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Dundalk packages healthcare

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New Landmark for Manchester

Steel on show at Trafford Park

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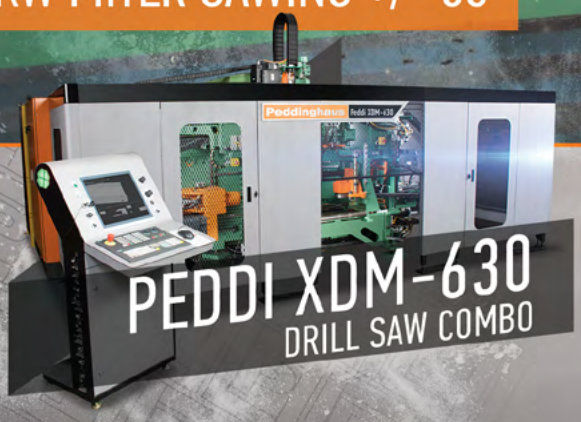

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Cover Image
St Giles Circus development, London
Main client: Consolidated Developments
Architect: ORMS
Main contractor: Skanska
Structural engineer: Engenuiti
Steelwork contractor: Severfield
Steel tonnage: 2,400t

NSC

February 2019
Vol 27 No 2

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

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

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In Greek mythology, Atlas was a Titan who was condemned to hold up the celestial heavens for eternity after the Titanomachy, a ten-year series of battles fought in Thessaly, between the Titans and the Olympians.
Strength Of A Titan
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Survey confirms steel's dominance

Nick Barrett - Editor

Steel is still the construction framing material of choice for the key multi-storey and single storey non-residential buildings markets according to the latest in a long line of independent market surveys.

Researchers at Construction Markets confirm that steel has increased its market share in key sectors, albeit against a background of falling demand overall with only rare bright spots.

The overall market for structural frames fell 2.7% to just under 42,000,000m^2. Steel's share of the total market was over 43%. Insitu and precast concrete between them took a market share of under 7%.

Steel still dominates the multi-storey office buildings market with a market share of over 70% for buildings of two storeys and over. The taller the buildings get the more steel dominates, with a share of almost 79% for buildings of six storeys and over. Steel's market share has risen against a background of a fairly steep fall in this sector of some 20%. The nearest rival to steel was insitu concrete with a market share of less than 22%.

Multi-storey public education buildings exhibited a strong preference for steel with a market share of 62.9%, although the overall market eased with a 1.1% fall. The multi-storey public health buildings market suffered a fall of 23%, although steel enjoyed by far the largest slice of the market, its share of 46% being more than twice that of nearest rival insitu concrete.

The multi-storey other public buildings sector fell overall by over 2% with publicly funded leisure buildings the only growth spot in the sector. Multi-storey other private buildings showed a fall of 9.5%. This sector includes private education and, as a result of the Free Schools programme, this sector now accounts for over 70% of the total 'other private sector'. Steel had a 65.3% market share of this sector.

Steel's greatest market preference lies in the huge sheds sector, which was a rare bright spot last year, showing a rise of almost 3%. Steel increased the area of floor covered by over 2.5% and maintained a dominant market share of well over 90%.

In the 'conventional single storey non-domestic buildings' market, which includes public and private health and education buildings, retail, leisure and offices, there was a fall of almost 4%, but steel increased its share to almost 65% from 63.5% the year before.

Overall the survey paints a subdued picture of the construction market, albeit one in which steel is confidently holding its own in the key sectors. There seems little doubt that Brexit related uncertainties have resulted in development projects stalling or being postponed rather than cancelled outright. Forecasts from industry experts suggest that 2019 will be another challenging year.

Against that background the steel sector is encouraged by the report's confirmation of its market position as still overwhelmingly the preferred solution for structural frames in key sectors. The BCSA's members are poised to respond to any pick up in construction demand.

New Steel Construction Technical Digest now available online

New Steel Construction's (NSC) third Technical Digest, which brings together a year's worth of technical guidance, is now available for download at: *www.steelconstruction.info*.

Helping to keep engineers and architects up-to-date with the latest steel construction related guidance, NSC's Digest compiles all the magazine's Technical Articles and Advisory Desk Notes from 2018, which can be downloaded as a pdf or viewed online.

Advisory Desk Notes reflect recent developments in technical standards or new knowledge that designers need to be made aware of. Some of them arise because a question is being frequently asked of the steel sector's technical advisers. They have always been recognised as essential reading for all involved in the design of constructional steelwork.

The longer Technical Articles cover more detailed insights into what designers need to know, often the result of legislative changes or changes to codes and standards.

Sometimes it is simply felt that it would be helpful if a lot of relatively minor changes, perhaps made over a period of time, were brought together in one place, so a technical update is needed.

Some of the topics covered in last year's Technical Articles include stainless steel in construction; members subject to combined bending and compression; the use of S355 fin plates; U-frames in bridges, and temperature profiles through composite slabs at elevated temperatures.

Latest images show City of London's evolving skyline

The City of London Corporation has released updated images of how its City Cluster skyline will look in 2026, assuming six further towers are built.

The City Cluster is the area in the eastern corner of the Square Mile and is home to some of London's most iconic skyscrapers.

A range of policies set to redefine the area and the wider City of London are currently out for consultation.

The Local Plan identifies seven key areas of change where the City Corporation will be promoting sustainable growth. As one of the key areas of change, the City Cluster will grow to close the gap between 20 Fenchurch Street (Walkie-Talkie) and the rest of the cluster of towers.

Chris Hayward, Chairman of the Planning and Transportation Committee at the City of London Corporation, said: "These images remind us that the City's skyscrapers are some of the most recognisable structures in the UK. But great cities are not made from great buildings alone.

"The ambitious policy proposals outlined in the Transport Strategy and the Local Plan aim to resolve challenges at street level, and in the river, air and open spaces, as well as ensuring that City buildings and infrastructure are more robust than ever.

"These plans will play a central part in shaping the future of the City of London therefore it is vital that we hear from the local residents, workers and key stakeholders that will be impacted."

Currently, seven major steel-framed towers are under construction in the City, while a further six are in the pipeline, including 1 Undershaft which will top out at 304m-high (73-storeys).

Hallé Orchestra to get new and larger rehearsal space

Manchester's Hallé Orchestra is enlarging its St Peter's rehearsal and recording facility with the construction of a steel-framed extension that includes acoustically-isolated practice spaces.

Located in Ancoats, Manchester the three-level extension, to be known as the Oglesby Centre at Hallé St Peter's, will provide a brand-new façade to the existing facilities, which are housed in a former church and front onto the adjacent open plaza of Cutting Room Square.

Working on behalf of main contractor HH Smith, BD Structures has recently completed the steelwork erection programme.

"The extension will provide additional rehearsal facilities, practice rooms, café function space and an exciting entrance atrium offering direct views up towards the existing church campanile tower," explained Stephenson Studio Project Architect Stuart Hollings.

The form of the extension is said to be expressed as a robust brickwork plinth at street level that cradles the first floor main rehearsal space. Most of the upper floor will be clad with weathering steel fins, allowing light to enter the rehearsal area while making an exterior reference to the industrial heritage of the local environment.

The extension's upper floor rehearsal room and two adjacent practice rooms are floating box-in-box spaces, which are acoustically-isolated from the primary structural frame and slab. This is to prevent sound transfer and ensure the highest level of acoustic performance in these key spaces.

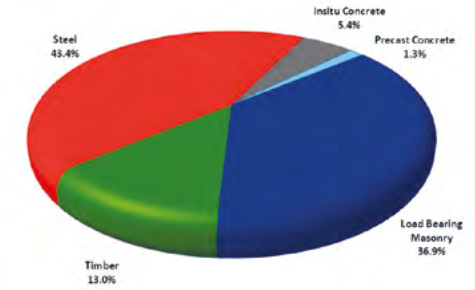
The boxes have their own compositely formed slabs, which are sat on acoustic pads and allow the spaces to be separated from the main first floor by a dividing and insulated void of 20mm.

Steelwork continues to dominate structural frames market

According to the latest market survey by Construction Markets, steel continues to be the framing solution of choice in the UK and accounted for 43.4% of the total market in 2018.

Steel continued to dominate the multi-storey office buildings market with a share of over 70% for buildings of two-storeys and higher. For buildings of six-storeys and over, steel's market share was almost 79%.

Multi-storey public education buildings exhibited a strong preference for steel with a market share of 62.9%, although the overall market eased with a 1.1% fall. The multi-storey public health buildings market suffered a fall of 23%, although steel continued to enjoy a 46% share of the market.



Total market for structural frames

In the conventional single storey non-domestic buildings' market, which includes public and private health and education buildings, retail, leisure and offices, there was a fall of almost 4%, but steel increased its share to almost 65%.

As usual, steel dominated the other single storey non-domestic buildings market, a sector that includes industrial buildings and distribution centres (sheds). This sector increased by nearly 3% in 2018 and steel increased the area of floor covered by over 2.5% and maintained a dominant market share of over 90%.

Steel arrives for new Antarctic wharf

A cargo ship loaded with 4,500t of steelwork and construction equipment required to build a new wharf has arrived at British Antarctic Survey's Rothera Research Station.

The DS Wisconsin has completed a month-long voyage from the UK and transported plant equipment, 83 containers, permanent and temporary materials and 1,000t of steelwork.

Her arrival at Rothera is a major milestone in the modernisation of the UK's Antarctic infrastructure, as once the ship is unloaded construction partner BAM Nuttall will begin deconstructing an old wharf and building a new one big enough to safely berth the new polar research vessel, the RRS Sir David Attenborough.

British Antarctic Survey Programme Manager David Seaton, said: "The arrival of the Wisconsin is extremely welcome and we are all now very keen to get on with the work of building the new wharf – an integral part of modernising our infrastructure and keeping the UK at the forefront of polar science."

BAM Nuttall Project Manager Martha McGowan, added: "It was a major logistical undertaking to get every single thing needed to build a wharf in freezing Antarctic waters loaded onto one ship. One month and 11,000km later, it is very good to see all that hard work paying off."

An additional 50 members of the construction team are present at Rothera this season in order to deliver the first phase of wharf work. This includes deconstructing the old wharf and building the rear section of the new one. Completion of the project is scheduled for April 2020.

Working on behalf of BAM Nuttall, Four-Tees Engineers has fabricated the steelwork and has erectors in Antarctica to help with the steel construction work.

Steel support for London residential towers

Structural steelwork on One Crown Place, a prestigious mixed-use project in east London, is nearing completion.

The scheme consists of 246 residential apartments in two towers, reaching heights of 29 and 33 floors respectively, 15,500m² of Grade A office space, and a boutique hotel and restaurant.

Working on behalf of main contractor Mace, Severfield is fabricating, supplying and erecting 2,600t of steel for the project.

The steelwork forms a six-storey podium that supports the two reinforced concrete apartment towers and accommodates the scheme's six floors of column-free commercial space.

The podium structure is topped by a series of 15 trusses that accommodates levels seven and eight within their depth and, importantly, allow the residential parts of the development to have a much smaller column grid pattern.

The truss elements will be left exposed as architectural highlights within levels 7 and 8 (see above).

Level 7 will accommodate a gym, a work hub, private screening room, meeting space and other exclusive amenities for the residents, while level 8 is given over to apartments.

One Crown Place is due to complete in February 2021.

NEWS IN BRIEF

McLaughlin & Harvey has awarded **Caunton Engineering** the steelwork contract for a £114M distribution hub for United Parcel Service at East Midlands Airport. The 41,800m² structure will be a multi-span portal frame requiring over 3,000t of structural steelwork and has been designed by architect and structural engineer Aecom.

Broxtowe Borough Council's planning committee has unanimously granted full consent for a new cinema and outline planning consent for a further mixed-used and residential building in Beeston, Nottinghamshire.

Graham Construction has been appointed as the contractor for a new modern office development known as i9, which is set in the heart of Wolverhampton. It will provide 4,600m² of Grade A office space when completed in 2020. i9 is the next step in building a thriving commercial quarter at the heart of Wolverhampton Interchange - bringing further investment and jobs to the city.

