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# NSC

Trusses support church

May 2020
Vol 28 No 5


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**Cover Image**
Lord's Cricket Ground redevelopment
Main client: Marylebone Cricket Club (MCC)
Architect: Wilkinson Eyre
Main contractor: ISG
Structural engineer: Buro Happold
Steelwork contractor: Severfield
Steel tonnage: 2,300t

The images used in this month's project features were all taken before the new coronavirus social distancing restrictions came into force. As such, some may show operatives in close proximity to each other.

May 2020
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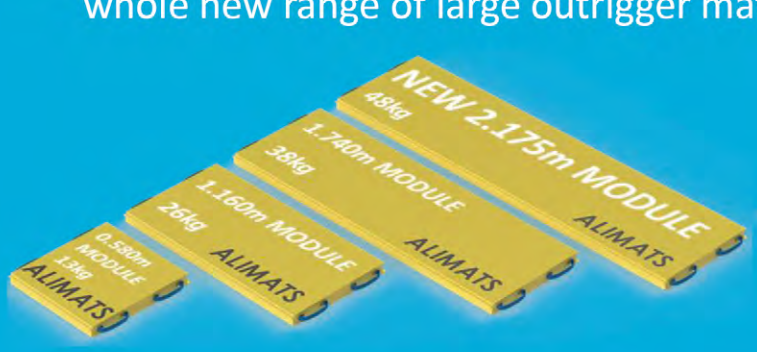



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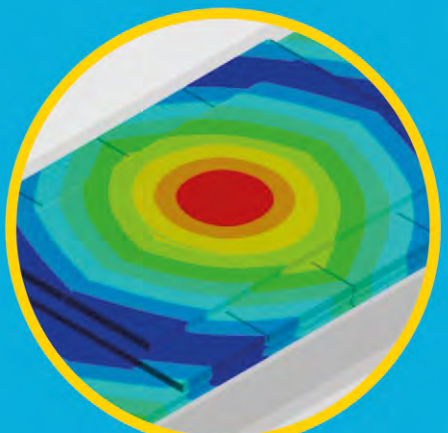

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# Slow return to 'normal' begins

Nick Barrett - Editor

A phased return towards the full level of working on construction sites in England, Wales and Northern Ireland was underway as we went to press, and an industry's workforce was about to learn for the first time how to cope with safe working requirements forced on them by a pandemic. Scottish sites and those in Ireland of course remained closed by government order unless they were engaged on 'essential' projects.

Social distancing is the key strategy, although there will be others such as providing face masks and having hand sanitisers available at key locations. Social distancing on scaffolding will be a challenge as the boards are nowhere near wide enough to allow a two metres distance to be maintained. To help ensure that new safe working guidelines are adhered to a new category of site supervision is being introduced, the COVID-19 Supervisor.

The challenges for the steel construction sector have had to be met in factories and design and administration offices as well as on sites. Office based staff have mostly been working from home and, like the rest of the world it seems, have been using services like Teams for meetings.

It is easier to introduce new working methods like safe distancing in the factory-controlled conditions of workshops, which is where most steel construction takes place, than on congested construction sites. Very few steelwork contractors have closed their workshops although most have furloughed some employees, and there has since been a steady return to work as the lockdown continues.

In the workshops, one-way systems have been introduced to make maintaining safe distances easier. Toolbox talks have been adopted to help make sure the new hygiene and other measures like cleaning handles and controls that will be shared by other users are understood by everyone.

The government is reportedly considering staggered start and finish work times as part of its back to work plans, and the steel construction sector can already report considerable success with the introduction of these sorts of measures over the past few weeks. Staggered break times have also been introduced and extra welfare facilities put in place to avoid overcrowding canteens.

On site, steel construction's offsite fabrication advantages obviously come to the fore. Main contractors have introduced their own measures, which BCSA members fully support. Some have adopted the BCSA Safe Site Handover Certificate processes, which were revised by BCSA for COVID-19, as one way to help promote safe working. Much of a steelwork contractor's on-site work is carried out from mobile elevated working platforms, so social distancing is seldom an issue. Most workers in steel construction work locally in workshops, but erectors have to travel and finding accommodation for them has been a challenge due to hotels and B&B's being closed.

Few projects seem to have been cancelled, but many have been delayed. Encouragingly, there has been a steady flow of enquiries and tenders are being prepared. Some BCSA members have even won new work in the past few weeks. All obviously yearn for a return to 'normal', or to see what the 'new normal' will look like.

As *NSC* went to press construction looked like being among the first industries, along with manufacturing, to be told to return to work, safely. From the experience of BCSA members so far, it looks like it can be done.

# Record number of high-rise buildings in London for 2019

Sixty tall buildings, of more than 20-storeys, were completed in Greater London in 2019, the highest number on record and an increase of 140% from the number in 2018.

The data, from the latest New London Architecture (NLA) annual London Tall Buildings Survey, also reported that planning permissions continued to rise, by 7% in 2019, suggesting an increasing willingness of planning committees to approve tall building proposals.

The vast majority of tall building proposals are located within inner London. However, the survey shows that there has been a further shift towards outer zones; 13 of the 20 outer London boroughs now contain tall buildings at various stages of the process. There was a noticeable increase in outer London boroughs, with 6% more tall buildings in the pipeline compared to 2018.

Peter Murray, Curator-in-chief of New London Architecture said: "These figures are for a period when the world was very different. COVID-19 means we will have to re-evaluate the direction of development in our cities. It raises questions about population growth in London, about property values and social quality."

Stuart Baillie, Head of Planning at Knight Frank, the report's Programme Champion and Research Partner, said: "London's tall buildings completion rate, which amounted to 60 in 2019, is quite staggering. Knight Frank's research found that there is a continued willingness from planning authorities to consider height positively, particularly in outer London boroughs where we have seen significant pipeline growth. Elsewhere we are seeing a fairly consistent number of new schemes coming into the planning system. Clearly, COVID-19 will impact the pipeline in 2020, but we're confident that planning policies, land availability and housing need in London are likely to facilitate a return to a stronger tall building pipeline in the medium term."

# Birmingham landmark building taking shape

Due to complete next year, 103 Colmore Row, which will be Birmingham's tallest office building, is already towering over the city landscape.

The 26-storey and 105m-high building will comprise 20,700m² of office space over 20 floors, and 700m² of restaurant space on the ground and top floors.

Designed by architects Doone Silver Kerr, the landmark building features a winter garden, an 18th floor terrace and multi-purpose lobby business lounges.

Rockspring Property Investment Managers LLP (Rockspring) and Sterling Property Ventures (Sterling), the development team behind the office tower, have selected BAM for the £80M build contract.

Michael Pryer, Partner and Fund Manager at Rockspring said: "Birmingham is the UK's most exciting regional city. The investment in transport infrastructure and its youthful demographics have made it a magnet for occupiers and inward investors.

"103 Colmore row will, without doubt, be the city's premier business address."

Severfield is fabricating, supplying and erecting the steelwork for the project. Some of the most significant steel elements for the job are four 'Mega Columns', each 20m-tall and weighing 20t. The columns will eventually form the four-storey-high ground floor winter garden and support the weight of the building.

# Creative space aplenty at new Soho development

Soho Estates' new Ilona Rose House Development is transforming a large swathe of land between London's Charing Cross Road and Greek Street into a new creative hub.

Occupying the plot previously occupied by the famous Foyle's book shop, Ilona Rose House is a new 27,800m² mixed-use development that will include ground floor shops and restaurants, office space on the upper eight floors including garden terraces, and a four-level basement that will house Warner Brother's European post-production studios, including a double-height 60-seat editing theatre.

Surrounding the building, a large portion of the site is dedicated to new public realm space with a new café and restaurant-lined mews linking Manette Street to Greek Street. The mews will also provide an entrance to the extensive subterranean creative office and post-production space.

Aiming to achieve a BREEAM 'Excellent' rating, the scheme also includes redevelopment of 14 Greek Street, a Grade II listed building, which will be protected and carefully restored. Next door at 12-13 Greek Street the façade of the building is being retained while eight affordable housing flats are constructed behind it.

The main building consists of a steel-framed superstructure, which is erected around a centrally-positioned concrete core.

Cellular steel beams, used to accommodate services within their depth, have been used throughout.

Working on behalf of main contractor Sir Robert McAlpine, William Hare is fabricating, supplying and erecting the steelwork.

Sir Robert McAlpine Project Director Allan Cameron said: "From the outset, William Hare has worked hand-in-hand with structural engineer Tier Consult to provide the most efficient solution with a key consideration given to buildability.

"With a fully coordinated and integrated 3D model in place prior to any site works commencing, all key interfaces have been resolved reducing the risk of any on-site clashes."

Ilona Rose House development is due to complete in 2021.

# Eurosteel conference postponed until 2021

Because of the ongoing coronavirus COVID-19 pandemic, the international Eurosteel conference, due to be held in Sheffield this September has been postponed until 1-3 September 2021.

The organisers said its local Organising Committee, in consultation with the International Steering Committee for Eurosteel 2020, has decided to postpone the conference and all submitted papers under review will be considered for inclusion at the rearranged event.

Delegates who have already registered for the September 2020 conference will be eligible for a full refund if they so wish.

The Eurosteel conference series started in 1996 and has run eight times in various European cities at three-year intervals.

# Fabrication completed for second mini-Gherkin

Steelwork contractor Caunton Engineering has completed work on its second miniature version of London's Swiss Re (Gherkin) building for the Constructionarium.

The Constructionarium is a not-for-profit organisation providing an innovative and 'hands-on' construction experience for students and professionals in the built environment sector.

Since 2003 over 12,000 delegates have attended Constructionarium to work in teams over six days to build one of their carefully designed projects. Each project is a scaled down replica of an iconic structure which mirrors the challenges of life on site and enables students to apply the knowledge they have gained in a practical and safe environment.

Caunton Engineering initially supplied a 12m-high mini-Gherkin in 2007 for the Constructionarium at Bircham Newton in Norfolk. A second similar structure has now been delivered to a new site in Southall, London.

According to Caunton Engineering, the aim for the new mini-Gherkin was to reduce the fabrication time and increase repetition, and also make it safer and quicker for site operatives to erect.

The steel frame for this new structure has been designed without a positive fixing to the ground slab. Instead, it is erected off a ground beam, which allows the structure to be more easily moved between different locations.

# Work starts on Leeds M1 distribution park

Construction work has begun on two distribution units, totalling 5,200m² at Logic Leeds, Muse Developments' flagship industrial and distribution hub next to Junction 45 of the M1.

National regeneration specialist Muse has already sold the two units to Phoenix Investment Management and Pegasus World respectively.

Phoenix Investment Management has purchased a 2,300m² unit, as part of its growing investment portfolio, while wholesale supplier of luxury hospitality textiles, Pegasus World, has taken an adjacent unit of 2,900m².

James Scott, Development Director at Muse, said: "We're delighted that work has now started on these two quality units, adding a further chapter to the success story of Logic Leeds.

"We're proud to be delivering quality buildings for both Phoenix and Pegasus at Logic. These new buildings represent our shared vision with Leeds City Region Enterprise Partnership to deliver a first-class destination for industrial and logistics organisations that benefits the whole city region. They are a further endorsement of the success of Logic Leeds.

Ivan Zhou, owner of Pegasus World, commented: "Pegasus is excited to be part of Logic Leeds. We're creating a state-of-the-art warehouse to be the super-hub of our fast-growing business, supplying high-quality textile products to hotels, restaurants and caterers across the UK."

Matt Brown, Director at Phoenix Investment Management, said: "We are delighted to have added a unit at Logic Leeds to our expanding investment portfolio. We've watched the development progress from afar and have been very impressed by the quality of the buildings delivered and the standard of the tenants that have chosen Logic to call home.'

## NEWS IN BRIEF

A turf cutting ceremony has marked construction work officially kicking-off for a new speculative office and laboratory space at the **Exeter Science Park**. The building will aim to be net zero carbon for operational energy as a result of innovative design features, including a 44kw roof-mounted solar PV panel system.

**Billington Holdings** has announced a record performance for the year ended 31 December 2019. Revenue increased by 35.7% to £104.9M and profit before tax increased by 20.4% to £5.9M. Billington Chief Executive Officer Mark Smith said: "I am very pleased that we have delivered a record performance in 2019, although these results will inevitably be overshadowed by the current global COVID-19 pandemic."

Developer **Cole Waterhouse** has submitted plans for a new mixed-use scheme that will create a new cultural, commercial and residential neighbourhood in the Digbeth area of Birmingham. The proposed development comprises almost 6,000m² of mixed creative, retail, leisure and workspace, and over 900 new homes with a mix of private sale and build to rent apartments that will help to meet the local housing need.

Architects **Hawkins\Brown** has secured planning consent for a 250-bed hotel in Glasgow city centre on behalf of Artisan Real Estate. The hotel will be located on the corner of St Vincent Street and Pitt Street and will help convert the previously commercial district into a thriving mixed-use quarter.

