www.newsteelconstruction.com

NSC

Steel reaches Sky

June 2016
Vol 24 No 6

Greenwich goes low carbon

Offices top car park

Principal Place targets excellence

Long spans for Antrim school

V10

BRINGING *YOU* THE FUTURE; NOW.

Specialist steel fabrication management information software *proven woldwide* to reduce costs whilst maximising productivity and profitability.

STRUMIS software connects, streamlines and simplifies all your business resources.

With a zero-swap out record* **STRUMIS** is the technology driving business for the UK's most successful fabricators.

Building on the benchmark, **V10** brings a host of brilliant **NEW** enhancements to complement the core software which already boasts technically superior features such as 3D functionality and mobile apps.

MANY OF THE NEW FEATURES ARE ONLY BEING TALKED ABOUT BY OTHERS.

With V10 you don't have to wait.

STRUMIS

BRINGING STRUCTURE TO STEEL

Stay connected to STRUMIS:

Developed in Britain.

*At the time of going to press no STRUMIS customer has switched out STRUMIS software for that from another developer.

SALES@STRUMIS.COM | 01332 545 800 | WWW.STRUMIS.COM

SOFTWARE BY STRUMIS LTD. PART OF THE GLOBAL RDS GROUP

Cover Image
Greenwich Peninsula Low Carbon Energy Centre, London
Main client:
Royal Borough of Greenwich
Architect: C.F Møller Architects
Main contractor: Kier Construction
Structural engineer: Price & Myers
Steelwork contractor:
Billington Structures
Steel tonnage: 475t

NSC

June 2016
Vol 24 No 6

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

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

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

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

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

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

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

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

The Steel Construction Institute
Silwood Park, Ascot, Berkshire SL5 7QN
Telephone 01344 636525 Fax 01344 636570
Website *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*

EDITORIAL ADVISORY BOARD
Ms S McCann-Bartlett (Chair);
Mr N Barrett; Mr D G Brown, SCI;
Mr C Dolling, BCSA; Mr R Gordon;
Mr A Palmer, Buro Happold Engineering;
Ms B Romans, Bourne Construction Engineering;
Mr G H Taylor, Caunton Engineering;
Mr M Thompson, Mott MacDonald;
Mr O Tyler, Wilkinson Eyre Architects

The role of the Editorial Advisory Board is to advise on the overall style and content of the magazine.

New Steel Construction welcomes contributions on any suitable topics relating to steel construction. Publication is at the discretion of the Editor. Views expressed in this publication are not necessarily those of the BCSA, SCI, or the Contract Publisher. Although care has been taken to ensure that all information contained herein is accurate with relation to either matters of fact or accepted practice at the time of publication, the BCSA, SCI and the Editor assume no responsibility for any errors or misinterpretations of such information or any loss or damage arising from or related to its use. No part of this publication may be reproduced in any form without the permission of the publishers.

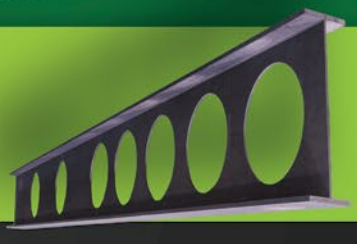
All rights reserved ©2016. ISSN 0968-0098

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

Complicated is Over.

Take the straight road with Jamestown

Superlative Steel Structures



Made By JAMESTOWN

www.jamestownprofiling.com

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

STEEL for life
HEADLINE SPONSOR

Barometer says outlook is fine for steel

Nick Barrett - Editor

Official government statistics on construction workloads have been less than encouraging recently, but industry reports contradict this and suggest that demand remains firm. The uncertainty driven by the pending EC referendum is apparently giving some investors pause for thought, but the industry's own observations suggest that there is no real sign that the recent strong demand for buildings in the key markets served by constructional steelwork is slackening off to any significant extent.

The most recent London Cranes Survey from Deloitte - covering a sector where steel dominates the multi storey market – gives solid grounds for optimism, showing that 51 schemes have got under way since the last survey a year ago, the highest number of starts since the survey started 20 years ago. The total volume of office space under construction was up 28% over six months, the highest level since 2008.

The survey is highly regarded in the property industry as a barometer of developer's sentiment and future office supply. Despite uncertainties generated by the EC referendum their outlook remains highly positive. Other reports suggest that the development market in the regions is also strong and the boom in internet shopping is leading to strong demand for that staple of the steel construction sector, the logistics centre, or large shed.

Within this steady construction outlook, steel's place within it looks secure thanks to the updated construction cost update from Gardiner & Theobald that can be found on www.steelconstruction.info. The cost models used in this series of studies are regularly updated, using the most up to date available data; for this study that was prices in the first quarter (Q1) of 2016.

The study confirms that steel remains the most competitive framing option. There have been recent price rises in steel which are unlikely to affect the relative competitive strength of steel solutions as rebar used in concrete alternatives has also risen in price.–

UK steel supply for the constructional steelwork sector remains assured following the conclusion of the sale of Tata's Long Products Europe business to Greybull Capital. The Long Products Europe business, which supplies the structural steelwork market, includes the Scunthorpe steelworks and two mills in Teesside, plus distribution facilities. The new business will trade under the name of British Steel.

STEEL for life

Headline sponsors:

ArcelorMittal | 150 Barrett Steel Limited | JAMESTOWN | Trimble

Gold sponsors: AJN Steelstock Ltd | Ficep UK Ltd | Kingspan Limited | National Tube Stockholders and Cleveland Steel & Tubes | ParkerSteel | voestalpine Metsec plc | Wedge Group Galvanizing Ltd

Silver sponsors: Hadley Group, Building Products Division | Jack Tighe Ltd

Bronze sponsors: BAPP Group of Companies | Barnshaw Section Benders Limited | Hempel | Joseph Ash Galvanizing | Kaltenbach Limited | Kloeckner Metals UK | Sherwin-Williams | Tension Control Bolts Ltd | Voortman Steel Machinery

BCSA

For further information about steel construction and Steel for Life please visit www.steelconstruction.info or www.steelforlife.org

Steel for Life is a wholly owned subsidiary of BCSA

London office construction at eight-year high

The total volume of office construction in London has increased by 28% over the past six months rising to 1.3 million m², the highest level since early 2008 according to the latest Deloitte London Office Crane Survey.

Since the last of Deloitte's twice yearly surveys at the end of 2015, fifty-one new schemes have started, the highest number in its 20-year history.

The largest number of new schemes was in the City where 26 projects started. This is the largest amount of new construction activity recorded in this submarket, higher than in 2011 the year in which three tower schemes commenced, including the former Pinnacle site.

Elsewhere across central London, both the Southbank and King's Cross submarkets recorded two new starts each, while The West End has seen 12 new starts.

Recognising that the low supply of available office space across central London offers a limited choice for tenants, developers have responded by starting a record number of new schemes since the last survey.

The survey states that the pace of development is rapid, with 38% of the space currently under construction scheduled to complete over the next 12 months.

This is partly the result of an increase in refurbishment projects, which account for just under half of the volume of new starts, and are typically quicker to complete than new-build.

Looking further ahead, the survey concludes that the geographic expansion of London's key office markets is set to continue as new business districts are established.

Steel-framed conference centre opens in Belfast

Belfast's conference and exhibition facilities have been significantly increased following the opening of the £29.5M Waterfront steel-framed extension.

The Lord Mayor of Belfast, Arder Carson, unveiled the new conference facilities and said: "Like the original decision to invest in the Laganside area back in 1997, the new-look Belfast Waterfront in 2016 will elevate our city's global profile, bringing growth, prosperity and opportunities to Belfast and its people."

Northern Ireland's only purpose-built conference centre has now doubled its existing conference, exhibition and entertainment space to 7,000m².

The steel-framed extension links into the original concrete-framed Waterfront but the new build is a fully independent structure gaining stability from its own braced cores.

The extension is constructed over the existing service yard between the Belfast Waterfront and the adjacent Hilton Hotel, and also extends outwards along the River Lagan embankment.

Inside the extension there is 4,000m² of conference, exhibition and banqueting space. This consists of two exhibition and conference spaces, hall 1 incorporating halls A, B, C and D, that can be used as one large 1,850m² area, or sub-divided via retractable walls into four smaller spaces.

Likewise the smaller hall 2 can also be divided into two separate halls, A and B, or used as one 702m² exhibition and conference area.

Working on behalf of main contractor McLaughlin & Harvey, Walter Watson fabricated, supplied and erected 1,200t of structural steelwork for the project.

New plate centre line-up unveiled

Steel manufacturing equipment producer Kaltenbach has announced the launch of the new KF range of processing centres for steel plate.

The company launched the first model from the new line-up - the KF2114 in 2014 - and it has now added three new models to complete the family, the KF1614, KF2614 and KF3114.

The new units have plate width capacities of 1.6m, 2.6m and 3.1m respectively, combined with a 6m-length capacity as standard.

All models in the new KF range are said to be designed for high productivity throughput of cut and machined plate components for industries such as structural fabrication and heavy engineering.

The KF machines work via an infeed gripper system, which clamps and controls the feed of the material through the solid portal frame of the machine itself. The gripper unit controls the plate from both the side and the rear, which is said to maintain a high degree of control and accuracy.

All machines are able to process materials up to 100mm thick and are equipped with a 14 tool, single head as standard. An optional second head can be added with a further 14 tools and working in synchronisation with the first to significantly increase the output capability.

Machine control is via a Windows-based touch-screen system for programme execution and machine operation, supported by the Lantek 'Expert II Cut Plus' software package for nesting, design and data import, with 'Expert III' for extended functionality and data feedback.

Tata Steel UK completes long products sale

Tata Steel UK has completed the sale of its Long Products Europe business to Greybull Capital, saving thousands of jobs in the process.

The Long Products Europe business, which includes the Scunthorpe steelworks, two mills in Teesside, an engineering workshop in Workington, a design consultancy in York, and associated distribution facilities, as well as a rail mill in northern France, will trade under the name of British Steel.

All together the business employs 4,800 people – 4,400 in the UK and 400 in France.

Bimlendra Jha, Executive Chairman of the Long Products Europe business and CEO of Tata Steel UK said: "As a responsible seller, Tata Steel is delighted to have secured a buyer for this business and we hope that under Greybull Capital ownership, the business will continue the momentum of the improvement program that has been initiated in the last 12 months.

"Employees and trade unions have worked closely with the Long Products Europe management team to improve the business's prospects, putting it in a more competitive position than it has been for many years. It is through their dedication and hard work that we are in this position today in spite of continued challenges in the market."

British Steel Commercial Director Peter Hogg added: "It has taken a huge amount of effort and a strong partnership between our employees and their union representatives, our customers and our suppliers, and many months of hard work to get to this point. We also appreciate the help and support from both local and national government and our local MPs."

£300M steel-framed expansion of Sheffield's Meadowhall shopping centre revealed.

British Land, joint owner of the large Meadowhall shopping centre in Sheffield, has revealed plans for a new steel-framed leisure hall at the site.

The plans represent the single biggest investment in Meadowhall since it opened more than 25 years ago. At over £300M, the proposals are also one of the largest investments in the Sheffield City Region for a decade and will create over 1,000 jobs.

Comprising 30,600m² of space, the proposed leisure hall will add a range of dining and entertainment experiences not currently available at the centre.

These will include new restaurants, a state-of-the-art cinema, a new café court, gym, and other leisure space that could be used to offer everything from ten-pin bowling to indoor golf.

Housed under a large glazed roof, the steel-framed leisure hall will integrate with the existing centre to create a new multi-levelled, landscaped mall with high quality internal and external spaces for promotional and community uses. It has also been designed to accommodate large outdoor events including live music.

A detailed planning application for the leisure hall will be submitted in late summer 2016, following extensive consultation with local stakeholders. If the proposals are approved, British Land hopes to start on site during 2018 and open the leisure hall to visitors in late 2020 or early 2021.

Steel speeds up Welsh school programme

The steel frame has been completed for one of Wales' leading Welsh language schools, Ysgol Glan Clwyd in St Asaph.

The new two-storey extension is part of a £15.9M development that will extend and improve the school site, to accommodate an increase in demand for spaces, as well as providing new, modern facilities.

Working on behalf of main contractor Willmott Dixon, EvadX has erected approximately 365t of hot and cold rolled steel, completing its programme in eight weeks.

"We prefabricated all of the steel cold rolled window frames at our facility which sped up our on site programme considerably," says EvadX Managing Director Simon Adams.

"The main frame perimeter beams had connection plates already welded on, so the frames could be bolted into place allowing the remaining cold rolled elements to be installed quickly."

