

NSC



Bridge link at Merthyr Tydfil

Northampton rail station rebuilt

Waste recycling for South Yorkshire

Steel roof waves to Greenwich

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Cover Image

River Taff Central Link
Bridge, Merthyr Tydfil
Main client: Merthyr Tydfil
County Borough Council
Structural engineer: Capita
Steelwork contractor:
Mabey Bridge
Steel tonnage: 280t



TATA STEEL



September 2014 Vol 22 No 4

5 **Editor's comment** The digital-only version of New Steel Construction has been well received by readers and advertisers and new readers are already signing up to receive it, reports Nick Barrett.

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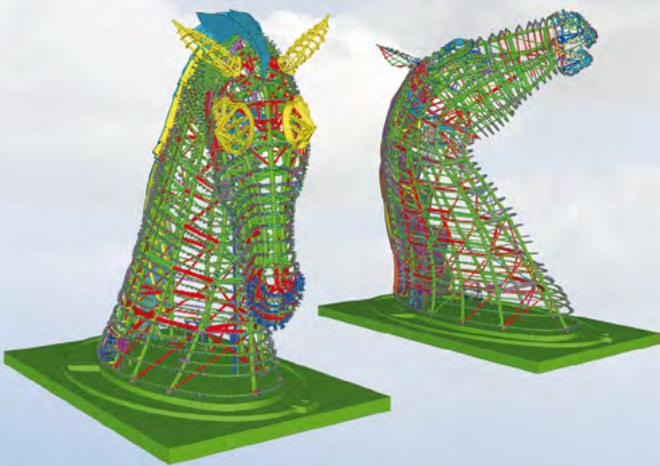
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Digital NSC gets off to a great start



Nick Barrett - Editor

The launch of the digital-only New Steel Construction has been a great success, with both readers and advertisers telling us that they like the product and look forward to hearing about new digital developments. Being able to link to other websites for more information on a subject or an advertisement by using the embedded hyperlinks is a key feature of digital magazines that our readers seem keen on.

There have been an encouraging number of new readers registering to receive the digital NSC, so the message is reaching a wider and appreciative audience, which is encouraging. News about changes like our move to digital-only always taken a while to get around everybody though, so if any colleagues complain that they are not seeing their printed copy of NSC, please update them on the move.

Making sure that you are kept fully up to date with new information like reports and design guidance from the steel sector could hardly be easier as all anyone has to do is register at www.steelconstruction.info. Alternatively, registering at the NSC website www.newsteelconstruction.com is a simple, practically one-click process that will also deliver a wide range of news and project reports straight to your inbox – no need to download a bulky file, we only send you an email alert that the new magazine is available and a link to where you can view it online, or download it as a digital magazine or as a pdf.

The NSC website contains a fully searchable archive of issues of the magazine going back for over ten years. From there any pages can be saved, emailed or printed, just as they can from the digital magazine. It might be worth telling your colleagues that they also can register to receive the digital magazine free by directing them to either the NSC website or www.steelconstruction.info where they can quickly register.

There are always significant stories around that construction professionals need to be kept up to date on, as we see in this issue. In News you will read that Tata Steel has secured BES6001 accreditation for its products, which is a major advantage for designers and specifiers as it means the increasing client demands for proof that construction products are being responsibly sourced, with full regard to the environment and human rights in the countries that many of our raw materials come from, can be easily met.

Using BES6001 certified steel products means a building can achieve extra BREEAM credits. Another bit of good news in this issue is the BCSA prediction that steel prices will move steadily, rather than suffering the sharp price spikes that are afflicting other materials in the construction industry's recovery.

NSC

EDITOR

Nick Barrett Tel: 01323 422483
nick@newsteelconstruction.com

DEPUTY EDITOR

Martin Cooper Tel: 01892 538191
martin@newsteelconstruction.com

CONTRIBUTING EDITOR

Ty Byrd Tel: 01892 553143
ty@barrett-byrd.com

PRODUCTION EDITOR

Andrew Pilcher Tel: 01892 553147
admin@newsteelconstruction.com

PRODUCTION ASSISTANT

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

NEWS REPORTER

Mike Walter

COMMERCIAL MANAGER

Fawad Minhas Tel: 01892 553149
fawad@newsteelconstruction.com

PUBLISHED BY

The British Constructional Steelwork Association Ltd
4 Whitehall Court, Westminster, London SW1A 2ES
Telephone 020 7839 8566 Fax 020 7976 1634
Website www.steelconstruction.org
Email postroom@steelconstruction.org

The Steel Construction Institute

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

Tata Steel

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

CONTRACT PUBLISHER & ADVERTISING SALES

Barrett, Byrd Associates
7 Linden Close,
Tunbridge Wells, Kent TN4 8HH
Telephone 01892 524455
Website www.barrett-byrd.com

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Tata Steel gains responsible sourcing accreditation

Tata Steel has become one of the largest companies to achieve the BRE standard BES 6001, and all of its construction products manufactured in the UK are now certified 'Very Good' under the responsible sourcing standard, including all structural steel sections - Advance®, Celsius® and ComFlor® decking.

Government funded projects in the near future will require the use of BES 6001 certified products, while main contractors, architects and engineering designers are in turn asking their supply chains to verify where their products were sourced.

Designers and developers can specify and use Tata Steel products manufactured in the UK confident in the knowledge they are fully certified to BES6001 and can secure maximum credits under the Responsible Sourcing of Materials sections of BREEAM.

Peter Quinn, Head of Climate Change/ Environmental Policy and Strategy at Tata Steel Europe, said achieving the certification involved a complex and multi-functional effort across the company.

"Tata Steel is leading the way with responsible sourcing and takes its

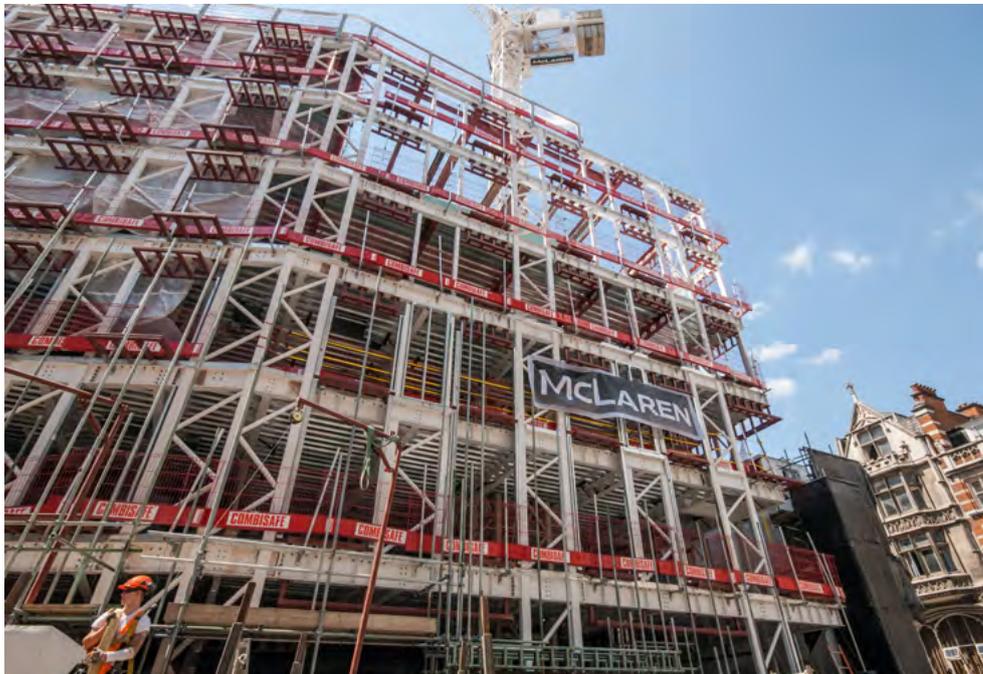
environmental and social responsibilities very seriously. It is not always easy to validate green credentials, but BES 6001 is an independently certified standard recognising companies that go that bit further to promote sustainability. The standard not only assesses the sustainability of our own operations but requires us to demonstrate confidence in the responsibility of all our raw material suppliers, as far back as mineral extraction. The fact that Tata Steel already had effective processes in place to manage environment, safety, compliance assurance

and responsible procurement helped us hugely in securing certification."

BES 6001 has been developed by BRE to enable construction product manufacturers to demonstrate their commitment to sustainability both within their own operations and through the responsible sourcing of raw materials and other products from suppliers.

For more information on Tata Steel's accreditation to BES 6001 or to obtain a copy of the certificate please contact construction@tatasteel.com or call 01724 405060.

Bespoke offices in Mayfair near completion



A landmark office and retail development at 49-51 Conduit Street in Mayfair, central London is rapidly taking shape.

Replacing two former retail/gallery/office buildings, the new build consists of a basement, ground floor and a first floor to accommodate 743m² prime retail space, five upper office levels with an overall floor area of 3,900m² and a rooftop plant deck.

Bespoke excellence in the heart of Mayfair is how EPR Architects describes the project. "Our design creates exceptional new office and retail space within a beautiful hand-glazed façade that seamlessly matches its surroundings," says Stephen Pey, EPR Associate Director. "While a unique slim steel construction accommodates the tight cladding tolerances and maximises the internal floor areas."

The topmost office floor is stepped back slightly, allowing the structure is fit into its surroundings with a similar design to its neighbours, while also creating a terrace for the future occupants.

Working on Behalf of McLaren Construction, steelwork contractor BHC has erected 300t of steel for the project.

Footbridge links two Liverpool venues

Main contractor ISG has successfully connected ACC Liverpool to its new interconnected sister venue Exhibition Centre Liverpool with the installation of a 30t steel link bridge.

The linking of the existing BT Convention Centre and Echo Arena to the exhibition centre marks a milestone moment in the city's journey to secure its future as a major international events destination.

Billington Structures' operation to transfer 12 pre-fabricated steel sections to Liverpool, assemble them on site and lift the giant structure into place is part of the £66M Exhibition Centre Liverpool and associated four star Pullman hotel development on the city's waterfront.

Alan McCarthy-Wyper, Managing Director of ISG's Construction Business, commented: "While the bridge will not be handed over until the development is complete, the positioning of the steelwork marks a major milestone for this project.

"The bridge will form a physical and metaphorical link between Liverpool's past and its future which will become a lasting landmark for the city."

Bob Prattey, chief executive of ACC Liverpool, said: "The pedestrian bridge symbolises the next stage in the continuing success of ACC Liverpool as we join our existing building with an ambitious new facility."



Steelwork to remain the most competitive material

Structural steelwork prices will increase steadily, in contrast to other construction materials which are seeing sharp jumps in price, making steelwork relatively more competitive as a framing material, according to Sarah McCann-Bartlett, British Constructional Steelwork Association (BCSA) Director General.

Structural steelwork contractors in the UK have sufficient capacity to meet increased demand from the construction industry said Ms McCann-Bartlett.

“Our members are now seeing stronger demand for constructional steelwork, and with improved prospects for construction, BCSA members have reviewed their capacity and capability and are confident

they can meet this demand,” said Ms McCann-Bartlett.

“Unlike other construction products, where we’re seeing shortages, long lead times and price spikes, demand and supply in the structural steel market is more balanced. While we do expect to see a firming of prices, this will be relatively slow and steady,” she said.

Cheesegrater reaches practical completion

Main contractor Laing O’Rourke has reached practical completion on the Leadenhall Building (Cheesegrater), an iconic addition to London’s skyline.

The building is 224m high and is made up of 18,000t of structural steelwork, 300 miles of cable and 75,000m² of cladding,

To overcome the challenges of a tight, central London location and lead architects’ Rogers Stirk Harbour + Partners intricate design, Laing O’Rourke had to adopt a pioneering methodology with 85 percent of the building structure (by construction value) manufactured offsite – which is said to be unprecedented for a City skyscraper.

The building’s distinctive yellow northern core, which houses 20 passenger lifts including some of the world’s fastest scenic lifts, was built by steelwork contractor Severfield (UK) using 138 table shaped components manufactured offsite and each weighing 35t.

“Using highly accurate fabrication methods by Severfield (UK), an entire north core floor lobby, including columns, slabs and building services were installed with just three crane lifts in a matter of hours,” commented Graham Aldwinckle, Associate and Lead Structural Engineer for the North Core.

The building is on course for its expected opening in early 2015.



Thames crossing plans unveiled

A proposed £600M Thames crossing linking Beckton and Thamesmead has been revealed by architect HOK and engineering consultancy Arup.

