www.newsteelconstruction.com

NSC

Efficient design in Kent

Vol 28 No 10 Nov/Dec 2020

High living in Salford

Steel leads the way in Glasgow

Antarctic wharf beats winter deadline

Steel reaps dividends for Co-op

HIGH SPEED ROBOTIC

HEAVY THERMAL PROCESSING

- Process plasma cuts, oxy-fuel cuts and arcwrite profiles all within a single program
- Process materials up to 1250 mm widths
- The 3D Vision System simultaneously scans each surface - no probing needed

www.peddinghaus.com/steel/peddibot

THE PEDDIBOT-1250

Peddinghaus STRONGER THAN STEEL®

www.peddinghaus.com | info@peddinghaus.com | +44 1952 200377

Cover Image
Regent Plaza
Main client: Sourced Development Group
Architect: Fletcher Rae Architects
Main contractor: Helix Contracting
Structural engineer: SWF Consulting
Steelwork contractor: EvadX
Steel tonnage: 360t

NSC

Nov/Dec 2020
Vol 28 No 10

EDITOR
Nick Barrett Tel: 01323 422483
nick@newsteelconstruction.com

DEPUTY EDITOR
Martin Cooper Tel: 01892 538191
martin@newsteelconstruction.com

PRODUCTION EDITOR
Andrew Pilcher Tel: 01892 553147
admin@newsteelconstruction.com

PRODUCTION ASSISTANT
Alastair Lloyd Tel: 01892 553145
alastair@barrett-byrd.com

COMMERCIAL MANAGER
Fawad Minhas Tel: 01892 553149
fawad@newsteelconstruction.com

NSC IS PRODUCED BY BARRETT BYRD ASSOCIATES ON BEHALF OF THE BRITISH CONSTRUCTIONAL STEELWORK ASSOCIATION AND STEEL FOR LIFE IN ASSOCIATION WITH THE STEEL CONSTRUCTION INSTITUTE

The British Constructional Steelwork Association Ltd
4 Whitehall Court, Westminster, London SW1A 2ES
Telephone 020 7839 8566
Website *www.steelconstruction.org*
Email *postroom@steelconstruction.org*

Steel for Life Ltd
4 Whitehall Court, Westminster, London SW1A 2ES
Telephone 020 7839 8566
Website *www.steelforlife.org*
Email *steelforlife@steelconstruction.org*

The Steel Construction Institute
Silwood Park, Ascot, Berkshire SL5 7QN
Telephone 01344 636525 Fax 01344 636570
Website *www.steel-sci.com*
Email *reception@steel-sci.com*

CONTRACT PUBLISHER & ADVERTISING SALES
Barrett, Byrd Associates
7 Linden Close,
Tunbridge Wells, Kent TN4 8HH
Telephone 01892 524455
Website *www.barrett-byrd.com*

These and other steelwork articles can be downloaded from the New Steel Construction Website at *www.newsteelconstruction.com*

Agile Strength

Jamestown's cellular beams are elegant and agile, deftly balancing strength and performance.

JAMESTOWN

www.jamestownprofiling.com

e: info@jamestownprofiling.com · t: +353 45 434 288

STEEL for life

HEADLINE SPONSOR

Challenging times meet interesting solutions

Nick Barrett - Editor

The background to this final issue of NSC for 2020 is fundamentally different to anything that could have been expected by most of us at the start of the year: we are certainly living in interesting times.

Among the good news is that steel construction was well placed to weather the storm that hit the industry in March. Fabrication was able to proceed in the normal factory-controlled conditions after initial COVID-related health and safety measures were adopted. Just in time deliveries to sites were made as usual in line with the demands of construction programmes with very few delays, and on-site erection of constructional steelwork with its relatively small workforce easily complied with social distancing rules.

A new lockdown was being imposed as NSC went to press, and without becoming at all complacent, the BCSA's steelwork contractor members were confident about their continuing ability to deliver a service as near 'business as usual' as it is possible to be across their diverse range of projects.

This issue of NSC ably illustrates the wide diversity of projects that have successfully continued during the pandemic, either on time and within budget or looking like heading that way if not already completed. One project where time was of the essence was the steel-framed wharf and operations building underway for the British Antarctic Survey's Rothera Research Station, which had to be completed during a tight weather window before the fierce Antarctic winter set in.

That was in geographical contrast to one of the first of a new breed of retirement villages in Kent which will surely be increasingly popular due to the ageing population, which was also delivered on time. Developers are increasingly turning to steel-framed solutions for high rise residential properties, as we report on a project in Salford. The continuing confidence of property developers in offices, despite the growth in working from home, is demonstrated in a major commercial development we report on in Glasgow. And the demand for logistics buildings remains solid as we see in the Co-op's new regional distribution centre - targeting a BREEAM 'Excellent' rating - in Bedfordshire.

As well as dealing with the pandemic the UK has the prospect of Brexit from 1st January, perhaps with a trade deal with the rest of the European Union, perhaps not. Either way, the BCSA has stressed several times that Brexit will not have any appreciable impact on supplies of constructional steelwork in the UK. And what of CE Marking? Well, the BCSA's Steel Construction UKCA Marking publication from earlier this year, that advised construction professionals on what would happen in relation to CE Marking of construction products if the UK left the EU without a deal, is being revised to suit the latest guidance from government and will be published early in the New Year.

The outlook today is that by this time next year the worst of the shocks of COVID-19, and possibly any Brexit-related impacts, should be well behind us. Interesting times throw up interesting solutions to challenges, and we look forward to keeping readers informed about how the steel construction sector continues to deliver.

HS2 installs modular steel bridge in just 45 minutes

The second of four bridges on the site of HS2's new Solihull Interchange Station has been installed in record time.

The 45m-long multi-girder steel composite bridge was assembled offsite, using 220t of steel from Cleveland Bridge.

After building the bridge from modular sections, the final part of this process was the 128-wheel hydraulic platform taking just 45 minutes to move the bridge deck 150 metres, where it was lowered onto the abutments to complete the overall bridge structure.

According to the team, traditional construction methods would have required several weeks of lane closures on both carriageways, followed by additional weekend and overnight closures.

The bridge move was led by specialist engineering contractor Expanded and HS2 enabling works contractor, LMJV (Laing O'Rourke and J. Murphy & Sons Joint Venture).

Also, supporting the hi-tech process, a design joint venture involving WSP and Ramboll provided engineering and environmental services. By applying advanced digital capabilities to design all elements of the structure in a virtual world, they determined that the A446 road bridge would be built using a Design for Manufacture and Assembly (DfMA) strategy.

HS2's Delivery Director David Bennett said: "As work ramps up at one of HS2's largest construction sites, it was fantastic to see this next milestone achieved so quickly. It was finished 24 hours ahead of schedule and follows hot on the heels of the installation of the bridge over the M42 in August, which was also completed early. We're pleased to see innovations like this on the project dramatically reducing environmental impacts and disruption for road users.

"With construction of the railway now well underway, 22,000 jobs being created and an estimated 400,000 supply chain contracts available, HS2 is playing a pivotal role in helping Britain's economic recovery."

Watch the bridge installation video here: *https://youtu.be/bzfyH5lXkVE*

Fourth office block approved for New Bailey site

The English Cities Fund's latest office development at New Bailey – a 16,200m² Grade A, BREEAM 'Excellent' office building for telecommunications giant BT - has received unanimous approval from Salford City Council's planning department.

BT's new regional hub will occupy the entire building, comprising the ground floor and an additional 10 storeys on a 20-year lease. The deal between The English Cities Fund and BT represents the largest single office deal in the region in 2020.

Designed by Make Architects, the architectural practice behind the iconic Three New Bailey, Four New Bailey will boast its own unique design with an exposed lattice steel frame, unlike any other development in the city.

Phil Mayall, Regional Director at The English Cities Fund, said: "It's a great moment to reach the latest milestone in the development of Four New Bailey, which will break the mould in terms of its striking design and sustainability credentials, while meeting BT's needs for their new regional hub. It's a highly-competitive market in Greater Manchester, so we're making sure we're doing everything we can to create workspaces that promote wellness, sustainability and agile working."

Jack Sargent, Project Architect at Make Architects, said: "This is a key building in The English Cities Fund's masterplan. Their overall vision is for a site with connections, both logistically and to nature and with amenities and facilities that create a place where people want to work. The building itself embodies this with retail and leisure, with great views out and with high quality flexible and large floorplates."

One New Bailey, Two New Bailey and Three New Bailey are all steel-framed buildings erected by Billington Structures, Severfield and EvadX respectively.

Work on this latest building is expected to start on site later this year.

Waterfront development to transform Banbury

Working on behalf of McLaren Construction, BHC is currently erecting 2,300t of structural steelwork for the Castle Quay Waterfront shopping centre expansion in Banbury, Oxfordshire.

Once complete, the development will feature restaurants, a ten-screen cinema, a Premier Inn hotel and a Lidl superstore as well as a 438-space two-level car park.

The project's design takes advantage of the waterfront location, with a raised and colonnade-covered restaurant terrace overlooking the canal.

According to Cherwell District Council, the new leisure scheme will greatly enhance the canal side, making it an attractive destination for local residents and visitors.

Steel rises on Belfast's tallest office

Said to be Belfast's tallest ever commercial development, City Quays 3 is taking shape. Topping out at 16-storeys, the steel-framed structure will offer more than 23,000m² of office space.

Belfast Harbour's Chief Executive, Joe O'Neill, describes the project as one of the largest strategic investments ever undertaken by Belfast Harbour.

"In addition to supporting 500 local construction jobs, the office will build upon City Quays' success by providing strategic accommodation to meet demand for Grade A, city-centre office space."

Main contractor Farrans Project Manager Noel Cosgrove said: "A hundred years ago or so the site was actually part of a much wider river and so the land is made-ground which was more recently used to accommodate warehouses.

"We had to do a soil improvement programme and then install more than 480 piles to support our raft foundations."

Situated approximately 1.2m below ground level, the raft is 1.7m-thick and supports the building's core and steel frame.

The 750mm-diameter CFA piles, which are up to 34m deep, are said to be the longest CFA's ever installed in Ireland.

The design of the superstructure consists of steel cellular beams radiating outwards from a centrally-positioned concrete core to the perimeter columns, creating spans of up to 11.3m.

As well as providing stability to the steel frame, the core accommodates six lifts, two stairwells and the building's washrooms and toilets.

Walter Watson is fabricating, supplying and erecting 1,500t of steelwork for the project.

Bridge adds more connectivity to Olympic Park

A new bridge connecting the communities of Fish Island and Queen Elizabeth Olympic Park has been installed by one of Europe's largest cranes.

Due to open in early 2021, the steel composite bridge will eventually become a bus, cycle and pedestrian access to the new residential community of Sweetwater and beyond.

The 400t structure had been pre-assembled alongside the Lee Navigation canal. It was then carefully lowered into place overnight by one of Europe's largest cranes and a team of experts from main contractor Balfour Beatty and steelwork subcontractor Severfield, while the canal was temporarily closed.

Its installation marks another major milestone in the London Legacy Development Corporation masterplan for new homes, transport infrastructure and landscaping enhancements on the former Olympic Games site in east London.

The bridge has been completed in advance of the new homes currently being built at East Wick + Sweetwater, a major new residential community that will provide more than 1,800 new homes alongside schools, nurseries and community spaces to the area.

Paul Brickell, Executive Director of Regeneration and Community Partnerships at the London Legacy Development Corporation, said: "Monier Road Bridge will make it easier for local residents to get to the facilities being created on the Park like schools, health centres and jobs as well as the amazing parkland and venues."

Steelwork contractor Taunton Fabrications has completed its work for Bouygues at the University of Bath's new School of Management building, which has included

Steel atrium for new management building

the erection of a steel-framed atrium.

"Due to the tolerances and temporary works, the top truss for the atrium had to be built offsite and was over 17m-long and weighed 6t," said Taunton Fabrications Sales and Commercial Director Chris Sampson.

"It was transported to site with a police escort and it was one of the most challenging projects we have done."

The University of Bath is investing £70M in this landmark building. The new facility will add over £240M of value to the local economy of Bath & North East Somerset over 25 years.

The building will feature an open layout to enable joint working to flourish, supporting the School's core philosophies of 'engagement, education and collaboration' and inspiring partnerships between students, academics across the University, and corporate partners.

The intention is to foster entrepreneurial thinking that develops a vibrant ecosystem of inspiration, initiation and acceleration to establish the School of Management as an anchor point in the local and regional business community.

Taunton Fabrications has also erected steelwork for the building's pavilion taking the company's total steel package up to 110t.

NEWS IN BRIEF

Manchester's burgeoning commercial sector has received another boost as developer **Marshall CDP** has submitted an application for a 34,300m² office scheme within the city's First Street regeneration zone. Proposals involve the construction of two office buildings at One City Road of 11-storeys and 14-storeys on a one-acre gateway site, which the developer owns.

Wirral Growth Company has submitted ambitious plans for the transformation of Birkenhead town centre to Wirral Council's planning department. The masterplan includes the delivery of a new central business district with high-quality office space, alongside leisure space with a new market hall, the creation of vibrant town-centre living, as well as extensive public realm and green space.

Developer **Bruntwood Works** and **Trafford Council** have revealed plans to transform the former Kellogg's site in Old Trafford, Stretford into a vibrant new neighbourhood. Known as Lumina Village, the 12-acre site will be transformed into a community of 750 homes, 18,500m² of office space, a primary school and 100-bedroom hotel.

