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NSC

New vision at Tameside

June 2017 Vol 25 No 6

Beacon of Light for Sunderland

Hub to catalyse Lincoln's regeneration

Column-free spaces for West Lothian school

Steel forms Leeds' new quarter

New online Blue Book for structural hollow sections

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- Developed with the Steel Construction Institute, this edition supersedes all previous versions

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Together we make the difference

Cover Image
Beacon of Light, Sunderland
Main client: Foundation of Light
Architect: FaulknerBrowns Architects
Main contractor: Tolent Construction
Structural engineer: s h e d
Steelwork contractor: Harry Marsh [Engineers]
Steel tonnage: 880t

NSC

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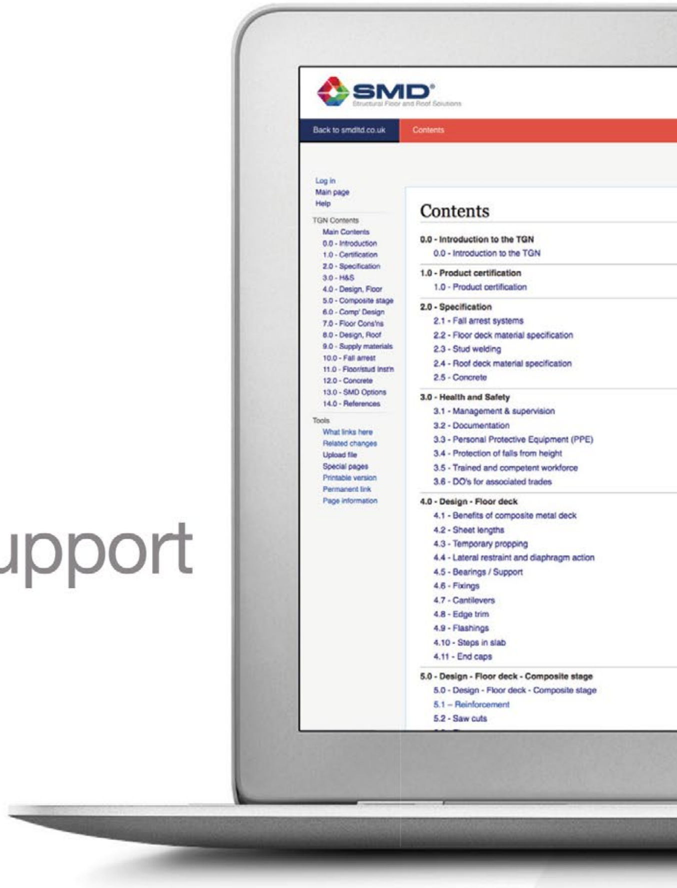

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Topping up the half full glass

Nick Barrett - Editor

The list of risks threatening to undermine economies and the investor confidence that underpins demand for the sorts of projects that you read about in NSC seems to grow almost by the day.

No doubt the fears are based on potentially relevant factors like Brexit and rising interest rate threats, but so far at least the worries seem to be overdone and economists are coming round to accepting that gloomier forecasts made six months ago underestimated what now looks like another year of growth. Private housebuilding and infrastructure look like being the main drivers of growth.

Individual market sectors will have their own stories to tell; London's residential construction boom seems to be over for the moment for example. So should we view the glass as half full or half empty?

At an NSC editorial meeting last month the Editorial Advisory Board went through the list of projects that is known to us that are either certain to or extremely likely to be steel projects, and it is as long a list as we have ever had. What is impressive about it is the diversity of type of projects and the fact that they are spread throughout the UK, both privately and publicly funded.

It includes schools, hospitals, further and higher education establishments, leisure facilities, sports stadia, commercial offices, mixed use regeneration projects, bridges, transport hubs, visitor centres at tourist attractions – you name it, and there seems to be a scheme to build it taking advantage of the obviously widely known benefits of steel construction.

These are just the projects that we know about and that are suitable for investing the time and effort in producing articles for NSC's readers, which means that they show steel design and construction to its best advantage - there are many others, just as worthy, as we learn from round table polls at NSC Editorial Advisory Board meetings where members generously keep us abreast of projects their organisations are involved in or they have heard about.

The latest crane survey from Deloittes, which we write about in News this month, confirms the sense of optimism that such a strong project pipeline engenders. The survey highlights a near record level of office space delivered in London last year, and the momentum continuing into this year. A slight slackening of pace in the City saw total activity slowing down but only because of the large volume of completions in the two preceding years rather than investors getting cold feet.

A rise in workload is expected this year and Deloittes point out that very few schemes have been cancelled, which suggests that developer confidence remains high. Away from the big City type office developments however the picture could be called a bit more mixed as not all sectors of the market will fare quite as well, as several commentators and surveys have shown.

But the overall picture does look like justifying more optimism than was evident last year in the immediate aftermath of the Brexit referendum. More challenging times might lie ahead in 2018 and 2019, on current forecasts, but just look at the long lists of planned projects and the absence so far of much investor fright and that half full glass looks like it has been topped up a bit since a year ago.

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Steel for Life is a wholly owned subsidiary of BCSA

Largest volume of office space delivered in London since 2004

London saw more than 360,000m² of new office space complete in the last six months, delivering the largest volume of office space in central London for 13 years.

Shaun Dawson, author of the London Office Crane Survey at Deloitte, said: "The sheer volume of completed space is no surprise given the surge in development activity 18 months ago.

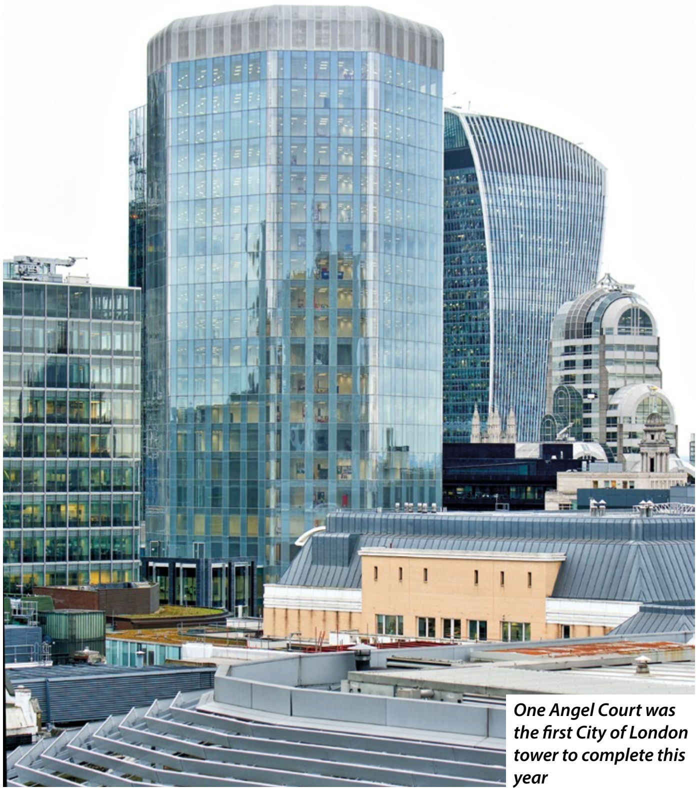
"In total, 480,000m² was completed in 2016 and this momentum has continued into 2017. We expect this year's annual total delivery to be the highest since 2004."

The City continues to dominate development activity with ten new schemes totalling 176,000m² taking the City's construction pipeline to 760,000m².

This represents a 7% decrease, but comes on the back of a number of large schemes having completed in the last six months.

Nigel Shilton, managing partner at Deloitte Real Estate, added: "The decrease in overall volume of space under construction could suggest that developers have slowed down, yet this is more a result of timing and two years of elevated levels of construction completing rather than developers holding off.

"Demolition levels remain high at 730,000m², which chimes with the sentiment of our surveyed contractors who expect a rise in workload over the coming 12 months. Looking at the development pipeline, we forecast around 3.6M square metres to be delivered by 2021. Very few schemes have been cancelled, highlighting continuing developer confidence."



One Angel Court was the first City of London tower to complete this year

Liverpool Lime Street development begins

The first sections of steelwork have started to be erected at the site of the new £39M mixed-use development at Liverpool's Lime Street regeneration area.

Main contractor ISG is working alongside Ion Development to transform this strategic site, opposite Lime Street Station, with a scheme that includes retail, leisure, student accommodation and a new Premier Inn hotel.

The steelwork contractor, Billington Structures, has started to install the first sections of over 1,300t of steel that will be used on-site to create the 33m tall student accommodation and 15m tall hotel buildings.

The new scheme involves 3,000m² of ground-floor retail space accommodating a range of shops and food and drink outlets, underneath a 101-bedroom hotel with restaurant, bar and meeting room facilities.

Fronting Bolton Street, there will be an 11-storey, 412-bedroom student block.

The project has involved the demolition of a number of Lime Street and Bolton Street buildings, including the former Futurist Cinema which was built in 1912 and has been vacant since the early 1980s.

Steel stockholder invests in new machinery

ParkerSteel has taken delivery of two heavy-duty Vernet Behringer plate processing machines and two high performance Esprit plasma profiling systems.

Dylan Alexander, Managing Director of ParkerSteel said: "We are very happy with our investment and are particularly impressed with the build quality and performance of the Vernet Behringer heavy duty FG 2000 machines, together with attention to detail given and the ability to accommodate our software interface and feedback requirements."

Behringer Managing Director Simon Smith added: "The FG series of heavy duty plate processing machines can perform various drilling (with carbide and HSS drills up to Ø 50 mm), milling, marking and deburring operations on base plates up to 2,000mm × 1,000mm × 60mm."

The closed portal machine frame is said to ensure an optimal rigidity, combined with a heavy duty feeding carriage system with grippers supporting the plate and an eight-position automatic tool changer.

The low tool cost V-scoring fast scribing system is a standard feature of FG machines, and is said to ensure a fast, accurate and precise identification and layout marking.

BCSA President stands down

Wendy Coney, Owner and Managing Director of Shipley Structures, will stand down as President of the British Constructional Steelwork Association (BCSA) at this month's AGM.

Beginning her presidency in 2014, Wendy says one of the biggest highlights of her tenure was the setting up of Steel for Life.

Steel for Life was launched in 2016 and is a wholly-owned subsidiary of the BCSA. Its key purpose is to communicate and disseminate the advantages that steel offers to construction.

"My hands-on involvement with the BCSA has been very rewarding, and I will always encourage members to be more involved with the Association, as it has so much invaluable information readily available," said Wendy.

In 2015, she represented the BCSA overseas at the American Institute of Steel Construction's annual steel conference held in New Orleans.

Seeing how the American steel sector goes about its business, while meeting representatives from other country's steel associations, was another highlight of the last three years.

"Training young people to ease the current skills shortage within the sector is very important and during my time as President the BCSA launched its own members' apprenticeship scheme," she said.

Known as the Competence Route to Attainment in a Fabrication Trade (CRAFT), the scheme is proving to be very successful.

"I'm sure this scheme will go from strength to strength in the future."

Wendy Coney was the BCSA's first female President and will be succeeded by Cleveland Bridge's Tim Outteridge.

Contractor starts long-span corrugated web beam production

Irish-based Kiernan Structural Steel (KSS) has installed a fully automated production facility for welded plate girders with sinusoidal corrugated webs.

Known as the SIN system, the production technology has been imported from Austria. The product, SIN beams, are said to combine large spans with a very low weight.

Having started production, KSS said it is now able to supply the beams to customers in the UK and Ireland.

Dimensions, material thickness and material quality of the upper and lower flange as well as the web are precisely adapted to the customer's respective requirements.

KSS Structural Engineer John Kiernan said: "SIN beams can be used for long-span portal frames, long-span roof structures – replacing trusses - open-sided multi-storey car parks, and pedestrian footbridges.

"The maximum length of a manufactured beam is 16m, but the beams can be spliced to make longer sections. An open span portal frame has been made in Austria spanning 56m."

The depth of sections varies from 350mm up to a maximum of 1,580mm, with a 400mm maximum width of flange. Sinusoidal corrugation of the web is standard no matter the depth or the width of the beam.

Steel delivers Oxford chemistry laboratories

Structural steelwork has been completed on main contractor ISG's contract to create new chemistry teaching labs for Oxford University.

Steelwork contractor Four Bay Structures erected 150t of steel for the project.

Although the braced steel frame is structurally independent, it is linked into the existing building on two levels.

Work on the project is scheduled to be completed in Spring 2018.

NEWS IN BRIEF

Said to include an array of enhancements, **StruMIS** has launched V10.2 of its steel fabrication software. The company said the new features have been driven by its continuous collaboration and communication with its steel sector customers.

Lindapter's Type HD clips have been chosen to secure low speed rails at Hitachi's Train Manufacturing and Assembly Plant in Newton Aycliffe, where the new InterCity Express (IEP) trains and AT200 commuter trains are being made.

Designs for the **UK's largest GP surgery** have been given the go-ahead by Nottingham city planners. CPMG Architects' design proposals will see a £9M state-of-the-art healthcare facility replace the 50-year-old Cripps Health Centre in Nottingham. The new centre, built on behalf of the University of Nottingham, will be used by more than 40,000 patients and provide space to support national research projects.

International real estate developer **HB Reavis** has announced the acquisition of Elizabeth House, a site on London's South Bank known as One Waterloo, where an 88,000m^2 development has been granted planning permission.

Westminster Council has approved plans to redevelop the historic Whiteleys shopping centre in west London. A joint venture between a Meyer Bergman-advised investment fund and Warrior Group aims to give the once grand Grade II-listed department store in Bayswater a new lease of life.

AROUND THE PRESS

Construction News
26 May 2017
ISG precision gives BBC a new home
"With this project, everything is about the detail," says ISG Project Director Kevin McElroy, pointing up at a colossal 2,000-tonne steel frame, which will ultimately be the floor of a rooftop garden about the BBC's new Cardiff HQ.

Building Magazine
19 May 2017
A stage for three stars
[The Storyhouse, Chester] – The theatre itself is a dynamic construction. In order to achieve full acoustic separation from the other activities that take place in the building, it is formed from a steel frame filled with acoustically resilient construction.

Building Magazine
12 May 2017
Are you ready to enter the fourth dimension?
The [steel-framed] 22 Bishopsgate will be the tallest building in the City of London when complete. But it has another point of interest that is a good deal less obvious: the project is pioneering a radical form of BIM that incorporates advanced virtual reality and 4D modelling applications.

Construction News
19 May 2017
From past to crescent: Vinci refurbishes a Georgian gem
[Buxton Crescent Hotel & Spa] – The team has been unable to crane-lift anything into the building, with steel beams broken down into sections so they can be safely lifted in by hand.

