www.newsteelconstruction.com

NSC

US Embassy selects steel

June 2015
Vol 23 No 6

Olympic legacy update

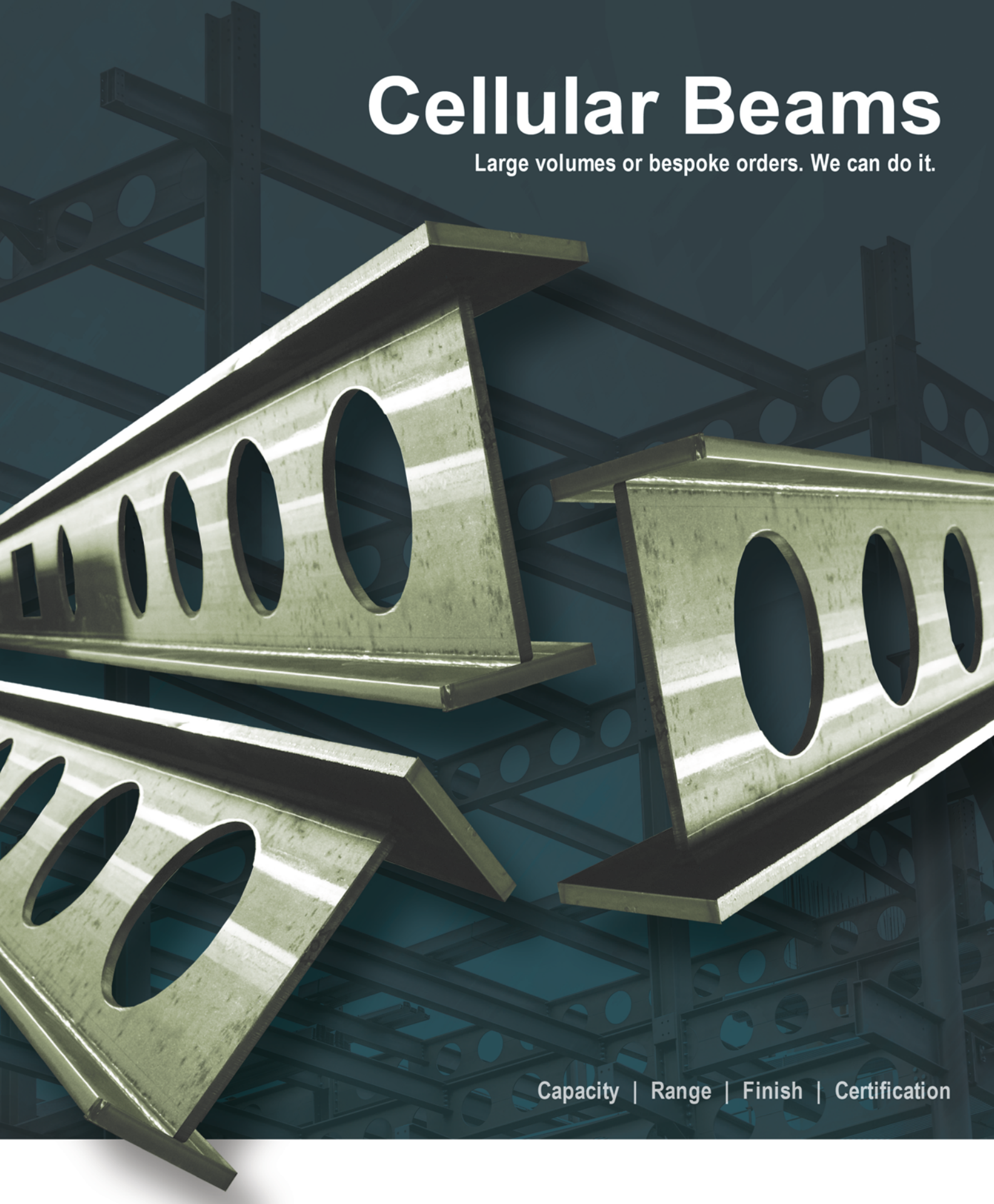
New School for Rhyl

Bridges for Borders Railway

Biomass plant for Brigg

Cellular Beams

Large volumes or bespoke orders. We can do it.



Capacity | Range | Finish | Certification

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

Made By JAMESTOWN

www.jamestownprofiling.com

Cover Image
Demounting one of the spine trusses from the London Aquatics Centre, Queen Elizabeth Olympic Park

NSC
June 2015 Vol 23 No 6

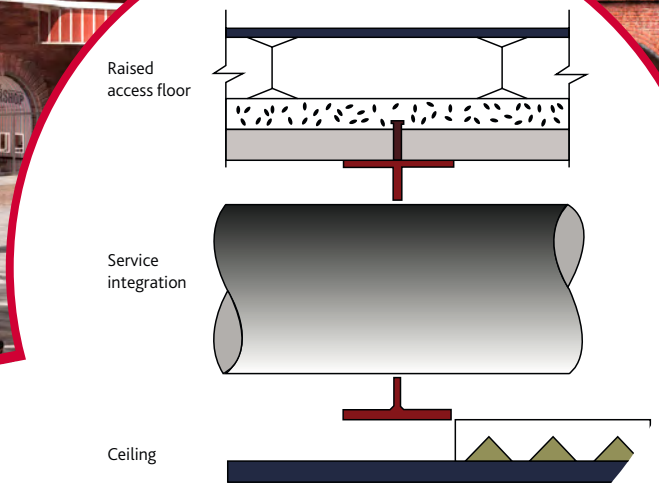
These and other steelwork articles can be downloaded from the New Steel Construction Website at *www.newsteelconstruction.com*

ASD Westok

klöckner & co multi metal distribution

OFFICE BLOCKS ON THE RISE

ASD Westok providing the optimum solution...



...WHY ASD WESTOK?

- Clear span solutions
- Optimised floor cross-section
- Unique ability to offer the right mix of cellular and plated beams
- Flexible service integration
- Pre-cambering provided free of charge
- CE Marking to BS EN 1090-1 Exc 4
- Revit® integration
- Free Westok design, vibration and BIM software
- Free design service: Scheme, detailed and value engineering

ENTRUSTED TO DESIGN AND DELIVER MULTI-METAL SOLUTIONS

ASD Westok Ltd. | Valley Farm Way | Stourton | Leeds | LS10 1SE | t: 0113 205 5270 | f: 0113 205 5271
e: design@asdwestok.co.uk | w: www.asdwestok.co.uk

MARWE2002-B

Steel gaining international repute

Nick Barrett - Editor

Now that the general election is behind us and a potentially stable government is in place for another five year term the wind looks to be set fair for another leg up to the recovery that has been evident in construction for some time.

Business confidence seemed to have been unnerved by the opinion poll predictions of a minority government being returned, or possibly one with an anti business outlook, so some investment plans were shifted to the backburner. That threat has been removed so all eyes are now on government making good on promises of increased infrastructure investment, which should feed through to more business investment.

Clear evidence that confidence has returned to developers can be seen in this month's news pages where you can read about a Japanese investor – Mitsubishi Estate Company - being behind a 40 storey tower for the City, which will be steel framed. It is a rare City multi storey development that isn't steel framed these days, thanks to steel's long span, fast construction and offsite capabilities in particular.

Not every market in the world has caught on to the advantages of steel to the same extent as the UK, which has the world's leading structural steel industry, but it is encouraging for designers and others who work internationally that the message has caught on with international investors like Mitsubishi, which should help promote the reputation of the structural steel sector internationally.

That strong message was certainly beamed about the world during the London Olympics and Paralympics where all the major sports buildings were made from structural steel, where construction went practically without a hitch and the exacting construction programme was easily met. Now those structures are in the process of being either dismantled or transformed for alternative post Olympic uses, again attracting international attention.

Our update in this issue on the legacy uses of these structures is a great advertisement for the flexibility of steel. The main Olympic venue had demountability designed in, so it could be easily reduced in size to avoid becoming a white elephant. Plans have changed however and instead a reconfigured stadium will house Premier League football, Rugby Union World Cup matches, and athletics events under a steel cantilevered roof that is twice the size of the original.

Demountability was proven in London as a key benefit of steel structures however and the world has taken note; the 2016 Rio Olympics will feature what is now being called 'nomadic architecture' on some of its venues.

Our article on the new United States embassy in London shows how easily steel construction can be adapted to other countries' standards as the project uses both UK and US sourced steel and the connections design is US derived. Steel's international reputation is only going to grow.

NSC

EDITOR
Nick Barrett Tel: 01323 422483
nick@newsteelconstruction.com
DEPUTY EDITOR
Martin Cooper Tel: 01892 538191
martin@newsteelconstruction.com
CONTRIBUTING EDITOR
Ty Byrd Tel: 01892 553143
ty@barrett-byrd.com
PRODUCTION EDITOR
Andrew Pilcher Tel: 01892 553147
admin@newsteelconstruction.com
PRODUCTION ASSISTANT
Alastair Lloyd Tel: 01892 553145
alastair@barrett-byrd.com
NEWS REPORTER
Mike Walter
COMMERCIAL MANAGER
Fawad Minhas Tel: 01892 553149
fawad@newsteelconstruction.com

NEW STEEL CONSTRUCTION IS PRODUCED BY BARRETT BYRD ASSOCIATES ON BEHALF OF THE BRITISH CONSTRUCTIONAL STEELWORK ASSOCIATION AND TATA STEEL, IN ASSOCIATION WITH THE STEEL CONSTRUCTION INSTITUTE.

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

Tata Steel
PO Box 1, Brigg Road, Scunthorpe,
North Lincolnshire DN16 1BP
Telephone 01724 405060
Website *www.tatasteelconstruction.com*
Email *construction@tatasteel.com*

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

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

Plans for 40-storey high City steel tower unveiled

Mitsubishi Estate Company (MEC) London has unveiled plans for a new 40-storey skyscraper to be built in the heart of the City's insurance district.

The Japanese investor, which has appointed Stanhope as development manager on the project, will shortly submit an application for the office building on the site currently occupying 6-8 Bishopsgate and 150 Leadenhall Street.

The Wilkinson Eyre-designed building will boast a 71,500m² gross area, including a public viewing gallery at level 40 and ground floor shops and restaurants.

The steel-framed design features a series of stacked blocks which taper as they rise.

Leases in the existing buildings expire at the end of this year, paving the way for a potential start on site in 2016, subject to planning.

The scheme is sandwiched in-between British Land's and Oxford Properties' completed Cheesegrater and the vacant 22 Bishopsgate site, where an Axa-led consortium will shortly submit plans for a new scheme to replace what would have been the Pinnacle.

MEC London Chief Executive Naoki Umeda said: "The submission of this application represents Mitsubishi Estate's confidence in the City of London's long-term growth prospects as a world financial centre, and its attractiveness for blue chip companies."

Steelwork contractor is FAB winner

A C Bacon Engineering has picked up five prizes, including four winner accolades, at this year's Farming and Agricultural Building (FAB) Awards ceremony held in York.

The company won and came third in the Diversification category for its work on CJH Farming, 17th Century Barn Conversion in Boyton Hall, Essex.

The judges said: "This was an excellent job at saving a building that could have easily been pulled down.

"Using original trusses, local labour and companies adds to this really nice project, along with sympathetic renovation which is largely in keeping with the original style of the building."

A second winning prize came in the Most Sustainable building category where A C Bacon was awarded for the Doubleday Group facility in Swineshead, Lincolnshire (pictured).

"Great use of green technology – photovoltaic panels and water processing," commented the judges.

Steelwork erected for Throws Farm Technology Center in Great Dunmow, Essex and for the Suffolk Hay Company in Monks Eleigh, helped A C Bacon also win the Non-agri farm building and Equestrian building categories.

Hosted by RIDBA (the Rural and Industrial Design and Building Association) the awards were presented by BBC TV's Countryfile presenter Tom Heap.

He told the audience he was "delighted there were creative people trying to raise the appeal of agricultural buildings by producing something people would enjoy looking at into the future".

The FAB awards were launched to recognise and reward contractors and clients who have taken the time and effort to ensure their new building is sympathetic to and even complementing the local landscape, while ensuring it is fit for purpose and has been designed with sustainability in mind.

RIDBA National Secretary Tony Hutchinson said: "Our awards scheme was particularly diverse this year which reflects the way the industry is going and its on-going reliance on buildings that are not only functional but also attractive, and increasingly now, sustainable."

Bomber Command memorial spire erected

A 30m-high steel spire has been erected as the first part of a project to build a visitor centre and memorial in Lincoln to commemorate the 55,500 servicemen who died serving Bomber Command during World War II.

The spire is formed from curved weathering steel plate tapering from 5.2m wide at its base to 700mm at the top. The height relates to the overall wingspan of a Lancaster Bomber which was the most successful aircraft used by Bomber Command.

Steelwork contractor for the project, S H Structures, brought the 55t spire to site in two sections, a 10.440m long base and a top piece measuring 21.216m long.

Once the lower section was secured on its concrete foundation, the top piece was installed and held with a temporary bolted connection.

A few days later, the final exercise was to weld the joint between the two sections and then test the welds before locally shot blasting the steel to ensure an even patina is developed when the weathering steel gradually turns its familiar rusty colour.

The completed spire will form the centrepiece of the proposed future memorial garden from where visitors will be able to stand within the spire and see a framed view of the nearby Lincoln Cathedral.