Willmott Dixon has been picked to deliver a £21M leisure centre and community hub in Morpeth for Northumberland County Council. The facility will include a six-lane swimming pool with spectator gallery, learner pool, spa facilities, four-court sports hall, 100 station fitness suite, plus a dedicated cycling studio and large fitness studios.

The development of **Birmingham Health Innovation Campus** (formerly known as Birmingham Life Sciences Park) has announced a new long-term partnership between the University of Birmingham and Bruntwood SciTech, a joint venture between Bruntwood and Legal & General. A £210M, 10-year masterplan will be developed for the Campus, which will provide up to 61,000m² of state-of-the-art lab, office and incubation space.

PRESIDENT'S COLUMN

The climate emergency and sustainability are still high on most people's agenda and rightly so. And while some choose to focus on carbon emissions alone, sustainability is not just about the carbon emissions associated with material manufacture, but should also encompass the wider requirements of the economy and societal needs. If we are to develop an industry that can deliver net-zero carbon steel by 2050 the industry needs to be viable, successful and maintain the in-house expertise to put in place new technologies. So, it is a matter of balancing the climate emergency whilst maintaining a successful UK steelmaking industry.

Our UK steelmaking industry is the envy of the world. The quality of the steel is some of the best and is produced by companies that have a high corporate level of social responsibility compared with others around the world. This industry deserves our support through the transition to net-zero carbon.

The UK constructional steelwork industry is also amongst the best in the world and has long been a leader on sustainability. BCSA's Sustainability Charter, which was the first Charter of its type, was introduced in 2005. It recognises the wider aspects of sustainability and covers, a number of policies, namely: environmental; health and safety; personnel training and development; equal opportunities; ethical trading and management of energy and vehicle fuel usage. The Charter also includes how the companies are supporting their local communities. The benefits of BCSA's Sustainability Charter are now being recognised by the wider construction industry and several clients require steelwork contractors to sign up to the Charter while others require them to be 'Silver' or 'Gold' members of the Charter.

In recent months BCSA has been campaigning for High Speed Two (HS2) to adopt a minimum UK content target for its supply chain. I am pleased to say that this is beginning to gain support from both members of Parliament and members of the House of Lords. The UK constructional steelwork industry has the capability and the capacity to supply all the steel structures required by HS2 at competitive prices. Not only will HS2 get a good job but taxpayers' money will be used to support the UK economy through the pandemic and help to 'Level-up' our economy. Sadly though, a large proportion of the first tranche of contracts for structural steel has been awarded to European contractors.

Not only has the UK industry lost out, but HMG and the wider UK economy has also lost out on the following revenue: corporation tax and VAT from the supplier companies; personal income tax from their employees; similar losses from companies and employees further down the supply chain; local business rates; spending in local shops and businesses by employees of the suppliers together with further consequential loss of tax revenue; participation in government initiatives such as apprenticeship training and support for initiatives such as preventing climate change.

It's time that HMG and HS2 recognised the advantages of employing UK companies and developed procurement guidelines that take account of these benefits.

Despite all the changes that the pandemic, BREXIT, climate emergency and the wider construction industry is throwing at the steel construction sector the one thing that I'm confident about is the resilience of the BCSA steelwork fraternity. I don't know of many casualties resulting from the lockdown and I'm confident we'll cope with BREXIT as well.

Mark Denham
BCSA President

New fabrication and welding guide for high strength steels

The British Constructional Steelwork Association (BCSA) has published a new guide entitled: High Strength Steels for Structural Applications: A Guide for Fabrication and Welding.

This guide supports the increasing use of high strength steels in the steel construction sector, namely steels with specified minimum yield strengths greater than 355 MPa. High strength steels are often divided into two categories from the point of view of fabrication and welding: those with specified minimum yield strengths up to and including 690 MPa and those with specified minimum yield strengths greater than 690 MPa. The latter, sometimes called 'mega-high strength steels', would typically only be used for very special applications and are not covered by this guide.

This new publication discusses the available product forms, steel grades, manufacturing routes, and weldability, and provides guidance on welding process selection, consumable selection and fabrication considerations including thermal cutting, forming and heat treatment.

BCSA Fabrication and Welding Manager Tom Cosgrove said: "With the increasing specification of high strength steels for buildings and bridges, this publication provides useful guidance for steelwork contractors on both the requirements and issues to consider for the welding and fabrication of high strength structural steels. This is particularly relevant with the broadened scope of the recently released 7th Edition of the National Structural Steelwork Specification, which now covers S460 grades."

The Guide (BCSA Publication No 63/20) is available in PDF format only and can be obtained from www.steelconstruction.org (£25 for BCSA members and £50 for non-members).

Steel up for new primary school

Good progress is being made on the delayed construction programme for the £14.3M primary school in Calderwood, East Calder.

West Lothian Council said the new state-of-the-art school will provide non-denominational primary education for up to 462 primary and 128 nursery pupils when complete in 2022.

The steel frame is already in place after the start of construction was delayed until June 2020 due to the COVID-19 outbreak.

Executive Councillor for Education David Dodds said: "The design of the new state-of-the-art school incorporates elements of the nearby award-winning West Calder High School, with sustainability and suitability as core objectives.

"Calderwood Primary will provide an anchor landmark for the Calderwood Core Development Area when it opens, helping bring the new community at Calderwood together."

The project is being delivered on behalf of the council by its development partner hub South East, with Morrison Construction as the main contractor and Hescott Engineering as steelwork contractor. The same team also constructed the steel-framed West Calder High School.

New Essex site for Kloeckner Metals

Kloeckner Metals UK has announced the purchase of a new site in Thurrock, Essex, which it said will be developed into a state-of-the-art steel processing facility.

Part of the global Klöckner & Co Group, Kloeckner Metals UK boasts 14 business units across the UK and is one of the leading multi-metals processing suppliers in the UK.

The company said the substantial investment into the new site was needed to support the relocation of the existing site at Thames Wharf, London, which, over the years, became too small for the business' needs.

Located adjacent to the M25, the new site is expected to be operational during the fourth quarter of 2021. Once completed, the new site will create more than 10,000m² of internal space, including newly built offices, state-of-the-art processing equipment, and the latest digital logistics and operations technologies.

Peter Whiting, CEO of Kloeckner Metals UK said: "This new investment is an important milestone in Kloeckner's strategic plan to establish ourselves as one of the leading supply chain partners in the UK."

Steel modular quarry bridge installed

As part of the ongoing investment by Cemex at its Cambusmore quarry site in Stirlingshire, Adey Steel has completed a contract to design, fabricate and clad a 77m-long conveyor bridge, which will aid transportation of aggregate across a quarry pool.

Adey Steel said its technical team provided a modular design that offered a large amount of offsite fabrication and assembly as well as a fast installation method that minimised the disruption brought about by challenging site ground conditions and changeable weather.

The truss bridge was modularised into five main pieces using bolted splice connections between the large rolled steel angle (RSA) and UC sections. Each bridge module was up to 18m in length and, when fully clad, weighed over five tonnes.

Adey Steel Project Manager Richard Greasley said: "The heavy emphasis on offsite manufacture allowed site programmes to be cut right back to the bone, every task that could be completed in controlled factory conditions was done, which was instrumental in the overall project success."

The quarry produces in the region of 400,000 tonnes of sand and gravel per year, which feeds into the local and regional construction industry.

Lindapter launches new fixing for metal decking

Yorkshire-based manufacturer Lindapter has launched Type COM, a new deck fixing for attaching building services to ComFlor 60 and ComFlor 80 profiles manufactured by Tata Steel.

Lindapter's Type COM is said to provide an efficient and economical fixing for suspending a variety of equipment including HVAC systems, fire protection, pipe work, electrical items and lowered ceilings.

The CE marked fixing is also said to create genuine efficiencies for the contractor as it can be installed in seconds and is adjustable on site without the need of specialist labour, expensive tools or power.

Developed at the request of Tata Steel, the fixing locks inside the dovetail re-entrant channel of the profile and unlike shot firing methods, this zero-impact method is said to preserve the strength of the deck and avoids delamination (separating the steel from the concrete) and damage to the deck.

Lindapter said the Type COM product has been independently approved and rigorous quality procedures have ensured a secure connection with a capacity of 1.25kN per fixing, calculated at a safety factor of 3:1.

Contractor named for Bristol city centre office scheme

Developer Nord has appointed Skanska as the main contractor for its new office building, One Portwall Square, in the heart of Bristol's commercial district.

Construction commences this month on the six-storey, 3,100m² scheme, which is located next to Bristol City Council's 100 Temple Street office, with completion set for late 2021.

Designed by Stirling Prize winners Allford Hall Monaghan Morris (AHMM), the scheme is said to combine contemporary architecture with a focus on tenant amenity, wellbeing and sustainability to deliver a new model office for Bristol.

In addition to a brand new landscaped public square at the front of the property, each upper floor will benefit from a generous terrace.

One Portwall Square is committed to outstanding sustainability, energy efficiency and connectivity and will be built to a BREEAM 'Excellent' rating and EPC Rating A standards.

Diary

For SCI events contact Jane Burrell, tel: 01344 636500 email: *education@steel-sci.com* web: *https://portal.steel-sci.com/trainingcalendar.html*
For BCSA events contact Ana Girao-Coelho, tel: 020 7747 8127 email: *Ana.Girao-Coelho@steelconstruction.org*

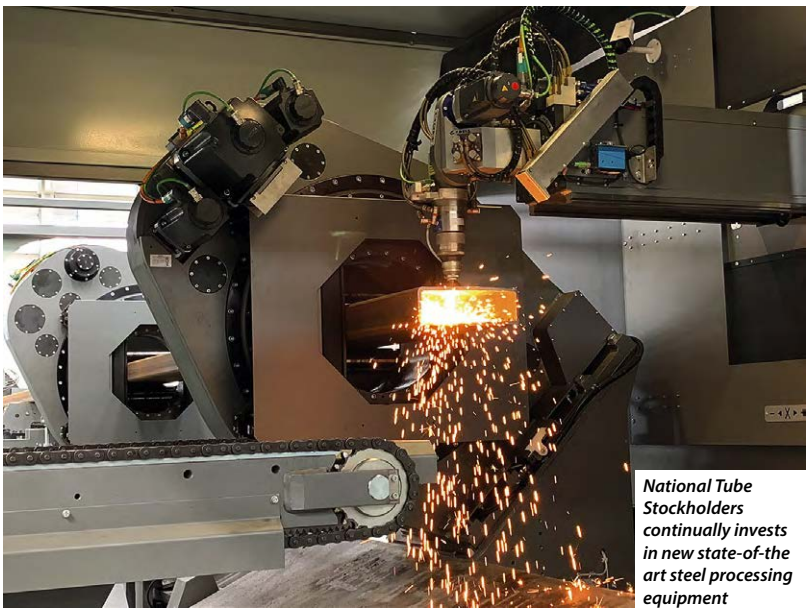
Tue 17, Thu 19 & Tue 24 November 2020
Steel Connection Design
Online course
This course is run over 3 sessions and is for designers and technicians wanting practical tuition in steel connection design. The course concentrates on the design of nominally-pinned connections, in accordance with BS EN 1993-1-8, considering vertical shear and tying. The Eurocode approach to the design of moment resisting connections will be discussed, anticipating that software will be used for the design of these connections.

Tue 8 December 2020
Composite Design
Webinar
SCI/BCSA Members only
This webinar will cover the application and design principles of composite beams, as well as codified design rules. Some recent developments with Eurocode 4 will also be covered.

Tue 12 January 2021
Update to EN 1993-1-1
General rules and rules for buildings
Webinar
This webinar will give an overview of the revisions to Part 1-1 of Eurocode 3 that has been issued for the formal 'CEN Enquiry' procedure, covering the change in scope, new sections, withdrawn sections and revisions to the key Section 5 on structural analysis.

Investing in cutting-edge technology

National Tube Stockholders' most recent investment of over £2M has included the addition of two state-of-the-art tube lasers for profiling up to 610mm diameter tubes and sections.



National Tube Stockholders continually invests in new state-of-the art steel processing equipment

As a gold sponsor and founding sponsor of Steel for Life, National Tube Stockholders (NTS) continually looks to support its customers' growth and the overall competitiveness of the steel construction industry.

The independent, family-owned business specialises in providing the highest quality tubes and hollow sections and has now added laser profiling to the services it can offer.

Two jumbo lasers, an LT14 and an LT24, were commissioned in September and can produce 'ready to use' parts with weld preps, alignment marks and etching as required.

Powered by a 4.5KW CO_2 laser source these machines can profile tubes, hollow sections and open sections up to 610mm-diameter, 500mm × 300mm RHS with a 25mm thickness with finished lengths of up to 15m. An integrated drill and tap facility, up to M16, completes the offering, which is said to ensure a high level of accuracy and tight tolerances due to the single process integration.

The five-axis cutting heads allow weld preps and complex geometries through full 3D cutting, as well as creating opportunities for new thinking in design possibilities.

To make this a reality the NTS team has been strengthened with the addition of several experienced and knowledgeable staff who bring the vital technical expertise to their sales and operations teams, including CAD/CAM specialists.

In-house 3D modelling skills and the ability to import .IFC and .STP files from Tekla complete this new service. The company says that these skills ensure that, in addition to the accuracy and repeatability of laser profiled parts, the speed of the machines make the finished components commercially competitive against conventional fabrication methods.

Located at NTS's main site at Dalton, North Yorkshire, a newly built 11,000m² warehouse provides the space to store pre-material and profiled parts alongside the machines, as well as immediate access to over 30,000t of stock and one of the largest ranges of prime tubes and hollow sections in the country.