Construction Enquirer
5 May 2017
Parker keeps lid on construction price rises
Steel is delivered directly to the firm's fully automated processing facility in Shoreham where it can be processed and delivered to customers the next day.

Kaltenbach's new owners target more growth and innovation

Steel processing machinery manufacturer Kaltenbach announced its new ownership at the International Partners in Steel (IPS) 2017, which is held every two years at its factory in Lörrach in southern Germany.

The family-owned Zobel company, a firm with a mechanical engineering background, has acquired 90% of Kaltenbach.

The deal was fully financed by the new owners and Kaltenbach is now financing its business without banks.

Speaking at the IPS show, Zobel Director Prof. Dr. Noack said, the purchase was made after some in-depth and thorough market survey and analysis, which backed-up their decision to buy. Kaltenbach was found to be outperforming other businesses in the market in all of the relevant categories.

Kaltenbach's order book is currently 36% above the figure for this time last year and 16% above the company's annual target.

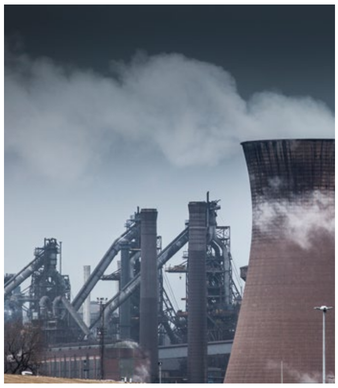
"Kaltenbach is celebrating its 130th anniversary, and we are now planning for the next 130 years. More innovations are expected in the future to maintain our market leading position."

Presenting the latest trends in steel processing, IPS 2017 was also attended by 44 partner companies, adding their products to the comprehensive range of services being exhibited.

A full range of Kaltenbach machines was on show including one of the first KDH 1060's. Designed for steelwork contractors and steel service centres, this machine is said to be the first to combine drilling, milling and sawing all running in parallel operations.

With less downtime and less waiting on other processes to complete, Kaltenbach says customers using this machine could benefit from increased productivity.

British Steel delivers first year profit



British Steel has reported a profit for the first year as an independent business since being sold for £1 by Tata Steel.

The company, which is primarily based at the Scunthorpe steelworks posted £47M in earnings before interest, tax, depreciation and amortisation in the 12 months ending 31 March.

British Steel Executive Chairman Roland Junck said: "In 12 months we have started transforming from an inward-looking production hub into a profitable, more agile business by controlling costs, improving our product range and quality, and through strategic investments."

The buoyant results at the company, which was acquired by the investment firm Greybull Capital exactly a year ago, will renew hopes of a sustainable long-term future for the UK steel making industry.

The company has also launched an employee share scheme that will give the workforce a 5% stake in the business. Full pay will be restored to workers who had agreed to a temporary 3% salary sacrifice to help the turnaround efforts.

Scunthorpe Multi-Union Chairman Paul McBean said: "The share scheme and reinstatement of employees' full salaries are both deserved and welcomed. I'm also pleased to see British Steel is continuing to make the significant capital investments this business needs but, people should be in no doubt, a lot of hard work lies ahead."

Steelwork contractor produces bespoke plant trailer

Severfield, together with trailer manufacturer Montracon, has designed and produced a specialist and bespoke trailer to safely transport steel erection plant equipment.

Severfield Group Plant Supervisor Gareth McCormick said: "We had a requirement for a new trailer system and wanted to create something that was unique to us.

"When designing, we considered our plant fleet and the requirements of adding tailored safety features."

With safety being of paramount importance, the company said it was essential to take into account the welfare of both the driver and anyone else who may be on the trailer during the loading and unloading process.

"This was a key consideration during the development stage, during which we were greatly assisted by the team from Montracon," added Mr McCormick.

Some of the new features that formed part of the design, include an air assisted ramp, a gate system fitted to the front of the trailer to allow safe access from the tractor unit, side posts and sockets to secure back loads if required, twin strap edge protection the full length of the trailer on both sides, a fitted rear camera, and hydraulic ramps with side shift to suit all plant.

Steelwork sector remembers former BCSA President

Benjamin Finley Hoppe OBE, former British Constructional Steelwork Association [BCSA] President died on 25th April, aged 83, at the Royal Gwent Hospital, after a short illness.

Mr Hoppe spent more than 50 years working in the steel construction sector, founding Rowecord Engineering and serving as the BCSA's President from 1996 to 1998.

Born in the Mumbles in 1933, Ben [as he was usually known] is remembered by all who knew him as a true gentleman, with great charisma matched with a degree of humility.

These attributes and his long illustrious steel career were recognised in 2004, when he received his OBE from Her Majesty the Queen at Buckingham Palace.

Ben's long association with the steelwork sector began in 1950, when aged 16 he made his first career choice and joined a local firm as an Apprentice Structural Draughtsman.

Following National Service, Ben was employed by Braithwaite Engineers of Swansea. His first role was at the Port Talbot Steelworks as their Site Agent.

In 1961, while working as a Site Agent for Rees & Kirby, Ben was heavily involved in the construction of Llanwern Steelworks near Newport.

Ben was persuaded to go it alone in 1970 setting up steelwork contractor Rowecord Engineering in a small workshop at Newport's Old Town Dock.

The company grew and undertook some of the most prestigious projects in steel construction, including Blast Furnaces, the London 2012 Olympic Aquatics Centre, the British Museum Extension and the graceful and iconic Peace Bridge in Londonderry.

As well as a busy and energetic businessman, Ben was also a keen sportsman, having represented Swansea schools at both rugby and cricket. He continued to play first team football until the age of 41 and cricket into his 50s.

Ben leaves behind his wife Val, sons Andrew and Ian, daughter Gill, and ten grandchildren.

Retirement village rises with steel

The steel frame for the £40M Wood Norton retirement village near Evesham in Worcestershire is nearing completion.

BAM Construction is building the project for BUPA-owned client Richmond Care Villages. The job's structural steelwork is being fabricated, supplied and erected by Adstone Construction.

The development will create 48 village apartments for independent living, 46 suites for assisted living, and a 60-bed care home providing nursing and dementia care. In addition, there will be a wellness spa, lounges, library, terrace café, restaurant and garden bar.

BAM Design developed the designs for the scheme. Its expertise in 3D co-ordinated design, working with the structural engineer and M&E subcontractor, is said to have been fundamental to the integration of over 1,000 services holes through the steel frame.

"This is a significant high quality private development in a specialist sector. We are very appreciative that the client has put its trust in us," commented BAM Construction in the Midlands Regional Director Rod Stiles.

"We are pleased to be working with BAM again on this prestigious new retirement village for Worcestershire. Richmond Wood Norton is an extremely complex development with a main Village Care Centre of 9,200m², but I am confident that BAM has the expertise to deliver a fantastic building for us to provide the very best in retirement living and care," said Richmond Care Villages Managing Director Paddy Brice.

Construction should be completed in September 2018.

Silverstone museum gets the chequered flag

Silverstone racetrack in Northamptonshire, the home of British Formula One, has received a lottery grant to help fund the construction of a £20M motor racing museum.

Contractors are now being sought for the project, which involves the conversion of a World War II hangar on the former aerodrome site. A large extension to the existing structure is also planned.

Chair of the Heritage Lottery Fund Sir Peter Luff said: "Silverstone is a place where so many legends of British motor racing have their roots. The speed and glamour though are only part of the success of motorsport since the late 1940s."

"When completed this project will help visitors, many of whom will know little about Silverstone's history, to understand much more about the site's heritage."

According to a spokesperson for Silverstone racetrack, the project will bring the extensive heritage of Silverstone and British motor racing to life for an estimated half a million visitors a year, through the creation of a dynamic, interactive and educational visitor experience.

The Silverstone Heritage Experience will include a permanent exhibition that will take visitors on an exciting two-hour journey through motor racing past, present and future.

The Project Architect, heading up the building services team, is Jane Lock-Smith of Cube Design who was awarded Architect of the Year at the Women in Construction Awards 2016.

Diary

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

Monday 19 June 2017
Fire Design of Beams and Columns
This webinar will cover design methods for fire protection, and how free design tools can simplify the process. Available to Corporate and Sole Trader Members only.
Repeated **Tuesday 20 June 2017**

Thursday 22 June 2017
Light Gauge Steel Design
A 1-day course to introduce the uses and applications of light gauge steel in construction.
Bristol

Monday 10 July 2017
Fabrication Economics
This 1 hour webinar will provide an overview of best practice in design in order to arrive at a cost-effective structural solution.
Repeated **Tuesday 11 July 2017**

Innovation key to progress

ArcelorMittal has been at the forefront of steel manufacturing technology developments since 1911 when Arbed, one of its constituents, rolled the world's first one metre deep universal beam.

Angelina™ beams in use for construction

The ambition to stay at the forefront of developments in steel manufacturing has been maintained through the years since 1902 when ArcelorMittal rolled its first universal beam, developing into today's multinational steel manufacturing force, standing just outside the top 100 of the world's biggest companies as ranked in the Fortune Global 500.

Recent developments include the launch of its Orange Book design tool, and the company is also promoting high grade S460 steel and its innovative HISTAR® range in the UK market. The company says being able to manufacture larger and heavier sections enables engineers to cater for the changing and demanding requirements of their clients.

"Innovation and research and development remain a fundamental part of ArcelorMittal's DNA," says the company's Neil Tilley. "Recently we have promoted the benefits of high grade steels that we have developed and made available to the UK market, where engineers are increasingly taking advantage of the benefits. Using high grade steels designers are able to reduce the weight of steel used in a structure or reduce column sizes in buildings to produce more usable space."

Super Jumbo Sections are now used extensively in the UK market with column sizes up to 356 × 406 × 1299 and beams up to 1138 mm depth. The combination of strength and size offer gives designers more choice, whether designing tall slender skyscrapers or long-span roofs and bridges. Another benefit is the low carbon equivalent value (CEV) of HISTAR® steels, exhibiting toughness at low temperatures and increased weldability, allowing easier processing through fabrication workshops.

Mr Tilley said: "Designing in high strength steel chimes with today's sustainability imperatives to do more with less weight. Cost savings of as much as 20% are being achieved by using high strength steels."

ArcelorMittal's HISTAR® range allows designers to utilise the full yield throughout the thickness range for HISTAR®355 and for HISTAR®460, dropping marginally to 450N/mm² only at thicknesses over 100mm. Cost-effective production of HISTAR® is made possible by the innovative "in line" Quenching and Self-Tempering (QST) process, developed by ArcelorMittal Europe - Long Products in cooperation with the Centre de Recherches Métallurgiques in Liège. HISTAR® steels are delivered in accordance with the European Technical Approval ETA-10/156.

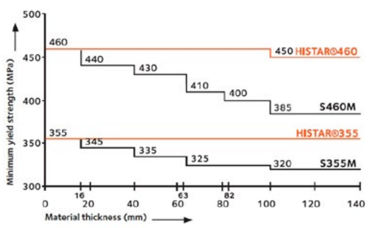


Figure 1: Comparison of yield strength between HISTAR and other structural steel grades

Figure 1 (above) shows a comparison, based on yield strength, between HISTAR® and other standard structural steel grades. HISTAR® grades are compatible with the requirements of the Eurocodes for the design of steel structures and composite steel-concrete structures.

Weathering Steel Rolled Sections

ArcelorMittal also reports growing interest in weathering steel for exposed steel structures and bridges, where safety considerations for access and maintenance of protective systems is a consideration.

The company produces rolled sections in its Arcorox® weathering steel grade to EN 10025-5 in grades S355 J0W, J2W and K2W. Initial oxidation of Arcorox® forms a natural, tightly adherent, protective oxide layer (patina) which greatly reduces further oxidation and negates the need for a further protective system.

Angelina™ Beams

ArcelorMittal lays claim to an innovative and novel approach to service integration and long span composite beams that has resulted in the development of the Angelina™ beam. Based on a sinusoidal web cut, Angelina™ beams produce no waste from the cell formation and can accommodate single web openings for both circular and rectangular services. By varying the input to the sinusoidal equation, cells can be sized and positioned for greatest economy and efficiency, see Figure 2 below. Pre-design software for Angelina™ beams can be downloaded from *http://sections.arcelormittal.com/download-center/design-software/castellated-beam-solutions.html*

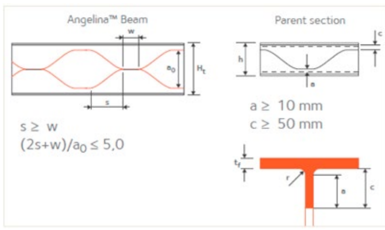


Figure 2. Geometric limits of the Angelina™ beam openings.

Neil Tilley concludes: "The advantages of our wide range of sections and high grade steels are becoming more popular with engineers. Recent work and collaboration with the Steel Construction Institute (SCI)

ArcelorMittal supports designers with an extensive range of free pre-design software and design guidance, all available from *http://sections.arcelormittal.com*

Orange Book aids design

ArcelorMittal recently published its Orange Book in collaboration with the SCI. It can be accessed at *http://orangebook.arcelormittal.com/*

The Orange Book is an essential aid for the design of steelwork. Comprehensive tables of member resistances are given for S355/HISTAR®355 and S460/HISTAR®460 steel to enable rapid selection of steel members in compression, bending and tension. Tables are also provided for combined bending and compression, web resistance and shear resistance.

Section property data for rolled beams, columns, bearing piles, channels and angles are provided in the Orange Book, including effective section properties.

The design data are derived in accordance with the following Parts of Eurocode 3 and the UK National Annexes (NA):

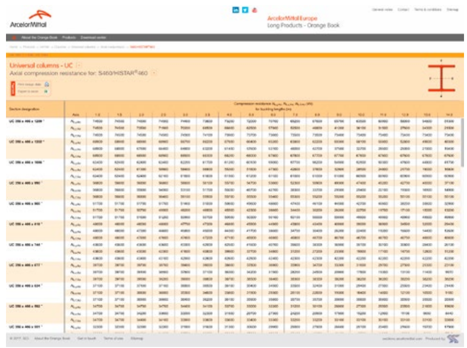
- BS EN 1993-1-1:2005: Design of steel structures. Part 1-1: General rules and rules for buildings.
- BS EN 1993-1-5:2006: Design of steel structures. Part 1-5: Plated structural elements.
- BS EN 1993-1-8:2005: Design of steel structures. Part 1-8: Design of joints.

The resistances given in the Orange Book have been calculated using the partial factors given in the UK National Annexes for the Eurocodes (NA to BS EN 1993-1-1:2005 as published in December 2008, NA to BS EN 1993-1-5:2006 as published in May 2008 and NA to BS EN 1993-1-8:2005 as published in November 2008).

ArcelorMittal's Orange Book covers the full range of section in BS EN 10365 which superseded BS 4-1 in January 2017.