Muse Developments has launched a consultation on plans to create a new £150M neighbourhood at Church Wharf in Bolton town centre. Set alongside the River Croal and between St Peters Way (A666), Bank Street, Manor Street and Folds Road, the under-used site is set to be transformed. The scheme will include a mix of around 320 homes, a new hotel, commercial offices, and leisure and retail opportunities, such as a café, convenience store or bar/restaurant.

A £300M power station producing energy from waste could be built in North East Lincolnshire. The proposed plant would be located next to the existing South Humber Bank Power Station near Stallingborough, according to developer **EP UK Investments**. More than 600,000t of domestic refuse, brought in on trucks, would be burnt to produce enough electricity for about 500,000 homes, the firm added. If approved, the station would open in 2022 with the creation of some 50 jobs.

PRESIDENT'S COLUMN

Main contractors often push the limits when drafting construction contracts for subcontract work, even though we have perfectly good standard form contracts in the form of NEC and JCT. I have seen pages and pages of 'z clauses' inserted into NEC contracts, and so many changes to JCT contracts that they should really be renamed. Standard clauses designed to protect subcontractors, though, simply vanish into thin air.

On the other side of the table, for some subcontractors, navigating the contractual landscape can be time-consuming and difficult, especially when 'standard' no longer really means 'standard' and those all-important standard clauses designed to provide protection and a level playing field are just deleted time and time again.

So what are subcontractors to do?

First, subcontractors should ensure that their commercial teams are properly educated about construction law. The place to start is knowing and remembering the basics, and sticking with good practice. I am unashamedly going to put in a plug for the BCSA's recently updated *Construction Contractual Handbook*. This comprehensive Handbook aimed at subcontractors, kicks off with a useful reminder about the formation of contracts and carries on to cover all the important aspects of construction law in a compact and accessible way.

Second, BCSA recommends that subcontractors should be aware of what onerous terms might unexpectedly appear in their contracts and what to do about them. The *Construction Contractual Handbook* has a chapter explaining some of the most common onerous clauses or changes that subcontractors might come across. These might include lengthening the payment period and inserting certain obligations regarding time. And the checklists at the back of the Handbook are a really useful tool to make sure that nothing's been forgotten.

Third, subcontractors need to maintain their vigilance throughout the duration of the contract, ensuring certificates are issued at the right time, variations and any disputes are properly managed and claims procedures are followed. Again, these are all covered in the updated *Construction Contractual Handbook*.

The Handbook also includes chapters on construction contracts in Scotland and Ireland.

Of course, sometimes a handbook, manual or textbook isn't enough. As part of their membership, BCSA members also have exclusive access to contractual seminars and individual commercial and contractual advice.

Negotiating contracts and juggling all the relevant commercial matters through a job will always be a necessary task for subcontractors. But having the right tools and advice to hand can help to redress the balance, and make life easier and fairer for subcontractors.

BCSA's *Construction Contractual Handbook* can be purchased from *https://www.cip-books.com/product/construction-contractual-handbook-5th-edition*

Tim Outteridge
BCSA President & Sales Director Cleveland Bridge

British Steel invests in new distribution fleet

British Steel is investing £1.4M in a new fleet of vehicles to support the growth of its UK distribution network.

The vehicles – 11 tractor units and 7 rigid vehicles – will improve the ability of metal centres to supply a wide range of constructional steel products and services to businesses of all sizes.

Richard Farnsworth, British Steel's Managing Director Construction, said: "This is a significant investment in our future which will enable us to provide an even better service to our customers throughout the UK.

"Our regional metal centres provide customers with a quick and convenient way of buying a wide range of steel products and a first-class fleet is central to our strategy of becoming the supplier of choice to this country's construction industry.

British Steel's metal centres stock a range of constructional steel products including sections, bars, angles, channels, plate, sheet, mesh, flooring and hand railing. They also offer a range of further processing facilities including shot-blasting, painting and cutting to length so products can be tailored to customers' precise requirements.

British Steel's Construction business is served by a network of metal and service centres across the UK and Ireland. They are located in Dartford, Wolverhampton, Redcar (Teesside), Newcastle, Stoke, Scunthorpe, Ashburton (Devon), Cheadle (Greater Manchester), Newport, Edinburgh, Dublin, Dundee and Lisburn.

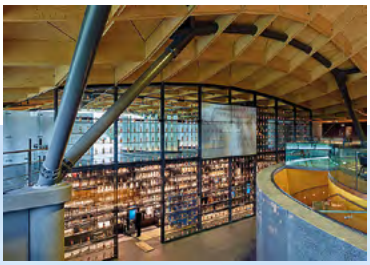
Multi-million pound distillery has steel columns

The £140M Macallan Distillery and Visitor Centre in Speyside has been opened as part of Edrington Group's £500M investment in the brand, which is considered to be one of the leading single malt whiskies.

Designed by Rogers Stirk Harbour + Partners, the distillery is said to be a striking piece of contemporary architecture as it is cut into a slope, taking its cues from Scottish hills and maximising aesthetic beauty while minimising the visual impact.

The building is topped with an undulating timber roof, which is supported by a series of steel CHS columns. Further steelwork supports and frames the structure's main glazed façade.

Working on behalf of main contractor Robertson Construction, S H Structures fabricated, supplied and erected 600t of steel for the project. The tonnage also included steel for the manufacturing process within the facility, such as process tables, pipe bridges, link bridges and flue towers.



Telford gets new six-level car park

Parking problems have been alleviated in Telford town centre as the new Southwater multi-storey car park, which offers 300 vehicle spaces, has now opened.

Bourne Parking (part of the Bourne Group) was responsible for the design and construction of the car park, which has been built adjacent to the town's International Centre and ice rink.

A spokesperson for the Southwater Event Group, which owns the centre and the car park, said: "The International Centre, Telford, as a leading national business events venue, attracts over a quarter of a million visitors every year.

"It is our responsibility and desire to ensure visitors can efficiently access the venue, parking quickly and easily, in turn making sure the centre of Telford is not congested."

The car park design is based around a series of 16m clear spans, which is said to maximise space and improve access. In addition, it features "smart glass" technology enabling the outside of the building to change colour.

Frame on the up at Salford's Embankment

Structural steelwork is now under way on the 100 Embankment commercial scheme in Salford.

The second of two adjacent office blocks, 100 will offer 15,500m² of BREEAM 'Excellent' office space over nine-storeys. Working on behalf of BAM Construction, Elland Steel Structures is fabricating, supplying and erecting 1,800t of steel for the project.

Both office blocks sit above a three-level steel-framed car park that infills a Victorian masonry podium which once supported Exchange Station that closed down in 1969.

Commenting on the scheme, Salford City Mayor, Paul Dennett said: "100 Embankment is a physical demonstration of the commercial development and investment in Salford.

"Once complete this iconic pair of buildings will provide a new corporate centre bringing more jobs and revenue to the local economy."

Ficep launches latest CNC drilling line

The new Ficep Valiant CNC drilling line is said to offer over double the number of tool changer positions than its predecessor – Endeavour – while a 300mm extended auxiliary axis increases the window of operation for scribing, milling and sequential drilling.

The addition of 14 new tool changer positions on each of the machine's three spindles takes the total tool availability to 42, while the spindles themselves have been redesigned to be all the same, allowing for a reduction in inventory for spare part replacement. This is said to offer steelwork contractors productivity gains and simplified maintenance.

Mark Jones, MD of Ficep UK said: "We're a company known for our commitment to R&D, devoting 5% of our annual profits into developing steel fabrication machines that work effectively for the modern steelwork contractor and Valiant is a perfect example of what this research can achieve.

"It takes elements of our leading Endeavour and adds practical, useful improvements that will benefit steelwork contractors in terms of machining potential, productivity and cost efficiencies. We do believe this heralds a new era in drilling equipment for the steel fabrication industry."

Kloeckner Metals UK obtains ISO 45001:2018

Kloeckner Metals UK is said to be the first UK stockholder and distributer to obtain the ISO 45001:2018 standard with Steel Construction Certification Scheme (SCCS).

ISO 45001:2018 is the new international standard for Occupational Health & Safety Management Systems (OHSMS), which this year replaced OHSAS 18001. The standard sets out requirements for companies who wish to create and maintain a safe and healthy environment.

Kloeckner Metals UK said it has been preparing for the transition since first being aware of the new standard. The company said greater emphasis on top management leadership, better understanding of risks and company stakeholders, in combination with enhanced health & safety management systems, will allow it to continue to deliver quality products and services in a safe and sustainable manner.

Peter Whiting Kloeckner Metals UK CEO said: "Health & Safety is paramount to Kloeckner and we are very proud to be the first stockholder and distributer with SCCS to conform to ISO 45001.

"The new standard reflects our commitment to providing a safe and healthy environment across the business. It is furthermore a testament to our team who are continuously working hard to improve health and safety practices and well-being across our sites, which in return improves our overall business performance."

The SCCS is a wholly-owned subsidiary of the British Constructional Steelwork Association. It was established in the early 1980s to provide quality management certification for steelwork contracting organisations.

SCCS now offers a wide range of certification and monitoring services for the structural steelwork sector,

including integrated or separate UKAS accredited Quality management systems, Environmental and Health & Safety management systems, Factory Production Control systems and selected National Highways Sector Schemes.

For more information about SCCS go to *www.steelcertification.co.uk*

Diary

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

Tuesday 26 February 2019
Straight to the Point in Eurocode Design - Half Day Course
This four hour course contains minimum theory and maximum hands-on member design – focusing on practical design using the Blue Book. London

Tuesday 26 February 2019
Wind Actions and Snow Loads to BS EN 1991 - Half Day Course
This short course will cover the calculation of wind actions and snow loads in accordance with the Eurocodes and the UK National Annexes. London

Tuesday 5 March 2019
Steel Frames and Disproportionate Collapse Rules
This course provides a solid introduction into the design of steel-framed buildings to avoid disproportionate collapse.
London

Tuesday 12 March 2019
High Strength Steel Structures
This webinar will cover various aspects of high strength steel including; production and fabrication, its applications and when to use HSS and design to EC3.
Webinar

Thursday 4 April 2019
Steel Building Design to EC3
This course will introduce experienced steel designers to the Eurocode provisions for steel design, providing attendees with a sense of reassurance that design to EC3 is straightforward.
Bristol.

Photo courtesy of Grey Acre Surveying

The project is one the first phases at the IDA Technology Park in Dundalk

Packaging factory is all in the frame

Speed of delivery and ease of construction are just two of the reasons why a steel-framed solution was chosen for a manufacturing facility in Ireland.

FACT FILE
Wasdell Production Facility, Dundalk
Main client: Wasdell Group
Architect: OCA Architects
Main contractor: Kilcawley Construction
Structural engineer: Malachi Cullen Consulting Engineers
Steelwork contractor: Walter Watson
Steel tonnage: 1,020t

Leading pharmaceutical packaging company Wasdell Group is building a new production facility in the Republic of Ireland that will service the local and international healthcare industries.

The new steel-framed facility, located in Dundalk, has a floor area of approximately 6,500m² and will house 12 bespoke production suites within a large production area, separate goods-in and despatch zones, offices and will eventually employ 300 staff.

Commenting on the facility, Wasdell Group Managing Director Martin Tedham says: "We have always had a strong customer base in Ireland and we are certain that this trend will continue with the impending Brexit situation as companies, typically from the UK and USA, look to securing a base to service their European markets.

"We have always been a business that changes to accommodate the needs of the market and its customer base. Having a facility in Ireland and the European market makes sense and we are very excited about this new opportunity, as well as extending our geographical footprint."

Impression of the completed facility

The project is being built on a 2.9-hectare greenfield site on the IDA Science & Technology Park on the southern outskirts of the Irish town.

Main contractor Kilcawley Construction started work on the project last summer and began with a six-week bulk excavation programme to prepare a flat plot on the previously sloping site.

"During this programme we excavated 10,000m³ of rock and moved 40,000m³ of soil, before installing the pad foundations for the steelwork," says Kilcawley Construction Contracts Manager Sheamus Tierney.