Another time saving procedure EvadX used for their steel package was to supply and manufacture balustrades for the areas of the first and second floors that overlook the central atrium.

These were brought to site already fixed to beams and consequently they have also doubled up as edge protection during the construction programme.

NEWS IN BRIEF

Specialist structural steel manufacturer, **voestalpine Metsec**, is supporting the upgrade of Ashton Gate Stadium, home to Bristol City Football Club and Bristol Rugby Club by supplying steel purlins and side rails. The construction work, which will be completed in time for the forthcoming 2016/17-football season will transform the stadium into a state-of-the-art ground that can hold 27,000 spectators.

Merseyside Galvanizing [part of the Wedge Group] has processed nearly 70t of steel for a new 14-acre visitor attraction at Chester Zoo, which will showcase the exotic wildlife that inhabit the islands of South East Asia.

Aberdeen Football Club

Chairman Stewart Milne has revealed plans for a new stadium and training facility at Kingsford, on the city's outskirts. Announcing the proposals, Mr Milne commented: "Kingsford offers an opportunity to locate both the stadium and the training facilities within a single site and it is in an ideal location for supporters travelling from all areas in and around Aberdeen.

Demolition work is under way and the main construction programme is set to begin soon on **Oldham** Council's Prince's Gate retail project at the Mumps development. Council bosses want to regenerate the area as an Eastern Gateway shopping centre around the new Metrolink station, as part of wider plans for the town centre.

AROUND THE PRESS

Building Magazine
22 April 2016
Testing our metal
The British Constructional Steelwork Association, which expects the UK structural steelwork sector to grow by 4% in 2016, says the issues [revolving around Tata Steel selling its UK assets] will not affect the structural steelwork sector's delivery of current and future projects.

The Structural Engineer
May 2016
Kew House, London – engineering and building a home from first principles
[The steel frame] – To allow the central section of top chord to be removed three columns in the basement were installed. This gave us a large column-free space below the house to use as our on site workshop.

The Structural Engineer
May 2016
2015 Serpentine Gallery Pavilion – challenges of form and fabric
The primary steel frames are a combination of curved and faceted steel arches. The curved arches were initially drawn as open curves with an almost infinite number of setting out points and associated curvatures.

Building Magazine
6 May 2015
A walk on the wild side
[Westonbirt Arboretum walkway] – Glenn Howells Project Assistant Architect Tom Bishop says the advantage of using steel balusters is that the design team wanted all elements to appear as thin as possible which would not have been possible to achieve with timber railings.

Construction News
20 May 2016
Galliford Try builds tip in a bottle
[Kirkby Waste Transfer Station] – These huge cranes are located on a freestanding train rail, which is itself supported on a series of twin-braced steel columns. These steel columns are braced to stiffen them, given that the crane rails have such a tight tolerance.

Cleveland bridge returns to profit

Now under a new management team, Cleveland Bridge UK has reported profits of £2.5M for the financial year ending 31 December 2015.

The company said this is the first profit the Darlington-based steelwork firm has returned in four years, reflecting the success of the current management team in turning the business around over the past 12 months.

Turnover at Cleveland Bridge UK, which is owned by Al Rushaid Petroleum Investment Company, increased in 2015 by 53 per cent on the previous year to £51.5M.

Cleveland Bridge UK has secured a number of UK and international projects for 2016 and 2017, which it said will support further turnover growth for 2016.

These projects include an extension to the M74 motorway in Scotland, the redevelopment of London Bridge Station and the A6 Manchester Airport Relief Road.

The company is part of the significant Forth Replacement Crossing, Scotland's largest infrastructure project for many years, with the fabrication of the bridge's North and South approach roads.

Currently the company is involved in the widening of the A1 in North Yorkshire with the fabrication of steel girders for the construction of bridges across the main carriageway (pictured).

Cleveland Bridge UK Managing Director Chris Droogan said: "The efforts of the new management team, together with the commitment of our workforce and the support of our owners, have enabled the business to return to profit.

"Cleveland Bridge UK has been a cornerstone of the British steel industry for more than 150 years and we are building on that legacy and global reputation by implementing innovative practices and production methods that will deliver further growth in UK and international markets."

Frame up for Manchester Airport Amazon warehouse

Working on behalf of main contractor McLaren Construction, Caunton Engineering has designed, supplied and erected 1,500t of structural steelwork for a new Amazon warehouse at Airport City Manchester, one of the first buildings at the flagship development.

The triple span portal-framed building, with hit-and-miss valley columns, encloses 24,000m^2 of floor space. In addition, Amazon has extended the floor space with two internal mezzanine levels.

The development is situated on a prime location just off the M56 near Manchester Airport, offering good connections both regionally and internationally.

Airport City is a £100M logistics hub at Manchester Airport that will create in excess of 1,800 jobs.

As well as distribution centres, the scheme will eventually include a number of other steel structures including retail buildings, office blocks and light industrial warehouses.

The new buildings will all be designed and constructed to the highest possible BREEAM and LEED environmental standards, according to the developer, Manchester Airport Group [MAG].

Steel tower starts at Shell Centre site

Construction of Southbank Place, the new £1BN mixed-use property development on the globally-recognised Shell Centre site on London's south bank, has begun.

The predominantly steel-framed Southbank Place is being developed by Braeburn Estates – a joint venture between Canary Wharf Group and Qatari Diar Real Estate Investment Company.

Parts of the original Shell Tower will remain the centrepiece of the site, framed by a cluster of seven complementary buildings for residential and business use, which will be constructed in phases from now until 2019.

The development will have a new public square, pedestrian routes and an underground station.

In addition to over 800 apartments in five of the buildings, two of the new buildings are being constructed for business use.

Southbank Place will also be home to retail outlets, restaurants and cafés.

No steelwork contractor has so far been named for the project but steel erection on site is expected to begin in December.

Work starts on Sunderland's former brewery site

The former Vaux brewery site in Sunderland, which has lain dormant for more 16 years, is being redeveloped with a steel-framed office block representing the first phase.

Siglion, a joint venture between Carillion and Sunderland City Council, with Igloo Regeneration providing development, asset and fund management, is carrying out the work on the five and a half hectare site.

A materplan has been drawn up which includes a mix of uses for the site including offices, retail, restaurants and cafes, a hotel, residential apartments, a car park and leisure spaces. The plan will also create new public spaces with path and cycle routes along the River Wear cliff edge and through the site, with direct links to the city centre.

Groundworks are now under way for the first phase of construction work and the erection of a steel-framed office block is expected to start later this summer.

Councillor Paul Watson, Leader of Sunderland City Council, said: "Shaping Sunderland for the future is now under way, and this is the biggest regeneration Sunderland has ever seen to reality."

More than 300 people lost their jobs when the Vaux Brewery closed in 1999 after 162 years. Several proposals for the site, including a Tesco superstore, previously failed to win planning permission.

King's Cross retail scheme due to start

Designed by architect Thomas Heatherwick, the Coal Drops Yard retail scheme in London's King's Cross is due to begin its two-year construction programme in the coming weeks.

Located next to Regent's Canal, Coal Drops Yard will include approximately 65 shops, including five large stores, as well as restaurants, galleries, music venues and a new public square.

The London-based Heatherwick Studio will renovate two existing buildings next door to the Central Saint Martins school campus, which were built in 1850 and used for storing coal arriving from the north of England.

The project will include a substantial steel element to form a distinctive main roof structure between the two existing buildings.

"These two historic structures were never originally designed for people to circulate through, and by themselves would have never made a successful retail destination if we did nothing more than clean them and fill them with shops," said Heatherwick.

"The distance between them being too great to have any social chemistry with each other and only two storeys of activity would not create enough busyness and vitality."

The 9,300m^2 project was commissioned by property developer Argent and is being led by King's Cross Central Limited Partnership (KCCLP), which is overseeing the wider redevelopment of the area.

Working on behalf of Sir Robert McAlpine, James Killelea has fabricated, supplied and erected 1,350t of steelwork for a 10-storey car park at the Victoria Gate development in Leeds.

As well as a large anchor John Lewis department store, the city centre scheme will also have 42,000m^2 of retail and leisure space and completion is set for the end of the year.

Diary

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

Thursday 16 June 2016
Steel Building Design to EC3
This course will introduce experienced steel designers to the Eurocode provisions for steel design
Dublin

Tuesday 21 June 2016
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
Birmingham

Tuesday 28 June 2016
Floor Vibrations
1 hour lunchtime webinar free to BCSA and SCI members.

Tuesday 5 July 2016
Steel Frame Stability
The course provides guidance on why second order effects are important and why they should be checked; how BS 5950 and EC3 check the significance of these effects, and help to understand the different rules for different frame types.
Chesterfield

Tuesday 12 July 2016
Steel Building Design to EC3
This course will introduce experienced steel designers to the Eurocode provisions for steel design
Reading

Tuesday 19 July 2016
Portal Frame Design - Part 1
In this three part series. Part 1 covers initial sizing and frame stability. 1 hour webinar free to BCSA and SCI Members

Complex roof tops school

The new school will boost Antrim's economy

Steel construction has taken a leading role in the design and building of a new school in Antrim, Northern Ireland.

FACT FILE
Parkhall Integrated College, Antrim
Main client: Education Authority
Architect: BDP
Main contractor: O'Hare & McGovern
Structural engineer: BDP
Steelwork contractor: Walter Watson
Steel tonnage: 650t

A £20M new school project, funded through the Northern Ireland Department of Education's capital build programme, is taking shape in the town of Antrim.

Known as Parkhall Integrated College, it will replace the nearby existing school, which will be demolished as part of the final element of the project providing space for new sports pitches.

Construction work began last year on the greenfield site that previously accommodated the school's playing fields.

Steelwork contractor Walter Watson used its own fleet of cranes and MEWPs

Main contractor O'Hare & McGovern undertook some groundworks prior to installing pad foundations in readiness for the steel frame to be erected.

Approximately 650t of structural steelwork is being fabricated, supplied and erected for the project by Walter Watson.

"The building on plan is a skewed H-shape, and the main challenge for us has been maintaining the ridge heights as well as marrying in the roof slopes at the various intersections," says Walter Watson General Manager Structural Division Trevor Irvine.

"As the school is a mix of single and two-storey parts the roof structure has some very complicated interfaces and geometry where sloping and curving elements meet," adds BDP Project Engineer David Nicholls.

The lower parts of the two vertical legs of the H-shape are two-storey, as is the spine that links the two legs together. These areas accommodate classrooms. Elsewhere the school structure is single-storey, interspersed with double-height areas.

Each of the legs are different lengths with the northern one measuring 125m-long by 40m-wide, and the southern leg measuring 77m-long by 40m-wide, while the interconnecting spine is 80m-long by 20m-wide.

The longer of the legs accommodates a sports hall and associated changing rooms, a gym, kitchen and dining hall, and breakout areas.

"Steel was chosen as the framing solution because it is quick to erect and for its long span qualities," says Mr Nicholls.

The sports hall has a span of 16.5m and the dining hall has a 15m span. These would have been difficult to achieve using a different framing material.

Approximately half of the opposite leg houses a single-storey technology block featuring a triple mono-pitched roof with windows on the vertical sections.

Structurally the school is a braced frame with tubular cross bracing positioned in partitions and walls providing the stability. Because the H-shaped building is so big it had to be divided up and so there are two movement joints, one at the end of the central spine block and a second splitting the longer northern leg in half.

Summing up the project, Northern Ireland Education Minister John O'Dowd says: "This significant investment will allow the college to move from its current split site arrangement to a brand new purpose-built school.

"This not only benefits the school and its pupils, but it will also be a boost to the local community and businesses."

Catering for pupils aged between eight and 12 years old, the school is being

constructed for 735 students and it will open its doors from September 2017. The entire project, including the demolition of the existing buildings and the creation of new sports pitches will be completed by 2018.

Steel erection

Steel construction was carried out with Walter Watson using its own fleet of mobile cranes and MEWPs. The cranes used were 60t-capacity units and MEWPs had reaches of 45 ft to 65 ft.

All of the steelwork was erected up to and including roof level. The cold rolled purlins were omitted to allow erection of the first floor precast slabs.

After erection and grouting of the slabs, the purlins were then subsequently installed using a crane sitting outside the footprint of the building, and two compact scissor lifts operating from the first floor precast slabs.