The concept called ‘Bridge East London’ would allow clear passage for ships and takes into account aircraft taking off or landing at City Airport.

According to the designers much of the deck, which supports a road and a segregated cycle path, could be constructed with steel.

Richard Gammon, HOK’s Global Director, Aviation & Transportation, said: “If the full potential of east London is to be harnessed and maximised to the benefit of

our growing city, then we need to provide catalysts to enable that potential to flourish.”

Stephanos Samaras, Director at Arup added: “London’s infrastructure is already under pressure and as the city’s population continues to grow it is more important than ever that we provide better accessibility and connectivity to integrate communities.”



NEWS IN BRIEF

The new **Association for Specialist Fire Protection (ASFP)** ‘Yellow Book’ (5th edition) covers the fire protection of structural steelwork to provide compliance with building regulations. It has been fully revised to make it easier to navigate and to cater for the new fire test and assessment methods in Europe for cellular beams. It also provides a comprehensive guide to proprietary materials and systems, all of which are manufactured, marketed or site-applied by ASFP members. To download click [here](#).

A steel-framed double cantilevered residential tower is to be constructed in Stratford, east London. **Bouygues** will start work on the 42-storey structure, designed by SOM architects, in October.

Structural design software developer **Graitec** has acquired MicroCAD, a well established Autodesk CAD solutions provider. The combined company will have a turnover in excess of £17M with over 70 staff supporting thousands of customers across the UK.

Kaltenbach has launched two new models for the punching and shearing of angle and flat materials. The company says the KPS-A 167 and KPS-A 207 replace their previous KPS models and have been completely redesigned.

Structural Metal Decks (SMD) has signed a new, long term agreement with Hilti for more than 100 direct fastening tools, renewing a relationship dating back to 1999.

Tata Steel’s app for steel section properties and member capacities for design to BS5950 and EC3 can be downloaded for free from the Apple App store



AROUND THE PRESS

The Structural Engineer July 2014

The Shard at London Bridge (£)

The Shard is designed to welcome more than 8,000 workers, residents and hotel guests each day. It is a vertical city comprising 25 storeys of offices, three levels of restaurants, 18 storeys of hotel and 13 floors of apartments. At the top is a 65m tall steel and glass spire, disappearing into the sky, where carefully detailed steel surrounds visitors as they appreciate views over London.

Building Magazine 18 July 2014

Fitting tribute (£)

[World Conservation and Exhibitions Centre at the British Museum] – The building occupies a 4,000m² site to the north west corner of the museum estate. It is divided into five pavilions and includes 10 storeys, half of which are underground. The above ground buildings are steel framed.

Construction News 11 July 2014

Wates on cue for arts centre (£)

[First Street Cultural Centre, Manchester] – “It is an isolated steel frame construction sitting on acoustic pads within a reinforced box. There is an 80mm gap between the two, which helps ensure the acoustic performance of the theatre,” Wates Construction Manager Denis O’Neil explains.

Construction News 4 July 2014

UK steel warns contractors on non-compliant rebar (£)

Contractors could be at risk of using imported non-compliant steel reinforcing bars as inspections are stepped up... Reinforcing bars used in the UK must comply with the standard BS 4449, which defines the properties of the material, including yield strength.

New Civil Engineer 3 July 2014

Midlands link (£)

[Catthorpe Interchange] – The A14-M1 connections will be at high level – the northbound on a 280m steel viaduct, the southbound on embankment.

Building Magazine 20 June 2014

Natural remedy (£)

[Southmead Hospital, Bristol] – The patient wards are arranged within three steel framed U-shaped finger blocks that extend from the central street. Landscaped courtyards are located within and around these blocks, offering generous views from patient rooms and providing the kind of tranquil, natural environment that is key to recovery.

Westfield development boosts regeneration of Bradford

Having stalled for a number of years, Westfield’s £275M Broadway development in Bradford is now approaching an important milestone as the 6,800t steel frame is nearing completion.



Located in the heart of the city centre, the development will boost the wider regeneration of Bradford and provide 2,500 new jobs.

On completion it will total 52,900m²

of retail and leisure space anchored by Debenhams and Marks & Spencer (M&S) stores, with 1,300 car parking spaces located on the upper levels.

The large braced steel frame is predominantly formed with four grid patterns, a regular 8m × 8m pattern for the retail zones, two slightly larger and different grids for Debenhams and M&S, and a 8m × 16m grid for the car parking areas.

“As with most inner city sites, the logistics of bringing steelwork to site and then erecting it in a coordinated programme has been our biggest challenge,” said Andy Rae, Severfield Contract Manager.

Using a fleet of mobile cranes with capacities up to 250t, Severfield has erected all of the project’s steelwork in a 24 week programme.

Forth Crossing construction passes half way stage

Transport for Scotland has announced that construction of £790M Forth Replacement Crossing has passed the half way point as all three towers are now higher than the level of the yet to be erected bridge deck.

A major part of the scheme is the construction of the southern and northern approach viaducts, work that is being undertaken by Cleveland Bridge.

The 545m-long southern viaduct is nearing completion and erection of the 220m-long northern structure is due to begin later this month (September).

Steelwork for the southern viaduct consists of 12 single open top deck sections measuring 30m wide × 4m high and around 12m long as well as a further eight open top trapezoidal box girders 8m wide × 4m high and up to 25m long.



All of the steelwork is being fabricated at Cleveland Bridge’s Darlington facility into sub-assemblies that are delivered to site and

welded together to form deck sections.

The decks are being slid into position using an incremental launching procedure.

Bus station begins journey at Blackburn

EvadX, working on behalf of main contractor Thomas Barnes, has erected the

first curving columns for Blackburn’s new £5M bus station.



Approximately 100t of structural steelwork will be erected to form the bus station that has been conceived as a giant canopy within the centre of the town. The steel frame will be clad with a 5m-high glazing system to create a fully enclosed concourse.

The station will feature 14 bus stands and three layover facilities as well as the latest ventilation systems and journey planning technology.

Blackburn bus station is scheduled to be completed in the early part of the New Year.

Steel checks out second largest Midlands supermarket

More than 1,100t of structural steelwork has been erected to form a Sainsbury's superstore in Wolverhampton; a 6,689m² building that boasts a café, recycling centre, gym and is said to be the second largest store in the Midlands.

The new £60M store was officially opened in July and it is expected to create 340 new jobs, with a further 192 workers moving from a nearby Sainsbury's store which has closed down.

Hambleton Steel was the steel contractor for the project and it utilised 325t of Westok cellular beams to aid the frame's structural efficiency.



Detailing and innovation reign at Galvanizing Awards

The winners of the 2014 Galvanizing Awards were announced at a ceremony at the Royal Aeronautical Society in London.

An eclectic mix of projects were shortlisted for the categories with Proctor and Matthews' Hargood Close winning the Galvanizing in Detail Award. The project is sheltered housing scheme for the homeless in Colchester and was completed within an extremely tight budget.

The considered use of galvanizing for Lancaster Cohousing, by Eco Arc Architects, enabled it to earn the Sustainable Award.

The project's brief stressed that a 100 year design life, rather than the 60 years typically used for housing, be provided. For this reason, galvanized steel was extensively used.

Liam Curtin's bridge over the Manchester and Bury Canal (below) won the Duplex Award, while the Skytower (right), a sculptural creation by Rob Mulholland, for the Forestry Commission of Scotland picked up the Architectural Award. A biomass storage facility in Liverpool was the winner in the Engineering category.



Diary

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



Tuesday 16 September 2014

Wind Actions to BS EN 1991-1-4

Working through BS EN 1991-1-4 and the associated National Annex can be a daunting task. In this webinar, Alastair Hughes, the author of SCI publication P394, will provide an introduction to the Eurocode with advice on the procedures, nuances and pitfalls.
1 hour webinar



Tuesday 23 September 2014

Connection Design

This course is for designers and technicians wanting practical tuition in steel connection design.
(1 day course) Manchester
For details click [here](#)



Tuesday 7 October 2014

Essential Steelwork Design

This course introduces the concepts and principles of steel building design to EC3.
(2 day course) London
For details click [here](#)



Tuesday 14 October 2014

Composite Design to EC4 (Part 1)

This first webinar will look at basic design principles, types of beams and discuss some common misunderstandings.
1 hour webinar



Tuesday 11 November 2014

Steel Frames and Disproportionate Collapse Rules

This one day course provides a solid introduction in the design of steel framed buildings to avoid disproportionate collapse.
(1 day course) Milton Keynes
For details click [here](#)



Tuesday 18 November 2014

Composite Design to EC4 (Part 2)

The second part of this two part webinar will look at Design of Composite Slabs, Scope of EN1994 and technical differences between BS5950 and EN1994
1 hour webinar

Streamlining steel distribution



Hollow sections being moved at Tata Steel's warehouse

Tata Steel is ramping up activity at its structural steel distribution site at Redcar, Teesside following the completion of the second phase of its redevelopment programme.

Tata Steel is ramping up activity at its structural steel distribution site at Redcar, following the completion of the Teesside Service Centre (TSC).

The TSC, which is situated next to Tata Steel's Teesside Beam Mill, is the only steel sections processing facility in the UK backed up by adjacent production capability. As well as providing customers with faster and more efficient delivery of steel sections, hollow sections and flat products, the recently completed facility will further reduce transportation costs.

Phase one of the development programme, which started in 2012, involved finding a home for this much larger stock

holding. A single, specially designed site for Tata Steel's UK sections distribution activities was established using an existing warehouse on the Redcar plant site.

The warehouse offers 15,000m² of premium storage space for the lighter sections and hollow sections. This is supplemented by outdoor stockyards (known as prairies) that cover nearly 40 acres and are used to store the other sections in the structural steelwork product range (nearly 200 sections), all of which are available in different steel grades.

This has created a modern stocking facility with the addition of new handling and processing equipment. The breadth

and depth of the stock range now available ensures that Tata Steel is better placed to service customer enquiries.

Following the installation of the last of the new processing equipment due on site, the new facility is already looking beyond its nominal 170,000t per annum throughput capability in order to support customers' increasing demand.

Director of the new facility, Tony O'Reilly comments: "The steel was previously transported to our Steelpark distribution centre in Wednesfield, and other service centres, before being transferred to the customer. This is now a much more efficient way of handling our steel sections that will



Teesside Beam Mill

As the only steel sections processing facility in the UK backed up by adjacent production capability, Tata Steel is able to support its customers with reduced lead times and increased stock availability as the mill routinely rolls to stock on a 48 hour basis and produces rolled-to-order sections to within 100mm increments of length.



The Prairie

The prairie holds the facility's stock of heavy sections. The immense area available allows Tata Steel to hold one of the most comprehensive ranges of stock in the market, ensuring it is able to support customer enquiries.

Consolidating distribution activities onto a single site adjacent to the mill means that it is able to reduce unnecessary transport between facilities and operate extremely efficiently.



Shotblaster Primer

Shotblasting is one of the services Tata Steel is able to provide to its customers. Sections can be prepared for fabrication through sawing (cut-to-length and mitring) as well as shotblasted and primed.

The site's new shotblaster-primer utilises water-based coating systems and the latest control equipment to ensure minimised environmental impact and the best product surface quality. Its high-speed throughput and capacity ensures Tata Steel is able to respond to customer demands.

Warehouse

The large warehouse provides the perfect indoor storage facility for light sections and hollow sections. The vast space ensures Tata Steel is able to stock one of the widest ranges of products available and that they always reach the customer in optimum condition.

Shotblasted and primed sections

Finished sections ready for despatch in the distinctive blue shade that reinforces Tata Steel's product and processing traceability from a CE Marked producer.

"This is now a much more efficient way of handling our steel sections that will speed up delivery for our customers."





The installation of more saws ensures a timely dispatch of materials

10 speed up delivery for our customers. We can offer our customers an improved delivery service, with shorter lead times throughout the UK and Ireland.”

Phase two has involved the construction of a new office block for all of the TSC’s staff, the opening up of another warehouse and the installation of a high-specification shotblaster primer which is located in a 400m-long bay. This long facility allows multiple trucks to enter at one end for loading and drive through the bay and exit at the other end for dispatch. Phase two was completed with the installation of a new saw, capable of processing the largest of sections, whose outside location reduces handling time and costs.

TSC hosts five saws serviced by 13 cranes all designed with maximum operating and logistical flexibility to ensure timely dispatch

of customer orders. TSC offers cutting-to-length and shotblasting, while a priming service means sections can come coated in the distinctive blue colour that distinguishes Tata Steel products throughout the market. The entire TSC operation is also fully compliant with all the new construction products regulations, including CE Marking.