The steel frame has been designed as three separate structures that are linked together and feature precast fire walls to divide up the main spaces.

Central to the facility is a large column-free production area, which has been formed with a series of 48m-long trusses. A two-storey office block is attached to the front elevation of the production area, and this 12m-deep structure gains all of its stability from its larger neighbour. Meanwhile, running the entire length of the production area's rear elevation is an attached plant mezzanine.

Either side of the production zone, two attached portal frames, one with a 28m span and the other measuring 42m wide, accommodate the goods in and despatch areas.

"Because the project features three long span column-free spaces, steel was obvious choice of framing material," says a spokesperson for Malachi Cullen Consulting Engineers.

"Steelwork also offered us the quickest and most versatile method of construction, as well as the convenience of having the elements fabricated offsite."

Steelwork contractor Walter Watson began its programme by erecting the large production area first and then building the attached portal frames at either end.

The 48m-long trusses that create the roof and the column-free space for the production area were fabricated in three sections, which consisted of a 12m-long centre section and two outer 18m-long sections.

"To erect these large elements, our methodology involved having six large skids laid out on the ground and levelled. Three truss sections were then laid out horizontally on top of the skids and the splice connections fully bolted-up using tension control bolts, explains Walter Watson General Manager Structural Division Trevor Irvine.

"Two of our own 80t-capacity cranes then lifted each assembled truss into the vertical position before hoisting it into its final place as a tandem lift. After it was connected to

A plant mezzanine runs the entire length of the rear elevation

the columns, one crane was released and the secondary trusses were fitted to provide stability, before the main truss was released by the second crane."

When fully assembled, each of the trusses weighed 21.5t and measured 2.8m-deep at the eaves and 3.3m-deep at the apex. They are all supported on 15m-high columns spaced at 6m centres.

Mirroring the same column spacing, the adjoining office block and mezzanine plant deck are both constructed with a traditional beam and column method. Both have upper floors formed with steel beams supporting precast planks.

While the office block steelwork was being finished, two precast fire walls were installed at both gable ends of the production area in readiness for the portal framed sheds to be built. The walls have large openings in the middle to allow the flow of products between the three parts of the facility.

Both portals were erected in a similar manner, with a pair of 60t-capacity mobile cranes lifting one rafter each. The final central splice was completed while the cranes were still holding the rafters in position.

For the smaller portal frame, the rafters are 533 × 21UB sections in 14m-long lengths, while 686 × 254UBs in 21m lengths were used for the other portal.

The Dundalk Wasdell facility is due to be handed over in summer 2019.

Two portal frames sit either end of the building

Photo courtesy of Grey Acre Surveying

48m-long trusses form the production area

FACT FILE
Landmark in St Peter's Square, Manchester
Main client: Barings
Development manager: Castlebrook Investments
Architect: Squire & Partners
Main contractor: Bowmer + Kirkland
Structural engineer: Curtins
Steelwork contractor: Billington Structures
Steel tonnage: 1,800t

The project fits into a confined city centre site

Creating a landmark

Model showing the rear elevation and core

Fabricated plate girder for the building's roof

Using a steel frame solution has helped form the flexible long-span floorplates required for a Manchester city centre commercial development.

Strong levels of demand are being experienced in the Manchester office market at present and, in order to satisfy this requirement, a number of new build commercial schemes are currently starting in the city centre.

One of only two wholly new developments due to complete in the city centre in 2019, the Landmark in St Peter's Square is a 14-storey steel-framed building that will offer 16,700m² of BREEAM 'Excellent' office space and 50 car parking spaces in two levels of basement.

The steel frame offers clear spans and maximum flexibility for the floorplates, with an offset core situated along one elevation.

"The office floors have typically been designed to be column-free and only one column exists within the floorplate. Typically, secondary beams at 3m centres span approximately 17.6m from perimeter columns to the core, except at the south west and north east ends of the building where the secondary beams span onto a primary beam in lieu of the core," says Curtins Structural Engineer Carl Bebbington.

Stephen Barrett, Squire & Partners Project Architect adds:

"From a spatial point of view a steel frame was chosen at the initial stages as this would allow for these larger spans, which provide an open-plan office space without any interruption.

"The benefits of steel also allow for a quicker programme in terms of installation and coordination of services, where steel beams can be penetrated offsite to allow sufficient openings for the distribution of services within the ceiling void."

The structure's one internal column is located close to the southern face of the core. Here the span from the core to the rear elevation is nearly 19m so, in order to keep the beam depth consistent with the rest of the building, a column was added.

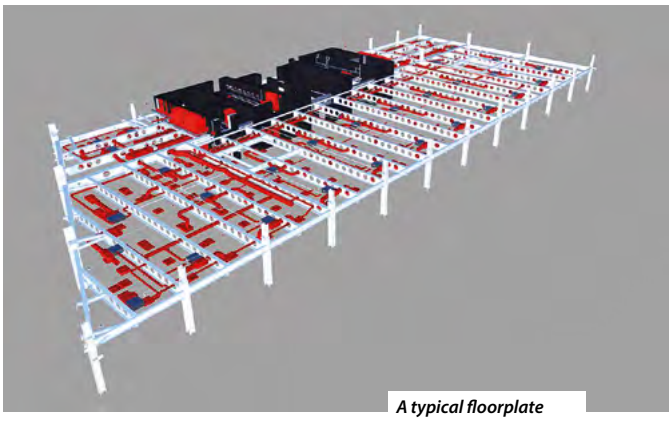
If the design team had opted for a clear span in this area the beam required would have been very big, up to 1,200mm deep, and so the additional column was considered to be the most cost-effective solution.

The overall structure has a number of constraints which drove some interesting technical details, and one of these is the connection between the single internal column and the reinforced concrete basement support column beneath, through which around 20MN of force needed to be transferred.

Mr Bebbington explains: "To transfer

Visualisation of the completed scheme

The main entrance foyer



A typical floorplate

the local bearing stresses between the two materials, an enlarged surface area was required, which exceeded the plan area of the concrete column below.

"This was achieved by casting a 2.85m steel section into the concrete, along with a number of shear studs which acted in combination with a stiffened baseplate to transfer the bearing stresses."

For efficient service integration, plate girders with bespoke holes have been used throughout the structure to accommodate the services within their depth.

However, steelwork contractor Billington Structures says the beams have been over-engineered with more holes than are immediately needed, giving the building the flexibility to accommodate future tenants that may have more service needs than the anticipated immediate commercial user.

The structural frame also has a composite design, with the plate girder beams supporting metal decking and a concrete topping. This solution was chosen as it is the most economical way to create floors with long column-free spans.

Steelwork forms the superstructure from the ground up but, before this part of the project began, main contractor Bowmer + Kirkland (B+K) had already completed some substantial preliminary substructure works.

Located on the plot of a former Odeon cinema, B+K started on site in early 2017 and commenced with a 21-week demolition programme. It then deepened the existing basement into a two-level subterranean zone, excavating the ground to its new 10m depth and surrounded the perimeter with a reinforced concrete liner wall.

Once these lower groundworks had been completed, which also included the installation of foundations and casting a ground floor slab, the steel erection was able to begin.

Steel erection followed on behind the slip-formed core construction, which was at level 10, when the first beams and columns were lifted into place.

"The building has one large core containing seven lift shafts and two staircases, which is a more efficient use of space as opposed to two separate cores," says B+K Project Manager Mark Taylor.

As the core was constructed, Billington Structures supplied cast-in plates in readiness for its steel erection programme. Once its main work was under way, the company also installed steelwork and flooring inside the core to form access areas on each floor level.

The steel frame is fairly repetitive with every floor the same, with the exception of two set-backs located on the first and eleventh levels. The first floor is set back along the main Oxford Street elevation, creating a double-height entrance foyer.

Along this elevation, the perimeter columns have been encased with an architectural precast concrete finish in order to match the building's overall cladding system.

A series of fabricated box sections, set back from the main columns, allows for a covered exterior pedestrian thoroughfare and supports the building's two-storey high glazed reception elevation.

A number of transfer beams were required at level 11 to support the columns forming the upper set-back and terrace area.

"This led to a particularly heavy primary plate girder being used which was also supporting the floorplate's long span beams," says Mr Bebbington.

"As this member was at the far end of the structure, detailed tower crane planning was key to ensuring it was within the radius of reach and the crane's capacities. The heavy end forces on this member created a challenge at the steel-to-concrete interface. Traditional studded cast-in plates were not feasible so instead a pocket detail was developed. This detail was developed in close collaboration with the site team and Billington to ensure buildability."

The building's main cladding system consists of precast panels, with each panel weighing up to 7t and measuring two storeys high. The panels are connected to a series of brackets, factory welded to all of the perimeter beams.

More than 2,700 brackets are needed to support the cladding and, because of the deflection criteria imposed on the steelwork, slightly larger members than would ordinarily be required were used for the building's frame.

The Landmark is scheduled to complete in Summer 2019.

Steel drives car showroom design

The ability to create long clear spans, as well as its speed of construction, are some of the reasons why steelwork is the ideal framing solution for car showrooms.

Steel construction has proven to be the correct framing solution for the Williams Group's £41M flagship retail centre for BMW, MINI, Land Rover and Jaguar vehicles.

The high-profile location of the showroom, adjacent to the Trafford Centre, Manchester, was selected by the company because it met its exacting requirements for a prominent site which it says will set new standards in vehicle retail and service.

Situated on a 14.3-acre plot, formerly occupied by a container base, the project includes three steel-framed showrooms and associated workshop structures, as well as a large steel-framed car wash building.

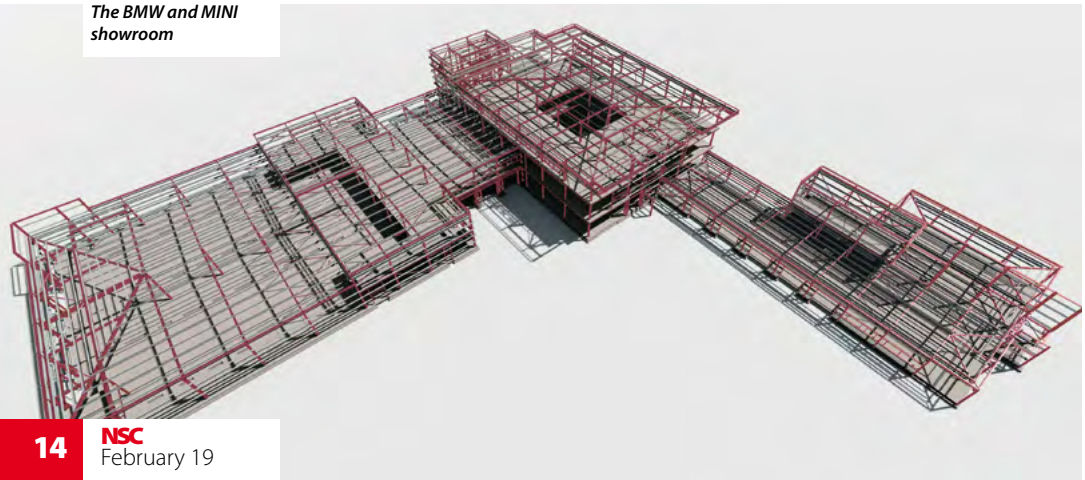
Main contractor Caddick Construction started on site last June and is due to complete in June 2019.

"With such a short and tight programme, steelwork is the ideal framing solution for this job. It gives us the required speed of construction to get the structures up quickly, which then allows all of the follow-on trades to get started early," says Caddick Contracts Manager Richard Gaukrodger. "There are also some long spans in the buildings and these are easily formed with steelwork."

Once on site, Caddick's initial task was to demolish a few small office buildings and then undertake a ground improvement programme.

The entire site was covered with a concrete slab, which was deemed to be unsuitable for the new construction. It was dug up in the areas where new structures were to be built, and the ground was then vibro-compacted. However, much of the slab has been retained in areas which will be given over to exterior parking lots within the new scheme.

The BMW and MINI showroom



How the BMW showroom will look

Pad foundations were also installed in readiness for the steelwork. Border Steelwork Structures (BSS) began its programme in August and the majority of the steel erection was completed during October.