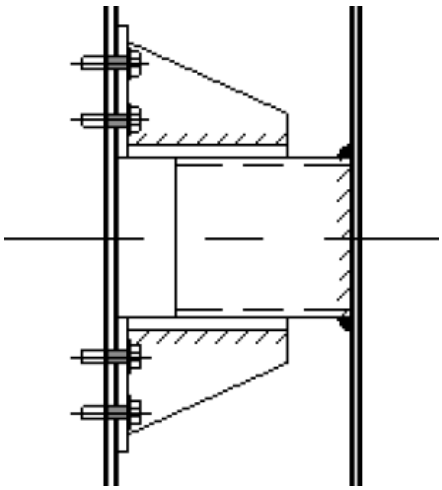
Parkhall College Movement Joints

Dr Richard Henderson of the SCI discusses the movement joints in the building footprint.

Where movement joints are introduced into a building, the resulting portions are often treated individually, each having its own vertical structure and lateral stability systems. Where the constraints of the architecture prevent this, certain forces have to be transferred across the movement joint whilst still allowing the necessary movement to take place. This requirement provides challenges to the designer which are not otherwise encountered.

The need for, and pros and cons of, movement joints are discussed in Steelwork Design Guide to BS 5950, Part 4 Essential Data for Designers, 1991 (SCI publication 070). The practical issues associated with joints are discussed in Chapter 7 which remains the best guidance available at present. Thermal movements of 24mm per 100m length of building are calculated for a 20 degree temperature change assuming free expansion, and maximum thermal stresses of about 50MPa for the same temperature change assuming the thermal strain is fully restrained.

Parkhall College's building footprint is roughly H shaped. Two legs of different lengths (one 125m long) are joined by a cross bar. The legs of the H are not parallel. Movement joints have been introduced into the footprint at one end of the cross bar and across the 125m long leg.



At the joint introduced part-way down the 125m leg of the building, beams parallel to the direction of thermal movement cross the joint and are supported by beams or columns on the other side. The movement is accommodated in the connection by a sliding bearing with bolts in slotted holes providing a guide. Where the floor slab is continuous on each side of the joint a beam is provided on each side of the joint.

The floors on both sides of the movement joint are required to move together. This is achieved by providing a series of shear keys at regular intervals along the joint. SHS stubs are welded to the beam web on one side of the joint. Pairs of stiffened angles are bolted to the beam web on the other side of the joint, with the legs spaced so as to allow the SHS stubs to fit between them (see the figure). The arrangement allows relative vertical movement and horizontal movement perpendicular to the span of the beams but transfers horizontal shear force across the movement joint from the diaphragm on one side into that on the other.

Energy beacon

FACT FILE
Greenwich Peninsula Low Carbon Energy Centre, London
Main client: Royal Borough of Greenwich
Architect: C.F. Møller Architects
Main contractor: Kier Construction
Structural engineer: Price & Myers
Steelwork contractor: Billington Structures
Steel tonnage: 475t

The Greenwich Peninsula Low Carbon Energy Centre will be an important sustainable and affordable energy landmark for one of London's major urban development areas. Martin Cooper reports.

The flue stack overlooks the southern entrance of the Blackwall Tunnel

Standing 49m-tall and positioned adjacent to the southern entrance of London's Blackwall Tunnel, a flue stack with a difference is being constructed as part of the Greenwich Peninsula Low Carbon Energy Centre project.

Designed in collaboration with C.F. Møller Architects, the flue is said to be the most ambitious public commission to date for renowned artist Conrad Shawcross.

Uniting sophisticated engineering and complex optical research the monumental structure – which is also 20m-wide and 3m-deep - is constructed from five interconnected steel ladder frames that will be clad with perforated aluminium panels.

These triangular panels fold across the surface of the tower forming intricate geometric patterns that visually break up the flat planes to create an uneven sculpted surface.

Interconnecting steel ladder frames form the flue stack

According to Mr Shawcross, a key aspect of the design is the creation of the Moiré Effect, which is created by overlaying the perforations on each panel at different angles to each other, resulting in a dynamic and beguiling surface which appears to change continually.

During the evening the tower will be lit from within, continually redefining the shape of the structure and its surroundings.

C.F. Møller Architects Associate Sam Whatman says: "The original design concept for the tower was to align the flues in a row in order to create a tower with an unusually slim profile, a fin or 'blade' on the skyline. This concept brought many structural challenges, not least the high wind loading on the long face of the structure.

"The tensile strength of steel coupled with its ductility made steel the obvious choice as it allowed us to create a strong but slim and highly perforated structure."

In addition to the structural properties of the material, the industrial aesthetic of steel lent itself to the historical context of Greenwich Peninsula.

"The cross bracing inherent to the structure echoes the lattice work of the neighbouring gas holder dating from 1886. Further benefits include the ability to accurately fabricate the frame in sections off-site followed by a quick installation on site," adds Mr Whatman.

The flue stack will act as a beacon or landmark to the huge regeneration scheme that is taking place on the North Greenwich Peninsula. This previously industrial area of south London that is now famous for the O_2 Arena (formerly the Millennium Dome) will eventually accommodate more than 10,000 new homes and over 300,000m² of office space.

The flue and the connected energy centre are being built to guarantee a supply of efficient and sustainable power to the development..

The steel-framed energy building measures 90m-long by 25m-wide and 12m-high, and it will house technically advanced boilers and combined heat and power plant that will distribute heat energy to each plot across the development.

Steelwork for the project is being fabricated, supplied and erected by Billington Structures, with 345t needed for the flue stack and 130t for the frame of the energy centre building.

Both the flue stack and the energy centre building are steel braced frames, however both are structurally independent.

The glazed façade of the visitor centre

"Initially the design envisaged the flue tower being formed with fabricated girders but, in order to make the structure as light and as narrow as possible, regular UC sections were the final choice," explains Price & Myers Project Engineer Amanda Constantinesco.

Although the flue is braced it still requires a series 1m-long holding down bolts for extra stability. These bolts are set within large circular base plates which guaranteed that once the ladders were up they were immediately stable without the need for any temporary bracing or propping.

"We decided the best way of fabricating, delivering and erecting the flue was to bring it to site as fully assembled ladder sections," says the Project Manager for Billington Structures.

There are five ladders in total and each one arrived on site in three pieces, which after being lifted into place and bolted up formed one 49m-high section.

The 3m-wide ladders are spaced at 4.5m centres and are connected by a series of diagonal cross members. Large nodes on the ladders accept these cross members with some nodes accepting up to eight members.

Because the flue stack's cladding is perforated, the steelwork will be exposed to the elements. For this reason all of the steelwork has been galvanized to guarantee a rust-resistant finish and less maintenance.

The ladder sections were galvanized after being assembled and these pieces, up to 16m-long by 3m-wide, were some of the largest elements Worksop Galvanizing had ever processed.

The length of the ladder sections was carefully planned so that they fitted the plant's hot-dip galvanizing facilities with only millimetres to spare. The width of the sections meant that each one had to be dipped once, lifted, turned and dipped again from the other side in a very precise operation to ensure full coverage.

Billington Structure's erection sequence saw the company erect each end of the energy centre building first. This left a central area clear to allow them to position a 200t mobile crane to erect the ladder frames. Once the flue was erected Billington then erected the final middle portion of the energy building.

The majority of the energy centre is a large braced box offering open column-free spans of 20m into which all of the boilers are being installed. At 90m-long the building has been future-proofed with plenty of room for additional boilers to be installed when the North Greenwich development expands further.

Likewise, the flue stack will initially accommodate four flues, but this can be increased to a maximum of 10 when the need arises.

Guided by a desire to demystify the process of energy generation, the machine rooms and flexible ancillary office accommodation are supplemented with a visitor centre at one end of the building that will offer an interactive educational experience for prearranged groups of visitors.

A 20m-long truss supports the roof at this end of the building and creates the column-free double-height space for the visitor centre. This end of the building also features a large glazed façade that will allow natural light to illuminate the centre.

Summing up, Kier Construction Project Manager Ben Fleming concludes: "The design has required a high degree of co-ordination between the structural design team (including Billington), our cladding designers, the flue designers and the artist Conrad Shawcross.

"The flexibility of steel has been a great benefit in helping us to achieve a solution that is acceptable to all. This is a complex structure that will certainly become a future landmark for the Greenwich Peninsula."

The Greenwich Peninsula Low Carbon Energy Centre is due to be operational by the end of this year.

The fully galvanized flue stack erected and awaiting the cladding

Sky's the limit for steel

Steelwork's long span qualities have created the lightweight roof for a new mixed-use building at the Sky campus in London

Steelwork supports the distinctive cladding system

FACT FILE
Sky campus, Osterley, London
Main client: Sky
Architect: PLP Architecture
Main contractor: Mace
Structural engineer: Arup
Steelwork contractor: Bourne Steel
Steel tonnage: 1,250t

Phase two of the redevelopment of media company Sky's campus at Osterley in west London has recently been completed.

Phase one included the Believe in Better Building, a structure that won a number of accolades including London's 'Best Building' at the Institution of Civil Engineers' (ICE) London Engineering Excellence Awards 2015, and the steel-framed Hub office building.

Following on phase two, known as Sky Central, has included the construction of a mixed-use structure offering 41,000m² of office space, studio, production and research and development facilities.

Although the three-storey building has a reinforced concrete frame on piled foundations, a substantial structural steel element was needed to construct a long span roof, support the cladding system and to form stand-alone internal mezzanine structures.

The roof is a long span structure with primary steel fabricated box girders spanning up to 27m, which support secondary timber fins (purlins) that in turn support the lightweight roof deck and skylights.

"A steel roof was chosen because we wanted a deep lightweight structure that would allow natural light into the building," explains Arup Associate Director Carolina Bartram.

The girders are arranged in two rows that run along the middle of the building's length, supported on columns at the ends and then spanning between six concrete cores three on either side. Further steelwork has been erected on top of these pods to form plant enclosures.

"Because the girders were too heavy for the onsite tower crane we had to bring them to site in two pieces, each weighing 16t," says Bourne Steel Divisional Director Kevin Springett.

"We erected them individually using temporary supports that had to stay in place until the two sections had been bolted together."

A lot of accuracy was needed for the steel erection as the box girders incorporate a camber that forms the roof, while pre-installed brackets on the steelwork had to be in exact positions for the later timber installation programme.

The box girders were fabricated from 25mm thick plate and measure 800mm by 300mm. A further quantity of rooftop box girders, measuring 500mm by 300mm, form a perimeter ring around the building.

Hung from the box girder perimeter ring is a secondary steel box section framing system that supports the building's cladding and glazing.

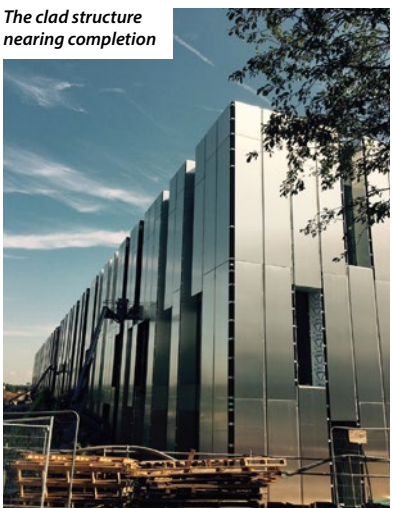
Within the building Bourne Steel also erected stand-alone steel structures that create reception and pubic spaces at mezzanine levels and a studio pod incorporating walkways.

"These structures have been formed with steel as the client wanted flexible plug-in spaces that looked different to the rest of the surrounding building," says Ms Bartram.

Both of the two-storey mezzanines are approximately 40m-long by 13m-wide, while the studio is a double-height space measuring approximately 10m by 8m.

One of the internal mezzanine structures

The clad structure nearing completion



From design to reality

Greenwich Reach Footbridge (UK)

Tekla Structures is a leading intelligent 3D modelling software used to design many of the UK's steel structures. Why? Because Tekla Structures comprehensively delivers from design, to manufacture, to site.

Together we are shaping a smarter future for construction.

www.tekla.com/uk/solutions

Tekla® Structures

TRANSFORMING THE WAY THE WORLD WORKS

Trimble

Steel drives quick car park delivery

Steel construction's speed of delivery has recently come to the fore, as an 830-space multi-storey car park for media company Sky had its frame erected and flooring installed in just eight weeks.

FACT FILE
Sky campus car park, Osterley, London
Main client: Sky
Architect: DRMM
Main contractor: Bourne Parking [part of Bourne Construction Engineering]
Structural engineer: Arup
Steelwork contractor: Bourne Parking
Steel tonnage: 1,200t

Sky's campus in Osterley, west London is undergoing a major expansion with new office buildings [see previous article] and a new multi-storey car park both being constructed at the same time, albeit as separate contracts.

For the car park, Bourne Parking was the main contractor and steelwork contractor, fulfilling both tasks on this fast programme.

"Normally the build programme would be much longer, but the client wanted the car park as quickly as possible, so with four cranes working simultaneously for the steel erection we were able to achieve this fast programme," explains Bourne Parking Senior Project Manager Greg Brown.