**Legal & General** has agreed to invest £150M in the first phase of Sheffield's West Bar Square development. The scheme is being developed by Urbo (West Bar), a joint venture between Urbo Regeneration and Peveril Securities, the development arm of the Bowmer and Kirkland Group. The first phase of development will comprise 18,500m² of Grade A office space, 350 'Build to Rent' homes, a multi-storey car park and high quality landscaped public spaces.

# PRESIDENT'S COLUMN

We're all acclimatising ourselves to new ways of working. For most steelwork contractors the restrictions have resulted in home working and social distancing in factories and offices, where being organised and planning work around the social distancing requirements is paramount. There were some mixed messages at the start of the lockdown, but this was a temporary measure to introduce better health and safety measures and the majority of sites in England and Wales are now open.

The social restrictions have now been in place for six weeks as thoughts focus on the future and the 'new normal'. Most of us have taken to virtual meetings using 'video conferencing' and while for many this was a new way of communicating, the benefits of not having to travel long distances for short meetings are clear enough. As one CEO put it, "for a meeting in London I usual get up at 5.30am catch the 7.30am to London, hold a meeting from 10.30 until 15.30 and take the 17.30 train home. With video conferencing I don't have to leave the office and I can have five meetings a day". The benefits of virtual meetings are obvious and its highly likely that the new normal will involve less travelling and more virtual meetings. It'll not be just the FD that likes that one, the dog gets an extra walk.

The industry is also looking forward and trying to gauge what the steelwork market will look like in Q3 and beyond. We may be concerned that clients could shelve projects during the lockdown and only proceed when the uncertainty is over. This will surely have an effect on the construction market in Q3 and Q4. This is why the BCSA wrote to the Rt Hon Alok Sharma MP, Secretary of State for Business, Energy and Industrial Strategy, urging him to encourage the public and private sectors not to suspend projects, but to continue with their schemes and, as a matter of urgency, progress with the infrastructure projects promised in the budget so that the work is brought on-stream later this year. I think this message was clear and I was very pleased to see HS2 recently get the green light. This is a sector that gets cash into the GDP very quickly, and that's really important for everyone. Every pound spent in infrastructure could generate nearly three into the GDP.

BCSA has also been trying to estimate the effects of the lockdown on the market for constructional steelwork. Assuming that the lockdown is in place for between 6 and 8 weeks and that construction sites continue to implement the social distancing guidelines, the estimate is that the effect will be to reduce the market by 46% in Q2, 5.1% in Q3 and to gain 5.5% in Q4. They also estimate the market will grow by 7.8% in 2021. This is only one estimate and if correct would be one of the better outcomes.

The good news is that the constructional steelwork industry is in good shape. Supply chains are doing their best to service customers with the supply of steel stock, engineering, fabrication and materials right through the chain. I for one, have been really impressed by the can-do attitude of the industry, one that keeps everyone as safe and operational as can be.

Tim Outteridge
BCSA President

# Keys handed over for steel-framed Borders school

Scottish Borders Council has taken possession of the newly-completed Jedburgh Grammar Campus following handover by its development partner hub South East and main contractor BAM Construction.

Designed by Stallan Brand, the new Jedburgh Grammar Campus is an innovative learning space, which will serve pupils aged from two up to 18, as well as providing further education opportunities and community facilities.

It replaces all three schools in the town and will have provision for nursery, primary, secondary and additional support needs pupils.

Community facilities include a multi-use games area, 2G hockey pitch, 3G sports pitch, 100m synthetic running track, 300m grass track and gym.

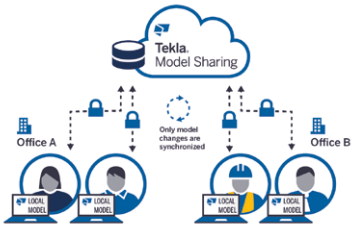
Alongside classrooms, there will be a rural skills area, flexible hall space that can be used for multiple activities such as community events, sport, dance or drama classes and a café.

The public library and contact centre will also be housed in the campus.

Martin Cooper, Construction Director, BAM Construction, said: "It's a great achievement for everyone involved. Our site team have faced a few unexpected hurdles along the way, but throughout the project we've had the full support of both hub South East and Scottish Borders Council, so this really has felt like a partnership in the true sense of the word. We are delighted to leave Jedburgh with such a positive legacy."

Hescott Engineering fabricated, supplied and erected 800t of structural steelwork for the project.

# Tekla launches remote working packages for BIM




Trimble Tekla UK has announced a series of new support measures, designed to help its customers with the challenges currently facing the BIM industry.

In light of the ongoing social distancing rules, Tekla has created a new dedicated support section on its website, containing practical advice and information on how customers can successfully access its software products, including Tekla Structures, Tekla Structural Designer and Tekla Tedds, remotely.

The company has also announced that it has extended its free trial offering of Tekla Model Sharing - an innovative collaboration tool that enables project teams to work on the same model at the same time, without fear of their work colliding.

Richard Fletcher, Regional Business Director at Tekla, said: "Right now, given these difficult times, ensuring effective collaboration and communication processes, both within a business and between project parties, has never been so crucial. Whether you're working at home, in the office or as part of a dispersed design team, cloud-based software, such as our Trimble Connect, and collaboration tools and technologies can make a real difference in helping keep businesses moving.

"Likewise, we want our customers to know that we remain here to help and support them, whether that be through practical remote access guides, flexible licensing or local support desks."

# Birmingham HS2 Curzon Street station gets planning approval

City councillors have voted unanimously in favour of plans for Birmingham's landmark HS2 Curzon Street station.

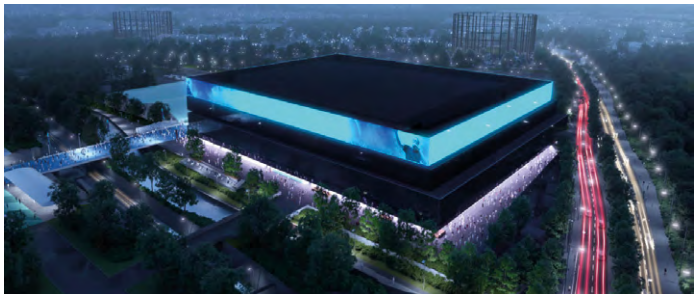
The £571M station will eventually link Birmingham with London, Manchester and Leeds via a new "Y"-shaped network of tracks for 225mph trains, as part of the £106bn national project.

The design by WSP and Grimshaw Architects includes seven platforms and a main entrance facing the city centre comprising a sheer wall of glass of up to 17m in height and 69m wide. The main building features an arched roof clad in metal panels and supported by large buttresses for the western part.

HS2 is aiming to create one of the most environmentally-friendly railway stations in the world – delivering net zero carbon in operation.

The design adopts the latest eco-friendly design and sustainable technologies including capturing rainwater and sustainable power generation, with over 2800m² of solar panels located on platform canopies.

# Project team named for Manchester arena



Developer Oak View Group (OVG) has appointed the Royal BAM Group (BAM) as its preferred construction partner, and Populous, a global architecture design firm, to lead the world-class team behind a new 23,500-capacity arena in Manchester.

The venue, which will be located close to Manchester City's Etihad Stadium, will be the largest arena in the UK, bringing £350M private direct investment into the city and significant economic benefit.

OVG said the new arena will deliver the best in class artist-fan experience for any arena in Europe, have the flexibility to accommodate multiple event types so Manchester can host a broader range of music, sport and entertainment events, and would be the most sustainable arena in the UK.

Tim Leiweke, Co-Founder and Chief Executive of OVG, said: "I'm thrilled that we have put together a project team of such calibre, and with such strong links to the beating heart of the North West and Manchester.

"While we are living in uncertain times, we know that Manchester and its people are resilient. And we look forward to being intrinsic to the redevelopment of the east of the City, working in close partnership with local people who are the most important part of this project.

"Manchester is a thriving and vibrant city – and along with BAM, Populous, and our other incredible partners, we are excited about a new addition to its entertainment scene in the coming months."

Ian Fleming, Regional Director for BAM in the North West said:

"Having built some of this incredible city's most important and recognisable structures, BAM is a perfect fit for the scale and quality of the scheme. We bring a highly sophisticated and sustainable construction approach coupled with our well-known collaborative ethos.

"What that means for Manchester is not only a world-class arena, but our commitment to the city as good partners will see us use this fantastic opportunity to help develop skills and people's life chances, as well as generating exciting local economic benefits."

Declan Sharkey, Senior Principal and Project Architect at Populous, added: "This ground-breaking venue will set new benchmarks in sustainable arena design, as well as creating an experience and form that sits perfectly within Manchester's architectural context and vibrant community. We are delighted to be working with Oak View Group on its exciting vision for East Manchester."

# Contractor named for Jenga hotel

Bowmer + Kirkland has been appointed as main contractor on the £35M 'Jenga-style' hotel project in Manchester.

Developer Capital & Centric said it has secured funding for the project through the Greater Manchester Pension Fund. Works on the 14-floor tower are due to begin in the summer, subject to coronavirus restrictions being lifted.

The 10,300m² hotel, situated on Adair Street in Manchester's Piccadilly East district, will have 275 bedrooms.

The development will be the first to come through Manchester City Council's Portugal Street East Strategic Regeneration Framework, which was established in 2017 in anticipation of developments surrounding the HS2 Manchester Piccadilly station – the link between HS2 and Northern Powerhouse Rail.

Capital & Centric Co-founder Tim Heatley said: "In these difficult times, it's even more important to be pushing ahead with our Adair Street hotel. Manchester will bounce back and these deals are a positive reminder of how resilient our city region is."

The hotel is set to be completed by early 2022.

# Film studio planned at former Ashford railway works

Regeneration specialist The Creative District Improvement Company (TCDI Co.) and Quinn Estates have announced plans for a £250M Kent TV and film studio at Ashford's former railway works.

The project will see the restoration of Grade II-listed buildings in the town, converting them into TV and film studios, ancillary production space and a media village office complex.

Plans also include an educational hub, a 120-room hotel, serviced apartments, a conference centre, a gym, restaurant and leisure space.

Mark Quinn of Quinn Estates said the site could become a major European filming hub.

"This project will make us the biggest regeneration specialists in Kent and I'm very proud of it," he said.

"The buildings will go from making trains to making films. The growth of filming in Kent is enormous at the moment and this will turbo-charge it."

Ashford's former railway works grew substantially in the early part of the 20th Century and, although damaged in the Second World War, it remained a locomotive works until 1962 when the work was transferred to Eastleigh, Hampshire.

Many of the buildings were demolished over the next 20 years and what remains is the shell of the original workshops. The site includes five Grade II-listed buildings.

# Diary

In the current circumstances, SCI have postponed all forthcoming face-to-face courses. A programme of online courses is being arranged and will be publicised on the SCI website *https://portal.steel-sci.com/trainingcalendar.html*. The regular programme of lunchtime webinars for members will be maintained. Further details of all the SCI online events are on the SCI's website.

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

**Tuesday 19 May 2020**
**Brittle Fracture** · *SCI/BCSA Members only*
The selection of an appropriate steel sub-grade is an essential part of a designer's responsibility. The UK National Annex makes significant modifications to the Eurocode approach, which is appropriate for structures subject to fatigue. The webinar will cover the process of specifying sub-grade, both in accordance with the UK NA, and using SCI publication P419, which is appropriate when fatigue is not a design consideration.

**Wednesday 27 May 2020**
**Execution to EN 1090** · *Free to all*
The steel design standard EN 1993-1-1 assumes that fabrication and erection comply with EN 1090 – but what does this important document contain, and what relevance is there to structural engineers? This two-part webinar will use the contents of EN 1090 as a springboard to discuss a range of topics including material, welding, inspection, and tolerances – and why the structural engineer should be interested.

**Wednesday 10 June 2020**
**Torsion** · *Free to all*
Members subject to torsion may be few and far between – but such members need careful consideration if the effects of twist are to be controlled. This webinar will use the SCI's guide on the subject demonstrating by example how the design charts are to be used, and how both resistance and deformation can be calculated.

# Jamestown's safety and people strategy

Building on the foundations of a strong performance through 2019, Jamestown continues to invest in both plant and people as it pushes forward into 2020.

Highlighting the company's desire to focus on safety, Jamestown's latest investment, which arrived early in the New Year, is a Straddle Carrier from Combilift. With a lifting capacity of 50t, the machine enables Jamestown to safely lift and manoeuvre plates up to 30m in length as they arrive in the stockyard, prior to loading on to the plasma and oxy-fuel profiling machines.

Another notable feature of the machine is its ability to not only lift and manoeuvre heavy plate girders and cellular beams, but it can also turn them within the confines of the machine. This is said to be a great asset when fabricating a long and heavy beam.

*A weathering steel studded bridge deck assembly in Jamestown's facility*

As well as investing in machinery, Jamestown says its strength comes from its people, and as projects get larger and more complex it was felt that a further addition to the team would benefit both the company and its customers.