Commercial Director, Jonathan Sochart says: "The construction sector is very important to NTS and we identified an opportunity for a reliable provider of laser cutting services and decided to strengthen our offering for both existing and new customers."

Known for service, NTS understands that quality matters in the steel stockholding industry. Services are important but quality is key. A knowledgeable, experienced, and hardworking team are backed up by robust and reliable management systems, certified to ISO 9001, 14001 & 45001 and now strengthened with the addition of EN 1090-1 CE Marking to Execution Class 4.

NTS is part of the Bianco Group, a group that was formed over half a century ago and today consists of over 20 companies, in 11 countries throughout Europe and North America. With group stocks of over 250,000t and over 1,000 people, the founding principles of conducting business in a fair manner, supported by the best people and the latest technologies remain the drivers of all business developments and partnerships globally.

The new laser layout at National Tube Stockholders

National Tube Stockholders and Cleveland Steel & Tubes is a Gold sponsor of *Steel for Life*

STEEL for life

NTS National Tube Stockholders

TW BOLT

STRUCTURAL FASTENERS FOR 'BLIND' STEELWORK CONNECTIONS

A simple yet ingenious solution for connections with access from one side only.

Thin Wall Bolts were developed to address the need for a blind fixing to be used into lightweight steel sheet or cladding material. After installation, a neat, low profile head is left with no stud.

- Design resistances in shear and tension for use with BS 5950 or BS EN 1993
- M5 to M8 in Zinc Nickel or Stainless steel
- Zinc Nickel coating gives 1000 hours salt spray protection

- Quick and easy to install from one side
- Designed for ordinary clearance holes
- Clamping range from 2 - 16mm
- Increased assembly efficiency
- Zinc electroplate finish gives excellent protection
- Fully tested by the SCI

Flush fit version coming soon

Other Blind Fixings from BLINDBOLT

BLINDBOLT HDBOLT

Full technical details, design resistances and SCI report available from www.blindbolt.co.uk

SCI ASSESSED www.sci-assessed.com

APPLICATIONS

Lightweight steel sheets
Light steel framing
Cladding and facades

CONTACT YOUR LOCAL FASTENER AND FIXING SUPPLIER FOR MORE INFORMATION

For technical advice please call 01299 272955 or email enquiries@blindbolt.co.uk

AN ALTERNATIVE DEEP DECK FLOORING SOLUTION

TR220 FLOOR DECK

High strength of a deep steel deck with the performance of a ribbed reinforced concrete slab

DESIGN FLEXIBILITY

Design option to be located on bottom beam flanges, slim floor construction can be achieved reducing the structural zone.

GO LONG!

Offering un-propped spans of up to 6m, TR220 is ideal when looking to create open uninterrupted spans, such as car parks.

SMD®
Structural Floor and Roof Solutions

SMD Ltd

www.smdltd.co.uk

The completed wharf in readiness for one of its first visiting vessels

Extreme construction

After two Antarctic summer seasons of work, a new steel-framed wharf has been completed at the Rothera Research Station in readiness for the arrival of the new RRS Sir David Attenborough.

Hundreds of miles from the southern tip of South America and surrounded by glaciers, mountains, and treacherous and unpredictable seas, there can few places on earth more challenging for construction than the British Antarctic Survey's (BAS) Rothera Research Station.

With working days limited to the short summer months, due to the severe weather conditions, and transportation links (sea and air) also subject to the meteorological conditions, logistics play a key role when planning a project on the world's most southerly continent.

Steel construction has proven to be the ideal solution for working in this remote location, as the frame for a new wharf was prefabricated and shipped in erectable pieces to the site.

Due to the practical restrictions of working in one of the most remote construction sites in the world, the construction team practiced a full-scale-assembly before deployment. The 45t steel frames forming the skeleton were tested at steelwork contractor Four-Tees Engineers' facility to identify any unexpected challenges or additional pieces of equipment that may be needed while still in the UK, which was critical, before shipping the materials 11,000km to Rothera.

The success of the new wharf symbolises an effective collaboration between science and industry. Building in one of the world's most extreme environments required careful planning, digital construction expertise and the ability to work collectively at every stage of the process from client brief, engineering design to supply chain delivery.

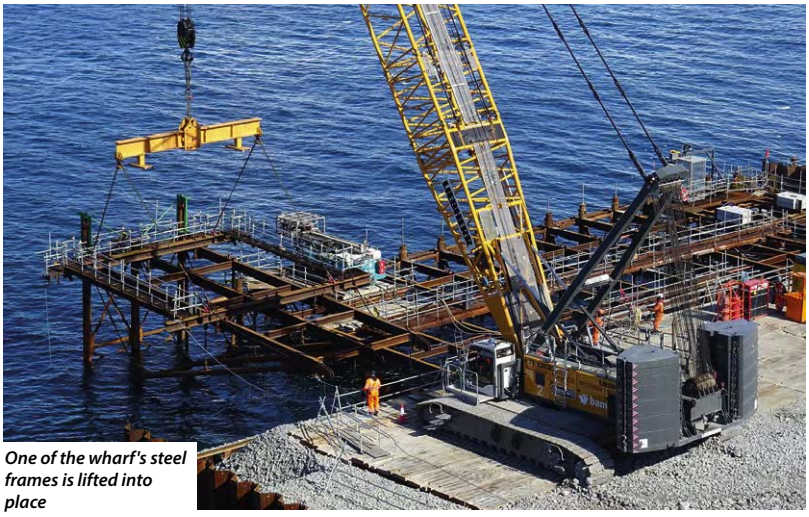
Operating safely and sustainably helped overcome potential risks from adverse weather, icebergs and wildlife, such as whales and seals. On site team integration and suitable wellbeing support were essential ingredients for working life, particularly for those who were new to working in the Antarctic.

The new wharf, which replaces a smaller structure built in the 1980s, is part of the Antarctic Infrastructure Modernisation Programme (AIMP), commissioned by the UK Research and Innovation's (UKRI) National Environment Research Council (NERC). The programme also includes Rothera's new Discovery Building (see Box) as well as work on other BAS sites.

The 74m-long wharf is designed to accommodate the new polar research vessel, RRS Sir David Attenborough. With its enhanced cargo handling facilities, including a larger crane, the new wharf enables more efficient loading and unloading of supplies, as well as the deployment of small boats used for scientific diving and marine research operations.

Following the trial assembly, all of the

FACT FILE
Rothera Wharf, Antarctica
Main client: British Antarctic Survey
Main contractor: BAM Nuttall
Structural engineer: Ramboll
Steelwork contractor: Four-Tees Engineers
Steel tonnage: 1,000t



One of the wharf's steel frames is lifted into place

1,000t of steelwork was shipped to Antarctica aboard the DS Wisconsin as part of a cargo that also included plant equipment and 83 containers.

Arriving on site during October 2018, the beginning of the Antarctic summer, the construction team began their work with the dismantling of the old wharf and then erected the initial 10 rear frames of the new structure. The construction decamped in April 2019, returning home before the onset of the harsh southern winter.

"The steelwork was fabricated in single elements for ease of transportation," explains Four-Tees Engineers' Managing Director Tim Stedman. "The longest member was 19m long and the heaviest 3t."

The steel wharf is formed by a series of frames, 10 at the front and a further 10 at the rear. The frames are up to 14m-high, and consist of three vertical tubular piles with beams tying them together at the top level with diagonal braces below. All of the frames are secured to the pile wall with waling beams.

The two sets of frames are connected via a pin at every beam end. The frames were partially assembled at the point of loading, but all the diagonal bracings were fitted on site.

The second season of construction began in November 2019 and completed this year. The returning project team started by de-winterising the site, which involved clearing 2,000t of snow at the start of the Antarctic summer. The team then successfully installed the final 10 steel frames and all the facing sheet piles. The wharf was then backfilled to complete the structure.

Martha McGowan, Rothera Wharf Project Manager at BAM says: "Working in one of the world's harshest climates has had its challenges, but it's been a pleasure to work as part of an integrated team where we all shared a common goal. I'm very proud of our team and how everyone worked together to make sure our spirits, health and wellbeing were all taken care of."

David Seaton, Senior Infrastructure Programme Manager at British Antarctic Survey says: 'We're immensely proud of the multi-skilled and multi-partnered team that have successfully completed this civil engineering challenge to schedule and to budget in one of the world's most remote construction locations. The new wharf will enable Rothera Research Station to remain at the forefront of marine and climate research for generations to come.'

Bruce Wulff, Project Manager at Ramboll, says: "Designing a wharf in the Antarctic, on a steeply sloping rock seabed, with massive icebergs floating past, and Orcas and penguins as your neighbours, has presented its challenges! Four years later, to see this beautiful piece of engineering completed is very moving."

New building for Rothera

Preliminary groundworks for a new building to facilitate the British Antarctic Survey's (BAS) ongoing climate related research in Antarctica have begun at the Rothera Research Station.

A steel-framed operations building, named The Discovery Building to commemorate the discovery of Antarctica 200 years ago, is being built.

The two-storey 4,500m^2 building will accommodate preparation areas for field expeditions, a central store, medical facility, offices, recreational spaces, workshops and areas for plant.

The energy-efficient, aerodynamic design is oriented into the prevailing wind and utilises a deflector to channel air at higher speeds down the leeward face, minimising snow accumulation around the entire perimeter of the building. It is the first time a snow and wind deflector has been used at this scale in Antarctica.

A control tower protrudes from the mono-pitch roof and provides 360-degree panoramic views of the runway, wharf and station buildings.

Jon Ager, Director of the Antarctic Infrastructure Modernisation Programme, BAS, says: "This is an exciting milestone in a long-term plan to modernise Rothera Research Station. Once built, this new facility will enhance significantly our operational support to deep-field science campaigns."

The new wharf can accommodate much larger vessels and will enable the research station to improve its vital work

"The steelwork was fabricated in single elements for ease of transportation."

The majority of the accommodation is in three-storey steel-framed blocks

Village community in the frame

Structural steelwork has ticked all the boxes for an efficient design and a speedy construction of a retirement village in Kent.

The housing shortage across the UK has been a hot topic for a number of years, with successive governments failing to address the problem.

More housing is needed and a raft of schemes are now promised up and down the country. Affordable housing, and homes for the young and first-time buyers is perhaps the most urgent sector that needs addressing. Another area of concern however, is the lack of residential properties for retired people, as the over 65s are a fast-growing percentage of the nation's populace.

Dedicated retirement villages are seen as one answer to this problem. These are usually self-contained residential developments with their own leisure and restaurant facilities, and quite often on-call medical assistance when needed.

Inspired Villages currently operate six of these sites in England and is currently on track to deliver a further 2,500 homes in the next six years. One of these new schemes is in the village of Leeds, near Maidstone.

Known as Ledian Gardens, it is said the scheme will help to address the chronic shortage of age-appropriate housing in this part of Kent, plus the central facilities will form an important meeting point for residents and the local community.

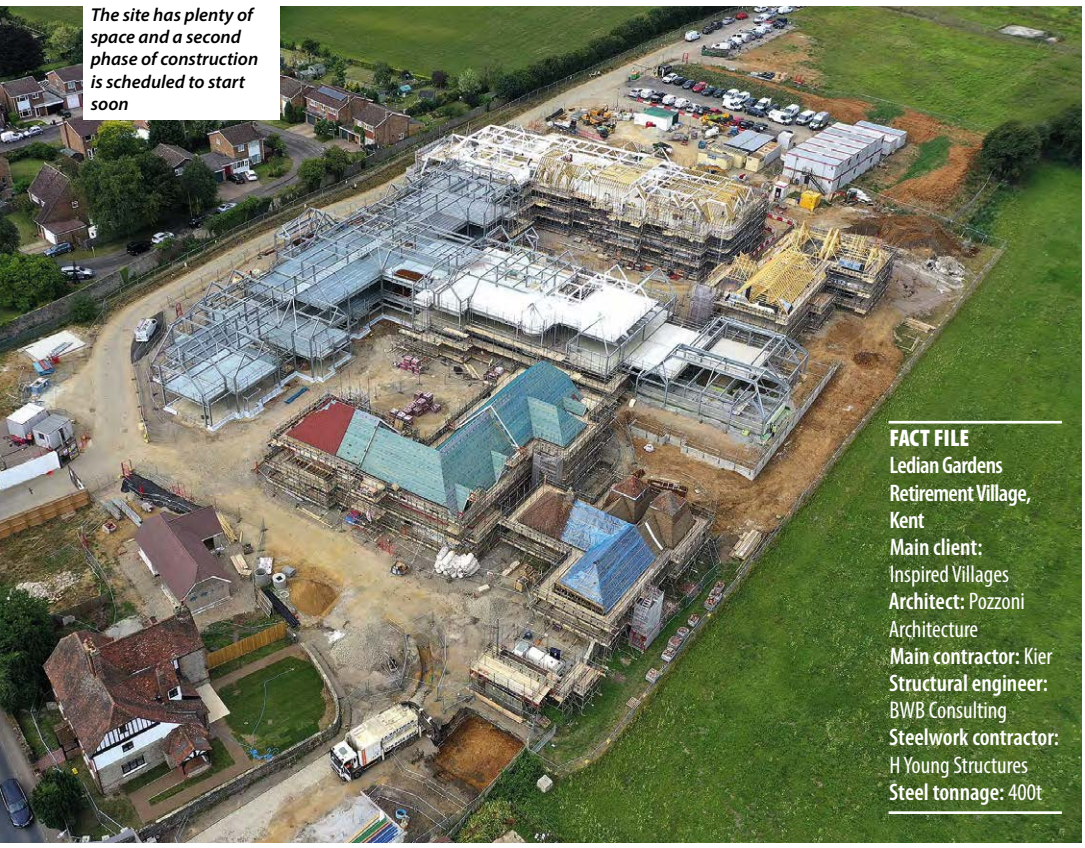
According to statistics, over 65's account for 18.2 percent of the local population. By 2030 it's predicted there will be 125,000 over 65s in the catchment area and nearly 20,000 over 85s, which demonstrates the increasing demand for age-appropriate housing within this part of Kent.