David Brown, Associate Director at the SCI, said: "Over the past few years the default steel grade has migrated from S275 to S355. The availability of S460 now offers further advantages of increased capacity, leading to lighter weight and smaller section sizes.

"This is particularly true for compression members, where the buckling curve for higher strength steels leads to further economy. The Orange Book design tool enables engineers to quickly assess the advantage of building with higher strength steel sections."



A typical page from the online Orange Book

to produce the Orange Book now means that engineers have quick access to seeing how moving to high grade steel benefits their design, and how the Eurocodes allow design advantage to be gained."

Rolled section bridge solutions

ArcelorMittal reports an increasing demand for steel for use in bridge construction, valued for its unique combination of performance and safety. The company offers several bridge solutions utilising rolled sections in composite construction.

Neil Tilley said: "For spans of up to around 45m it is possible to use rolled sections as primary bearing elements in a series of bridge systems. Using our high grade steels in S460 and HISTAR®, along with a wide range of deep beams, longer spans for rolled section bridges can now be achieved than would have been previously been the case in the UK and Ireland."

To enable engineers and designers to consider the benefits of rolled sections in composite bridges ArcelorMittal has developed a pre-design software called ACOBRI (ArcelorMittal Composite Bridges) in association with CTICM. This valuable pre-design tool enables competitive solutions to be produced for single and multi-span bridges in accordance with Eurocode (EN) regulations for road, railway and footbridges in a very quick and interactive way. It can be downloaded free from *http://sections.arcelormittal.com.*

ACOBRI supports design of a variety of alternative bridge solutions such as conventional composite multi-girder decks and ladder decks, and filler-beam decks, as well as the innovative Pre-CoBeam solutions.

"The output of the software involves a large amount of data," says Mr Tilley. "Therefore, to enable clear interpretation and optimisation, a post-processing model is embedded in the software to enable clear visualisation, see Figure 3 (below). Other output data includes display of the influence lines, deflections or internal forces according to the loading type, all design checking criteria, stresses due to fatigue and the resulting fatigue category."

The main image (above) shows a filler-beam bridge deck capable of spanning 40m for single span and 50m for multiple spans in road bridges and 30m for single span and 35m for multiple spans in rail bridges. Advantages of filler-beam bridge decks include shallow depth for restricted headroom and monolithic construction that allows launching, in-situ deck casting or lifting of connected beams and lost formwork to reduce traffic disruption.

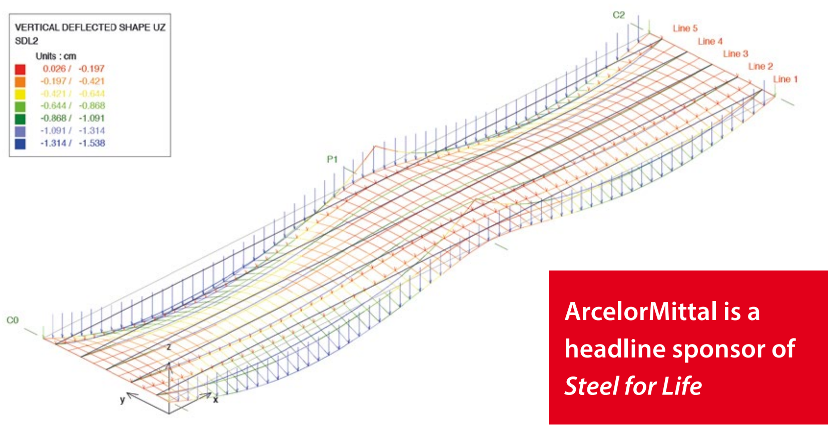


Figure 3: Visualisation of the model in the post-processor including loads, moments and deflected shape

ArcelorMittal is a headline sponsor of *Steel for Life*

STEEL for life

An introduction to steel manufacturing equipment

Steel manufacturing equipment fulfills a vital role for steel contractors and steel stockholders alike.

Manufacturing equipment plays a key role in the structural steel fabrication process and has developed considerably over the past few decades.

In addition to steelwork contractors this equipment can now be found more frequently within steel stockholders' premises as it provides them the opportunity to offer additional services such as cutting, drilling and scribing.

In this introductory article, we will look in more detail at manufacturing equipment and its role within the structural steel fabrication process.

What are some of the key functions carried out by manufacturing equipment?

Structural steel manufacturing equipment carries out a number of essential tasks required during the fabrication process including; blast cleaning, auto-painting, cutting and drilling.

Blast cleaning and auto-painting

For many steelwork contractors, sections and plates are blast cleaned prior to fabrication, although some choose to carry out the blast cleaning after the sections are cut to length. This surface preparation is an important part of the fabrication process, which is essential to provide a suitably clean finish for welding and subsequently also to produce a keyed surface ready to accept coatings. Shot or grit is fired at the steel surface which displaces dirt and mill scale, and also indents the steel creating a "rough" surface.

Manufacturing equipment with auto-painting functions can ensure prefabrication primers are applied immediately after blast cleaning. This immediate application maintains the reactive blast cleaned surface in a rust-free condition through the fabrication process until final painting can be undertaken.

Cutting and drilling

In the fabrication factory or steel service centre one of the first operations is to cut the sections to length and profile the plates to the desired size or shape. This can be done in a number of ways using a range of automated machinery; circular saws which are generally used for cutting to length, gas and flame cutting which can be used to cut components from steel plate; components can also be cut efficiently by plasma arc systems.

To support the efficiency of the steelwork fabrication process the use of drilling and punching equipment allows sections to be rapidly bolted together on site.

Multi-function machinery

Equipment manufacturers are increasingly offering multi-function machines which combine a number of the processes outlined above.

"FICEP invest heavily in developing automated and multi-function machinery for the steel sectors. Tasks such as scribing, milling and coping can be produced simultaneously, this benefit's steelwork contractors by reducing labour and providing higher productivity using less equipment or manual processing," says FICEP UK Managing Director Mark Jones.

Advancements in integration with 3D and simulation software

Equipment manufacturers have invested heavily in the development of 3D simulation software. One of the most notable developments which has impacted the efficiency and output of the sector is the introduction of CNC (Computer Numerical Control) solutions. Equipment manufacturers offer solutions which seamlessly utilise 3D modelling information from the production office and make it simple to transfer data in the form of assembly information directly to the equipment.

Moving a step back from the fabrication of structural steel, equipment manufacturers increasingly work closely with steelwork contractors using simulation software to look at the fabrication factory layout taking into account the differing needs of individual steelwork contractors.

"The structural steel industry is constantly evolving. At Peddinghaus, we invest within the research and development sector to produce cutting-edge technology and pioneer fabrication trends. Our goal is to provide partners with innovative solutions for long-term success." says Peddinghaus Corporation Marketing Manager Lindy Casey.

The advancement and use of real time simulation software means layouts can be verified, tonnage capacities can be understood, bottlenecks identified through analysis of material flow and activities identified which could be automated. The aim of this analysis is to create a fabrication factory that optimises the factory layout to ensure maximum throughput and resource efficiency.

The Future

The next innovation in this sector is likely to be the full automation of all processes on the factory floor, utilising robots or cobots (collaborative robots) where humans and robots work together with direct interaction in a defined workspace to reduce material handling and welding.

STEEL for life

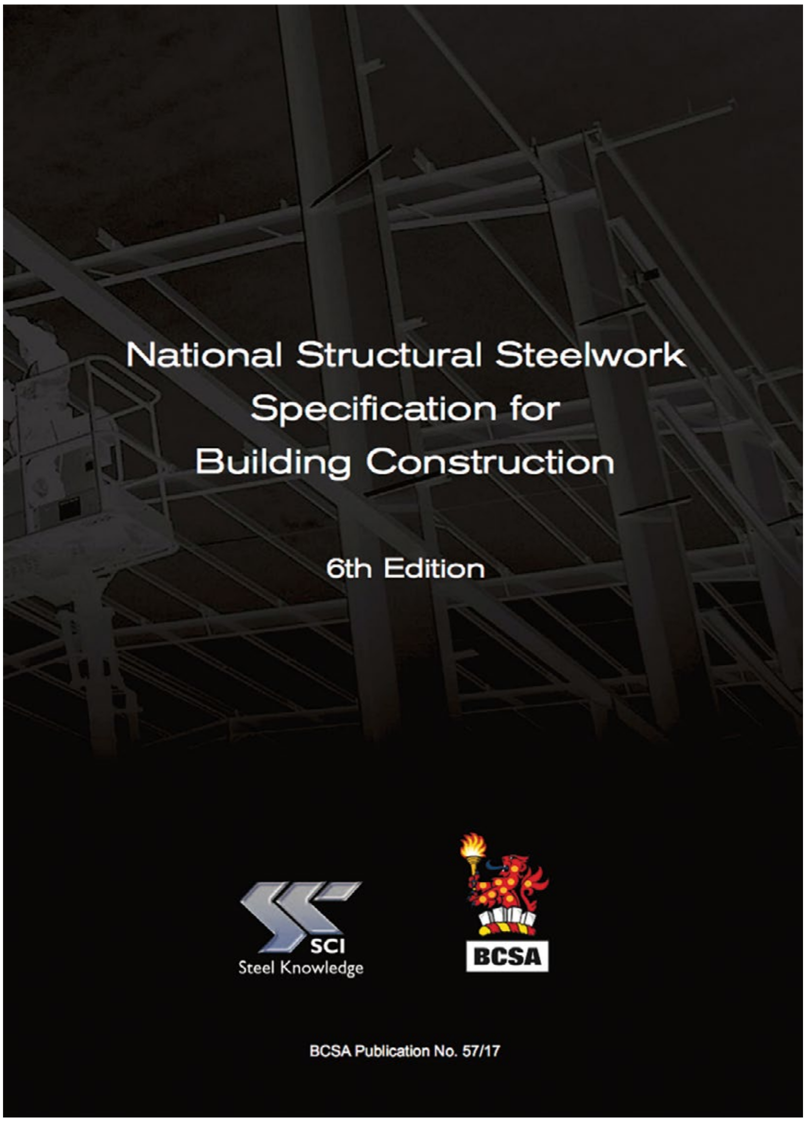
Sponsors Manufacturing Equipment

Gold: Ficep UK Ltd, Peddinghaus Corporation

Bronze: Kaltenbach Limited, Voortman Steel Machinery

BCSA publishes latest NSSS edition

The 6th edition of the NSSS is an invaluable tool for specifiers and designers of steel structures



The British Constructional Steelwork Association [BCSA] has published the 6th Edition of the National Structural Steelwork Specification [NSSS] for Building Construction (BCSA Publication No. 57/17).

The 6th edition can be used for all types of building construction designed for static loading and is based on Execution Class 2 structural steelwork designed in accordance with BS 5950-1 or BS EN 1993-1-1 (including BS EN 1993-1-8 and BS EN 1993-1-10) and executed in accordance with BS EN 1090-1 and BS EN 1090-2.

BCSA Director of Engineering Dr David Moore said: "The NSSS clarifies and aids the process of translating designers' requirements into specific work instructions for execution. Specifiers are encouraged to use this latest NSSS as the default specification for all steel building structures."

The main changes between the 5th edition (CE Marking version) and the latest 6th edition are:

- Various clauses throughout the NSSS have been modified to make it clear that under the Construction (Design and Management) Regulations 2015 all parties have a duty to cooperate with others involved in the construction of the works.
- Information is increasingly exchanged in electronic format and on government projects Building Information Modelling (BIM) is mandatory. Additional definitions for terms used in BIM have been added and Sections 1 and 3 of the NSSS have been updated to include the BIM information required and provided by the steelwork contractor.
- UK suppliers and distributors of structural fasteners shall comply with National Highways Sector Scheme 3 (NHSS3) or an equivalent quality management system
- BS EN 1993-1-10 'Design of steel structures. Part 1.10 Material toughness and through-thickness properties', allows fracture mechanics to be used to determine toughness requirements. This approach has been included in Section 2.2.5 as an alternative to selecting the steel qualities according to Table 2.2.
- The tables for specifying ordinary and preloaded bolt assemblies have been updated and include additional tables for ordinary tie-bar assemblies and matching ordinary tie- bar assemblies.
- Clause 4.1.1 on the traceability of steel products and in particular the meaning of 'Partial' traceability has been clarified
- A new Clause 4.11 has been added which describes the method for adding together permitted deviations.
- Clause 5.3.2 has been modified to allow the Responsible Welding Coordinator to act as the examiner/examining body for the approval of welding procedures provided suitable competence can be demonstrated.
- Clause 5.6 on the welding of shear studs has been revised and includes requirements for initial type testing and routine testing.
- A new Clause 11.5 on modifications has been added to make it clear that any proposals to improve or modify the work shall be considered and confirmed by the engineer prior to the modifications being carried out.
- References to British Standards (issued with BS, BS EN, BS EN ISO or BS ISO references) have been updated throughout the specification.

Copies of the National Structural Steelwork Specification for Building Construction 6th Edition (BCSA Publication No. 57/17) can be obtained from BCSA's web site (*www.steelconstruction.org/shop*) at a cost of £20 + VAT for Non-members and £15 + VAT for BCSA members. This book is only available in PDF format.

Hub provides city centre boost

Steel construction is being extensively utilised for Lincoln city centre's multi-million pound transport hub.

FACT FILE
Lincoln Transport Hub multi-storey car park
Main client: City of Lincoln Council
Architect: John Roberts Architects
Main contractor: Willmott Dixon
Structural engineer: Morgan Tucker Consulting Engineers
Steelwork contractor: Caunton Engineering
Steel tonnage: 1,000t

The £30M Lincoln Transport Hub will on completion create a new gateway to the city and significantly regenerate the area adjacent to the main railway station.

The scheme will provide a state-of-the-art bus station, 1,000 space multi-storey car park, retail space and a new pedestrian plaza.

Led by City of Lincoln Council, the scheme has received £11M funding from the Department for Transport (DfT), along with a further £2M from the Greater Lincolnshire Local Enterprise Partnership (GLLEP).

Along with its other partners, Lincolnshire Co-op, Network Rail, Lincolnshire County Council and East Midlands Trains – the City Council aims to deliver the scheme by January 2018.

Explaining the importance of the scheme's central position, Willmott Dixon Operations Manager David Reid says: "The location of this project means it will act as a catalyst for further Lincoln city centre regeneration developments."

The largest single structural element of the scheme is the six-level multi-storey car park. The structure is a large square with each elevation measuring approximately 100m-long.

Founded on a series of 18m-deep piles, it has been designed as a steel-framed structure, based on a 16.1m × 7.5m grid pattern, with the steelwork supporting precast flooring units.

"The car park was originally going to be a precast concrete structure but we changed to a steel-framed solution because steel offered cost and speed of construction benefits," says Mr Reid.