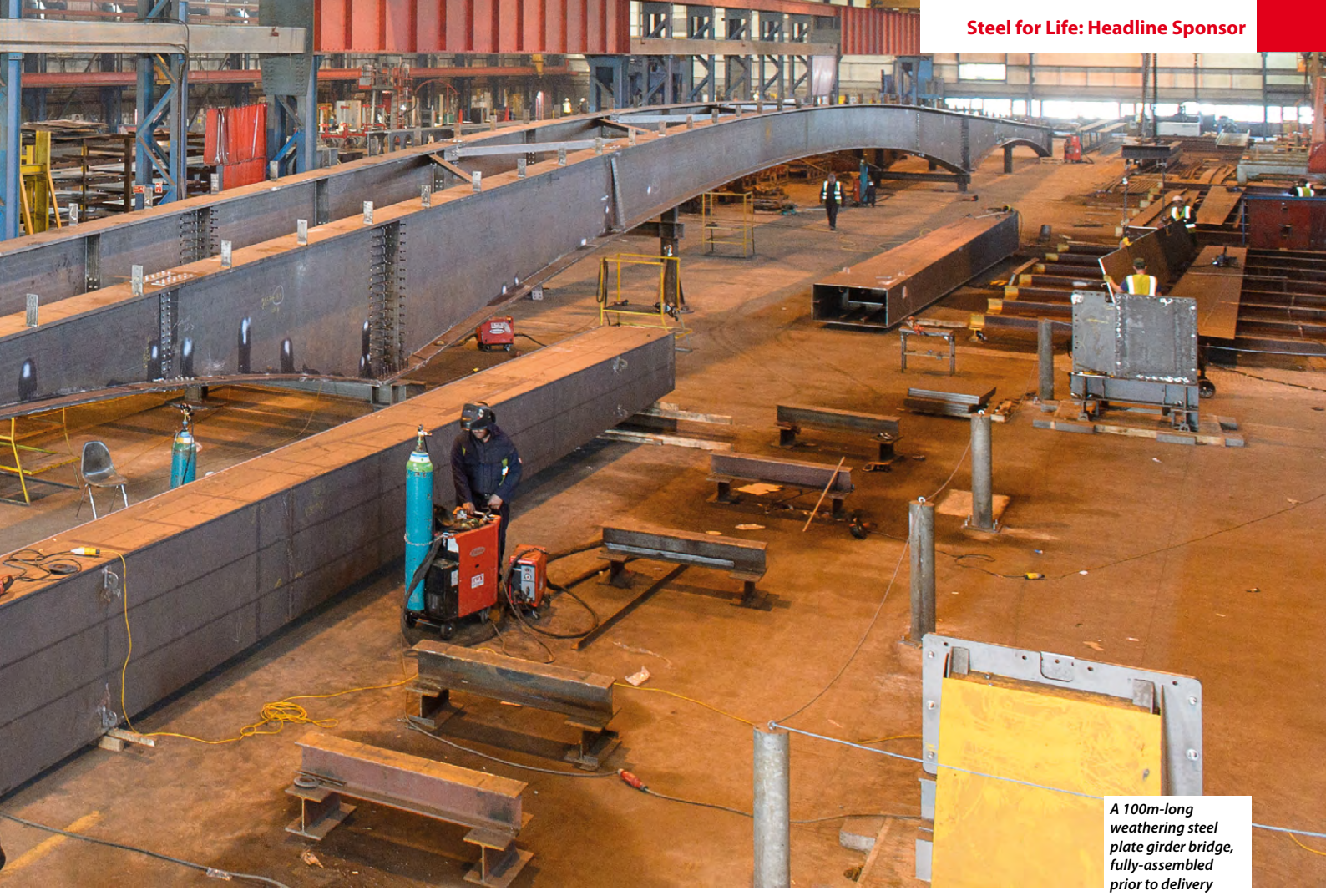
As General Manager Niall Fortune explains: "The introduction of Stephen George, our new Project Manager, has strengthened our team, not only in day-to-day operations but Stephen's dedication to the business has been a big hit with customers as we generate regular updates on all our key projects."

## Resilience and determination

Jamestown has robust plans for the future and while some minor projects have been put on hold as a result of the coronavirus crisis, the company is looking forward with confidence to be able to support customers, old and new, as they move into the second half of this year and beyond.

Jamestown's plans for continued development of its business include enhanced capability and improved efficiency as it moves forward.

The company's 17-acre site in



*A 100m-long weathering steel plate girder bridge, fully-assembled prior to delivery*

Portarlington, Ireland, still has more to give and as new avenues and opportunities are discovered, Jamestown says it is continually finding further applications where the demand for steel fabrication is paramount.

"So, whether it be new welding technology, cutting equipment, surface preparation and finishing techniques, Jamestown will continue to invest and grow to give their customers the support they need," says Mr Fortune.

"During the past year, we have been challenged as a business to go above and beyond in the service we give to our customers.

"Plate girders that are too long or too heavy for customers to handle in their premises have resulted in last minute additions to the scope where we have been able to assist with full fabrication, shot blasting and painting and final delivery to site."

Mr Fortune adds: "Examples of this work include a rail bridge in weathering steel with its precast concrete element cast in house to accommodate a tight programme, and more recently we have manufactured 36m long crane gantry box girders. These have been fully fabricated and painted, inclusive of full fit out with walkways, electrics and ancillary equipment."

## How could we plan for this?

The Republic of Ireland has weathered the COVID-19 situation very well, with restrictions now on a clear path towards being lifted gradually over the coming weeks. "Who would have thought that the whole world could be struck be such a virus," says Mark Morris, Jamestown's Compliance Manager. "Jamestown, like many of our customers and suppliers across the construction and manufacturing sector, are managing their businesses through these unprecedented times - moving logically and safely from one stage to the next as best we can."

Jamestown, like many other companies, currently have staff working from the confines of their own homes in an endeavour to keep families safe. Where possible, and with 'essential work' to be carried out, operations are resuming on a day-by-day basis, while employing social distancing measures throughout the plant. With a strong order book and materials to hand Jamestown is working towards a full resumption of work on 18th May when construction activity is permitted to return to work fully.

"Jamestown has operated a small crew of maintenance and essential machine overhaul work during the quieter days over the past few weeks, so that when we can return to work fully, we are in a better situation than ever with all plant and machines in top condition ready for the busy months ahead," says Martin Gorman, Jamestown's Maintenance Manager.

## Commitment to health & safety

Jamestown invests heavily in health and safety and in measures which ensure that the workforce are kept safe, compliant and with the best of PPE and all related safety equipment. In doing so, Jamestown seek to guarantee continuous top quality output from both their people and their machinery, so that they can continue to serve their customers, and meet the ever increasing demands of the industry.

Mark Morris, Compliance Manager, and Mark Lawler, Health & Safety Manager, will be working hand in hand to ensure that the company follows best practice and guidelines on distancing, and on the host of COVID-19 related initiatives which will no doubt be with us all for the foreseeable future.

As Jamestown strives to achieve the latest ISO 45001:2018 Occupational Health & Safety Standard, the company's commitment to improving employee safety, reducing workplace risks and creating better, safer working conditions is paramount.

Who knows what lies in store for Jamestown in the future, only one thing is certain and that is steel will play a major part.

**Jamestown is a headline sponsor of *Steel for Life***

STEEL for life

# New church accommodated with steel

## Steel construction has provided all the answers for a new church and residential scheme in south London.

**FACT FILE**
Dundonald Church, Wimbledon, London
**Main client:** Adoni Developments
**Architect:** Brimelow McSweeney Architects
**Main contractor:** Curo Construction
**Structural engineer:** Meinhardt
**Steelwork contractor:** TSI Structures
**Steel tonnage:** 320t

A community-led Anglican church in south London is constructing a new congregational facility that not only includes a main hall, meeting rooms and a youth club games area, but also consists of three upper floors containing 18 apartments, which will fund the development.

The new Dundonald Church will replace an older facility which was deemed to be out-dated and too small for the church's requirements, and was demolished during the initial phase of the construction works.

The project is being developed in partnership with Adoni Developments, a wholly-owned subsidiary of Green Pastures CBS, a UK-wide homelessness social enterprise. The apartments will all be for private sale, but the proceeds will then be used by Green Pastures in its 'help the homeless' projects.

Main contractor Curo Construction started on-site late last year and after the demolition programme, its preliminary works included installing pad foundations to allow the main steel frame of the building to begin.

"It's a brilliant scheme for a fantastic client, but also challenging as the site is very tight, which means it is ideally suited to steel construction for its programme benefits," says Curo Construction Senior Project Manager Jonathan O'Neill. "As we have limited space, materials storage and distribution is key. Upon delivery, steel sections are lifted into position via our temporary pit lane, this accelerates production and reduces double handling."

The main steel frame design for the project was carried out by structural engineers Meinhardt, with all connection design carried out in-house by steelwork contractor TSI Structures. The five-storey building is predominantly a steel frame with a steel core positioned along one elevation. The exception is the uppermost floor, which is constructed with a light steel framing solution.

The design is a traditional braced frame with pre-cast concrete flooring providing diaphragm action back to braced bays. There are a large number of big service holes, both circular and rectangular, through the webs of the beams to provide service routes within the depth of the steelwork. Shear studs were shop applied by TSI to provide composite action with the precast flooring.

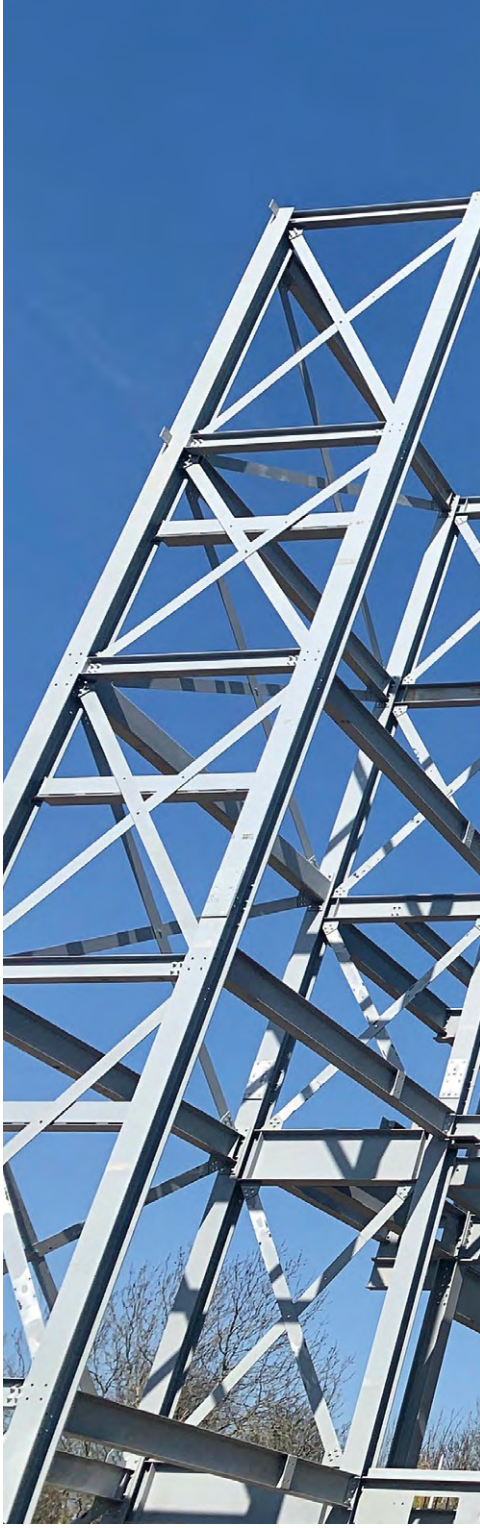
"We looked at a number of framing solutions for this project and finally went with steel as we wanted a lightweight frame and a quick construction programme," explains Meinhardt Associate Structural Engineer Paul Edwards.

The main hall, which is a double-height space on the ground floor was always going to be a steel frame, because of the required 20m-long spans. However, the original plans envisaged a masonry design for the residential elements of the scheme, but this was changed as constructing the entire project with steelwork was more economical.

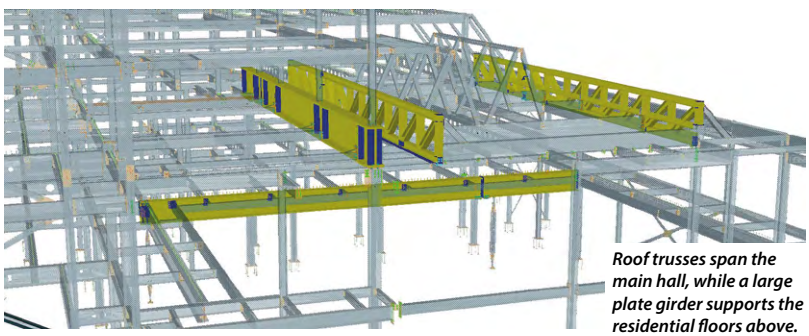
"The building layout is very complicated in order to provide the clear internal areas at the lower levels, which were a main client requirement," adds Mr O'Neill.

Dundonald Church occupies the ground and first floor of the building, with the main foyer, a café and multi-use spaces arranged around the lowest level, alongside the double-height main hall. The first floor accommodates a balcony that wraps around three sides of the hall, further meeting rooms, offices and a games hall.