Ian Beveridge, Director – Construction Structures Sector, says: “We have established the TSC so as to be able to offer customers a uniquely flexible service. The location at the end of a mill production line gives customers the option of buying ex-rolling or ex-stock. Besides, the investments we’ve made in logistics, handling and processing equipment means we’re able to offer a product and delivery service with unrivalled speed and efficiency. That all adds up to the

TSC being a leading distribution facility in the UK and a benchmark in our industry.

“We stock an unrivalled range of structural steel products. Everything from beams, columns, parallel flange channels and hollow sections to wide flats and plate is available from TSC. Increased investment in our processing facilities has given us the ability to supply material to exact size, shape and specification, ready for immediate fabrication. We have expertise in assembling bespoke packages of structural steel ready for fabrication or delivery to site. And because we work closely with our customers we can optimise material usage and production cycles, thus cutting operating expenses and material waste.”

Sales and Marketing Director - Distribution, Paul Steele, adds: “Tata Steel is committed to investing in the future of its business and this scheme will provide significant cost-saving benefits, as well as ensuring the business is in an ideal position to meet the demand from our customers.”

Tata Steel has invested a total of £8.5M in TSC. Main markets served include the construction and building products sector, civil engineering and general fabrication. The facility complements other significant recent investments at both the Scunthorpe and Teesside sites, including the current £52M project to reline the Queen Anne blast furnace in Scunthorpe to support increased production of long products.

A net total of around 40 new jobs have been created as a result of the establishment of TSC, which employs 94 people in all.

TSC hosts five saws serviced by 13 cranes all designed with maximum operating and logistical flexibility to ensure timely dispatch of customer orders.



A new large saw has been installed adjacent to the Prairie yard



The complex will help the leisure park become a focal point in Milton Keynes

Steel boost for movie goers

A cinema complex containing 11 screens and seven restaurants has relied on steel's long span qualities and speed of construction to complete on time.

A new cinema and restaurant complex, adjacent to the MK Dons football stadium, is set to enhance the fast expanding MK1 Leisure Park in Milton Keynes.

The project developer is Inter MK, owned by MK Dons football club Chairman Pete Winkelmann, which has received the £25M funding for the 11-screen complex from Crown Estate.

As well as the football stadium, the park already boasts a number of popular retail and food outlets. Mr Winkelmann says: "The project will strengthen the overall site's reputation as one of the most popular leisure destinations in Milton Keynes and the wider region."

The complex, which is aiming for a BREEAM 'Excellent' rating, consists of two interlinked steel-framed structures, one portal framed, accommodating seven restaurants and the entrance to the cinema, and the other a braced structure, located directly behind, that will house the cinema.

"We have designed the steel frame to meet the specification and developed the frame to be as efficient as possible," says Colin Stewart, BHC Technical Manager.

"We have reduced the size of members where possible and ensured that the steel sections both work to their capacity while meeting the specified performance criteria."

The portal framed portion of the building, which is approximately 103m long x 31m wide, will accommodate seven restaurants. The outlets are arranged in a row of three and four on either side of the cinema's main entrance and foyer.

The slightly taller braced frame of the cinema complex is separated from the portal frame by a service corridor that runs along the rear of the restaurant units. The cinema has an irregular grid pattern as it accommodates 10 screens with varying capacities up to 286-seats, arranged around a larger 373-seat IMAX screen auditorium as well as the main foyer.

Above the centrally located foyer there is a 733m² mezzanine level which gives

access to all of the screen's projectors as well as access to the roof plant equipment, supported within the plant well above.

"Both the portal frame and the braced frame work independently to serve different functions," explains Mr Stewart. "The portal frame provides the restaurants with the unobstructed floor areas they required, while the braced frame design was the best and most efficient solution for the cinema."

Main contractor McLaren Construction started work on site late last year beginning with a groundworks programme that included the installation of piled foundations.

BHC's steel erection was then able to start at the beginning of this year.

"Steel erection had to be undertaken with a fair amount of coordination and planning because we had already installed the ground floor slab supporting piles," explains Simon Fokes, McLaren Construction Project Manager. "We had to manage site logistics and traffic, and avoid placing cranes on top of the installed piles."

The first part of the complex to be erected was the centrally positioned IMAX screen.

"This was the starting point for our steel ▶ 16

FACT FILE

MK1 Leisure Park Cinema Complex, Milton Keynes

Main client:

Crown Estate

Concept architect: Q2

Executive architect:

Chapman Taylor

Main contractor:

McLaren Construction

Structural engineers:

SKM/RPS

Steelwork contractor:

BHC

Steel tonnage: 680t

"We have designed the steel frame to meet the specification and developed the frame to be as efficient as possible."

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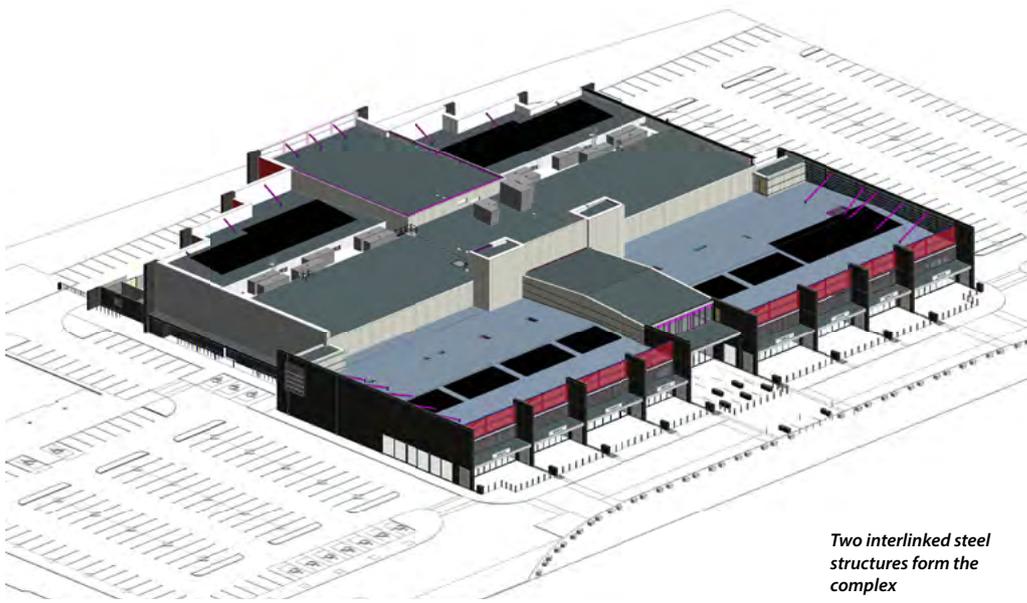
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Assymmetric, Multi-web

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Connection Plates

Certification

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Welding to BS EN 1090-2, EXC 4
Quality Management System
to ISO 9001:2008



Two interlinked steel structures form the complex



Rafters for the cinema seating were inserted after the main steel frame was finished



Steel erection under way

programme as the IMAX is a fully braced box and once it was up it was fully stable and we could erect the rest of the cinema screens around it," says Bobby McCormick, BHC Project Manager.

The cinema part of the complex is a collection of individual braced boxes, 11 in total, all connected into one large all-encompassing braced box, says Mr Stewart. The IMAX screen is the largest and tallest of these boxes with an internal clear span of 19.5m.

This box is formed with a large 2.5m deep truss positioned at one end that supports the high roof over the IMAX, as well as supporting the low roof and plant equipment above the mezzanine from its bottom boom.

Using two mobile cranes BHC erected the cinema steelwork with two erection gangs working outwards from the IMAX. The other 10 cinema screens vary in size with spans of up to 11.7m.

Perimeter columns for the cinema are all around 14m-high to suit the parapets and are spaced at regular intervals. Internally it is different story, as the cinema consists of individually braced boxes, with each box housing a single screen, the grid pattern has to incorporate them accordingly and so the pattern is highly irregular.

The main foyer is centrally located and is another column free area with spans of up to 13.7m. A series of transfer beams, positioned in line with the main entrance and extending into the foyer's perimeter, support the mezzanine floor.

Once the cinema area was erected BHC then started on the portal frame restaurant section, allowing McLaren to start the cladding and roofing of the completed parts of the frame.

Externally the cinema is predominantly clad with profiled steel composite panels, while the restaurants are brick clad. Each restaurant is separated from its neighbours by protruding fin partitions formed around two steel braced columns. As well as creating feature partitions, the fins also provide support to a steel canopy that extends along the entire elevation.

Construction work on the MK1 Leisure Park cinema complex is scheduled for completion this month (September), with an internal fit-out programme beginning immediately. The complex should be open to the public by February 2015.



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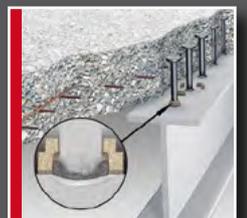


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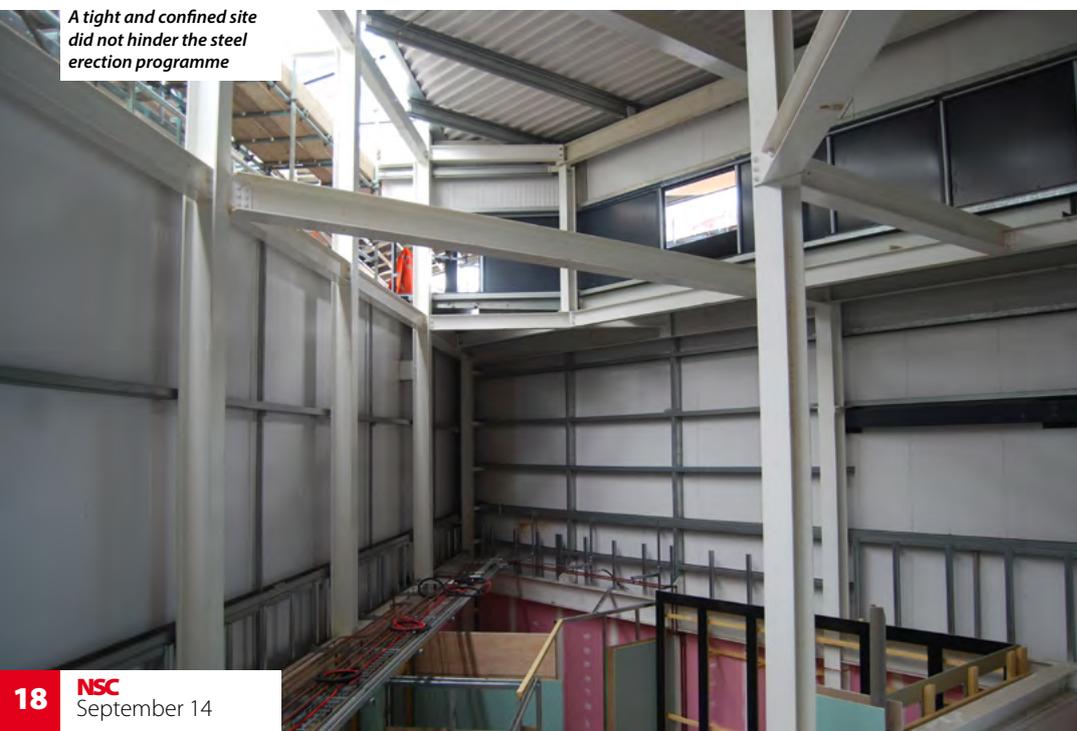




The new station will be a cornerstone for future regeneration

Regeneration on track

Northampton's replacement railway station is a key element in the town's extensive regeneration strategy.



A tight and confined site did not hinder the steel erection programme

Big changes are afoot in Northampton as the county town strives to capitalise on its many strengths, notably a location in the centre of England and a diverse economy.

To help achieve its aspirations the Northampton Waterside Enterprise Zone, which encompasses more than 20 sites along the River Nene, has been set up. It aims to regenerate a range of brownfield areas, industrial estates and expanding sports stadium sites throughout the town.

One of the Zone's key projects is a new £20M railway station built adjacent to the old station.

The new 2,500m² building opened in August and is twice the size of the old station, offering more capacity and improved facilities.

Commenting on the station, Councillor David Mackintosh, Leader of Northampton Borough Council, said: "At last we have a railway station worthy of the town. As a key gateway to the Enterprise Zone, this will be a facility we can be proud of and will present a fitting welcome for visitors."