The car park measures 90m-long by 50m-wide and consists of seven levels, including ground floor and an open rooftop level. The structure is a steel braced frame that supports precast flooring planks, with steelwork erected around a 7.5m by 16m grid pattern.

Prior to Bourne starting on site, the plot for the car park had already been cleared with an old office block demolished under a separate contract.

Once the piling and the installation of ground beams had been completed, as well as the construction of two precast cores, the steel erection programme was able to begin.

"Using four mobile cranes was a challenge as the structure takes up the entire site's footprint leaving no room for material storage," adds Mr Brown.

Erecting the structure to its full-height, as well as installing the flooring planks, two cranes were used to erect the area incorporating the car park's ramps as this had a higher degree of complexity and a higher piece count, while the rest the building was divided between the other two cranes.

"Each crane served two MEWPs and in this way we were able to erect the entire structure quickly and without disrupting the surrounding road," says Mr Brown. "Only the final few bays required a temporary road closure as we'd used up all of the site's available space."

Stability is derived from strategically positioned cross bracing, located in areas that don't interfere with parking bays, and the diaphragm action derived from the grouted floor planks.

Some additional temporary bracing was also necessary during the steel erection process.

"The steel frame had to be extra rigid as it has to go around and incorporate two structurally independent precast buildings that are located on the ground floor," adds Mr Brown.

These two buildings consist of a substation for electric car charging, and an office and pump room.

Once the steel frame had been completed, Bourne fitted out the car park, work that included M&E, installation of lifts, and asphalting and waterproofing the upper level.

The car park was then handed over to the client, on time and within a 30-week schedule. While it was in use the distinctive rainbow coloured cladding was installed.

A team of abseilers undertook this work as they required less plant on site and consequently caused little or no disturbance to car park users.

Parker ParkerSteel

www.parkersteel.co.uk

Huge Structural Steel Saw & Drill Capacity

9 saw & drill lines working 24/7

Our saw and drill lines give you added flexibility when ordering your steel stock for a job. Seven CNC controlled axes allow superior accuracy. Drilling is available on both the horizontal and vertical plane of long products in one pass. Material can be cut/mitre cut to length as part of the same process, as well as offering tapping, countersinking and part marking on all beams, further reducing your fabrication time and costs. With the capacity to process in excess of 250 tonnes of cut, drilled, shotblast and painted material per day, we offer a true full steel solution.

Structural Steel Cut to Length and Mitred

Etching and layout marks for fabrication

Part Marking for easy identification

Drilling, Tapping and Countersinking

CE Approved to Execution Class 4

Call us for industry leading prices 01227 863700

Email your material list: sales@parkersteel.co.uk

Buy steel & fasteners online: www.parkersteel.co.uk

Head Office / Main Plant
Vauxhall Road, Canterbury,
Kent, CT1 1HD

Structural Solutions Plant
Basin Road South,
Portslade, Brighton, BN41 1WF

Andover Depot
Smeaton Road, Portway Ind Est,
Andover, Hants, SP10 3LF

Cambridge Depot
Pembroke Avenue, Denny Ind Centre,
Waterbeach, Cambridge, CB5 9QP

Midlands Office
Isis House, Smith Road
Wednesbury, West Midlands, WS10 0PD

bsi. ISO 9001 Quality Management RS 20966 CE 2273 BCSA nass

John Parker & Son Ltd www.johnparker.co.uk - T/A ParkerSteel, ParkerTools, ParkerHire. Registered London 654746 VAT Reg. No. GB347 1670 50

A tale of two cities

The steel-framed Embankment commercial development is the first part of a large regeneration scheme altering the area separating Manchester and Salford. Martin Cooper reports.

The reception area of Building 101 features a large column-free space

Set within a retained Grade II listed sandstone façade wall, and consisting of a nine- and a 10-storey office block sat atop a three-level car park podium, the Embankment scheme forms an initial phase of a much larger regeneration project that aims to breathe new life into the area where the cities of Manchester and Salford meet.

On the banks of the River Irwell, overlooking Manchester Cathedral, the project is situated on a plot once occupied by Exchange Station that closed down in 1969.

Opened in 1884, the bulk of this station was within the boundaries of Salford, although Europe's longest platform – built in 1929 – did provide a direct link to nearby Manchester Victoria Station.

Although the original buildings and platforms are long gone, the sandstone façade of the masonry podium that once supported the station has been retained, and this forms the exterior for a three-storey car park on top of which, at podium level, the two office blocks will both sit.

Building 101 nears completion, while the transfer deck is in place for Building 100

The cladding goes up on 101

The car park under construction along with the core for Building 101

The steel-framed car park infills most of the retained façade, except the rounded corner areas, creating 442 spaces.

The main pedestrian access route from street level to the car parking levels is via the new podium hub, utilising two large arch openings in the listed façade wall. Access to the upper levels is via a lift or a feature helical stair, which rises up to a fully glazed atrium structure atop the podium.

The car park has been built around a variable grid pattern to meet parking requirements and the constraints of the existing retained façade, with stability-giving cross bracing positioned within internal bays and perimeter elevations.

As far as the steelwork is concerned, the car park and the first office structure (Building 101) are complete, with the second office structure (Building 100) due to begin early next year.

For the duration of the construction, the façade has been propped and the steel-framed car park has been built back from the wall. The last two or three metres of the podium slab is supported by the wall and tied into it with resin fixings.

The roof of the car park or podium deck provided the design team with the project's biggest challenge as Ramboll Design Engineer Allan Wilson explains: "Both of the office buildings will have a similar design that includes main columns set at 7.5m centres, which doesn't match the car park grid below. This, combined with the larger column density in the core areas, led us to adopt transfer structures at this level to maximise parking spaces."

The client requirement to maximise the number of car parking spaces did not permit the building cores to continue down through the podium structure. Therefore, steel-framed cores were adopted to minimise the loads onto the transfer structures, as they are significantly lighter than concrete cores.

Encompassing an area around each of the building's cores, which equates to approximately one third of their footprints, the two transfer slabs will employ an innovative design, with a 1500 thick RC slab built off a 130mm thick composite slab acting as permanent formwork.

The remainder of the podium slab is 170mm thick. In order to resolve complex punching shear issues, 914UB cruciform sections were cast within the depth of the transfer slabs.

"Many buildings of this size would have used a concrete core, but a steel core is quicker to erect," says Elland Steel Structures Commercial Director Jeremy Shorrocks. "In order to get the required stiffness the steel core is heavily braced and consists of a condensed configuration of beams and columns all supported by the transfer slab."

Steelwork for both transfer slabs was installed as part of the initial car park construction programme in preparation for the steel erection programme for Building 100 starting next year.

Building 101 is a 10-storey commercial block offering clear spans of up to 15.3m. Westok cellular beams, 680mm-deep with 475mm diameter holes, have been used throughout for service integration.

▶20

FACT FILE

The Embankment, Salford

Main client: Ask Real Estate, Tristan Capital, Carillion JV

Architect: Flanagan Lawrence

Main contractor: Carillion

Structural engineer: Ramboll

Steelwork contractor: Elland Steel Structures

Steel tonnage: 2,700t

A depiction of the new public realm and the two offices

▶19

Elland Steel Structures engaged Kloeckner Westok early in the process, who presented value engineering proposals to both Ramboll and Carillion which were adopted by the team.

Kloeckner Westok Design Team Leader, John Callanan explains: "This is another example of the benefits of a collaborative working relationship between Westok, the engineer, fabricator and main contractor.

"The key players took on board our value engineering proposals of clear span Westok plated primary beams at the four corners of the core. A larger deck span reduces the net floor tonnage and erection piece count for the fabricator. This economic mix of cellular and plated beams is speedy to erect, and delivers a floor plate without any internal columns whatsoever."

Offering some aesthetic appeal around the exterior, all of the perimeter columns are CHS sections that are set within a 900mm cantilever and will be left exposed in the building's completed form. These sections are 406.4mm diameter columns at the lower levels, decreasing to 323.9mm diameter columns for the upper two storeys.

Building columns outside of the building core were generally co-ordinated with the car park layout, but where this was not possible, transfer beams were employed to take the loads into the podium columns.

There are 25 transfer beams in total with the largest measuring 1,400mm-deep and weighing close to 8t.

Building 100 will have a similar design to its neighbour, however it will have a larger floor area on plan but one less storey (nine-storeys), so the net lettable area is approximately the same as Building 101.

This second building will include a column-free cantilever corner (6.5m projection) and will also incorporate curves to follow the shape of the listed retained façade wall. A further 1,500t of structural steelwork will be fabricated, supplied and erected for this phase.

For the erection programme Elland Steel Structures began its work by firstly installing the car park steelwork directly below each of the transfer slabs.

In preparation for the next phase of the construction programme, all of the transfer beams for Building 100 were also installed in readiness.

While the transfer slab was being cast Elland completed the remainder of the car park steel erection.

"We then erected Building 101 using a sequence that required three levels of core to be erected, followed by three levels of main building steelwork wrapping around the core structure in a clockwise manner," adds Mr Shorrocks.

"These floors were metal-decked while the next three levels of core were going up. This then gave us a surface on which to work off for the next stage of the sequence."

The Embankment scheme will be connected to Manchester city centre via the old station's link bridge that spans the River Irwell. As part of the project the bridge is being renovated, including the wrought ironwork railings.

A new public square, adjacent to the scheme, has also been constructed and many of the retained façade's arches will include shops and restaurants complementing the realm.

A commitment to sustainability by the client requires the buildings to achieve a BREEAM 'Excellent' rating, as well as achieving an efficient thermal performance, which improves on current Part L requirements.

Phase one of the Embankment is due to complete later this year.

Left: A 1960s view of Exchange Station showing the now demolished buildings and the retained façade

Right: L S Lowry's painting of the station in its heyday

kloeckner metals
UK | Westok

ABOVE & BEYOND

A partnership that goes above & beyond manufacturing

So make sure you take advantage of Westok's unique products and expertise in design and value engineering.

254129

Kloeckner Metals UK | Westok
Valley Farm Way, Stourton, Leeds, LS10 1SE
t: 0113 205 5270 | f: 0113 205 5271
e: info.westok@kloeckner.com
www.kloecknermetalsuk.com

Westok® Cellular Beams

Westok Plate Beam

Westok USFB® ULTRA SHALLOW FLOOR BEAM

The principal of steel

Located on a prime central London plot, the 15-storey Principal Place Commercial is a landmark mixed-use development utilising steel construction's flexibility. Martin Cooper reports.

Cladding begins to be installed

FACT FILE
Principal Place Commercial, London
Main Client: Brookfield Property Partners
Architect: Foster + Partners
Main contractor: Brookfield Multiplex
Structural engineer: WSP Parsons Brinckerhoff
Steelwork contractor: Severfield
Steel tonnage: 8,000t

Sitting just to the north of the City of London boundary, Shoreditch has in recent times transformed itself from a run-down former manufacturing district into a trendy and fashionable area that now seamlessly merges with the nearby business-dominated streets.

Taking advantage of Shoreditch's proximity to the Square Mile, a number of commercial developments have sprung up, including Principal Place Commercial, a landmark 15-storey development being built by Brookfield Multiplex.

Designed by Foster + Partners the 79,000m² scheme offers efficient and high density Grade A space with typical floors of 4,100m². The building will also offer retail space within its ground floor area.

The steel-framed building will also feature a 1,400m² reception area and a significant public realm, as well as two roof terraces exclusively for tenant use. All of these attributes, and with the City of London literally next-door, have persuaded Amazon, the global on-line retailer to pre-let 40,000m² of space at Principal Place.

A project on this site had been mooted for a number of years and a previous developer did begin preliminary works and installed a significant quantity of steel to form a bridge over the railway lines into Liverpool Street Station.

This ground level grillage of steel beams has now been incorporated into the Principal Place job, as it will form the entrance to the new building and a support for the public realm.

Brookfield Property Partners acquired the site in 2012 and immediately reviewed and improved the overall design with significant changes to the façade and interior of the scheme.

"Principal Place was always going to be a steel-framed building, but our design changes have enhanced the building and its cost-effectiveness," explains Brookfield Multiplex Project Director David Jordan.

Prior to the construction programme starting, sports pitches most recently occupied the plot, although in the past it had been the site of a railway yard and one of Europe's first gasworks in the early 19th Century.

"The industrial past of the site meant we had to remediate parts of the site before we could start on the building's substructure," adds Mr Jordan.

The site's history went back further than Georgian times as Mr Jordan adds. "As with many central London projects, an archaeological dig was also undertaken and quite a few medieval and Roman artifacts were recovered."