"It has been a privilege being involved in this scheme which honours the thousands of aircrew who gave up their lives whilst serving with Bomber Command," said S H Structures Sales & Marketing Manager Tim Burton.

Manchester steel scheme kicks off

Developer Allied London has appointed BAM Construction to deliver its £73M steel-framed No.1 Spinningfields project in central Manchester.

Situated on the site of the former Quay House in Quay Street, Manchester, the project is aiming for a BREEAM 'Excellent' rating.

According to BAM, the 24-storey building is set to deliver a world-class business environment and will be the finest and highest specified building in Manchester.

The Grade A office accommodation includes ground floor and mezzanine reception areas, which will provide space for restaurants, cafés and a business lounge.

A roof-top restaurant will open onto a garden terrace. The two basement levels have parking for 115 cars, 10 motorcycles and secure storage for 120 bicycles with showers and lockers provided.

BAM Construction Director Tony Grindrod said: "No.1 Spinningfields is a great project for BAM in Manchester's premier business district. We are delighted to have been chosen to deliver this high profile building, which follows our other prominent Manchester projects like the Co-Operative Group HQ."

No.1 Spinningfields has been designed by architects Simpson Haugh & Partners with technical detailing by Axis. The client team includes Gardiner & Theobald as the Project Manager and Cost Consultant and Mott MacDonald as the Façade Engineer. The design team now novated to BAM includes Roc Consulting as the Civil and Structural Engineer, Grontmij as the Building Services Engineer and William Hare as steelwork contractor.

BAM Construction is expected to start the build programme in June.

New Steel Contruction returns to print format

After one year as a digital only publication, New Steel Construction (NSC) is reverting to a traditional paper format as from the Structural Steel Design Awards special issue in July/August.

Following numerous requests from subscribers and advertisers, we have decided to offer the magazine in its paper format once again for those in the UK and Ireland who prefer to read it that way.

NSC will be provided, free of charge, in paper as well as the existing digital and website formats ten times a year.

To subscribe to the new paper format:

Existing digital NSC Subscribers should:

- Visit www.steelconstruction.info
- Login using the normal 'Login / create account' button in the top left corner *(If you don't remember your password, and get an error message, you can create a temporary replacement by clicking on 'Email new password'. The system will send you a temporary password to the address entered in the email box.)*
- Once logged in you will be returned to the site's homepage. Go to the 'Toolbox' sidebar menu on the lower left hand side
- Select 'My Profile' to edit your profile
- Tick the box to 'Receive printed NSC magazine', and enter your address details
- Click 'Save'

New NSC Subscribers should:

- Visit www.steelconstruction.info
- Click the 'Login / create account' button in the top left corner
- Click the 'Create an account' blue link in the Login box
- Enter the required details to create an account
- Ensure that the box to 'Receive printed NSC magazine' is ticked
- Click 'Save'
- On future visits you can edit your profile and settings by logging in, going to the 'Toolbox' sidebar menu on the lower left hand side and selecting 'My Profile'

Huge distribution centre for Felixstowe port expansion

Main contractor McLaren Construction has been appointed to build Uniserve's new 140,000m² distribution centre at the Port of Felixstowe.

Part of the port's expansion programme and one of many steel-framed distribution centres planned for the port, the Uniserve facility will be 40m-high and consist of four-storeys, providing more than 150,000 racked pallet positions.

The centre will provide UK and European delivery and collection services for packets, parcels, pallets, part and full loads. Uniserve has designed a multi-user facility, which has been based around flexibility and efficiency that will operate multi-user and dedicated services to clients' DC's, stores and customers.

Phil Pringle, Managing Director, McLaren Construction – UK & UAE said: "McLaren is thrilled to have been awarded this major contract by Uniserve. We look forward to increasing our position in the distribution sector and bringing our expertise to bear on the delivery of what will be a high profile and state-of-the-art facility for Uniserve and a prominent development in Felixstowe."

Uniserve Property Director, John Gandy commented, "We are delighted that McLaren are joining the team to deliver the first of our new breed of super DCs. They have an excellent track record of delivering high quality projects and we are looking forward to working with them on this exciting new facility.

Construction will begin this year.

NEWS IN BRIEF

The Technology and Innovation Centre (TIC) at the University of Strathclyde is now open for business, with a full programme of conferences scheduled for the coming weeks and most of the building's occupants having taken up residence. More than 2,600t of steelwork was supplied and erected by **Severfield** for the wedge shaped nine-storey steel-framed project.

Jack Tighe has been awarded a SC21 Bronze Recognition Award for its manufacturing excellence. SC21 is a change programme designed to accelerate the competitiveness of industry by raising the performance of supply chains.

A two-storey steel-framed **Ikea** store is due to begin construction in Reading during June. Main contractor for the project is RG Group and it has yet to appoint a steelwork contractor.

Acrow Galvanizing (part of the Wedge Group) has used hot-dip galvanizing to protect the Cow Parsley 'Gone to Seed' sculpture, which appeared on BBC1's Glorious Gardens. Standing 3.6m tall with 10 seed heads and spanning 6m wide, the steel sculpture was designed and manufactured for the popular scenic gardens of East Ruston Old Vicarage in Norwich.

Arup claims new and radical designs for steel connections in construction can be achieved using 3D printing. The company said the process could also enhance the design and production process to the point that the weight and resulting cost of future construction materials could be reduced significantly. Steel connections could be designed 50% smaller and with a weight reduction of approximately 75%.

Construction of a new steel composite road bridge over the **River Wear** in Sunderland is now under way. Sunderland City Council has signed a contract for the bridge and approach roads with Farrans Construction and it has now begun preliminary works. The new bridge will be a three span cable-stayed bridge with supporting A-frame pylon rising to a height of 105m.

AROUND THE PRESS

Construction News
22 May 2015
Steel braces for dentists
[Birmingham Dental Hospital] – Concrete may be the order of the day for most of the structure, but across the upper two floors of the north block the wide spans needed across a kitchen area meant the team needed even wider spans than a post-tensioned slab could offer. The team has installed five 16m long 1,200mm deep steel trusses that help provide the span dimensions needed.

The Structural Engineer
May 2015
Engineering victory: structural advances during the World Wars
Although welded steelwork had been used as early as 1914-18 for construction of ammunition barges, the technology came of age during WWII and rivets were almost rendered obsolete. Welding received a huge boost during the war years due to savings in weight, fabrication costs and production speed.

New Civil Engineer
14 May 2015
Ring of steel
[International Thermonuclear Experimental Reactor] - Five elevations of the columns, representing 6,000t of steel will be needed for the expanse of space in which the Tokamak can be assembled. A 900t roof is due to be raised in the next few months.

Construction Enquirer
19 May 2015
Second biggest jump in London office starts for 20 years
The scramble by developers to meet rising demand for new office space has powered up a 24% surge in London building activity. According to Deloitte Real Estate's latest London Office Crane Survey there were 31 new project starts in the last six months, promising an extra 4.4m sq ft.

Third steel tower planned for Birmingham's Snowhill

Developer Ballymore Properties has applied for detailed planning consent for an £80M steel-framed office building in central Birmingham to complete its trio of steel Snowhill development towers.

Designed by Sidell Gibson Architects, the 17-storey Three Snowhill replaces proposals for a 43-storey residential tower and adjacent 23-storey hotel, whose construction started but was halted in 2010.

The building would provide 33,500m² of B1 office space and 1,400m² of leisure and conference facilities.

Construction will reuse part of the aborted residential and hotel scheme, including three levels of basement car parking and the ground floor conference area. Structural cores for the earlier project had been built to fourth floor level but have now been demolished. The steel frame of the new building will punch through into new foundations, enabling existing structures to be reused.

"The development will provide high quality office space and will put the last piece of the Snowhill jigsaw in place, both architecturally and in terms of the business and employment community that is taking shape in this part of the city," said Ron Sidell of Sidell Gibson.

"Reusing part of the scheme that was aborted owing to the effects of the global financial crisis will ensure a more sustainable approach, one which will also reduce the disruptive effects of the construction phase of the proposed project," he added.

Subject to consent, the development will start on site later this year and is expected to be completed in the third quarter of 2017.

Opened in 2013, steel for Two Snowhill was erected by Caunton Engineering and the steel-framed One Snowhill was in completed in 2010.

Scottish Galvanizers land major contract

Scottish Galvanizers (part of the Wedge Group) has galvanized structural steel used to create a helideck at the new Southern General Hospital in Glasgow.

The new 'super' hospital is the first health facility in Scotland to have its own roof top landing pad offering quicker and more direct access to the emergency department.

Scottish Galvanizers were also contracted to galvanize steel for the helipad's access ramps.

The 14-storey hospital is the location for one of four new trauma care units in Scotland, with the helipad enabling the hospital to admit air ambulance patients who require urgent emergency care.

Scottish Galvanizers Commercial Manager Paul Tait said: "It was a great privilege to be involved in the construction of the new Southern General Hospital which is a mammoth project not only for the region, but the country as a whole.

"Galvanizing the helipad seemed an obvious choice for protection against rust and corrosion, as not only is the structure exposed to the elements, but it will be subjected to an aggressive marine environment, as it's in close proximity to the River Clyde."

The client explained that it was paramount that the correct protective treatment for a long-life was applied and galvanizing was chosen by the design team as the optimum solution for long term protection and robustness during installation, to remove the need for follow-up protective layers in what is a challenging location.

Steel bridges drive junction improvement scheme

Improvements to the Catthorpe Interchange (M1 Junction 19) are progressing on schedule with the entire £186M scheme due to be completed by Autumn 2016.

More than 150,00 vehicles currently use the interchange every day as it forms an important link between the M1, M6 and A14 routes.

In order to improve congestion and safety, traffic will be diverted away from

an out-dated and inadequate roundabout beneath Junction 19 of the M1 with the creation of a new three-level junction.

Working on behalf of main contractor Skanska, four new steel bridges, requiring more than 4,000t of steel, are being erected by Mabey Bridge as part of the scheme.

The longest of the bridges is 248m and this structure will carry traffic from the M6 to the M1 southbound. A total of 17 lifts, each one involving a pair of braced girders, were needed to complete this structure.

Edinburgh film campus will feature steel structures

An application has been lodged for planning permission in principle for a mixed-use studio development site at Straiton, near Edinburgh, with Midlothian Council.

The 86-acre site will host a world-class film and television production facility incorporating six sound stages, an external water-stage, two backlots, workshops and production office spaces.

Complementing the core studio campus will be a film academy and student residence, a visitor attraction and hotel. A data centre, parking areas and an innovative CHP energy centre will support the future-proofed complex.

PSLL Development Director Jim O'Donnell said: "We look forward to creating a world-class facility to complement Scotland's existing studio spaces and stunning locations."

Keppie Design leads the studio design team and it envisages many of the buildings will be steel-framed.

The project will be centred around a reception building that will provide a creative hub for resident production companies, staff and visiting crew, with a studio commissary offering stunning views of the Pentland Hills across a landscaped glen.

Creating a production facility of national importance that will also target the international market, six state-of-the-art sound stages will offer a range of options with two measuring 1,400m², two at 1,800m² and two at 2,800m². The two largest stages will reach a height of 21m, with the remaining four stages measuring 15m each.

The developers say the project promises to be the UK's only purpose-built studio in recent decades and the new build can ensure important elements for future-proofing, avoiding compromises for production, and utilising innovative uses of space; and it is anticipated to attain a BREEAM 'Excellent' rating.

Sport for all in Oldham

Under construction in Oldham town centre is a new £15M sports centre that boasts a 25m eight-lane swimming pool; a smaller learner pool; an eight-court sports hall; an 80-station fitness studio and a four-rink indoor bowls hall.

In addition to these sporting facilities the centre will also have 250 spectator seats for the main pool and 150 competitor seats at pool side; flexible seating for 250 people in the sports hall; exercise studios; separate changing facilities for dry sports, the swimming pools and fitness suite, as well as a cafeteria and outside parking.

Main contractor Willmott Dixon started onsite mid-2014 and handover of the project is scheduled for 23 October.

"This job was procured through a collaborative framework approach," explains Willmott Dixon Operations Director Mike Lane. "This helped us get subcontractors like EvadX on board quickly allowing them to start the steel design and fabrication process early, which in turn meant steel arrived onsite early in the programme."

EvadX has fabricated, supplied and erected 500t of structural steelwork for the new Oldham Sports Centre.

Diary

For SCI events contact Jane Burrell, tel: 01344 636500 email: *education@steel-sci.com*

Tuesday 9 June 2015
Steel Building Design to EC3
This course will introduce experienced steel designers to the Eurocode provisions for steel design.
Manchester. For details click here

Tuesday 16 June 2015
Crane Girders and Monorail Beams to EN 1993-6
1 hour lunchtime webinar free to BCSA and SCI members, offering an overview of the design of Crane Girders and Monorail Beams to EN 1993-6
1 hour webinar.