Having completed the new station, main contractor Buckingham Group Contracting is now demolishing the old station building, which will then allow this land to be used for a new taxi rank and drop off zone.

Buckingham Group started on site in March 2013 and initially had to temporarily relocate the existing station's taxi rank, which cleared the space for the new building to be constructed.

Soon after work started a three-month



Large glazed façades make the new station a much brighter building



The new footbridge was the first steel to be erected



The old station buildings, in the foreground, are now being demolished

archaeological dig commenced as the site is of historical importance (see box) and this was the first time such research had ever been able to be undertaken.

Once the archaeologists had finished, 12m-long CFA piles were installed. The existing footbridge over the station's platforms was then demolished and a temporary structure, complete with lifts, installed.

The first steel erection to be completed on the scheme was the replacement footbridge on the same footprint as the old structure.

Brought to site in two 9m-long pre-assembled sections, the entire footbridge, along with its two support towers and stairs, was installed by a 500t capacity mobile crane during a two-day rail possession during the Christmas holidays.

Meanwhile, Billington Structures had commenced the erection of the new three level station building using a single 50t capacity mobile crane for all of its lifting duties.

"The project was always going to be a steel framed structure for efficiency," says Rob Hazell, Jacobs Project Engineer. "The main challenge was fitting the station into its footprint which is bounded by railway lines and a main road on two elevations. This resulted in the building's rhomboid shape and the irregular grid pattern of the steelwork."

Long clear spans for the entrance and concourse areas were also an important consideration and another reason for using steel.

The ground floor of the building

"The project was always going to be a steel framed structure for efficiency."

accommodates the main entrance from the drop off point and taxi rank, back-of-house facilities, ticket machines, retail zones all arranged around a 15m wide foyer.

Lifts and a main staircase give access up to the first floor, which contains another entrance from the adjacent road bridge, the main ticket office, more retail outlets, and access to all five platforms via the new footbridge and gateline.

Above this, a second floor covers only a quarter of the building's overall footprint accommodating staff rooms and offices.

"The design for the station and bridge is steel-framed for its speed construction," says Andy Latham, Buckingham Group Project Manager. "The bridge was brought to site in prefabricated sections, while the main

building was erected quickly as no sections needed to be longer than 15m which allowed a fast programme."

Externally the station features a 16m-high totem that signposts the station, as well as a 2m wide canopy that extends around all four elevations. Three of the façades feature full height glazing, with the exception of the elevation along the main road which is clad with granite tiles.

"The glazed façades are unrestrained with stability are derived from the frame's braced bays," adds Mr Hazell. "In other areas the steelwork is designed as a sway frame."

The station project, including all remaining demolition work and associated landscaping is due to be completed by February 2015.

FACT FILE Northampton Railway Station

Main client:

Network Rail

Architect: CJCT

Main contractor:
Buckingham Group Contracting

Structural engineer:
Jacobs

Steelwork contractor:
Billington Structures
Steel tonnage: 230t

Historic site

The site of the new station building was once Northampton Castle. Before falling into disrepair in the Tudor period, this Norman Castle had been one of England's most strategic as it was the first major castle a day's ride north of London.

In 1861 the Castle and the surrounding land was sold to the L&NW Railway Company, who levelled what

was left of the stone-built fortified walls, in order to construct the first Northampton station.

Early last year an extensive archaeological dig was undertaken and a number of significant finds, including Saxon broaches, medieval pottery and Victorian tiles from the first station were unearthed.

Andy Chapman from Northampton Archaeology says: "This was a rare chance to learn about the Castle and the findings have helped to paint a picture of how people lived and worked over 1,000 years ago."

Steel accommodates waste solution



Steel for the MBT is erected by a crane positioned within the building's footprint

An environmentally friendly steel-framed waste treatment centre will process refuse from three South Yorkshire authorities.

FACT FILE

BDR Waste Treatment Facility, Manvers, South Yorkshire

Main client:
BDR Waste Partnership

Architect: URS

Main contractor:

Balfour Beatty

Structural engineer:

URS

Steelwork contractor:

Border Steelwork

Structures

Steel tonnage: 1,600t

Councils up and down the country are investing in new ways of treating and disposing of waste as they seek to find environmentally friendly alternatives to sending material to landfill sites.

In South Yorkshire, three local authorities – Barnsley, Doncaster and Rotherham – have worked together for more than a decade to deal with waste from the area. Known as the BDR Waste Partnership, it has commissioned Shanks and Scottish & Southern Energy, to construct and run a waste facility that will treat up to 265,000t per year of leftover household and a small amount of commercial waste.

To meet the construction programme the overall scheme has been divided into two contracts, with the larger one being built by Balfour Beatty. This consists of a mechanical biological treatment (MBT) plant that will dry waste, and recover and process materials that can be reused, such as metals, glass, plastics, compost and stone.

The solid recovered fuel from the MBT process will be used to generate electricity at the nearby Ferrybridge power station.

Being built under a separate contract, but part of the overall facility, is an anaerobic



digestion plant (see box) that will compost residues from the MBT process, producing renewable energy and a digestate for compost and fertiliser.

Balfour Beatty started work on the former colliery site in September 2012 and initially had to construct a culvert so an access road could be built over a stream. The waterway had previously cut the site off from any major roads.

“Once excavation and piling had been completed we then started a phased construction programme, whereby the main

substructure works were being done at one end, while steel erection was begun at the other end of the building,” explains Pete Finegan, Balfour Beatty Project Manager.

“The tipping hall has two 5m deep refuse pits and it was important to have these completed before the frame was erected over them, so this area was the final part of steelwork to be done.”

Working in this phased manner Border has erected 1,600t of steelwork for the project, a contract that also includes ancillary buildings consisting of an administration and



The completed MBT structure



Inside one of the 112m long drying bed halls

visitor centre, workshop and substation.

The internal floor slabs were all also cast prior to the steel erection programme and used as the working platform for the cranes.

Using a variety of mobile cranes, from 35t up to a 250t capacity unit, Border was able to erect all of the main steelwork from inside the structure's footprint, leaving other areas of the site relatively clear for other trades.

"Coordination has been very important as it is quite a tight site with limited access and we have always been working around many other trades," says Douglas Corbett, Border Steelwork Structures Project Manager.

The main waste treatment building is 210m-long and is divided into three main parts: a tipping hall where refuse trucks will deliver the waste; a bio-drying hall where the waste is treated, and a refinement hall where the final sorting of waste takes place.

Although it comprised the final part of the steelwork erection programme, the tipping shed is in fact the initial port of call for the waste process. A large 75m x 30m single span portal frame has formed the required long clear space for trucks to enter and turn around in.

"Most of the treatment facility requires long clear spans for its industrial use, this is best achieved using steel as the main framing material," says Dave Fielding, URS Project Engineer.

"It's a typical design with bracing at roof level for stability and to limit movement between bays."

The potential for movement was greatest in the bio-drying hall, as it has to accommodate six overhead gantry cranes that will move the waste. Because of the speed the cranes will move at, tolerances are very tight and a stiff structure was required to limit deflections. Large 16m high 914 columns on fixed bases have provided the stiffness to support the facility's crane beams.

The waste process is divided into two adjacent treatment lines and so the bio-drying hall is a twin-portal frame connected to the tipping hall but positioned at a 90 degree angle to it.

Each of the two 25m wide spans accommodates a refuse pit and 112m length of drying bed.

The refinement hall, which is the area where the final product is sorted, was the first part of the structure to be erected. This is another large two span (30m each) portal frame, which in turn is connected to the bio-drying halls.

Adjacent to the bio-drying halls are two steel framed control room structures, one two-storey unit and the other three-storeys high. Although they are part of the main building they have been designed as two independent braced steel structures.

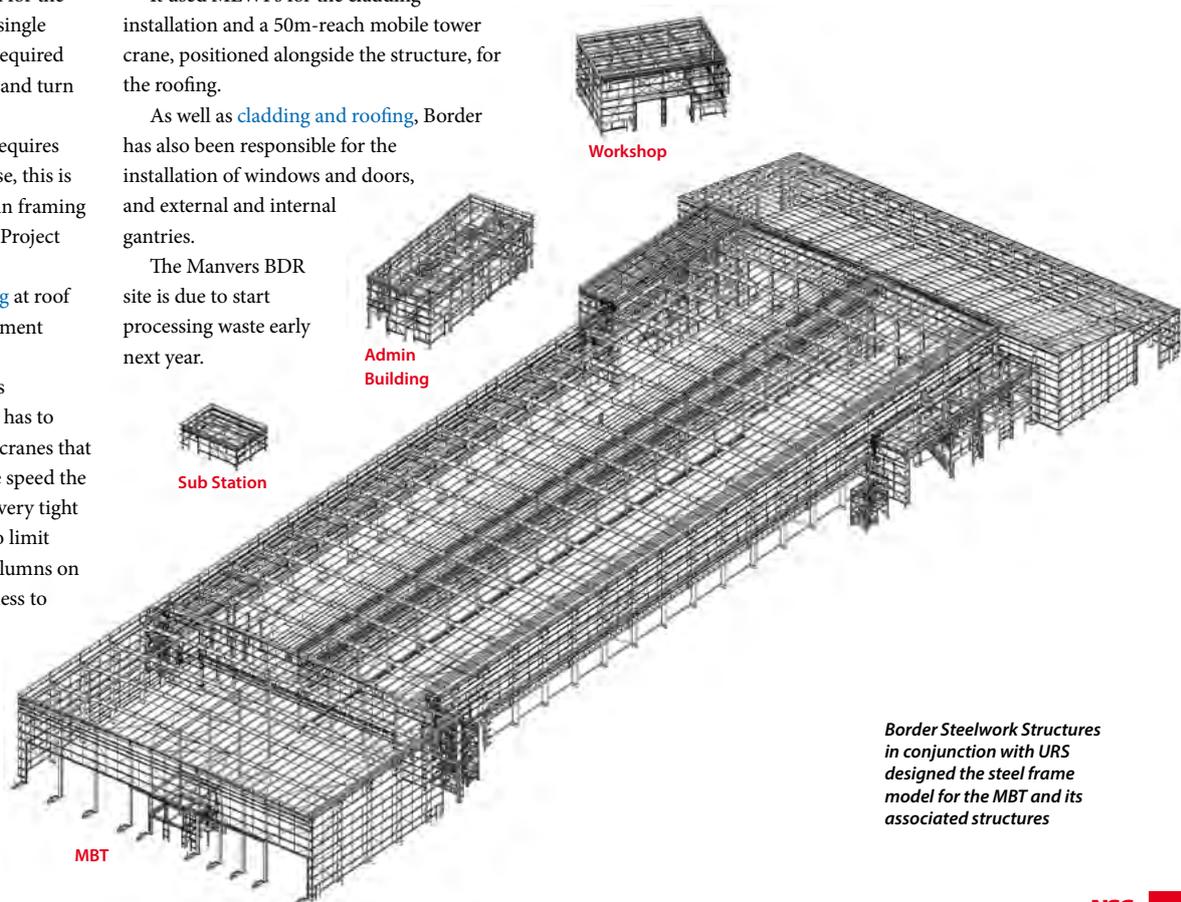
"We needed to limit vibration from the process area to the control rooms," explains Mr Fielding.

Working progressively along the entire frame, Border erected the steelwork bay by bay and once complete it then installed the roof and the cladding.

It used MEWPs for the cladding installation and a 50m-reach mobile tower crane, positioned alongside the structure, for the roofing.

As well as cladding and roofing, Border has also been responsible for the installation of windows and doors, and external and internal gantries.

The Manvers BDR site is due to start processing waste early next year.



Workshop



Admin Building



Sub Station

MBT

Anaerobic Plant

Rippin Steel working on behalf of Luddon Construction fabricated, supplied and erected the steelwork for the site's anaerobic digestion plant.

Erected on top of a concrete substructure, the steel frame consists of a three span prop portal, with each span 21m wide by 70m long.

Rippin has erected approximately 190t of steel for this project, a total that includes 40t of cold rolled purlins.

"Some of the steelwork has been galvanized, and the balance, including the purlins has had a high specification protective paint system applied because of the corrosive atmosphere associated with the anaerobic process," explains David Jamieson, Rippin Managing Director.

Border Steelwork Structures in conjunction with URS designed the steel frame model for the MBT and its associated structures



The arch was lifted into place as one large piece

A bridge to town centre renewal

An iconic steel composite bridge forms the centrepiece of a multi-million pound regeneration scheme in the South Wales town of Merthyr Tydfil.