Steelwork for the superstructure begins at basement level, so once this had been dug out and the slab cast, Severfield was able to begin its steel erection programme.

The centrally-positioned concrete core, that provides the steel frame with its stability, was more than 60 percent complete when the steelwork package started. To allow both of the site's tower cranes to be used for the steel erection, a third crane was temporarily installed by Brookfield Multiplex to serve the core construction.

The structure steps down at the eastern end to accommodate sight lines

In addition to the office building and the half-acre public piazza, there is also a significant residential component to the development, also being built by Brookfield Multiplex but under a separate contract for Brookfield Property Partners and Concord Pacific.

Principal Tower, the 50-storey luxury residential establishment at Principal Place, will be Foster + Partners' first fully designed residential tower, reaching 175m, making it one of the tallest residential buildings in Central London.

Severfield will be installing a steel transfer structure that will support the concrete tower as it cantilevers over the rail lines that serve Liverpool Street Station

The residential tower will be completed in 2018.

"One of the main challenges for us was the installation of the basement to first floor columns," says Severfield Associate Project Director Steve Dobbs. "They were erected and left free-standing while the reinforced ground floor slab was cast around them, as erecting them after the slab was cast would have been very difficult."

To allow the columns to free-stand, a series of large base plates was initially installed, these each measured 1.5m × 1m and weighed close to 1.5t each. Once the base plates were in place the columns were then attached via a welded connection.

Within the double-height basement a steel-framed mezzanine deck was also installed along with the main columns. This extra level will primarily support cycle storage facilities and plant areas.

The steel frame has been erected around a 10.5m x 10.5m grid, offering quite a lot of repetition as the steel frame went up. Two of the main features are the double-height entrance foyer that incorporates a first floor that is setback to overlook the main doors, and large 4.5m deep cantilevers that run along both of the building's main elevations.

One of the enhancements to the original design was the addition of these two cantilevers. The columns have been set back to form these overhangs and increase the floorplates above. An added benefit has been the creation of a sheltered pedestrian walkway along the Worship Street elevation.

"A lot of work and coordination was required so we could agree the cantilever deflection criteria with the cladding contractor," says WSP Parsons Brinckerhoff Project Engineer Andrew Woodward.

The building has a step at level 10 that creates one of its roof terraces on this western portion – the other terrace sits atop level 15 on the eastern side. As well as forming an interesting design feature, viewing corridor regulations also stipulated a lower part of the structure at the western side.

During the initial steel erection programme both of the site's tower cranes were positioned within the structure's two atriums. However, once the steelwork had progressed past level 10, Brookfield Multiplex decided to reposition the crane on the western side in order to help speed up the cladding installation within the atrium.

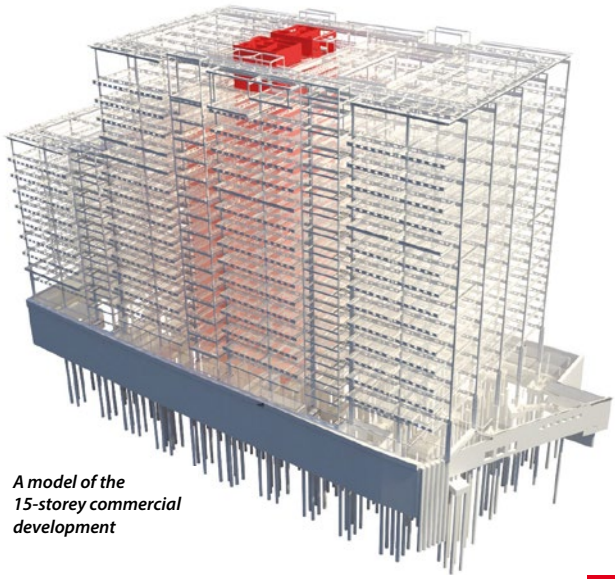
In order to support the tower crane on the steel frame at level 10, Severfield designed, fabricated and installed a bespoke steel grillage.

Also at level 10 the main core decreases in size as there are less services to accommodate for the upper floors.

"This means the steel piece count actually increases for the upper levels as more steel components were required to infill the area above the core," adds Mr Woodward.

"Plus the roof has a significant amount of steel to form plant enclosures and a Building Maintenance Unit (BMU) support system."

Principal Place is targeting a BREEAM 'Excellent' rating and is scheduled for completion by the end of the year.



A model of the 15-storey commercial development

Design of fillet welds and partial penetration butt welds

Richard Henderson of the SCI discusses the directional method for the design of fillet welds and partial penetration butt welds and shows how the combined stress formula is related to Von Mises' failure criterion. The weld design rules can be applied in all cases.

Introduction

A simple rule of thumb approach to sizing partial penetration butt welds carrying longitudinal shear has sometimes been used where the resistance is based on the average shear stress used for checking the shear resistance of beam webs: $0.6p_y$ in BS 5950 or $f_y/\sqrt{3}$ in EN 1993-1-1. This confusingly led to a lower shear resistance than that found when sizing the weld using the specified design strength. In what follows, the directional method in EN 1993-1-8 is discussed and examples of weld design are presented, showing the rule of thumb approach to be conservative and inappropriate.

Directional method

The directional method for design of fillet welds and partial penetration butt welds in EN 1993-1-8 clause 4.5.3.2 involves checks of 1) combined stress and 2) direct stress on the weld throat and compares each with a different limiting stress denoted here by the general term σ_L. The limiting stresses are based on the ultimate strengths of the material (which are constant for most thicknesses up to 100 mm) and the values for different steel grades are given in the table below. The stresses are in MPa. A material factor of 1.25 (for bridges) has been used.

Steel grade		S235	S275[1,2]	S355[1]	S420[1]	S460[1]
	β_w	0.8	0.85	0.9	1.0	1.0
Ultimate strength	f_u	360	410	470	520	540
Limiting combined stress	$f_u/(\beta_w\gamma_{M2})$	360	386	418	416	432
Limiting direct stress	$0.9f_u/\gamma_{M2}$	259	295	338	374	389

1 Subgrade M has minimum tensile strengths which vary with thicknesses below 100 mm
2 Subgrades M and N have a minimum tensile strength of 370 MPa

Table 1 Limiting stresses in fillet welds in EN 1993-1-8

In the directional method for the design of fillet welds, direct stresses perpendicular and parallel to the weld throat are denoted in clause 4.5.3.2(4) and so are shear stresses in the plane of the weld throat. Direct stresses parallel to the axis of the weld are not considered further. The orientations of the stresses are shown in Figure 1.

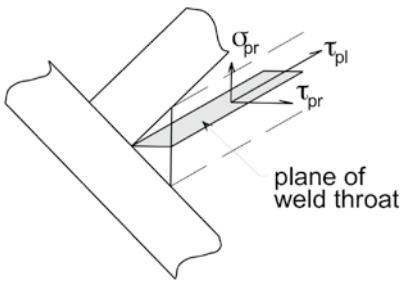


Figure 1 Stresses on the weld throat

The formula in EN 1993-1-8 is

$$\left(\sigma_{pr}^2 + 3(\tau_{pr}^2 + \tau_{pl}^2)\right)^{0.5} \le \sigma_L \quad (1)$$

where the direct stress is perpendicular to the weld throat and the shear stresses are in the perpendicular (transverse) and parallel (longitudinal) directions. In equation (1), the subscript "pr" has been used instead of the EN 1993-1-8 symbol "⊥" and "pl" instead of "||".

In designing partial penetration butt welds, the designer determines the penetration required and the fabricator chooses the weld preparation to achieve the penetration specified, based on his welding processes and the corresponding weld procedures.

Von Mises' failure criterion

The EC3 formula for the combined stress on a weld is based on the Von Mises failure criterion which is usually expressed in terms of principal stresses (orientated such that there are no coincident shear stresses). The standard expression is:

$$(\sigma_1 - \sigma_2)^2 + (\sigma_2 - \sigma_3)^2 + (\sigma_3 - \sigma_1)^2 \le 2\sigma_L^2$$

where σ_1, σ_2 and σ_3 are the principal stresses in three orthogonal directions and σ_L is a limiting stress. In the design of joints with essentially linear welds between plates, the stress in the through thickness direction is zero (see figure 2) so for the biaxial stress state, the equation becomes:

$$(\sigma_1 - \sigma_2)^2 + \sigma_2^2 + (-\sigma_1)^2 \le 2\sigma_L^2 \quad (2)$$

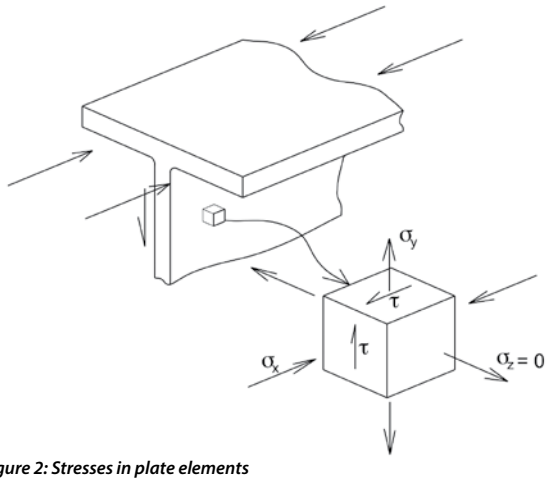


Figure 2: Stresses in plate elements

The failure criterion in equation (2) is expressed in terms of principal stresses which are related to coincident direct and shear stresses using the transformation equations illustrated by Mohr's circle of stress.

NEW SCI PUBLICATION

SCI
Steel Knowledge
www.steel-sci.com

Thermal Bridging in Light Steel Framing & Modular Construction (P411)

Buildings account for nearly half of the UK's total carbon emissions and heat losses through the building envelope account for more than 75% of the total heat loss including air leakage.

In response to the Energy Performance of Buildings Directive and the UK Climate Change Act 2008, national regulations are requiring ever more energy efficient buildings.

SCI's newest publication illustrates various cases of thermal bridging and how local heat losses can be reduced. It describes the results of thermal modelling analyses of typical interface details used in light steel framing and modular construction.

This publication focusses on thermal bridging at junction details and balcony support attachments. The information may be used as general guidance on how to minimise thermal bridging in light steel framing and modular construction.

Complimentary publications include;
P402 Light Steel Framing in Residential Construction
P410 Thermal Bridging in Steel Construction
ED019 Thermal Performance of Light Steel Construction

Publication costs;
SCI Members - £20.00
Non Members - £40.00

Purchase your copy:

SCI Shop: http://shop.steel-sci.com/
Email: Sales@steel-sci.com | Telephone: 01344 636505

@SCIsteel
steel-construction-institute

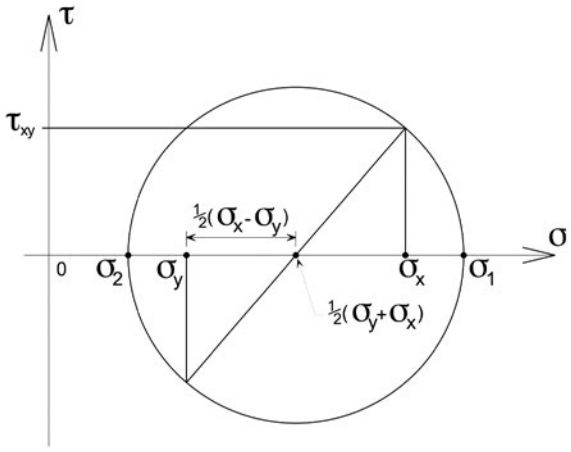


Figure 3: Mohr's circle of stress

In general, orthogonal stresses σ_x and σ_y and coincident shear stress τ_{xy} are present and principal stresses are given by:

$$\sigma_1 = \frac{\sigma_x+\sigma_y}{2} + \sqrt{\left(\frac{\sigma_x-\sigma_y}{2}\right)^2 + \tau^2_{xy}}$$

$$\sigma_2 = \frac{\sigma_x+\sigma_y}{2} - \sqrt{\left(\frac{\sigma_x-\sigma_y}{2}\right)^2 + \tau^2_{xy}}$$

where the square root term is the radius of the Mohr's circle and its centre is at $\frac{1}{2}(\sigma_x + \sigma_y)$.

If the transformations are made, the formulae in equations (1) and (2) are algebraically identical when σ_y equals zero.