Thursday 18 June 2015
Steel Building Design to EC3
This course will introduce experienced steel designers to the Eurocode provisions for steel design.
Newcastle. For details click here

Thursday 25 June 2015
Portal Frame Design
This course provide in-depth coverage of the major issues surrounding the analysis, design and detailing of portal frames.
London. For details click here

Tuesday 30 June 2015
Essential Steelwork Design - (2 day course)
This course introduces the concepts and principles of steel building design to EC3.
Glasgow. For details click here

Tuesday 30 June 2015
High Strength Steels in Long Span Structures
This seminar will equip engineers with essential information for the effiecient design of long span structures such as stadia and exhibition halls made of high strength steel.
London. For details click here

Tuesday 7 July 2015
Light Gauge Steel Design
This course introduces the uses and applications of light gauge steel in construction, before explaining in detail the methods employed by Eurocode 3
Leeds. For details click here

Tuesday 14 July 2015
Steel in Offsite Construction Solutions
Webinar

An education in steel

A design change has resulted in Rhyl New School being constructed with structural steelwork, resulting in a more cost-effective programme.

A steel frame has proven to be beneficial to the overall programme

FACT FILE
Rhyl New School
Main client: Denbighshire County Council
Architect: AHR
Main contractor: Willmott Dixon
Structural engineer: Ramboll
Steelwork contractor: EvadX
Steel tonnage: 500t

Work is progressing on schedule on the £25M redevelopment of a North Wales school into what will be known as Rhyl New School North Wales.

Denbighshire County Council and the Welsh Government, through its 21st Century Schools and Education Capital Programme, are jointly funding the project which is aiming to achieve a BREEAM 'Excellent' rating.

The new steel-framed building is being constructed on land previously occupied by the school's sports fields. Once the new school opens its doors to students in 2016, the existing buildings will be demolished, making way for new playing fields.

The new 10,000m² school will accommodate 1,200 pupils, as well as providing a base for 45 pupils from the nearby community special school, Ysgol Tir Morfa. As well as modern classrooms, laboratories and workshops, the new building will also include a performance studio and specialist areas for use by the local community.

Cabinet Lead Member for Education Councillor Eryl Williams says: "The new school is great news for future generations of pupils, as well as the continued regeneration of Rhyl.

"The state-of-the-art facilities that will be provided in the new school demonstrates the council's continued commitment to providing the best possible start for our children and young people in modern surroundings".

Minister for Education and Skills, Huw Lewis said: "This significant investment in Rhyl New School is fantastic for future generations of pupils, staff and the wider community.

"Our 21st Century Schools programme is a real statement of our belief in our young people. We are committed to providing them with the best possible opportunities to access the most up-to-date facilities which, in turn, will help them to realise their full potential".

Main contractor Willmott Dixon started on site in October 2014 and its steel subcontractor EvadX, who are based in the town of Rhyl, were able to begin steel erection last February, completing the job in May.

"It's great to be involved in such an important local project," says EvadX Director Simon Adams. "I went to this school and so I can appreciate the benefits it will bring to the local community."

As well as erecting the main steel frame for the three-storey school building, EvadX was also responsible for installing precast lift shafts and stairs, as well as supplying and installing metal decking.

Completing the structure's frame so quickly was one of the main reasons structural steelwork was chosen for this job. However, steel was not the original choice for this project, as a concrete-framed building was initially envisaged.

Willmott Dixon was signed up more than four years ago to lead the design for Denbighshire County Council.

But when the project became entangled in the Welsh 21st Century school building spending review a long delay ensued.

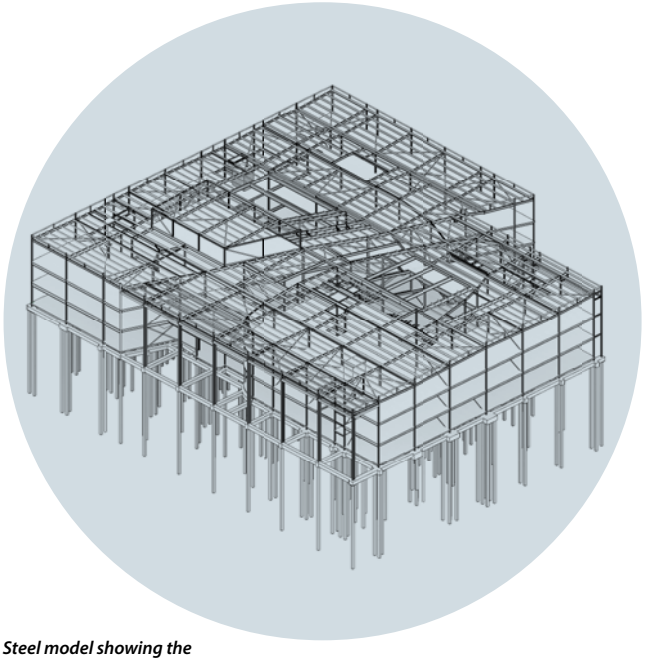
During the hiatus leading up to construction actually getting under way, the project was subject to a redesign and a steel framed structure emerged as a more cost-efficient solution.

"The school was completely redesigned and is now a totally different building," explains Ramboll Associate John Whitfield. "The old design included a sports hall on the ground floor and this has been omitted as it isn't needed. A nearby leisure centre is now being refurbished as part of the project."

The overall footprint of the school structure is rectangular with a slightly skewed in plan covered street dividing the building in half. Footbridges span this open void and link the building above ground floor level.

Both halves of the building are braced frames and each one has been designed to be structurally independent. Stability is provided by strategically positioned diagonal bracing which is mostly located in and around the stair cores.

Because of the lack of areas in which to



Steel model showing the school and its dividing street

> *"It's great to be involved in such an important local project. I went to this school and so I can appreciate the benefits it will bring to the local community."*

put bracing, Ramboll came up with the idea of utilising the performance space's seating steelwork for extra stability. The auditorium's terraced seating is formed with steel rakers and these have been designed as bracing members.

The majority of the steel frame has been erected around a standard 7.5m grid pattern, which is ideal for standard classrooms. There are some longer spans, up to 13m in length, forming the roof over the central 'street', the performance area and the dining hall.

Using two mobile cranes, EvadX erected the steel in a phased progamme that allowed follow-on trades to begin their work as soon as possible.

"We erected levels one and two, including the metal decking, before beginning the steelwork for the two uppermost floors," explains EvadX Project Manager Steve Morris. "This allowed the concrete contractor to begin the lower slabs while we were erecting floors three and four."

EvadX has also installed the precast terrace units for the performance space, a feature steel spiral staircase for the entrance foyer and hot-rolled framing for all of the building's windows.

The design decision to go for a hot-rolled system for the window framing, instead of a traditional cold-rolled system, was another example of steel's all-important speed of construction, as it was quicker to install.

Steel rakers form the seating areas for the drama hall

Retail development checks out with steel

Steelwork's speed of construction has played a significant role in the building of a new retail park in Rugby, scheduled to open in September less than one year after work began.

The Homebase store under construction

FACT FILE
Technology Retail Park, Rugby
Main client: St Modwen
Architect: Stephen George & Partners
Main contractor: Barnwood Construction
Structural engineer: Rowntree Partnership
Steelwork contractor: Adstone Construction
Steel tonnage: 360t

The new multi-million pound Technology Retail Park under development by St. Modwen, is located close to the A426 Leicester Road, one of the main thoroughfares into Rugby town centre.

This ideal location for a retail development is best summed up by the fact that it was 100% pre-let ten months prior to its earmarked opening this coming September.

The park is a central part of the fourth phase of works at St. Modwen's 70-acre regeneration scheme on Leicester Road, and will complement the existing offer at the Junction 1 Retail Park and support the on-going regeneration of the area.

St. Modwen Senior Development Surveyor Peter Rudd says: "We secured a great tenant line-up prior to starting on site, which demonstrates the demand for units of this size and the strength of the site's location. The new Technology Retail Park will play a central part of our new multi-million pound urban community and is great news for shoppers and the local economy."

The 10,200m² retail park has secured lettings from major retailers Homebase, Wickes, Pets at Home and Bensons For Beds.

Homebase has taken a 4,500m² unit plus 920m² for a garden centre; Wickes has taken a 2,500m² unit plus 920m² for a garden and external compound area; Pets at Home has taken a 923m² unit; and Bensons for Beds has taken an 877m² unit.

The floor areas include first floor mezzanine space that is included in the two largest units occupied by Homebase and Wickes. Both mezzanines are approximately 8m wide and extend the full length of both structures. They will accommodate offices, staff rooms and toilets.

According to Rowntree Partnership Project Engineer Paul Preston, the design of the project was always going to be a steel-framed solution, with the main driver being speed of programme.

"Steel is the best and quickest way of constructing buildings with long clear spans, which is what we have here."

Speed of programme has been key to this job as the retail park is earmarked to opening this coming September.

"We started onsite last October with less than one year to complete the project," Paul Limbrick, Barnwood Construction Site Manager, says. "The steel erection programme then started in January and was completed by early April which helped with keeping us on schedule."

Three of the units, occupied by Homebase, Pets at Home and Bensons, are joined together and form one large structure that has been divided into three stores by two internal column lines supporting partition walls.

The Homebase unit is a 56m wide propped portal framed structure, while the adjoining stores are slightly smaller and feature just a single spliced 35m wide span with no internal columns.

Stability for all of the units is provided

Visualisation of the completed park

Each store has a connected steel-framed entrance pod

by a combination of portal action and strategically positioned cross bracing.

Although the three units are all connected, the two smaller units are structurally independent and would stand up if the larger Homebase unit was not there.

The Wickes unit is a stand-alone structure separated from the other units by a car park. Similar in design to its neighbours, this structure is a single 30m wide portal frame. Like the other units, cross bracing positioned in the portalised bays provides stability.

"There is a fair amount of complexity in all of the unit's hipped roofs and connecting parapets," adds Mr Preston. "There is also a lot of cold rolled steel all around the structures from 2.5m above ground level upwards."

During the steel erection programme, steelwork contractor Adstone Construction had a large part of the site to itself. Working in a sequential manner and using one mobile crane Adstone, following on behind the piling and groundworks teams, initially erected the Homebase unit and its two smaller connected neighbours.

The steel erection programme was then wrapped up with the completion of the Wickes unit that is positioned at the opposite end of the site.

Cladding of the structures was completed during May, and Barnwood Construction has now begun the fit-out programme and the final elements of landscaping, paving and tarmacing of the external areas of the site, in readiness for the opening date.

St. Modwen's Technology Retail Park is situated on Technology Drive, which is within two miles of the M6 motorway and is close to existing shops, services and Rugby railway station. It is also minutes from the £35M Warwickshire College, which was constructed by St. Modwen and opened in 2010.

"Steel is the best and quickest way of constructing buildings with long clear spans, which is what we have here."

Portal frames are ideal for retail units

Steelwork being erected around the turbine equipment

Fuel efficiency

Steelwork's flexibility and economy of design are major pluses when building an energy centre around multiple equipment installations.

Finding cleaner and more environmentally friendly ways of generating energy is one of the most important issues of the day.

It has seen many local authorities investing in renewable energy plants where either household waste or another renewable commodity is used as fuel.

One of the latest projects of this ilk is a new 40MW renewable energy plant under construction at Brigg, Lincolnshire. It will generate enough electricity to power 70,000 homes using straw and woodchip as a sustainable fuel source. It is claimed this will save 300,000t of carbon dioxide emissions per annum.

The Brigg Renewable Energy Plant is scheduled for commissioning in early 2016 and is expected to create 30 jobs during operations and 50 jobs in fuel supply. Being built on a site formerly occupied by a sugar factory, the straw-fuelled plant will use more than 240,000t of wheat straw feedstock annually, which will be sourced from producers within a 50-mile radius, while woodchip will be used as an auxiliary fuel.

Overall the facility comprises a turbine building and attached office block and boiler hall, two straw storage barns and woodchip shed. All of these structures are steel-framed, as are a number of enclosed bridges linking the main buildings and housing conveyor belts.

"Steel is the most efficient way of designing this sort of energy centre as it allows the flexibility to construct the tall buildings quickly and economically," explains Ramboll Senior Project Manager, Agust Asgrimsson.

The project is on a fast-track construction programme and in order to keep the job on schedule, the steel frames for the boiler hall and turbine building had to be erected around equipment installation

"Much of the project's steelwork was designed to include temporary works, so that it could be partially erected around equipment installation," adds Mr Asgrimsson. "The boiler hall for instance was initially erected without one façade and its roof so the boiler could be lifted into place

FACT FILE
Brigg Renewable Energy Plant
Client: Fichtner
Architect: Ramboll
Main contractor: BWSC
Structural engineer: Ramboll
Steelwork contractor: Caunton Engineering
Steel tonnage: 1,430t

during a break in the steel erection process."

Steelwork contractor Caunton Engineering erected the boiler hall with columns brought to site in 10m lengths. This allowed the structure to be initially erected to a height of 20m, with only three façades in place as the fourth façade was left out to allow access for other trades.

Once the boiler equipment was in place the remainder of the structure, including the roof, was erected and the temporary bracing removed.

The boiler house is a large 30m-high braced structure, designed with a series of temporary wind girders positioned around the perimeter. With a combined weight of 10t, these temporary members were only removed once the main boiler equipment was in place.

The roof consists of five 32m-long trusses, weighing 10t each that had to be assembled on the ground from two sections before being lifted into place.

The adjacent turbine hall was designed in a similar way, with temporary bracing and props, allowing openings to be left in the steel frame.

"Using steel allowed us to design frames that could be erected quickly and in conjunction with other trades," says Mr Asgrimsson.

