has a composite design as the four upper floors are formed with long span steel beams supporting precast planks and structural topping laid on top.

According to Alan Johnston Partnership Associate Paul Layton, a steel frame was chosen for this project for its speed of construction, lightweight nature – compared to other solutions – and the ease with which the material could form the required long spans.

"The decision was also made in conjunction with IHP, based on its recent experience of building MSCP's," he adds.

Meanwhile, the use of precast flooring was also chosen for its spanning qualities and the resultant lower piece count the product provided to the scheme.

A precast flooring solution is also said to have been chosen as the most cost-effective, as well as the quickest method, as steelwork contractor James Killelea is able to install the precast planks during its steel erection programme.

Using two 80t-capacity mobile cranes, the project is divided into four phases, and each area is erected to its full height before the programme moves on to next bay. For ease of construction, and to avoid having to thread the flooring units through the steel frame, the precast planks are installed once each floor level is completed.

Prior to the steel erection programme starting, main contractor IHP (which is a joint venture between Vinci Building and Sir Robert McAlpine) had been onsite for nearly a year.

FACT FILE
Grindley Hill Multi-Storey Car Park, Stoke-on-Trent
Main client: **University Hospitals of the North Midlands NHS Trust**
Architect: **Gilling Dod Architects**
Main contractor: **Integrated Health Projects (IHP)**
Structural engineer: **Alan Johnston Partnership**
Steelwork contractor: **James Killelea**
Steel tonnage: **1,300t**

A series of 16m-long beams form the internal spans.

The completed project will provide much-needed staff parking.

The main core was one of the initial areas to be erected.

Initially demolishing the previous housing development, the company then reused the resultant material to help level the sloping plot. A contiguous piled wall was then constructed around two elevations and a series of CFA piles, up to a depth of 15m, installed.

"We also laid tarmac across the site, creating a flat and clean surface for the steel erection team and all of the other follow-on trades," explains IHP and Vinci Building Senior Construction Manager Phil Atkinson.

"This has speeded up the erection programme and ensured there is no mud getting on the steel members when they are stored onsite."

Before being delivered to the project, all of the 1,300t of structural steelwork was galvanized in order to protect the frame from the elements. James Killelea used Worksop Galvanizing (part of the Wedge Group) to undertake this work as they have largest galvanizing bath in the UK, one which is capable of accommodating this projects's 16m-long beams.

The MSCP has one main steel-framed core, containing lifts and stairs, while there are three smaller stair cores along the other three elevations. However, none of the cores provide stability to the structure, as this is derived from strategically-located cross bracing in perimeter and internal bays.

Some temporary bracing has also been needed, especially for the first parts of the frame to be erected. The temporary members will remain in place until the entire steel frame is completed in October.

In order to maximise the available space, and eliminate the need for special pedestrian ramps, to allow for more car parking spaces, a state-of-the-art traffic circulation system known as Vertical Circulation Module (VCM) has been used.

The basic principle of the applied VCM means each floor slopes to create a half height rise in its length, thereby necessitating shorter ramps between levels. The other half-height rise is created by the structure's cross ramp configuration, which actually means the floors are sloping in two directions. Each floor rises only 1:20 which complies with regulations for the disabled and offers a relatively flat level with full pedestrian access.

According to the project team, the VCM has provided a more efficient layout than a split-level car park, while the design also helped reduce the amount of earthworks, and reduced the size and extent of the site's retaining walls.

This final point was important during IHP's preparatory works programme. The existing site sloped from the south east corner to the north west corner, with an approximate 5m level change across the plot.

In order to reduce the required retaining walls around the site, the north west corner of the MSCP has a higher 4.5m ground-to-first-floor height, designed into the steel frame. Elsewhere, the height reverts to a more traditional 3.6m, with the exception of the uppermost level which is open to the elements.

The top floor of the car park is also stepped, with the MSCP only reaching its maximum five levels along the southern elevation. This was an architectural decision, in order to have a lower structure overlooking nearby residential properties.