BSS has since remained on site as it is also contracted to install the project's wall and roof cladding systems.

The main buildings include a striking three-storey contemporary glass-fronted showroom for the Group's BMW marque, which is located at the northern end of the site.

The three-storey structure is constructed in a traditional beam and column method with the steelwork supporting metal decked flooring. The structure features a constant 6m x 8m grid pattern, with cross bracing giving the frame its stability.

All three of the floors will have display areas for BMW cars, so the front elevation is fully glazed for maximum impact. The floorplates also accommodate office space and meeting rooms towards the rear.

The JLR showroom is two adjoining portal frames

The JLR showroom is divided in two by a central row of columns

Composite Profiles were contracted to detail, supply and install the composite metal floor decking for the upper floors in the showrooms. In total, over 4,100m² of ComFlor E60 and ComFlor 51+ in various gauges, together with perimeter edge shutter and over 12,000 shear studs, were supplied and installed by the company.

Adjoining the BMW showroom and continuing the overall building's glazed front elevation is a lower MINI showroom. This is a single-storey portal frame structure, which also contains a small two-storey element for plant.

Another, much larger, propped portal-frame is attached to the rear of the BMW showroom. Featuring two 20m-long spans, this structure will house the BMW and MINI workshops.

The other main steel-framed structure is the single-storey Jaguar Land Rover (JLR) showroom which is to the south of the site, but also overlooking Barton Dock Road.

This showroom's design is based around JLR's recently implemented ARCH concept, featuring an 18-car dual-branded showroom together with a service drive-through.

The creation and implementation of the dual-brand ARCH corporate identity is said to have been driven by Jaguar Land Rover's significant growth in recent years.

ARCH dual-brand showrooms are all decorated in colours which are said to be unique to Jaguar Land Rover – sunshine grey and champagne silver. The showroom façades are designed in such a way as to frame the product line of each marque within extensive glazed areas, creating what has been described as a 'jewel box' effect.

As the customer enters any ARCH showroom they are met with an interior environment that, like the exterior of the building, expresses the modernity of Jaguar Land Rover's current design philosophy. A single reception area serves both the Jaguar and Land Rover brands and customers wishing to inspect the product lines will head left or right to see the two distinct vehicle ranges.

This dual-brand configuration in the showroom is formed with a propped portal frame that has two 21m-wide spans, creating a space for each marque. A double row of central prop columns forms a 2m-wide corridor that separates the two showrooms.

"We have worked on the designs for a number of showrooms and steel is the best framing solution because of the large amount of glazing and extensive open-plan space they usually incorporate," says RPS Project Engineer Conor Stratton.

To the rear of the JLR showroom a link structure connects into the workshop area, which is another large propped portal frame with two 21m-wide spans.

The final piece of the steelwork programme involved BSS erecting a further portal frame to house wash bays and valeting areas. In keeping with the site's bespoke design, this is no ordinary car wash facility as it is 78m-long and 30m-wide, housing four lines of wash bays in a wet zone, which is accommodated in one half of the building, with valeting occupying the dry half of the structure.

Summing up, Williams Group Managing Director Nick Cook says: "We operate one of the largest family groups of premium and luxury automotive retail centres in the country and continually invest and improve our business to benefit our staff and customers.

"As a family-owned business, we are underlining our commitment to the region by relocating to this flagship site where we will retail and service cars from the finest retail centres in the North West. Once complete we will be delivering the Williams' difference that our loyal customers have come to expect and look forward to welcoming new customers to our new location."

FACT FILE

Williams Group retail centre

Main client: Williams Group

Architect: Taylor Design Architects

Main contractor: Caddick Construction

Structural engineer: RPS

Steelwork contractor: Border Steelwork Structures

Steel tonnage: 800t

FACT FILE
St Giles Circus development, London
Main client: Consolidated Developments
Architect: ORMS
Main contractor: Skanska
Structural engineer: Engenuiti
Steelwork contractor: Severfield
Steel tonnage: 2,400t

Steelwork performs complex circus act

A central London mixed-use development that contains an urban gallery and a basement auditorium is being constructed around a number of site constraints including a nearby Underground escalator shaft and a Crossrail tunnel. Martin Cooper reports from St Giles Circus.

Situated alongside London's Denmark Street, a thoroughfare steeped in musical heritage, and also known as Tin Pan Alley, the St Giles Circus development is a mixed-use scheme that features, among other things, a large urban gallery which is said to re-imagine a music venue for the 21st Century.

Housed in a large column-free ground floor space, which is four-storeys high, the gallery will feature two innovative, retractable façades which when open reveal LED screens along two walls as well as the ceiling.

"The urban gallery is the face of the project. It is a multi-functional space for different types of events. The concept is built on the musical and creative past of Denmark Street and provides a venue relevant for the 21st Century," says Orms Project Architect and Associate, Andrew McEwan.

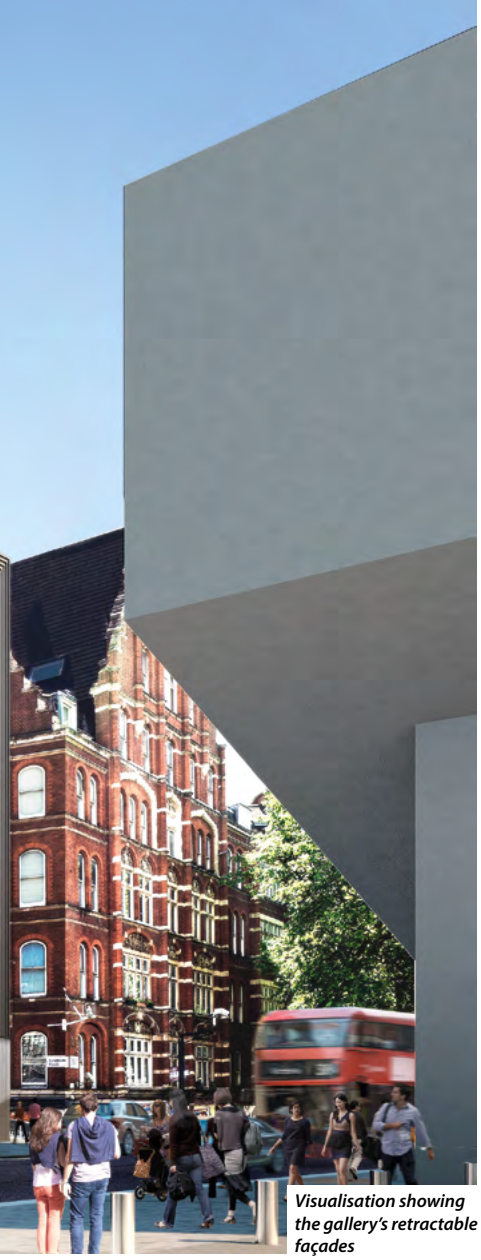
"A series of sliding doors will allow the Urban Gallery to be open to the general public or closed for private events, while the moving three-storey high louvres situated above the doors will be open for most of the day and evening, allowing the gallery to essentially be a covered outdoor area. They will bring a real sense of theatre to the building."

The gallery is just one part of the overall development as the St Giles Circus scheme consists of four separate new buildings (A, B, C and D) that also house an hotel, retail spaces, commercial offices, restaurants and bars, and residential accommodation.

Meanwhile, below ground there is a four-storey deep basement, which will house a box-within-a-box 2,000-capacity acoustically isolated auditorium as well as offices and back-of-house facilities.

"The subterranean parts of the scheme have dictated our construction programme and methodology," explains Skanska Senior Project Manager Neil Keogh. "To construct the scheme efficiently and within our timescale we are using a top-down method, whereby the basement is being dug-out while the steel frames for A and B are simultaneously erected above."

A series of steel plunge columns has been



Visualisation showing the gallery's retractable façades

The bigger picture

The street that is still synonymous with music publishers, music industry magazines and recording studios will be partially refurbished as part of the project's phase two.

Skanska will refurbish some of the buildings along the north side of Denmark Street, with many independent music shops having their premises updated with offices and residential accommodation on the upper levels.

The works also cover a number of Grade II listed buildings on Denmark Street, Denmark Place and St Giles High Street (pictured above), some dating back to before the Great Fire of London in 1666.

The 'smithy', a 300-year-old structure that has been a stable yard and a blacksmith, has been placed on a concrete raft and moved temporarily within the site, before being returned to its original location to become part of a new grassroots music venue.

Steel construction under way for the gallery

installed, some within metres of the Crossrail Elizabeth Line tunnel that is located under the site. The piles have allowed the basement excavation to begin and then the ground floor transfer slab to be cast.

To form the ground floor, four steel transfer beams, up to 33m long, were installed and then cast into the slab to help bridge over the basement auditorium, which is a large column-free space.

With the slab completed, the above ground steel erection was able to begin with the project's largest structure. This is the seven-storey high Building A, which has some long spans to accommodate the urban gallery. These are up to 24m-long and could only have been efficiently created with a steel solution.

Erecting and designing this structure has been anything but straightforward, with one of the biggest challenges involving the position of the new escalator shaft for Tottenham Court Road tube station.

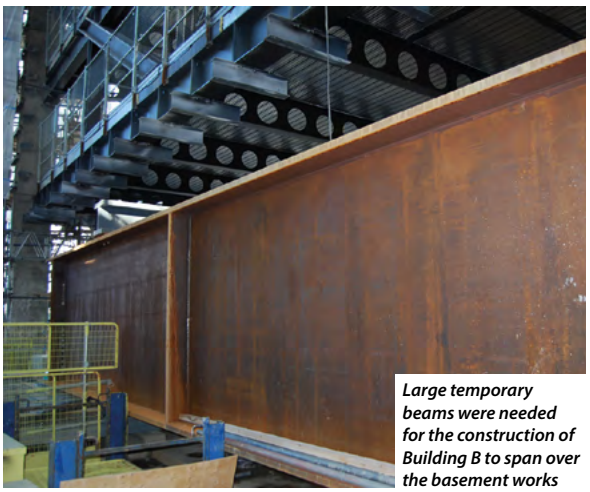
One of Building A's columns in the north-west corner sits directly above this shaft and so foundations were out of the question and consequently it is hung from cantilevering steelwork.

Some large beams in the gallery, up to 34t in weight, connect to this hanging column and transfer the loads from above onto adjacent columns.

"These beams are very large because they also support the 24 moveable louvres that weigh four tonnes each. Consequently, there are some considerable loads being transferred to the box section columns," says Engenuiti Associate Ian Hamilton.

All of the gallery's columns are fabricated plated box sections, with the largest measuring 1,650mm × 400mm.

Meanwhile, a series of three 24m-long three-storey high trusses forms the lid to the gallery, with parts of the building's upper floors accommodated within their depth. ▶18



Large temporary beams were needed for the construction of Building B to span over the basement works

▶17

The gallery fills roughly two-thirds of Building A's footprint, with a smaller area to the south formed in a traditional beam and column configuration around a central core. The rear part of the building, as well as part of the top three floors, will accommodate the hotel, alongside offices, conference spaces and a top floor restaurant.

A considerable amount of temporary works has also been needed during the erection of the adjacent five-storey Building B, which is similar in design to its sister structure, insofar that it also has a ground floor open space for events.

Rooftop view from Building A

"While the excavation of the basement was ongoing we had to install a series of large temporary beams to spread the steel frame's loads and span over areas where the permanent works below ground were not complete," explains Severfield Senior Project Manager Michael Bryars.

The ground beams are very large, with each one measuring 18m-long × 2.2m-high and weighing 15t each.

"Once the basement works are complete and the plunge columns are able to support the permanent loads, we will have to remove the ground beams by cutting them into smaller elements."

Because of the top-down construction programme, the steelwork has been split into two phases, with the initial part involving the erection of buildings A and B. This work was completed at the end of last year (2018) and a second phase of basement steelwork will begin in March (2019).

"This part of the project will be like building a ship in a bottle, as the steelwork for the auditorium will be lifted into the basement through a 7m × 4m opening in the ground floor slab," says Mr McEwan.