The boiler hall, turbine building and the offices form one large steel frame and were erected in a sequential manner. Each of the three zones is however separated by a fire-protected row of columns and wall.

The first steel buildings to be erected were straw barn (one) and the boiler building. The concrete slab for the second straw barn was used as the steel assembly area, as erection of this frame only commenced once the boiler equipment had been installed.

"When we erected these two structures it was quite early in the overall construction programme and we had the area to ourselves," says Caunton Engineering Site Manager Robert Aitman. "Once they were finished we left site until most of the turbine and boiler equipment had been installed."

The two straw barns are identical braced frames that are structurally independent but are linked via a conveyor system that feeds straw to the boiler house.

The sheds will receive deliveries of straw bales, and have two 20m spans and a single line of internal columns – ideal for storage and vehicle movements.

The completed straw barns were then used as storage areas for weather sensitive construction materials for other parts of the works. Some parts of this structural frames had already been constructed, but one elevation and the roof were completed while the boiler was being commissioned.

Each of the straw barns has parallel roof level crane rails to support two overhead cranes. These units will work 24-hours a day and will consequently exert considerable loadings into the steel frames. Stiffness of the frame was consequently important to avoid any movement. Meanwhile, to avoid fatigue the barns' frames have been designed to Execution Class 3.

The coordination of the steelwork programme around other activities was also a key part of the conveyor bridge erection. Once they leave the straw barns, two conveyors converge into one and feed into a sorting zone and then the boiler.

The conveyors are housed with enclosed bridges and span a number of roads and passageways. To keep one of these main thoroughfares open for the other construction trades, Caunton assembled one large 35m-long bridge section onsite and, using a 160t-capacity mobile crane, lifted it into place in one single weekend operation.

"As this bridge section spans the busiest and most used thoroughfare within the site, we were able to minimise any disruption by working in this way," sums up Mr Aitman.

Summing up the project the client BNLL say: "We are very happy with the intuitive way that this construction has been designed. The co-operation between the parties recognising others needs has certainly paid dividends thus far with respect to achieving an early completion."

CGI of the completed scheme

The Process

The straw fuel for the plant will be delivered on flat bed trailers and unloaded into one of the two straw barns.

Each straw barn is capable of holding straw bales sufficient for 36 hours of operation. The straw is transferred to be burnt in the boiler to produce high-pressure, high-temperature steam which drives the steam turbine to generate electricity.

The steam passing through the turbine is condensed back into water, with the help of an air-cooled condenser, for reuse in the boiler.

The hot combustion gases generated in the process pass through a complete cleaning system before being released through the chimney stack and the ash produced due to the combustion of straw is recycled for fertiliser.

The power plant is designed for continuous operation for base load power generation except one annual shutdown for inspection and repair.

The long spans inside one of the straw barns

A conveyor bridge under construction

London's Olympic legacy

Nearly three years ago London hosted one of the most successful Olympic and Paralympic Games in modern times, but what has happened to those iconic venues? NSC finds out

With just over 12 months to go before the 2016 Olympic and Paralympic Games start in Rio de Janeiro, NSC finds out what has happened to London's Queen Elizabeth Olympic Park and its iconic venues in the three years since those golden days of August and September 2012.

All of the major venues at Queen Elizabeth Olympic Park in east London were constructed with steel and legacy was always a built-in requirement of their designs.

Whether this involved demounting seating areas to scale down the venue after Olympics, or taking the entire structure down and reusing it elsewhere – which happened with the Basketball and Water Polo venues - steelwork has played an important and innovative role.

Floodlights are removed to allow the stadium's new roof to be installed

The Stadium

The centrepiece for any Olympic Games is the main stadium that hosts the opening and closing ceremonies as well as track and field events.

In the past many of these venues have become 'white elephants' after the Games, too big for local events and too expensive to upkeep in the hope of hosting intermittent international competitions.

The solution for the London stadium was to have an initial capacity of 80,000, but to incorporate a design with a demountable upper tier, so after the Games it could be removed to leave a smaller legacy mode venue with a 25,000-seat capacity.

These plans changed however before the Games took place when West Ham United FC and Newham Borough Council won the right to convert the stadium into a football venue, incorporating the athletics track.

Whether future plans involve demounting parts of the structure or reconfiguring it, steelwork's flexibility makes it the ideal material for this kind of work.

Working on behalf of main contractor Sir Robert McAlpine in 2010, Severfield erected 10,000t of steel for the construction of the stadium, making it the lightest Olympic stadium in modern times.

The ongoing redevelopment work includes installing a new cantilevered roof as well as retractable seating so the stadium can easily be switched between an athletics and football venue. Steelwork contractor for the redevelopment of the stadium is William Hare, working with main contractor Balfour Beatty.

The new roof will be twice the size of the original at around 45,000m^2. Measuring 84m at its deepest point, the steel-framed roof will cover every seat in the reconfigured 54,000 capacity stadium.

Eight kilometres of cable net weighing around 930t and ranging in width from 60mm to 105mm were lifted and connected to create the new roof. There are 5,423 pieces of steel in the roof, with a total weight of 3,900t.

The stadium will reopen temporarily for five matches of the Rugby Union World Cup this Autumn, before opening permanently in mid-2016 as the new home of West Ham United FC and a national competition centre for UK Athletics.

A large truss, which formerly supported temporary seating, is removed as part of the venue's reconfiguration

London Aquatics Centre

Designed by Zaha Hadid, the London Aquatics Centre marked one of the main gateways into the London 2012 Olympic Park. With its sweeping steel roof, measuring 160m x 80m, the structure immediately became an iconic structure.

During the Games the centre had a spectator seating capacity of 17,500, mostly accommodated in two steel-framed temporary wings.

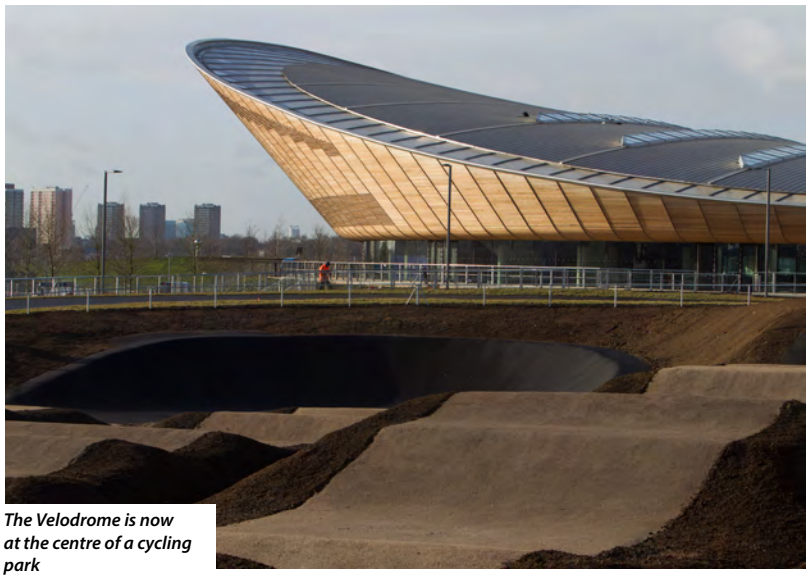
The permanent structure consists of 2,800t of steelwork, while the temporary structure required 3,200t.

After the Olympics the temporary wings were dismantled as part of a transformation programme, which culminated in the reopening of the facility in 2014 with a smaller 2,500 capacity.

The final part of the steel dismantling programme, involving the removal of two 172t spine trusses that supported the temporary seating wings, was carried out in early 2013 with two 800t-capacity mobile cranes.

Today the Aquatics Centre contains two 50m swimming pools, a 25m diving pool, a dry diving zone, and a 50 station gym and crèche.

The structure also incorporates a 250m long and 45m wide land bridge that forms a route into the Queen Elizabeth Olympic Park and the roof of the training pool. The bridge includes 14 steel beams, up to 60m long and weighing 75t each.



The Velodrome is now at the centre of a cycling park

Olympicopolis

As well as the Olympic venues, the 560-acre Queen Elizabeth Olympic Park boasts a number of residential schemes centred around the former athletes villages, 6.6km of waterways, 15 acres of woods, hedgerow and wildlife habitat, 4,300 new trees and a host of artworks including the steel Orbit.

Further residential schemes are planned, while last year the Government committed to funding to help deliver the Mayor's Olympicopolis vision. This will create a world class education and cultural district on the Park.

Continuing the legacy theme it will include facilities for University College London, University of the Arts London, a new Victoria & Albert Museum and a new campus for the London College of Fashion.

The Velodrome

During the Olympics Team GB won seven gold, one silver and one bronze medal at the Velodrome making it the most successful venue for home competitors.

The venue is now the centrepiece of the Lee Valley Velo Park that also includes facilities for road cycling and BMX bikes.

Steelwork played a crucial role in the construction of the Velodrome and it can be divided into two main elements; a concrete base and lower tier, and an upper steelwork portion forming the mid level concourse, the upper tier seating and the curved roof.

The upper tier of the Velodrome is formed by 48 inclined steel trusses, while the lower parts of the truss form the steel rakers supporting the upper tier's precast terrace units.

Because of the shape of the roof structure, the Velodrome has two upper seating areas positioned on either side of the track and suspended within the two curves of the roof.

A tubular steel ring beam sits on top of the steel trusses and goes around the entire perimeter of the structure, in a rollercoaster fashion, supporting and helping to form the distinctive double-curved roof.

The project's 1,100t steel tonnage, erected by Severfield, consisted of 2,500 sections.

The Velodrome has been adapted for use by the public, while a further 1,000 seats have been added to guarantee the venue can still host international cycling events in the future.

The Copper Box is now a multi-use arena

Arenas

Known as the Copper Box because of its distinctive cladding, this venue was the first to reopen after the Olympic Games. With the addition of 500 seats bringing the capacity up to 7,500, the venue does not look too dissimilar to when it hosted Olympic handball and modern pentathlon, as well as Paralympic goalball.

Approximately 1,000t of steel was erected for this venue by Severfield. The Copper Box now hosts London's only professional basketball team, as well as local handball and netball clubs.

The Basketball Arena was a temporary structure erected by Severfield and also contained 1,000t of steel. It was commissioned on a take-back basis and after the Games it was dismantled and returned to contractor GL Events.

More than 3,000 seats from the basketball Arena have been reused at the nearby Lee Valley Hockey and Tennis Centre.

Likewise, the Water Polo venue was also designed as a temporary steel-framed arena and it was also dismantled and returned to contractor after the Games.

Steel for the Water Polo venue was fabricated and supplied by Caunton Engineering.

Demountable steel frames

Michael Sansom of the SCI

Steel structures are inherently demountable and reusable; more so than competing structural materials. It is no coincidence that virtually all demountable structures and systems use steel.

Think of traditional scaffolding; think of formwork for in-situ concrete construction – these all-metal temporary support systems are used for the traditional steel benefits of being lightweight and fast to erect but also because they are durable and reusable. Although the timescales may be longer, the same principles and benefits apply to steel buildings.

Greater attention is being focussed on end-of-life impacts of buildings, long-term resource efficiency and the adoption of circular economy models in the built environment. A few simple design principles, focusing on how buildings are taken apart, rather than how they are put together, is often all that is required to enable steel structures to be deconstructed and reused.

There are three levels at which steel structures can be deconstructed and reused:

- in their entirety – generally relatively simple structures such as portal frame buildings and car parks or bespoke temporary structures such as venues for special events
- parts of the structure for example temporary seating structures at sporting venues
- as individual members, for example reuse of steel beams, reclaimed from Brighton railway station, in the BedZed building in London (below).

Although applicable to many building types, event venues are some of the structures most amenable for reuse, particularly where they are 'temporary' venues for one-off events such as the Olympics or the football World Cup. The scale and cost of such events means that the legacy of these high profile sporting venues is a high priority. In this context 'legacy' means leaving permanent venues in a state suitable for their permanent, post-event function, for example in terms of seating capacity and, where possible, reusing redundant and temporary structures in new applications when the event is over.

This is not a new idea. As far back as 2000, this approach was adopted in the Sydney Olympics. For example, the temporary seating at the aquatics venue was deconstructed when the Games were over and was re-erected as a permanent grandstand at the rugby stadium in Wollongong.

More ambitiously, the 2016 Rio Olympic Committee has adopted the concept of 'nomadic architecture' for some of its temporary venues. For example, the handball arena has been designed so that it can be deconstructed and will be reused to construct four new schools on the outskirts of Rio.

Design for deconstruction and reuse is another unmatched sustainability attribute of steel construction. Already common in specialist niche markets, particularly temporary event venues, the challenge is to broaden the approach to make it commonplace in mainstream construction.

SUBSCRIBE TO THE PRINT EDITION OF NSC

By popular demand, NSC is being printed again. It'll still be available online as a digital magazine at www.newsteelconstruction.com with all the videos and multimedia links you've come to expect, but starting with the July/August SSDA special issue it will now be accompanied by a printed edition.

Subscriptions are now available for **free*** online at www.steelconstruction.info - the same place the digital subscriptions are handled at.