The Grindley Hill MSCP is due to complete in Spring 2024. ■

Protected portal frames on fire boundary

Where single storey buildings have external walls close to a site boundary, the walls are required to have fire resistance. Such external walls have commonly in the past been provided with moment-resisting bases and fire protected columns. Richard Henderson of the SCI discusses an alternative approach to providing moment-resisting bases that has been adopted more recently.

Introduction

Building Regulations[1] require that external walls of single storey buildings that are close to site boundaries have fire resistance to protect the next-door land or property. Any structure that provides support to such walls must also have fire resistance. Portal frame structures with walls close to a site boundary have commonly been constructed with moment-resisting bases and fire protected columns to provide the necessary protection. SCI's guidance document P313[2] assists designers in satisfying the Building Regulations and is referred to in them. The publication provides guidance on the design of the moment resisting bases by providing methods of calculating the forces on protected columns that develop due to the effect of a fire on unprotected rafters.

Recently, as a result of changes in the relative costs of various forms of construction and fire protection, there has been a move away from providing moment resisting bases to columns on fire boundaries. The equivalent result is achieved by constructing standard bases to the columns and providing the entire portal frame span next to the fire boundary (referred to here as the boundary span) with fire protection. The structure is therefore able to provide support to the external wall for the required period and satisfy the Building Regulations.

Portal frames with several spans

Where this strategy is adopted in portal frames that have several spans, the boundary span is fire protected and the adjacent span is unprotected and subject to heating in the event of a fire. As set out in P313, the rafters of the unprotected portal frame weaken and form plastic hinges with less than 10% of the normal plastic moment resistance. This behaviour leads to the rafters inverting and results in horizontal and vertical loads being applied to the supporting structure, in this case, the protected boundary span. The arrangement of the structure is such that the method of calculating the loads from the unprotected rafters described in P313 can be applied and the protected boundary span checked to ensure the structure stands for the required period. According to P313 section 3.14, the loads applied by the unprotected rafters can be based on a symmetrical frame, even though one of the columns may be unprotected

Hit and miss fames

Hit and miss portal frames are so-called because internal columns on valley lines are omitted in alternate frames to provide more flexible internal space. Buildings may also be constructed with internal columns omitted in two adjacent frames in a hit, miss, miss, hit arrangement. Loads from the miss frames are supported on valley beams and transferred to the hit frame valley columns.

The absence of a valley column means that miss frames are less stiff in-plane than hit frames and bracing in the plane of the roof is often provided on the valley lines to share loads between the frames. In the fire load case, it is likely that bracing will be required to transfer loads from the miss frame(s) to the hit frames, unless the valley beam is designed for bending in two directions.

Behaviour in a fire

P313 describes the behaviour of portal frame structures in real fires and makes suggestions for the fire protection of various elements when designing boundary columns with moment-resisting bases. This guidance can be applied to structures where fire protected boundary spans are substituted.

Valley columns were observed to have remained standing following seven out of eight severe fires. As a result, P313 recommends that fire protection to valley columns can be omitted unless the ratio $L/Y < 1.6$ where L is the span of the portal frame and Y is the vertical height of the frame to the end of the haunch on the rafter centreline. If the frame formed by the protected outer column and protected rafters is not strong enough to resist the applied horizontal force, fire protection can be applied to the valley column to form a complete portal frame to provide the resistance. In most cases the valley column will need protection.

P313 also indicates that valley beams are assumed to be lightly loaded in a fire and do not require fire protection. With modern cladding and the increased placement of photovoltaic panels on roofs it is no longer considered reasonable to assume valley beams are lightly loaded and do not require fire protection. Table 2.1 in P313 indicates cladding arrangements where it is assumed that the full weight of the outer covering remains in place at the time of rafter collapse. It is reasonable to assume that external photovoltaic panels will also remain and the panel weight should be allowed for when checking the resistance of the frame.

Out of plane stability

The possible modes of collapse in the direction perpendicular to the span of the portal frames must be considered. In the case of boundary columns supported on moment resisting bases described in P313, the out of plane (longitudinal) stability of each perimeter column is assumed to be provided by its base fixity. The lateral restraints provided by the longitudinal members chosen for the permanent works are considered to be adequate without fire protection according to P313 section 2.8.