Steel grade		S235	S275	S355	S420	S460
Limiting combined stress	$f_u/(\beta_w\gamma_{M2})$	360	386	418	416	432
Combined stress (shear only)	$f_L/\sqrt{3}$	208	223	241	240	249
Limiting shear stress: BS 5950: 1990	$0.7f_y$	165	193	249	294	322
Design Strength[1]: BS 5950: 2000	–	–	220	250	200	–

1 Matching electrodes

Table 2: Comparison of Limiting shear stresses EC3 and BS 5950: 1990

Limiting stresses

The Von Mises failure criterion is often expressed in terms of the yield strength of the material. However, in the Eurocode, in the design of fillet welds and partial penetration butt welds, as we have seen in Table 1, for lower steel grades, the limiting strength is allowed to be a higher value, between the yield strength and the ultimate strength of the material. Interestingly, for higher strength steels, the inclusion of the material factor of 1.25 means that the limiting stress is less than the yield strength of the material. For S355 steel, the limiting direct stress is less than the yield strength for material 40 mm thick or less.

Engineers who remember designing to BS 5950-1: 1990 will recall the requirement to check the stress on the fusion line of partial penetration butt welds and limit it to $0.7p_y$ in shear or $1.0p_y$ in tension. This check was no longer a requirement in the 2000 update of the code. Comparisons of the limiting shear stress with the values for combined stress assuming pure shear (ie σ_{pr} in equation (1) is zero) in Table 2 show that the limiting stresses in the Eurocode are higher for the lower strength grades and lower for the higher strength grades.

Examples

(1) A weld in pure shear is carrying a force of 1.27 kN/mm in grade S355 material. A partial penetration Vee butt weld is to be used. What depth of weld penetration is required? The shear stress on the weld of 250 MPa gives a weld throat to BS 5950 of 5.1 mm. Design to BS 5950: 1990 used a design strength p_w of 255 MPa on the weld throat. However the shear stress on the fusion line was also limited to $0.7p_y$ = 249 MPa resulting in the same weld size.

Using the directional method in EC3, all the components of stress are zero except for the shear stress parallel to the axis of the weld (τ_{pl}) so substituting in equation (1), the design shear stress is $418/\sqrt{3}$ MPa (241 MPa) and the weld size is 5.3 mm. If the principal stresses are calculated in each case, we find the following for the weld to BS 5950: 2000. The shear stress is 250 MPa and the direct stresses σ_x and σ_y are both zero. The principal stresses are therefore equal to ± 250 MPa.

Nationwide delivery of all Structural Steel Sections
RAINHAM
BCSA
Phone: 01708 522311 Fax: 01708 559024
MULTI PRODUCTS ARRIVE ON ONE VEHICLE

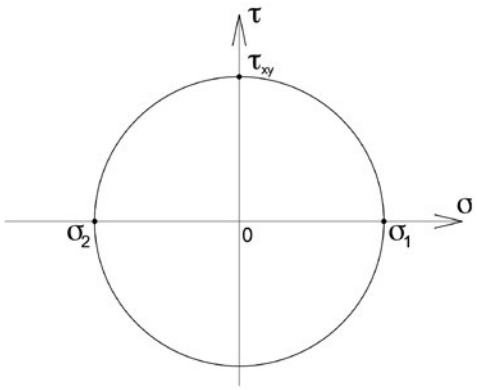


Figure 4: Principal stresses for pure shear

Substituting in equation (2) for the failure criterion, the limiting stress is 250 x √3 = 433 MPa. This is higher than 418 MPa, the limiting stress to EC3, where the principal stresses are ± 241 MPa.

(2) A second example of welds in pure shear is a lap joint transferring tension between plates in S355 material 20 mm thick, through longitudinal welds. It will be assumed that the edges of the plate are to be prepared for a partial penetration Vee butt weld. The thickness of the plates and length of the welds is such that it is assumed the direct stresses due to the eccentricity moment can be neglected.

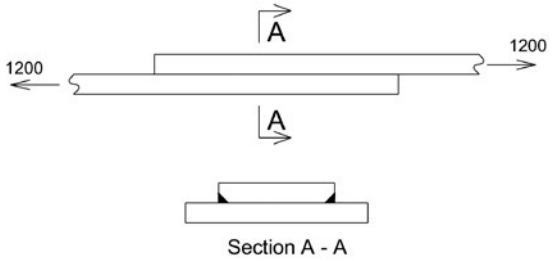


Figure 5: Connection assuming pure shear

1200 kN is to be transferred through welds on each edge of the plate with an effective length of 400 mm. The longitudinal shear stress per mm of weld is 1200 / (2 x 400) = 1.5 kN/mm. The penetration required is $1.5 \times 10^3 \times \sqrt{3}/418 = 6.2$ mm.

The size of weld throat to BS 5950: 2000 would be $1.5 \times 10^3 / 250 = 6.0$ mm.

(3) Consider a similar example to (2) where the eccentricity is not negligible. The force to be transferred is 500 kN and the eccentricity is 100 mm so the eccentricity moment is 50 kNm.

Figure 6: Connection with shear and moment

The effective length of weld is 400 mm. A plastic distribution of stress will be assumed (EN 1993-1-8 clause 4.9(1)) so the modulus of the weld group is $2 \times (1 \times 400^2/4) = 8 \times 104$ mm^3/mm.

The shear stress on the weld is 500 / (2 × 400) = 0.625 kN/mm and the direct stress on the weld is $50 \times 10^3 / (8 \times 10^4) =$ 0.625 kN/mm. Weld penetration a is given by:

$$a = \sqrt{\frac{0.625^2 + 3 \times 0.625^2}{0.418^2}} = 3.0 \text{ mm}$$

For interest, principal stresses are -129 MPa and 337 MPa.

Were fillet welds to be used instead of partial penetration butt welds, the forces/mm of weld would be as follows, assuming a 45° throat: transverse shear = 0.625/√2 = 0.442 kN/mm; direct stress = 0.442 kN/mm; longitudinal shear = 0.625 kN/mm. The weld size is:

$$a = \sqrt{\frac{0.442^2 + 3 \times (0.442^2 + 0.625^2)}{0.418^2}} = 3.4 \text{ mm}$$

The corresponding principal stresses are -169 MPa and 301 MPa.

Examples 1 and 2 illustrate that in the case of pure shear, the weld sizes resulting from design to EN 1993-1-8 are little different from those to BS 5950. When sizing welds to EN 1993-1-8, use the limiting weld strengths for direct stress and combined stress on the weld throat. There is no requirement for a separate check on the fusion faces. The limiting shear stress ($f_y/\sqrt{3}$) for the determination of shear resistance of webs in EC3 (equivalent to $0.6p_y$ in BS5950) is not used in weld design.

GRADES S355JR/JO/J2
STEEL
Beams • Columns
Channel • Angle
Flats • Uni Flats
Saw Cutting
Shot Blasting
Painting • Drilling
Hot & Cold Structural Hollow Sections
Head Office: 01708 522311 Fax: 01708 559024 Bury Office: 01617 962889 Fax: 01617 962921
email: sales@rainhamsteel.co.uk www.rainhamsteel.co.uk
RAINHAM STEEL Proud sponsors of BOXNATION Channel of Champions

New and revised codes & standards

From BSI Updates May 2016

CORRIGENDA TO BRITISH STANDARDS

BS EN 16623:2015
Paints and varnishes. Reactive coatings for fire protection of metallic substrates. Definitions, requirements, characteristics and marking
CORRIGENDUM 1

BRITISH STANDARDS WITHDRAWN

BS 8202-2:1992
Coatings for fire protection of building elements. Code of practice for the use of intumescent coating systems to metallic substrates for providing fire resistance
Superseded by BS EN 16623:2015

NEW WORK STARTED

EN ISO 898-2
Mechanical properties of fasteners made of carbon steel and alloy steel. Nuts with specified property classes. Coarse thread and fine pitch thread
Will supersede BS EN ISO 898-2:2012

EN ISO 1891-1
Fasteners. Terminology. Descriptions of fasteners and fasteners features

EN 1993-1-5:2006/A1
Eurocode 3. Design of steel structures. Plated structural elements

EN 1993-1-6:2007/A1
Eurocode 3. Design of steel structures. Strength and stability of shell structures

EN 1993-4-1:2007/A1
Eurocode 3. Design of steel structures. Silos

EN 1993-4-2:2007/A1
Eurocode 3. Design of steel structures. Tanks

EN ISO 4042
Fasteners. Electroplated coatings
Will supersede BS EN ISO 4042:2000

EN 10348-2
Steel for the reinforcement of concrete. Galvanized reinforcing steel. Galvanized reinforcing steel products

EN 14399-1:2015/A1
High-strength structural bolting assemblies for preloading. General requirements

EN 14399-2:2015/A1
High-strength structural bolting assemblies for preloading. Suitability for preloading

EN ISO 15330
Fasteners. Preloading test for the detection of hydrogen embrittlement. Parallel bearing surface method
Will supersede BS EN ISO 15330:1999

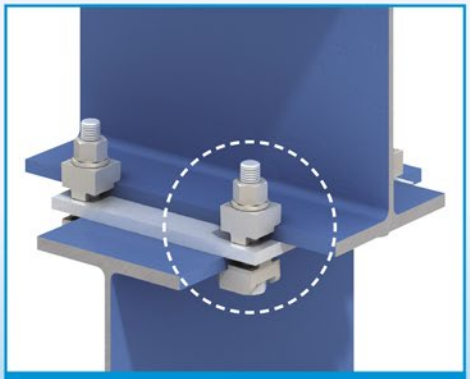
lindapter®
www.Lindapter.com

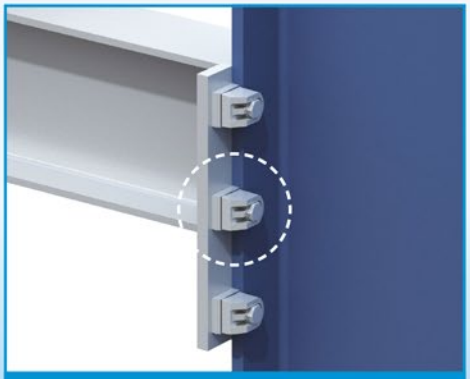
Faster Steel Connections

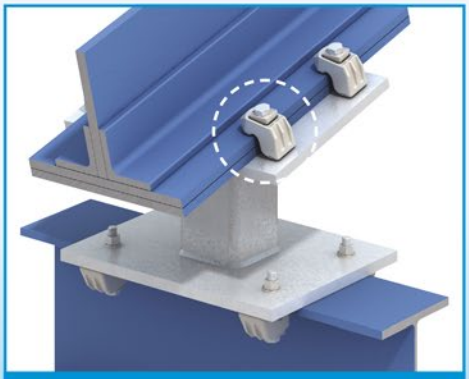
For over 80 years, Lindapter's steelwork clamps have provided a faster alternative to both drilling or welding, saving contractors' time and money.

✔ High strength steel-to-steel connections
✔ CE mark, DIBt and TÜV approved
✔ Adjustable on-site for fast alignment
✔ For permanent or temporary use

Inventor of the Girder Clamp Est. 1934 lindapter Accept no substitute and Hollo-Bolt®


Beam-to-beam
(tensile loading)


Beam-to-column
(slip resistance)


Inclined beam-to-beam
(combined loading)

NEW Lindapter product catalogue out now! Visit **www.Lindapter.com** to get your copy.

AD 398:
Net area for staggered holes in accordance with Eurocode 3

Determining the net area of a cross section with staggered holes is dealt with in EN 1993-1-1:2005 (+A1:2014) clause 6.2.2.1(4). For those new to this calculation, the illustrative diagram in Figure 6.1 and the presence of the summation sign in equation 6.3 of the Eurocode may be a source of confusion which this AD note attempts to dispel. The following definitions are provided as a starting point: the gross cross sectional area of a plate is its width perpendicular to the longitudinal axis multiplied by its thickness. The net area of the member is the gross area minus the area of holes for fasteners.