Here's how to register for your copy. ▶

* UK and Ireland addresses only

Existing Digital NSC Subscribers

Visit *www.steelconstruction.info*

Login using the normal 'Login / create account' button in the top left corner *(If you don't remember your password, and get an error message, you can create a temporary replacement by clicking on 'E mail new password'. The system will send you a temporary password to the address entered in the email box)*

Once logged in you will be returned to the site's homepage. Go to the 'Toolbox' sidebar menu on the lower left hand side

Select 'My Profile' to edit your profile

Tick the box to 'Receive printed NSC magazine', and enter your address details

Click 'Save'

New NSC Subscribers

Visit *www.steelconstruction.info*

Click the 'Login / create account' button in the top left corner

Click the 'Create an account' blue link in the Login box

Enter the required details to create an account

Ensure that the box to 'Receive printed NSC magazine' is ticked

Click 'Save'

The steel frame races towards completion

Steel joins the diplomatic corps

London's south bank is a hive of construction activity and one of the most prestigious projects is the new steel-framed US Embassy.

FACT FILE
Embassy of the United States, London
Main client: US Department of State
Architect: Kieran Timberlake
Main contractor: B.L Harbert
Structural engineer: Weidlinger Associates
Steelwork contractor: Severfield
Steel tonnage: 3,900t

After more than 50 years of residing on London's Grosvenor Square, the US Embassy is planning to move to a brand new 11-storey building at Nine Elms on the south bank of the River Thames.

Regarding the move, former US Ambassador Robert Tuttle said: "We looked at all our options, including renovation of our current building. In the end, we realised that the goal of a modern Embassy could best be met by constructing a new facility.

The US Department of State's Bureau of Overseas Buildings Operations chose the project architects through a design competition.

With a brief to create a secure, welcoming, environmentally friendly and sustainable building, one that would complement its surroundings as well as appropriately represent the United States in the UK, Philadelphia-based architect Kieran Timberlake won the design competition.

Taking into account the urbanisation and redevelopment that is currently taking place in the Nine Elms area, the 46,450m^2 Embassy building is described as a transparent crystalline cube atop a four-sided colonnade.

The glazed façade of the embassy building is covered on three sides with a tensioned outer envelope system made from ethylene tetrafluroethylene (ETFE) cushions. This system is oriented to provide shade, minimise heat absorption and protect the building from external environment and act as a thermal buffer for the building.

Severfield is fabricating, supplying and erecting approximately 3,000t of structural steel for this project and erecting a further 900t of structural steel that has been sourced by the project via the United States.

According to Severfield one of this project's unique challenges is dealing with the US supplied material, as all steel and connections on this project have been designed to US standards by structural engineer Weidlinger Associates of New York.

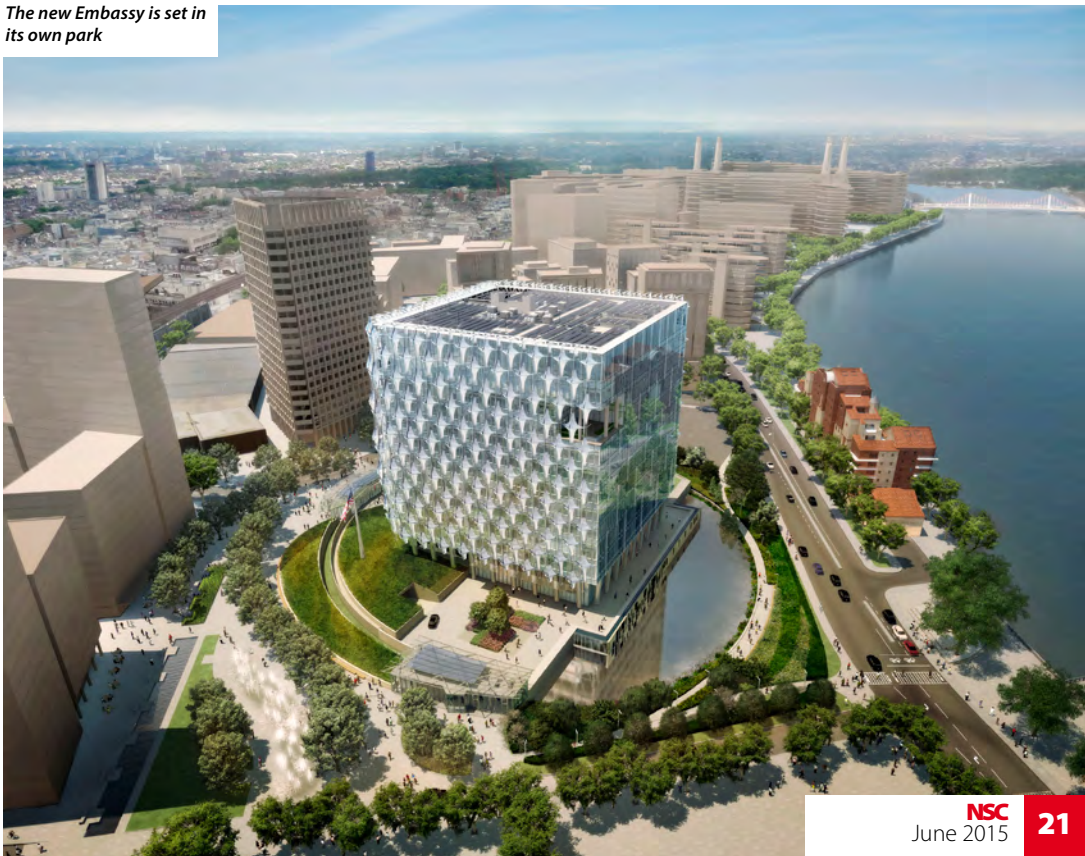
Steel erection is now progressing towards completion and the new US Embassy will open in 2017.

The new Embassy is adjacent to one of London's largest regeneration schemes

A central core provides the steel frame with stability

Internal view of the Embassy

The new Embassy is set in its own park



The steel frame is based around a regular grid with long spans

Bridge solutions for new railway

The UK's newest railway is gearing up for service as steel bridges play their part in this groundbreaking project.

FACT FILE
Borders Railway footbridges
Main client: Network Rail
Main contractor: BAM Nuttall
Structural engineer: URS
Steelwork contractor: Cairnhill Structures
Steel tonnage: 255t

Due to open in September, the construction of the line between Edinburgh and Tweedbank constitutes the longest new domestic railway to be built in the UK for more than 100 years.

The route was originally opened in 1849 as the Waverley Line and once linked Edinburgh and Carlisle via Midlothian and the Scottish Borders. However as with many branch lines and cross-country routes the line was closed down in 1969.

Pressure from commuter groups finally persuaded the Scottish Parliament to endorse the partial reopening of the line in 2006, with construction work finally kicking off in April 2013.

Although the construction project initially only involves reinstating the 30 miles of line from the Scottish capital to Tweedbank, it has been mooted that if the railway is successful then the remaining 70 mile stretch to Carlisle could also be rebuilt.

According to Transport Scotland, the £294M project will deliver major economic and social development opportunities by providing a fast and efficient rail link. It will significantly increase the accessibility of jobs for the people of Midlothian and the Borders, and as a result of creating an attractive public transport alternative to the car, approximately 60,000 peak car trips per year will be cut from the region's roads.

The Borders Railway has 10 stops, seven of which are newly constructed stations. A total of 95 bridges have been refurbished for the project and 42 new bridges constructed by main contractor BAM Nuttall.

Four of these bridges were new steel footbridge structures fabricated, supplied and erected by Cairnhill Structures.

All four footbridges are located in the north section of the railway project – near Dalkeith, which is just south of Edinburgh.

Two of the bridges serve newly constructed railway stations at Shawfair and Eskbank, while the other structures form public crossings across the railway at Station Road and Old Craighall, both near Shawfair.

All of the bridge's spans vary in length with the longest at Old Craighall measuring 24m long and the shortest at Eskbank measuring 10m long.

In order to maximise steelwork's speed of construction and minimise onsite work, all of the bridge decks arrived for installation as complete units with their balustrades already in place.

"Staircases also came to site in fully assembled units, while the access ramps were fabricated in two or three sections," explains Cairnhill Structures Director Steven Hendry.

Using a variety of mobile cranes, with the biggest having a 350t-capacity, Cairnhill's installation programme for each bridge was completed in a single day.

"We had to install supporting columns and then lift and bolt the various bridge and ramps sections into place," adds Mr Sanderson.

Cairnhill completed its work earlier this year in readiness for the Borders Railway grand opening in September.

Speed of construction meant steel was the ideal material for the project's bridges

A prefabricated unit is lifted into place

A central span is lifted into position in one piece

Shawfair Station

The new Shawfair station will support a large community in the area, including the nearby villages of Danderhall, Newton, Millerhill and Harelaw. The station will also serve 4,000 new homes as part of a £200M development plan recently unveiled by Shawfair LLP.

The new development will see the construction of two primary schools and a secondary school along with an estimated 92,000m² of commercial and retail space available for businesses.

Shawfair station will have bus links and easy access to Midlothian's extensive path and cycle network. It will have two platforms with sheltered areas for passengers, car parking for up to 59 vehicles and cycle storage for up to 10 bikes.

Cairnhill hit the road

Celebrating its 35th anniversary this year, Cairnhill Structures has recently been awarded National Highways Sector Scheme 20 (the execution of steelwork in transportation infrastructure assets) to its list of accreditations.

The award is apt as the company has for most of its lifetime been involved with bridge projects, such as strengthening work, refurbishment, repairs and overhauls.

Other steel bridges on the Borders Railway

Wheatlands Road bridge in Galashiels is constructed

One of the many steel bridges erected in south Edinburgh

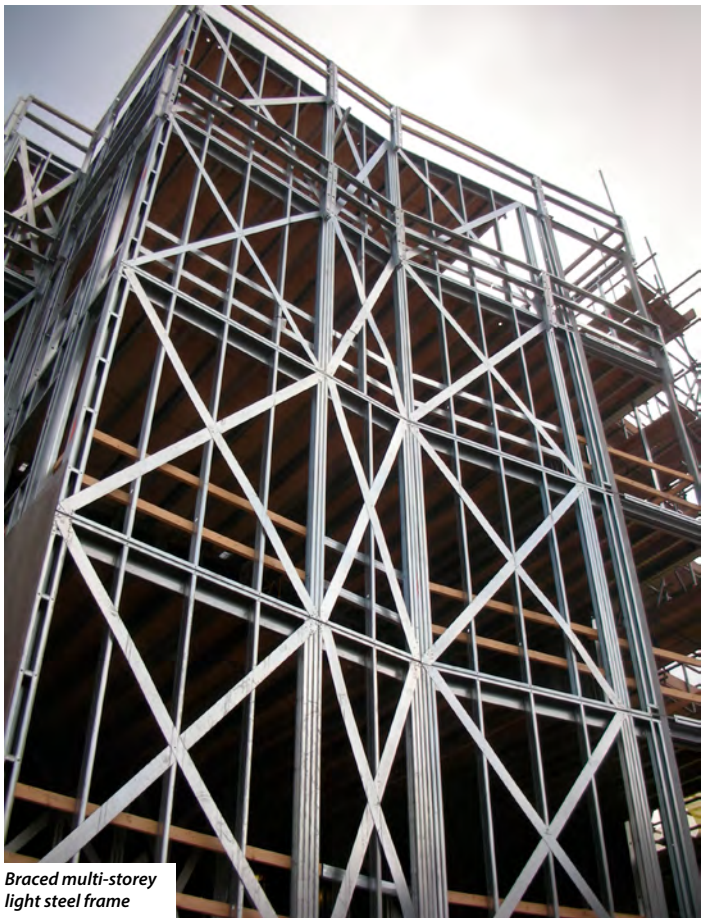
Best practice for light steel framing

Andrew Way of the Steel Construction Institute discusses some of the best practice issues to be considered for the design and construction of light steel frame buildings

Light steel framing

Light steel framing is an off-site manufacturing process that uses pre-fabricated wall panels and other elements to produce load-bearing structures. The basic components are cold-formed steel C and Z sections that are rolled from galvanized strip steel in the order of 1.2 to 4 mm thickness.

The most common use for light steel framing is residential type buildings of 4 to 10 storeys e.g. apartments, hotels and student accommodation. However, it is also used in housing, particularly 2 and 3 storey houses with habitable roof space, and applications where its light weight is beneficial such as mixed use buildings, including residential space over supermarkets.



Braced multi-storey light steel frame

Best practice guidance

The technologies of light steel framing and modular construction are very versatile and are being used for larger and more complex projects than ever before. Considering this, SCI and the wider industry has recognised the need for best practice information for the supply chain, site managers, specifiers and checking authorities.

A series of Technical Information Sheets covering four key areas of best practice for light steel framing are available from the SCI. The information sheets are; ED027: Design and Detailing, ED028: Pre-Start Requirements, ED029: Installation and ED030: Follow-On Trades. These have been produced with co-funding from the UK Commission for Employment and Skills (UKCES) through the UK Futures Programme and with support from the members of the Light Steel Forum[1].

Design and Detailing

Light steel framing is a highly engineered structural system which is linked through BIM systems to sophisticated manufacturing. The design should be carried out by a suitably qualified specialist structural engineer in accordance with national design codes and SCI design guidance. The Eurocodes and the previous British Standards both have specific parts for the design of cold formed sections, these are BS EN 1993-1-3[2] and BS 5950-5[3], respectively. However, light steel frame structures should also be designed in accordance with many of the more general parts of the design standards, particularly the Eurocodes. For example; the robustness requirements in BS EN 1991-1-7[4] and frame stability requirements in BS EN 1993-1-1[5].