Only the front portion of the building, containing the offices and foyer, extend upwards into the three upper residential floors. The area towards the back of the structure, encompassing the games hall and the majority of the main hall is only two storeys high. There is a plant deck above the games hall and steel A-frame skylights above the main hall that allow natural light into the main congregational space.



*One of the main trusses that create the open-plan congregational space is lifted into place.*



*Roof trusses span the main hall, while a large plate girder supports the residential floors above.*

*"It's a brilliant scheme for a fantastic client, but also challenging as the site is tight, which means it is ideally suited to steel construction for its programme benefits."*

*Steelwork provided a lightweight solution and a quick construction programme.*

The main hall is a large open-plan space, formed with two 20m-long roof trusses that create a column-free zone. One large 1,200mm-deep plate girder positioned at the underside of the second floor towards the front of the hall also spans the hall. Weighing 16.5t, the plate girder also acts as a transfer structure supporting the rear perimeter column line of the three residential floors, which are positioned directly above the front of the building.

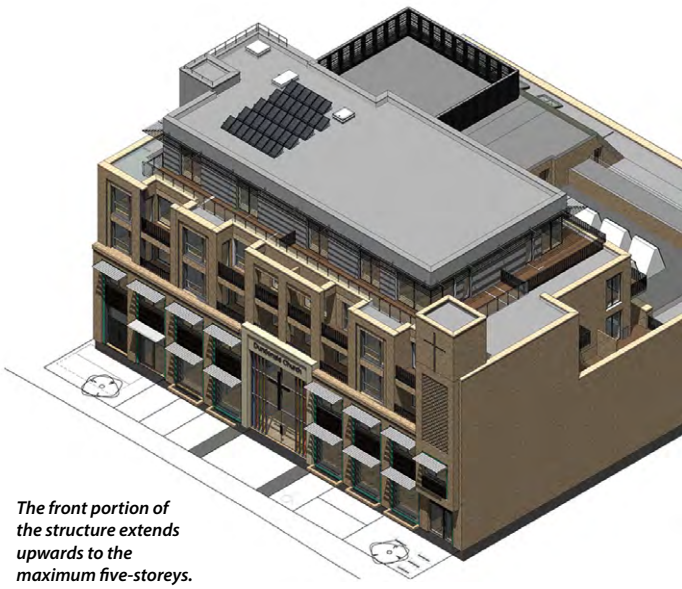
In order to further minimise columns in the main hall, one end of the plate girder supports a 914 × 419 UB balcony edge girder via a hanging column.

"Installing this part of the steelwork required temporary propping to support the 914 UB and all connecting beams at that level, which would not have been accessible once the plate girder was installed," explains TSI Structures' David Williams.

"While the main building was erected using the site's tower crane, we had to hire in a 70t-capacity mobile crane to offload and erect the plate girder along with the 20m-long 914 UB section as they were too heavy for the tower crane."

Summing up the scheme, project architect Brimelow McSweeney Architects says Dundonald is a mixed-use community scheme that provides 18 homes, which are seamlessly integrated into a contemporary new-build church. The design focusses on creating a modern church facility that will be a social hub for locals. A new carefully detailed façade offers a holistic signature building that enhances the street scene and displays the vibrant activity within.

The Dundonald Church is due to be complete by Spring 2021.



*The front portion of the structure extends upwards to the maximum five-storeys.*

*The logistics park is said to offer unrivalled connectivity.*

# Steel creates icons

## Located adjacent to Manchester Airport, one of the North West's most strategically-located logistics parks is expanding with two new steel-framed distribution centres.

**FACT FILE**
**Icon Manchester Airport**
**Main client:** Icon Industrial
**Architect:** Webb Gray
**Main contractor:** Winvic Construction
**Structural engineer:** Complete Design Partnership
**Steelwork contractor:** Caunton Engineering
**Steel tonnage:** 1,000t

Icon Industrial – a joint venture between Stoford Developments and TPG Real Estate – is continuing the expansion of its Manchester Airport logistics park.

Two new BREEAM 'Very Good' rated distribution warehouses, known as units three and four, are set to complete later this year, both of which are steel-framed units offering ample column-free floor space and integral offices.

Commenting on the scheme, Dan Gallagher, Joint Managing Director of Stoford Developments says: "Icon Manchester Airport is a hugely successful scheme that continues to stimulate the Greater Manchester economy through the flexibility the site offers to its tenants.

"The scheme has understandably attracted significant demand from businesses keen to locate here, given the strong list of existing occupiers and the site's unrivalled airport connectivity."

Icon Manchester Airport is a 45-acre build-to-suit logistics park located next to the World Freight Terminal.

The site is said to offer excellent road, air and rail connections, with immediate access to junction 6 of the M56 motorway and Greater Manchester, as well as benefiting from the £290M A6 Manchester Airport Relief Road that links the A6 and M56.

Main contractor Winvic Construction started on site during August 2019 and initially had to import 26,000m$^3$ of material to build up the levels above the airport's jet fuel line.

Known as the Manchester Airport Pipeline System (MAPS), it is owned by Manchester Jetline and consists of a high-pressure fuel pipeline that provides a supply of product to Manchester Airport. It runs in an approximate 'L' shape across the site, effectively cutting the plot in two.

"As part of the project we installed a 3m wide, 300mm thick, reinforced concrete bridging ('protection') slab across its entire length, circa 500m," says Winvic Construction Project Manager Matt Percival.

Steelwork erection began after a protection slab was installed over a fuel pipeline that runs under the site.

The crane's jib heights were restricted due to the proximity of the airport's runway.

Steelwork offered the most viable solution for the construction of both distribution centres.

"This transfers any imposed loads into the ground either side of the pipeline, not through the pipe. All works on the pipeline have to be supervised by the pipeline's owner"

Once these preliminary tasks had been completed, along with the installation of retaining walls, Caunton Engineering was able to begin its steelwork erection programme in November. Working on a design and build contract, Caunton designed all of the steelwork and erected approximately 1,000t of the material for the two distribution centres.

Unit three is approximately 110m-long × 115m-wide with a 15m clear height to the underside of the haunch. The structure will offer 11,900m² of industrial or warehouse space and features three internal spans of 38.33m. It also includes a three-storey integral 930m² office block and plant deck positioned at one end of the building.

The neighbouring unit four is approximately 115m-long × 85m-wide and is a twin-span portal frame warehouse, with a 12.5m clear height to the underside of the haunch. This structure will be an 8,800m² single storey in-flight meal manufacturing warehouse including an integral three-storey 700m² office area and plant deck.

The three spans in unit three are formed with two rafters, each weighing 2.1t, which were spliced at height during the erection process. Likewise, a similar procedure was undertaken to form the twin spans in unit four, although here the rafters weigh 2.4t each.

Supporting the distribution centre's long rafters are a variety of columns, varying from 533 × 267 members to 762 × 267 sections and 406 × 140s. The column spacings also vary between each of the buildings, with a column bay width of 4.8m in unit three and larger 8.2m spacing in unit four.

"We used a combination of 40t-capacity and 50t-capacity mobile cranes to erect all of the steelwork, with the heaviest element being the 3.5t valley beams in both distribution centres," says Caunton Engineering Contract Manager Stuart Cree.

"However, our biggest challenges were the inclement weather, which meant the erection programme was winded off on a number of days, while on a technical note, the lifting operations had to be pre-planned as there was a maximum height of 38m which couldn't be exceeded by the crane's jib due to the proximity of the airport."

Summing up and explaining the use of steel, Mr Percival says: 'Steel is the most viable material for industrial warehouses, whether that's from an affordability, durability, sustainability or erection speed point of view.

"It is versatile and allows fewer columns to intrude into the industrial facility, which of course means the space can be used in a flexible way."

Both units are expected to be complete later this year.

*The two new stands sit either side of the existing media centre.*

# Stands bowled by steel

## Structural steelwork is playing an integral part in MCC's masterplan to redevelop its historic Lord's Cricket Ground. Martin Cooper reports on the first innings.

**FACT FILE**
**Lord's Cricket Ground redevelopment**
**Main client:** Marylebone Cricket Club (MCC)
**Architect:** WilkinsonEyre
**Main contractor:** ISG
**Structural engineer:** Buro Happold
**Steelwork contractor:** Severfield
**Steel tonnage:** 2,300t

Forming part of Marylebone Cricket Club's (MCC) ongoing masterplan to redevelop the world-famous and historic Lord's Cricket Ground, two new steel-framed stands are currently under construction.

The new Compton and Edrich stands are both three-tier structures and together they will accommodate around 11,600 spectators at the Nursery End of the ground. Also, forming part of the scheme, a walkway linking both stands at second tier level and spanning beneath the existing media centre is also being built.

The ground's overall capacity will be increased by 2,500 seats and the new additions will have corporate and hospitality areas in the middle tier and, exceeding industry best-practice, 3% of all seating will be for wheelchair users or those with restricted mobility. The top tier of the new stands will be partially covered with a steel-framed roof.

Commenting on the latest part of the masterplan, MCC Chief Executive & Secretary Guy Lavender says: "MCC is committed to ensuring Lord's remains the best place in the world at which to watch and play cricket. These new stands will transform the Nursery End, providing world-class facilities, opening up views both to the Pavilion and back towards the Nursery Ground, and adding another architectural enhancement to Lord's."

Main contractor ISG began work on site during August 2019, after the final international cricket match of the season at the ground had taken place.

"We have organised our work into three phases," explains ISG Project Director Fraser Tanner.

"The first phase started towards the end of last year's season, while the ground was still being used for County Championship games, so as we began demolishing the old stands we had hoardings in place to separate our working areas from the pitch."

As well as demolition and groundworks, the first phase also includes the erection of the main steel frames of the stands along with precast floor and terrace units.

Phase two includes blockwork installation, dry lining and M&E fit-out, while the final phase includes bar and restaurant fit-out, and the erection of the stand's steel-framed roofs and the steel link bridge.

The steel roofs are architectural features that top the stands. Elliptically-shaped, the roofs are formed with a steel framework that supports a further timber frame and a canvas covering.

The bridge will link both stands at second tier level, allowing spectators to travel between the two hospitality areas. The bridge will be 40m-long × 3.5m-wide and supported on a single row of 7.5m-high CHS columns.

Commenting on the use of steel, Buro Happold Senior Structural Engineer Paul Eddleston says: "The choice of steel for the main frame was determined following a fully detailed design, programming and cost option study led by Buro Happold, comparing in detail steel versus precast versus in-situ solutions.

"It was the examination of the outcomes of the Buro Happold-led exercise that resulted in steel being selected for the frame, whereas the initial project assumptions had been for a concrete frame."

WilkinsonEyre Project Director Sam Wright adds: "The steel frame gives a clear legibility to the gymnastics of the design,

How the new stands will fit into the overall design of the cricket ground.

which was developed to complement the existing media centre, but also vastly improve circulation at ground level.

"The rapid build has only been possible through a close relationship with Severfield's design team. All approvals have been through the 'live' model and in collaboration with the pre-cast terracing contractor."

Working on behalf of main contractor ISG, Severfield is responsible for the project's steelwork connection design, detailing, fabrication, supply and erection. The company is also installing metal decking, steel stairs and pre-cast components such as the terrace units and vomitory walls.

Some of the largest elements in each of the two stands are the main supporting columns. These are typically 1,400mm × 500mm box sections, with 100mm-thick base plates fixed with Macalloy bar anchor assemblies. There are nine of these columns in the Compton stand and seven in the Edrich stand.

Positioned on grid line B, which is in the middle of each stand, the columns sit towards the back of the lower tier, support the 7m-wide cantilevering seating area of the second tier, and then also support the underside of the uppermost seating level.

Explaining the main challenges of the steelwork programme, Severfield Project Manager Dominic Charlton says: "The logistics of the site are particularly challenging as there is only a single access point for vehicles and it involves driving through areas that are open to the public as the Indoor Cricket Centre needs to remain in use throughout the construction works. To complicate matters, the single access point needs to feed four work-fronts for both steelwork and precast concrete deliveries."

*"The steel frame gives a clear legibility to the gymnastics of the design."*

To construct the stands Severfield primarily used four mobile cranes working concurrently – allowing both stands to be constructed at the same time.

There were two in-front of the stands (pitch side), one 300t-capacity unit and a 250t-capacity crane, and a couple of 100t-capacity cranes positioned to the rear of the structures.

"To erect the heavy upper tier rakers – the heaviest being 22t and 20m long – we had to bring in an additional 300t-capacity crane," adds Mr Charlton. "While, during March we also had a fifth crane on-site – a self-erecting tower crane – installing the steel stairs."

Severfield's steelwork package involved some complex fabrication, especially for the plate girder rakers, which provide support to the precast concrete terraces.

"As part of the fabrication method each raker component was split into three individual sub-assemblies. This made turning, handling and machining in the factory a lot easier than if the rakers were fabricated as a single assembly," explains Mr Charlton.

"The three sub-assemblies were then dimensionally checked and welded together to form the single assembly prior to painting and loading-out for delivery to site."

Work on the Compton and Edrich stands is due to complete in April 2021.