Clause 6.2.2.1(4) states that the total area deducted for fasteners should be the greater of:

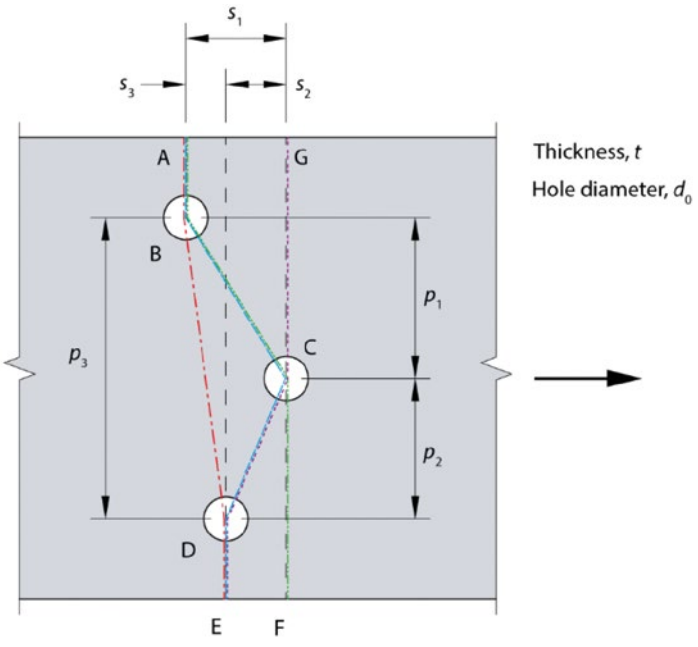
a) the deduction for non-staggered holes, and

b) $t\left(nd_0 - \sum \frac{s^2}{4p}\right)$ (equation 6.3)

where s is the staggered pitch of the holes in the longitudinal direction and p is the spacing of the holes measured perpendicular to the axis of the member. Where a section perpendicular to the longitudinal axis of a member passes through the centre of a number of bolt holes (n say) of diameter d_0, the loss of area is clearly n times the area of one bolt hole. If the bolt holes are staggered along the member (see the figure below), an empirical expression of American origin (eq 6.3 above) reduces the area deducted. Paths are drawn across the member that start and finish perpendicular to the edges of the member and pass in zig-zag lines through the bolt holes, defining all the possible critical sections. A reduction in the area deducted for bolt holes is made for the diagonal line between each pair of holes in a possible critical section given by

$$\frac{s_i^2}{4p_i}$$

for diagonal line i between a pair of holes. If there are several diagonal lines in a possible critical section, a reduction is made for each diagonal line, hence the summation sign in equation 6.3. Obviously, the reduction cannot be such that the total area deducted is less than the area of bolt holes on the worst perpendicular cross section.



Staggered holes in tension member

Because an approach expressed in terms of reducing a deduction for holes is potentially confusing, two examples are presented below. These are based on Owens and Cheal[1] section 7.3.1.

Deduction for holes is the maximum of:

Section ABCF $\quad$ deduction $= 2td_0 - \frac{s_1^2 t}{4p_1}$

Section GCDE $\quad$ deduction $= 2td_0 - \frac{s_2^2 t}{4p_2}$

Section ABDE $\quad$ deduction $= 2td_0 - \frac{s_3^2 t}{4p_3}$

Section ABCDE: $\quad$ deduction $= 3td_0 - \frac{s_1^2 t}{4p_1} - \frac{s_2^2 t}{4p_2} = t\left(3d_0 - \sum_{i=1}^{2} \frac{s_i^2}{4p_i}\right)$

(this is the EC3 formula)

Example 1:

$t = 20$ mm; $d_0 = 22$ mm; $s_1 = 50$ mm; $s_2 = 30$ mm; $s_3 = 20$ mm; $p_1 = 80$ mm; $p_2 = 70$ mm; $p_3 = 150$ mm.

ABCF: deduction = 880 – 156.3 = 724 mm²

GCDE: deduction = 880 – 64.3 = 816 mm²

ABDE: deduction = 880 – 13.3 = 867 mm²

ABCDE: deduction = 1320 – 156.3 – 64.3 = 1099 mm²; **this is the critical section.**

Example 2:

Note: the area of one bolt hole is 440 mm²

Suppose s_1 is increased to 90 mm and s_2 increased to 60 mm; therefore $s_3 = 30$ mm

ABCF: deduction = 880 – 506 = 374 mm² **< 440 mm² therefore not applicable**

GCDE: deduction = 880 – 257 = 623 mm²

ABDE: deduction = 880 – 30 = 850 mm²; **this is the critical section.**

ABCDE: deduction = 1320 – 506 – 257 = 557 mm²

Reference

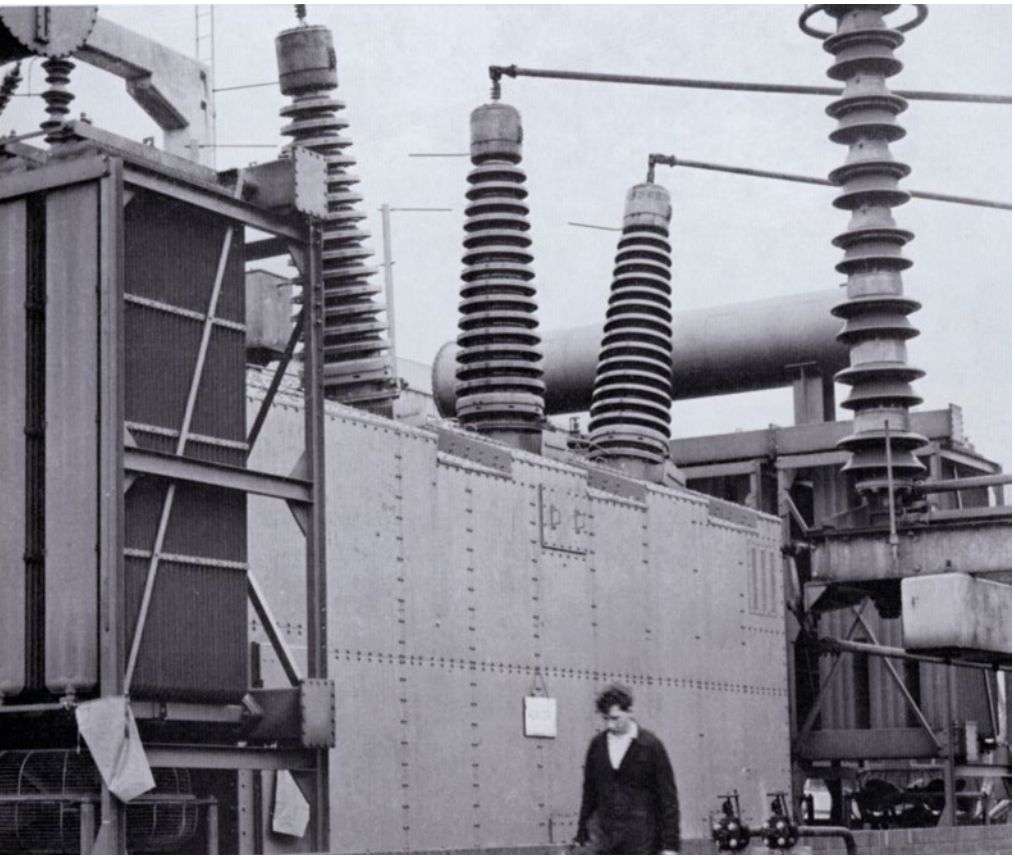
1 Owens & Cheal, Structural Steelwork Connections, Butterworths 1989

Contact: **Richard Henderson**
Tel: **01344636525**
Email: **advisory@steel-sci.com**

BUILDINGWITHSTEEL Reprinted from Volume 4 No. 1 February 1966

Steelwork enclosures reduce transformer noise

by L. Jump, ARTCS, AIEE
Transformer Divison, AEI Ltd



One of the problems associated with modern power transformers is the noise they produce. The shortage of available land for power station and substation sites frequently requires transformers to be located close to residential property, with occasional justifiable complaints from nearby householders.

The noise is produced in the magnetic core and is difficult to suppress at the source because of the magnetic requirements of the transformer. Though much research is being undertaken to investigate methods of reducing noise at the source the possibility of success in this direction is as yet remote. It therefore becomes necessary to reduce the volume by building noise reducing enclosures around the transformer.

Popular materials for such structures are brick, concrete and steel. Brick and concrete, though often used, both have the disadvantage of not being readily demountable and thus if it is considered that there is the possibility of the transformer being removed at a later date it becomes necessary to use steel. Another problem is the electrical requirements of the high voltage bushing connections. It is essential that the correct clearance from the high voltage point to earth is maintained and consequently it is found impossible on some existing transformer designs to fit concrete roofs over transformers and still maintain this clearance. Steel enclosures, however, can be readily shaped to follow the contours of the transformer tank. Furthermore, the dimensions of any enclosure relative to the transformer tank are important because coincidence with critical wavelengths of sound will cause resonance: it is found easier to avoid these critical dimensions with steel.

Examples of Steel Technique

Four large transformers of 180 MVA rating have been enclosed in this manner. These transformers were of an older design and had the L.V. bushings fitted close to the transformer tank. A close fitting roof section of a suspended portal type design was used. This suspended structure was 25 ft in length and weighed 8 tons. A heavy universal beam running the length of the enclosure and situated above the on-load tap changers served as the main portal beam. The main roof supporting structure was made with small channels and the roof and wall cladding superstructure with tees.

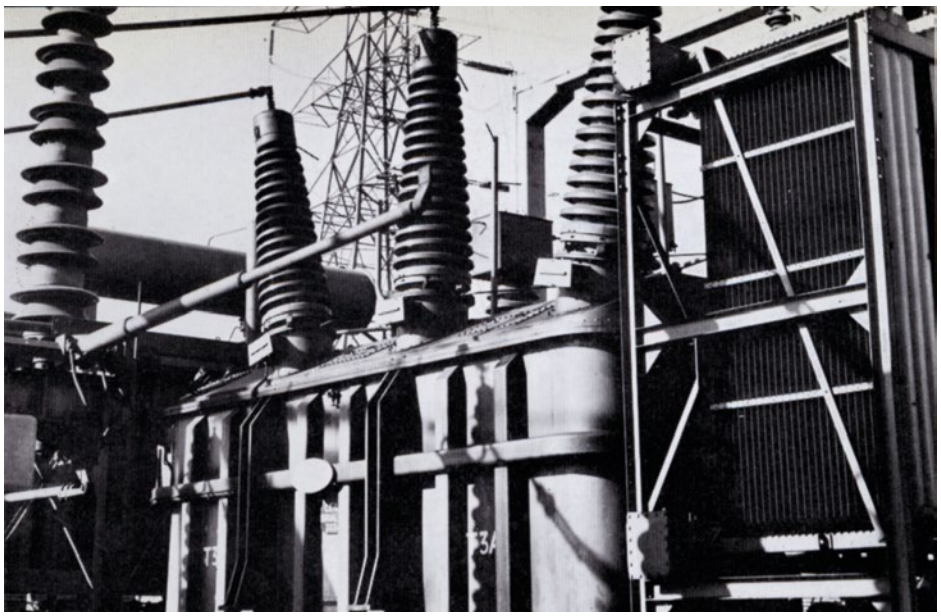
The wall cladding used was of special design which produced a damped panel, that is a panel which will not ring when it is struck. This damping is essential in noise attenuation work where mass alone (as with brick and concrete) cannot be used. The cladding consisted of two 1/8-in thick plates with a sandwich filling of viscous compound. This compound, used in AEI acoustic hoods, is a plastic compound capable of withstanding wide variations of temperature with negligible variations in viscosity. The main cladding was made in 6 ft by 3 ft panels.

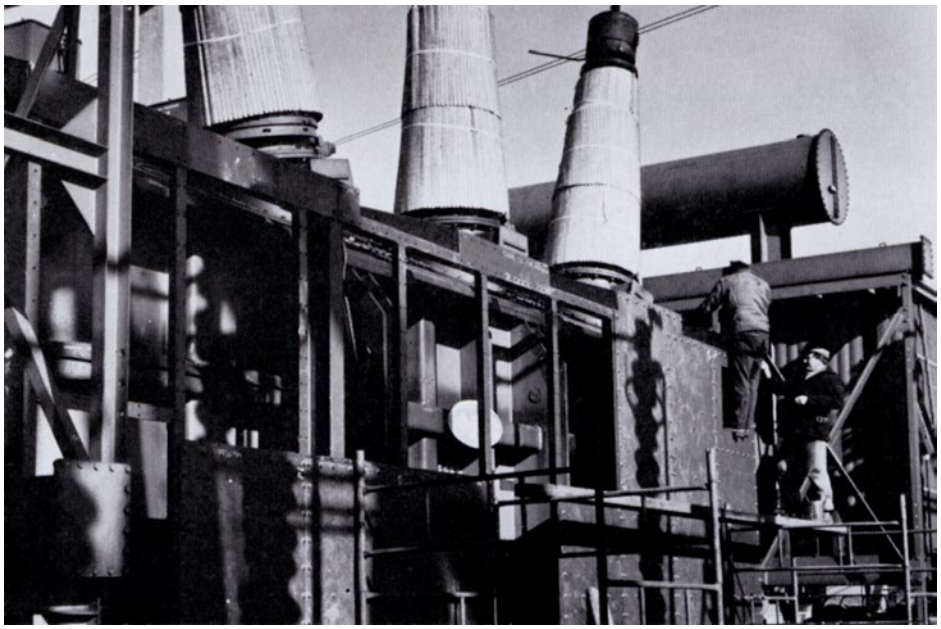
Openings in enclosures can permit noise leakage and reduce the hood efficiency and ventilation ducts and access doors are very carefully designed to avoid such leakages. In this instance the steel doors were damped in the same manner as the main cladding though a heaver, shaped construction was used. Sealing of the edges was achieved with rubber strip. All pipe connections were given adequate clearance through the hood and sealed with special convoluted rubber bellows.

