www.new-steel-construction.com

NSC

Olympic venues head for finish line

June 2011
Vol 19 No. 6

Oxford Street shops for steel

Steel just the ticket at Farringdon

Steel for sustainable Excellence

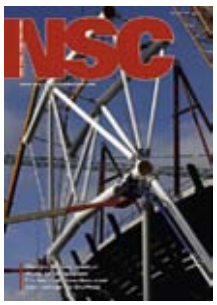
Invest in students says IStructE President

SUBSCRIBE FOR FREE TO NSC

*UK and Ireland only

Simply fill out this card and send it to us.

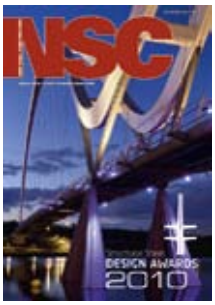












New Steel Construction keeps designers and contractors abreast of all major steel construction related developments and provides detailed technical information on key issues such as the introduction of the Eurocodes. NSC will be the first place most people hear about advances made by the extensive research and development efforts of the steel construction partners – Tata Steel, the British Constructional Steelwork Association, and the Steel Construction Institute, as well as other researchers.

Each issue of NSC is a blend of project reports and more in depth technical material. Taking up our free subscription offer is a guarantee that you will be alerted to significant developments in a sector that retains a commitment to continuous development in knowledge and techniques for timely delivery of cost effective, quality projects across all sectors of construction.

Each issue of NSC is typically 44 pages and contains five pages of news, developments related to Eurocodes, cutting edge project reports from site, and the latest technical updates from the Steel Construction Institute in its Advisory Desk Note series. Popular features are 50 Years Ago and 20 Years Ago, looking at key projects of the past by revisiting the pages of 'Building With Steel' and 'Steel Construction'.

A recent development has been the introduction of Steel Industry Guidance Notes, SIGNS, with each issue of NSC, a loose leaf insert series aimed at students and designers new to steel construction. SIGNS provide essential introductory explanations of basic steel related design topics and point the way towards where more detailed, free, support can be accessed in the steel sector.

NSC is available free of charge each month to subscribers living in the UK or Ireland by simply filling in the reply paid card bound into this issue, or by contacting us by email, post or fax as described on the card.






If the card has already been removed from this issue you can fill out this form and fax it to **020 7747 8199**, or scan and email it to **admin@new-steel-construction.com**

Name

Position

Company

Address

Postcode

Telephone

Email

Cover Image
Park House, London
Main Client: SFL3
Architect: Robert Partington Architects
Steelwork contractor: Severfield-Reeve Structures
Steel tonnage: 3,300t

NSC

June 2011 Vol 19 No 6

These and other steelwork articles can be downloaded from the New Steel Construction Website at *www.new-steel-construction.com*

lindapter® Type AF

For extreme loads and high friction applications

Project:
Gatwick Airport, London

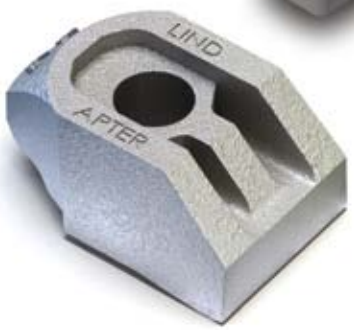
Lindapter Type AF

As used to secure Gatwick Airport's new baggage system to existing beams without drilling or welding, for a faster installation.

Lindapter Type AF fixings are approved by TÜV Nord, verifying the tensile performance of a four bolt girder clamp configuration of up to 250kN and 70kN in friction.*

- No drilling or welding
- Faster installation
- Reduced labour costs
- Adjustable on-site
- No hot work permits
- No damage to steel or protective coatings
- Free connection design

**Lindapter Type AF size M24 with Grade 10.9 bolts*



lindapter®

Lindapter International
Lindsay House, Brackenbeck Road
Bradford, West Yorkshire BD7 2NF
Tel: +44 (0) 1274 521444
Email: enquiries@lindapter.com

For more information visit: www.lindapter.com

BCSA goes the extra mile

Nick Barrett - Editor

That steel construction is inherently safer than other forms of construction is a key message that the sector has been at pains to deliver. Safety superiority is consistently proven to be no idle boast, with an improving performance that has seen accidents down by 25% in the past year.