Stability of the structure in normal conditions in the longitudinal direction can be achieved in different ways: by providing discrete stability systems in the perimeter walls and in the valley lines, or providing wall bracing in the perimeter walls and roof bracing spanning from exterior wall to exterior wall. Stability systems on the valley lines are likely to be goal-post frames to avoid restricting the floor space, particularly in hit and miss framed buildings.

If no moment resisting bases are to be provided, out of plane stability must be provided by alternative means. The permanent vertical bracing and longitudinal eaves beam should be fire protected to ensure stability for the fire resistance period.

Where longitudinal stability to valley lines is provided by a plan roof truss spanning from one outside wall to the other, the members in the plan truss should be fire protected in the boundary span. In the most extreme case, the whole valley line nearest to the boundary wall could collapse completely in the longitudinal direction, although the description in P313 suggests this is unlikely. Such a collapse will involve a rotation of the boundary span in plan. The provision of a fire protected plan truss in the boundary span together with protected valley beams and valley columns will inhibit complete longitudinal collapse of the frames on the valley line. If some longitudinal movement of the valley line occurs, the proportions of the frame limit the reduction in height of the boundary wall, maintaining the integrity of the boundary.

Where longitudinal stability systems (bracing or goal-post frames) are provided on the valley lines, fire protection to these systems (including longitudinal members between frames) should be provided on the valley line of the boundary span.

Recommended treatment of a boundary portal span

The elements that require fire protection in a particular arrangement of building will vary depending on the structural arrangement (conventional, hit-miss etc.), geometry (span, column height etc.) and the loading present. An appropriate analysis should be carried out case by case to identify those parts of the boundary spans that are required to resist the loads they will be subjected to.