The new stands also overlook the Nursery Ground, which is positioned adjacent to the main Lord's pitch.

Typical rear view of the stands

Severfield used four cranes to erect the majority of the steelwork.

## MCC masterplan

The redevelopment of the Compton and Edrich Stands is the second phase of the MCC masterplan, following last year's opening of the £25M Warner Stand.

Once they are completed in 2021, work will commence on redeveloping the East Gate Building (between 2021-25) before the Nursery Ground is redesigned (2025-27).

The South Western Project, involving the rebuilding of the Tavern and Allen Stands, as well as renovation of the Thomas Lord Suite, is scheduled to take place from 2027-2030 before the masterplan is completed with the redevelopment of the North Gate Building from 2031-32.

MCC is the world's most active cricket club, the owner of Lord's Ground and the guardian of the Laws and Spirit of the game. Founded in 1787, it is recognised as the sole authority on the game's Laws and moved to its current home on St John's Wood Road in 1814.


# Steel sets the stage

A lightweight framing solution, which could also efficiently provide long spans, meant structural steelwork was the ideal material for a new theatre in Brixton, south London.

**FACT FILE**
**Ovalhouse, Brixton, London**
**Main client:** Lambeth Council
**Architect:** Foster Wilson Architects
**Main contractor:** Galliford Try
**Structural engineer:** Conisbee
**Steelwork contractor:** Mifflin Construction
**Steel tonnage:** 525t

Forming part of Lambeth Council's regeneration of Brixton's Somerleyton Road, a new steel-framed theatre is being constructed as the focal point of a project that also includes 300 homes, workspaces and community facilities.

The Ovalhouse has been designed by Edmund Wilson of Foster Wilson Architects as a fully-accessible space for both artists and audiences. It will contain two theatre spaces, rehearsal studios as well as high-quality training facilities and spaces designed to be used by the local community.

Ovalhouse, which is currently based in nearby Oval, has built its reputation on supporting new artists, working with young people and communities, and putting on shows.

Deborah Bestwick, current Director of Ovalhouse, says: "We're bringing theatre back to Brixton. It is wonderful to see the structure go up and the space take shape. We look forward to welcoming new friends as audiences, participants, trainees and new staff members.

"The theatre will offer a new generation of theatre companies and artists a space to develop their work in Brixton and beyond. We are hugely grateful to our funder Arts Council England and partner Lambeth Council, and to the charities who have kick-started our fundraising campaign including Cockayne, The Wolfson Foundation and The Garfield Weston Charitable Trust."

According to Foster Wilson Architects, the design of the new theatre building is purposefully robust, with exposed materials, such as the steel frame, that are capable of adaption to individual performances, in keeping with the spirit of studio theatre.

Externally, the design of the building relates to the industrial architecture of Brixton and the early street lighting of nearby Electric Avenue, with a new anodized aluminium facade that incorporates a range of lighting and signage.

"Using structural steelwork was the obvious choice for this project as a lightweight frame was required because the Victoria underground line runs directly below the site, preventing any piling," explains Conisbee Associate Denis Kealy.

"We also needed a framing solution that could efficiently provide the long spans and column-free spaces within the building."

An 800mm-thick ground-bearing raft foundation was deemed to be the best solution for the site, onto which a concrete box basement was constructed, with the main steel frame starting at ground floor.

Overall, the steel frame is braced for stability, with most of the bracing located in lift cores, as well as in one elevation that abuts an adjacent building and has no windows.

Steelwork supports precast planks to form the floors and this solution was chosen as the underside of the flooring will be left exposed in the completed building, along with some steelwork elements, to fulfil the architectural vision.

The design of the building's frame includes a number of spaces of varying

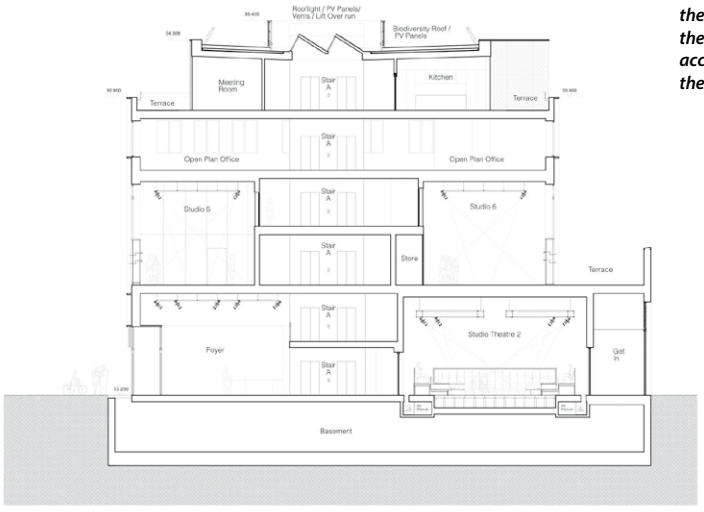
▶20

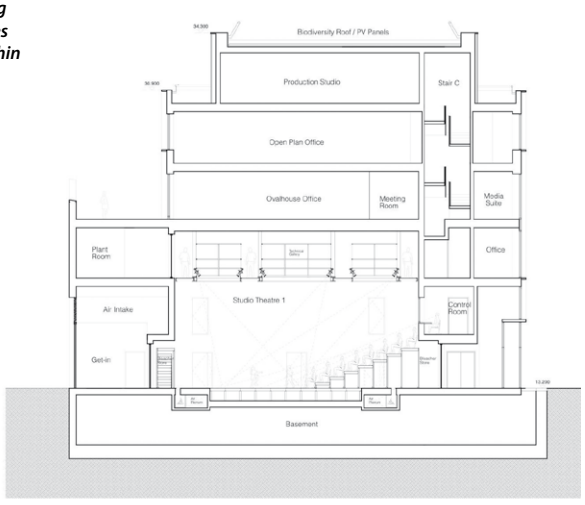
The theatre forms part of the much larger regeneration programme for the Somerleyton Road area of Brixton.

*"Using structural steelwork was the obvious choice for this project as a lightweight frame was required."*


Visualisation of the completed theatre.


The design incorporates a steel braced frame, with much of the bracing located in the cores.




Cross sections of the theatre, highlighting the numerous spaces accommodated within the building.

*Steelwork was chosen as it provided the most efficient solution for the theatre's complex design.*

▶18 sizes on each floor, most of which require transfer structures to take into account the changing column lines.

The most significant parts of the steel frame form the main theatre, which is a triple-height space on the ground floor. A total of four Vierendeel trusses span the performance area and create the column-free space. The trusses are 11m-long × 4.9m-deep and each weigh 11t when fully-assembled.

As well as forming the roof the main 200-seat theatre, the trusses create a gantry for maintenance walkways and scenery storage within their depth, while also supporting the floor above.

"The trusses are working very hard, they support third floor precast planks that sit on the top chord as well as supporting a line of columns that extend up to roof level, which are positioned roughly at mid span," says Mr Kealy.

Space was at a premium during construction, and bringing the trusses to site was a challenge as there was not enough room for them to be delivered in one piece.

"The trusses had to be brought to site piece-small, assembled within the theatre's footprint and then erected using a 250t-capacity mobile crane," says Mifflin Construction Contracts Director Dave Ornsby.

The main theatre is an acoustically-treated box-in-box, with a double row of columns and acoustic pads on all connections, which will prevent any noise escaping or getting in.

A similar acoustic treatment approach has been taken with the structure's second and smaller theatre space, which is also located on the ground floor.

With no requirement for a gantry, the single storey-high second theatre has been formed with a series of 8.5m-long UB sections that span and support the ceiling.

Adjacent to both theatre spaces on the ground floor, the main double-height foyer is another column-free space formed with a series of 8.7m-long UB sections.

Highlighting the complexity of the structure's steel frame, there are two double-height rehearsal spaces sitting at second floor, adjacent to the main theatre's gantry level.

The fourth floor accommodates open-plan offices and features the project's longest spans. Again, a series of UBs form the 12m-long spans of these spaces, while also supporting columns on the uppermost floor that divide meeting rooms from a kitchen and a production studio.

For the installation of precast elements and the steelwork erection, Mifflin Construction primarily used the site's tower crane. The exceptions to this were the areas around the tower crane, where 60t-capacity and 95t-capacity mobile cranes had to be used, as minimum radius could not be achieved by the tower crane itself, as it was too close.

The Ovalhouse is scheduled to open its doors in spring 2021.

## Vierendeel trusses

### David Brown of the SCI offers some comments on the design of Vierendeel trusses.

The primary reason for choosing a Vierendeel truss is the opportunity to use the space within the depth of the truss – at the Ovalhouse, the space is used for all the essential paraphernalia which must be located above the performance area. The term "truss" is hardly appropriate as a Vierendeel truss is a continuous frame, with rigid joints at the nodes. The bending moments within the frame increase towards the supports, so Vierendeel trusses are often characterised by vertical members which increase in size from the centre of the span to the supports, to accommodate the larger moments. It is generally not convenient to change the depth of the chords, so these are usually the same size throughout.

The joints between the chords and vertical members will be modelled as 'rigid' in the numerical analysis and it is important the real details deliver this assumed behaviour. The joints must obviously be strong enough, but must also be sufficiently stiff to behave as rigid joints. Often, joints in Vierendeel trusses are fully welded, but this was not possible at the Ovalhouse as the truss had to be assembled on site. The haunches shown in the photograph give greater resistance for the bolted connections between the most heavily loaded vertical members and the chords.

Vierendeel trusses are often one of the possible solutions to questions set in the Institution of Structural Engineers examination – so knowing how to determine an approximate bending moment diagram could be a useful skill. A simple approach is to assume a point of zero moment at the mid-point of every member. A worked example of this method can be found in older versions of the Steel Designer's Manual.

A simple approach to the analysis has particularly relevance for a Vierendeel truss – named after Arthur Vierendeel, a Belgian Civil Engineer and Professor. He is credited with the following opinion: "When constructing in metal the dimensions must be determined a priori by aesthetic considerations and only afterwards should mathematical formulas be used". One wonders what Professor Vierendeel's view would be of the modern dependence on software to analyse the form of structure that carries his name.

Advisory desk articles 293 and 294 discuss the joints in welded Vierendeel trusses with particular reference to the web panel zone within the joint.

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# Steel takes the load

The London School of Economics' new Marshall Building includes a number of steelwork elements that are helping the design to achieve the overall architectural vision as well as maintaining slimmer structural profiles. Martin Cooper reports.

Offering approximately 18,100m² of space, the Marshall Building is the latest project in the London School of Economics (LSE) campus-wide redevelopment programme.

Following on from the recently completed Centre Building (see NSC May 2018), the Marshall Building occupies a prime spot, overlooking Lincolns Inn Fields.

The new flagship building will have ten upper floors and two basement levels, and will contain The Marshall Institute for Philanthropy and Social Entrepreneurship, founded by Sir Thomas Hughes-Hallett and Sir Paul Marshall to improve the impact, effectiveness and appeal of private contributions to the public good.

It will also house the academic departments of accounting, finance and management, teaching facilities, as well as sports and arts rehearsal facilities including a Sports England standard multi-purpose sports hall for use by staff and students.

Overall the Marshall Building is a concrete-framed structure, but within its frame there are a number of integral steelwork elements, that have been introduced to provide the necessary structural capacity, achieve the desired architectural vision as well as to maintain slimmer structural profiles.

All of the steelwork will be hidden from view within the completed building, as it will all be encased in concrete to blend in

Both trees are similar in design and provide comparable structural solutions.

with the adjacent structures. However, two of the most noticeable elements formed with steelwork are two tree-like structures, that help to create open-plan areas and evenly transfer substantial loads to the foundations.

Both of the trees have four steel raking branches, are similar in size and provide similar solutions. Tree one is supported by a column, stemming from the first floor through a second-floor void, and supports the third floor. Tree two supports the slab at level four and is founded on a steel column that is sat on top of a transfer beam at level one.

"Steel was used for the trees as the four branches collectively support approximately 3,500t, which was not feasible in concrete given the structural zones available,' explains AKT II Associate Wai Pang.

"Steel was also chosen as the most suitable form of construction due to the concentration of load effect from raking columns."

*"Steel was used for the trees as the four branches collectively support approximately 3,500t, which was not feasible in concrete given the structural zones available."*

Tree one was delivered to site in six pieces, which consisted of a base plate, central node and four branches. Each of the branches weighed 8t and were fabricated from 700mm × 700mm × 50mm rectangular hollow sections (RHS).

The second tree supports the level four slab and is supported on an 8m-high, 10t column. It helps to form a central atrium within the Marshall Building.