This record has come about thanks to untiring efforts across the sector, from boardrooms to sites, and it is encouraging for all to see these efforts recognised by the Royal Society for the Prevention of Accidents (RoSPA) which has made the BCSA recipient of its first ever SME Assistance Trophy (see News).

This award is designed to highlight good safety practice, recognising where a trade association has gone the extra mile and made an outstanding contribution to promote health and safety among its 'small and medium enterprise' members. The judges looked for, and found, solid evidence of performance, diligence and commitment towards improving safety in its examination of the BCSA's safety credentials.

Congratulations are due to the BCSA safety group headed by Pete Walker, who receive as part of the award back up from RoSPA to enhance their contribution to improving members' health and safety management systems even further.

Interestingly, the construction industry also won the most prestigious of RoSPA's traditional awards, with the Sir George Earle Trophy going to contractor Balfour Beatty Construction Scottish and Southern, who we also congratulate. This trophy is not awarded solely on the basis of accident statistics, but also assesses health and safety management systems, a company's overall approach to safety. Balfour Beatty has a 'zero harm' target across the group to be achieved by 2012. An entire industry can only wish them well, and the steel sector applauds the ambition.

Steel still the competitive choice

The annual Cost Comparison series of studies comparing steel framed solutions for multi storey commercial buildings against reinforced concrete alternatives extends back to 1993, and has consistently shown that if a cost effective, speedily constructed quality solution is needed then steel is the sensible option (see News).

The most recent study shows that despite recent fluctuations in world raw materials, energy and transport costs, steel solutions are still the most cost effective – the cost differential between steel and concrete is actually wider now than ever. Cost is a major reason for selecting steel but it is not the only one by any means. Safety for example, as mentioned above, could itself be justification for selecting steel.

Many other benefits like off-site fabrication and sustainability advantages, as are being revealed by the Target Zero series of design guidance, are increasingly being factored into the cost equation by savvy developers and other clients, which is maintaining steel's market share in multi storey buildings as the latest Market Shares study shows.

Some construction markets are now showing clear signs of emerging from recession, but the focus on safety, sustainability and cost will not be any less during recovery than it was before.

NSC

EDITOR
Nick Barrett Tel: 01323 422483
nick@new-steel-construction.com
DEPUTY EDITOR
Martin Cooper Tel: 01892 538191
martin@new-steel-construction.com
CONTRIBUTING EDITOR
Ty Byrd Tel: 01892 553143
ty@barrett-byrd.com
PRODUCTION EDITOR
Andrew Pilcher Tel: 01892 553147
andrew@new-steel-construction.com
PRODUCTION ASSISTANT
Alastair Lloyd Tel: 01892 553145
alastair@barrett-byrd.com
NEWS REPORTER
Mike Walter
COMMERCIAL MANAGER
Sally Devine Tel: 01474 833871
sally@new-steel-construction.com

CHANGES TO THE MAILING LIST
If you wish to notify us of a change:
Members BCSA and Non Members
Telephone BCSA on 0207 747 8131
Members SCI Telephone SCI on 01344 636 525

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.org*
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*

Steel remains the competitive choice

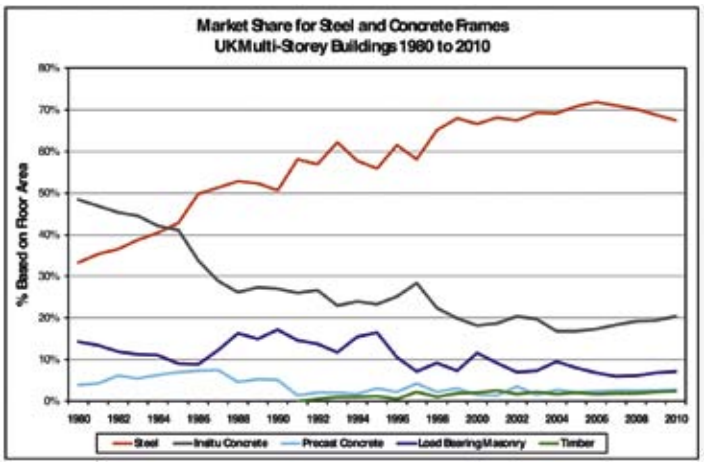
Steel is still the framing material of choice and the competitive option for the construction of multi-storey buildings.