Where a protected boundary portal span is to be adopted, fire protecting ▸30

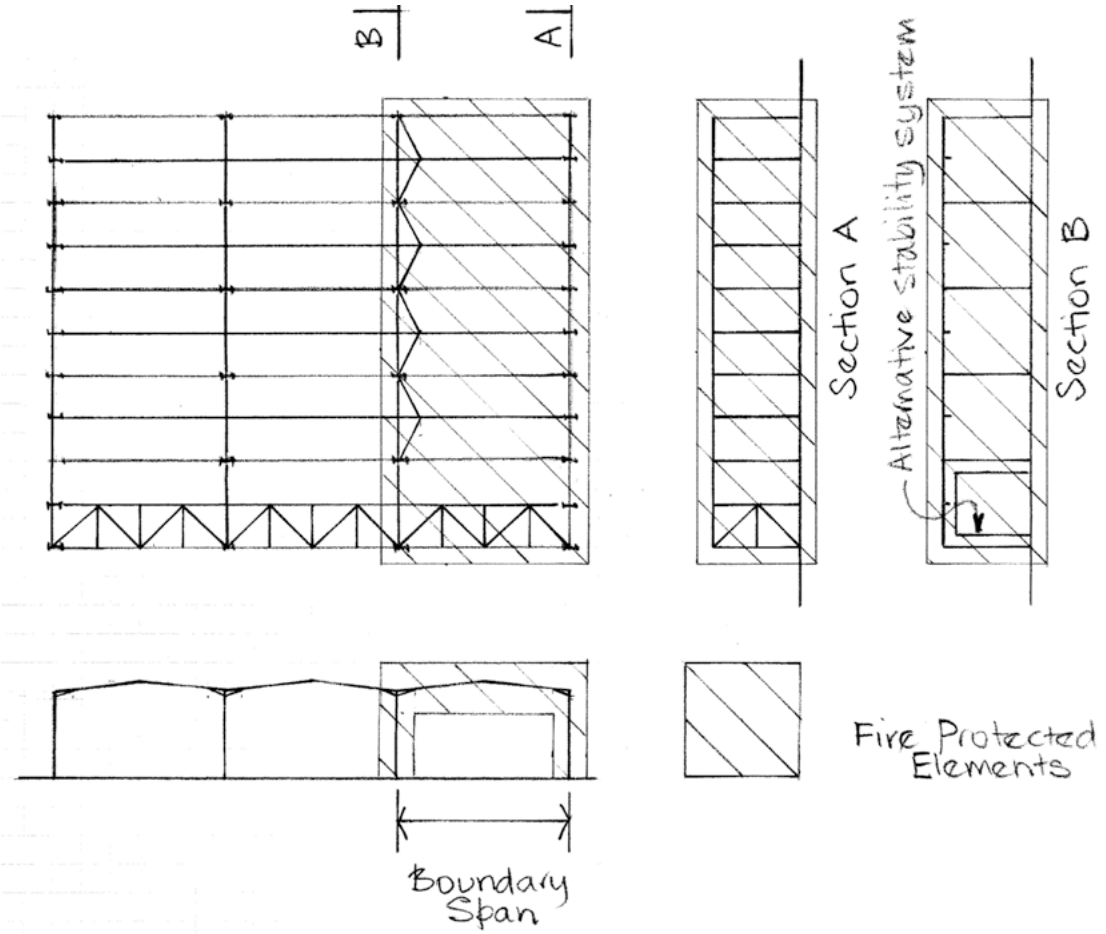


Figure 1: Fire protected elements as listed

▸29

many of the following elements will be necessary, noting that the plan bracing and valley line longitudinal stability systems are alternatives.

- boundary span perimeter columns;
- boundary span rafters;
- boundary longitudinal stability system;
- boundary longitudinal eaves member;
- boundary span plan bracing;
- boundary span valley columns;
- boundary span valley beam;
- boundary span miss frame bracing;
- boundary span valley line longitudinal stability system.

These elements are shown diagrammatically in Figure 1.

Conclusion

Protection to a fire boundary equivalent to that described in P313 can be achieved by fire protecting elements in the portal frame next to the fire boundary (the boundary span) as described. The protected boundary span should be checked to demonstrate adequate resistance to the forces from the collapsing rafters in the next span determined as described in P313. ■

References

1. Approved Document B Volume 2, *Buildings other than dwellings*
2. Simms, W I, Newman G M, *Single storey steel framed buildings in fire boundary conditions*, SCI P313, 2002.

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New and revised codes and standards

From BSI Updates June2023

BS EN PUBLICATIONS

BS EN 17549-2:2023
Building information modelling. Information structure based on EN ISO 16739-1 to exchange data templates and data sheets for construction objects. Configurable construction objects and requirements
no current standard is superseded

BS IMPLEMENTATIONS

BS ISO 21928-2:2023
Sustainability in buildings and civil engineering works. Sustainability indicators. Framework for the development of indicators for civil engineering works
no current standard is superseded

NEW WORK STARTED

EN ISO 17635
Non-destructive testing of welds. General rules for metallic materials
will supersede BS EN ISO 17635:2016

ISO 18878
Mobile elevating work platforms. Operator (driver) training
will supersede BS ISO 18878:2013

DRAFT BRITISH STANDARDS FOR PUBLIC COMMENT – ADOPTIONS

23/30420673 DC
BS ISO 59004 Circular Economy. Terminology, Principles and Guidance for Implementation
Comments for the above document were required by 17 June 2023

23/30420676 DC
BS ISO 59010 Circular Economy. Guidance on the transition of business models and value networks
Comments for the above document were required by 7 June 2023

23/30420679 DC
BS ISO 59020 Circular economy. Measuring and assessing circularity
Comments for the above document were required by 11 June 2023

23/30441434 DC
BS EN ISO 10882-1 Health and safety in welding and allied processes. Sampling of airborne particles and gases in the operator's breathing zone. Sampling of airborne particles
Comments for the above document were required by 3 July 2023

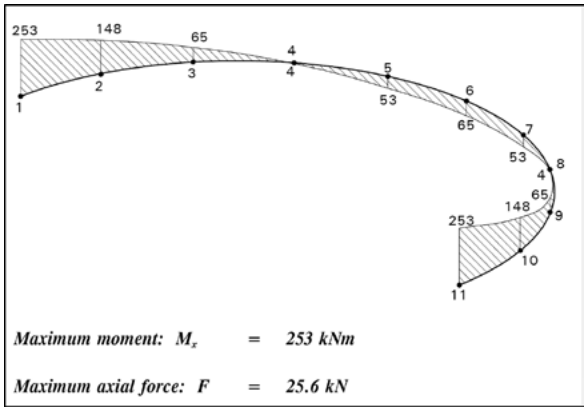
ISO PUBLICATIONS

ISO 25980:2023
Health and safety in welding and allied processes. Transparent welding curtains, strips and screens for arc welding processes
Will be implemented as an identical British Standard