"Another reason was that the supply chain for precast suppliers is limited, while our choice of steelwork contractor was quite extensive."

John Roberts Architects Project Architect Paul Ponwaye adds: "We, along with Willmott Dixon, recognised at an early design stage the benefits of using a structural steel frame for the multi-storey car park, offering maximum clear spans to avoid unnecessary columns which would potentially affect the capacity of the car park.

"The long spans allow all columns to be marginalised and the column sections are significantly smaller on plan than would be possible using a reinforced concrete frame."

Taking these comments into account, there are however three precast lift and stair cores, positioned in three of the building's corners. They are independent of the steel frame and offer no stability. Instead, all of the steel frame's stability is derived from vertical braced panels and moment frames.

The decision to install precast cores was all about programme. According to Willmott Dixon, it has allowed the team to

The car park represents the largest element of the transport hub

Bus Station

Under a separate steelwork contract the steel-framed bus station is also currently being constructed.

This elongated facility consists of a couple of two-storey buildings at either end, housing a ticket office, a café and staff areas, connected by a 110m-long single storey shelter, which provides access to the 16 bus bays.

The two end buildings are both traditional beam and column structures, but the shelter is a fully glazed area with exposed columns supporting glulam rafters.

The position of the bus station building within the site was changed a few times during the design phase. One of the main considerations was a wide culvert - housing the Sincil drain – which cuts across part of the site.

"The culvert is encased in concrete and passes beneath the part of the site where the bus station building is positioned," says Morgan Tucker Project Engineer Steve Hall.

"So as not to overload the culvert the structure is positioned in such a way that the shelter, which is the lightest part of the bus station, is sat on bridging beams over the culvert."

install the cores simultaneously with the steelwork. As well as doing the erection and fabrication programmes for the project, Caunton Engineering has been contracted on a design and build basis for the entire steelwork package.

"The cores are not stable on their own so we've designed a steel roof feature that sits on top of the precast panels and restrains them," explains Caunton Engineering Project Designer Matthew Shimwell.

"We designed a bespoke detail whereby four beams fit over the uppermost panels like a sleeve. Above this, further steelwork creates the frame of the feature steel roofs that incorporate windows that wrap around the top of the cores, allowing natural light into the public areas."

Without these bespoke steel details the cores would have needed internal buttresses. These would have been impractical as they would have hindered the installation of stairs and lifts.

Using a single 50t-capacity mobile crane, Caunton erected the car park in a sequential manner, starting at the northern end of the building. Erecting each bay to the full height of the structure, the company gradually worked to the southern end, while also installing the precast slabs along with the steelwork.

Floor beams vary in size, with the largest members being 762 UB sections. The car park's 356 UC perimeter columns were all brought to site in full length 22m-long sections, while internal members were spliced at second floor level for efficiency.

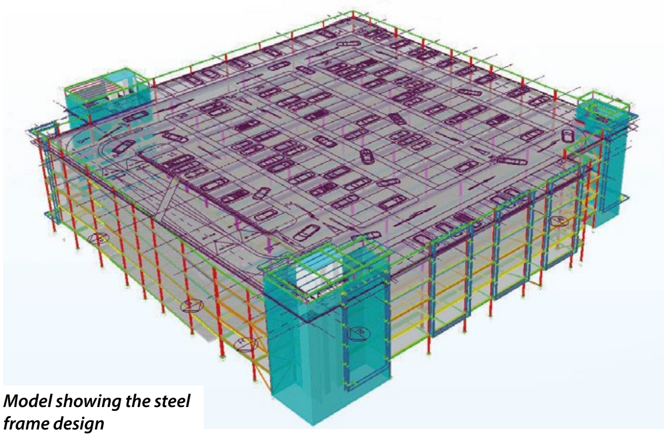
The car park does not have exterior ramps, everything is contained within its 100m × 100m footprint. Each floor has internal ramps, involving two 90 degree turns and positioned in the northwest corner of the structure.

Steelwork erection for the car park is expected to finish this month (June). The car park will then receive a full structural screed and a proprietary deck finish. The plan is to have the car park open to the public by the end of the year.

Although the entire Lincoln Transport Hub is due to complete next year, this facility will be one of the city's largest car parks and so the client is hoping to have it open before Christmas.

> *"The car park was originally going to be a precast concrete structure but we changed to a steel-framed solution because steel offered cost and speed of construction benefits."*

Car park and bus station (bottom of picture) simultaneously under construction



Model showing the steel frame design

School goes for steel option

Set to replace an existing school in a nearby village, the West Calder High School has opted for a steel framing solution for cost and efficiency. Martin Cooper reports.

FACT FILE
West Calder High School, West Lothian
Main Client: Hub South East Scotland on behalf of West Lothian Council
Architect: Archial NORR
Main contractor: Morrison Construction
Structural engineer: Arup
Steelwork Contractor: Hescott Engineering
Steel tonnage: 800t

Work is progressing on a new 1,100 capacity secondary school in the West Lothian village of West Calder. The project will replace a nearby existing school and includes a host of amenities such as a swimming pool and other indoor and outdoor sports facilities.

The school is West Lothian Council's largest ever single investment in education. It is being developed through Hub South East Scotland, with Morrison Construction appointed to build the new school.

Due to open in 2018, the project architects say the school has been designed with the pupil experience at the core, as well as providing facilities accessible to the local community.

The swimming pool, fitness suite, games hall and outdoor sports pitches will be open to the public at certain times, as will the amphitheatre, which is a feature that forms an integral part of the school's overall design.

The multi-use amphitheatre is positioned in the centre of the school with the classrooms located around the perimeter, while more flexible learning space is located in nearby main circulation areas.

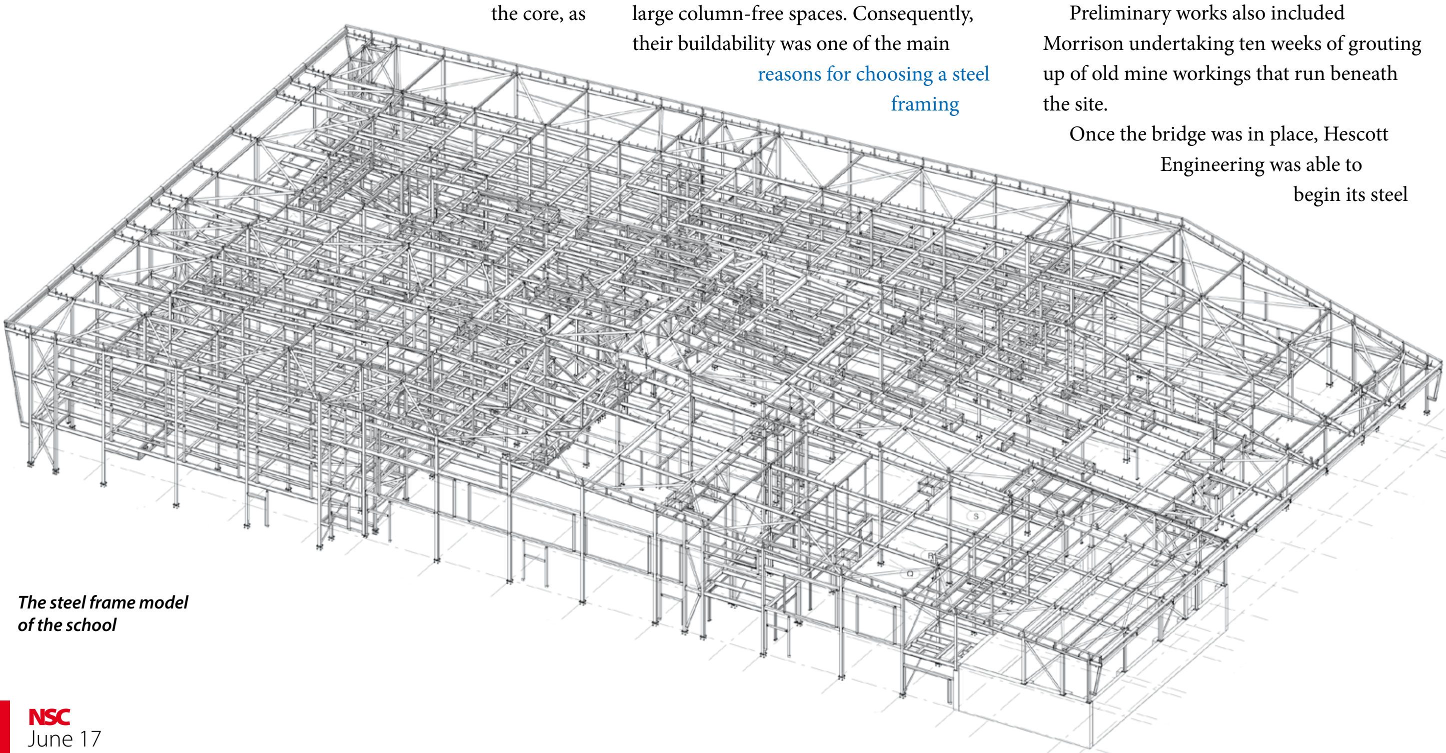
As well as the amphitheatre, most of the school's facilities, such as the pool, games hall and dining area, are all located within large column-free spaces. Consequently, their buildability was one of the main reasons for choosing a steel framing solution for the project.

"Early in the design process we looked at all framing options, weighing up their pros and cons. Ultimately to build the required long spans efficiently and quickly we went with a steel-framed solution," says Arup Lead Project Engineer Ian Miller.

However, before any of the structure could be built, access to the project's site had to be improved. During the early stages of the job's 91-week programme, a narrow local road, passing a number of private properties was used. Construction of a new £5.5M bridge over the A71 and a link road has now provided the site with a haul route for materials.

Preliminary works also included Morrison undertaking ten weeks of grouting up of old mine workings that run beneath the site.

Once the bridge was in place, Hescott Engineering was able to begin its steel



The steel frame model of the school

The three-storey teaching block

erection in February. A cut and fill operation, to form a level base for the school building on this sloping site, was also under way at this time.

Approximately 25,000m³ of overburden has been excavated from the site, with almost 13,000m³ of this spoil re-used. Sitting on concrete pad foundations, the steelwork erection programme has followed on behind the groundworks and earthmoving teams, with all of these trades working in a southerly direction from the lowest end of the site.

In order to integrate the school to the sloping topography, two retaining walls have been constructed across the building's footprint, approximately dividing the building into thirds. The walls form two steps, 3m and 5m-high respectively. Consequently, the 100m-long × 60m-wide building descends from three-storeys down to one storey at the southern end.

Most of the classrooms, as well as the school's main entrance, are located within the three-storey northern end of the building. Because of their different uses, many of the classrooms are of varying sizes. This has resulted in an irregular structural grid and the need for numerous transfer beams to support the irregularly spaced columns.

Overall the school building has a composite design with steelwork supporting metal decking with a concrete topping. Bracing, located in the roof and in stairwells, provides the frame with its stability.

Dominating the central area of the school, the amphitheatre and its adjacent feature staircase are the most complex part of the project's steelwork.

As well offering access to all of the school's floors, the staircase is 20m-wide and incorporates terraced seating. A series of facetted rakers forms the curved shape of the terrace as it wraps around a portion of the performance space.

Supporting the staircase is a series of girders each weighing in excess of 4t.

As well as erecting the steelwork and installing the metal decking, Hescott Engineering also lifted in the precast terracing units. According to Hescott's Business Development Manager John Dowds, a total of 37 crane lifts were needed to install the precast units.

Three 20m-long × 3.5m-deep trusses form the amphitheatre's open-plan column-free space. One of these trusses is positioned at the north end of the space, where the building steps up from two storeys to three. The other two trusses tie into the first truss and span southwards creating the open void.

Looking at the school from the outside the most striking feature will be the roof. Intended to be a nod to the surrounding countryside, the roof slopes down from the three-storey element towards the single storey area, incorporating three different pitches.

A West Lothian Council spokesperson said: "The modern, high-quality school will be a fantastic resource for local young people, providing an ideal learning environment for them to achieve their full potential. This investment will help ensure that West Lothian continues to have one of the best school estates in Scotland."

Terraced seating for the amphitheatre

A number of varying floor levels have resulted in a complex steel design

Photo: David Allan

The Beacon of Light, pictured in foreground, with the aquatics centre and Sunderland FC's stadium behind

Trusses provide sports legacy

An array of different sized trusses are needed to create the column-free spaces for Sunderland's Beacon of Light sports and education facility. Martin Cooper reports.

An education and sporting facility with a difference is under construction in Sunderland. Known as the Beacon of Light and located adjacent to the city's famous Stadium of Light football ground, the centre is said to be the first of its kind in the UK and will include engaging and interactive zones for education, health and fitness, as well as sport.

The Beacon is also the final project of the wider regeneration of the former Monkwearmouth colliery site. Other projects on the site, as well as Sunderland FC's stadium have included a hotel and an aquatics centre boasting a 50m competition pool.

Built over five-storeys and occupying 4.75 hectares, the Beacon is a large cube-shaped structure which will be illuminated at night. The upper areas will be clad with transparent polycarbonate cladding, light from within the structure will seep out creating a highly visible beacon [hence the name] on the city's landscape.

"Steel has been chosen for the Beacon of Light to enhance the concept of a simple lightweight enclosure over a brick base. This is of particular importance within the polycarbonate enclosed football barn where the primary and secondary structural elements remain visible."

Here, connections have been designed carefully to minimise visual impact and painted hot-rolled box elements have been used to create an unimposing support frame. The use of steel in the roof provides a strong but lightweight solution, maximising light penetration through the fabric covering creating a glowing beacon effect at night," says Paul Reed, Architect, FaulknerBrowns.

At ground floor level the building will accommodate a large multi-use sports and performance hall, adjacent to which sits a four-level teaching and learning block. Above this, and topping the entire structure, is an indoor 4G football pitch.

"Structural steelwork was the obvious choice and it is the only material that could form the building, particularly the trusses, cost-effectively and efficiently," says s h e d Director Marc Horn.

There are a lot of trusses in this structure! Working from top to bottom, the uppermost and longest trusses, at 60.5m-long, are the nine that form the Beacon's roof, creating the open column-free space for the third-storey football pitch.

They are fabricated from structural hollow sections, 150mm × 150mm × 10mm top boom and 200mm × 200mm × 8mm bottom boom. The top boom was pre-cambered for steelwork contractor Harry Marsh [Engineers] by specialist bending company Angle Ring.

The trusses are 4.1m-high and weigh 13t each. They needed to be brought to site in three pieces and were erected individually using Harry Marsh's on-site mobile tower crane (pictured above).

"It's a two-way spanning roof, as connecting the main trusses is a set of secondary trusses formed from secondary members," says Mr Horn. "This design proved to be more efficient and lighter."