Kent based Gallagher Group was appointed in July 2019 to undertake preparatory site works, building the main access road, preceding the work of main contractor, Kier.

Kier has now begun construction on phase one of the build, which consists of the village centre, plus 66 apartments and assisted-living units, which are scheduled for completion in spring 2021.

The village centre at Ledian Gardens will include a wellness suite, complete with 9m-long swimming pool, gymnasium, restaurant, bistro and bar, plus a village shop.

In a bid to lower carbon emissions and



The site has plenty of space and a second phase of construction is scheduled to start soon

FACT FILE
Ledian Gardens Retirement Village, Kent
Main client: Inspired Villages
Architect: Pozzoni Architecture
Main contractor: Kier
Structural engineer: BWB Consulting
Steelwork contractor: H Young Structures
Steel tonnage: 400t

H Young Structures begin the erection of one of the initial steel frames

Strategically placed bracing provides the stability for the steel frames

fuel bills, Ledian Gardens will use energy efficient ground source heat pumps to heat radiators and provide hot water.

Jamie Bunce, CEO of Inspired Villages, says: "Our country's ageing demographic means there is a growing demand for an offering such as this – beautiful, age-appropriate homes in a safe setting that offer residents access to our incredible facilities, which focus on holistic wellbeing and, if required, flexible support options as our residents age.

"Inspired Villages is dedicated to helping promote independent living within our vibrant villages and I'm excited we are one step closer to delivering that in Leeds and helping make senior living the best years of people's lives."

The village centre and 56 of the apartments are housed in three conjoined steel-framed structures. The other 10 apartments in phase one will be in adjacent timber-framed buildings and a renovated oast house.

According to Pozzoni Architecture, a steel-framed solution was chosen for the main areas, as it allows the design to maximise the large open-plan spaces at ground floor, which make up the key service areas, such as the restaurant, Eric's café and the Wellness area. The nature of our design does not always allow walls to stack up vertically and a steel frame solution has helped overcome this issue, the company says.

The use of steel has also allowed the frame to be prefabricated and delivered to site in sections to coincide with the build sequence.

Sat on pad foundations, the three steel-framed structures are all of a similar design and all comprise three-storeys, including ground floor. Building A and B both have

"The nature of our design does not always allow walls to stack up vertically and a steel frame solution has helped overcome this issue."

footprints of 22m × 50m, and accommodate apartments of various sizes on the upper two floors, while the ground level has some living spaces alongside front-of-house, the restaurant, keep-fit facilities and the swimming pool.

Structure C is the largest, measuring 19m × 82m and it will have the Village's reception and family rooms on the ground floor with apartments above.

Kier Project Manager Ian Saunders says the scheme will offer a dozen different living space variants, from one-bedroom flats to penthouse apartments. The various room sizes and the pitched roof, which accommodates third floor living spaces, have been the main challenge, which the steel frame solution has overcome.

"The roof was the most complex area," says BWB Consulting Project Engineer Maia Stride. "This is due to the steep pitch, rooms within the roof and the overall roof structure needing to remain slim, so many of the steel roof beams had to sit within the cut timber line."

Elsewhere, the three steel-framed structures are predominantly based around a perimeter column spacing of 8.2m. Internally, the spans vary according to the area's function, with the longest 8.9m spans located over the ground floor main foyer and restaurant areas.

Stability for the steel frames is provided by the diaphragm action of the composite floor slabs, which transfer lateral forces to the vertical bracing placed at strategic locations around the building. The forces are then taken into the foundations where the forces are transmitted into the ground.

A metal deck composite floor was chosen as it provided a single monolithic floor plate which allows the internal fit out to commence without having to have the roof complete, which helped to speed-up the construction process.

BWB Consulting says that if precast planks had been used, there would have been gaps between planks, which would have allowed rain to penetrate through the building, while work was still being undertaken.

H Young Structures completed the steelwork erection programme in June, using a combination of 50t and 60t-capacity mobile cranes.

The work was undertaken during the COVID-19 lockdown, and H Young Structures Director Ian Peachment says the main challenge during this unprecedented time was getting its workers from the company's base in Norwich to Kent and back again each day as there were no hotels or guest houses open at this time.

Highlighting steelwork erection's efficiency and how it was possible to follow all government advice, Mr Peachment adds:

"We had to maintain a 2m gap between workers at all times, even when they were working at height. This meant that no beam shorter than 2m could be installed, which luckily didn't compromise the design."

Ledian Gardens phase two is scheduled to begin later this year.

Steelwork's speed of construction was one of the reasons the material was chosen for this scheme

Steel frames sustainability

Offering around 29,000m^2 of Grade A office space, 177 Bothwell Street is set to become Glasgow's largest and most ambitious office block.

The drive and necessity to construct sustainable buildings is bearing fruit and one commercial scheme in Glasgow is said to be one of the most progressive schemes ever built in the Scottish city.

Forming the second part of the wider Bothwell Exchange development - the first part was 122 Waterloo Street (see *NSC* Feb. 2017) – this latest steel-framed commercial block will generate £2.8bn of gross value added (GVA) to the Scottish economy over 25 years, according to an independent economic assessment.

Situated on a plot previously occupied by the Albany Hotel, 177 Bothwell Street is a 14-storey steel-framed structure aiming to achieve a BREEAM 'Excellent' rating and offering 2,276m^2 floorplates and a 743m^2 rooftop terrace that includes a 150m-long running track.

"Every HFD development has sustainability built into every aspect of the property. That starts with the physical methods and materials used during construction, but it equally applies to the finished product and the way the building is used," explains Stephen Lewis, Managing Director for HFD Property Group.

To this end, at 177 Bothwell Street, the building's energy will be provided by 100% renewable energy and technology will be used to make sure the building is used and operates as efficiently as possible. Heat recovery ventilation, solar control glazing, and smart low-energy light systems and controls are just some of the many steps HFD has taken to achieve this.

The building will also feature waste recycling facilities, sustainable drainage attenuation systems and advanced energy monitoring and optimisation. It will have electric vehicle charging points and hundreds of bike storage spaces to support sustainable travel.

The company's rationale extended to the choice of steel for the building's main frame.

"Speed of erection, the ability to achieve longer spans than concrete and therefore create a more open floor plate, together with the sustainability of steel as a recyclable product were the reasons for choosing the material," explains David Shearer, Managing Director for HFD Construction.

"Our steelwork subcontractor has a renewably powered fabrication plant, which was another important consideration."

Steelwork contractor BHC's investment in sustainability and renewables within its manufacturing facility has allowed the steel for 177 Bothwell Street to have 52% less associated carbon emissions, and it is the first building in Glasgow to have this added sustainability within the structure.

"A hybrid frame of concrete stability core with long span steel floor construction was the logical choice," adds Woolgar Hunter Project Engineer Jack Dempster.

"The steel floorplate can achieve long, clear spans to reduce internal columns, as well as providing good response to footfall vibrations. The hybrid superstructure frame allowed full integration with the services strategy, as well as ensuring a quick and safe construction sequence for the superstructure frame."

The structure's columns are arranged around the perimeter on a varied grid of between 6m and 9m, while the typical main span between the core and the front elevation is 17.5m.

As open-plan column-free office space was an important design criteria, there are only four internal columns. Therefore,

FACT FILE
177 Bothwell Street, Glasgow
Main client: HFD Property Group
Architect: Sheppard Robson Architects
Main contractor: HFD Construction
Structural engineer: Woolgar Hunter
Steelwork contractor: BHC
Steel tonnage: 4,100t

Sustainability is at the core of the design for 177 Bothwell Street

Cladding installation was in full-swing when the steel frame topped out in October

> *"Speed of erection, the ability to achieve longer spans than concrete and therefore create a more open floor plate, together with the sustainability of steel as a recyclable product were the reasons for choosing the material."*

according to Woolgar Hunter, designing the columns for the high axial loads was a challenge.

The solution was to employ a combination of plated column sections, European sections and high Grade S460 steel to resist the high loadings.

"We worked closely with BHC to ensure that an optimum solution was reached, both regarding steel tonnage and material procurement," says Mr Dempster.

Although the building's basement sub-structure and ground floor slab are reinforced concrete, the steel columns are in fact founded at basement level and are supported on piled foundations. The first steel composite floor is at level one.

Erecting the lower level steel columns had to be sequenced around the concrete works. The main steelwork erection programme did not fully start until the basement works were complete, which allowed BHC to use the ground floor slab as a safe working platform.

The structure's stability is derived from the concrete floor slabs, which are supported by metal decking, and thereby create diaphragms to transfer lateral forces to the single concrete core.

The core is tied to the floor plates through a combination of connections, including a bespoke plate detail developed between BHC and Woolgar Hunter. The concrete core acts as a vertical cantilever resisting all destabilising loads. The core is also located centrally in the east-west direction and is offset slightly to the rear of the building.

The floor is a 150mm deep reinforced concrete slab, cast onto re-entrant metal decking. This flooring solution is said to have provided a lightweight floor to reduce the load on the long span floor beams, and it did not require any propping in the temporary condition. The slab thickness and decking type were also selected to suit the floor vibration response requirements.

Adding some architectural interest, the perimeter of the building cantilevers throughout its height on each elevation, with the cantilever dimension varying throughout. At levels 11 and 12, the front façade line steps back, and therefore transfer structures are required on these floors.

The transfer structures consist of doubled-up plated girders, which are said to have kept the structural depth consistent throughout the floorplate.

The project is being constructed in unusual times due to the global pandemic. In summary, Mr Lewis says: "COVID-19 has prompted us to review the building design and operation of 177 Bothwell Street, ahead of its delivery next year. Factoring in what we know about the virus so far, our review has focussed on a number of aspects of the development, particularly people's physical interaction with the building, along with the use of technology and amenities.

"We have removed the need for people to physically touch the building with their hands as far as possible, while taking a range of other steps including a review of ventilation systems and air circulation."

177 Bothwell Street is set for completion in the third quarter of 2021.

Accommodating steel

A high-rise residential scheme in Salford is making use of steelwork's speed of construction to deliver its first apartment block.

The 12-week steelwork erection programme underway on Regent Plaza's first residential block

FACT FILE
Regent Plaza, Salford
Main client: Sourced Development Group
Architect: Fletcher Rae Architects
Main contractor: Helix Contracting
Structural engineer: SWF Consulting
Steelwork contractor: EvadX
Steel tonnage: 360t

Located adjacent to the busy thoroughfare of Regent Road in Salford, a new prestigious residential scheme is underway, which will on completion offer more than 500 apartments.

Known as Regent Plaza, the scheme comprises five residential blocks, varying in height, with the tallest topping out at 26-storeys. Linked to four of the blocks, there will also be a two-level car park featuring a landscaped roof to be used as a resident's piazza.

Designed by Fletcher Rae Architects the Regent Plaza scheme incorporates one, two and three-bedroom apartments and three-bedroom townhouses with a 24-hour concierge, resident's lounge and gym.

Construction work is being undertaken in phases, with the nine-storey Block B currently underway. Explaining the project's sequence of construction, Sourced Development Group Projects Director Hamid Zakaria says: "Block A is the tallest of our buildings and we wanted a percentage of its apartments pre-sold before we started construction, in line with our business model, so our work began with the smaller Block B."

Block B is a steel-framed structure and this framing solution is likely to be used for all of the project's other buildings.

"Steelwork is quick to erect and provides us with the desired speed of construction, while it is also the most relied upon method," adds Mr Zakaria.

Under current proposals, the seven-storey Block C, the 16-storey Block D, the four-storey Block E and the car park are all steel-framed structures, while the 26-storey Block A is most likely going to be constructed with steel, according to Sourced Development Group.

The project's plot is a brownfield site, which was previously occupied by a pub and a number of industrial warehouses. It was purchased by Sourced Development Group in 2019.

Once demolition was completed, the initial groundworks for Block B, which included the installation of drainage, reinforced ground beams and pile caps, were completed earlier this year.

Working on behalf of main contractor Helix Contracting, EvadX has subsequently fabricated, supplied and erected 360t of structural steelwork for Block B. Using a single 50t-capacity mobile crane, the steelwork was erected in a 12-week programme.

According to steelwork contractor EvadX, this one crane was sufficient for the erection as although the overall steel tonnage was 360t, there were no members longer than 12m and the heaviest piece was under 1.5t.

EvadX Project Manager Andrew Roberts says: "We also brought a 90t-capacity mobile

Regent Plaza comprises five residential blocks up to 26-storeys high

crane to site in order install the precast stairs and place metal decking packs on each level for the installer."

Steelwork is based around a column spacing of 6m to 7.5m for the block's perimeter, a pattern which was designed to suit the fenestrations. Internally, two rows of columns, 2.1m apart, form the central corridor that runs the length of the building on every floor.

A composite floor design has been chosen, whereby steel beams support the aforementioned metal decking, supplied and installed by Structural Metal Decks (SMD), and a fibre-reinforced concrete topping.

"The use of a composite deck solution gave us a slim floor construction, which was beneficial as the structure's design has limited floor-to-floor heights in order to minimise the building's overall height," says SWF Consulting Director Phil Sarbutts.