The structural characteristics and the critical design checks for light steel frames can be significantly different to those of hot-rolled steel frames. Light steel frames must be designed for the consideration of uplift forces at the foundations due to lateral wind loads and suitable anchorage details designed to resist the uplift forces. It may be the case that hot-rolled steel sections are incorporated into the light steel frame to resist heavy point loads, e.g. for balcony connections. The hot-rolled sections should be detailed such that they fit within the depth of light steel walls and floors.

Floor Design

Floors in light steel frame buildings are typically either joisted light steel or composite slabs. In addition to vertical load resistance, light steel floors must be designed for strict serviceability limits to ensure user comfort during use. The serviceability limits for joisted light steel floors are described in detail in SCI[6] and NHBC[7] guidance, they include four principle requirements:

- Deflection due to dead load plus imposed load ≤ Minimum of Span / 350 and 15 mm.
- Deflection due to imposed load only ≤ Span / 450.
- Deflection due to dead load plus 20% of imposed load ≤ 5 mm. (To achieve a minimum natural frequency of 8 Hz.)
- Deflection of floor system due to a 1 kN point load ≤ Limit based on span.

Composite decking supported on light steel walls

For simply supported composite slabs supported on light steel walls, SCI and NHBC have developed detailing restrictions to limit the effect of creep and shrinkage of concrete on the long-term deflection of floors. The simplified restrictions are based on the span-to-depth ratio of the slab:

- Span-to-depth ratio ≤ 26, where composite action is assumed in the design of the slab and there is no reinforcement bar is provided in ribs of the deck.
- Span-to-depth ratio ≤ 28, where composite action is assumed in the design of the slab and reinforcement bar is provided in ribs of the deck.
- Span-to-depth ratio ≤ 30, where composite action is not assumed in the design of the slab, and sufficient reinforcement is provided to resist the applied loads.

Pre-Start Requirements for light steel frame projects

It is vital that the main contractor and the light steel frame supplier discuss and agree the requirements that need to be satisfied before the light steel frame installation can commence. A pre-start meeting should typically be convened by the main contractor at least 8 to 10 weeks before start on site. The objective is to identify the key issues that affect the installation of the light steel framing and the construction programme. The pre-start requirements include aspects of; access for delivery, site and working constraints, site facilities, craneage, sequencing of construction, foundation requirements, scaffolding provision and hand-over process. It is also necessary to agree how the value of the work will be measured for stage payments to the light steel supplier.

Scaffolding is usually the responsibility of the main contractor but it is an important requirement for the light steel frame installation process. Two lifts of scaffolding are generally required around the perimeter of the slab prior to beginning installation of the light steel framing. It is common for scaffolding to be tied to the light steel frame from level three onwards, but this should be agreed in advance as there are special requirements for these attachment points.

Light steel frame construction

Installation of light steel framing requires intensive use of a crane. Depending on the project and the subsequent craneage needs, the responsibility to provide craneage may rest with the light steel installer or the main contractor. Therefore, this responsibility must be agreed in advance and form part of the contract.

Installation of light steel framing

Light steel framing uses storey high wall panels that are delivered to site in bundles appropriate for the build sequence. These are unloaded from the lorry and placed on the floors near to where they are to be installed. One lorry can deliver 30 to 50 wall panels which are typically required to build two houses or four apartments. Wall panels on the first level are positioned on the foundation slab, if necessary, galvanized steel shims are used to level the panels. Panels are temporarily supported during installation by inclined struts. There should be a minimum of one strut per panel and typically at a maximum spacing of 3 m. Panels must be fixed to the adjacent panels. The fixings used are system specific and should be stated on construction drawings and comply with the structural calculations.

Floors in light steel frame buildings are generally either; light steel joisted floors with timber boarding, panelised floor cassettes or composite slab floors. The installation process for each of these floor types are appreciably different, with each having their own best practice considerations. However, floor cassettes must be lifted using the designated lifting points (which will be system specific) and cassettes should remain attached to the crane until adequately fixed to their supports.

Installation of a light steel floor cassette

Follow-On Trades

After an area of light steel framing has been constructed it is necessary to have an agreed handover process from the light steel installer to the main contractor. This must include what is required before the start of follow-on activities. It is important to acknowledge that follow-on trades may not be familiar with light steel framing and the significance of the various parts of the structure, particularly if they are regularly working on more traditional forms of construction. A selection of key points of best practice advice for follow-on trades are listed below:

- Holes should not be cut in light steel sections without prior agreement from the light steel frame manufacturer; authorisation can only be granted by following an agreed approval process with the associated documentation.
- As for any framed construction, bracing is vital for the stability of a light steel frame building. Diagonal bracing must never be cut or removed.
- Temporary loading on light steel floors must be carefully managed to ensure the floor load capacity is not exceeded during construction.
- Rubber or polyethylene grommets should be installed in holes in light steel sections that have services through them. The holes can have sharp edges so the grommets prevent damage to cables and pipes.
- Wall lining materials provide an important part of the acoustic performance of the building and its resistance to fire. The specified boards must be installed in accordance with the design and manufacturer's instructions.

Concluding remarks

There are significant differences between light steel framing and other forms of construction. Therefore, those considering the use of light steel framing and people working on projects which include light steel should be familiar with its principal attributes and the necessary considerations. SCI guidance provides useful information to assist designers, specifiers and main contractors.

References

1. Light Steel Forum, *www.lightsteelforum.co.uk*
2. BS EN 1993-1- 3. Eurocode 3. Design of steel structures. General rules. Supplementary rules for cold-formed members and sheeting. BSI, 2006.
3. BS 5950-5. Structural use of steelwork in building. Code of practice for design of cold formed thin gauge sections. BSI, 1998.
4. BS EN 1991-1-7. Eurocode 1. Actions on structures. General actions. Accidental actions. BSI, 2006.
5. BS EN 1993-1- 1. Eurocode 3. Design of steel structures. General rules and rules for buildings. BSI, 2005.
6. SCI-P402: Light steel framing in residential construction. SCI, (June) 2015.
7. NHBC Standards, Chapter 6.10, Light steel framed walls and floors. NHBC, 2014.

AD 388
Partial factors for material properties for design in the UK

Partial factors and the methodology of their use are described in BS EN 1990[1]. Partial factors for actions (commonly called load factors) allow for unfavourable deviations in the effects of the action, while the partial factors for material properties (known as material or resistance factors) take account of variability of material and type of design situation. The principle of structural design using the partial factor method is that the effect of the characteristic action multiplied by the load factor must not exceed the design resistance i.e characteristic resistance divided by the material factor.

The values of the load factors (γ_F) are given in Annex A of BS EN 1990 and its National Annex. Recommended values of the material factors (γ_M) are given in Eurocodes 2 to 9, generally with the opportunity for the recommended values to be varied in the National Annexes.

To improve ease of reference for steel designers, Table 1 lists the recommended material factors used in steel design together with values taken from the relevant UK National Annex. Note that the values tabulated are correct at June 2015, but may be revised in the future.

Table 1 List of partial factors for material properties used in steel design - values recommended for use in the UK

Partial factor	Design situation/application	Reference to BS EN clause	Value given in the Eurocode	Value given in the UK National Annex
γ_{M0}	Resistance of cross sections	1993-1-1[2] §6.1 Note 2B	1.0	1.0
γ_{M1}	For resistance of members to instability assessed by member checks (buckling resistance)	1993-1-1 §6.1 Note 2B	1.0	1.0
γ_{M2}	Resistance of cross sections in tension to fracture	1993-1-1 §6.1 Note 2B	1.25	1.1
γ_{M2}	Joints: bolts, rivets, pins, welds	1993-1-8[3] Note, Table 2.1	1.25	1.25
γ_{M2}*	Joints: plates in bearing	1993-1-8 Note, Table 2.1	1.25	1.25 (1.5 where SLS governs)*
γ_{M3}	Joints: slip resistance at ULS (Category C)	1993-1-8 Note, Table 2.1	1.25	1.25
$\gamma_{M3,ser}$	Joints: slip resistance at SLS (Category B)	1993-1-8 Note, Table 2.1	1.1	1.1
γ_{M5}	Joints: resistance of hollow section joints	1993-1-8 Note, Table 2.1	1.0	1.0
$\gamma_{M6,ser}$	Joints: resistance of pins at SLS	1993-1-8 Note, Table 2.1	1.0	1.0
γ_{M7}	Joints: preload of high strength bolts	1993-1-8 Note, Table 2.1	1.1	1.1 for bolts to BS EN 14399-4[4] & BS EN 14399-8[5] 1.0 for others
γ_c	Resistance of concrete	1992-1-1[6] Table 2.1N	1.5 for persistent and transient design situations 1.2 for accidental design situations	Use the recommended value
$\gamma_{M,u}$**	Resistance of components in structural integrity checks	**	**	**

* In circumstances where deformation at serviceability limit state governs the design γ_{M2} = 1.5 is more appropriate. Controlling deformation is pertinent where deformation of the bolt holes needs to be avoided, i. e. when α_b = 1 (as defined in Table 3.4 of BS EN 1993-1-8).

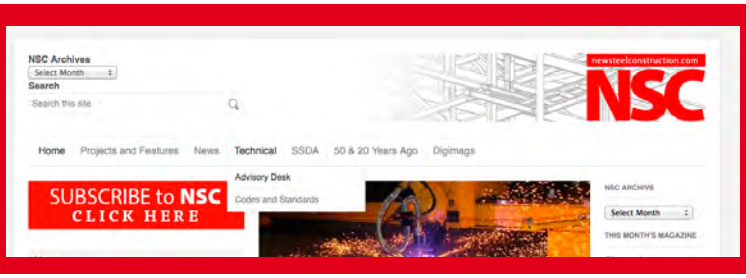
** $\gamma_{M,u}$ is not given in BS EN 1993-1-8, however it is used in the Green Book *Joints in Steel Construction: Simple Joints to Eurocode 3*[7] when verifying structural integrity. A value of $\gamma_{M,u}$ = 1.1 is recommended.

Contact: **Dorota Koschmidder-Hatch**
Tel: **01344 636525**
Email: **advisory@steel-sci.com**

1 BS EN 1990:2002+A1:2005 - Eurocode. Basis of structural design, BSI
NA to BS EN 1990:2002+A1:2005 - UK National Annex for Eurocode. Basis of structural design
2 BS EN 1993-1-1:2005 (incorporating corrigenda February 2006 and April 2009) Eurocode 3: Design of steel structures. General rules and rules for buildings, BSI
NA to BS EN 1993-1-1:2005:2008 Eurocode 3: Design of steel structures. General rules and rules for buildings, BSI
3 BS EN 1993-1-8:2005 (incorporating corrigenda December 2005, September 2006, July 2009 and August 2010) Eurocode 3: Design of steel structures. Design of joints, BSI
NA to BS EN 1993-1-8:2005:2008 UK National Annex to Eurocode 3: Design of steel structures. Design of joints, BSI
4 BS EN 14399-4:2015 High-strength structural bolting assemblies for preloading. System HV. Hexagon bolt and nut assemblies, BSI
5 BS EN 14399-8:2007 High-strength structural bolting assemblies for preloading. System HV. Hexagon fit bolt and nut assemblies, BSI
6 BS EN 1992-1-1:2004 (incorporating corrigendum January 2008, November 2010 and February 2014) Eurocode 2: Design of concrete structures. General rules and rules for buildings, BSI
NA to BS EN 1992-1-1:2004:2005 (incorporating National Amendment No. 1) UK National Annex to Eurocode 2: Design of concrete structures. General rules and rules for buildings, BSI
7 Joints in steel construction: Simple joints to Eurocode 3 (revised edition), (P358), SCI and BCSA, 2014

Search for Advisory Desk articles on newsteelconstruction.com

Use the search bar at the top of every page of ***newsteelconstruction.com*** to search out Advisory Desk articles by name, number or subject, or list them (most recent first) by hovering over *Technical* in the main menu and selecting *Advisory Desk* from the resulting pop-up menu.



SCI PUBLICATION

SCI
Steel Knowledge
www.steel-sci.com

DESIGN OF STEEL PORTAL FRAME BUILDINGS TO EUROCODE 3

This new publication extends the previous guidance (which was limited to elastic design) and in a major step forward, now covers frames designed plastically, with hinges in the members.

44 pages of worked example take the results of a frame analysis and demonstrate the verification of members – columns, rafters, adjacent to plastic hinges, with and without intermediate restraints to the tension flange. A comprehensive section of the example demonstrates the detailed verification of a haunch, including issues not explicitly covered in BS EN 1993-1-1. It is expected that the guidance in this publication will be implemented in bespoke software.

This is a specialised guide, comprehensively demonstrating the application of the Eurocode rules to complex situations involving tapered members, a varying bending moment diagram and restraints to the tension flange. It is an essential guide for anyone with more than a passing interest in portal frame design.

Cost: £80 full price | SCI Members: £50

The SCI is committed to helping members meet their design, manufacture, construction and commercial objectives.