Spanning the River Taff and connecting a recently redeveloped college with the town centre, the River Taff Central Link Bridge forms an important element of Merthyr Tydfil's £24M regeneration programme.

Funded by the European Regional Development Fund and Welsh Government, the regeneration masterplan encompasses a number of town centre enhancements with the new road bridge helping to make the riverside area an attractive destination for future investment.

The council's Regeneration Manager Gavin Lewis wanted something that would be a feature and not simply a **typical highway bridge** structure.

A number of design options went out to consultation with the local planning and highways authorities, together with other stakeholders, and the favoured design was for a bridge with an iconic **arch**.

Once a bridge design was selected locally based civil engineering company Alun Griffiths was chosen as the principal contractor for the project, while Mabey Bridge was awarded the **bridge construction** subcontract package.

Designed by Capita, the bridge's stand out feature is 136t skewed arch. Measuring 40.9m across its base and reaching a maximum height of 18.5m, it was fabricated from 60mm thick plate. Connecting the arch to the bridge deck are a total of 14 × 80mm diameter **hangers** ranging in length from 4.7m to 22.5m.

One of the project's main technical challenges revolved around the hangers and the associated cable tensioning.

"During the non-linear analysis of the installation and stressing procedure for the hangers, we found that some hangers would go into compression if the full pre-stress design was induced in an adjacent hanger," says Christopher Prosser, Capita Project Engineer.

"We therefore had to design an incremental tensioning sequence to prevent this occurring. The designed sequence was later streamlined by Mabey Bridge during the construction phase in order to speed up the process."

The appearance of the bridge was critical to the overall design and so it was decided that each hanger fin plate would be designed with the same geometry, but with varying orientation to suit the alignment of the hangers.

This required Capita to extensively model each element to ensure there were no clashes and determine the practicalities of completing the internal welds, while ensuring the alignment of the hangers between the top and bottom plates was correct both aesthetically and structurally.

When designing the structure it was



The new bridge will offer better transportation links across the River Taff

also necessary to take into account the BS EN 1993-1-11 requirement for the loss of a hanger without any restriction to live load capacity.

“This required us to model what effect the loss of a hanger had on the remaining structural elements for the critical loading case. This analysis resulted in the increasing of the diameter of the hangers and associated fixings,” says Mr. Prosser.

For the site erection programme, the 29m long x 19.8m wide deck was the first steelwork to be installed earlier this year by Mabey Bridge. It is formed with a ladder configuration with two main 900mm deep x 600mm wide outer girders, each 29m-long, connected by a series of nine crossbeams.

“We erected the deck steelwork using MEWPs positioned on each riverbank in

conjunction with one 250t capacity crane,” says Andy Hosking, Mabey Bridge Project Manager. “Once the beams were erected we then bolted on the cantilevers which support the parapets as well as having the deck connection for the hangers.”

Mabey Bridge’s contract required it to have input in a number of aspects relating to the project, not just the steelwork detailing, but also construction methodology, and cable installation and stressing. However, the company’s main recommendation was to fully assemble the arch and then lift the complete structure into position.

This eliminated working at height as well as having environmental benefits as no trestles were installed into the fast flowing river. Working in this way also

reduced the construction programme as steelwork fabrication was carried out off site by Mabey Bridge while Alun Griffiths was constructing the substructure on site.

The arch was transported to site in four equal sections from Mabey Bridge’s Newhouse manufacturing facility which is 88km away from Merthyr Tydfil. Once on site, the sections were placed on temporary trestles and welded together to produce the continuous and completed arch.

Using a single 550t capacity mobile crane positioned on one of the riverbanks, the entire arch was lifted into a vertical position, slewed over the river to its final position where it was fixed to the abutments.

“The entire lifting procedure took eight hours and a large crowd, including school children and council representatives, gathered to watch,” says Mr Hosking.

Commenting on the bridge, which is scheduled to open in November, Daniel Francis, Project Manager for Merthyr Tydfil County Borough Council, says: “It is an iconic structure that also opens up areas of the town for future development. It is also a key structure in our redevelopment programme that will, along with a new road system, cater for our anticipated increase in visitors to the town.”

FACT FILE
River Taff Central Link Bridge, Merthyr Tydfil
Main client: Merthyr Tydfil County Borough Council
Principal contractor: Alun Griffiths (Contractors)
Structural engineer: Capita
Steelwork contractor: Mabey Bridge
Steel tonnage: 280t





Making a wave

A complex multi-functional steel structure forms the centrepiece for the Greenwich Square development, reports Martin Cooper

FACT FILE

Greenwich Centre,
London

Main Client:

Hadley Mace

Architect:

Make Architects

Main contractor: Mace

Structural engineer:

Meinhardt

Steelwork contractor:

TSI Structures

Steel tonnage: 250t

Located on the site of the former Greenwich District Hospital, a new residential development is contributing towards the ongoing regeneration of south east London.

Known as Greenwich Square, the scheme will deliver 645 new homes, with apartments, maisonettes and town houses, which comprise of 331 private, 170 social and 144 shared ownership.

A new public square is enclosed within the development by three residential blocks. Within this courtyard and extending into the lower levels of the adjacent structures, a civic centre will feature two swimming pools, a fitness suite, dance and exercise studios, retail spaces, a library, a crèche and café, and a healthcare clinic.

The civic centre will essentially be triangular in plan and will be called the Greenwich Centre. According to project architect Make, it will be an important local destination for the whole community.

Signposting the centre and forming a sculptural link to the development from

nearby Woolwich Road is one of the development's feature elements; the steel-framed Wave.

Measuring 55m long, the Wave is multi functional as it is an entrance canopy, roof structure and an internal wall to the Greenwich Centre's atrium.

Designed, detailed and delivered in a complete 3D BIM modelling exercise between the entire project team, the Wave is so called because of the way it twists and undulates along its entire length.

"It is a highly complex steel structure and utilising BIM was essential in avoiding any clashes and ensuring that the structure was erected efficiently," explains Gareth Stone, Mace Project Manager.

Early in the design process, project engineer Meinhardt worked extensively with Make Architects to come up with a concept for the Wave that would be buildable.

"As the structure is sat on a podium that covers the Centre's swimming pools, minimising the weight was one of the important criteria and one of the main

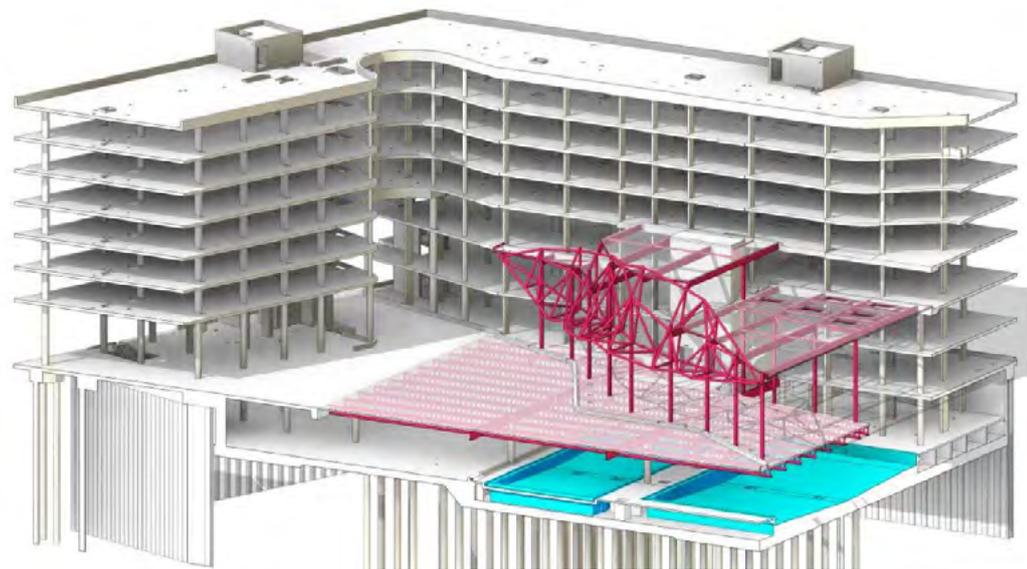




Complex and bespoke members are a feature of the Wave



The Wave will top the civic centre and form a signpost to the scheme



Steel podium

The Greenwich Centre's two swimming pools (a 25m-long pool and a 20m-long learner pool) are both accommodated within a 7m-deep basement positioned beneath the Wave.

Three rows of 18m-long cellular beams form the

54m x 30m pool area, which is not only positioned below the Wave and the atrium but also partially below the new public realm.

Because the pool area will be a highly corrosive zone, all of the cellular beams, which are all left fully exposed within the completed building, were painted off-site prior to installation.

reasons for using steel," says Nick Gillespie, Meinhardt Director. "The entire Wave structure only weighs 86t."

Forming the primary structure of the Wave is a series of steel trussed frames, made from 219mm diameter CHS sections. Secondary steelwork, which is a combination of either cold rolled or RHS sections, act as purlins and cladding rails and form the wave-like curvature and profile.

Stability in one direction is gained from a series of steel rafters, up to 14m in length that form the rear portion of atrium's roof and connect the Wave back to the residential blocks. The primary trusses also contribute to the stability by acting as moment frames.

The Wave is primarily supported by a series of 14.5m-high slender columns, spaced at 4.8m centres. However, the profile of the Wave results in members being significantly longer than the column grid might suggest.

"The truss members that span between the columns vary from 6m up to 9m depending on the structure's curving profile," says Nick Thompson, TSI Structures Director.

Fabrication and erection of the Wave has been very complex due to the huge number of individual pieces, most of which are bespoke. There are more than 1,000 individual pieces in the structure, all joined together by bolted connections.

For the erection programme, TSI Structures utilised one of the site's tower cranes for all lifting duties, using the completed podium as a materials lay down area.

Working from one end of the Wave to the other, TSI Structures erected the structure

in a sequential manner, bay by bay, along with the associated columns and the beams connecting to the main structure.

"Once the frames and the bracings were up we then attached the secondary steelwork," adds Mr Thompson. "Cold rolled sections were used for the straight members, while RHS's were used for the curved steelwork."

TSI Structures contracted steel bending specialist Angle Ring to curve the steelwork. As well as bending RHS sections, some of the primary CHS members also had to be bent.

These CHS members were very complex as they had to be bent in two directions and in order to accept the cladding, flat plates needed to be welded on to them.

The entire Wave structure's steelwork was completed during July and now the cladding, which consists of silver coloured rainscreen, is being installed.

The entire Greenwich Square development is due to be completed in 2018.

3D modelling has proven to be crucial in the design and erection of the Wave



Matters of principle

Part two

In Part One Alastair Hughes outlined the distinction between Principles and Application Rules in Eurocode design philosophy. Part Two picks out some examples from Eurocodes 3 and 4 and discusses the importance of the distinction in practice

Principles of Eurocode 3

Turning to EN 1993-1-1, two examples of Principles can be found under the heading 5.1 Structural modelling for analysis:

- (1) **P** Analysis shall be based upon calculation models of the structure that are appropriate for the limit state under consideration.
- (2) The calculation model and basic assumptions for the calculations should reflect the structural behaviour at the relevant limit state with appropriate accuracy and reflect the anticipated type of behaviour of the cross sections, members, joints and bearings.
- (3) **P** The method used for the analysis shall be consistent with the design assumptions.
- (4) **B** For the structural modelling and basic assumptions for components of buildings see also EN 1993-1-5 and EN 1993-1-11.

It is far from obvious why 1 and 3 are Principles but 2 is not. Indeed, might it not be argued that 2 could stand alone and sufficient as **the** Principle, as 1 and 3 have little if anything to add? And might 4 exemplify a clause which is neither Principle nor Application Rule? It could almost be a NOTE.

A conscientious user of the Eurocodes will surely discover more cases of Principles masquerading as Application Rules and vice versa, and begin to wonder how much it matters. The same thought must have crossed the minds of their creators; rumour has it that at least one Part came out in draft without any identified Principles, and had to be hastily reissued with a smattering of '**P**'s inserted. In the bulk of EN 1993-1-1 Parts 5 and 6, the '**P**' designation is routinely applied to the standard 'effect not to exceed resistance' formulations but otherwise rare.

Principles of Eurocode 4

Eurocode 4, which generally comes top of its class for clarity of writing and adherence to the rulebook, contains at least one questionable 'Principle', in EN 1994-1-1 6.7.1(1):

P Clause 6.7 applies for the design of composite columns and composite compression members with concrete encased sections, partially encased sections and concrete filled rectangular and circular tubes, see Figure 6.17.