Stability for the block is derived from cross bracing, which is concealed in partition walls and around the lift shaft and ▶20

The former industrial site in Salford is being converted into a prestigious residential development

"Steelwork is quick to erect and provides us with the desired speed of construction, while it is also the most relied upon method."

Visualisation of the completed Regent Plaza scheme

▶19

stairwells. Moment frames have also been used given the absence of a concrete core.

At first floor level and above, the building features a 1.25m-wide cantilever, which has been designed using moment connections back to the perimeter columns. The internal braced bays throughout the building are not continuous to ground so the first-floorplate has been designed to transfer forces to the outer braced bays.

Vibration can be an issue with residential buildings and in order to negate any problems a typical floorplate was modelled using SCIA engineer and CADS footfall analysis to determine the vibration characteristics.

"The floorplate was checked for excitation nodes along the corridor and response nodes in the living areas," says Mr Sarbutts.

"The response factors were found to be in the region of 4 or below, which is very good. A vibration dose analysis was also carried out on the worst-case excitation node to assess the floorplate throughout the night."

In summary, Sourced Development Group says it is delighted to have made such fantastic progress on the project, particularly with this year's difficulties with the supply chain and changing government guidelines to working safely.

The company adds, EvadX has erected the steel frame ahead of schedule and they are incredibly excited to complete this first phase of a new landmark development.

Block B is expected to be complete in mid-2021, by which time Sourced Development Group will have already started work on blocks C and D.

Blocks A and E, as well as the car park, will then commence in 2022, with the project's overall completion set for full occupation in early 2024.

Floors and vibration analysis at Regent Plaza

Callum Heavens of the SCI comments on the vibration analysis and floor solution used in the Regent Plaza development.

The dynamic performance of the structures in the Regent Plaza scheme was an important consideration for ensuring the comfort of future occupants of the apartments. Vibrations of floors resulting from the movement of people are typically not a cause for concern for the safety of the structure but can be a discomfort to occupants if those vibrations are not limited to established acceptability levels.

When designing to limit the magnitude of vibration of a floor, three quantities are important: mass, stiffness and damping. Damping is not practical to significantly alter or control precisely and so an engineer has to work with the mass and stiffness of the floor to achieve the desired criteria.

Composite slabs are effective in this regard as they bring high mass and stiffness whilst achieving a slim floor depth. It is also relatively straightforward to alter these properties, if necessary, by increasing the depth of the slab. Consideration of the grid arrangement of the beams supporting the slab can also be effective in reducing vibration by ensuring that the beam spacing is not too large nor the spans too long.

The traditional approach in the UK is to check the frequency of the beams independently for a minimum natural frequency of 4 Hz and it has been found that buildings designed in this way have generally performed well. However, this limit merely reduces the probability of adverse comments from occupants arising. It does not give any indication of the floor performance in service.

A more sophisticated technique is a 'response factor' analysis. This type of analysis is readily available in modern design software and can indicate the in-service performance of the floor, along with how the performance varies in different locations, allowing for a targeted approach to resolving vibration issues. The response factor itself is a measure of the magnitude of the vibration of the floor (in terms of acceleration) relative to a baseline value. Acceptable response factors vary depending on the usage of the floor (and the time of day in the case of residential structures).

SCI publication P354 discusses the response factor method (for use with software) and other vibration considerations in detail along with hand-calculation methods which can be applied in simple cases where a regular floor grid is used. An on-line tool found at *http://bcsatools.steel-sci.org/FloorResponse* provides improved predictions of performance over the simplified method without the complications of a detailed computer model.

celebrating

excellence in steel

Call for entries for the 2021 Structural Steel Design Awards

The British Constructional Steelwork Association and Trimble Solutions (UK) Ltd have pleasure in inviting entries for the 2021 Structural Steel Design Awards.

Now in their 53rd year, the Awards celebrate the excellence of the United Kingdom and the Republic of Ireland in the field of steel construction, particularly demonstrating its potential in terms of sustainability, cost-effectiveness, aesthetics and innovation. The Awards are open to steel-based structures situated in the UK or overseas that have been built by UK or Irish steelwork contractors.

Why enter?
If your project is shortlisted, your company would have the kudos of being part of a prestigious Awards scheme - one with a long history, focussed solely on steel construction and the only one where expert judges visit every shortlisted project to truly appreciate its qualities. In addition, you'll receive:

- Free publicity for you, your project and your client, both online and in the construction press.
- Free attendance at a major Awards event in central London for your project team.
- Recognition of excellence for your project, be it large or small.

How to succeed?
Plan ahead and involve the whole project team from the outset in preparing a high-quality submission, don't leave it to the last minute. Read the entry criteria and particularly the 'Submission Material' section on the entry form and provide exactly what is required, nothing more, nothing less. In addition:

- High quality photos will portray you project at its best.
- A well written, flowing description of the context, concept design, outstanding features and key construction details will allow the judges to swiftly appreciate the essence of your project.
- Broad representation from all parties at the judges' visit will demonstrate collaboration and enthusiasm.

To find out more and download an entry form visit
https://www.steelconstruction.info/Structural_steel_design_awards
or call Chris Dolling (BCSA) on 020 7747 8133

Closing date for entries: Friday 26th February 2021

BCSA

Trimble

Efficient spans for excellent hub

A series of individually-designed portal frames has proven to be the most cost-efficient solution for a major Co-op distribution centre.

Further expansion is planned for Symmetry Park

Situated close to the A1 trunk route and just south of the Bedfordshire town of Biggleswade, a new steel-framed regional distribution centre for the Co-op is quickly taking shape.

Developed by Tritax Symmetry and designed by AJA Architects, the 61,409m² facility will create up to 1,200 new jobs and will support the Co-op's continued growth strategy across London, the South and South East.

Targeting a BREEAM "Excellent' rating and an EPC rating of A, main contractor Winvic says this is one of the most sustainable industrial facilities in the country.

Covering an area of 50-acres, the site is known as Symmetry Park, and as well as the large main distribution centre, the scheme also includes two smaller steel-framed buildings, a De-Kit building (for recycling packaging) and a vehicle maintenance unit (VMU). The De-Kit building is a portal frame with two 28m-wide spans, while the VMU is a 26m-wide single span structure.

Work on the greenfield site began in January with a considerable earthworks programme, followed by the steelwork erection by Caunton Engineering, which was adapted and designed specifically for the project.

"Ordinarily the steelwork erection for the distribution centre would have utilised the ground outside of its footprint, but as we were still doing earthworks, Caunton had to position its cranes and MEWPs inside the structure and change its build programme to suit," says Winvic Project Manager Ian Evans.

Supported on pad foundations, the main distribution centre is a large portal-framed structure, measuring 357m-long x 144m-wide. It has four equal spans of 36m and reaches a maximum height of 15m at the haunch.

Inside the building there will be various zones for the storage of food in ambient, chilled and frozen sections. To service and maintain these areas, the distribution centre will have gantries, walkways, and supports for pipework and power cables, all connected to the main steel frame.

"Some parts of the building have more maintenance walkways and gantries, such as the freezer zone, so the portal frame design needed to change along the length of the structure."

"The internal layout of the building and its different uses, meant we had to design 18 separate portal frames for the building, in order to create the most efficient design," explains Caunton Engineering Senior Structural Engineer Julian Harrold.

"Some parts of the building have more maintenance walkways and gantries, such as the freezer zone, so the portal frame design needed to change along the length of the structure."

The different portal frames along the building's length mean the column sizes change as do the rafters, according to the loading they are expected to carry. Roof

Column sizes change along the building's length as 18 different portal frames have been used

Cladding installation follows on behind the steel erection programme

For the erection programme, Caunton divided the building into four separate zones

rafters within the structure vary from 82kg/m² up to 238kg/m².

Slightly unusual for a modern distribution centre, it features a barrel-vault style roof, as opposed the more traditional pitched roof. This shape has impacted on the way the rafters had to be erected. Instead of two main sections forming each span, there are four members for every span, each cranked to create the desired barrel shape.

Two pairs of rafters were assembled on the ground, and with two cranes working in tandem, each piece was then lifted up, connected to a column and then bolted together at mid-span.

Splitting the structure into four zones along its width, the erection sequence saw Caunton erect the two middle spans in tandem with two mobile cranes, followed by the outer spans. This sequence was then repeated for each of the subsequent zones.

The distribution centre also features an attached two-storey office block measuring 90m-long x 18m-wide, which is located midway along one of the main elevations.

So, staff do not have to enter the office via the busy warehouse or the surrounding service yard, access is via an internal first floor steel walkway, which is supported by the structure's main perimeter columns. The walkway extends along the elevation and attaches to an external steel-framed lift and stair tower. Meanwhile, on the opposite elevation, the distribution centre has a single-storey operations hub building.

Once the distribution centre and the two smaller De-Kit and VMU structures were all erected, Caunton also erected a pedestrian bridge that spans the site's access road and connects the main facility with the car park.

In a separate contract, Caunton will be returning to the site in the New Year to erect internal steelwork as part of the fit-out, which Winvic is also undertaking. This second phase of steelwork consists of the gantries and maintenance walkways.

Andy Perry, Supply Chain & Logistics Director, Co-op, says: "We are delighted to have committed to this exciting new project and look forward to developing a market leading RDC with our partners at Tritax Symmetry and Winvic. The site will deliver greater agility, scale and efficiency – improving service and availability at existing stores while building capacity to support our ambitions for continued growth."

Summing up and emphasising the importance of distribution centres, Councillor Kevin Collins, Executive Member for Planning & Regeneration, Central Bedfordshire Council, says: "It is pleasing to see the arrival of the Co-op to Biggleswade. The modern and efficient scheme will inject significant investment into the area and create a large number of jobs for the local community."

The Co-op Regional Distribution Centre is scheduled to be operational in June 2021.

The De-Kit building has two 28m-wide spans

FACT FILE
Co-op Regional Distribution Centre, Symmetry Park, Biggleswade
Main client: Tritax Symmetry
Architect: AJA Architects
Main contractor: Winvic Construction
Structural engineer: Hydrock
Steelwork contractor: Caunton Engineering
Steel tonnage: 2,500t

Shelf angle floor beams in fire

Mark Lawson, Consultant to The Steel Construction Institute, discusses the resistance of unprotected shelf angle floor beams at elevated temperatures.

Composite floor slabs used in light steel construction are often supported by steel beams that are partially encased in the concrete slab. These beams may be required for longer spans or where walls do not align at different levels. They usually have side angles to support the slab and are known as 'shelf angle floor beams' and provide at least 30 minutes inherent fire resistance. These beams may also be fire protected by a plasterboard ceiling, and by intumescent coating or box protection for longer periods of fire resistance.

Shallow shelf angle floor beams are often designed for serviceability criteria, which means the design moment at the fire limit state is a relatively low proportion of the bending resistance of the beam. In these situations, it may be possible to verify an unprotected solution for 60 minutes fire resistance by calculating the reduced resistance based on a temperature profile through the cross section. Tabulated temperatures from the standard or temperatures determined from a software analysis may be used to determine the temperature profile through the section.

A typical case of a shelf angle floor beam is shown in Figure 1, in which a 170 mm deep composite slab is supported on 150 × 90 × 10 mm thick angles welded or bolted to the sides of a 254 × 254 × 107 kg/m UC beam used to minimise the overall floor depth. The decking has crushed ends in this case and so provides a solid block of concrete next to the beam web.

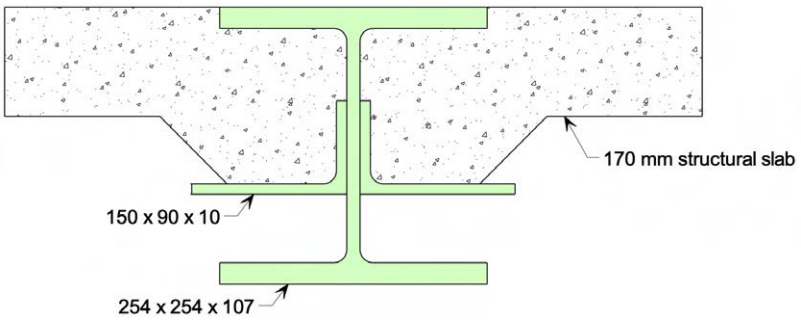


Figure 1: Cross-section through a 254 × 254 UC beam and 150 × 90 shelf angles supporting a composite slab with decking supplied with crushed ends

The fire resistance of shelf angle floor beams using UB or UC sections is given in Annex C to BS 5950-8[1]. Design guidance on the fire resistance of shelf angle floor beams in accordance with BS 5950-8 is provided in SCI publications P080[2] and P126[3]. This design process is considered to be satisfactory for Eurocode designs by taking the strength reduction factors ($k_y\theta$) from the Eurocode.

The verification involves calculating the reduced plastic moment resistance of the section, including the continuous shelf angles, at elevated temperatures. The plastic moment resistance uses the strength reductions of the various elements of the cross-section. The strength reduction factors in BS EN 1993-1-2[4] may be used to replace those given in BS 5950-8, (both standards are similar). The reduction factor for the design load at elevated temperatures is also given in BS EN 1993-1-2.

In light steel construction, the top of the steel section is generally cast level with the top of the slab and most of the steel section is encased by the slab and is therefore relatively cool so that its full tensile strength can be developed. The difference with respect to solid slabs is that the outer part of the angle is exposed between the ribs of the decking, which often is supplied with crushed ends for this application. Therefore, it is recommended that the contribution of the outer 50 mm of the angle should be taken as the same as for the exposed bottom flange. There is value in performing a thermal analysis by finite element modelling to be able to predict the precise temperature distribution for a particular configuration if it is to be used regularly.