Because of this design, each truss, during erection, was supported at third points by two temporary trestles. These had to stay in position until the entire series of nine roof trusses and their connecting steel members were in place, thereby making the entire structure stable.

The main structure of the Beacon is formed with UC section columns up to the underside of the top floor. Above this point, a series of SHS vertical trusses, up to 4.8m high and measuring up to 21m in length, form the football pitch area's elevations and support the roof trusses.

Moving down the structure, another two series of trusses were required to create the column-free space for the multi-use sports and performance hall, as well as the areas that overlook it.

Spanning a distance of 34.7m and each

Who are the Foundation of Light?

Established in 2001 by former Sunderland FC Chairman Sir Bob Murray, the Foundation of Light [FOL] seeks to use the power of football to change the lives of young people, via sports, health, community and educational schemes.

While the FOL is linked to its neighbour Sunderland FC, it is structurally and financially independent. It is responsible for fundraising £4M every year to run its life-changing programmes.

The Patron of the Foundation of Light is Her Royal Highness The Countess of Wessex. The list of Trustees, which includes Sir Tim Rice, also reads like a who's who of local north east personalities with athlete Steve Cram, news reporter Kate Adie, cricketer Paul Collingwood and TV presenter and architect George Clarke.

Trusses span the sports hall and support the football pitch above

weighing 13.7t, nine 4m-high trusses form the hall's roof and support approximately half of the floor for the football pitch above.

They were brought to site in three sections, and then bolted up to form two larger pieces, consisting of one third and another two thirds element. Using two mobile cranes, they were then lifted into place, with the final connection between the two pieces being completed while they were being supported by the cranes.

These trusses are supported at one end by the building's perimeter columns, and internally by another series of three spine trusses.

The storey-high spine trusses are positioned in a row, at second floor level, across the building's width, effectively forming the demarcation between the sports hall and the teaching zone.

As well as supporting the sports hall trusses, these multi-purpose spine trusses also support three levels of structure and allow the first floor below to have just two columns within the viewing gallery overlooking the sports hall.

The gallery will be used by spectators during sports contests and concerts. More spectators can be accommodated on moveable bleachers (stands), which can be stored when not in use in a recess beneath the first floor.

The three-level accommodation block is formed around a semi-regular 6.75m grid pattern, which also corresponds with the set-out pattern for the project's trusses.

"A number of discussions were held about the grid as it has to accommodate classrooms, offices and work spaces," sums up Mr Horn. "The chosen column spacings proved to be the most efficient for all of the intended uses."

The roof trusses spanning the football pitch

FACT FILE
Beacon of Light, Sunderland
Main client: Foundation of Light
Architect: FaulknerBrowns Architects
Main contractor: Tolent Construction
Structural engineer: s h e d
Steelwork contractor: Harry Marsh [Engineers]
Steel tonnage: 880t

Temporary trestles support the roof trusses during installation

Development expands with steel

3 Wellington Place is the latest steel-framed building to be constructed for a new prestigious business quarter in Leeds.

A mix of cellular beam solutions have been used. Pictured, 1 is a plate girder, 2 is a UB section, while all others are Westok beams

FACT FILE
3 Wellington Place, Leeds
Main client: MEPC
Architect: Sheppard Robson
Main contractor: Wates Construction
Structural engineer: Curtins Consulting
Steelwork contractor: Billington Structures
Steel tonnage: 700t

Leeds city centre is currently one of the busiest in terms of construction activity. A number of developments are under way as Yorkshire's largest city transforms many its former industrial and brownfield sites into new commercial, residential and retail schemes.

One of the largest developments is Wellington Place, located on the site once occupied by Leeds Central Station, and only a stone's throw from the current main railway station.

Central Station closed in 1967 and all that remains of the site's transportation heritage is a wagon hoist tower, once used to lift goods, and the viaduct that spans the River Aire and the Leeds and Liverpool canal.

Both of these historic landmarks have been incorporated into the scheme, with the tower sat in the middle of the centrally-positioned public realm.

Overall, Wellington Place will eventually boast a total of 140,000m^2 of commercial, retail, leisure and residential space and developer MEPC says it will be one of the biggest and most prestigious new city centre business quarters in Europe.

So far, three commercial blocks have been completed, including 6 Wellington Place [*see NSC April 2015*].

All of the completed buildings have similar designs and footprints, as well as being steel-framed structures.

A fourth steel-framed building is now under construction, known as 3 Wellington Place. It will offer 10,200m^2 of prime office space and is due to complete at the end of the year.

The building will house five upper floors of office space, offering state-of-the-art facilities and a restaurant and retail outlets at ground floor level. The energy efficient project, which also features a basement car park, is set to achieve an 'Excellent' BREEAM rating.

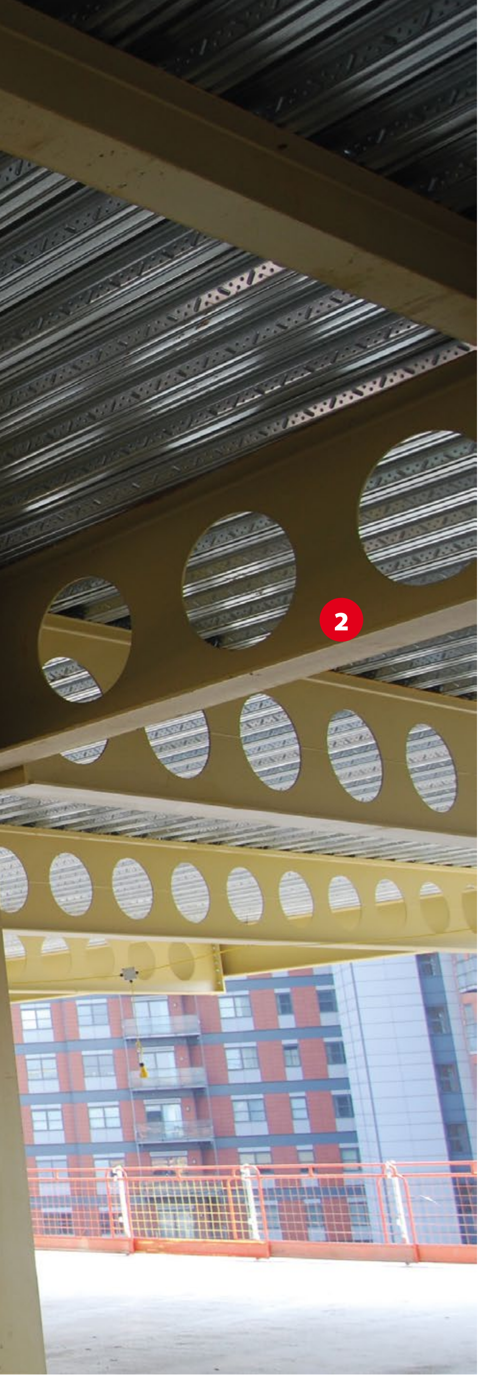
"Steelwork provided the required open and flexible office spaces," says Sheppard Robson Project Architect Matt Millington. "We wouldn't have achieved so few internal columns with any other framing solution."

The structure is wedge-shaped in profile, and the roof slopes down from the widest part to conceal a plant deck, while the rooftop of the narrowest area of the wedge accommodates an outdoor terrace for the topmost offices.

Working on behalf of main contractor Wates Construction, steelwork contractor Billington Structures has erected 700t of steel for the project.

As well as fabricating, supplying and erecting the steelwork, Billington has also been contracted on a design and build basis for the structural frame.

"The steel frame structures at Wellington Place have become increasingly more efficient as we incorporate learnings from each building we work on. Early engagement with Billington Structures and other key supply chain partners has been crucial in enabling us to continue to push for improvement in design and operations," says Wates Construction Project Manager Dan Miller.



All of the development's commercial buildings are wedge-shaped on plan

The topmost floor accommodates an outdoor terrace

Due to the building's wedge shape, the steel frame has been designed around an irregular grid pattern. Internal spans vary from 11.5m up to 14m, and this has created the column-free flexible office space needed for a modern commercial building.

All of the columns connect to a centrally positioned concrete core that provides all of the structural stability, negating the need for any bracing.

Westok cellular beams, together with a mixture of fabricated plate girders and universal beams with holes, have been used throughout the building for service integration.

To complete service integration in some areas of the building, irregularly spaced holes were needed in the beams. As Westoks are manufactured with hole spacings set at regular intervals, they were not used in these areas.

Billington's solution was to use fabricated plate girders with holes cut at bespoke intervals for the longer 14m spans, and universal beams with a bespoke pattern of holes for the shorter 11.5m spans.

Prior to Billington Structures starting its steel erection programme, Wates had completed the project's preliminary works. These included digging out the basement car park, constructing the concrete retaining walls and installing CFA piled foundations.

The steelwork then begins at ground floor slab level with each level from first floor upwards identical in size and layout. The exception is the ground floor where a slightly higher floor-to-ceiling height of 5.5m is needed to house the retail outlets.

Another prominent feature is the centrally-positioned double-height entrance foyer that will allow natural light to penetrate the building's inner zones.

> "Steelwork provided the required open and flexible office spaces. We wouldn't have achieved so few internal columns with any other framing solution."

Spanning the entrance and supporting the cladding is the project's largest single steel element, a 5t 10m-long transfer beam.

All of the project's steelwork has been erected using the on-site tower crane working in conjunction with two MEWPs, each with a 40m-high maximum reach.

Billington Structures completed the steel programme in May and, as well as erecting 700t of steelwork, the company also installed 3,000m of its easi-edge safety barriers and 14,000m² of metal decking.

Summing up MEPC Chief Executive James Dipple says: "It's great to see the regeneration of this large master planned site coming together. Fuelled by strong demand from local, national and international companies, Wellington Place is coming out of the ground at an impressive pace. The winning combination of great buildings coupled with high-quality public realm provides innovative, global businesses with the opportunity to attract and retain the best staff."

Council offices, a college and a store will all be housed within Phase Two

Steel stars in town centre regeneration

Cost and flexibility played significant roles in the choice of framing material for the latest phase of Ashton-under-Lyne's central redevelopment programme.

Big changes are afoot in Ashton-under-Lyne as the local authority seeks to radically improve the town centre. A central element of these plans is known as Vision Tameside and Phase Two, which consists of a new Joint Public Service Centre and Advanced Skills Centre, is currently under way.

Phase One consisted of a new building for Tameside College, which opened in 2015 and is located across the road from this second phase.

As well as housing new council headquarters and other public sector organisations, Phase Two will also include a college wing, a public library, a Wilko store and an elevated landscaped public realm.

Both phases will benefit from a new nearby public transport interchange which will shortly get under way. This development will help and encourage more people to travel to and from the town to access jobs, learning and leisure – three things that Vision Tameside will provide.

Being built on the site of the former Tameside Administrative Centre [TAC], which was demolished last year, the Phase Two building has been designed as one large steel-framed development, albeit one that the Council will share with other tenants.

Explaining the reasons why the Council chose to build a new centre, Councillor Jim Fitzpatrick (Executive Member with responsibility for Investment and Development) says: "The deteriorating condition of the old TAC complex, which was built 35 years ago, meant it was increasingly expensive to operate. It would have cost around £4M to bring it up to standard, and it had become far too big for the number of staff now employed.

"It was simply not fit-for-purpose in the context of modern working practices and council service delivery. The new centre, which the Council will share with Tameside College, will be much cheaper to maintain as it is a modern building."

It consists of two five-storey wings that splay outwards in a V-shape on plan. The central space is infilled by a single storey Wilko store, the roof of which will form the landscaped public realm.

The realm will be accessible from the first floor of each wing and via a main staircase located to the front of the building. The architectural vision for the realm is to open up the site and form an extension of the nearby Market Place.

One of the building's wings will be solely

occupied by the Council and other public sector organisations, while the other will accommodate Tameside College's vocational campus. The ground and first floor levels will both house public facilities. For the College this means hair salons, a bakery, a bistro and a café, while in the Council wing it will include a job centre and customer service centre. One end of the Council wing will also include a new public library which incorporates a retained façade of the former Victorian Water Board building.

Both of the wings are approximately 100m-long and are of similar structural arrangement. They are based on a column space planning grid of 7.2m × 7.3m to best suit the architectural window module size and the width of the building wings respectively. This regular column spacing is also replicated in the centrally positioned Wilko store.

"The wings have been designed as one large development, albeit with a bespoke classroom fit-out for the College side," explains Ryder Architecture Director Mark Clasper. "Although steel was chosen primarily for its cost and speed of programme, flexibility was also a prime consideration. In the future, the College wing could easily be reconfigured into a modern office due to the column layout."

The lateral stability of the building, as a whole, is provided by the use of a braced steel frame. The building is braced in each orthogonal direction, utilising the composite floor slabs at each floor level of the building

▶24

FACT FILE
Vision Tameside Phase Two, Ashton-under-Lyne
Main client: Tameside Metropolitan Borough Council
Architect: Ryder Architecture
Main contractor: Carillion
Structural engineer: TPS
Steelwork contractor: Elland Steel Structures
Steel tonnage: 1,350t

V-shaped on plan, Phase Two will benefit from the redevelopment of the nearby transport interchange

▶23 as horizontal diaphragm elements to transfer the laterally applied wind and stability forces to discrete vertical braced bays.

These braced bays then transfer the applied lateral forces to the building's piled foundations through an arrangement of continuous steel diagonal bracing members located within the main column and floor beam frames.

What is already in the ground from the demolished TAC building also played a role in the choice of a steel-framed solution for Phase Two.

The demolition specification for the original Council office building required the pile elements of the building's foundations to be left in the ground. This requirement meant that the construction of the foundations to the new building needed to be set out around these existing piles, while also providing the necessary support to the new building superstructure and its proposed column positions.

Consequently, a composite steel frame building was adopted to minimise the weight of the superstructure and to enable the new foundations to be offset around the existing piles in an economical solution.

"A composite steel frame building offers a lighter frame solution than a comparable reinforced concrete frame, offering economies in the foundation design, while the use of composite floor slabs within the steel frame avoids the use of traditional formwork associated with RC frames, offering a faster form of construction," says TPS Associate Director Andrew Forshaw.

New piles were installed to a depth of 20m and, to keep the construction programme on schedule, the installation of pile caps and then the steel erection were started before the piling had been completed.

This meant, that at one point, all of these trades were on-site at the same time, following each other in a sequential manner.

Steelwork was erected by Elland Steel Structures in six phases, working around the project clockwise and then finishing with the central element.

The composite floors above the store area are subject to higher loads than the individual building wings to suit the build-up of finishes forming the podium deck to the elevated public realm area and its associated occupancy loads.

To accommodate this design feature slightly larger steel sections were used for the store.

Vision Tameside Phase Two is scheduled for completion in early 2018.