@SCIsteel

steel-construction-institute

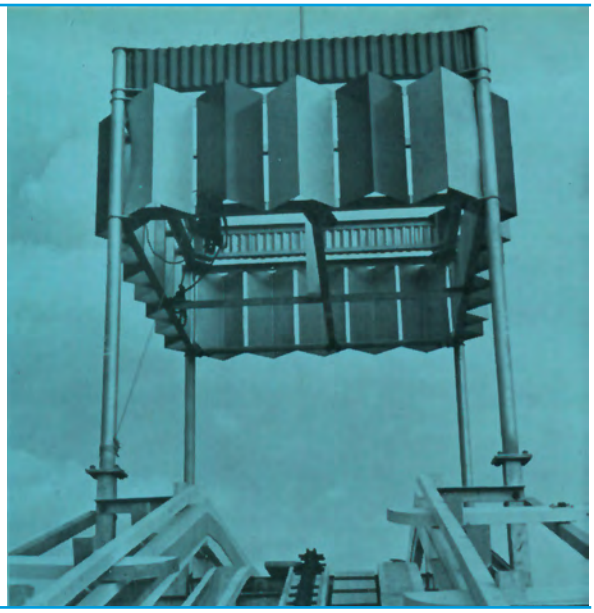
SCI Publications

For further details contact
+44 (0)1344 636505

http://shop.steel-sci.com

FROM BUILDING WITH STEEL MAY 1965

New Water Chute at Southend's Kursaal



A landmark familiar to several generations of visitors seeking pleasure at the famous Kursaal Amusement Park, Southend-on-Sea, was the huge water chute which dominated the surrounding buildings and stalls. The structure has now been replaced by a new water chute of equally prepossessing dimensions and which comes into service when the Kursaal re-opens for its 1965 seasons.

The previous water chute, of steel construction, was originally erected at the White City Exhibition, Shepherd's Bush – together with other large steel structures such as the great 'flip flap' – and as far as can be ascertained, about 1905, and in 1922 was re-erected at the Kursaal, since when it has been in continuous operation. The lasting qualities of steelwork, even in a corrosive marine atmosphere, are well demonstrated by the fact that after 60 years service the structure was still in first class condition. However, although still functioning up to the time of its demolition in 1963, the design has become obsolete and uneconomical as the time taken by the cars to reach the top was unduly long, the turnaround procedure at the top and bottom was cumbersome and twenty attendants were necessary to ensure smooth operation.

Water chutes of this type built elsewhere during the past few years have been of timber construction and thus the Kursaal authorities had to decide whether to build in this or some other material. Very serious consideration was given to this matter and after careful research it was found that steelwork would not only be more economical but also easier and quicker to erect and, being galvanized, easier and cheaper to maintain.

Had timber been used it would have been expensive impregnated Canadian Pitch Pine specially imported because of the considerable lengths required, and the fabrication of the structure on site would have been a lengthy process: with the present shortage of carpenters the latter factor was also of considerable importance. Also, because of the need for periodic painting, maintenance would have been quite expensive. For these reasons it was decided to erect a steel structure of similar size and contour to those already erected in timber at Manchester and Battersea Park to the designs of Sir Leslie Josephs.

The new water chute structure is designed to B.S. 449, using steel (mainly angles) to B.S. 15. It was wholly fabricated at works, welded as far as transport considerations would permit and galvanized. All site connections were bolted. Steel was employed wherever practical, i.e. the framework for the station building walkways, the splash screen and the elevated track supporting structures – which include the forward and return ramps and top loop.

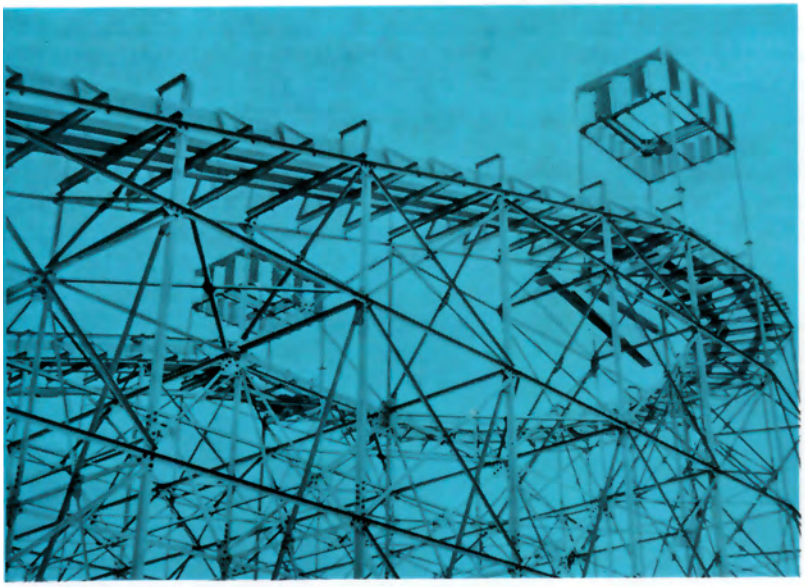
The overall dimensions of the structure are: length 321 ft. 6 in.; width 54 ft. 6 in.; height to top level of track 50 ft.; height to top of towers 61 ft 6 in. The total length of the track is 692 ft.

The new water chute has six boats, each carrying six passengers and, in contrast to the previous water chute, it can be operated by only five instead of twenty attendants. Each boat enters the station to load with passengers and is then pulled to the top of the incline by a motor-driven endless chain. Here it is released from the chain whilst on a slight fall in the track which gives it initial momentum to continue the journey around the banked half circle to reach the beginning of the downward run. An emergency braking system is provided at this point. Then, accelerating very quickly, it plunges downwards into the water 50 ft. below with a tremendous splash and finally continues its journey around the lower half circle to return to the station under the control of a braking system comprising squeeze-type angles.

As the boats travel around the circuit the structure is subjected to very severe shock loads and thus maximum strength and rigidity are essential requirements. The elevated portion comprises a series of braced towers of varying heights designed as cantilevers from the ground level bases to resist wind pressure: a system of inter-connecting cross bracing ensure necessary rigidity. Horizontal semi-circular braced girders at the top level take the thrust induced by the surge action of the boats during the semi-circular run before entering the slide. The entire elevated horizontal length of the structure is anchored with angles at track level from the top to the lower end, where they are secured in concrete blocks.

At the top are two decorative features in the form of flag towers comprising a frame of tubes and angles faced with 1/8 in. thick galvanised fluted plate, slotted to minimise the effect of wind pressure.

Normally structures of this type require considerable checking and adjustment after the preliminary test runs but in the case of this water chute the proprietors found everything perfectly satisfactory from the initial switch on. In their opinion this success originated in the drawing office, followed by accurate workmanship in the fabricating yard of the contractor.



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
Gillian Mitchell MBE, Deputy Director General, BCSA, 4 Whitehall Court, London SW1A 2ES
Tel: 020 7747 8121 Email: *gillian.mitchell@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
- **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	SCM	Guide Contract Value (1)
A & J Stead Ltd	01653 693742			●	●					●	●			●	●		2		Up to £100,000
A C Bacon Engineering Ltd	01953 850611			●	●		●										2		Up to £3,000,000
A&J Fabtech Ltd	01924 439614	●			●		●				●		●			✔	3		Up to £400,000
Access Design & Engineering	01642 245151				●	●			●	●	●			●	●	✔	2		Up to £4,000,000
Adey Steel Ltd	01509 556677				●	●	●	●		●	●			●	●	✔	3	●	Up to £2,000,000
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 £1,400,000
AKD Contracts Ltd	01322 312203				●					●	●			●	●		2		Up to £100,000
Angle Ring Company Ltd	0121 557 7241												●			✔	4		Up to £1,400,000
Apex Steel Structures Ltd	01268 660828			●	●	●	●			●	●			●			2		Up to £1,400,000
Arminhall Engineering Ltd	01799 524510	●			●	●		●		●	●			●	●	✔	2		Up to £400,000
Arromax Structures Ltd	01623 747466	●		●	●	●	●	●	●	●	●	●		●	●		2		Up to £800,000
ASA Steel Structures Ltd	01782 566366			●	●	●	●			●	●			●	●	✔	2		Up to £800,000
ASD Westok Ltd	0113 205 5270												●			✔	4		Up to £6,000,000
ASME Engineering Ltd	020 8966 7150				●	●				●	●			●	●	✔	3	●	Up to £1,400,000
Atlasco Constructional Engineers Ltd	01782 564711			●	●	●	●				●			●	●	✔	2		Up to £1,400,000
Austin-Divall Fabrications Ltd	01903 721950			●	●		●	●		●	●			●	●	✔	2		Up to £800,000
B D Structures Ltd	01942 817770			●	●	●	●				●	●		●		✔	2		Up to £800,000
Ballykine Structural Engineers Ltd	028 9756 2560			●	●	●	●	●				●				✔	4		Up to £1,400,000
Barnshaw Section Benders Ltd	01902 880848												●			✔	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			●	●	●	●				●				●		2		Up to £3,000,000
Bourne Construction Engineering Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	●	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●			●	●	✔	4		Up to £3,000,000
Builders Beams Ltd	01227 863770				●					●				●	●	✔	2		Up to £1,400,000
Cairnhill Structures Ltd	01236 449393	●			●	●	●	●	●	●				●	●	✔	4	●	Up to £3,000,000
Caunton Engineering Ltd	01773 531111	●	●	●	●	●	●	●		●	●	●		●	●	✔	4	●	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 £800,000
Coventry Construction Ltd	024 7646 4484			●	●	●	●		●	●	●			●	●	✔	2		Up to £800,000
D H Structures Ltd	01785 246269			●	●		●				●						2		Up to £100,000
Duggan Steel Ltd	00 353 29 70072		●	●	●	●	●	●			●					✔	4		Up to £4,000,000
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			●	●	●	●	●	●	●	●	●				✔	2	●	Up to £3,000,000
Four Bay Structures Ltd	01603 758141			●	●					●	●			●	●		2		Up to £1,400,000
Fox Bros Engineering Ltd	00 353 53 942 1677			●	●	●	●	●			●				●		2		Up to £2,000,000
Gorge Fabrications Ltd	0121 522 5770				●	●	●	●		●				●	●	✔	2		Up to £800,000
Gregg & Patterson (Engineers) Ltd	028 9061 8131			●	●	●	●	●				●		●		✔	3		Up to £2,000,000
H Young Structures Ltd	01953 601881			●	●	●	●	●			●			●	●	✔	2	●	Up to £2,000,000
Had Fab Ltd	01875 611711				●				●	●	●				●	✔	4		Up to £3,000,000
Hambleton Steel Ltd	01748 810598		●	●	●	●	●	●				●		●		✔	4	●	Up to £2,000,000
Harry Marsh (Engineers) Ltd	0191 510 9797			●	●	●	●				●	●			●	✔	2		Up to £1,400,000
Company name	**Tel**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**Q**	**R**	**S**	**QM**	**FPC**	**SCM**	**Guide Contract Value (1)**

Company name	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	SCM	Guide Contract Value (1)
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				●	●									●		2		Up to £200,000
James Killelea & Co Ltd	01706 229411		●	●	●	●	●					●		●			4		Up to £6,000,000*
John Reid & Sons (Strucsteel) Ltd	01202 483333		●	●	●	●	●	●	●	●	●	●		●	●	✔	4		Up to £6,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445			●	●	●	●	●	●	●	●	●		●	●	✔	4	●	Up to £3,000,000
Leach Structural Steelwork Ltd	01995 640133			●	●	●	●	●			●					✔	2	●	Up to £4,000,000
Legge Steel (Fabrications) Ltd	01592 205320			●	●		●		●	●	●			●	●		3		Up to £400,000
Luxtrade Ltd	01902 353182									●	●				●	✔	2		Up to £800,000
M Hasson & Sons Ltd	028 2957 1281			●	●	●	●	●	●	●	●				●	✔	4		Up to £2,000,000
M J Patch Structures Ltd	01275 333431				●					●	●			●		✔	2		Up to £800,000
M&S Engineering Ltd	01461 40111				●				●	●	●			●	●		2		Up to £1,400,000
Mackay Steelwork & Cladding Ltd	01862 843910			●	●		●			●	●			●	●	✔	4		Up to £800,000
Maldon Marine Ltd	01621 859000				●	●		●	●	●					●	✔	3		Up to £1,400,000
Mifflin Construction Ltd	01568 613311			●	●	●	●				●						2		Up to £3,000,000
Murphy International Ltd	00 353 45 431384	●			●		●				●				●	✔	4		Up to £1,400,000
Newbridge Engineering Ltd	01429 866722	●		●	●	●	●				●				●	✔	3		Up to £1,400,000
Nusteel Structures Ltd	01303 268112						●	●	●	●						✔	4		Up to £4,000,000
Overdale Construction Services Ltd	01656 729229			●	●		●	●			●				●		2		Up to £400,000
Painter Brothers Ltd	01432 374400								●		●			●	●	✔	2	●	Up to £6,000,000
Pencro Structural Engineering Ltd	028 9335 2886			●	●	●	●	●	●		●			●	●	✔	2		Up to £2,000,000
Peter Marshall (Steel Stairs) Ltd	0113 307 6730									●					●	✔	2		Up to £800,000*
PMS Fabrications Ltd	01228 599090			●	●	●	●		●	●	●			●	●	✔	2		Up to £1,400,000
R S Engineering SW Ltd	01752 844511				●					●	●			●	●	✔	2		Up to £100,000
Rippin Ltd	01383 518610			●	●	●	●	●						●	●		2		Up to £1,400,000
S H Structures Ltd	01977 681931	●					●	●	●	●	●	●				✔	4	●	Up to £2,000,000
SDM Fabrication Ltd	01354 660895	●	●	●	●	●	●				●			●	●	✔	4		Up to £800,000
Severfield plc	01845 577896	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	●	Above £6,000,000
Shaun Hodgson Engineering Ltd	01553 766499	●		●	●					●	●			●	●	✔	3		Up to £800,000
Shipley Structures Ltd	01400 251480			●	●	●	●		●	●	●			●	●		2		Up to £1,400,000
Snashall Steel Fabrications Ltd	01300 345588			●	●	●	●	●			●				●		2		Up to £1,400,000
South Durham Structures Ltd	01388 777350			●	●	●				●	●	●			●		2		Up to £800,000
Southern Fabrications (Sussex) Ltd	01243 649000				●					●	●			●	●	✔	2		Up to £800,000
Taziker Industrial Ltd	01204 468080									●				●	●	✔	3		Above £6,000,000
Temple Mill Fabrications Ltd	01623 741720			●	●	●	●				●			●	●	✔	2		Up to £200,000
Traditional Structures Ltd	01922 414172			●	●	●	●	●	●		●	●		●	●	✔	2	●	Up to £2,000,000
TSI Structures Ltd	01603 720031			●	●	●	●										2		Up to £1,400,000
Tubecon	01226 345261						●	●	●	●				●	●	✔	4	●	Above £6,000,000*
W & H Steel & Roofing Systems Ltd	00 353 56 444 1855			●	●	●	●	●						●	●		4		Up to £2,000,000
W I G Engineering Ltd	01869 320515				●					●					●	✔	2		Up to £200,000
Walter Watson Ltd	028 4377 8711			●	●	●	●	●				●				✔	4		Up to £6,000,000
Westbury Park Engineering Ltd	01373 825500	●		●	●		●	●	●	●	●				●	✔	4		Up to £800,000
William Haley Engineering Ltd	01278 760591			●	●	●			●	●	●			●		✔	4	●	Up to £4,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	●	Above £6,000,000
Company name	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	SCM	Guide Contract Value (1)