Design of shelf angle floor beams in fire

The design of shelf angle floor beams in fire is presented in Annex C of BS 5950-8. Temperatures are defined for various segments of the cross-section (known as 'blocks'). These are given as:

- θ_1 - Bottom flange
- θ_2 - Exposed web of beam
- θ_3 - Bottom leg of angle
- θ_R - Angle root
- θ_4 to θ_6 - Encased web of beam and vertical leg of angle
- θ_7 - Top flange

These temperatures are presented in Table 1 as a function of B_e, which is the bottom flange width and D_e, which is the exposed depth of beam. The data for 30 and 60 minutes presented in Table 1 is reproduced from BS 5950-8 which also provides data for the 90 minutes case.

The temperature of the exposed bottom flange should be determined from Table 2 (over page), which is extracted from Table 10 of BS 5950-8 and is based on downstand beams supporting concrete slabs. This data is very conservative for shelf angle floor beams. Table 10 of BS 5950-8 only gives temperature

Table 1: Block temperatures (°C) in a shelf angle floor beam as a function of bottom flange temperature at 30 and 60 minutes fire resistance

Aspect ratio of exposed depth: width of beam	Fire resistance 30 min			Fire resistance 60 min		
	θ_2	θ_3	θ_R	θ_2	θ_3	θ_R
$D_e/B_e \le 0.6$	θ_1 - 140	475	350	θ_1 - 90	725	600
$0.6 < D_e/B_e \le 0.8$	θ_1 - 90	510	385	θ_1 - 60	745	620
$0.8 < D_e/B_e \le 1.1$	θ_1 - 45	550	425	θ_1 - 30	765	640
$1.1 < D_e/B_e \le 1.5$	θ_1 - 25			θ_1		
$D_e/B_e > 1.5$	θ_1					

θ_1 = bottom flange temperature - see Table 2 and exposed depth, $D_e = h\text{-}h_c$

▶26

Visit **www.SteelConstruction.info**

All you need to know about Steel Construction

Everything construction professionals need to know to optimise the design and construction of steel-framed buildings and bridges can be easily accessed in one place at **www.SteelConstruction.info**, the largest and most comprehensive database of steel design guidance and advice available anywhere.

This online encyclopedia is an invaluable first stop for steel construction information. Produced and maintained by industry experts, detailed guidance is provided on a wide range of key topics including sustainability and cost as well as design and construction.

This is supported by some 250 freely downloadable PDF documents and over 470 case studies of real projects.

The site also provides a single portal, one-stop-shop access to key resources including:

- The Green Books
- The Blue Book
- Eurocode design guides
- Advisory Desk Notes
- Steel section tables
- Steel design tools

Explore the full content of **www.SteelConstruction.info** using the index of main articles in the quick links menu, or alternatively use the powerful search facility.

BCSA

STEEL for life

▶24 data up to 60 minutes, for longer durations or for less conservative temperature data, thermal modelling may be carried out. SCI can perform this modelling.

Flange Thickness, t_f	Fire resistance 30 min	Fire resistance 60 min
10 mm	772	938
15 mm	736	933
20 mm	714	925
25mm	676	909
30 mm	638	886

Table 2: Temperature θ_1 (°C) of the exposed bottom flange for a beam supporting a concrete slab

The temperature gradient in the web and vertical leg of the angle is given in Table C2 of BS 5950-8 as 2.3°C per mm for 30 minutes fire resistance, and 3.8°C per mm for 60 minutes fire resistance. Therefore, the depth of web with a temperature difference of 200°C over its depth is 53 mm for the 60 minute case. This may be approximated to 50 mm for analysis purposes.

The strength reduction factors for steel in Class 1 to 3 sections based on the effective yield strength at elevated temperatures are given in Table 3.1 of BS EN 1993-1-2 and are reproduced in Table 3.

Temperature (°C)	Strength reduction factor ($k_{y,\theta}$)
400	1.0
500	0.78
600	0.47
700	0.23
800	0.11
900	0.06
1000	0.04

Table 3: Strength reduction factor for steel for effective yield strength, $k_{y,\theta}$

The combined width of the two side angles should be wider than the beam in order provide a suitable bearing length of the slab. The temperature of the outer 50 mm of the exposed leg of the angle may be taken as the bottom flange temperature, θ_1, and for analysis purposes, its average temperature may be taken as $(\theta_1 + \theta_3)/2$.

The reduced bending resistance of the embedded steel section may be determined as follows:

- The plastic neutral axis depth is determined by equating the reduced tension and compression forces based on the cross-sectional areas of these elements multiplied by their strength reduction factors - see Figure 2. It is generally found that the plastic neutral axis lies at or close to the top flange of the steel section.
- The bending resistance is determined by taking moments of the reduced resistance of each element multiplied by the distance from the neutral axis. This includes the steel section and shelf angles but not the concrete.
- The reduced bending resistance in fire is then given as a ratio of the bending resistance of the steel section in normal conditions ignoring the shelf angles.

Simplified design of shelf angle floors beams in fire

The load ratio that may be supported in fire conditions depends on the shape and depth of the steel section, the relative cross-sectional area of the shelf angles and the depth of concrete. Lighter UB sections will benefit more from the effect of the partial encasement than heavy UC sections. For an approximate design, Table 4 may be used to obtain the maximum load ratio that may be applied at the fire limit state depending on the steel section and fire resistance period. Where data is not presented in this table, such as for the 90 minute fire resistance case with low load ratios, the precise configuration may be analysed by thermal modelling. This is cost-effective if the same or similar details are used in a large project or in other projects.

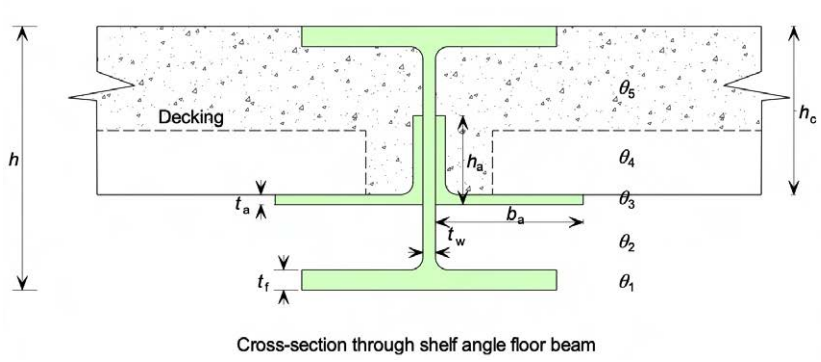


Figure 2: Plastic bending resistance of a shelf angle floor beam in fire using a UC section in this case

	UB Sections		UC Sections
Fire resistance	$h/h_c < 1.6$	$h/h_c < 2$	$h/h_c < 1.6$
	$M_{Rd,fi}/M_{Rd}$	$M_{Rd,fi}/M_{Rd}$	$M_{Rd,fi}/M_{Rd}$
30 mins	≤ 0.65	≤ 0.50	≤ 0.60
60 mins	≤ 0.35	≤ 0.25	≤ 0.30
90 mins	≤ 0.20	Not presented	Not presented

Table 4: Maximum load ratios for unprotected partially encased UB and UC sections with side angles supporting composite slabs

In Table 4:
$M_{Rd,fi}$ is the reduced bending resistance of the partially encased section in fire conditions
M_{Rd} is the bending resistance of the UB or UC section in normal conditions
h is the beam depth and h_c is slab depth

It is also generally the case that the peak temperature at the top of the flange does not exceed the limit for insulation at 60 minutes fire exposure provided the web thickness does not exceed 18 mm or as substantiated by thermal modelling.

Where, the exposed part of the steel section is fire protected, the required fire protection of a shelf angle floor beam or a partially encased beam may be determined from the section factor of the exposed part of the section.

This method does not apply for RHS sections with side angles or a welded bottom plate (known as a slim floor beam) and in this case, the temperatures should be obtained by thermal modelling as the temperatures in the web of the RHS will be higher than for a UC section. Nevertheless, 60 minutes fire resistance can often be achieved in the case of an RHS slim floor beam and 30 minutes for an RHS section with shelf angles.

1 BS 5950-8:2003. *Structural use of steelwork in building – Part 8: Code of practice for fire resistant design*, BSI, 2003

2 *Fire resistant design of steel structures – A handbook to BS 5950: Part 8*, SCI, 1990, Lawson, R, M and Newman, G, M. (available on Steelbiz)

3 *The fire resistance of shelf angle floor beams to BS 5950: Part 8* Newman, G, M., SCI, 1993, (available on Steelbiz)

4 BS EN 1993-1-2:2005. *Eurocode 3: Design of steel structures – Part 1-2: General rules – Structural fire design*, BSI, 2006

AD 453:
Accumulated deviations in erected steelwork

Questions about tolerances continue to arrive at SCI's Advisory Desk – often concerning the potential to sum all the possible deviations to reach a (usually large) tolerance on the final position of a component.

The suggestion is that, (for example) the base of a column can be out of position, and the column can be out-of-plumb, and the connections for a façade beam can be out of position, and the beam itself can have a lack of straightness. Combine that situation with some fabricated bracket (with its own set of tolerances) connected to the beam and the potential for a large deviation at measured locations is obvious.

The National Structural Steelwork Specification (NSSS), which is now in its 7th Edition, deals with this by adopting a "root sum of the squares" approach. The accumulated sum of several independent sources of deviation (Δ1, Δ2, Δ3 etc) is given by:

$$\Delta_{sum} = \sqrt{\Delta_1^2 + \Delta_2^2 + \Delta_3^2 \text{ etc}}$$

SCI advice is that when certain locations are critical (usually at interfaces with other components), it is much better to build in provision for adjustment than to argue about tolerances later.

Contact: **Graham Couchman**
Tel: **01344 636555**
Email: **advisory@steel-sci.com**

New and revised codes & standards

From BSI Updates October 2020

BS EN PUBLICATIONS

BS 8579:2020
Guide to the design of balconies and terraces
no current standard is superseded

BS EN PUBLICATIONS

BS EN ISO 2560:2020
Welding consumables. Covered electrodes for manual metal arc welding of non-alloy and fine grain steels. Classification
supersedes BS EN ISO 2560:2009

BS EN ISO 11463:2020
Corrosion of metals and alloys. Guidelines for the evaluation of pitting corrosion
supersedes BS EN ISO 11463:2008

BS EN ISO 14341:2020
Welding consumables. Wire electrodes and weld deposits for gas shielded metal arc welding of non alloy and fine grain steels. Classification
supersedes BS EN ISO 14341:2011

BS IMPLEMENTATIONS

BS ISO 6707-1:2020
Buildings and civil engineering works. Vocabulary. General terms
supersedes BS ISO 6707-1:2017

BS ISO 16573-1:2020
Steel. Measurement method for the evaluation of hydrogen embrittlement resistance of high strength steels. Constant load test
supersedes BS ISO 16573:2015

BS ISO 22858:2020
Corrosion of metals and alloys. Electrochemical measurements. Test method for monitoring atmospheric corrosion
no current standard is superseded

NEW WORK STARTED

EN XXX
Execution of steel structures and aluminium structures. Environmental Product Declarations. Product category rules complementary to EN 15804 for Steel, Iron and Aluminium structural products for use in construction works.
will supersede None

ISO/TR 3834-6
Quality requirements for fusion welding of metallic materials. Guidelines on implementing ISO 3834
will supersede PD CEN ISO/TR 3834-6:2007

DRAFTS FOR PUBLIC COMMENT

20/30392670 DC
BS EN 1990 Eurocode. Basis of structural and geotechnical design
Comments for the above document were required by 26 October, 2020

20/30414381 DC
BS EN 1993-1-1 Eurocode 3. Design of steel structures. General rules and rules for buildings
Comments for the above document were required by 26 October, 2020

20/30422209 DC
PD 7974-7 AMD1 Application of fire safety engineering principles to the design of buildings. Probabilistic risk assessment
Comments for the above document were required by 23 October, 2020

CEN EUROPEAN STANDARDS

EN 10210-3:2020
Hot finished steel structural hollow sections. Technical delivery conditions for high strength and weather resistant steels

EN 10219-3:2020
Cold formed welded steel structural hollow sections. Technical delivery conditions for high strength and weather resistant steels

NSC online

more that just a magazine

It's a digimag.

You can read this issue and all previous issues of NSC going back to 2005 online as digital magazines. You can read it on your computer, your tablet or your phone. And it comes with enhancements like links to further information on steelconstruction.info, and the ability to share, bookmark, print and download pages.

It's a website.

All the content of NSC is also available on our website at newsteelconstruction.com. Like the magazine, the front page is divided into sections like News, Features and Technical. Once again, it's all cross referenced with links to steelconstruction.info, and contains extra video content. And it's all fully searchable with information going back to January 2005.

House and Studio

FROM
Building with Steel
November 1970

1

Richard + Su Rogers believe in using available materials to create individual houses by industrialised techniques. John Young here describes two recent buildings and outlines the next steps in the development of the concept.