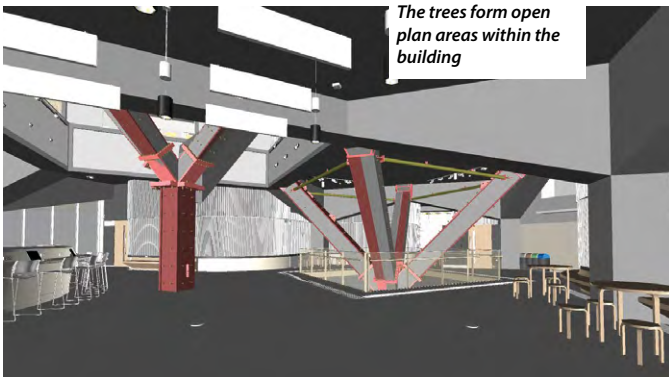
Tree two came in ten pieces, which consisted of a column, central node, four branches and a ring beam. The branches weighed 6t each and were fabricated from slightly smaller 500mm × 500mm × 40mm RHS.

The architectural intent for this tree was to have a void in the slab at level four, and therefore it was not possible to have connecting Macalloy bars between the opposite raking branches, like the other tree. As the forces are lower, the design team decided to redirect the horizontal forces around the perimeter of the void with a steel ring beam encased in concrete.

"Coordination between the individual trades was key to installing the trees successfully," explains Mace Senior Design Manager Richard O'Shea. "Our steelwork contractor, Bourne Steel, had to work in tandem with the concrete contractor, as the trees were erected within the concrete programme. Once the trees were installed the encasement was begun and the slabs were cast on top of them."

The installation process for the first tree, sat at level two, had to wait until the slab was cast around the 2.5m² cast-in base plate. This then allowed Bourne to install the prefabricated node, which weighed approximately 5.5t. Once the node was bolted into position, using grout between the base plate and node for positional tolerance, each of the 7m-long branches were individually lifted into place and held in place with temporary bracings.

In a cross formation, a series of high-tensile Macalloy bars connect the tops of diagonally opposite branches. The bars were installed as each branch supports a column and, due to the large axial compression loads in the raking steel elements, a significant component of tension is introduced at the ▶24



The trees form open plan areas within the building

Visualisation of the completed interior

**FACT FILE**

Marshall Building, London School of Economics

**Main client:** London School of Economics
**Architect:** Grafton Architects
**Main contractor:** Mace
**Structural engineer:** AKT II
**Steelwork contractor:** Bourne Steel
**Steel tonnage:** 126t

Once the steelwork was installed, the entire tree was encased in concrete

Tree two has a steel ring beam in order to create a void in the level four slab

▶23 top of the tree system within the third-floor slab.

"The tension forces are resolved through a system of Macalloy high tension bars within the concrete floor," adds Mr Pang. "Pre-tensioning the Macalloy bars during construction allows pre-compression of the floor slab, which reduces the risk of cracking in the floor slab during normal loading as the arms tend to splay apart under the building loading."

"Lifting the tree steelwork into position and achieving the critical erection tolerances was a difficult task," says Bourne Steel Project Manager Theo Pitrakkos. "The installation programme was very tight, the pit lane for offloading the steel has limited space and the site logistics simply did not allow for any storage. This meant that our deliveries and lifting operations had to be planned so the steel could be installed directly off the transport vehicle with minimal handling."

High strength steel of grade S460NL was specified for the trees. This material had a long lead time, was a challenge to source within the programme constraints, and also required original welding procedures to be developed to suit the design requirements.

Bourne Steel Construction Manager, Steve Condon adds: "To safely erect the complex steelwork trees, we worked closely with the temporary works design team to strategically locate any lifting brackets, while also reviewing the connection details to ensure that the steel was erected within tolerance.

"We also trial erected both of the trees at our Poole fabrication yard, prior to delivering them to site, in order to make sure they could be assembled correctly."

Elsewhere on the project, there are two steel nodes, each weighing 2t, which have been cast into the building's main concrete core at level one. These triangular steel elements measure 1.5m × 800mm × 800mm.

They have been installed as concrete transfer beams at level one span up to 30m between supporting columns. These concrete beams act continuously over supports and the connection to the east core requires a continuous connection.

The resultant forces are very large and are required to mobilise the mass of the core to resist overturning. As the beams are set at 45 degrees to the core, the large tension forces must be translated into the walls on the orthogonal grid, therefore a steel node was provided to anchor all reinforcement and allow for the change in direction of the forces.

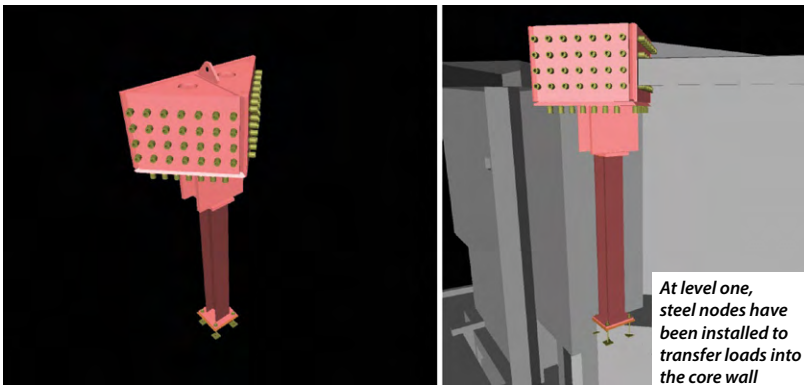
At the steel node locations, a combined system of standard reinforcement couplers and Macalloy bars have been used.

Bourne Steel's design team adopted Finite Element Analysis to model both nodes, applying the loads at each of the individual coupler locations. This gave a good representation of how the nodes were behaving under the complex loading that they were subjected to. Furthermore, due to the unique structure of the nodes, determining a fabrication sequence that would allow adequate access to all of the welds was indeed a challenge.

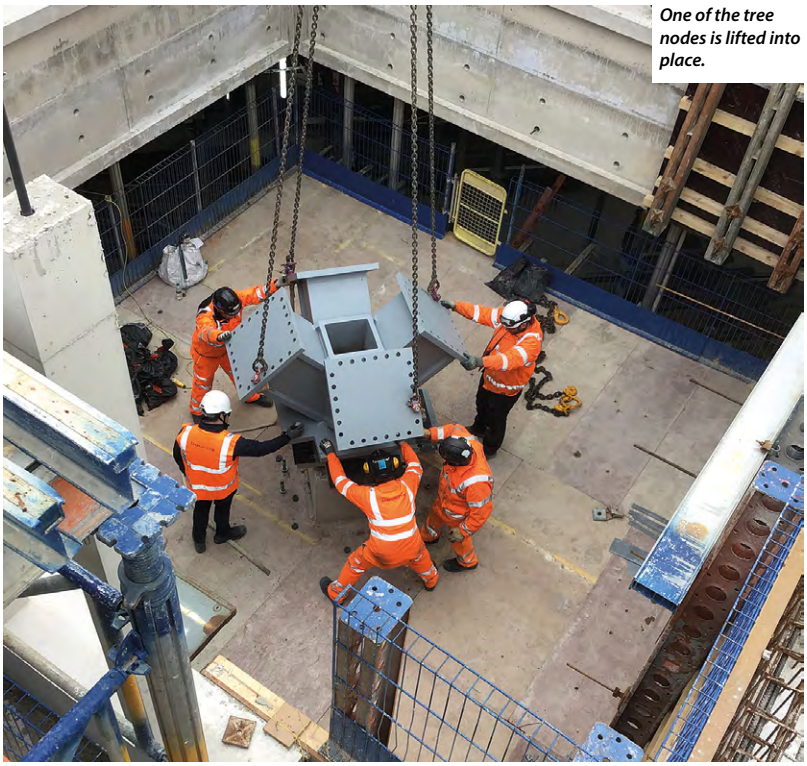
Each of the nodes are supported on 3m-high steel columns. The columns are sacrificial and negated the need for temporary works during the node installation process. Later in the construction programme, they were cast into the concrete cores. Bourne Steel also supplied a base plate for installation at ground floor weighing 0.5t, measuring 1.5m × 1.5m with 1m long rebar welded onto one side.

The Marshall Building is due to complete in time for the start of the autumn 2021 term.

*Visualisation of the completed Marshall Building*



*At level one, steel nodes have been installed to transfer loads into the core wall*



*One of the tree nodes is lifted into place.*

# Joint stiffness and the elastic critical load factor

The susceptibility of moment-resisting frames to global buckling is profoundly influenced by the stiffness of joints as calculated by the proposed method in BS EN 1993-1-8. Richard Henderson of the SCI illustrates the potential effects.

## 1 Introduction

It is unfortunate that BS EN 1993-1-1 does not adopt a succinct label for such an important parameter as $\alpha_{cr}$, the authors instead choosing the descriptor "factor by which the design loads would have to be increased to cause elastic instability in a global mode". The BS 5950 label in the title above has much greater utility. The article on the calculation of joint stiffness in the February edition of *New Steel Construction* hinted at the effect on stability of the stiffness of bolted joints and the present article provides an illustrative example.

## 2 Example portal frame

### 2.1 Rigid joints

The structure used in this simple example is a pinned-foot portal frame with a horizontal rafter. Sufficient restraints are assumed to be provided to prevent out of plane and lateral torsional buckling. The frame has a span $L$ of 30 m and a height $h$ to the centre-line of the rafter of 15 m. The rafter is subject to a uniform load of 10 kN/m. In order to achieve a high elastic critical load factor, stiff UB columns have been adopted, consisting of 914 × 305 UB 224 rolled sections. The rafter is a 533 × 210 UB 101. Hand analysis has been carried out for amusement and checked by stick FE analysis, first assuming the joints are infinitely stiff.

### 2.2 Frame deflections

For the vertical load case, determining the bending moments by moment distribution requires the stiffness coefficients for the members at the joint. Assuming symmetry, these are $k_c = 3EI_c/h$ for the column and $k_b = 2EI_b/L$ for the rafter. The distribution coefficient for the column is given by $k_c/(k_b + k_c)$. No redistribution is required and the results are obtained directly as shown in Table 2.1.

| Element | I value (m⁴) | Stiffness (kNm/rad) | Distribution coefficient | FEM (kNm) | Bending moment (kNm) |
|---|---|---|---|---|---|
| Column | 3.76e-3 | 157920 | 0.9483 | - | +711.2 |
| Beam | 6.15e-4 | 8610 | 0.0517 | -750 | -711.2 |

*Table 2.1 Vertical load case: bending moments*

The free bending moment in the rafter is 1125 kNm giving a mid-span moment of 413.8 kNm. The bending resistance of the rafter cross section given in the Blue Book is 901 kNm. The mid-span deflection of the rafter is given by the difference between the simply supported deflection and the upward deflection due to the end moments:

$$\delta = \left(\frac{5wL^4}{384EI_b} - \frac{M_0L^2}{8EI_b}\right) = 0.197\text{m}$$

The lateral deflection of the frame from a horizontal load at rafter level can be found using the slope-deflection equations and is given by:

$$\delta = \frac{Hh^2}{EI_bI_c}(LI_c + 2hI_b)$$

Assuming a unit load of H = 100 kN, substituting values gives a horizontal deflection at rafter level of 0.507 m.

### 2.3 Elastic critical load factor $\alpha_{cr}$

Using the formula in para. 5.2.1(4) of BS EN 1993-1-1,

$$\alpha_{cr} = \left(\frac{H_{Ed}}{V_{Ed}}\right)\left(\frac{h}{\delta_{H,Ed}}\right)$$

the $\alpha_{cr}$ value for the frame can be calculated. The global stiffness of the frame ($H/\delta$) is 100/0.507 = 197 kN/m. Substituting the remaining values gives $\alpha_{cr}$ = 9.9. According to para. 5.2.1(3) of EC3, the frame is therefore almost stiff enough for second order effects to be ignored. Increasing the rafter by one serial size would achieve this, with $\alpha_{cr}$ = 10.6

### 2.4 Introducing joint flexibility

According to Para 5.1.2 of BS EN 1993-1-8, for elastic global analysis, joints should be classified according to their rotational stiffness. If the joint is semi-rigid, the rotational stiffness $S_j$ corresponding to the design bending moment should be used in the analysis. A reasonable idea of the joint stiffness is therefore required to model the structure. The joint must be classified according to BS EN 1993-1-8 para. 5.2.2 and the initial rotational stiffness is denoted $S_{j,ini}$. The joint is deemed semi-rigid if:
$0.5EI_b / L \le S_{j,ini} \le 25EI_b / L$ or if $K_b / K_c < 0.1$

For the purpose of this example, the rotational stiffness of the beam to column joint has been assumed to have the same value as that calculated in February's technical article on the calculation of joint stiffness. The beam in that case was also a 533 deep UB and the joint stiffness calculated:
$S_{j,ini} = k_{\theta B}$ = 100 MNm/radian. Using Table 2.1, $K_b / K_c$ = 0.082 but $25EI_b / L$ = 107 MNm/radian so the joint is semi-rigid.

Joint flexibility increases the lateral deflection of the frame because, in addition to the rotation of the intersection of the members due to their curvature, the joints themselves rotate. The effect of this joint flexibility on the lateral deflection can be determined by assuming the joints behave as rotational springs and the members are rigid.