The 2010 Market Share Survey conducted by independent researcher Construction Markets shows that steel was the preferred framing solution for 67.4% of multi-storey commercial buildings, with in-situ concrete accounting for only 20.3% of the market.

Meanwhile, the 2010 fourth quarter cost comparison study conducted by Davis Langdon reaffirms that structural steel framing solutions are faster to build and more cost effective than reinforced concrete alternatives.

The study shows the concrete frame and floor options cost an average of £153.70 per m^2, and this is £34.34 more than the average steel cost of £119.36 per m^2. In comparison with 1995, the cost differential between the two framing options is actually wider today, as steel options were only £12.10 per m^2 cheaper then.

Alan Todd, BCSA Market Development Director, said: "That steel is more cost effective than concrete as a framing solution has been consistently shown in the annual cost comparison series of studies. Cost is a major reason why the annual survey of market shares confirms that steel is chosen for about 70% of the UK's multi storey building frames.



"When all the other pluses of using steel are added on, like construction programme advantages, off-site fabrication and fire protection and sustainability benefits, it is no surprise that steel frames enjoy such a huge competitive advantage."

New home for historic flagship to open next year

A new museum and permanent home for the hull of the Mary Rose – Henry VIII's flagship – which was raised from the seabed of The Solent near Portsmouth in 1982 will be completed next year.

The £35M project in Portsmouth Dockyard involves the construction of a new boat-shaped building positioned over the dry dock in which the Mary Rose sits.

According to architect Wilkinson Eyre the design takes an 'inside-out' approach, cradling the hull at the centre of the new museum alongside a virtual hull which will display the original artefacts in context.

Deck galleries will run the length of the ship, corresponding to the original deck levels and leading to further gallery space at the end of the dry dock.

Steelwork for the superstructure is currently being supplied and erected by Rowecord Engineering, working on behalf of main contractor Warings.

Once the steel shell has been completed the building will be roofed by a low shell structure that will be prefabricated and lifted into place over the ship hall.

Tube division makes further cutting investment

Lasertube Cutting, part of the Barrett Steel Group, has commissioned its second LT8 tube laser, with a third on order for delivery later this month.

David Cleaver, Sales Manager of Lasertube Cutting said: "Acquiring our second LT8 opens up a wealth of opportunities for our customers, not just in the extra capacity it provides, but also in the speed of turn round. It also increases our capabilities for newer and growing requirements in the offshore wind turbine industry and other renewable energy markets where high volumes are required, often to tight deadlines.

"Crucially, the LT8 allows us to guarantee repeatability in terms of accuracy, tolerances and finish."

Laser cutting offers a number of key benefits for the customer as complex cutting procedures, including angles and V-shapes in both closed and open section tubes, can be carried out in a single pass. A key benefit is the opportunity to innovate: electronic drawing lists can be programmed direct into the machine, allowing prototypes to be produced quickly in a single pass, saving time and money on processing and providing greater opportunities to redesign and refine. Time savings can be up to 70% over traditional methods of cutting.

The LT8 can process traditional circular, square, rectangular, oval, elliptical oval and open sections such as channel, angle and flat bar. Also equipped with a tilting head, the LT8 offers 3D cutting for time-saving weld preparations.

Health and safety award for the BCSA

The BCSA has been awarded the first ever SME Assistance Trophy at this year's RoSPA Occupational Health and Safety Awards.

The award recognises the most outstanding contribution made by a trade association or similar body to provide health and safety assistance to small and medium sized enterprises.

Run by the Royal Society for the Prevention of Accidents (RoSPA), the award's judging criteria were awareness raising and information provision, policy development, performance improvement and recognition, services and benefits, competence development and research.

Awarding the trophy, the judges said they were particularly impressed by the level of dedication of the BCSA in providing advice and assistance to the full range of businesses in the sector from large to small.

Tom Mullarkey, Chief Executive of RoSPA, said: "We congratulate the BCSA for being the first recipient of this new award. The SME Assistance Trophy is founded on the belief that external organisations that have 'gone the extra mile' in the help they provide should be recognised and thanked. We also hope that highlighting good practice in this way will encourage other trade associations to step up their support in this area."