The hood and its superstructure were treated against corrosion; the framework and plates were shot blasted and coated with micaceous oxide before the coats of conventional paints were applied. Other anti-corrosive treatments can be used however, for example metal-loaded epoxy resins.

Attention was paid to the reduction of ground-bourne vibration by fitting anti-vibration pads under the transformer. On this particular site this necessitated lifting the 200-ton transformer and inserting anti-vibration pads underneath before the erection of the enclosure took place. In order to avoid the lifting problem should it later become necessary to take sound-reducing measures, it is becoming common practice to fit such pads when a transformer is installed.

The quickly assembled steel noise enclosure is becoming a popular choice on many sites and work is in hand to apply this sort of acoustic hood to transformers of much larger rating and size. An alternative steel application likely to be used frequently is the close fitting 'curtain' enclosure which is built onto the transformer in the factory.





1. *Here the transformer has been provided with its noise-reducing enclosure.*

2. *Ground-bourne vibration is one source of noise and to reduce this transformers are mounted on pads consisting of rubber sandwiches (seen above) bonded to steel plates.*

3. *One of the four 180 MVA auto-transformers before enclosure by its steel hood to reduce the noise from its magnetic core.*

4. *Building the steel framework for the acoustic hood. Special precautions were taken to avoid damage to the insulators.*

5. *To prevent the escape of noise through openings where pipework passes through the hood, the pipes were isolated from the latter by large-diameter holes which were then sealed with special rubber bellows.*

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

BIM BIM Level 2 assessed
QM Quality management certification to ISO 9001
SCM Steel Construction Sustainability Charter
(● = Gold, ● = Silver, ● = Member)

Notes

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

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

Company name	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	BIM	SCM	Guide Contract Value (1)
A & J Stead Ltd	01653 693742			●	●					●	●			●	●		2			Up to £200,000
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
AIC Steel Ltd	01633 528400	●			●	●		●			●	●	●			✔	4			Up to £800,000*
AJ Engineering & Construction Services Ltd	01309 671919			●	●					●	●			●	●	✔	4			Up to £2,000,000
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			●	●	●	●			●	●			●	●	✔	4			Up to £800,000
ASME Engineering Ltd	020 8966 7150				●	●				●	●			●	●	✔	3		●	Up to £2,000,000
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	0121 557 8261												●			✔	4			Up to £2,000,000
BHC Ltd	01555 840006	●	●	●	●	●	●	●			●	●		●	●	✔	4			Above £6,000,000
Billington Structures Ltd	01226 340666		●	●	●	●	●	●	●	●	●	●		●	●	✔	4		●	Above £6,000,000
Border Steelwork Structures Ltd	01228 548744			●	●	●	●			●	●				●		4			Up to £3,000,000
Bourne Construction Engineering Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●			●	●	✔	4			Up to £4,000,000
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 £1,400,000
Coventry Construction Ltd	024 7646 4484			●	●	●	●		●	●	●			●	●	✔	4			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			●	●	●	●	●	●	●	●	●				✔	3		●	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 £1,400,000
Gregg & Patterson (Engineers) Ltd	028 9061 8131			●	●	●	●	●				●		●		✔	3			Up to £3,000,000
H Young Structures Ltd	01953 601881			●	●	●	●	●		●	●			●	●	✔	2		●	Up to £2,000,000
Had Fab Ltd	01875 611711				●				●	●	●				●	✔	4			Up to £3,000,000
Company name	**Tel**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**Q**	**R**	**S**	**QM**	**FPC**	**BIM**	**SCM**	**Guide Contract Value (1)**

Company name	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	BIM	SCM	Guide Contract Value (1)
Hambleton Steel Ltd	01748 810598		●	●	●	●	●	●				●		●		✔	4		○	Up to £6,000,000
Harry Marsh (Engineers) Ltd	0191 510 9797			●	●	●	●				●	●			●	✔	2			Up to £1,400,000
Hescott Engineering Company Ltd	01324 556610			●	●	●	●			●				●	●	✔	2			Up to £3,000,000
Intersteels Ltd	01322 337766				●	●	●	●					●			✔	3			Up to £2,000,000
J & A Plant Ltd	01942 713511				●	●									●		2			Up to £40,000
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
Kloeckner Metals UK Westok	0113 205 5270												●			✔	4			Up to £6,000,000
Leach Structural Steelwork Ltd	01995 640133			●	●	●	●	●			●					✔	2		○	Up to £6,000,000
Legge Steel (Fabrications) Ltd	01592 205320			●	●		●		●	●	●			●	●		3			Up to £800,000
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				●				●	●	●			●	●		3			Up to £1,400,000
Mackay Steelwork & Cladding Ltd	01862 843910			●	●		●			●	●			●	●	✔	4			Up to £1,400,000
Maldon Marine Ltd	01621 859000				●	●		●	●	●	●			●	●	✔	3			Up to £1,400,000
Mifflin Construction Ltd	01568 613311			●	●	●	●				●						2			Up to £3,000,000
Murphy International Ltd	00 353 45 431384	●			●		●				●				●	✔	4			Up to £1,400,000
Newbridge Engineering Ltd	01429 866722	●		●	●	●	●				●				●	✔	4			Up to £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
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 £1,400,000
Sean Brady Construction Engineering Ltd	00 353 49 436 4144			●	●	●	●			●	●			●	●		2			Up to £800,000
Severfield plc	01845 577896	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4		●	Above £6,000,000
SGC Steel Fabrication	01704 531286				●					●				●	●	✔	2			Up to £800,000
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 Co 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 £400,000
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*
Underhill Engineering & Building Services Ltd	01752 752483				●		●	●	●	●	●			●	●	✔	4			Up to £3,000,000
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**	**BIM**	**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
A Lamb Associates Ltd	01772 316278
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
Sandberg LLP	020 7565 7000
Structural & Weld Testing Services Ltd	01795 420264
SUM Ltd	0113 242 7390
Welding Quality Management Services Ltd	00 353 87 295 5335

Industry Members

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

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
AJN Steelstock Ltd	01638 555500								●		M	
Albion Sections Ltd	0121 553 1877	●									M	
Arcelor Mittal Distribution - Scunthorpe	01724 810810								●		D/I	
Autodesk Ltd	01252 456893		●									
AVEVA Solutions Ltd	01223 556655		●								N/A	
Ayrshire Metals Ltd	01327 300990	●									M	
BAPP Group Ltd	01226 383824									●	M	
Barrett Steel Services Limited	01274 682281								●		M	
Behringer Ltd	01296 668259					●					N/A	

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
British Steel	01724 404040				●						M	
BW Industries Ltd	01262 400088	●									M	
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	

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
BIM BIM Level 2 compliant
SCM Steel Construction Sustainability Charter
(● = Gold, ● = Silver, ● = Member)

Notes
(1) Contracts which are primarily steelwork but which may include associated works. The steelwork contract value for which a company is pre-qualified under the Scheme is intended to give guidance on the size of steelwork contract that can be undertaken; where a project lasts longer than a year, the value is the proportion of the steelwork contract to be undertaken within a 12 month period.
Where an asterisk (*) appears against any company's classification number, this indicates that the assets required for this classification level are those of the parent company.

BCSA steelwork contractor member	Tel	FG	PG	TW	BA	CM	MB	RF	AS	QM	FPC	BIM	NHSS 19A	NHSS 20	SCM	Guide Contract Value (1)
A&J Fabtech Ltd	01924 439614	●	●	●	●				●	✓	3					Up to £400,000
AIC Steel Ltd	01633 528400	●	●	●					●	✓	4		✓	✓		Up to £800,000*
Bourne Construction Engineering Ltd	01202 746666	●	●	●				●	●	✓	4	✓			●	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●	●	●	●	●	●	●	●	✓	4			✓		Up to £4,000,000
Cairnhill Structures Ltd	01236 449393	●	●	●	●			●	●	✓	4			✓	●	Up to £3,000,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £6,000,000*
Donyal Engineering Ltd	01207 270909	●						●	●	✓	3			✓	●	Up to £1,400,000
ECS Engineering Ltd	01773 860001	●	●	●	●		●		●	✓	3					Up to £3,000,000
Four-Tees Engineers Ltd	01489 885899	●	●	●	●		●	●	●	✓	3			✓	●	Up to £2,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445	●		●				●	●	✓	4			✓	●	Up to £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
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
Underhill Building & Engineering Services Ltd	01752 752483	●	●	●	●			●	●	✓	4					Up to £3,000,000
Non-BCSA member																
Allerton Steel Ltd	01609 774471	●	●	●	●				●	✓	4			✓		Up to £4,000,000
Centregreat Engineering Ltd	029 2046 5683	●	●	●	●		●	●	●	✓	4					Up to £800,000
Cimolai SpA	01223 836299	●	●	●	●	●	●	●	●	✓	4					Above £6,000,000
CTS Bridges Ltd	01484 606416	●	●	●	●	●	●		●	✓	4				●	Up to £800,000
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
HS Carlsteel Engineering Ltd	020 8312 1879	●	●					●	●	✓	3			✓		Up to £400,000
IHC Engineering (UK) Ltd	01773 861734	●							●	✓	3			✓		Up to £400,000
Interserve Construction Ltd	020 8311 5500							●	●	✓	N/A					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
Daver Steels Ltd	0114 261 1999	●									M	
Dent Steel Services (Yorkshire) Ltd	01274 607070								●		M	
Duggan Profiles & Steel Service Centre Ltd	00 353 56 7722485	●							●		M	
easi-edge Ltd	01777 870901							●			N/A	◐
Fabsec Ltd	01937 840641	●									N/A	
Ficep (UK) Ltd	01924 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	◐
Kloeckner Metals UK	0113 254 0711								●		D/I	

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
Lindapter International	01274 521444									●	M	
MSW UK Ltd	0115 946 2316	●									D/I	
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	◐
StruMIS Ltd	01332 545800		●								N/A	
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	
Tension Control Bolts Ltd	01948 667700						●			●	M	
Trimble Solutions (UK) Ltd	0113 887 9790		●								N/A	
voestalpine Metsec plc	0121 601 6000	●									M	◐
Wedge Group Galvanizing Ltd	01909 486384						●				N/A	
Yamazaki Mazak UK Ltd	01905 755755					●					N/A	

Gamechangers in their field

FICEP beam and plate processing machines and systems have been used for the production of structural steel for some of the most iconic buildings and sports stadiums throughout the world. Whenever increased productivity, reduced production costs and accuracy are the goals, FICEP's team of high performance CNC machines, for structural steel and fabrication companies, are in a totally different league. Seeing the machines in action will win you over - just ask for a demonstration.

Gemini - CNC Plate Machining System

It's one of the fastest and most technologically advanced machines for the profile cutting, drilling, bevelling, machining and scribing of parts from plate up to 3.6 metres wide and from 5mm up to 305mm thick - in just one set-up

Can produce complex machined flat parts far faster and more economically but with the same or greater accuracy than using much more expensive, separate cutting and labour-intensive machining centres.

Now with the options for double bevel heads, double drill spindles and up to 3 Oxy Fuel cutting torches

Endeavour - CNC Drilling, Milling & Scribing Line for Beams

Once a beam is clamped in position, drilling, milling and scribing can be undertaken simultaneously on all sides of the beam without any further intervention of the operator.

Each drilling spindle can move rapidly and independently with an auxiliary axis window of 250mm, allowing milling including notches, apertures, pocketing, slots, countersinks, scribing, drilling and tapping up to 250mm diameter.

Excalibur 12 - CNC Single Spindle Drill for Beams

A non-contact laser is incorporated into the vertical clamp to establish the physical location of the web surface. A wireless remote control system eliminates up to 30% of the operator's movements.

Equipped, as standard, with a six-position automatic tool changer to not only facilitate different holes size requirements but ideal for applications such as scribing, countersinking, milling for slotted holes and tapping.

FICEP UK THINK PRODUCTIVITY

STEEL for life SPONSOR

For further details - call **01924 223530** or e-mail **info@ficep.co.uk**

FICEP UK Ltd., 3 Gilcar Way, Valencia Park, Wakefield Europort, Normanton WF10 5QS, UK.
www.ficep.co.uk