AD 510: P281 worked example of beams curved on plan

SCI publication P281 was published in 2001 covering the design of curved steel members, in accordance with BS 5950. It is clear that this guide is still used, as SCI receive occasional questions. The most common question, repeated recently, concerns example 6 which covers the verification of a universal beam curved on plan.

The design process starts by applying the vertical load to the curved beam, which produces a bending moment diagram as reproduced from the example:

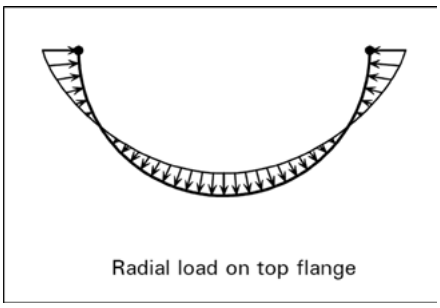


Designers following the example generally question how the axial force of 25.6 kN shown below the bending moment diagram has been determined. The unfortunate answer is that the determination of this axial force should have come later in the process – the value is correct, but the location of the text causes confusion.

The bending moment as shown above is converted into axial forces in the flanges, simply by dividing the moment by the lever arm between the flanges. If the top flange is considered, the flange force is tension near the supports varying to compression at the furthest part of the curved member.

Since the top flange is curved on plan, the axial force just calculated has a radial component of varying intensity – the component is "inward" adjacent to the supports, and "outward" when the flange force is compression.

This varying radial force is shown below (again taken from P281).



The next step is to analyse the curved member again, with the loading shown above. This produces a bending moment (given as 149 kNm in the example) and an axial force. The value of this axial force is the 25.6 kN, which has been quoted at the earlier location in the example.

The process is described in steps in section 8.5.4. As there are two forces "*F*", it may be helpful to identify them separately. In Steps 1 and 2, the equivalent flange force – which leads to the radial components, might be defined as F_1.

Steps 3 and 4 cover the analysis of the member subject to the radial loads, which produces an axial load which might be defined as F_2. In this example, F_2 = 25.6 kN. Referencing this force within Steps 1 and 2 of the numerical example has led to the confusion identified earlier in the Note.