The steelwork for the basement auditorium's roof, which measures 28m × 24m, will be built at low level in the basement and then jacked up to the underside of the ground floor slab using 16 hollow ram jacks located above the slab.

While still being held by the jacks, the acoustically and dynamically isolated auditorium's remaining steelwork will then be erected before the jacks are removed via the same access void in the slab.

The project's two remaining structures, C and D, are smaller concrete-framed buildings, both featuring steel-framed top floor plant decks.

Building D adjoins Building B and shares a retained façade along the St Giles High Street elevation.

The St Giles Circus development is due to complete in 2020.

Plunge columns

David Brown of the SCI gives more background on their use

The use of plunge piles at St Giles Circus facilitated simultaneous progress on the superstructure and substructure, which has benefits for the overall construction programme. Plunge piles are bored piles, with a steel liner to at least the upper length. After reinforcing the pile bore with a prefabricated cage and pouring concrete, a steel section is lowered into the wet concrete.

Key to this process is the final position of the steel section on plan, to the correct level and vertical alignment, as the superstructure steelwork will be located directly on the tops of the steel sections. The positional tolerance for bored piles is generally specified as 75 mm in any direction at the level the boring commences (note that BS EN 1536 specifies a more generous minimum tolerance of 100 mm for small piles and a tolerance of 150 mm for bored piles over 1.5 m diameter), which is incompatible with the accuracy of the superstructure steelwork.

To ensure accurate placing of the steel section, contractors have developed temporary guide frames that are located within the upper length of the pile casing (concrete is not placed in this upper length of the pile). These frames adjust to suit the size of the steel section, and usually have hydraulic jacks to align the steel section to a high degree of precision. The steel section is then lowered through the guide frame into the concrete, held in position whilst the concrete cures and the guide frame subsequently removed. The plunge column may have a removable top extension with side brackets to assist in the adjustment and maintenance of the vertical position.

Typical tolerances of the steel section within the plunge pile are ±10 mm on plan and level, which is satisfactory for subsequent erection of the steel superstructure. Tolerance of 1:400 might be allowed for in design, but practice is often much more precise: an average verticality of 1:3000 has been achieved on some sites.

The load transfer between the steel section and the concrete pile is usually based on the surface area of the steel section in contact with the concrete, to calculate an appropriate embedment length. There does not appear to be any codified guidance on what bond strength should be taken, so designers and contractors have their own approaches to this calculation, supported by test.

Final call for entries for the 2019 Structural Steel Design Awards

The British Constructional Steelwork Association and Trimble Solutions (UK) Ltd have pleasure in inviting entries for the 2019 Structural Steel Design Awards.

The Awards celebrate the excellence of the United Kingdom and the Republic of Ireland in the field of steel construction, particularly demonstrating its potential in terms of efficiency, cost-effectiveness, aesthetics and innovation.

The Awards are open to steel-based structures situated in the United Kingdom or overseas that have been built by UK or Irish steelwork contractors. They must have been completed and be ready for occupation or use during the calendar years 2017-2018; previous entries are not eligible.

To find out more and request an entry form visit www.steelconstruction.org/resources/design-awards or call Chris Dolling of BCSA on 020 7747 8133

Closing date for entries:
Friday 22nd February 2019

BCSA

Trimble

The rear of the school is built into the site's slope

Steel creates stand-out campus

Overlooking a Scottish Borders town, an architecturally-impressive school campus has been constructed with a steel framing solution.

FACT FILE
Jedburgh Intergenerational Community Campus, Jedburgh
Main client: Hub South East and Scottish Borders Council
Architect: Stallan Brand
Main contractor: BAM Construction
Structural engineer: Goodson Associates
Steelwork contractor: Hescott Engineering
Steel tonnage: 800t

Three existing schools in the Scottish Borders town of Jedburgh will be relocating next year into a new, modern and architecturally-inspiring school campus.

Known as the Jedburgh Intergenerational Community Campus, the £32M facility will have provision for up to 1,000 nursery, primary and secondary school children, alongside further education students.

Meanwhile, serving the wider populace of the town, community facilities at the Campus will include a multi-use games area, 2G hockey pitch, 3G rugby/football pitch and a 100m running track. The Campus will also have a separate steel portal-framed rural skills building that will teach farming techniques.

Positioned towards the top of a steep sloping site, the desire was always to have a stand-out and architecturally-impressive building, as the school will be visible from large parts of the town below.

To this end, a steel-framed solution was chosen for the building, with precast planks used to form each of the upper floor slabs.

"By using steel we've been able to work closely with the architect to design a regular, economic frame, which has allowed the saving in weight to be spent on the more visually exciting parts of the structure, such as the rooflights and cantilevers," says Goodson Associates Project Engineer Euan Kerr.

These rooftop cantilevers form canopies that will give some protection against the weather, as well as providing solar shade. The parapets at the end of each cantilever have been utilised to provide edge protection to the roof. At the main front elevation of the school building the cantilever is 7.5m-deep, while on the other facades the overhang is slightly shallower at 4.5m.

Internally, the steelwork and the precast ceiling soffit are all left exposed, thereby creating the desired modern industrial looking environment that also complements the open-plan layout of the school. There are no doors to many of the classrooms and plenty of break-out space, which all contributes to an informal and relaxed school design.

Preparing a suitable flat plot for this stand-out school required main contractor BAM Construction to undertake a three-month long enabling works programme, in order to create several terraces to accommodate the building and its sports facilities.

The school is positioned on two terraces, while the sports pitches are located on the top plateau, which is at the same level as the school's roof.

Four retaining walls have been formed to create the terraces, the tallest of which is 12m-high and positioned at the rear of the main school building. The retaining structures have been constructed as gabion walls using locally-sourced rocks to create a natural look.

"Our first task was to create an access road up the site," explains BAM Project Manager David Brodie. "We then undertook a large cut-and-fill earthmoving programme, with very little overburden leaving the site as it was reused around the plot."

The nursery school will be accommodated on the lowest level

Once the considerable preparatory works had been completed, the main steel frame for the school building was erected by Hescott Engineering during a 12-week programme.

Overall the steel frame forms one large structure which is two storeys high at the front and three storeys towards the rear as it works its way into the hill.

One row of columns is supported on concrete piers set within the main retaining wall. The steelwork in this location overhangs a void between the Campus's lower levels, forming an undercroft, which will be used to accommodate plant equipment. Above, the third-floor classrooms over-sail the undercroft and have access to a rear positioned playground on an upper terrace.

The Campus is centred around a large entrance and atrium area that has a series of centrally-positioned rooflights. This is a large column-free double-height space and forms the zone where the school steps up from two to three storeys.

The design brief for the Campus incorporates a journey through education, beginning with the nursery school at ground floor level.

The nursery is located at the front portion of the two-storey block in front of the entrance, with primary school facilities above. Pupils will then continue their educational voyage along to the high school parts of the Campus which are located in the three-storey part of the school positioned towards the rear of the entrance/atrium.

Predominantly the steelwork is based around a 7.5m column grid, as this was considered the most economic and efficient pattern for the classrooms. The only exceptions, apart from the entrance/atrium are the main assembly hall and sports hall.

Both of these large column-free areas sit adjacent to each other, separated by a storage area, and are located at the rear of the school. These two double-height spaces are formed with long-span Westok cellular beams that not only form the large open spaces for the halls, but also act as transfer structures for the school's third floor high school level, where the column grid returns to the project's standard 7.5m column spacing.

A series of 19m-long × 1.1m-deep cellular beams has been used for the sports hall. These sections, weighing 6t each, were the heaviest individual steel elements on the project. They arrived on site in two pieces, measuring 15m and 4m-long respectively.

"The complete beams would have been too long to transport up the access road which has a couple of tight bends," says Hescott Engineering Contracts Manager Tony McAleese.

The beams were spliced together on site before being lifted into place as complete members. The cellular beams, like the majority of the project's steelwork, will be left exposed within the completed scheme and so the bolted connections will be feature elements. There were no such transportation challenges encountered for the assembly hall beams as these members are slightly smaller at 15m-long × 900mm-deep.

The Campus is scheduled to be complete by Spring 2020.

Steel erection was completed in 12 weeks

The campus juts out from the slope with the sports pitches located behind on a plateau

Properties of quality class steel

David Brown of the SCI discusses the specification of steel with improved through thickness properties. It should be noted that steel with through thickness properties (so-called "Z grade") is only needed in high risk situations.

Steel with improved through thickness properties is often referred to as "Z grade", although the formal description is 'Quality class'. The "Z" is simply because the dimensions in-plane are "x" and "y" and out-of-plane, through the thickness of the material, is the "z" direction. The word "improved" is important, as steels to the EN 10025 Standards will generally have resistance to stress in the z direction. The common arrangement used to demonstrate the potential need for improved through thickness properties is shown in Figure 1 – tensile stress is applied through the 'incoming' plates, leading to possible lamellar tearing in the 'through' plate. Lamellar tearing is when the steel in the 'through' plate separates internally.

Internal tearing may be occur due to areas of inclusions or impurity which can be detected by ultrasonic testing, or when through thickness loading causes tearing to propagate between micro imperfections. Micro imperfections cannot readily be detected by ultrasonic testing, but would be revealed by through thickness testing to EN 10164.

Material specification

Steel may be examined for the two types of imperfections mentioned above by specifying certain options at the time of order. Within EN 10025, which covers the steel sections and plate normally used in construction, options 6 and 7 apply to plate and sections with parallel flanges respectively, and require the steel to be examined for internal defects by ultrasonic testing. If through thickness properties are required, this must be selected by specifying option 4, which is testing in accordance with EN 10164. For rolled sections to EN 10025-2, clause 7.3.3 indicates that option 4 can only be specified for sub-grades J2 and K2.

If through thickness testing to EN 10164 is specified, this automatically includes ultrasonic testing to EN 10160 (for plate) or EN 10306 (for sections) as applicable, so there is no need to separately specify option 6 or 7.

Through thickness testing

Through thickness testing to EN 10164 requires samples cut from the plate (or section) to be subject to a tensile force in the z direction until the sample fractures. The test is examining the capacity of the steel to 'neck' before fracture, which is a measure of material ductility in the z-axis. The samples are machined to have a circular cross section, typically of 6 mm or 10 mm diameter, with a "headed" portion of the form shown in Figure 2, so that it can be gripped in a testing machine. EN 10164 specifies where the samples are to be taken – typically at 1/3 of the web depth and 1/3 of the flange outstand (measured from the tip).

The obvious question relates to the testing of thin material – how can this be prepared in such a way to be gripped in a testing machine? For thin material, extension pieces are welded to the sample. Because welding will change the material properties locally, the original sample must be at least 15 mm thick. To minimise the effect of the welding, EN 10164 suggests that extension pieces be friction welded to ensure the heat affected zone is minimised. Fracture in the weld or heat affected zone invalidates the results. Extension pieces are mandatory for samples up to 20 mm thick, optional for samples between 20 and 80 mm thick, and cannot be used for samples thicker than 80 mm.