That might more accurately be described as a scope limitation, one of many, some but not all of which are dignified by the **P** prefix. But further down, in subclause 5, we find:

Composite columns or compression members of any cross-section should be checked for:

- resistance of the member in accordance with 6.7.2 or 6.7.3,
- resistance to local buckling in accordance with (8) and (9) below,
- introduction of loads in accordance with 6.7.4.2 and
- resistance to shear between steel and concrete elements in accordance with 6.7.4.3.

which does seem like a Principle – everything listed must be verified. Perhaps the references to relevant Application Rules disqualify it from that status.

There is also a whole string of Principles in EN 1994-1-1 6.7.2, a clause which only applies to one of two alternative design methods, the other of which is in 6.7.3. Do the Principles of 6.7.2 apply to the method of 6.7.3? If not, can they really deserve the designation **P**?

A classic example of the statement of a principle, followed immediately by permission to (mostly) neglect it, can be found in EN 1994-1-1 5.4.2.4 (1)**P** and (2), on the subject of accounting (or not) for construction sequence.

These examples are chosen almost at random, and more could easily be picked up by anyone with the inclination and the time to trawl through the Eurocodes in search of anomalies. But perhaps the take-home message is that code rules will never divide neatly into Principles and Application Rules; they take their place on a spectrum, with Newton's laws at one end and scope limitations or matters of fact at the other.

It's almost like classifying connections as Rigid or Simple (limp). Virtually all practical connections are something in between. In the realm of frame design it can be claimed that the classification, though idealistic, is helpful nonetheless. Whether the same can be said of the Principles/Application Rules distinction is a moot point. To put this question another way, would users be seriously, or at all, disadvantaged if those **P**s after the clause numbers were printed in white ink instead of the red that we have given them in this article?

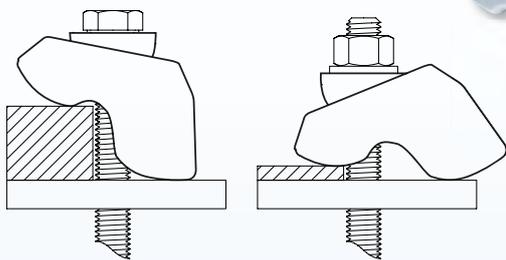
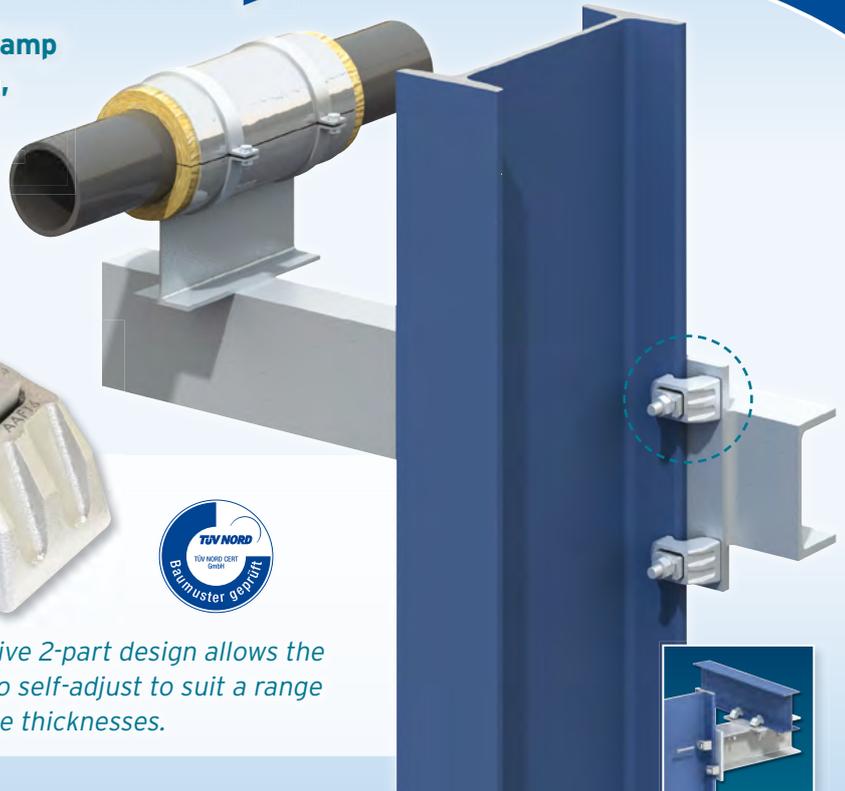
Does the distinction between Principles and Application Rules matter?

In the early days of the European Project, international consensus was not always easy. It was convenient to be able to reassure those who lost the argument, or were outvoted, that they would be free to adopt 'alternative design rules' in place of unfamiliar or unpalatable Application Rules. Subclause (5) in EN 1990 1.4 (reproduced in Part One of this article) legitimizes such substitutions, provided that they accord with relevant Principles and deliver equivalent safety etc. 'Don't worry; we aren't going to force you to drive on the right', so to speak. Much opposition was neutralized in this way. The sting came ▶ 28

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later, when the NOTE was inserted directly after that subclause:

NOTE If an alternative design rule is substituted for an application rule, the resulting design cannot be claimed to be wholly in accordance with EN 1990 although the design will remain in accordance with the Principles of EN 1990. When EN 1990 is used in respect of a property listed in an Annex Z of a product standard or an ETAG, the use of an alternative design rule may not be acceptable for CE Marking.

NOTEs are informative, not normative, but this one is quite threatening: if you want the CE Mark, follow the official Application Rules.

So now a distinction is drawn between a design which is 'wholly in accordance with EN 1990' and a design which is merely in accordance with its Principles.

Where does this leave us? If we must have a CE Mark, must we obey the Application Rules? Arguably this means that in practice the distinction between Principles and Application Rules ceases to be worth notice. We can, of course, stop fretting over any questionable designations but that's cold comfort.

Advice from BCSA is that client agreement can provide an escape route. One of the four different methods for CE Marking

given in EN 1090-1 allows **any** design method (even BS 5950) to be used, subject to agreement with the client. So prudent designers will obtain explicit client agreement as a matter of course. Designers of 'kit' structures (pre-designed buildings, towers, temporary bridging and the like) are in a more difficult position. As would we all, were the system to decide that this is a loophole and needs closing.

Conclusions

The distinction between Principles and Application Rules is much less important than it first appears, but this is because of the way the European Design Standards and Product Directives interact. To qualify for a CE Mark it may be necessary to conform with Eurocode Application Rules, not just Principles. Remember CE Marking became mandatory in July! Supplementary design rules (from NCCI or of the designer's own devising) may only be permissible if they do not conflict with anything normative in the Standard. That is the official vision, even if it seems disconnected from reality.

Even if the CE Marking aspect is put to one side, it does seem fair to suggest that if the Principles / Application Rules distinction is to be retained in the next generation of Eurocodes it needs to be expressed in a much more consistent manner than hitherto. Alternatively, let it fade away unmourned.

AD 383

Use of alkali-zinc silicate paint in slip-resistant bolted connections

The Advisory Desk has been made aware of some concerns about the use of alkali-zinc silicate paint in slip resistant connections, such that the structural reliability of the slip resistant connection might be compromised. There is as yet no published data about the frictional resistance of surfaces when the coating is applied in normal production conditions (rather than closely controlled test conditions) but instances of significantly lower slip factors (than recommended) have been experienced in practice.

According to Table 18 of EN 1090-2, an alkali-zinc silicate paint with a thickness of between 50 and 80 microns may be classed as a 'Class B' surface, with a slip factor (friction coefficient) of 0.40. It appears that while this value may be appropriate when the thickness is at the lower end of the thickness range and that the curing of the paint has been fully in accordance with the manufacturer's recommendations, the slip factor is very sensitive to the quality of the application. In practice, application does often result in thicknesses exceeding 80 microns locally over the contact surface and in less than ideal curing conditions. Tests modelling practical application conditions have shown slip factors as low as 0.20.

The issue of the slip factor to be used with alkali-zinc silicate paint has been raised with the CEN committee responsible for EN 1090-2 and it was advised that the slip factor of 0.4 comes

from German recommendations. However, on re-checking these recommendations it was found that the slip factor of 0.4 relates to an upper thickness limit of 40 microns. The original German recommendations also noted that when a maximum thickness of 60 microns is used, the slip factor is reduced, which correlates with findings of the tests mentioned previously. Hence, Table 18 of EN 1090-2 will be modified, reducing the thickness to a maximum of 40 microns

Until Table 18 is modified, the Advisory Desk therefore recommends that, for structural reliability, the execution specification should include additional inspection requirements and acceptance limits, depending on the factor that the designer has assumed. The following is suggested:

When a slip factor of 0.4 has been assumed (for alkali-zinc silicate coated contact surfaces), the constructor shall be required to carry out slip tests in accordance with EN 1090-2 Annex G to confirm that adequate friction will be achieved as a result of the painting and curing procedures that will be used on the structure. (Note that such conditions are not the same as 'laboratory conditions.') The coating thickness for the test should be 25% greater than the average thickness achieved on the contact surfaces under normal production conditions for the structure (rather than the thickness stated in G.3 of EN 1090-2). Tests should

also be undertaken to demonstrate whether allowance should be made for loss of preload with time, due to paint creep under the bolt. It should also be required that the painting inspectors are trained in the necessary painting workmanship measures required to maintain the quality of the coating on the contact surfaces, consistent with the quality in those tests.

If additional slip testing on site conditions is not to be specified, then, until research can prove otherwise, it is recommended that designers assume a reduced slip factor of 0.30, and that the execution specification includes the following additional requirements: (a) the paint thickness actually applied to the contact surfaces shall be checked, to ensure that the mean coating thickness does not exceed 60 microns; (b) the paint manufacturer's curing recommendations are rigorously followed.

If it is preferred to not impose any additional workmanship requirements for the coating on the contact surfaces, then the designer should assume a slip factor not greater than 0.2.

Contact: **David Iles**
Tel: **01344 636525**
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Sports Stadia

FROM BUILDING WITH STEEL MAY 1964

To use a well worn phrase, the 'wind of change' is blowing vigorously through those regions where sport is promoted. This wind is soft and balmy quite unlike that which blows over football grounds and racecourses, as likely as not accompanied by driving rain or snow. Whether each generation becomes progressively softer one is not quite sure but it became clear a few years back that 'fans' were not prepared to stand for hours on end in the path of the winter elements as they had done for many years and attendances began to fall off substantially and abruptly. The promoters sat up and took notice of this unwelcome manifestation.

Eminent designers were consulted and the result has been a complete metamorphosis

in the appearance of our sports arenas. Fast disappearing are the open terraces at football grounds, the ugly uncomfortable stands on racecourses. Elegant modern structures are rising in their place utilising the beauty and practicability of structural steelwork to the full.

Two of the best known arenas to be treated this way were, of course, Wembley Stadium and Royal Ascot racecourse. A new stand at Ascot is to be opened by H.M. the Queen in June (1964). But many less nationally known stadia familiar to local people have been similarly treated and we are illustrating a number on these pages. Included in this selection is a fine example from Naples and the illustration is reproduced by kind permission of the engineer.



LIVERPOOL FOOTBALL CLUB, KEMLYN ROAD STAND

This is a most attractive structure designed by Bingham Blades & Partners, consulting engineers. An old stand

had to be demolished to make way for this modern structure: erection of the steelwork, some 410 tons, was completed in 4 weeks during the 'close' season.

Length of the stand is 360 feet, with welded cantilever frames at 36-foot centres



and intermediate framing at 12-foot centres. There was one site welded joint on each of the main frames, the weld being checked by X-rays.

The structure itself was analysed for wind effects in the wind tunnel at

Liverpool University. Fire resistance is provided mainly by lightweight cladding. Having a cantilever roof the stand has no sight-obstructing supports. The stand seats some 7,000 spectators, all season ticket holders.

THE CRYSTAL PALACE NATIONAL RECREATION CENTRE

This is a large undertaking costing £2 million and will provide on this natural site something that the country has always lacked – a really national sports centre. The main picture shows a model of the completed project and the inset is of the unusual structural design for the 284 ft × 268 ft × 68 ft high sports hall. Steelwork has been used in the stadium, practice area and restaurant and in the common room and library adjoining the eleven-storey athlete's hostel.

The building is openly planned with the roof structure cantilevering from a central spine framework of specially prepared concrete. The trusses and cross-braces produce, when covered, a series of roof booms giving a saw toothed pattern.