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
Balfour Beatty Utility Solutions Ltd	01332 661491
Bluefin Group	020 3040 6723
Griffiths & Armour	0151 236 5656
Highways England Company Ltd	08457 504030
Kier Construction Ltd	01767 640111

Company name	Tel
PTS (TQM) Ltd	01785 250706
Roger Pope Associates	01752 263636
Sandberg LLP	020 7565 7000
SUM Ltd	0113 242 7390
Welding Quality Management Services Ltd	00 353 87 295 5335

Associate Members

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

1 Structural components
2 Computer software
3 Design services
4 Steel producers
5 Manufacturing equipment
6 Protective systems
7 Safety systems
8 Steel stockholders
9 Structural fasteners

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

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
AceCad Software Ltd	01332 545800		●								N/A	
Albion Sections Ltd	0121 553 1877	●									M	
Arcelor Mittal Distribution - Scunthorpe	01724 810810								●		D/I	
ASD metal services	0113 254 0711								●		D/I	
Ayrshire Metal Products (Daventry) Ltd	01327 300990	●									M	
BAPP Group Ltd	01226 383824									●	M	
Barrett Steel Services Limited	01274 682281								●		D/I	
Behringer Ltd	01296 668259					●						
BW Industries Ltd	01262 400088	●									M	

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
Cellbeam Ltd	01937 840600	●									M	
Cellshield Ltd	01937 840600							●			N/A	
Cleveland Steel & Tubes Ltd	01845 577789								●		M	
CMC (UK) Ltd	029 2089 5260								●		D/I	
Composite Profiles UK Ltd	01202 659237	●									D/I	
Cooper & Turner Ltd	0114 256 0057									●	M	
Cutmaster Machines (UK) Ltd	01226 707865					●					N/A	
Daver Steels Ltd	0114 261 1999	●									M	
Duggan Profiles & Steel Service Centre Ltd	00 353 56 7722485	●							●		M	

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:

FG Footbridge and 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
RF 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
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	FG	PG	TW	BA	CM	MB	RF	AS	QM	FPC	NHSS 19A	NHSS 20	SCM	Guide Contract Value (1)
A&J Fabtech Ltd	01924 439614	●	●		●				●	✓	3				Up to £400,000
Briton Fabricators Ltd	0115 963 2901	●	●	●	●	●	●	●	●	✓	4		✓		Up to £3,000,000
Cairnhill Structures Ltd	01236 449393	●	●	●	●			●	●	✓	4		✓	●	Up to £3,000,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	✓	4	✓	✓	●	Above £6,000,000*
Four-Tees Engineers Ltd	01489 885899	●	●	●	●		●	●	●	✓	3		✓	●	Up to £2,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445		●		●			●	●	✓	4		✓	●	Up to £3,000,000
Millar Callaghan Engineering Services Ltd	01294 217711	●						●	●	✓	4				Up to £800,000
Murphy International Ltd	00 353 45 431384	●	●	●					●	✓	4				Up to £1,400,000
Nusteel Structures Ltd	01303 268112	●	●	●	●	●		●	●	✓	4	✓	✓		Up to £4,000,000
Painter Brothers Ltd	01432 374400	●		●					●	✓	2			●	Up to £6,000,000
S H Structures Ltd	01977 681931	●		●	●	●	●		●	✓	4		✓	●	Up to £2,000,000
Severfield (UK) Ltd	01204 699999	●	●	●	●	●	●	●	●	✓	4		✓	●	Above £6,000,000
Taziker Industrial Ltd	01204 468080	●						●	●	✓	3	✓	✓		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 £400,000
Cimolai SpA	01223 350876	●	●	●	●	●	●	●	●	✓	4				Above £6,000,000
Concrete & Timber Services Ltd	01484 606416	●	●	●	●	●	●		●	✓	4			●	Up to £800,000
Donyal Engineering Ltd	01207 270909	●						●	●	✓	3		✓	●	Up to £1,400,000
Francis & Lewis International Ltd	01452 722200							●	●	✓	2		✓	●	Up to £2,000,000
Harland & Wolff Heavy Industries Ltd	028 9045 8456	●	●	●	●	●		●	●	✓	3				Up to £2,000,000
IHC Engineering (UK) Ltd	01773 861734	●							●	✓	3		✓		Up to £400,000
Interserve Construction Ltd	0121 344 4888							●	●	✓	3				Above £6,000,000*
Interserve Construction Ltd	020 8311 5500	●	●	●	●		●	●	●	✓	3				Above £6,000,000*
Lanarkshire Welding Company Ltd	01698 264271	●	●	●	●	●	●	●	●	✓	4	✓		●	Up to £2,000,000
P C Richardson & Co (Middlesbrough) Ltd	01642 714791	●						●	●	✓	N/A				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

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
easi-edge Ltd	01777 870901							●			N/A	●
Fabsec Ltd	0845 094 2530	●									N/A	
FabTrol Systems UK Ltd	01274 590865		●								N/A	
Ficep (UK) Ltd	01942 223530					●					N/A	
FLI Structures	01452 722200	●									M	●
Forward Protective Coatings Ltd	01623 748323						●				N/A	
Goodwin Steel Castings Ltd	01782 220000	●									N/A	
Graitec UK Ltd	0844 543 8888		●								N/A	
Hadley Group Ltd	0121 555 1342	●									M	○
Hempel UK Ltd	01633 874024						●				N/A	
Highland Metals Ltd	01343 548855						●				N/A	
Hilti (GB) Ltd	0800 886100									●	M	
Hi-Span Ltd	01953 603081	●									M	○
International Paint Ltd	0191 469 6111						●				N/A	●
Jack Tighe Ltd	01302 880360						●				N/A	
Jamestown Cladding & Profiling Ltd	00 353 45 434288	●									M	
John Parker & Sons Ltd	01227 783200								●	●	D/I	
Joseph Ash Galvanizing	01246 854650						●				N/A	
Jotun Paints (Europe) Ltd	01724 400000						●				N/A	
Kaltenbach Ltd	01234 213201					●					N/A	
Kingspan Structural Products	01944 712000	●									M	●
Lindapter International	01274 521444									●	M	

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
Murray Plate Group Ltd	0161 866 0266								●		D/I	
National Tube Stockholders Ltd	01845 577440								●		D/I	
Peddinghaus Corporation UK Ltd	01952 200377					●					N/A	
PPG Performance Coatings UK Ltd	01773 814520						●				N/A	
Prodeck-Fixing Ltd	01278 780586	●									D/I	
Rainham Steel Co Ltd	01708 522311								●		D/I	
Sherwin-Williams Protective & Marine Coatings	01204 521771						●				M	○
Sika Ltd	01707 384444						●				M	
Simpson Strong-Tie	01827 255600									●	M	
Structural Metal Decks Ltd	01202 718898	●									M	●
Tata Steel	01724 404040				●						M	
Tata Steel Distribution UK & Ireland	01902 484000								●		D/I	
Tata Steel Ireland Service Centre	028 9266 0747								●		D/I	
Tata Steel Service Centre Dublin	00 353 1 405 0300								●		D/I	
Tata Steel Tubes	01536 402121				●						M	
Tata Steel UK Panels & Profiles	0845 3088330	●									M	
Tekla (UK) Ltd	0113 887 9790		●								N/A	
Tension Control Bolts Ltd	01948 667700						●			●	M	
voestalpine Metsec plc	0121 601 6000	●									M	●
Wedge Group Galvanizing Ltd	01909 486384						●				N/A	
Yamazaki Mazak UK Ltd	01905 755755					●					N/A	

New and revised codes & standards

From BSI Updates May 2015

BS EN PUBLICATIONS

BS EN ISO 14373:2015
Resistance welding. Procedure for spot welding of uncoated and coated low carbon steels
Supersedes BS EN ISO 14373:2007

BS EN ISO 23277:2015
Non-destructive testing of welds. Penetrant testing. Acceptance levels
Supersedes BS EN ISO 23277:2009

BS EN IMPLEMENTATIONS

BS ISO 16573:2015
Steel. Measurement method for the evaluation of hydrogen embrittlement resistance of high strength steels
No current standard is superseded

BRITISH STANDARDS REVIEWED AND CONFIRMED

BS EN ISO 18592:2009
Resistance welding. Destructive testing of welds. Method for the fatigue testing of multispot-welded specimens

BRITISH STANDARDS UNDER REVIEW

BS EN 1011-3:2000
Welding. Recommendations for welding of metallic materials. Arc welding of stainless steels

BS EN 10295:2002
Heat resistant steel castings

NEW WORK STARTED

ISO 17633
Welding consumables. Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non alloy and fine grain steels. Classification
Will supersede BS EN ISO 14171:2010

ISO 17633
Welding consumables. Tubular cored electrodes and rods for gas shielded and non-gas shielded metal arc welding of stainless and heat-resisting steels. Classification
Will supersede BS EN ISO 17633:20105

BS EN ISO 23278:2015
Non-destructive testing of welds. Magnetic particle testing. Acceptance levels
Supersedes BS EN ISO 23278:2009

DRAFT BRITISH STANDARDS FOR PUBLIC COMMENT – ADOPTIONS

15/30287681 DC
BS EN ISO 3581 Welding consumables. Covered electrodes for manual metal arc welding of stainless and heat-resisting steels. Classification
Comments for the above document were required by 19 May, 2015

15/30318326 DC
BS EN 16828 Hot rolled steel channels, I and H sections. Dimensions and masses
Comments for the above document are required by 26 June, 2015

15/30318676 DC
BS EN 10056-1 Structural steel equal and unequal leg angles. Dimensions
Comments for the above document are required by 2 July, 2015

ISO PUBLICATIONS

ISO 16573:2015
Steel. Measurement method for the evaluation of hydrogen embrittlement resistance of high strength steels
Will be implemented as an identical British Standard

Click on the page to **zoom**

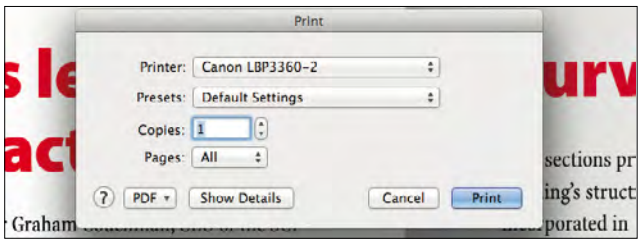
Navigate around the page with the mouse - no need to drag

Click again to return to **full page view**

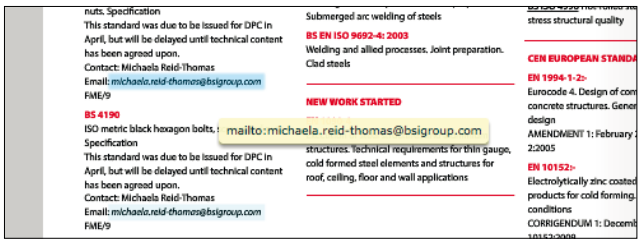
You can read NSC like a magazine on any desktop or laptop computer, or any Apple iOS or Android mobile device, but you can also...

Share articles with friends using the integrated social media or email tools

Browse or download a PDF copy of the magazine



Print out individual pages directly from the digital magazine



Click on links to visit referenced websites, email contributors, book places at events or download extra material