Three samples are tested and in each case the reduction ▶24

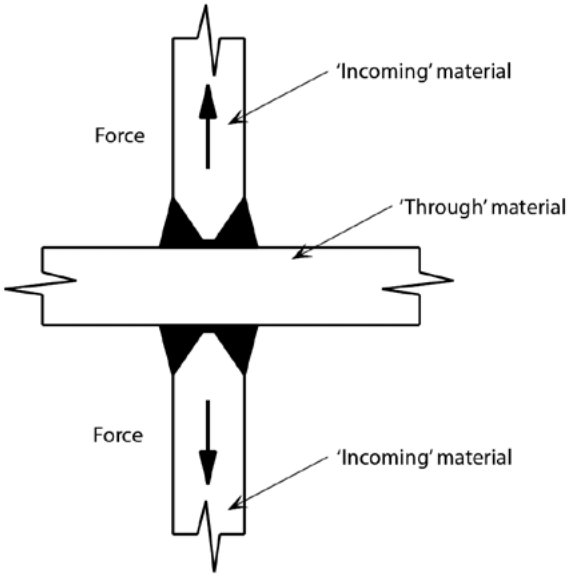


Figure 1 – Cruciform joint

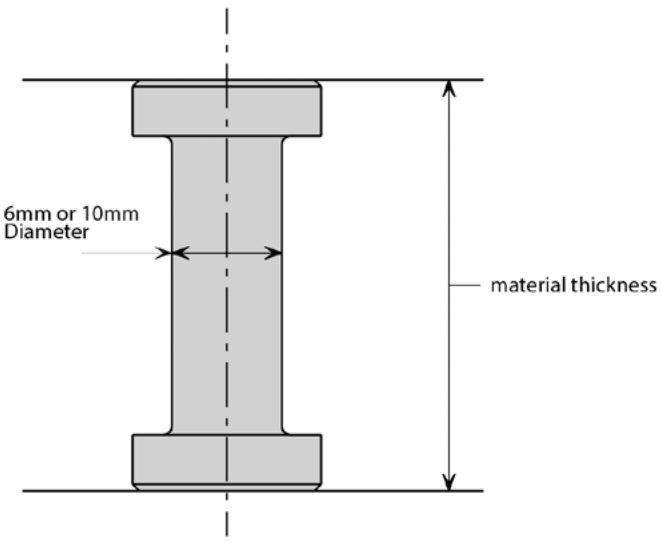


Figure 2 – Testing sample profile

Contractual Help for Contractors:

BCSA's Construction Contractual Handbook updated (5th edition)

The Construction Contractual Handbook is an essential tool which sets out the law and contracts for specialist contractors in a compact and accessible way.

It has now been updated for 2019.

The Handbook contains a wide range of information including:

- A reminder about the formation of a contract
- A chapter explaining onerous clauses
- Addressing the need to maintain vigilance throughout the duration of the contract and dispute management.
- Chapters on Scottish and Irish law
- Useful checklists as a reminder
- And more...

BCSA's Construction Contractual Handbook can be purchased from Construction Industry Publications **www.cip-books.com/product/construction-contractual-handbook-5th-edition**

BCSA

CONSTRUCTION INDUSTRY PUBLICATIONS

▶22 of area when the sample fractures is given by:

$$\frac{S_o - S_u}{S_o} \times 100$$

where S_o is the original cross sectional area,
S_u is the minimum cross sectional area after fracture.

Both the average and individual results are needed to define the quality class in accordance with Table 1.

Quality class	Reduction of area in %	
	Minimum average value of three tests	Minimum individual value
Z15	15	10
Z25	25	15
Z35	35	25

Table 1: Z Quality class

Eurocode requirements

A procedure to determine if improved through thickness properties are required is given in Section 3 of BS EN 1993-1-10. Readers should note that there is little enthusiasm in the UK for this procedure, and alternative guidance is given in PD 6695-1-10. Despite the UK position, the guidance in BS EN 1993-1-10 establishes important principles, reinforced by the PD. The Eurocode notes that:

- The strain through the thickness of the material arises as welds to the surface (see Figure 1) cool and shrink. If that shrinkage is restrained by other stiff parts of the assembly, it is clear that the possibility of lamellar tearing increases,
- Larger welds increase the possibility of tearing,
- Thoughtful weld detailing can reduce the risk, for example by avoiding fusion faces which are parallel to the surface of the steel,
- The sulphur content in the steel is important – lower levels improve the through thickness properties of the steel.

The procedure in BS EN 1993-1-10 is essentially a scoring system based on a number of contributing factors. Criteria that increase the risk are awarded a higher score, those that reduce the risk given a lower or negative score. The required Z quality class (Table 1) must be greater than the summation of the individual scores. Some examples illustrate the features of the system:

A fillet weld throat 5 mm scores zero, a throat of 14 mm scores 6. The table includes fillet welds up to a 35 mm throat with a score of 15, but would be unusual, one hopes!

Welds where the fusion faces are not parallel to the surface (Figure 3a) score -25 (indicating that these are not a problem). Welds made to the surface of the steel (Figure 3b) score 5, or 8, depending on the detail.

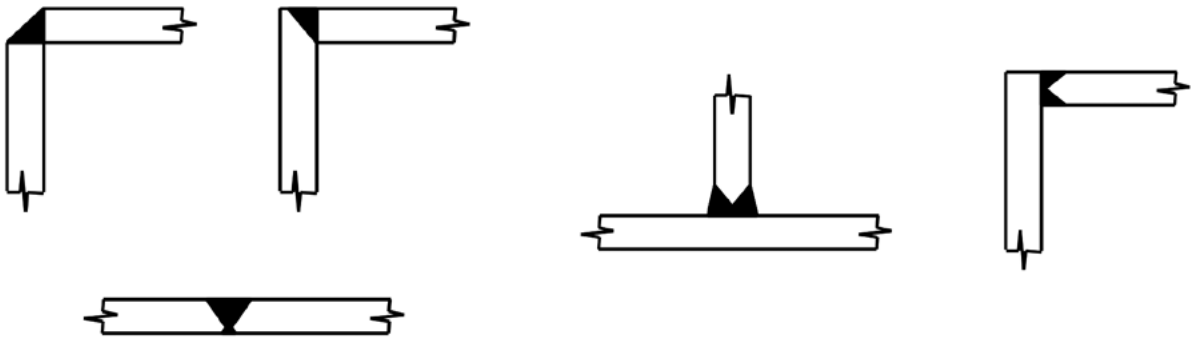
Thicker material, which provides more restraint, scores between 2 for 10 mm material and 15 for 70 mm material.

Perhaps surprisingly, the degree of restraint offered by other portions of the assembly is not so significant – a score of zero for low restraint to (a mere) 5 for high restraint. The most significant contributions are therefore the weld size, the thickness of the material and the joint type.

Guidance in PD 6695-1-10

The UK guidance is that through thickness testing is expensive,

Figure 3: Joint types



often unnecessary, and should only be specified in 'high-risk' situations. High-risk situations, illustrated in Figure 4, are identified as:

- Tee joints with butt welds where the thickness of the 'incoming' material is greater than 35 mm, or if fillet welded the throat is greater than 35 mm (again, a notable fillet weld!)
- Cruciform joints with butt welds where the thickness of the 'incoming' material is greater than 25 mm, or if fillet welded the throat is greater than 25 mm (still notable!)

In these high risk situations, the specification of quality class Z35 is recommended. If Z35 material cannot be readily obtained, then the sulphur content should be limited to 0.005%. This is significantly lower than the maximum specified in BS EN 10025-2, which is typically 0.03%.

In addition, weld volume should be minimised by avoiding over-specification – which is sensible advice in all situations. Both the designer and steelwork contractor can contribute here: the designer by not specifying conservative forces for the connection design and the steelwork contractor by making a careful choice of joint preparation.

PD 6695-1-10 notes that steel with low sulphur levels is likely to have improved through thickness properties (Z25 or even Z35) as a matter of course. The sulphur levels which have such a significant influence on through thickness properties may be verified by looking at the mill certificates. The PD also lists a series of practical measures to reduce the risk of lamellar tearing. These measures are primarily for the steelwork contractor and reflect the contributions to the overall risk score noted above. Practice to reduce the risk includes:

- Avoiding weld details where the fusion face is on the surface of the material.
- Managing the assembly of fabricated items to reduce restraint on subsequent welds.
- Minimising shrinkage of the welds by process control.
- Ordering steel with lower maximum sulphur levels, or purchasing steel from suppliers known to produce 'cleaner' steel.

Conclusions

In Western and other developed countries, steel is likely to be 'clean' (low sulphur), the steelwork contractors undertaking complex welding of large assemblies are likely to be highly experienced and the welding operations will be managed by a Responsible Welding Coordinator (an essential individual for the production of CE Marked steelwork). In these circumstances improved through thickness properties need only be specified for the high risk situations noted above.

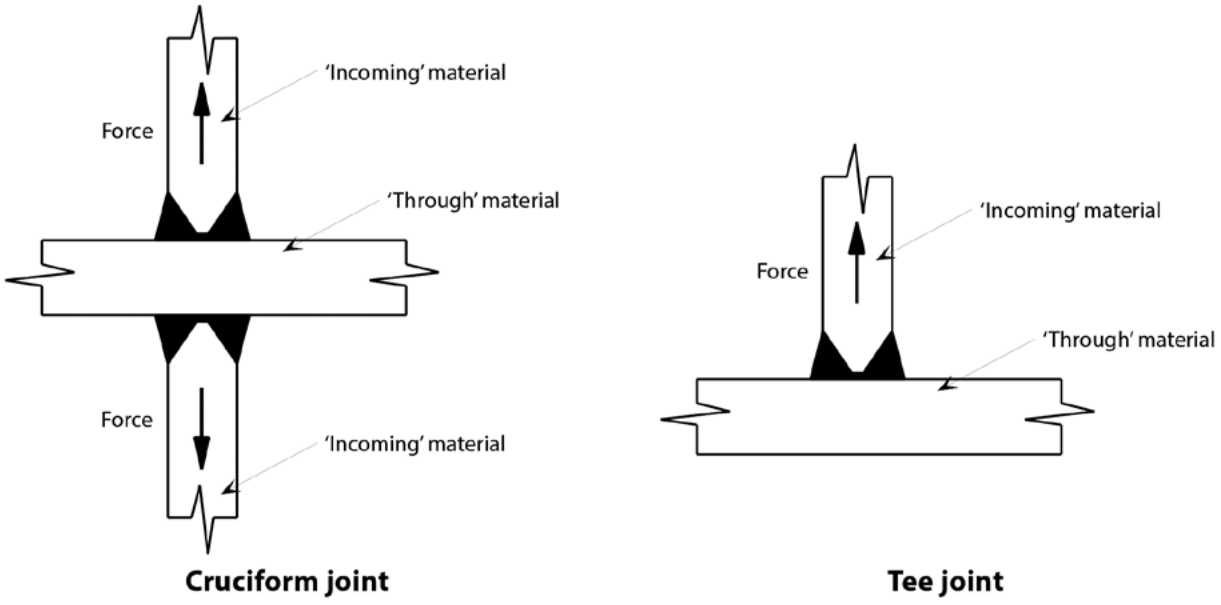


Figure 4: 'High risk' situations

New and revised codes & standards

From BSI Updates December 2018 and January 2019

BS EN PUBLICATIONS

BS EN 1992-4:2018
Eurocode 2. Design of concrete structures. Design of fastenings for use in concrete
Supersedes DD CEN/TS 1992-4-1:2009, DD CEN/TS 1992-4-2:2009, DD CEN/TS 1992-4-3:2009, DD CEN/TS 1992-4-4:2009 and DD CEN/TS 1992-4-5:2009

BS EN ISO 11124-3:2018
Preparation of steel substrates before application of paints and related products. Specifications for metallic blast-cleaning abrasives. High-carbon cast-steel shot and grit
Supersedes BS EN ISO 11124-3:1997

BS EN ISO 11125-1:2018
Preparation of steel substrates before application of paints and related products. Test methods for metallic blast-cleaning abrasives. Sampling
Supersedes BS EN ISO 11125-1:1997

BS EN ISO 11125-7:2018
Preparation of steel substrates before application of paints and related products. Test methods for metallic blast-cleaning abrasives. Determination of moisture
Supersedes BS EN ISO 11125-7:1997

BS EN ISO 11126-5:2018
Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast-cleaning abrasives. Nickel slag
Supersedes BS EN ISO 11126-5:1998

BS EN ISO 11126-6:2018
Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast-cleaning abrasives. Iron and steel slags
Supersedes BS EN ISO 11126-6:1998

BS EN ISO 11126-7:2018
Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast-cleaning abrasives. Fused aluminium oxide
Supersedes BS EN ISO 11126-7:2001

PUBLISHED DOCUMENTS

PD ISO/TR 22299:2018
Document management. Digital file format recommendations for long-term storage
No current standard is superseded

CORRIGENDA TO BRITISH STANDARDS

BS EN 14399-8:2018
High strength structural bolting assemblies for preloading. System HV. Hexagon fit bolt and nut assemblies
To be completed. Corrigendum, October 2018