The stadium will seat 12,000 spectators: the central portion embodies a welded steel frame canopy averaging 668 ft radius, 72 ft girth in fifteen equal bays each 72 ft 6 in wide. The 16 cantilevered frames and supporting legs are of all-welded construction. Consulting engineers: Ove Arup and Partners. Illustration of model by kind permission of L.C.C. Architect's Department.



SHEFFIELD WEDNESDAY FOOTBALL CLUB, NEW NORTH STAND

The cantilever stand illustrated is part of an overall plan by the club to have all spectators on the ground under cover, and to make the ground what the consulting engineer has described as 'The Wembley of the North'.

The stand is 360 ft long with a light cantilever roof having an overhang of 124 ft. The overall length is divided into nine sections of 40 ft; each section contains 1,112 seats making a total capacity of 10,008 seats in all. The roof trusses are cantilevers 124 ft long, supported entirely from the back of the terracing. Mild steel was chosen as the most suitable material for the roof structure after its advantages had been compared with aluminium and reinforced concrete, 36,000 high strength friction grip bolts were used on the structure. Consulting engineers were Hudson & Co of Sheffield.



A NEW STADIUM IN NAPLES

The structure is of particular interest, firstly because the two-layer structural steel grid roof consisting of girders intersecting each other at right angles is supported on just four columns 177 ft apart. Secondly because it is completely all welded, most of it carried out 60 ft up on site. The total area of the roof is 288 ft x 233 ft and is made up by end overhangs of 28 ft or a total of 56 ft beyond the column spacing of 177 ft. Consulting engineer was Alberto Defez of Naples.



WORLD'S LARGEST CLEAR SPAN DOME

The new sports stadium now being built six miles south of Houston, Texas, will have the largest steel clear-span dome in the world - 642 ft. The stadium will be a remarkable structure altogether: it will seat 60,000 persons for conventions, 46,000 for baseball, 53,000 for football and 60,000 for boxing. Outside diameter is 710 ft, height from playing field to top of dome is 213 ft, enough to fit the nearby 18 storey Shamrock-Hilton Hotel underneath. Architects: Lloyd & Morgan and Wilson, Morris, Crain and Anderson of Houston.



WEMBLEY STADIUM

The whole of the national stadium was completely roofed in by the time the 1963 Cup Final was played. This was a major undertaking in which 1,500 tons of structural steelwork was used in the roof structure. All the members were shop welded and bolted on site. Consultants for the whole undertaking were Sir William Halcrow and Partners. Illustration shows the roof steelwork in course of erection on the vast arena.



QUEEN ELIZABETH II GRANDSTAND AT ASCOT

A 560 ft long cantilever steel framed structure which now forms an important and attractive part of the famous course. Architectural team was led by E.V. Collins, ARIBA, and structural engineering team by D. Dennington BSc, ACGI, AMICE. Illustration shows view of the Royal Enclosure taken from the stand.



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- D** High rise buildings (offices etc over 15 storeys)
- E** Large span portals (over 30m)
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- G** Medium rise buildings (from 5 to 15 storeys)
- H** Large span trusswork (over 20m)
- J** Tubular steelwork where tubular construction forms a major part of the structure
- K** Towers and masts
- L** Architectural steelwork for staircases, balconies, canopies etc
- M** Frames for machinery, supports for plant and conveyors
- N** Large grandstands and stadia (over 5000 persons)

- Q** Specialist fabrication services (eg bending, cellular/castellated beams, plate girders)
- R** Refurbishment
- S** Lighter fabrications including fire escapes, ladders and catwalks

- FPC** Factory Production Control certification to BS EN 1090-1
 - 1 – Execution Class 1
 - 2 – Execution Class 2
 - 3 – Execution Class 3
 - 4 – Execution Class 4

- QM** Quality management certification to ISO 9001
- SCM** Steel Construction Sustainability Charter
 - (● = Gold, ○ = Silver, ○ = Member)

Notes

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

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

Company name	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	SCM	Guide Contract Value (1)
A C Bacon Engineering Ltd	01953 850611			●	●	●											2		Up to £2,000,000
Access Design & Engineering	01642 245161				●	●			●	●	●			●	●	✓	2		Up to £4,000,000
Adey Steel Ltd	01509 556677				●	●	●	●		●	●			●	●	✓	2	○	Up to £2,000,000
Adstone Construction Ltd	01905 794561			●	●	●	●									✓	2	○	Up to £3,000,000
AJ Engineering & Construction Services Ltd	01309 671919			●	●					●	●			●	●	✓	2		Up to £1,400,000
AKD Contracts Ltd	01322 312203				●					●	●			●	●	✓	2		Up to £100,000
Angle Ring Company Ltd	0121 557 7241														●	✓	4		Up to £1,400,000
Apex Steel Structures Ltd	01268 660828			●	●	●	●			●	●			●		✓	2		Up to £1,400,000
Arminhall Engineering Ltd	01799 524510	●			●					●	●			●	●	✓	2		Up to £400,000
Arromax Structures Ltd	01623 747466	●		●	●	●	●	●	●	●	●	●		●	●	✓	2		Up to £800,000
ASA Steel Structures Ltd	01782 566366			●	●	●	●			●	●			●	●	✓	2		Up to £800,000
ASD Westok Ltd	0113 205 5270												●			✓	4		Up to £6,000,000
ASME Engineering Ltd	020 8966 7150				●	●				●	●			●	●	✓	2	○	Up to £800,000
Atlasco Constructional Engineers Ltd	01782 564711			●	●	●	●			●				●	●	✓	2		Up to £1,400,000
Austin-Divall Fabrications Ltd	01903 721950			●	●	●	●	●		●	●			●	●	✓	2		Up to £800,000
B D Structures Ltd	01942 817770			●	●	●	●			●	●			●		✓	2		Up to £800,000
Ballykine Structural Engineers Ltd	028 9756 2560			●	●	●	●	●				●				✓	4		Up to £1,400,000
Barnshaw Section Benders Ltd	01902 880848													●		✓	4		Up to £800,000
BHC Ltd	01555 840006	●	●	●	●	●	●	●		●	●			●	●	✓	4		Above £6,000,000
Billington Structures Ltd	01226 340666		●	●	●	●	●	●	●	●	●	●		●		✓	4	●	Above £6,000,000
Border Steelwork Structures Ltd	01228 548744			●	●	●	●			●	●				●	✓	2		Up to £3,000,000
Bourne Construction Engineering Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●	●	✓	4	●	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●			●	●	✓	4		Up to £3,000,000
Builders Beams Ltd	01227 863770				●					●				●	●	✓	2		Up to £400,000
Cairnhill Structures Ltd	01236 449393	●		●	●	●	●	●	●	●				●	●	✓	4	●	Up to £3,000,000
Caunton Engineering Ltd	01773 531111	●	●	●	●	●	●	●		●	●	●		●	●	✓	4	●	Up to £6,000,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	●	●	●		●		✓	4	●	Above £6,000,000*
CMF Ltd	020 8844 0940				●		●	●		●	●				●	✓	2		Up to £6,000,000
Cook Fabrications Ltd	01303 893011				●					●	●			●	●	✓	2		Up to £800,000
Coventry Construction Ltd	024 7646 4484			●	●	●	●	●	●	●	●			●	●	✓	2		Up to £800,000
D H Structures Ltd	01785 246269			●	●		●			●				●		✓	2		Up to £100,000
Discairn Project Services Ltd	01604 787276				●					●	●			●		✓	2		Up to £1,400,000
Duggan Steel Ltd	00 353 29 70072	●	●	●	●	●	●	●		●						✓	4		Up to £4,000,000
ECS Engineering Services Ltd	01773 860001	●		●	●	●	●	●	●	●	●			●	●	✓	3		Up to £2,000,000
Elland Steel Structures Ltd	01422 380262		●	●	●	●	●	●	●	●	●	●		●		✓	4	●	Up to £6,000,000
EvadX Ltd	01745 336413			●	●	●	●	●	●	●	●	●				✓	2	●	Up to £3,000,000
Four Bay Structures Ltd	01603 758141			●	●					●	●			●	●	✓	2		Up to £1,400,000
Gorge Fabrications Ltd	0121 522 5770				●	●	●	●		●				●		✓	2		Up to £800,000
Gregg & Patterson (Engineers) Ltd	028 9061 8131			●	●	●	●	●				●		●		✓	3		Up to £2,000,000
H Young Structures Ltd	01953 601881			●	●	●	●	●			●			●	●	✓	2	○	Up to £2,000,000
Had Fab Ltd	01875 611711				●				●	●	●			●		✓	4		Up to £2,000,000
Hambleton Steel Ltd	01748 810598	●	●	●	●	●	●	●				●		●		✓	4	○	Up to £2,000,000
Harry Marsh (Engineers) Ltd	0191 510 9797			●	●	●	●			●	●			●		✓	2		Up to £1,400,000
Henry Smith (Constructional Engineers) Ltd	01606 592121			●	●	●	●	●								✓	3		Up to £2,000,000
Hescott Engineering Company Ltd	01324 556610			●	●	●	●			●				●	●	✓	2		Up to £2,000,000
Intersteels Ltd	01322 337766				●	●	●	●					●			✓	3		Up to £2,000,000

Company name	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	FPC	SCM	Guide Contract Value (1)
J & A Plant Ltd	01942 713511				●	●									●		2		Up to £200,000
James Killelea & Co Ltd	01706 229411		●	●	●	●	●					●		●			4		Up to £6,000,000*
John Reid & Sons (Structsteel) Ltd	01202 483333		●	●	●	●	●	●	●	●	●	●		●	●	✓	4		Up to £6,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445			●	●	●	●	●	●	●	●	●		●	●	✓	4	●	Up to £3,000,000
Leach Structural Steelwork Ltd	01995 640133			●	●	●	●	●		●						✓	2	●	Up to £4,000,000
Legge Steel (Fabrications) Ltd	01592 205320			●	●		●		●	●	●			●	●		2		Up to £400,000
Luxtrade Ltd	01902 353182									●	●				●	✓	2		Up to £800,000
M Hasson & Sons Ltd	028 2957 1281			●	●	●	●	●	●	●	●				●	✓	2		Up to £3,000,000
M J Patch Structures Ltd	01275 333431				●					●	●				●	✓	2		Up to £800,000
M&S Engineering Ltd	01461 40111				●				●	●	●				●	●	2		Up to £1,400,000
Mabey Bridge Ltd	01291 623801	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✓	4	●	Above £6,000,000
Mackay Steelwork & Cladding Ltd	01862 843910			●	●		●			●	●			●	●	✓	4		Up to £800,000
Maldon Marine Ltd	01621 859000				●	●		●	●	●					●	✓	3		Up to £1,400,000
Mifflin Construction Ltd	01568 613311		●	●	●	●	●				●						2		Up to £3,000,000
Murphy International Ltd	00 353 45 431384	●			●		●								●	✓	4		Up to £1,400,000
Newbridge Engineering Ltd	01429 866722			●	●	●	●								●	✓	3		Up to £1,400,000
Nusteel Structures Ltd	01303 268112						●	●	●	●						✓	4		Up to £4,000,000
Overdale Construction Services Ltd	01656 729229			●	●		●	●			●				●		2		Up to £400,000
Painter Brothers Ltd	01432 374400								●		●				●	✓	2	●	Up to £6,000,000
Pencro Structural Engineering Ltd	028 9335 2886			●	●	●	●	●	●		●			●	●	✓	2		Up to £2,000,000
Peter Marshall (Steel Stairs) Ltd	0113 307 6730									●					●	✓	2		Up to £800,000*
PMS Fabrications Ltd	01228 599090			●	●	●	●		●	●	●			●	●	✓	2		Up to £1,400,000
R S Engineering SW Ltd	01579 383131				●					●	●			●	●	✓	2		Up to £100,000
Rippin Ltd	01383 518610			●	●	●	●	●						●	●		2		Up to £1,400,000
S H Structures Ltd	01977 681931						●	●	●	●		●				✓	4	●	Up to £3,000,000
SDM Fabrication Ltd	01354 660895	●	●	●	●	●	●				●			●	●	✓	4		Up to £800,000
Severfield plc	01845 577896	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✓	4	●	Above £6,000,000
Shaun Hodgson Engineering Ltd	01553 766499	●			●		●			●	●			●	●	✓	3		Up to £800,000
Shipley Structures Ltd	01400 251480			●	●	●	●		●	●	●			●	●		2		Up to £1,400,000
Snashall Steel Fabrications Ltd	01300 345588			●	●	●	●	●			●				●		2		Up to £1,400,000
South Durham Structures Ltd	01388 777350			●	●	●				●	●	●			●		2		Up to £800,000
Southern Fabrications (Sussex) Ltd	01243 649000				●					●	●			●	●	✓	2		Up to £800,000
Temple Mill Fabrications Ltd	01623 741720			●	●	●	●				●			●	●	✓	2		Up to £200,000
Traditional Structures Ltd	01922 414172	●	●	●	●	●	●	●	●		●	●		●	●	✓	2	●	Up to £2,000,000
TSI Structures Ltd	01603 720031			●	●	●	●										2		Up to £1,400,000
Tubecon	01226 345261						●	●	●	●				●	●	✓	4	●	Above £6,000,000*
W & H Steel & Roofing Systems Ltd	00 353 56 444 1855			●	●	●	●	●						●	●		4		Up to £2,000,000
W I G Engineering Ltd	01869 320515				●					●					●	✓	2		Up to £200,000
Walter Watson Ltd	028 4377 8711			●	●	●	●	●				●				✓	2		Up to £6,000,000
Westbury Park Engineering Ltd	01373 825500	●			●		●	●	●	●	●			●	✓	4		Up to £800,000	
William Haley Engineering Ltd	01278 760591			●	●	●			●	●	●					✓	4	●	Up to £2,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●	●	●		✓	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	Company name	Tel
Balfour Beatty Utility Solutions Ltd	01332 661491	PTS (TQM) Ltd	01785 250706
Bluefing Group	020 3040 6723	Roger Pope Associates	01752 263636
Griffiths & Armour	0151 236 5656	Sandberg LLP	020 7565 7000
Highways Agency	08457 504030	SUM Ltd	0113 242 7390
Kier Construction Ltd	01767 640111	Welding Quality Management Services Ltd	00 353 87 295 5335