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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 £3,000,000
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 £800,000
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 £1,400,000
BHC Ltd	01555 840006	●	●	●	●	●	●	●		●	●	●		●	●	✔	4	✔	●	Above £6,000,000
Billington Structures Ltd	01226 340666		●	●	●	●	●	●		●		●	●	●		✔	4	✔	●	Above £10,000,000
Border Steelwork Structures Ltd	01228 548744			●	●	●	●			●	●				●		4			Up to £3,000,000
Bourne Group Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £10,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●		●	●	●	✔	4		●	Up to £6,000,000
Cairnhill Structures Ltd	01236 449393	●			●	●	●	●	●						●	✔	4		●	Up to £6,000,000
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 £400,000
D Hughes Welding & Fabrication Ltd	01248 421104				●	●	●	●	●	●	●		●	●	●	✔	4			Up to £800,000
Duggan Steel	00 353 29 70072	●	●	●	●	●	●	●	●		●				●	✔	4			Up to £10,000,000
ECS Engineering Services Ltd	01773 860001	●		●	●	●	●	●	●	●	●			●	●	✔	4		●	Up to £3,000,000
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 £2,000,000
Fox Bros Engineering Ltd	+353 (0) 53 942 1677			●	●	●	●	●		●	●				●		3			Up to £2,400,000
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)
Gorge Fabrications Ltd	0121 522 5770				●	●	●	●		●				●	●	✔	3			Up to £1,200,000
G.R. Carr (Essex) Ltd	01286 535501	●		●	●			●			●			●	●	✔	4			Up to £800,000
H Young Structures Ltd	01953 601881			●	●	●	●	●			●			●	●	✔	4	✔	●	Up to £5,000,000
Had Fab Ltd	01875 611711				●				●	●	●				●	✔	4			Up to £4,000,000
HBE Services Ltd	01525 854110				●	●				●				●	●	✔	2			Up to £800,000
Hescott Engineering Company Ltd	01324 556610			●	●	●	●			●				●	●	✔	2			Up to £3,000,000
Hillcrest Structural Steel Ltd	023 8064 1373			●	●	●	●	●		●	●			●	●	✔	3		●	Up to £3,400,000*
Intersteels Ltd	01322 337766	●			●	●	●	●	●	●			●	●	●	✔	3	✔		Up to £5,000,000
J & A Plant Ltd	01942 713511				●	●									●		4			Up to £40,000
James Killelea & Co Ltd	01706 229411		●	●	●	●	●				●	●					4			Up to £6,500,000
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 £6,000,000
Leach Structural Steelwork Ltd	01995 642000			●	●	●	●	●			●					✔	2		●	Up to £6,500,000
Legge Steel (Fabrications) Ltd	01592 205320			●	●					●	●			●	●		2			Up to £600,000
Littleton Steel Ltd	01934 311670					●				●	●			●	●	✔	3			Up to £1,400,000
Loaninghill Fabrications Ltd	01506 858466				●				●	●	●			●	●		3			Up to £400,000
M Hasson & Sons Ltd	028 2957 1281			●	●	●	●	●	●	●	●			●	●	✔	4		●	Up to £1,400,000
M&S Engineering Ltd	01461 40111				●				●	●	●			●	●	✔	3			Up to £2,000,000
Mackay Steelwork & Cladding Ltd	01862 843910			●	●		●			●	●			●	●	✔	4			Up to £1,400,000
Maldon Marine Ltd	01621 859000				●	●			●	●	●				●	✔	3			Up to £1,400,000
Murphy International Ltd	00 353 45 431384	●			●		●	●	●		●				●	✔	4			Up to £5,000,000
Newbridge Engineering Ltd	01429 866722	●	●	●	●	●	●	●			●	●				✔	4		●	Up to £2,000,000
North Lincs Structures	01724 855512			●	●					●	●				●		2			Up to £600,000
Nusteel Structures Ltd	01303 268112						●	●	●	●				●		✔	4		●	Up to £6,000,000
Painter Brothers Ltd	01432 374400	●			●				●	●	●				●	✔	3			Up to £6,000,000*
Peter Marshall (Steel Stairs) Ltd	0113 307 6730				●	●				●	●				●	✔	3			Up to £2,000,000
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
S H Structures Ltd	01977 681931	●		●	●	●	●	●	●	●	●	●	●		●	✔	4	✔	●	Up to £3,000,000
SDM Fabrication Ltd	01354 660895	●	●	●	●	●	●			●	●			●	●	✔	4			Up to £2,000,000
Severfield plc	01845 577896	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £10,000,000
Shaun Hodgson Engineering Ltd	01553 766499	●			●		●			●	●			●	●	✔	3			Up to £800,000
Shipley Structures Ltd	01400 251480			●	●	●	●		●	●	●			●	●	✔	2			Up to £2,400,000
Snashall Steel Fabrications Co Ltd	01300 345588			●	●	●	●	●			●				●		2	✔		Up to £2,000,000
Southern Fabrications (Sussex) Ltd	01243 649000				●	●				●	●			●	●	✔	2			Up to £1,400,000
Stage One	01423 358001				●		●	●	●	●					●	✔	2			Up to £6,500,000
Steel & Roofing Systems	00 353 56 444 1855	●		●	●	●	●				●	●		●	●	✔	4			Up to £5,000,000
Taziker Industrial Ltd	01204 468080	●		●	●		●	●		●	●		●	●	●	✔	3		●	Above £6,000,000
Temple Mill Fabrications Ltd	01623 741720			●	●					●	●				●	✔	2			Up to £400,000
TSI Structures Ltd	01603 720031			●	●	●	●	●			●			●			2	✔		Up to £2,000,000
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 £2,400,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £10,000,000
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)

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

Steelwork contractors for bridgeworks

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.