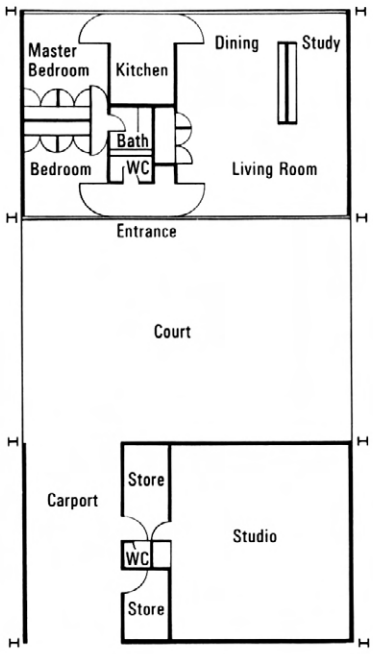
Richard + Su Rogers have spent the last few years developing a series of houses which offer the users an environment which they can adapt, add to, and change at will. Their eventual goal is to develop houses as off-the-peg consumer items, which offer the potential home-seeker a kit of parts, with unlimited possibilities for freedom of choice and identity, and which can be bought just as easily as a car can be bought today.

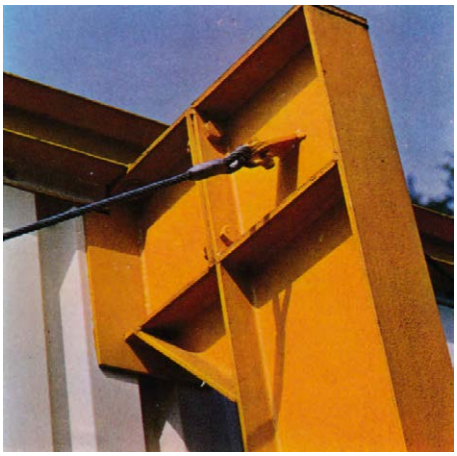
However, they firmly believe that serious comparisons with the production techniques of the motor industry are largely irrelevant, since it is unlikely that the demands of the UK market could ever justify the capital outlay on plant for the mass-production of houses. Instead, the Rogers team uses available technology and materials, already proven in the transport, aerospace and refrigeration industries. Their buildings have few elements and are assembled from largely factory finished, maintenance-free components using the minimum of site labour.

Two houses have been completed this year in the Rogers building programme, both single storey, one at Ulting in Essex, the other in Wimbledon. Both sites are long and narrow, and the planning has been organized for maximum privacy whereby each house has two separate elements separated by a 40ft wide court.

The Ulting house has a long west view into an orchard and looks east across the court towards the windowless rooflit studio. Subsequent owners can remove wall panels on the studio and turn it into a second house or make it into an extension of the first, either with a corridor link, or by developing the linear growth. The Wimbledon house has a separate flatlet and pottery studio which acts as a sound barrier between the house and a major road.

To allow for growth and change, both houses have clear span steel structures permitting maximum demountability and re-use of the enclosing envelope and internal partitions. Structure consists of rigid portal frames spanning 45ft, shop fabricated from 12 × 5 × 25 lb I-beams. The Ulting house uses steel wires and turnbuckles for wind bracing between portals, with stiffening in the horizontal plane achieved by the corrugated steel roof deck acting as a diaphragm. The deck has a 2½in deep profile with ribs at 6in centres which dictate the partitioning module, and the factory-applied vinyl-based coating is left as an exposed ceiling. The walls are clad in white Colorsteel corrugated sheet using shot-fired fasteners and selascrews. Insulation is achieved with a plasterboard-based, dry-lining system. Partitions are wedged between floor and deck, and the concentrated service core containing bathroom, shower, kitchen, storage and warm-air heating is the only





2


3


4


5

restriction on planning flexibility.

Whereas in the Ulting house, the steel structure is exposed and completely articulated from the enclosing envelope, at Wimbledon it is brought inside the skin to eliminate maintenance of the steelwork. The cladding system is a fully-finished, maintenance-free, sandwich panel with an expanded polystyrene core. Originally developed in the USA for refrigerated transport, this is its first application in the UK. Windows are either full height double-glazed in sliding steel frames, or neoprene zipped into the panels, and all internal subdivision is in the form of sliding partitions enabling the whole plan to be opened up or closed at will.

In both the Ulting and Wimbledon houses, minimal tolerances were possible right from the erection of the steel frames (+⅛in over 45ft) and maintained throughout the job, departing radically from the theory of first and second fixings in traditional methods of construction. Cost per square foot is comparable with traditional building, but this is based on one-off only. Substantial reductions would be possible with any quantity, since this form of construction is material rather than labour intensive, and consequently any bulk-buying of components would reduce costs significantly.

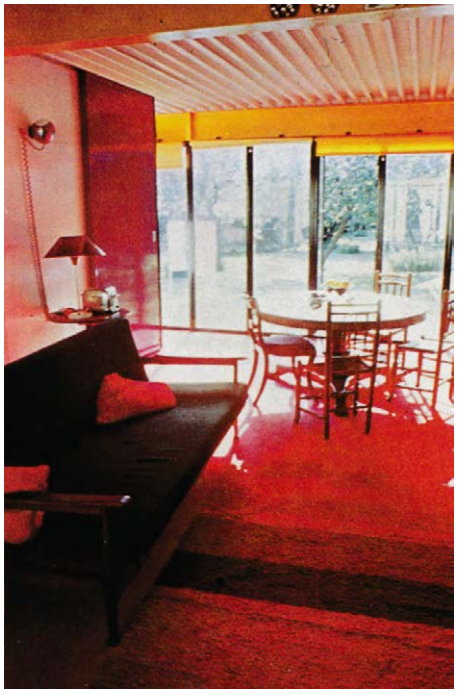
These two designs represented Great Britain at the Paris Biennale, and the Rogers' latest work on housing won second prize in a national competition last year. This current work attempts to combine structure and envelope to produce a long-span monocoque structure based on a sheet steel and expanded urethane sandwich. The prototype will begin this winter, and incorporates a light RHS framework within the panel thickness, and rigidized Stelvetite for the skins. It will also be the first two-storey house in their building programme.

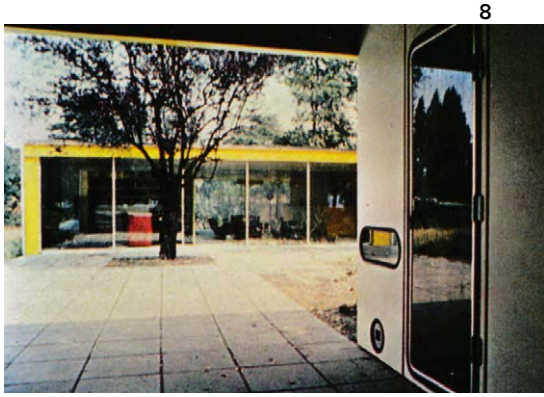
The Rogers team are developing houses which respect the disciplines of production rather than exploit the limitations of tradition and imitation and the results might just capture the imagination of the house-buying public.

1. The house from the car port
2. Knee of portal frame and bracing wire
3. Braced end of house
4. Studio and car port
5. Side elevation of studio
6. Studio interior
7. Dining room showing steel ceiling
8. The Rogers' house at Wimbledon

Architects Richard+ Su Rogers
Consulting Engineer Anthony Hunt & Partners


6


7


8

Steelwork contractors for buildings

Membership of BCSA is open to any Steelwork Contractor who has a fabrication facility within the United Kingdom or Republic of Ireland. Details of BCSA membership and services can be obtained from

Lorraine MacKinder, Marketing and Membership Administrator,
The British Constructional Steelwork Association Limited, Unit 4 Hayfield Business Park, Field Lane, Auckley, Doncaster DN9 3FL
Tel: 020 7747 8121 Email: *lorraine.mackinder@steelconstruction.org*

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, ● = Member)

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.

Company name	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 £3,000,000
Adey Steel Ltd	01509 556677	●		●	●	●	●	●	●	●	●			●	●	✔	3		●	Up to £4,000,000
Adstone Construction Ltd	01905 794561			●	●	●	●							●		✔	2	✔	●	Up to £3,000,000
Advanced Fabrications Poyle Ltd	01753 653617				●	●	●	●		●	●			●	●	✔	2			Up to £800,000
AJ Engineering & Construction Services Ltd	01309 671919			●	●		●		●	●	●			●	●	✔	4		●	Up to £3,000,000
Angle Ring Company Ltd	0121 557 7241												●			✔	4			Up to £1,400,000*
Arminhall Engineering Ltd	01799 524510	●			●	●		●		●	●			●	●	✔	2			Up to £800,000
Arromax Structures Ltd	01623 747466			●	●	●	●	●	●	●	●				●		2			Up to £800,000
ASME Engineering Ltd	020 8966 7150			●	●	●		●		●	●			●	●	✔	4		●	Up to £4,000,000
Atlasco Constructional Engineers Ltd	01782 564711			●	●	●	●			●	●			●	●	✔	2			Up to £1,400,000
B D Structures Ltd	01942 817770			●	●	●	●				●	●		●	●	✔	2	✔	●	Up to £1,400,000
Ballykine Structural Engineers Ltd	028 9756 2560			●	●	●	●	●				●			●	✔	4			Up to £1,400,000
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 £6,000,000
Border Steelwork Structures Ltd	01228 548744			●	●	●	●			●	●				●		4			Up to £3,000,000
Bourne Group Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●		●	●	●	✔	4			Up to £6,000,000
Cairnhill Structures Ltd	01236 449393	●			●	●	●	●	●	●				●	●	✔	4		●	Up to £4,000,000
Caunton Engineering Ltd	01773 531111	●	●	●	●	●	●	●		●	●	●		●	●	✔	4	✔	●	Above £6,000,000
Cementation Fabrications	0300 105 0135	●			●		●	●	●	●	●		●	●	●	✔	3		●	Up to £6,000,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4		●	Above £6,000,000
CMF Ltd	020 8844 0940				●		●	●		●	●				●	✔	4			Up to £6,000,000
Cook Fabrications Ltd	01303 893011			●	●		●			●	●			●	●		2			Up to £1,400,000
Coventry Construction Ltd	024 7646 4484			●	●	●	●		●	●	●			●	●	✔	4			Up to £1,400,000
D H Structures Ltd	01785 246269			●	●		●				●						2			Up to £40,000
D Hughes Welding & Fabrication Ltd	01248 421104				●	●	●	●	●	●	●		●	●	●	✔	4			Up to £400,000
Duggan Steel	00 353 29 70072	●	●	●	●	●	●	●	●		●				●	✔	4			Up to £6,000,000
ECS Engineering Services Ltd	01773 860001	●		●	●	●	●	●	●	●	●			●	●	✔	4		●	Up to £3,000,000
Elland Steel Structures Ltd	01422 380262		●	●	●	●	●	●	●	●	●	●		●	●	✔	4	✔	●	Up to £6,000,000
EvadX Ltd	01745 336413			●	●	●	●	●		●	●	●			●	✔	3		●	Up to £3,000,000
Four Bay Structures Ltd	01603 758141			●	●	●	●	●		●	●			●	●		2			Up to £1,400,000
Four-Tees Engineers Ltd	01489 885899	●			●		●	●	●	●	●		●	●	●	✔	3		●	Up to £2,000,000
Fox Bros Engineering Ltd	00 353 53 942 1677			●	●	●	●	●		●	●				●		2			Up to £2,000,000
Gorge Fabrications Ltd	0121 522 5770				●	●	●	●		●				●	●	✔	2			Up to £1,400,000
G.R. Carr (Essex) Ltd	01286 535501	●		●	●			●			●			●	●	✔	4			Up to £800,000
Company name	**Tel**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**Q**	**R**	**S**	**QM**	**FPC**	**BIM**	**SCM**	**Guide Contract Value (1)**