BS EN ISO 20378:2018
Welding consumables. Rods for gas welding of non-alloy and creep-resisting steels. Classification
To be completed. Corrigendum, October 2018

BRITISH STANDARDS WITHDRAWN

DD CEN/TS 1992-4-1:2009
Design of fastenings for use in concrete. General
Superseded by BS EN 1992-4:2018

DD CEN/TS 1992-4-2:2009
Design of fastenings for use in concrete. Headed fasteners
Superseded by BS EN 1992-4:2018

DD CEN/TS 1992-4-3:2009
Design of fastenings for use in concrete. Anchor channels
Superseded by BS EN 1992-4:2018

DD CEN/TS 1992-4-4:2009
Design of fastenings for use in concrete. Post-installed fasteners. Mechanical systems
Superseded by BS EN 1992-4:2018

DD CEN/TS 1992-4-5:2009
Design of fastenings for use in concrete. Post-installed fasteners. Chemical systems
Superseded by BS EN 1992-4:2018

BS EN ISO 11124-3:1997 (BS 7079-E3:1994)
Preparation of steel substrates before application of paints and related products. Specifications for metallic blast-cleaning abrasives. High-carbon cast-steel shot and grit
Also numbered BS 7079-E3:1994. Superseded by BS EN ISO 11124-3:2018

BS EN ISO 11125-1:1997 (BS 7079-E6:1994)
Preparation of steel substrates before application of paints and related products. Test methods for metallic blast-cleaning abrasives. Sampling
Also numbered BS 7079-E6:1994. Superseded by BS EN ISO 11125-1:2018

BS EN ISO 11125-7:1997 (BS 7079-E12:1994)
Preparation of steel substrates before application of paints and related products. Test methods for metallic blast-cleaning abrasives. Determination of moisture
Also numbered BS 7079-E12:1994. Superseded by BS EN SIO 11125-7:2018

BS EN ISO 11126-5:1998 (BS 7079-F5:1994)
Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast-cleaning abrasives. Nickel refinery slag
Also numbered BS 7079-F5:1994. Superseded by BS EN ISO 11126-5:2018

BS EN ISO 11126-6:1998 (BS 7079-F6:1994)
Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast-cleaning abrasives. Iron furnace slag
Also numbered BS 7079-F6:1994. Superseded by BS EN ISO 11126-6:2018

BS EN ISO 11126-7:2001
Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast cleaning abrasives. Specification for fused aluminium oxide
Also numbered BS 7079-F7:1996. Superseded by BS EN ISO 11126-7:2018

ISO PUBLICATIONS

ISO 8504-3:2018
Preparation of steel substrates before application of paints and related products. Surface preparation methods. Hand- and power-tool cleaning
Will be implemented as an identical British Standard

AD 427: Typographical error in P419

A few eagle-eyed readers have noticed a typographical error in SCI publication P419 Brittle fracture: selection of steel sub-grade to BS EN 1993-1-10, within the expression to determine the design crack growth a_d presented in section 3.1.1.

The sign of the fourth term in the expression should be negative and read

$$-6.3837 \times 10^{-4} t^2$$

The typo is repeated in the numerical example in Appendix A section A.2 where the expression is stated again. However, the result of the expression (a design crack depth of 2.26 mm) is correctly stated, having been calculated respecting the correct sign. The tabulated values in the publication have also been determined using the correct expression.

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BUILDING WITH STEEL

Reprinted from Volume 5 No. 3
November 1968

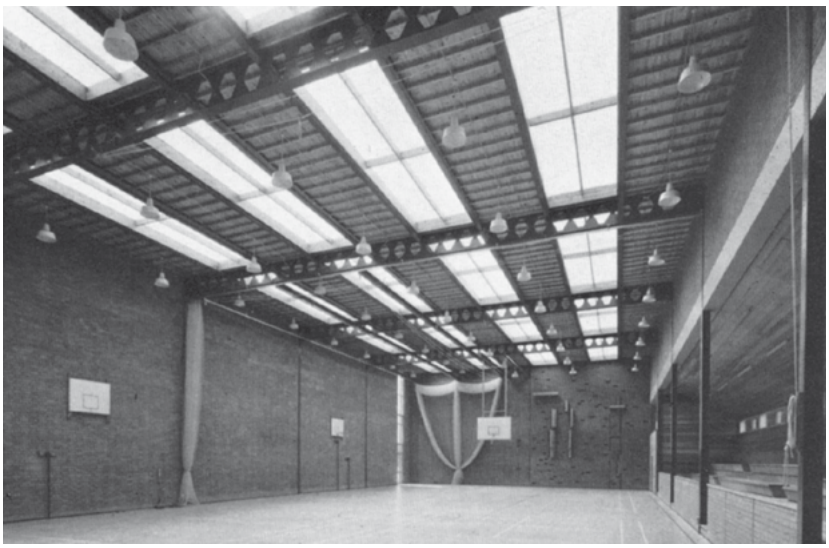
AUSTERE BEAUTY

A striking landmark in an historical setting is St Aengus's church on the shore of Lough Swilly some six miles from Londonderry.

Set austerely in a mountainous countryside, the church serves three neighbouring village communities.

Near at hand, on a hilltop overlooking the church stands the circular Grianan Fort built of stone and dating back to pre-Christian times. The new church is circular in plan and seats 550 worshippers. The design incorporates an inner ring of steel columns which supports a steel and timber roof. Copper covers the roof and spire. All fittings and materials display imaginative choice. Illustrations show the startling beauty of both outside and inside of this unusual church. Architects, F. M. Corr & W. H. D. McCormick of Northern Ireland.

NOVEL SPORTS HALL AT AYLESBURY COLLEGE OF FURTHER EDUCATION



A three-year building extension programme for this college costing £375,000 was concluded a month before time earlier in the year.

Included in the project were six buildings or extensions to existing buildings, extensive car parks, external works and landscaping.

One of the new buildings is a two-storey administration block with a large single storey sports hall with squash court, together with administrative offices.

A highlight of the sports hall is a climbing wall, (see illustration) believed to be only the second of its kind in the country.

The sports hall also includes a volleyball court and facilities for basketball badminton and tennis.

Total floor area of the extensions is 65,532 sq. ft. Construction is generally traditional with the engineering workshop and domestic science blocks having structural steelwork frames; in addition the administration block and extensions to the boiler house and kitchens have part structural steelwork frames. The domestic science block is seen in the second illustration.

The whole design project was under the direction of F. B. Pooley CBE, FRIBA, FRICS, AMPTI, County Architect of Buckinghamshire.

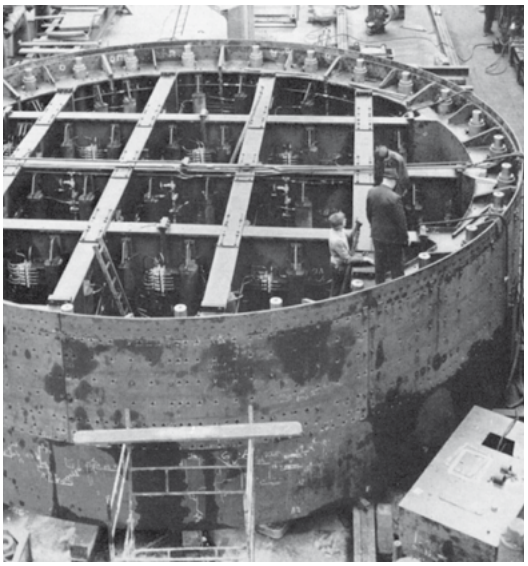
STEEL FOR AIRPORT TUNNELLING

An immense tunnelling shield - the largest of its kind yet to be made in the UK - has been in operation on the cargo tunnel at Heathrow.

The main body of this shield is made up of welded segments of mild steel plate bolted together with high strength friction grip bolts. Outside dia is 39 ft, length 9 ft 11½ in and it was designed to operate in clay 22 ft below ground level. To form the twenty working cells the inside is divided by three vertical and four horizontal girders of heavy welded construction. There are sliding platforms in each of the sixteen upper cells.

The structure weights 202 tons: it was trial assembled in the fabricator's works (see illustration) and fitted with all hydraulic equipment, sliding platforms etc. After being thoroughly tested it was dismantled and finally reassembled on site.

Consulting engineers for the British Airports Authority for the whole project are Sir William Halcrow and Partners.