A similar approach to the slope-deflection equations results in the following formula for lateral deflection due to flexible joints:

$$\delta = \frac{-Hh^2}{(k_{\theta A} + k_{\theta B})}$$

Here $H$ is the shear force in the element in kN and the $k_\theta$ ▶26

▶25 parameters are the rotational stiffnesses in kNm/radian at ends A and B of the column of length $h$ m and the deflection is in metres. This deflection is added to the deflection due to element flexure already calculated. The foot of the column is pinned so the rotational stiffness at this end is zero. Substituting the values $H = 100$ kN and $h = 15$ m gives $\delta = 0.113$ m and a total lateral deflection of 0.620 m. The revised global stiffness of the frame is 161 kN/m and the elastic critical load factor reduces to 8.07 - second-order effects must therefore be considered.

The effect of the joint stiffness on the moments and deflections due to vertical loads can be calculated by considering rotations at the joint. The slope in the rafter is equal to the simply-supported value reduced by the slope due to the end moment. This rotation is equal to the slope in the column plus the rotation due to the flexibility of the joint.

$$\frac{wL^2}{24EI_b} - \frac{ML}{2EI_b} = \frac{Mh}{3EI_c} - \frac{M}{k_\theta}$$

The value of $M$ is 657.4 kNm, a reduction of 53.7 kNm. The mid-span moment increases to 467.5 kNm and the mid-span deflection to 0.244 m.

The results can be confirmed by FE analysis, assuming elements have infinite shear stiffness.

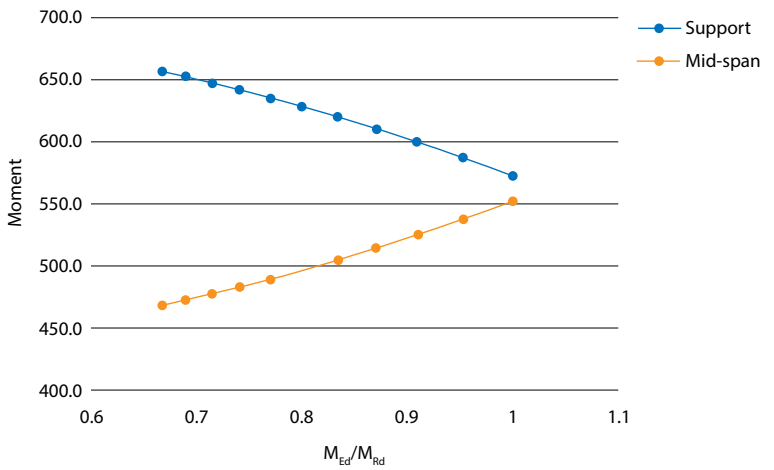



*Figure 2.1 Beam Moments*

## 2.5 Effect of connection design resistance

According to BS EN 1993-1-8 para. 6.3.1, the rotational stiffness of a beam-to-column joint $S_{j,ini}$ is reduced by a factor $\mu$ that depends on the joint utilization. If the design resistance is at least 1.5 times the design bending moment, the initial stiffness of the joint can be used in the analysis and $\mu = 1.0$. If the resistance ratio is less than 1.5 times, plastic deformation is assumed and a reduced stiffness must be used.

$\mu = (1.5M_{j,Ed} / M_{j,Rd})^{\psi}$ where $\psi = 2.7$ for a bolted end plate. The effect of the resistance ratio on the bending moments is shown in Figure 2.1

The support (hogging) moment reduces as the margin of resistance of the joint reduces. When the joint resistance equals the design moment, the support moment has reduced from 711 kNm, the value found from classical analysis, to 572 kNm. The mid-span (sagging) moment increases correspondingly.

The effect on the elastic critical load factor is shown in Figure 2.2. The reduction in $\alpha_{cr}$ with reducing joint over-design is

almost linear, from 8.07 to 5.93. This reduced value would require the design lateral loads to be increased by 20% to allow for second-order effects. Increasing the rafter by one serial size gives $\alpha_{cr}$ = 6.2 and a lateral load increase of 19%.

An unverified estimate of initial stiffness for the specific elements in the example found a value of about 60 MNm/radian for a joint with a moment resistance of 622 kNm. This gives $\alpha_{cr}$ = 6.6 and a support moment of 603 kNm. The value of $M_{Ed}/M_{Rd}$ is therefore 0.97 and $\mu$ = 2.6 approximately. This value of $\mu$ corresponds to a lower joint stiffness which reduces the support moment to about 508 kNm. Iteration indicates a joint stiffness of about 29 MNm/radian giving a support moment of 538 kNm and $\mu \approx 2.05$. The corresponding value of $\alpha_{cr}$ is about 5.3.

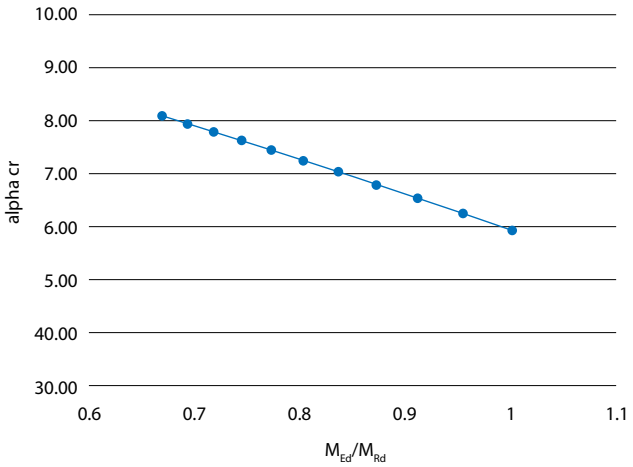



*Figure 2.2 Elastic critical load factor*

## 3 Conclusions

The above example illustrates the effect of joint stiffness on frame behaviour, in terms of the design bending moments, the deflections and the global stability and second-order effects. The sequencing of analysis and design steps is also affected as the designer must either have a preliminary idea of joint details when setting up the analysis model or iteration will be necessary.

The presence of the resistance ratio $\mu$ in the stiffness calculation potentially introduces difficulties where the frame and joints are designed by different parties. The designer could specify design moments 50% larger than those determined in the analysis, in the hope of the joint remaining elastic. The steelwork contractor could well find it challenging and expensive to satisfy such a requirement.

The UK National Annex to BS EN 1993-1-8:2005 states in clause NA.2.6 that connections designed in accordance with the principles given in the SCI publication P207[1] may be classified on the basis of the guidance given in section 2.5 of the same publication. SCI publication P398[2], the successor to P207 contains the advice that well-proportioned connections that follow the recommendations for standardisation given in P398 and designed for strength alone can generally be assumed to be rigid for joints in braced frames and single-storey portal frames.

1 SCI P207, Joints in Steel Construction – Moment Connections
2 SCI P398 Joints in Steel Construction – Moment Resisting Joints to Eurocode 3

# New and revised codes & standards

**From BSI Updates April 2020**

### BS EN PUBLICATIONS

**BS EN ISO 439:2020**
Steel and cast iron. Determination of silicon content. Gravimetric method
*supersedes BS EN ISO 439:2010*

**BS EN ISO 8044:2020**
Corrosion of metals and alloys. Vocabulary
*supersedes BS EN ISO 8044:2015*

**BS EN ISO 10113:2020**
Metallic materials. Sheet and strip. Determination of plastic strain ratio
*supersedes BS EN ISO 10113:2014*

**BS EN ISO 23386:2020**
Building information modelling and other digital processes used in construction. Methodology to describe, author and maintain properties in interconnected data dictionaries
*No current standard is superseded*

### BS IMPLEMENTATIONS

**BS ISO 4986:2020**
Steel and iron castings. Magnetic particle testing
*supersedes BS ISO 4986:2010*

**BS ISO 4987:2020**
Steel castings. Liquid penetrant testing
*supersedes BS ISO 4987:2010*

**BS ISO 11845:2020**
Corrosion of metals and alloys. General principles for corrosion testing
*no current standard is superseded*

### CORRIGENDA TO BRITISH STANDARDS

**BS 8004:2015+A1:2020**
Code of practice for foundations
*Amendment, March 2020*

**BS EN ISO 14713-2:2020**
Zinc coatings. Guidelines and recommendations for the protection against corrosion of iron and steel in structures. Hot dip galvanizing
*Corrigendum, March 2020*

### BRITISH STANDARDS REVIEWED AND CONFIRMED

**BS EN ISO 17632:2015**
Welding consumables. Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steels. Classification

**BS EN ISO 25980:2014**
Health and safety in welding and allied processes. Transparent welding curtains, strips and screens for arc welding processes

### DRAFT BRITISH STANDARDS FOR PUBLIC COMMENT – ADOPTIONS

**20/30381897 DC**
BS ISO 630-4 Structural steels. Technical delivery conditions for high-yield-strength quenched and tempered structural steel plates
*Comments for the above document were required by 19 April, 2020*

**20/30391695 DC**
BS ISO 10845-2 Construction procurement. Formatting and compilation of procurement documentation
*Comments for the above document were required by 4 April, 2020*

**20/30391698 DC**
BS ISO 10845-1 Construction procurement. Processes, methods and procedures
*Comments for the above document were required by 4 April, 2020*

**20/30397780 DC**
BS ISO 630-1 Structural steels. General technical delivery conditions for hot-rolled products
*Comments for the above document were required by 18 April, 2020*

**20/30399843 DC**
BS ISO 630-3 Structural steels. Technical delivery conditions for fine-grain structural steels
*Comments for the above document were required by 19 April, 2020*

### ISO PUBLICATIONS

**ISO 21904-1:2020**
Health and safety in welding and allied processes. Equipment for capture and separation of welding fume. General requirements
*Will be implemented as an identical British Standard*

**ISO 21904-2:2020**
Health and safety in welding and allied processes. Equipment for capture and separation of welding fume. Requirements for testing and marking of separation efficiency
*Will be implemented as an identical British Standard*

**ISO 21904-4:2020**
Health and safety in welding and allied processes. Equipment for capture and separation of welding fume. Determination of the minimum air volume flow rate of capture devices
*Will be implemented as an identical British Standard*

# AD 440: Fire design of external steelwork

SCI publication *P375 Fire resistance design of steel framed buildings* gives guidance on (amongst other things) the design of external steelwork when heated by a fire in a building fire compartment. This AD note clarifies which part of the publication should be used for this purpose.

It has been brought to SCI's attention that some users of P375 are misinterpreting which section of the document is relevant to the design of external steelwork. *Section 3.4.2 Compartment fires – external members* refers to Annex B of BS EN 1991-1-2[1] for the model describing the compartment fire conditions and the flames emanating from openings. The expressions in Section 3.4.2 are used in the calculation of the relevant radiative and connective heat fluxes. Design of external steelwork using these heat fluxes should be based on Annex B of BS EN 1993-1-2[2] as described in para. 4.2.5.4. of the same standard.

*Section 3.3.2 External fire curve* gives the nominal temperature-time curve intended for the outside of separating external walls as defined in para. 1.5.3.5 of BS EN 1991-1-2 and presented in para. 3.2.2 of the same standard. It is not intended for use in the design of external steel members.

Contact: **Richard Henderson**
Tel: **01344 636555**
Email: **advisory@steel-sci.com**

1. BS EN 1991-1-2:2002 *Eurocode 1: Actions on structures Part 1-2: General actions – Actions on structures exposed to fire*
2. BS EN 1993-1-2:2005 *Eurocode 3: Design of steel structures – Part 1-2: General rules – Structural fire design*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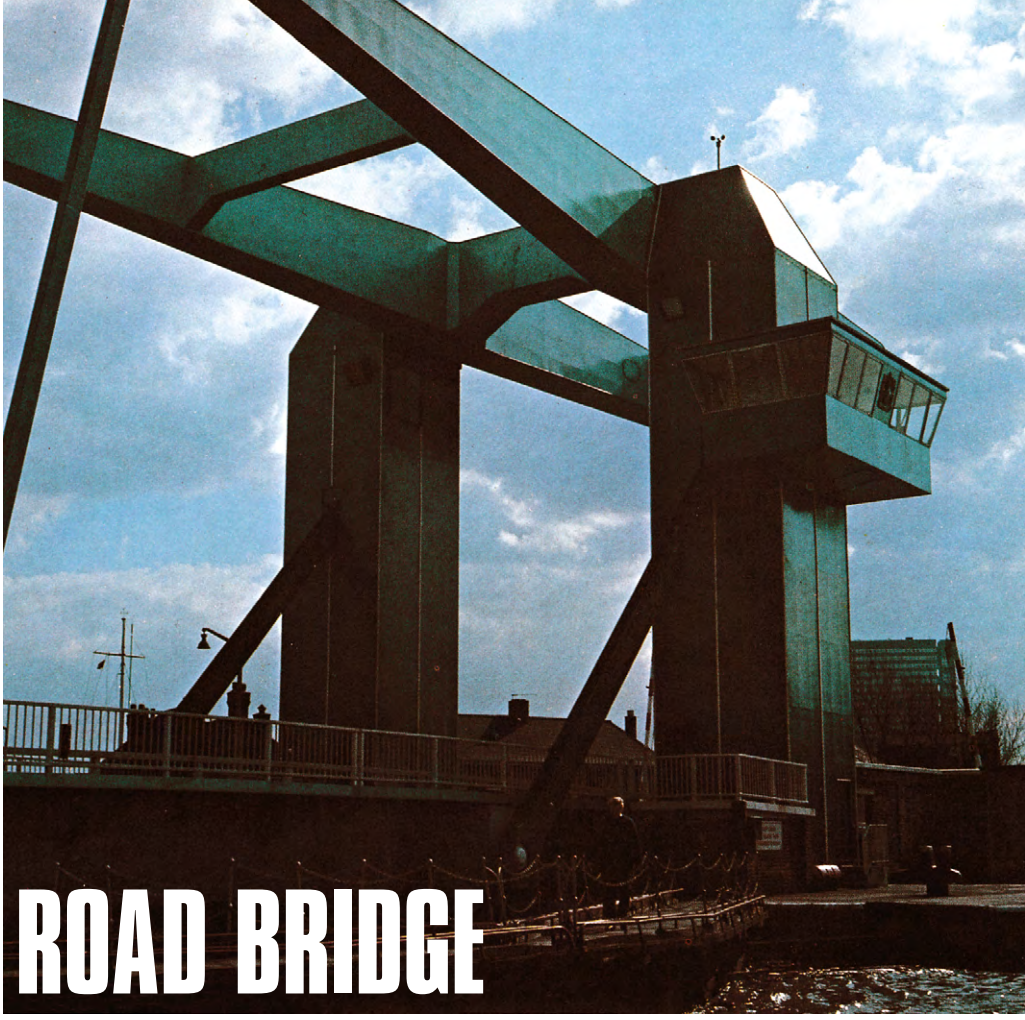
STEEL for life