Associate Members

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

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

- 8 Steel stockholders
- 9 Structural fasteners

- CE CE Marking compliant, where relevant:
- M manufacturer (products CE Marked)
- D/I distributor/importer (systems comply with the CPR)
- N/A CPR not applicable

- SCM Steel Construction Sustainability Charter
- = Gold, ○ = Silver, ● = Member

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
AceCad Software Ltd	01332 545800		●								N/A	
Albion Sections Ltd	0121 553 1877	●									M	
Andrews Fasteners Ltd	0113 246 9992									●	M	
Arcelor Mittal Distribution - Scunthorpe	01724 810810								●		D/I	
ASD metal services	0113 254 0711								●		D/I	
Ayrshire Metal Products (Daventry) Ltd	01327 300990	●									M	
BAPP Group Ltd	01226 383824									●	M	
Barrett Steel Services Limited	01274 682281								●		D/I	

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
Behringer Ltd	01296 668259					●						
BW Industries Ltd	01262 400088	●										M
Cellbeam Ltd	01937 840600	●										M
Cellshield Ltd	01937 840600							●				N/A
Cleveland Steel & Tubes Ltd	01845 577789								●			M
CMC (UK) Ltd	029 2089 5260								●			D/I
Composite Profiles UK Ltd	01202 659237	●										D/I
Cooper & Turner Ltd	0114 256 0057									●		M



Steelwork contractors for bridgeworks



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

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

- FG Footbridge and sign gantries
- PG Bridges made principally from plate girders
- TW Bridges made principally from trusswork
- BA Bridges with stiffened complex platework (eg in decks, box girders or arch boxes)
- CM Cable-supported bridges (eg cable-stayed or suspension) and other major structures (eg 100 metre span)
- MB Moving bridges
- RF Bridge refurbishment

- AS Ancillary structures in steel associated with bridges, footbridges or sign gantries (eg grillages, purpose-made temporary works)
- QM Quality management certification to ISO 9001
- FPC Factory Production Control certification to BS EN 1090-1
1 - Execution Class 1 2 - Execution Class 2
3 - Execution Class 3 4 - Execution Class 4
- SCM Steel Construction Sustainability Charter
(● = Gold, ○ = Silver, ● = Member)

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

BCSA steelwork contractor member	Tel	FG	PG	TW	BA	CM	MB	RF	AS	QM	FPC	NHSS 19A	20	SCM	Guide Contract Value ⁽¹⁾	
Briton Fabricators Ltd	0115 963 2901	●	●	●	●	●	●	●	●	✓	4		✓		Up to £3,000,000	
Cairnhill Structures Ltd	01236 449393	●	●	●	●			●	●	✓	4			●	Up to £3,000,000	
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	✓	4	✓	✓	●	Above £6,000,000*	
Four-Tees Engineers Ltd	01489 885899	●	●	●	●	●	●	●	●	✓	3		✓	●	Up to £2,000,000	
Kiernan Structural Steel Ltd	00 353 43 334 1445		●		●			●	●	✓	4			●	Up to £3,000,000	
Mabey Bridge Ltd	01291 623801	●	●	●	●	●	●	●	●	✓	4	✓	✓	●	Above £6,000,000	
Millar Callaghan Engineering Services Ltd	01294 217711	●						●	●	✓	4				Up to £800,000	
Murphy International Ltd	00 353 45 431384	●	●	●				●	●	✓	4				Up to £1,400,000	
Nusteel Structures Ltd	01303 268112	●	●	●	●	●	●	●	●	✓	4	✓	✓		Up to £4,000,000	
Painter Brothers Ltd	01432 374400	●		●					●	✓	2			●	Up to £6,000,000	
S H Structures Ltd	01977 681931	●		●	●	●	●		●	✓	4		✓	○	Up to £3,000,000	
Severfield (UK) Ltd	01204 699999	●	●	●	●	●	●	●	●	✓	4		✓	●	Above £6,000,000	
Non-BCSA member																
Allerton Steel Ltd	01609 774471	●	●	●	●				●	✓	4		✓		Up to £2,000,000	
Cimolai SpA	01223 350876	●	●	●	●	●	●	●	●	✓	4				Above £6,000,000	
Concrete & Timber Services Ltd	01484 606416	●	●	●	●	●	●		●	✓	4			●	Up to £800,000	
Donyal Engineering Ltd	01207 270909	●							●	✓	3		✓	●	Up to £1,400,000	
Francis & Lewis International Ltd	01452 722200								●	✓	2		✓	●	Up to £2,000,000	
Harland & Wolf Heavy Industries Ltd	028 9045 8456	●	●	●	●	●			●	✓	3				Up to £2,000,000	
Hollandia BV	00 31 180 540540	●	●	●	●	●	●	●	●	✓	3				Above £6,000,000	
IHC Engineering (UK) Ltd	01773 861734	●							●	✓	3		✓		Up to £400,000	
Interserve Construction Ltd	0121 344 4888								●	✓	N/A				Above £6,000,000*	
Interserve Construction Ltd	020 8311 5500	●	●	●	●		●	●	●	✓	N/A				Above £6,000,000*	
Lanarkshire Welding Company Ltd	01698 264271	●	●	●	●	●	●	●	●	✓	4	✓		●	Up to £2,000,000	
P C Richardson & Co (Middlesbrough) Ltd	01642 714791	●							●	✓	N/A				Up to £3,000,000	

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
CSC (UK) Ltd	0113 239 3000	●									N/A	
Cutmaster Machines (UK) Ltd	01226 707865				●						N/A	
Daver Steels Ltd	0114 261 1999	●									M	
Duggan Profiles & Steel Service Centre Ltd	00 353 56 7722485	●							●		M	
easi-edge Ltd	01777 870901							●			N/A	●
Fabsec Ltd	0845 094 2530	●									N/A	
FabTrol Systems UK Ltd	01274 590865		●								N/A	
Ficpe (UK) Ltd	01942 223530				●						N/A	
FLI Structures	01452 722200	●									M	●
Forward Protective Coatings Ltd	01623 748323					●					N/A	
Goodwin Steel Castings Ltd	01782 220000	●									N/A	
Graitec UK Ltd	0844 543 8888		●								N/A	
Hadley Group Ltd	0121 555 1342	●									M	○
Hempel UK Ltd	01633 874024					●					N/A	
Highland Metals Ltd	01343 548855					●					N/A	
Hilti (GB) Ltd	0800 886100								●		M	
Hi-Span Ltd	01953 603081	●									M	●
International Paint Ltd	0191 469 6111					●					N/A	●
Jack Tighe Ltd	01302 880360					●					N/A	
Jamestown Cladding & Profiling Ltd	00 353 45 434288	●									M	
John Parker & Sons Ltd	01227 783200							●	●		D/I	
Jotun Paints (Europe) Ltd	01724 400000					●					N/A	
Kaltenbach Ltd	01234 213201				●						N/A	

Company name	Tel	1	2	3	4	5	6	7	8	9	CE	SCM
Kingspan Structural Products	01944 712000	●									M	●
Lindapter International	01274 521444									●	M	
Metsec Plc	0121 601 6000	●									M	●
MSW Structural Floor Systems	0115 946 2316	●									D/I	
Murray Plate Group Ltd	0161 866 0266								●		D/I	
National Tube Stockholders Ltd	01845 577440								●		D/I	
Peddinghaus Corporation UK Ltd	01952 200377					●					N/A	
PPG Performance Coatings UK Ltd	01773 814520						●				N/A	
Prodeck-Fixing Ltd	01278 780586	●									D/I	
Rainham Steel Co Ltd	01708 522311								●		D/I	
Sherwin-Williams Protective & Marine Coatings	01204 521771						●				M	○
Sika Ltd	01707 384444						●				M	
Structural Metal Decks Ltd	01202 718898	●									M	●
Tata Steel	01724 404040					●					M	
Tata Steel Distribution UK & Ireland	01902 484000								●		D/I	
Tata Steel Ireland Service Centre	028 9266 0747								●		D/I	
Tata Steel Service Centre Dublin	00 353 1 405 0300								●		D/I	
Tata Steel Tubes	01536 402121						●				M	
Tata Steel UK Panels & Profiles	0845 3088330	●									M	
Tekla (UK) Ltd	0113 307 1200		●								N/A	
Tension Control Bolts Ltd	01948 667700							●		●	M	
Wedge Group Galvanizing Ltd	01909 486384							●			N/A	

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New and revised codes & standards

From BSI Update August 2014

BS IMPLEMENTATIONS

BS ISO 4998:2014

Continuous hot-dip zinc-coated and zinc-iron alloy-coated carbon steel sheet of structural quality
Supersedes BS ISO 4998:2011

CORRIGENDA TO BRITISH STANDARDS

BS EN ISO 3452-1:2013

Non-destructive testing. Penetrant testing. General principles
 CORRIGENDUM 1

NEW WORK STARTED

EN 15048-1

Non-preloaded structural bolting assemblies. General requirements
Will supersede BS EN 15048-1:2007

EN 15048-2

Non-preloaded structural bolting assemblies. Suitability test
Will supersede BS EN 15048-2:2007

DRAFT FOR PUBLIC COMMENT

14/30275134 DC

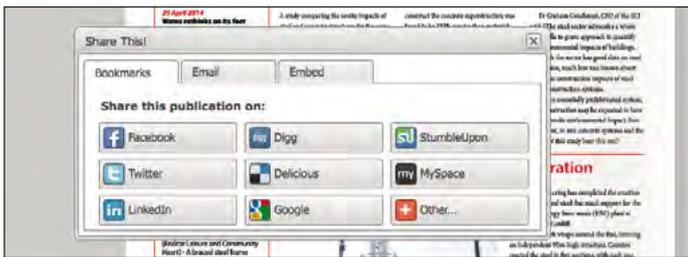
BS ISO 17577 Steel. Ultrasonic testing for steel flat products of thickness equal to or greater than 6 mm

ISO PUBLICATIONS

ISO 4999:2014

(Edition 6)
 Continuous hot-dip terne (lead alloy) coated cold-reduced carbon steel sheet of commercial, drawing and structural qualities
Will be implemented as an identical British Standard

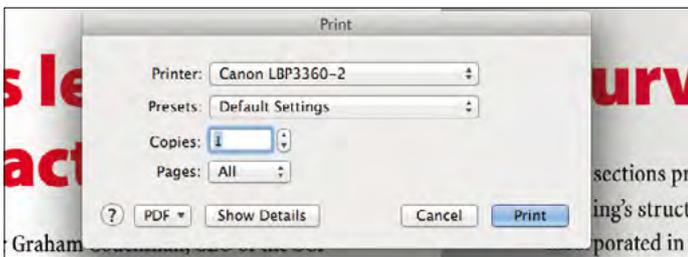
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