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			●	●					●	●			●	●		3			Up to £400,000
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					●				●	●			●	●	✔	4			Up to £4,000,000
Adey Steel Ltd	01509 556677	●		●	●	●	●	●	●	●	●			●	●	✔	3	✔	●	Up to £4,000,000
Adstone Construction Ltd	01905 794561			●	●	●	●									✔	2	✔	●	Up to £3,000,000
Advanced Fabrications Poyle Ltd	01753 653617				●	●	●	●		●	●			●	●	✔	2			Up to £800,000
AJ Engineering & Construction Services Ltd	01309 671919			●	●		●		●	●	●			●	●	✔	4		●	Up to £3,000,000
Angle Ring Company Ltd	0121 557 7241												●			✔	4			Up to £1,400,000*
Apex Steel Structures Ltd	01268 660828					●	●			●	●			●	●		2			Up to £3,000,000
Arminhall Engineering Ltd	01799 524510	●			●	●		●		●	●			●	●	✔	2			Up to £800,000
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		●	Up to £4,000,000
Atlasco Constructional Engineers Ltd	01782 564711			●	●	●	●			●	●			●	●	✔	2			Up to £1,400,000
Austin-Divall Fabrications Ltd	01903 721950				●	●	●	●		●	●			●	●	✔	2			Up to £1,400,000
B D Structures Ltd	01942 817770			●	●	●	●				●	●		●	●	✔	2	✔	●	Up to £1,400,000
Ballykine Structural Engineers Ltd	028 9756 2560			●	●	●	●	●				●				✔	4			Up to £1,400,000
Barnshaw Section Benders Ltd	0121 557 8261												●			✔	4			Up to £1,400,000
BHC Ltd	01555 840006	●	●	●	●	●	●	●			●	●		●	●	✔	4	✔	●	Above £6,000,000
Billington Structures Ltd	01226 340666		●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £6,000,000
Border Steelwork Structures Ltd	01228 548744			●	●	●	●			●	●				●		4			Up to £3,000,000
Bourne Group Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●		●	●	●	✔	4			Up to £6,000,000
Builders Beams Ltd	01227 863770			●	●	●	●			●	●			●	●	✔	2	✔		Up to £3,000,000*
Cairnhill Structures Ltd	01236 449393	●			●	●	●	●	●	●				●	●	✔	4		●	Up to £4,000,000
Caunton Engineering Ltd	01773 531111	●	●	●	●	●	●	●		●	●	●		●	●	✔	4	✔	●	Above £6,000,000
Cementation Fabrications	0300 105 0135	●			●		●	●			●		●		●	✔	3		●	Up to £6,000,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●		●	●	●			✔	4		●	Above £6,000,000
CMF Ltd	020 8844 0940				●		●	●		●	●				●	✔	4			Up to £6,000,000
Cook Fabrications Ltd	01303 893011			●	●		●			●	●			●	●		2			Up to £1,400,000
Coventry Construction Ltd	024 7646 4484			●	●	●	●		●	●	●			●	●	✔	4			Up to £1,400,000
D H Structures Ltd	01785 246269			●	●		●				●						2			Up to £40,000
D Hughes Welding & Fabrication Ltd	01248 421104				●	●	●	●		●	●		●	●	●	✔	4			Up to £800,000
Duggan Steel	00 353 29 70072		●	●	●	●	●	●	●		●	●			●	✔	4			Up to £6,000,000
ECS Engineering Services Ltd	01773 860001	●		●	●	●	●	●	●	●	●			●	●	✔	3			Up to £3,000,000
Elland Steel Structures Ltd	01422 380262		●	●	●	●	●	●	●	●	●	●		●		✔	4	✔	●	Up to £6,000,000
ESL (GB) Ltd	01482 787986	●					●	●	●	●	●	●	●	●	●	✔	4			Up to £400,000
EvadX Ltd	01745 336413			●	●	●	●	●	●	●	●	●			●	✔	3		●	Up to £3,000,000
Four Bay Structures Ltd	01603 758141			●	●	●	●	●		●	●			●	●		2			Up to £1,400,000
Four-Tees Engineers Ltd	01489 885899	●			●		●	●	●	●	●		●	●	●	✔	3		●	Up to £2,000,000
Fox Bros Engineering Ltd	00 353 53 942 1677			●	●	●	●	●		●	●				●		2			Up to £2,000,000
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)
Gorge Fabrications Ltd	0121 522 5770				●	●	●	●		●				●	●	✔	2			Up to £1,400,000
Gregg & Patterson (Engineers) Ltd	028 9061 8131			●	●	●	●	●				●		●		✔	3			Up to £3,000,000
H Young Structures Ltd	01953 601881			●	●	●	●	●		●	●			●	●	✔	2		●	Up to £2,000,000
Had Fab Ltd	01875 611711				●				●	●	●				●	✔	4			Up to £3,000,000
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*
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 £2,000,000
Mackay Steelwork & Cladding Ltd	01862 843910			●	●		●			●	●			●	●	✔	4			Up to £1,400,000
Maldon Marine Ltd	01621 859000				●	●		●	●	●	●			●	●	✔	3			Up to £1,400,000
Mifflin Construction Ltd	01568 613311			●	●	●	●				●						3			Up to £3,000,000
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
Newbridge Engineering Ltd	01429 866722	●	●	●	●	●	●	●	●		●	●		●	●	✔	4		●	Up to £2,000,000
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			●	●	●	●		●	●	●			●	●		3			Up to £1,400,000
Robinson Structures Ltd	01332 574711			●	●	●	●				●			●	●	✔	3			Up to £6,000,000
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
Severfield plc	01845 577896	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4		●	Above £6,000,000
SGC Steel Fabrication	01704 531286				●					●				●	●	✔	2			Up to £200,000
Shaun Hodgson Engineering Ltd	01553 766499	●		●	●		●			●	●			●	●	✔	3			Up to £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 £1,400,000
Southern Fabrications (Sussex) Ltd	01243 649000				●	●				●	●			●	●	✔	2			Up to £1,400,000
Steel & Roofing Systems	00 353 56 444 1855			●	●	●	●				●	●		●	●	✔	4			Up to £3,000,000
Structural Fabrications Ltd	01332 747400	●							●	●						✔	3		●	Up to £1,400,000
Taunton Fabrications Ltd	01823 324266				●					●				●	●	✔	2		●	Up to £2,000,000
Taziker Industrial Ltd	01204 468080	●		●	●		●			●	●		●	●	●	✔	3			Above £6,000,000
Temple Mill Fabrications Ltd	01623 741720			●	●	●	●			●	●			●	●	✔	2			Up to £400,000
Traditional Structures Ltd	01922 414172			●	●	●	●	●	●		●			●	●	✔	3	✔	●	Up to £2,000,000
TSI Structures Ltd	01603 720031			●	●	●	●	●			●			●			2	✔		Up to £2,000,000
Underhill Engineering Ltd	01752 752483				●		●	●	●	●	●			●	●	✔	4	✔		Up to £3,000,000
W I G Engineering Ltd	01869 320515				●					●					●	✔	2			Up to £400,000
Walter Watson Ltd	028 4377 8711			●	●	●	●	●				●				✔	4			Above £6,000,000
Westbury Park Engineering Ltd	01373 825500	●		●	●	●	●	●	●	●	●				●	✔	4		●	Up to £800,000
William Haley Engineering Ltd	01278 760591				●	●	●									✔	4		●	Up to £4,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✔	4	✔	●	Above £6,000,000
WT Fabrications (NE) Ltd	01642 691191			●	●	●	●				●			●	●	✔	4			Up to £40,000
Company name	**Tel**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**Q**	**R**	**S**	**QM**	**FPC**	**BIM**	**SCM**	**Guide Contract Value (1)**

Steelwork contractors for bridgeworks

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

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

- **FB** Footbridges
- **CF** Complex footbridges
- **SG** Sign gantries
- **PG** Bridges made principally from plate girders
- **TW** Bridges made principally from trusswork
- **BA** Bridges with stiffened complex platework (eg in decks, box girders or arch boxes)
- **CM** Cable-supported bridges (eg cable-stayed or suspension) and other major structures (eg 100 metre span)
- **MB** Moving bridges
- **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	FB	CF	SG	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
AJ Engineering & Construction Services Ltd	01309 671919	●			●	●	●	●	●	●	●	✓	4				●	Up to £3,000,000
Bourne Group Ltd	01202 746666	●			●	●				●	●	✓	4	✓		✓	●	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●	●	●	●	●	●	●	●	●	●	✓	4			✓		Up to £6,000,000
Cairnhill Structures Ltd	01236 449393	●	●	●	●	●	●	●		●	●	✓	4			✓	●	Up to £4,000,000
Cementation Fabrications	0300 105 0135	●		●	●	●	●				●	✓	3			✓	●	Up to £6,000,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £6,000,000
D Hughes Welding & Fabrication Ltd	01248 421104	●		●		●			●	●	●	✓	4			✓		Up to £800,000
Donyal Engineering Ltd	01207 270909	●		●						●	●	✓	3			✓	●	Up to £1,400,000
ECS Engineering Ltd	01773 860001	●			●	●	●		●		●	✓	3					Up to £3,000,000
ESL (GB) Ltd	01428 787986									●	●	✓	4			✓		Up to £400,000
Four-Tees Engineers Ltd	01489 885899	●			●	●	●		●	●		✓	3			✓	●	Up to £2,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445	●				●				●	●	✓	4			✓	●	Up to £6,000,000
M Hasson & Sons Ltd	028 2957 1281	●	●	●	●	●	●	●			●	✓	4			✓	●	Up to £2,000,000
Millar Callaghan Engineering Services Ltd	01294 217711	●						●		●	●	✓	4			✓		Up to £1,400,000
Murphy International Ltd	00 353 45 431384	●	●	●	●	●	●				●	✓	4			✓		Up to £1,400,000
Nusteel Structures Ltd	01303 268112	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Up to £4,000,000
S H Structures Ltd	01977 681931	●	●	●	●	●	●	●	●	●	●	✓	4	✓		✓	●	Up to £2,000,000
Severfield (UK) Ltd	01204 699999	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £6,000,000
Shaun Hodgson Engineering Ltd	01553 766499									●	●	✓	3			✓		Up to £800,000
Structural Fabrications Ltd	01332 747400	●		●	●	●	●			●	●	✓	3				●	Up to £1,400,000
Taziker Industrial Ltd	01204 468080	●		●	●	●	●	●	●	●	●	✓	3		✓	✓		Above £6,000,000
Underhill Engineering Ltd	01752 752483	●	●	●	●	●				●	●	✓	4	✓		✓		Up to £3,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	✓	4	✓	✓	✓	●	Above £6,000,000
Non-BCSA member																		
Allerton Steel Ltd	01609 774471	●	●	●	●	●	●	●		●	●	✓	4			✓	●	Up to £4,000,000
Centregreat Engineering Ltd	029 2046 5683	●		●	●	●	●	●	●	●	●	✓	4					Up to £2,000,000
Cimolai SpA	01223 836299	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓		Above £6,000,000
CTS Bridges Ltd	01484 606416	●	●	●	●	●	●	●	●	●	●	✓	4			✓	●	Up to £1,400,000
Ekspan Ltd	0114 261 1126	●				●			●	●	●	✓	2					Up to £400,000
Francis & Lewis International Ltd	01452 722200									●	●	✓	4			✓	●	Up to £2,000,000
Harrisons Engineering (Lancashire) Ltd	01254 823993	●		●	●	●	●	●	●	●	●	✓	3		✓			Up to £1,400,000
Hollandia Infra BV	00 31 180 540 540	●	●	●	●	●	●	●	●	●	●	✓	4					Above £6,000,000*
HS Carlsteel Engineering Ltd	020 8312 1879									●	●	✓	3			✓		Up to £200,000
IHC Engineering (UK) Ltd	01773 861734	●									●	✓	3			✓		Up to £400,000
In-Spec Manufacturing Ltd	01642 210716									●	●	✓	4			✓		Up to £400,000
Lanarkshire Welding Company Ltd	01698 264271	●		●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Up to £2,000,000
Total Steelwork & Fabrication Ltd	01925 234320	●		●		●				●	●	✓	3			✓		Up to £3,000,000
Victor Buyck Steel Construction	00 32 9 376 2211	●	●	●	●	●	●	●	●	●	●	✓	4		✓	✓	●	Above £6,000,000

Corporate Members

Corporate Members are clients, professional offices, educational establishments etc which support the development of national specifications, quality, fabrication and erection techniques, overall industry efficiency and good practice.

Company name	Tel
Control Energy Costs Ltd	01737 556631
Gene Mathers	0115 974 7831
Griffiths & Armour	0151 236 5656

Company name	Tel
Highways England Company Ltd	08457 504030
Kier Construction Ltd	01767 640111
McGee Group (Holdings) Ltd	020 8998 1101

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

Industry Members

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

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		
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 Ltd	01724 404040				●						M		
British Steel Distribution	01642 405040								●		D/I		
BW Industries Ltd	01262 400088	●									M		
Cellbeam Ltd	01937 840600	●									M		
Cleveland Steel & Tubes Ltd	01845 577789								●		M		
Composite Metal Flooring Ltd	01495 761080	●									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 567722485	●							●		M		
easi-edge Ltd	01777 870901							●			N/A	●	
Fabsec Ltd	01937 840641	●									N/A		
Ficep (UK) Ltd	01924 223530					●					N/A		
FLI Structures	01452 722200	●									M	●	
Forward Protective Coatings Ltd	01623 748323						●				N/A		
Hadley Industries Plc	0121 555 1342	●									M	○	
Hempel UK Ltd	01633 874024						●				N/A		
Highland Metals Ltd	01343 548855						●				N/A		
Hi-Span Ltd	01953 603081	●									M	●	
International Paint Ltd	0191 469 6111						●				N/A	●	

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM	BIM
Jack Tighe Ltd	01302 880360						●				N/A		
Jamestown Manufacturing Ltd	00 353 45 434288	●									M		
John Parker & Son Ltd	01227 783200								●	●	D/I		
Joseph Ash Galvanizing	01246 854650						●				N/A		
Jotun Paints (Europe) Ltd	01724 400000						●				N/A		
Kaltenbach Ltd	01234 213201					●					N/A		
Kingspan Structural Products	01944 712000	●									M	●	
Kloeckner Metals UK	0113 254 0711								●		D/I		
Lincoln Electric (UK) Ltd	0114 287 2401					●					N/A		
Lindapter International	01274 521444									●	M		
MSW UK Ltd	0115 946 2316	●									D/I		
Murray Plate Group Ltd	0161 866 0266								●		D/I		
National Tube Stockholders Ltd	01845 577440								●		D/I		
Peddinghaus Corporation UK Ltd	01952 200377					●					N/A		
PPG Architectural Coatings UK & Ireland	01924 354233						●				N/A		
Prodeck-Fixing Ltd	01278 780586	●									D/I		
Rainham Steel Co Ltd	01708 522311								●		D/I		
SDS/2 Ltd	07734 293573		●								N/A		
Sherwin-Williams Protective & Marine Coatings	01204 521771						●				N/A	○	
Structural Metal Decks Ltd	01202 718898	●									M		
StruMIS Ltd	01332 545800		●								N/A		
Stud-Deck Services Ltd	01335 390069	●									D/I		
Tata Steel – Tubes	01536 402121				●						M		
Tata Steel – ComFlor	01244 892199	●									M		
Tension Control Bolts Ltd	01978 661122						●			●	M		
Trimble Solutions (UK) Ltd	0113 887 9790		●								N/A		
voestalpine Metsec plc	0121 601 6000	●									M	●	
Wedge Group Galvanizing Ltd	01909 486384						●				N/A		
Wightman Stewart (WJ) Ltd	01422 823801					●					N/A		

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