Elland Steel's erection programme nears completion

Vierendeel Truss Design

David Brown of the SCI considers the design of Vierendeel trusses

A recent theme in NSC has been the design of trusses – which also feature in the Vision Tameside project. At the ends of the 100 m wings, each façade is extended as a cantilever from the main structure. Wind loading on the façade extensions causes out-of-plane (horizontal) bending of the cantilevers, so the vertical orientation of the trusses is a little deceptive. Vertically, the trusses carry the façade loading.

In the vertical direction, the trusses are Vierendeel trusses. Named after the inventor – Arthur Vierendeel – these trusses have no diagonal members. The classification as a truss is rather deceptive, as they are really continuous frames with moment resisting connections between the vertical members and the chords. The bending moments in the truss members are at a maximum near the supports, so in a simply supported Vierendeel truss it would not be unusual to have larger members towards the supports, possibly diminishing in size towards the centre of the span. With a cantilever Vierendeel truss, the bending moments tend to be larger at the central support.

Compared to Pratt or Warren trusses, a Vierendeel truss will probably have more expensive connections (as they are moment resisting), but has the advantage of no diagonal members – so storey-height Vierendeel trusses are sometimes used as transfer trusses within buildings, as access through the truss is maintained.

Vierendeel trusses can be analysed "by hand" – a pin is assumed at the mid-point of the members and an approximate analysis completed. The method is described and an example presented in older editions of the Steel Designers Manual (SDM). Most designers will simply use software to readily determine forces, moments and deflections, which is the method encouraged by more recent editions of the SDM.

With all trusses, the design of the joints is key, with the objective to remove the need for local reinforcement, which would be expensive. This is particularly so with Vierendeel trusses, where the bending moments must be transferred across the joints. Joint resistances can be checked using the guidance in BS EN 1993-1-8, with free software available from Tata Steel. It is highly likely that an iterative process of checking joint resistances, revising member sizes and re-analysis will be needed to reach an optimum solution, both structurally and economically. This best practice iterative approach was followed for the Vierendeel trusses in the Vision Tameside project – although like so much elegant engineering, the trusses will be concealed by the cladding in the completed structure.

The design of hybrid fabricated girders

David Brown of the SCI discusses the design of hybrid fabricated girders. In the first part of the article, some background is presented, and a worked example taken as far as the moment resistance. Shear resistance will be covered in Part 2.

Why hybrid?

Hybrid girders are plate girders with flanges of higher strength than the web. Conceptually, one might say that the web merely keeps the flanges apart, so why not use a lower steel strength for the web? The web must carry the shear force, but this is generally low in a beam designed for bending or deflection, so high strength webs are not required. The low demand for shear resistance coupled with the desire to keep the flanges far apart means that webs in fabricated plate girders are often deep and thin – making a stiffened web likely and triggering a visit to BS EN 1993-1-5 to determine properties for Class 4 sections.

Shear Lag

Shear lag may affect both compression and tension flanges. Ordinarily, it is assumed that the stress distribution across a flange is uniform, as shown in Figure 1. In fact, the longitudinal stresses are transmitted through the web-to-flange junction. It may readily be imagined that the flange local to the web is compressed more than the flange tips, as indicated in Figure 2. The tips of the flanges "lag" in that they do not take the assumed evenly distributed share of stress. The phenomena is managed in BS EN 1993-1-5 by calculating a reduced effective width of the flange.

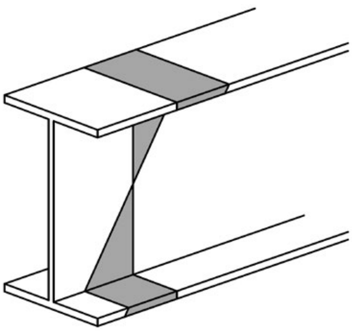


Figure 1: Commonly assumed stress profile

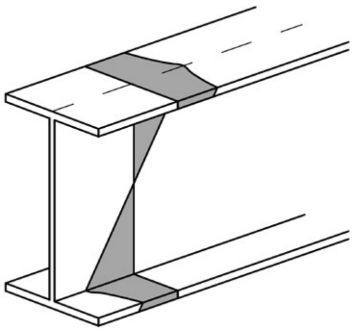


Figure 2: Shear lag in flanges

Plate buckling - flanges

All elements in compression share an enthusiasm to buckle – so the tips of relatively thin, wide flanges wish to buckle locally and do not carry load as assumed. Plate buckling only applies to the compression flange and is managed in BS EN 1993-1-5 by reducing the effective area of the flange.

Plate buckling – web

The compression zone of a thin web will suffer from local buckling. This is managed by a "hole in the web" approach where the ineffective portion of the web is neglected. The Standard specifies the stable lengths of web attached to the flange and attached to the tension zone of the web.

Stress distribution

Combining a lower strength web with higher strength flanges and assuming an ineffective portion of the compression zone of the web, the resulting stress distribution may look something like that shown in Figure 3. It is not possible to determine a modulus directly, so the position of the neutral axis is found by equating the tension to the compression. The hole in the web adds complication to the process, because the stable parts are a proportion of the compression zone – and therefore change as the neutral axis moves. Others designers may have a clever way to determine when equilibrium of force is reached – the SCI approach is to move the neutral axis a (small) step at a time, check the resulting forces, and repeat as necessary until the solution is found. This is a task for a spreadsheet, or VBA.

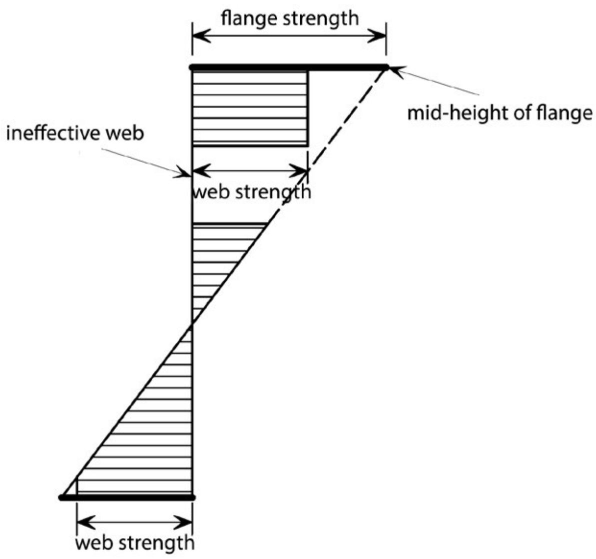


Figure 3: Typical stress profile for a hybrid girder

Once the stress distribution has been determined, the moment resistance of the cross section $M_{cy,Rd}$ may be calculated, being the product of stress, area and lever arm.

Worked example

The cross section to be verified is shown in Figure 4 overleaf. The flanges are S460 and the web S355. The beam span is 8 m.

Material strengths (BS EN 1993-1-1) and classification

Because the flange is greater than 16 mm, f_y = 440 N/mm²

$$\varepsilon = \sqrt{\frac{235}{440}} = 0.73$$

$$\text{Flange outstand} = \frac{400\text{-}12}{2} = 194 \text{ mm}$$

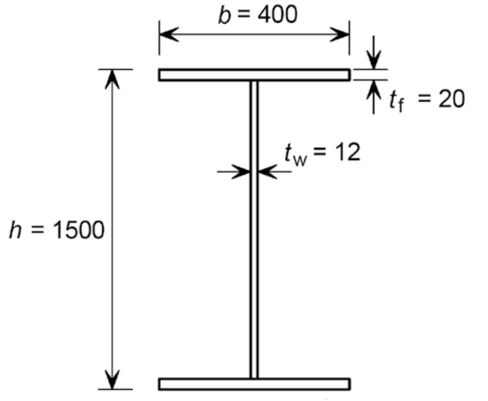


Figure 4: Cross section dimensions

$c/t = 194/20 = 9.7$
Class 2 limit is $10\varepsilon = 7.3$
Class 3 limit is $14\varepsilon = 10.2$, so the flange is Class 3
for the web, $\varepsilon = 0.81$
$c/t = 1460/12 = 121.7$
Class 3 limit is $124\varepsilon = 100.9$, so the web, and therefore the section, is Class 4.

Shear Lag (clause 3.1(1) of BS EN 1993-1-5)

$b_0 = 400/2 = 200$. Note in Figure 3.2 of the Standard, b_0 is half the flange width.
$L_e/b_0 = 8000/200 = 40$. As this is not greater than 50, shear lag cannot be neglected.
From Table 3.1, because there are no longitudinal stiffeners, $A_{sl} = 0$ and therefore $\alpha_0 = 1.0$
$\kappa = \alpha_0 b_0/L_e = 1 \times 200/8000 = 0.025$
because $0.02 < \kappa \le 0.7$, and there is a sagging bending moment diagram:

$$\beta = \beta_1 = \frac{1}{1+6.4\kappa^2} = \frac{1}{1+6.4\times 0.025^2} = 0.993$$

Stress distribution due to shear lag (clause 3.2.2 of BS EN 1993-1-5)

Because $\beta > 0.2$, the stress distribution is shown in Figure 5.
The ratio of stresses is needed later, so the calculation is best expressed as:

$$\frac{\sigma_2}{\sigma_1} = 1.25(\beta - 0.2) = 1.25(0.996 - 0.2) = 0.995$$

The value of 0.995 indicates that there is hardly any influence from shear lag in this example.

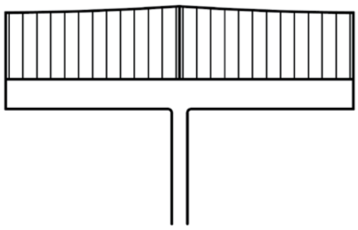


Figure 5: Stress distribution across flange outstand

Flange plate buckling (Clause 4.4 of BS EN 1993-1-5)

From Table 4.2, for outstand elements, $\psi = \frac{\sigma_2}{\sigma_1} = 0.995$

therefore $k_\sigma = \frac{0.578}{\psi + 0.34} = \frac{0.578}{(0.995+0.34)} = 0.433$

then $\bar{\lambda}_p$ is given by clause 4.4(2) as:

$$\bar{\lambda}_p = \frac{\bar{b}/t}{28.4\varepsilon\sqrt{k_\sigma}} = \frac{194/20}{28.4\times 0.73\times\sqrt{0.433}} = 0.711$$

note that $\bar{b} = c$ for outstand flanges. $c = (400 - 12)/2 = 194$ mm
because $\bar{\lambda}_p < 0.748$, $\rho = 1.0$
effective^p area $A_{c.eff} = 1.0$ Ac $= 400 \times 20 = 8000$ mm^2
The superscript ^{p} indicates this is the effective area when considering plate buckling.

Combined effects of shear lag and buckling (clause 3.3(1), Note 3, of BS EN 1993-1-5)

The effective area of the compression flange considering both shear lag and plate buckling is given by:
$A_{eff} = A_{c,eff}\beta^{\kappa} = 8000 \times 0.996^{0.025} = 7999$ mm^2
There is therefore no reduction due to the effects of shear lag and plate buckling.

Web buckling

Because (in this case) there is no reduction of the compression flange due to the combined effects of shear lag and plate buckling, and no reduction of the tension flange due to shear lag, the gross cross section is symmetrical. The neutral axis of the gross section is at mid-height of the web.
The length of the compression part of the web b_c is $1460/2 = 730$ mm
Because the gross cross section is symmetrical, $\psi = -1$, and from Table 4.1 of BS EN 1993-1-5, $k_\sigma = 23.9$
According to clause 4.3(6), the yield strength of the flange must be used when determining the effective area of the web. Because

$f_{yf} = 440$ N/mm^2, $\varepsilon = 0.73$. Then

$$\bar{\lambda}_p = \frac{\bar{b}/t}{28.4\varepsilon\sqrt{\kappa_\sigma}} = \frac{1462/12}{28.4 \times 0.73 \times \sqrt{23.9}} = 1.20$$

$$0.5+\sqrt{0.085-0.05\psi} = 0.5+\sqrt{0.085\text{-}0.55\times(-1)} = 0.874$$

$$\bar{\lambda}_p = 0.874,\ \text{so}\ \rho = \frac{\bar{\lambda}_p - 0.055(3+\psi)}{\bar{\lambda}_p^{\,2}} = \frac{1.2-0.055\ (3+(-1))}{1.2^2} = 0.757$$

The effective depth of the compression part of the web is therefore $\rho \times b_c = 0.757 \times 730 = 553$ mm
From Table 4.1, the stable length adjacent the compression flange is $0.4b_{eff} = 0.4 \times 533 = 221$ mm
The ineffective length (the 'hole') = 730 – 533 = 177 mm
According to clause 4.3(5) the stress in the flange is considered at the mid-plane of the flange.

Stress Block

By postulating a position of the neutral axis, the stresses at locations throughout the cross section can be computed. The stress in the web is limited to f_{yw}, which in this case is 355 N/mm^2. Knowing the stresses and cross sectional dimensions, the tension force and compression force can be calculated, compared, and the position of the neutral axis adjusted until equilibrium is achieved. This is a job best left to electrons within a spreadsheet…
In this case, the solution is shown in Figure 6. Summing the product of the stress and area, the following forces are obtained:

Compression flange	440 × 400 × 20	= 3520000 N
web "plateau"	139 × 355 × 12	= 592140 N
web above "hole"	0.5 × (308+355) × 82 × 12	= 326196 N
web below "hole"	0.5 × 207 × 363 × 12	= 450846 N
	Summation	= 4890 kN
Tension flange	405 × 400 × 20	= 3240000 N
web "plateau"	355 × 77 × 12	= 328020 N
web	0.5 × 622 × 355 × 12	= 1324860 N
	Summation	= 4890 kN

Equilibrium of force has been achieved.