BCSA

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 £3,000,000
AJ Engineering & Construction Services Ltd	01309 671919	●		●	●	●	●	●	●	●	●	●	✓	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 £6,000,000
Cairnhill Structures Ltd	01236 449393	●	●	●	●	●	●	●		●	●	●	✓	4			✓	●	Up to £6,500,000
Cementation Fabrications	0300 105 0135	●	●	●	●	●	●	●	●	●	●	●	✓	3			✓	●	Up to £10,000,000
D Hughes Welding & Fabrication Ltd	01248 421104	●		●		●			●	●	●	●	✓	4			✓		Up to £800,000
ECS Engineering Services Ltd	01773 860001	●		●	●	●	●		●			●	✓	4				●	Up to £3,000,000
Four-Tees Engineers Ltd	01489 885899	●	●	●	●	●	●		●	●	●	●	✓	3			✓	●	Up to £2,000,000
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
M&S Engineering Ltd	01461 40111	●	●	●	●	●	●	●		●	●	●	✓	3					Up to £2,000,000
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 £5,000,000
Nusteel Structures Ltd	01303 268112	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Up to £6,000,000
REIDsteel	01202 483333	●			●	●	●		●			●	✓	4				●	Up to £10,000,000
S H Structures Ltd	01977 681931	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓		✓	●	Up to £3,000,000
Severfield plc	01204 699999	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓	✓	✓	●	Above £10,000,000
Taziker Industrial Ltd	01204 468080	●	●	●	●	●	●	●	●	●	●	●	✓	3		✓	✓	●	Above £6,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓	✓	✓	●	Above £10,000,000
Non-BCSA member																			
Allerton Steel Ltd	01609 774471	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓		✓	●	Up to £3,400,000
Beaver Bridges Ltd	01204 668773	●		●	●	●	●	●	●	●	●	●	✓	4					Up to £3,000,000
Carver Engineering Services Ltd	01302 751900	●		●	●	●	●		●	●	●	●	✓	4			✓		Up to £3,000,000
Centregreat Engineering Ltd	029 2046 5683	●		●	●	●	●	●	●	●	●	●	✓	4					Up to £3,400,000
Cimolai SpA	01223 836299	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £10,000,000
CTS Bridges Ltd	01484 606416	●	●	●	●	●	●	●	●		●	●	✓	4			✓	●	Up to £600,000
Eiffage Metal	00 33 388 946 856	●	●	●	●	●	●	●	●			●	✓	4					Above £6,000,000
Harrisons Engineering (Lancashire) Ltd	01254 823993			●	●	●	●	●	●	●	●	●	✓	3		✓			Up to £3,000,000
Hollandia Infra BV	00 31 180 540 540	●	●	●	●	●	●	●	●	●	●	●	✓	4					Above £6,000,000*
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 Ltd	01698 264271	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Up to £3,000,000
Malin Group	0141 370 5467	●			●	●	●			●	●	●	✓	4			✓		Up to £4,000,000
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 £6,000,000
Tecade S.A.U.	00 34 955 833 811		●	●	●	●	●	●	●			●	✓	4		✓	✓		Up to £6,000,000
Total Steelwork & Fabrication Ltd	01925 234320	●		●		●				●	●	●	✓	3			✓		Up to £3,000,000
Victor Buyck Steel Construction	00 32 9 376 2211	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £6,000,000

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
Gene Mathers	0115 974 7831
Griffiths & Armour	0151 236 5656
Highways England Company Ltd	0300 123 5000
Keiths Welding Limited	07791 432 078

Company name	Tel
MMCEngineer Ltd	01423 855939
Paul Hulme Engineering Ltd	07801 216858
QHSE-Interspect Ltd	07438 413849
Sandberg LLP	020 7565 7000

Company name	Tel
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			
BW Industries Ltd	01262 400088	✓	M	3			
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			
ES Steel	0161 511 8386	✓	N/A				
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				

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			
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
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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Want to know more?
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[1] *https://worldsteel.org/steel-topics/life-cycle-thinking/lca-eco-profiles/*