FROM

Building with Steel
May 1970



**Using a principle of mechanics centuries old this new bridge has been described as a 'shaduf in steel'. This design however makes use of the latest technology to achieve operating efficiency with considerable elegance in appearance. Mr. R. E. West CEng, MICE, of the Engineering Dept, Port of London Authority here briefly describes the structure which was opened in 1969.**

# MANCHESTER ROAD BRIDGE

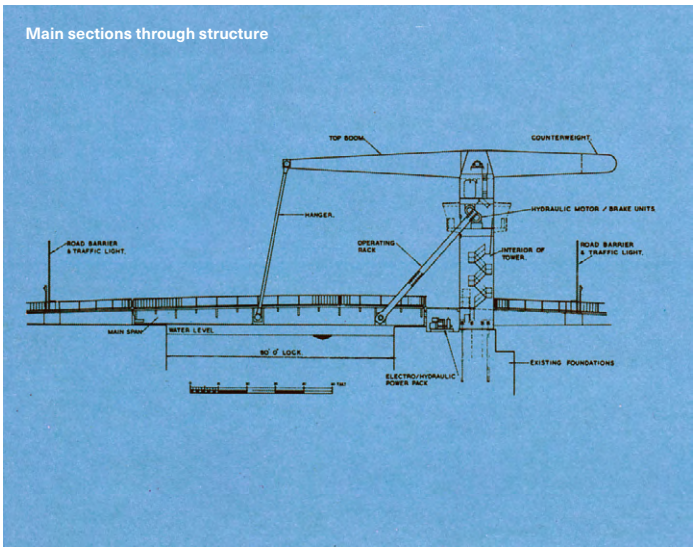
Until 1969 the South Dock Entrance of the India and Millwall Docks group was spanned by a double leaf cantilever bridge of Schertzer pattern. This bridge carried Manchester Road which is part of the perimeter road around the Isle of Dogs. However, after forty years service the bridge was in need of repair, partly from deterioration of the bearing girders, partly from damage caused by ships colliding with the footway and main girders and also because the motors and switchgear had reached the end of their useful lives. Various design studies were completed to examine the economics of repairing the existing structure or building a new bridge and the cost difference was so little that the decision was made to go ahead with a new installation at a cost of about £250,000. The existence of massive concrete foundation blocks for the double leaf bridge influenced the choice of structure and enabled considerable economy to be made in the civil works.

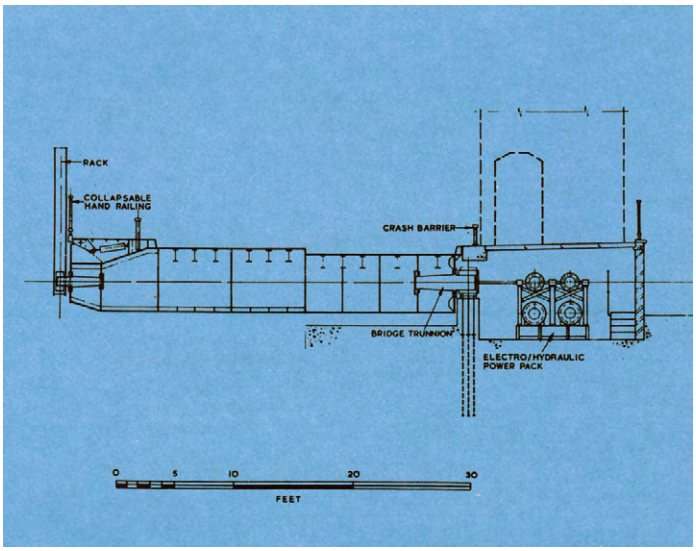
The selected design is of a counterbalanced drawbridge type similar to those traditional to Holland. However, Manchester Road bridge is on a larger scale and is believed to be the biggest bridge of its type anywhere. The line of the road has been maintained and its new slightly elevated profile has been graded down to meet the existing levels. Manoeuvring a ship through a lock entrance is not easy, particularly when there are strong tides or high winds. For this reason the towers have been sited on the south side of the entrance as experience has shown this to be the less vulnerable position. The bridge span of 110ft is greater than the lock entrance so that when it is raised sufficient width remains on the quay to work ships through. The roadway is 25ft wide, thus providing two lanes of traffic and there are two 7ft 6in footways. 'Verynyl' PVC tiles are bonded to the steel deck to provide the road surface and crash barriers protect pedestrians from vehicular traffic.

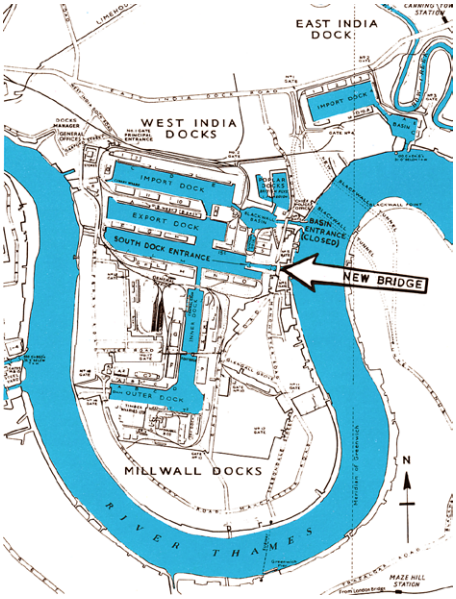
The particular type of bridge consists of a few large components and these were assembled by site welding prefabricated sections together in an erection yard at the lock side. The towers are held down by anchor rods which were grouted into holes drilled into the existing concrete foundations. All parts of the bridge were raised to the open position within a few hours of erection so that no obstruction was caused to ships using the dock.

The superstructure is welded throughout and in general is fabricated from steel to BS 2762 'Notch Ductile Steel for General Structural Purposes'. Since the racks operate on the sides of the deck structure they impose considerable torsional loads which are efficiently resisted by the closed cellular structure. Local point loads are resisted by Universal Beam stringers while the hangar, rack and main trunnions are supported by integral transverse boxes. The orthropic

Main sections through structure






road deck is designed to BS 153 HA loading plus 45 one-ton units of HB. The towers are 12ft square and withstand all loads from the operating racks as well as supporting the top booms and counterweights.

The lifting racks are activated by driving pinions which are driven by hydraulic pumps powered by two 70 HP electric motors. The combined pump and motors are situated immediately behind the main trunnions on which a cam is mounted so that the delivery of the pumps is always related to the inclination of the deck, thus ensuring complete control of its angular movement and dispensing with the more usual electric limits and inching motors. The deck is raised or lowered in approximately one minute.

Erection of the superstructure was effected rapidly as the components were few in number. To lift them into position use was made of the PLA's 200 ton lifting crane.

In order to eliminate the risk of any accidents operation of the bridge is manually controlled by remote push buttons (all controls are electrically interlocked to ensure that they are operated in the correct sequence). The control cabin is large in area and has a clear view of both the road and the lock. It will be possible in the future to operate all lock gates and sluices from this position though this is not done at present.

Maintenance of the bridge is the responsibility of the PLA and to keep costs down care has been taken to ensure that work can be carried out as easily as possible. To this end the external surfaces of the superstructure are easy to paint while bearings should need no more than occasional packing with grease. The pump/motor sets are duplicated so that the bridge can be operated while one set is being serviced.

The bridge is a good example of the unique properties of steel, no other material being suitable for the purpose.

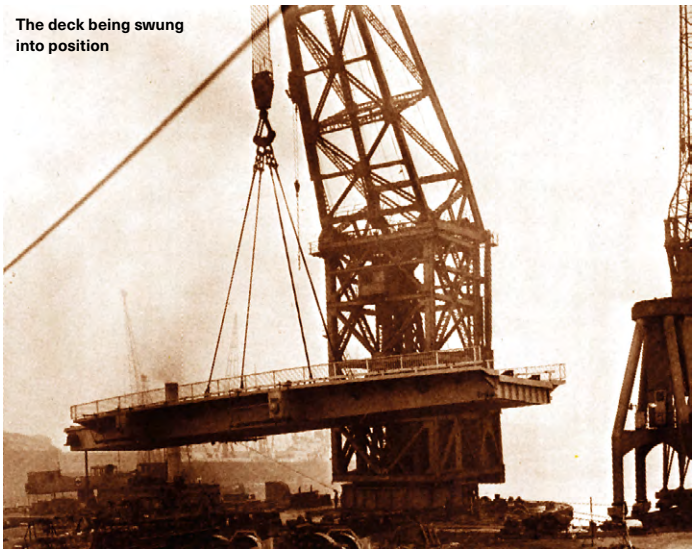
**Main contractors for the superstructure**
Sir William Arrol & Co Ltd

**Sub-contractors for the operating machinery**
MacTaggart Scott Ltd

**Contractors for the civil works**
John Mowlem & Co Ltd

**Design and erection supervision**
Engineering department of the Port of London Authority (Chief Engineer J. F. Stanbury C.Eng, FICE)

**The 200 ton Goliath crane lifting in the top beams**



**The deck being swung into position**

# 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 £800,000 |
| Duggan Steel | 00 353 29 70072 | ● | ● | ● | ● | ● | ● | ● | ● | | ● | | | | ● | ✔ | 4 | | | Up to £6,000,000 |
| ECS Engineering Services Ltd | 01773 860001 | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | ✔ | 3 | | 🟠 | 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 £2,000,000 |
| 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 £2,000,000 |
| 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 |
| M Hasson & Sons Ltd | 028 2957 1281 | | | ● | ● | ● | ● | ● | ● | ● | ● | | | | ● | ✔ | 4 | | ● | Up to £2,000,000 |
| M J Patch Structures Ltd | 01275 333431 | | | | ● | | | | | ● | ● | | | | ● | ✔ | 3 | | | Up to £1,400,000 |
| M&S Engineering Ltd | 01461 40111 | | | | ● | | | | ● | ● | ● | | | ● | ● | | 3 | | | Up to £2,000,000 |
| Mackay Steelwork & Cladding Ltd | 01862 843910 | | | ● | ● | | ● | | | ● | ● | | | ● | ● | ✔ | 4 | | | Up to £1,400,000 |
| Maldon Marine Ltd | 01621 859000 | | | | ● | ● | | | ● | ● | ● | | | | ● | ✔ | 3 | | | Up to £1,400,000 |
| 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 Engineering Ltd | 01582 584220 | | | ● | ● | ● | | | | ● | ● | | | ● | ● | | 2 | | | Up to £800,000 |
| SDM Fabrication Ltd | 01354 660895 | ● | ● | ● | ● | ● | ● | | | | ● | | | ● | ● | ✔ | 4 | | | Up to £3,000,000 |
| 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 £1,400,000 |
| Southern Fabrications (Sussex) Ltd | 01243 649000 | | | | ● | ● | | | | ● | ● | | | ● | ● | ✔ | 2 | | | Up to £1,400,000 |
| Steel & Roofing Systems | 00 353 56 444 1855 | ● | | ● | ● | ● | ● | | | | ● | ● | | ● | ● | ✔ | 4 | | | Up to £3,000,000 |
| 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 |
| 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 £800,000 |
| 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 | ✓ | | ✓ | ● | Up to £6,000,000 |
| M Hasson & Sons Ltd | 028 2957 1281 | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ✓ | 4 | | | ✓ | ● | Up to £2,000,000 |
| 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 | | | | | | | | | | | | ● | ✓ | 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 |
| 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 £400,000 |
| 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 |
| Inspire Insurance Services | 02476 998924 |
| 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** | | | | **Bronze** |
| 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** | | **Headline** |
| **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 | | |
| 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 | | | | |

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