Moment resistance

Once equilibrium has been found, the moment resistance is simply the summation of the force in each element, multiplied by the lever arm.
3520000 × 771 = 2.71 × 10^9 Nmm
592140 × 692 = 409 × 10^6 Nmm
326196 × 581 = 189.5 × 10^6 Nmm
450846 × 2/3 × 363 = 109 × 10^6 Nmm
3240000 × 709 = 2.30 × 10^9 Nmm
328020 × 661 = 217 × 10^6 Nmm
1324860 × 2/3 × 622 = 549 × 10^6 Nmm
Moment resistance = 6485 kNm

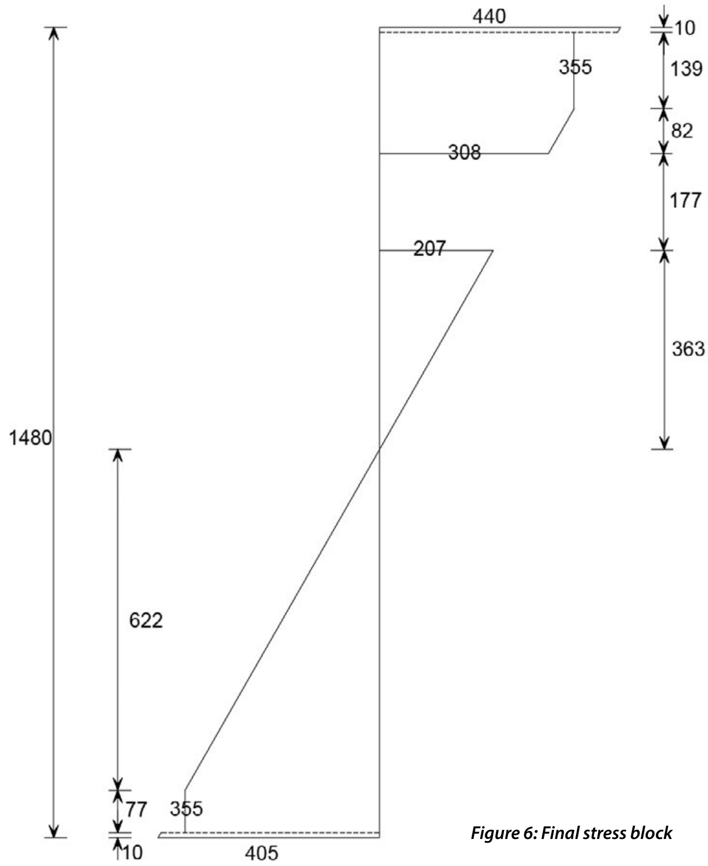


Figure 6: Final stress block

Conclusions to Part 1

Despite how it may appear at first glance, this process is not overly onerous and is suited to a spreadsheet application – perhaps with some VBA to determine the neutral axis. Different solutions can then be readily examined and resistance calculated. In Part 2, the lateral torsional buckling resistance and the shear resistance will be calculated.

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AD 408:
Effective length of cantilevers

SCI has recently been contacted regarding the effective length of cantilevers and the effective length factors applied for destabilizing loads which are tabulated in Figure 3.2 of SCI publication P360[1]. The effective length factors were queried when compared with the factors tabulated in Table 14 of BS 5950-1[2]

This AD note demonstrates that the information given in P360 and BS 5950-1 are identical but presented differently.

In P360, a simplified formula for the non-dimensional slenderness of a doubly symmetric I-section beam, taken from NCCI SN002[3] is given as:

$$\bar{\lambda}_{LT} = \frac{1}{\sqrt{C_1}} UVD\bar{\lambda}_z\sqrt{\beta_w}$$

The effective length factor for destabilising load is parameter D. The minor axis non-dimensional slenderness $\bar{\lambda}_z = \lambda_z/\lambda_1$ and $\lambda_z = kL/i_z$ where k is an effective length parameter applied to the length of the beam L which takes different values depending on the restraint conditions. The remaining terms are defined in P360 Section 2.3. The combined effects of support conditions and destabilizing load are therefore allowed for in the product kD.

P360 Figure 3.2 repeats guidance given in NCCIs SN009[4] on the effects of common restraint conditions and destabilizing loads for cantilever beams. The restraint conditions identified are identical to those presented in Table 14 of BS 5950-1. This table (without diagrams) is repeated below. The values of the coefficients in the column for normal loading are the same as the corresponding k values in P360.

Restraint Conditions		Loading Conditions	
At support	At tip	Normal	Destabilizing
a) Continuous, with lateral restraint to top flange	1) Free	3.0*L*	7.5*L*
	2) Lateral restraint to top flange	2.7*L*	7.5*L*
	3) Torsional restraint	2.4*L*	4.5*L*
	4) Lateral and torsional restraint	2.1*L*	3.6*L*
b) Continuous, with partial torsional restraint	1) Free	2.0*L*	5.0*L*
	2) Lateral restraint to top flange	1.8*L*	5.0*L*
	3) Torsional restraint	1.6*L*	3.0*L*
	4) Lateral and torsional restraint	1.4*L*	2.4*L*
c) Continuous, with lateral and torsional restraint	1) Free	1.0*L*	2.5*L*
	2) Lateral restraint to top flange	0.9*L*	2.5*L*
	3) Torsional restraint	0.8*L*	1.5*L*
	4) Lateral and torsional restraint	0.7*L*	1.2*L*
d) Restrained laterally, torsionally and against rotation on plan	1) Free	0.8*L*	1.4*L*
	2) Lateral restraint to top flange	0.7*L*	1.4*L*
	3) Torsional restraint	0.6*L*	0.6*L*
	4) Lateral and torsional restraint	0.5*L*	0.5*L*

Table 14 Effective length L_E for cantilevers without intermediate restraint

If the values in the last column of the table below left (equivalent to *kDL*) are divided by the corresponding values in the third column (equivalent to *kL*), then the destabilising parameter *D* can be derived. The result of this exercise is presented below. An additional column giving the values of *D* from P360 is included in the table for comparison.

Restraint Conditions		Loading Conditions		
At support	At tip	Normal	Destabilizing	*D*
a) Continuous, with lateral restraint to top flange	1) Free	3.0*L*	2.50	2.5
	2) Lateral restraint to top flange	2.7L	2.78	2.8
	3) Torsional restraint	2.4L	1.88	1.9
	4) Lateral and torsional restraint	2.1L	1.71	1.7
b) Continuous, with partial torsional restraint	1) Free	2.0L	2.50	2.5
	2) Lateral restraint to top flange	1.8L	2.78	2.8
	3) Torsional restraint	1.6L	1.88	1.9
	4) Lateral and torsional restraint	1.4L	1.71	1.7
c) Continuous, with lateral and torsional restraint	1) Free	1.0L	2.50	2.5
	2) Lateral restraint to top flange	0.9L	2.78	2.8
	3) Torsional restraint	0.8L	1.88	1.9
	4) Lateral and torsional restraint	0.7L	1.71	1.7
d) Restrained laterally, torsionally and against rotation on plan	1) Free	0.8L	1.75	1.75
	2) Lateral restraint to top flange	0.7L	2.00	2.0
	3) Torsional restraint	0.6L	1.00	1.0
	4) Lateral and torsional restraint	0.5L	1.00	1.0

Effective length factors for cantilevers without intermediate restraint

It can immediately be seen that the effective length factors for destabilising load included in P360 are the BS 5950-1 values rounded to two significant figures except in one case where three significant figures are adopted and the values are identical.

In fact the effective lengths of cantilevers assumed in design to EC3 were adopted from those in BS 5950-1.

References

1 SCI P360 Stability of steel beams and columns (2011)
2 BS 5950-1:2000 Structural use of steel in building – Part 1
3 NCCI SN002 Determination of non-dimensional slenderness of I and H section (2005)
4 NCCI SN009 Effective lengths and destabilizing load parameters for beams and cantilevers – common cases (2005)

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New and revised codes & standards

From BSI Updates May 2017

BS EN PUBLICATIONS

BS EN ISO 8503-5:2017
Preparation of steel substrates before application of paints and related products. Surface roughness characteristics of blast-cleaned steel substrates. Replica tape method for the determination of the surface profile
Supersedes BS EN ISO 8503-5:2004

BRITISH STANDARDS WITHDRAWN

BS 2994:1976
Specification for cold rolled steel sections
Superseded by BS EN 10162:2003

NEW WORK STARTED

EN 10079
Definition of steel products
Will supersede BS EN 10079:2007

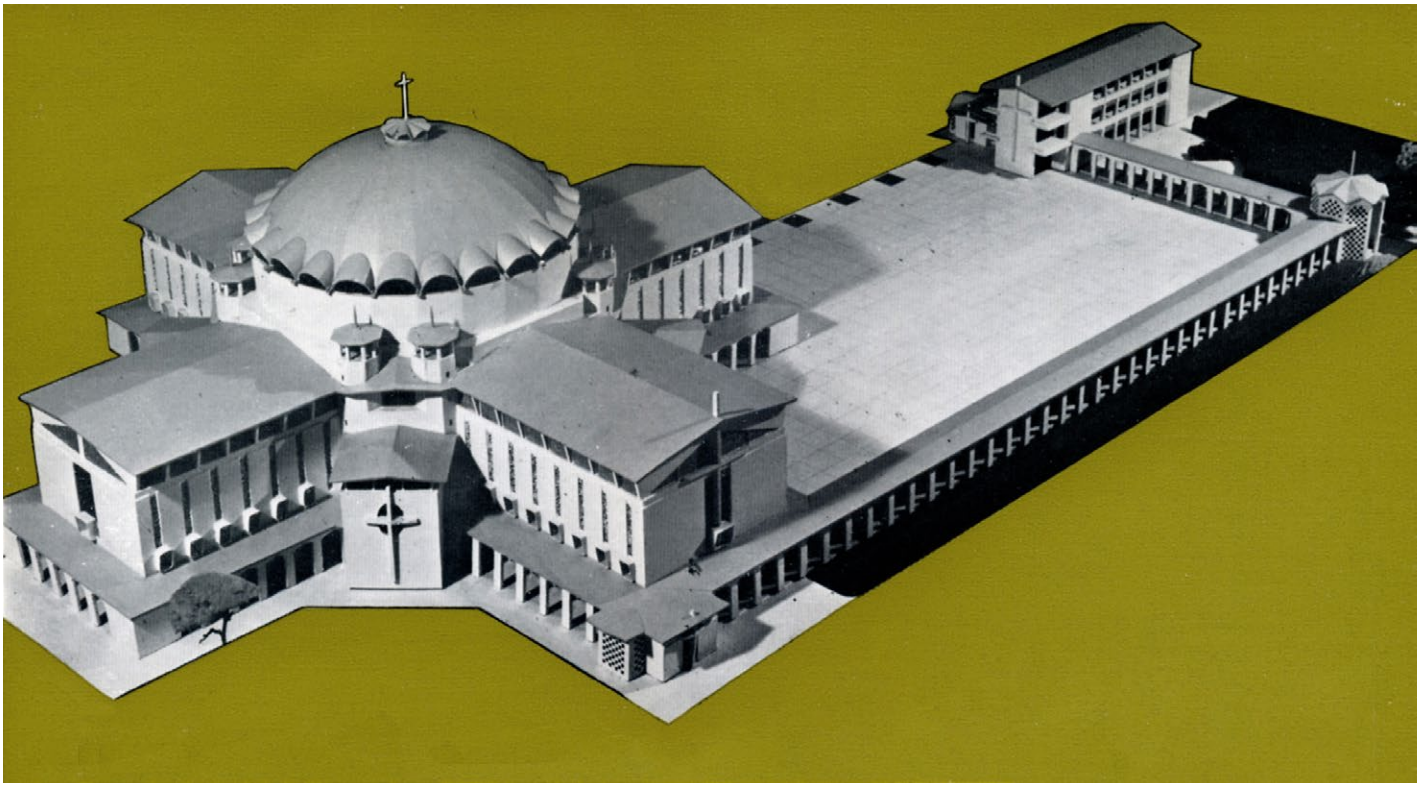
ISO PUBLICATIONS

ISO 3010:2017
(Edition 3)
Bases for design of structures. Seismic actions on structures
Will not be implemented as a British Standard

ISO 14343:2017
(Edition 3)
Welding consumables. Wire electrodes, strip electrodes, wires and rods for arc welding of stainless and heat resisting steels. Classification
Will be implemented as an identical British Standard

ISO 18276:2017
(Edition 2)
Welding consumables. Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high strength steels. Classification
Will be implemented as an identical British Standard

BUILDINGWITHSTEEL
Reprinted from Volume 4 No. 6
May 1967



Steelwork for the cathedral of Maria Assumpta, Nigeria

The history of the building of the cathedral of Maria Assumpta is typical of that so often met with in religious ventures. Construction started as long ago as 1954, since when it has progressed intermittently, chiefly because of lack of funds. Dublin architects were responsible for the general design of the cathedral and the steelwork was designed in and supplied from Eire. On-site work is being done by local labour. By March 1966 the main part of the building had been completed except for the roof decking and covering.

The cathedral, which when completed will seat a congregation of 3,000, is sited in a commanding position at the junction of three roads about a mile from the centre of Owerri in the Port Harcourt area of Nigeria, and is planned in the form of a Greek cross measuring 230 ft by 221 ft with an 88-ft diameter dome at the crossing. Inside the building the arms of the cross span 48 ft 6 in. The dome, 93 ft 6 in high, terminates with an octagonal lantern, the ceiling of which is 101 ft above floor level.

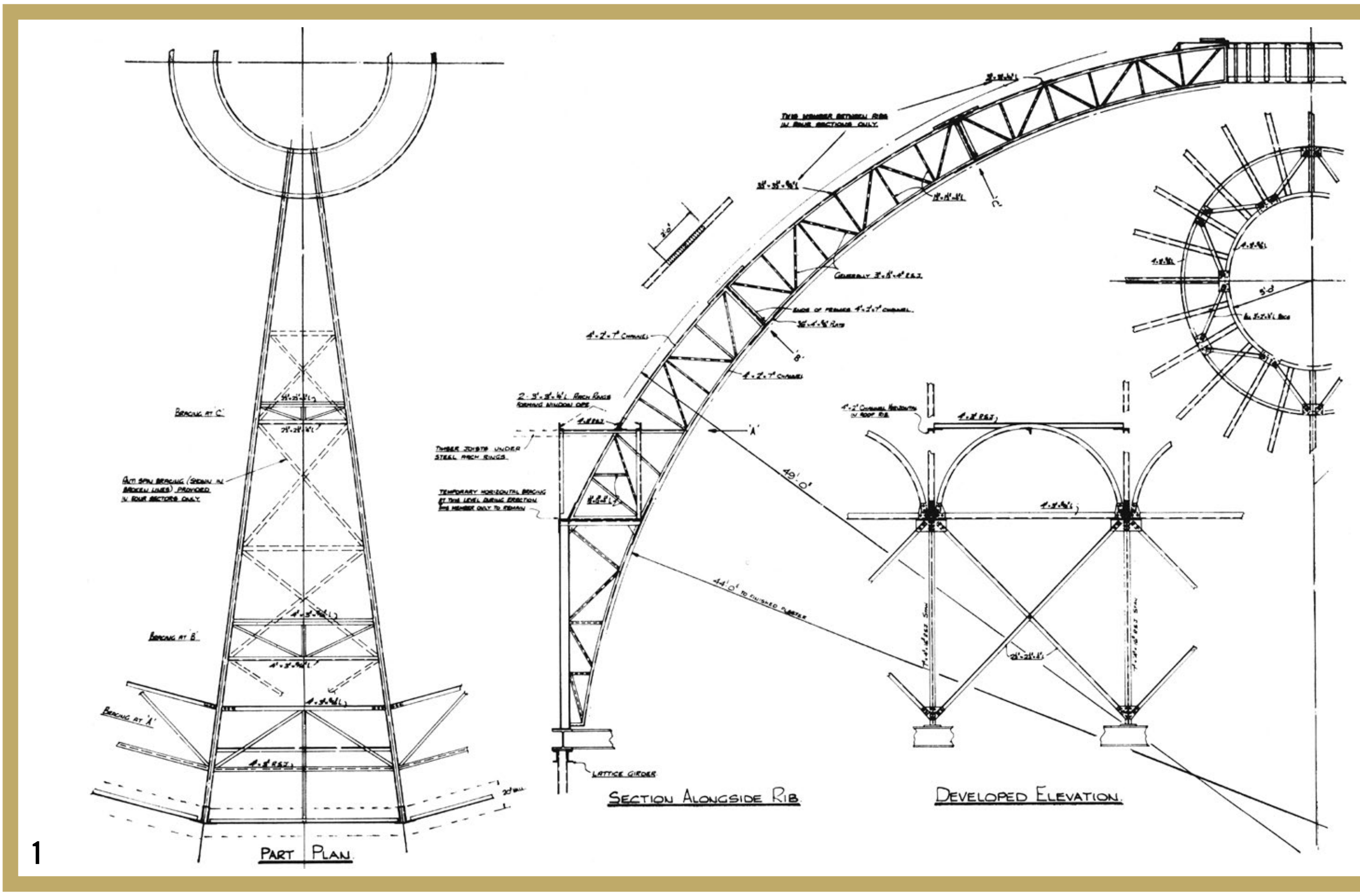
Radiating symmetrically from the centre are four smaller buildings forming a sub-cross transforming the main Greek cross into an eight point star: two of the buildings house the 28-ft by 22-ft 6-in main side chapels and the other two the public gallery and choir gallery. Above each of these buildings are twin octagonal belfry towers which form a predominant feature of the external massing, explaining visually the supporting and buttressing system of the dome.