Company name	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	BIM	SCM	Guide Contract Value (1)
H Young Structures Ltd	01953 601881			●	●	●	●	●						●	●	✔	4	✔	●	Up to £3,000,000
Had Fab Ltd	01875 611711				●				●	●	●				●	✔	4			Up to £3,000,000
Hambleton Steel Ltd	01748 810598		●	●	●	●	●	●			●	●		●		✔	4		●	Up to £6,000,000
Hescott Engineering Company Ltd	01324 556610			●	●	●	●			●				●	●	✔	2			Up to £3,000,000
Intersteels Ltd	01322 337766	●			●	●	●	●	●	●			●	●	●	✔	3			Up to £3,000,000
J & A Plant Ltd	01942 713511				●	●									●		4			Up to £40,000
James Killelea & Co Ltd	01706 229411		●	●	●	●	●				●	●		●			4			Up to £6,000,000*
Kiernan Structural Steel Ltd	00 353 43 334 1445	●		●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £6,000,000
Kloeckner Metals UK Westok	0113 205 5270												●			✔	4			Up to £6,000,000
LA Metalworks Ltd	01707 256290				●	●				●	●			●	●	✔	2			Up to £2,000,000
Leach Structural Steelwork Ltd	01995 640133			●	●	●	●	●			●					✔	2		●	Up to £6,000,000
Legge Steel (Fabrications) Ltd	01592 205320			●	●		●		●	●	●			●	●		3			Up to £800,000
Littleton Steel Ltd	01275 333431				●					●	●			●	●	✔	3			Up to £1,400,000
M Hasson & Sons Ltd	028 2957 1281			●	●	●	●	●	●	●	●				●	✔	4		●	Up to £3,000,000
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
Mifflin Construction Ltd	01568 613311			●	●	●	●				●						3			Up to £3,000,000
Murphy International Ltd	00 353 45 431384	●			●		●	●	●		●				●	✔	4			Up to £1,400,000
Newbridge Engineering Ltd	01429 866722	●	●	●	●	●	●	●			●	●				✔	4		●	Up to £2,000,000
North Lincs Structures	01724 855512			●	●					●	●				●		2			Up to £800,000
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									●					●	✔	2			Up to £1,400,000*
PMS Fabrications Ltd	01228 599090			●	●	●	●		●	●	●			●	●		3			Up to £1,400,000
Robinson Structures Ltd	01332 574711			●	●	●	●				●				●	✔	3			Up to £2,000,000
S H Structures Ltd	01977 681931	●		●	●	●	●	●	●	●	●	●			●	✔	4	✔	●	Up to £3,000,000
SAH Luton Ltd	01582 805741			●	●	●				●	●			●	●		2			Up to £800,000
SDM Fabrication Ltd	01354 660895	●	●	●	●	●	●				●			●	●	✔	4			Up to £2,000,000
Severfield plc	01845 577896	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £6,000,000
SGC Steel Fabrication	01704 531286				●					●				●	●	✔	2			Up to £200,000
Shaun Hodgson Engineering Ltd	01553 766499	●		●	●		●			●	●			●	●	✔	3			Up to £1,400,000
Shipley Structures Ltd	01400 251480			●	●	●	●		●	●	●			●	●		2			Up to £3,000,000
Snashall Steel Fabrications Co Ltd	01300 345588			●	●	●	●	●			●				●		2	✔		Up to £2,000,000
South Durham Structures Ltd	01388 777350			●	●	●				●					●		2			Up to £800,000
Southern Fabrications (Sussex) Ltd	01243 649000				●	●				●	●			●	●	✔	2			Up to £1,400,000
Steel & Roofing Systems	00 353 56 444 1855	●		●	●	●	●				●	●		●	●	✔	4			Up to £4,000,000
Structural Fabrications Ltd	01332 747400	●			●	●	●	●	●	●	●			●	●	✔	3		●	Up to £1,400,000
Taunton Fabrications Ltd	01823 324266				●					●	●				●	✔	2		●	Up to £2,000,000
Taziker Industrial Ltd	01204 468080	●		●	●		●			●	●		●	●	●	✔	3			Above £6,000,000
Temple Mill Fabrications Ltd	01623 741720			●	●	●	●			●	●			●	●	✔	2			Up to £400,000
Traditional Structures Ltd	01922 414172			●	●	●	●	●	●		●			●	●	✔	3	✔	●	Up to £2,000,000
TSI Structures Ltd	01603 720031			●	●	●	●	●			●			●			2	✔		Up to £2,000,000
Underhill Engineering Ltd	01752 752483				●		●	●	●	●	●			●	●	✔	4	✔		Up to £3,000,000
W I G Engineering Ltd	01869 320515				●					●					●	✔	2			Up to £400,000
Walter Watson Ltd	028 4377 8711			●	●	●	●	●				●				✔	4			Above £6,000,000
Westbury Park Engineering Ltd	01373 825500	●		●	●	●	●	●	●	●	●				●	✔	4		●	Up to £800,000
William Haley Engineering Ltd	01278 760591				●	●	●									✔	4		●	Up to £6,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £6,000,000
WT Fabrications (NE) Ltd	01642 691191			●	●	●	●				●			●	●	✔	4			Up to £40,000
Company name	**Tel**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**Q**	**R**	**S**	**QM**	**FPC**	**BIM**	**SCM**	**Guide Contract Value (1)**

Steelwork contractors for bridgeworks

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

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

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

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)
AJ Engineering & Construction Services Ltd	01309 671919	●			●	●	●	●	●			●	✓	4				●	Up to £3,000,000
Billington Structures Ltd	01226 340666	●		●	●	●	●					●	✓	4	✓	✓	✓	●	Above £6,000,000
Bourne Group Ltd	01202 746666	●			●	●				●		●	✓	4	✓		✓	●	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●	●	●	●	●	●	●	●	●	●	●	✓	4			✓		Up to £6,000,000
Cairnhill Structures Ltd	01236 449393	●	●	●	●	●	●	●		●	●	●	✓	4			✓	●	Up to £4,000,000
Cementation Fabrications	0300 105 0135	●		●	●	●	●					●	✓	3			✓	●	Up to £6,000,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £6,000,000
D Hughes Welding & Fabrication Ltd	01248 421104	●		●		●			●	●	●	●	✓	4			✓		Up to £400,000
Donyal Engineering Ltd	01207 270909	●		●						●	●	●	✓	3			✓	●	Up to £1,400,000
ECS Engineering Services Ltd	01773 860001	●			●	●	●		●			●	✓	3				●	Up to £3,000,000
Four-Tees Engineers Ltd	01489 885899	●		●	●	●	●		●	●	●	●	✓	3			✓	●	Up to £2,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445	●			●	●				●	●	●	✓	4	✓		✓	●	Above £6,000,000
M Hasson & Sons Ltd	028 2957 1281	●	●	●	●	●	●	●	●	●		●	✓	4			✓	●	Up to £3,000,000
Millar Callaghan Engineering Services Ltd	01294 217711	●	●	●	●	●	●	●	●	●	●	●	✓	4			✓		Up to £1,400,000
Murphy International Ltd	00 353 45 431384	●	●	●	●	●	●					●	✓	4			✓		Up to £1,400,000
Nusteel Structures Ltd	01303 268112	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Up to £6,000,000
S H Structures Ltd	01977 681931	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓		✓	●	Up to £3,000,000
Severfield (UK) Ltd	01204 699999	●	●	●	●	●	●	●	●	●	●	●	✓	4	✓	✓	✓	●	Above £6,000,000
Shaun Hodgson Engineering Ltd	01553 766499											●	✓	3					Up to £1,400,000
Structural Fabrications Ltd	01332 747400	●		●	●	●	●			●	●	●	✓	3				●	Up to £1,400,000
Taziker Industrial Ltd	01204 468080	●		●	●	●	●	●	●		●	●	✓	3		✓	✓		Above £6,000,000
Underhill Engineering Ltd	01752 752483	●	●	●	●	●				●	●	●	✓	4	✓		✓		Up to £3,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●		●	✓	4	✓	✓	✓	●	Above £6,000,000
Non-BCSA member																			
Allerton Steel Ltd	01609 774471	●		●	●	●	●	●			●	●		4	✓				Up to £4,000,000
Centregreat Engineering Ltd	029 2046 5683	●		●	●	●	●	●	●	●	●	●	✓	4					Up to £2,000,000
Cimolai SpA	01223 836299	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓		Above £6,000,000
CTS Bridges Ltd	01484 606416	●	●	●	●	●	●	●	●	●		●	✓	4			✓	●	Up to £1,400,000
Ekspan Ltd	0114 261 1126	●				●			●	●	●	●	✓	2					Up to £400,000
Eiffage Metal	00 33 388 946 856	●	●		●		●	●	●			●	✓	4					Above £6,000,000
Francis & Lewis International Ltd	01452 722200											●	✓	4			✓	●	Up to £2,000,000
Harrisons Engineering (Lancashire) Ltd	01254 823993			●	●	●	●	●	●	●		●	✓	3		✓			Up to £1,400,000
Hollandia Infra BV	00 31 180 540 540	●	●	●	●	●	●	●	●	●	●	●	✓	4					Above £6,000,000*
HS Carlsteel Engineering Ltd	020 8312 1879									●	●	●	✓	3			✓		Up to £200,000
IHC Engineering (UK) Ltd	01773 861734											●	✓	3			✓		Up to £400,000
In-Spec Manufacturing Ltd	01642 210716									●	●	●	✓	4			✓		Up to £800,000
Kelly's Welders & Blacksmiths Ltd	01383 512 517											●	✓	2			✓		Up to £200,000
Lanarkshire Welding Company Ltd	01698 264271	●	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Up to £3,000,000
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

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	08457 504030

Company name	Tel
Inspire Insurance Services	02476 998924
Keiths Welding Limited	07791 432 078
Paul Hulme Engineering Ltd	07801 216858

Company name	Tel
Sandberg LLP	020 7565 7000
Structural & Weld Testing Services Ltd	01795 420264
SUM Ltd	0113 242 7390

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

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

SCM
Steel Construction Sustainability Charter
● = Gold,
● = Silver,
● = Member

SfL
Steel for Life Sponsor

Structural components

Company name	Tel	QM	CE	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			
Fabsec Ltd	01937 840641		N/A				
Farrat Isolevel	0161 924 1600	✓	N/A				
FLI Structures	01452 722200	✓	M	4	20	●	
Hadley Industries Plc	0121 555 1342	✓	M	4		●	
Hi-Span Ltd	01953 603081	✓	M	4		●	
Jamestown Manufacturing Ltd	**00 353 45 434288**	✓	**M**	**4**	**20**		**Headline**
Kingspan Structural Products	01944 712000	✓	M	4		●	
Lionweld Group	01642 233238	✓	M	4			
MSW UK Ltd	0115 946 2316		D/I				
Prodeck-Fixing Ltd	01278 780586	✓	D/I				
Structural Metal Decks Ltd	01202 718898	✓	M	2			
Stud-Deck Services Ltd	01335 390069		D/I				
Tata Steel – ComFlor	**01244 892199**		**M**				**Silver**
voestalpine Metsec plc	**0121 601 6000**	✓	**M**	**4**		●	**Gold**

Computer software

Company name	Tel	QM	CE	FPC	NHSS	SCM	SfL
Idea Statica UK Ltd	02035 799397		N/A				
StruMIS Ltd	01332 545800		N/A				
Trimble Solutions (UK) Ltd	**0113 887 9790**		**N/A**				**Silver**

Steel producers

Company name	Tel	QM	CE	FPC	NHSS	SCM	SfL
British Steel Ltd	01724 404040	✓	M				
Tata Steel – Tubes	**01536 402121**	✓	**M**				**Silver**

Manufacturing equipment

Company name	Tel	QM	CE	FPC	NHSS	SCM	SfL
Behringer Ltd	01296 668259		N/A				
Cutmaster Machines (UK) Ltd	**07799 740191**		**N/A**				**Bronze**
Ficep (UK) Ltd	**01924 223530**		**N/A**				**Gold**
Kaltenbach Ltd	**01234 213201**		**N/A**				**Silver**
Lincoln Electric (UK) Ltd	0114 287 2401	✓	N/A				
Peddinghaus Corporation UK Ltd	**01952 200377**		**N/A**				**Gold**
Wightman Stewart (WJ) Ltd	01422 823801		N/A				

Protective systems

Company name	Tel	QM	CE	FPC	NHSS	SCM	SfL
Forward Protective Coatings Ltd	01623 748323	✓	N/A				
Hempel UK Ltd	**01633 874024**	✓	**N/A**				**Bronze**
Highland Metals Ltd	01343 548855	✓	N/A				
International Paint Ltd	0191 469 6111	✓	N/A				
Jack Tighe Ltd	**01302 880360**	✓	**N/A**		**19A**		**Silver**
Joseph Ash Galvanizing	**01246 854650**	✓	**N/A**				**Bronze**
Jotun Paints (Europe) Ltd	01724 400000	✓	N/A				
PPG Architectural Coatings UK & Ireland	01924 354233	✓	N/A				
Sherwin-Williams Protective & Marine Coatings	**01204 521771**	✓	**N/A**			●	**Bronze**
Vale Protective Coatings Ltd	01949 869784		N/A				
Wedge Group Galvanizing Ltd	**01909 486384**	✓	**N/A**				**Gold**

Safety systems

Company name	Tel	QM	CE	FPC	NHSS	SCM	SfL
easi-edge Ltd	01777 870901	✓	N/A			●	

Steel stockholders

Company name	Tel	QM	CE	FPC	NHSS	SCM	SfL
AJN Steelstock Ltd	**01638 555500**	✓	**M**	**4**			**Bronze**
Arcelor Mittal Distribution - Scunthorpe	01724 810810	✓	D/I	4	3B		
Barrett Steel Services Limited	**01274 682281**	✓	**M**	**4**	**3B**		**Headline**
British Steel Distribution	01642 405040	✓	D/I	4			
Cleveland Steel & Tubes Ltd	**01845 577789**	✓	**M**	**3**			**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**		**3B**		**Gold**
Rainham Steel Co Ltd	01708 522311	✓	D/I	4	3B		

Structural fasteners

Company name	Tel	QM	CE	FPC	NHSS	SCM	SfL
BAPP Group Ltd	01226 383824	✓	M		3		
Cooper & Turner Ltd	0114 256 0057	✓	M		3		
Henry Venables Products Ltd T/A Blind Bolt	01299 272955		M				
Lindapter International	01274 521444	✓	M				
Tension Control Bolts Ltd	**01978 661122**	✓	**M**		**3**		**Bronze**

Welding equipment and consumables

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

STRUMIS

V10.4

NOW INTRODUCING
PROGRESS INVOICING
SAVING YOU TIME AND MONEY

A WORLD LEADING STEEL FABRICATION MANAGEMENT INFORMATION SOFTWARE SUITE, USED WORLDWIDE TO REDUCE COSTS WHILE MAXIMISING PRODUCTIVITY AND INCREASING PROFITABILITY.

NEW FEATURES INCLUDE:
ADDITIONAL ESTIMATING FEATURES
SMARTER VARIATIONS LOGIC
ENHANCED NESTING ENGINE
GLOBAL DOCUMENT PRINT FUNCTION
APPLICATION FOR PAYMENT FEATURE

COME SEE THE STRUMIS FEATURES THAT OTHER PROVIDERS ARE ONLY TALKING ABOUT.
OTHERS PROMISE; WE DELIVER.

THE FUTURE OF STEEL FABRICATION.

Stay connected to STRUMIS:

STRUMIS

BRINGING STRUCTURE TO STEEL

SALES@STRUMIS.COM | 01332 545800 | WWW.STRUMIS.COM

SOFTWARE BY STRUMIS LTD. PART OF THE GLOBAL RDS GROUP