All four main roofs and that of the dome are also to be covered with copper-surfaced felt on timber decking secured to steel trusses through timber purlins. Ceilings will, in general, be finished in hardboard sheeting and exposed parts of the steel trusses finished in plaster.

The Dome

The dome, carried on an 11-ft high steel-framed drum, is constructed with 24 lattice ribs giving a purlin length of 11 ft and tied together at intervals of about 17 ft by light lattice girders. Domes have a tendency to spin, so to control this movement bracing is provided between two adjacent ribs in four sectors spaced 90 degrees apart. The 24 vertical legs of the drum portion are braced together in all bays and bolted to a ring of steel beams. At at the top the ribs of the dome connect to a 10-ft diameter ring which is to carry the lantern surmounted by a cross. Outside this ring is another ring, 16 ft diameter, and both are braced together to control deformation of the 10-ft diameter opening. A similar circuit bracing system is provided at the level of the top of the lunettes.

Certain considerations had to be bourne in mind when designing the dome steelwork: (1) it was known that the last stage of the journey from Port Harcourt to site was by road over very difficult terrain, (2) erection tackle was limited to one steel mast and (3) scaffolding was scarce.



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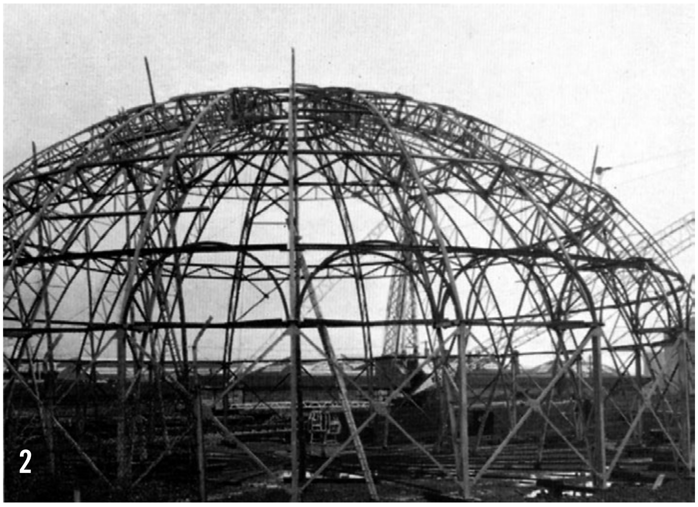

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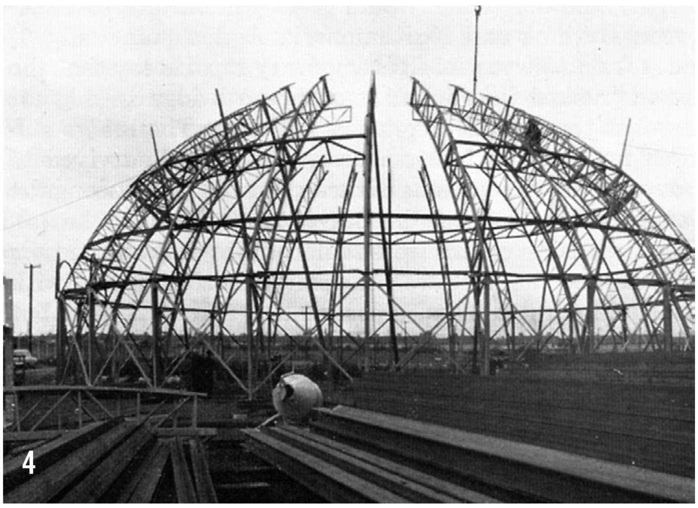
3

1. General arrangement of the dome steelwork.
2. Trial erection of the 34¼ tons of steelwork for the dome.
3. The braced rings for the opening to carry the lantern and cross
4. The dome was erected by progressively cantilevering the ribs inwards, as seen in this view taken during trial erection.



4

Bearing these points in mind it was decided that erection should be done by progressively cantilevering the ribs inwards, commencing at bottom level of the dome. The rib sections were made in 17-ft lengths with closed ends to prevent damage in transit and to facilitate erection; as the weight of the sections did not exceed 4cwt they could be manhandled without much difficulty. The dome was trial erected before despatch and this provided an opportunity to check the proposed method of erection.

Architects – Hooper and Mayne.

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	✔	Silver	Up to £2,000,000
Adstone Construction Ltd	01905 794561			●	●	●	●									✔	2	✔	Gold	Up to £3,000,000
Advanced Fabrications Poyle Ltd	01753 653617				●	●	●	●		●	●			●	●	✔	2			Up to £800,000
AJ Engineering & Construction Services Ltd	01309 671919			●	●					●	●			●	●	✔	4			Up to £2,000,000
Angle Ring Company Ltd	0121 557 7241												●			✔	4			Up to £1,400,000
Apex Steel Structures Ltd	01268 660828			●	●	●	●			●	●			●			2			Up to £2,000,000
Arc Fabrication Services Ltd	01709 557654			●	●	●	●	●	●	●	●			●	●	✔	3			Up to £200,000
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				●	●				●	●			●	●	✔	4		Gold	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 £1,400,000
Ballykine Structural Engineers Ltd	028 9756 2560			●	●	●	●	●				●				✔	4			Up to £1,400,000
Barnshaw Section Benders Ltd	0121 557 8261												●			✔	4			Up to £2,000,000
BHC Ltd	01555 840006	●	●	●	●	●	●	●			●	●		●	●	✔	4		Silver	Above £6,000,000
Billington Structures Ltd	01226 340666		●	●	●	●	●	●	●	●	●	●		●	●	✔	4	✔	Gold	Above £6,000,000
Border Steelwork Structures Ltd	01228 548744			●	●	●	●			●	●				●		4			Up to £3,000,000
Bourne Construction Engineering Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	Gold	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●			●	●	✔	4			Up to £6,000,000
Builders Beams Ltd	01227 863770			●	●	●	●			●	●			●	●	✔	2	✔		Up to £3,000,000
Cairnhill Structures Ltd	01236 449393	●			●	●	●	●	●	●				●	●	✔	4		Silver	Up to £3,000,000
Caunton Engineering Ltd	01773 531111	●	●	●	●	●	●	●		●	●	●		●	●	✔	4	✔	Gold	Above £6,000,000
Cementation Fabrications	0300 105 0135	●			●			●			●		●		●	✔	3		Gold	Up to £6,000,000*
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	●	●	●		●		✔	4		Gold	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
D Hughes Welding & Fabrication Ltd	01248 421104				●	●	●	●		●	●		●	●	●	✔	4			Up to £800,000
Duggan Steel	00 353 29 70072		●	●	●	●	●	●	●		●	●			●	✔	4			Up to £6,000,000
ECS Engineering Services Ltd	01773 860001	●		●	●	●	●	●	●	●	●			●	●	✔	3			Up to £3,000,000
Elland Steel Structures Ltd	01422 380262		●	●	●	●	●	●	●	●	●	●		●		✔	4	✔	Gold	Up to £6,000,000
EvadX Ltd	01745 336413			●	●	●	●	●	●	●	●	●				✔	3		Gold	Up to £3,000,000
Four Bay Structures Ltd	01603 758141			●	●	●	●	●		●	●			●	●		2			Up to £1,400,000
Four-Tees Engineers Ltd	01489 885899												●		●	✔	3		Member	Up to £2,000,000
Fox Bros Engineering Ltd	00 353 53 942 1677			●	●	●	●	●			●				●		2			Up to £2,000,000
Gorge Fabrications Ltd	0121 522 5770				●	●	●	●		●				●	●	✔	2			Up to £1,400,000
Gregg & Patterson (Engineers) Ltd	028 9061 8131			●	●	●	●	●				●		●		✔	3			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)
H Young Structures Ltd	01953 601881			●	●	●	●	●		●	●			●	●	✔	2		🟢	Up to £2,000,000
Had Fab Ltd	01875 611711				●				●	●	●				●	✔	4			Up to £3,000,000
Hambleton Steel Ltd	01748 810598		●	●	●	●	●	●				●		●		✔	4		⚪	Up to £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				●	●									●		4			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 £6,000,000
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 £1,400,000
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								●		●			●	●	✔	3			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
SAH Engineering Ltd	01582 584220			●	●	●				●	●			●	●		2			Up to £800,000
SDM Fabrication Ltd	01354 660895	●	●	●	●	●	●				●			●	●	✔	4			Up to £2,000,000
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 £3,000,000
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			●	●	●	●	●	●		●			●	●	✔	3	✔	⚪	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 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 £400,000
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
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

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
Bourne Construction Engineering Ltd	01202 746666	●	●	●				●	●	✓	4	✓		✓	Gold	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●	●	●	●	●	●	●	●	✓	4			✓		Up to £6,000,000
Cairnhill Structures Ltd	01236 449393	●	●	●	●			●	●	✓	4			✓	Silver	Up to £3,000,000
Cementation Fabrications	0300 105 0135	●	●						●	✓	3			✓	Gold	Up to £6,000,000*
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	✓	4		✓	✓	Gold	Above £6,000,000*
D Hughes Welding & Fabrication Ltd	01248 421104	●		●			●	●	●	✓	4			✓		Up to £800,000
Donyal Engineering Ltd	01207 270909	●						●	●	✓	3			✓	Member	Up to £1,400,000
ECS Engineering Ltd	01773 860001	●	●	●	●		●		●	✓	3					Up to £3,000,000
Four-Tees Engineers Ltd	01489 885899	●	●	●	●		●	●	●	✓	3			✓	Member	Up to £2,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445	●		●				●	●	✓	4			✓	Gold	Up to £6,000,000
Millar Callaghan Engineering Services Ltd	01294 217711	●				●		●	●	✓	4			✓		Up to £1,400,000
Murphy International Ltd	00 353 45 431384	●	●	●	●				●	✓	4			✓		Up to £1,400,000
Nusteel Structures Ltd	01303 268112	●	●	●	●	●		●	●	✓	4		✓	✓	Gold	Up to £4,000,000
S H Structures Ltd	01977 681931	●		●	●	●	●		●	✓	4	✓		✓	Silver	Up to £2,000,000
Severfield (UK) Ltd	01204 699999	●	●	●	●	●	●	●	●	✓	4			✓	Gold	Above £6,000,000
Shaun Hodgson Engineering Ltd	01553 766499							●	●	✓	3			✓		Up to £800,000
Taziker Industrial Ltd	01204 468080	●	●	●	●			●	●	✓	3		✓	✓		Above £6,000,000
Underhill Engineering 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 £1,400,000
Cimolai SpA	01223 836299	●	●	●	●	●	●	●	●	✓	4					Above £6,000,000
CTS Bridges Ltd	01484 606416	●	●	●	●	●	●		●	✓	4			✓	Member	Up to £800,000
Francis & Lewis International Ltd	01452 722200							●	●	✓	4			✓	Gold	Up to £2,000,000
Harland & Wolff Heavy Industries Ltd	028 9045 8456	●	●	●	●	●		●	●	✓	3					Up to £2,000,000
Hollandia Infra BV	00 31 180 540 540	●	●	●	●	●	●	●	●	✓	4					Above £6,000,000*
HS Carlsteel Engineering Ltd	020 8312 1879	●	●					●	●	✓	3			✓		Up to £40,000
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		✓	✓	Gold	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		✓	✓	Silver	Above £6,000,000

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	BIM
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		
British Steel	01724 404040				●						M		
BW Industries Ltd	01262 400088	●									M		
Cellbeam Ltd	01937 840600	●									M		
Cleveland Steel & Tubes Ltd	01845 577789								●		M		
Composite Profiles UK Ltd	01202 659237	●									D/I		
Cooper & Turner Ltd	0114 256 0057									●	M		
Cutmaster Machines (UK) Ltd	01226 707865					●					N/A		
Daver Steels Ltd	0114 261 1999	●									M		
Daver Steels (Bar & Cable Systems) Ltd	01709 880550	●									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	Gold	
Fabsec Ltd	01937 840641	●									N/A		
Ficep (UK) Ltd	01924 223530					●					N/A		
FLI Structures	01452 722200	●									M	Gold	
Forward Protective Coatings Ltd	01623 748323						●				N/A		
Graitec UK Ltd	0844 543 8888		●								N/A		
Hadley Group Ltd	0121 555 1342	●									M	Silver	
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	Member	
International Paint Ltd	0191 469 6111						●				N/A	Gold	
Jack Tighe Ltd	01302 880360						●				N/A		
Jamestown Manufacturing 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	Gold	
Kloeckner Metals UK	0113 254 0711								●		D/I		
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		
Pipe and Piling Supplies Ltd	01592 770312	●									M		
PPG Performance Coatings UK Ltd	01525 375234						●				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	Silver	
Structural Metal Decks Ltd	01202 718898	●									M	Gold	
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	Gold	
Wedge Group Galvanizing Ltd	01909 486384						●				N/A		
Yamazaki Mazak UK Ltd	01905 755755					●					N/A		

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

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