BCSA Health and Safety Manager Peter Walker, said: "We are delighted to be the first ever winners of this Trophy, which reflects the importance our industry places on health and safety. The judges were looking for hard evidence of our performance, diligence and commitment towards improvement. I am proud that we have demonstrated those qualities to the highest standard among our peers."

The BCSA will hold the Trophy for one year and has also received a commemorative plaque to keep permanently.

The award coincides with the news that the accident rate for BCSA member companies has been reduced by 25% over the last 12 months.

The BCSA team with the SME Assistance Trophy, back row left to right: Roger Steeper, BCSA Marketing and Communications Manager; Stuart Price, Secretary of BCSA Midland and Southern Region; Gillian Mitchell MBE, BCSA Deputy Director General and Dr Derek Tordoff, BCSA Director General. Front row left to right: Jack Sanderson, BCSA President; Peter Walker, BCSA Health and Safety Manager; Tony Power, Chairman of BCSA Health and Safety Committee

Steel Day success in Scotland

During May a CPD (Continuing Professional Development) event was hosted jointly by the BCSA and The Institution of Structural Engineers (IStructE).

Known as Steel Day Scotland, the event was a combination of factory tours to BCSA member facilities, followed by a series of evening lectures at the University of Stirling.

Five Scottish based BCSA members opened their doors to showcase the depth of expertise of the local steel industry, as well as promoting and encouraging more effective cooperation between designers and steelwork contractors.

IStructE members took the opportunity to see firsthand, modern steel fabrication facilities to gain a better understanding of the steel fabrication processes.

The five member companies that participated in the tours were Barnshaw Steel Bendiing; BHC; Cairnhill Structures, Had-Fab and Highland Colour Coaters.

Complimenting the factory tours were a series of short and informative lectures tackling issues such as health and safety and steelwork detailing. All four of the lectures were well received and consisted of: Steel the safe solution; A walk through the workshop and beyond; The devil's in the detail, and Steel supply and subgrades to EC3.

Both the BCSA and IStructE look forward to continuing to work in partnership and further CPD events, throughout the UK, are planned.

Granite edifice becomes modern steel framed headquarters

The world's second largest granite building, Marischal College, is undergoing a full scale conversion to provide a 21st century corporate headquarters for Aberdeen City Council.

The Grade A listed building, renowned as a city centre landmark, is being reconfigured to create 18,500m^2 of office workspace across four floors.

All of the historic facades have been retained and new steelwork is being inserted to form new floors in four wings around an internal quadrant.

ASD Westok has supplied cellular beams for all of the project's floors, which have spans of 10m and 7m. The majority of the beams are 550mm deep with 300mm diameter openings at 450mm centres.

The project's structural steel frame has now been completed and main contractor Sir Robert McAlpine has now commenced work on the new roof.

AROUND THE PRESS

The Structural Engineer
17 May 2011
Wembley Stadium arch dream becomes reality
Without computer modelling analysis, the iconic arch floating above London's Wembley Stadium would have remained a designer's dream. Weighing around 1500t, Wembley's giant, yet slim looking, arch is a 7m diameter lattice shell structure with a span of 315m and a height of 135m. The long span nature of the arch required it to be designed to be as efficient and lightweight as possible. At the same time, the architectural intent of the arch required it to be as slender as possible.

New Civil Engineer
12 May 2011
Buried treasure
(Farringdon Station) A 600t crawler crane is currently stationed on the site of what will be the Crossrail half of the project. It is lifting in the up to 50t steel beams needed for the Integrated Ticket Hall. The steelwork is expected to be up by July.

Construction News
28 April 2011
Combined success at composite centre
(National Composites Centre) "These types of elevations were client expectations and there are some tricky details. The key to making sure these didn't cause problems further into the project was to get all the subcontractors and suppliers on board as early as possible. The structural steel was already in production, so design workshops with the cladding and glazing specialists helped iron out any potential clash," says Mike Thomas, Kier Western senior project manager.

Building Magazine
21 April 2011
It's big, it's bold
Internally Heron Tower has all the seductive sheen and glamour that one would expect of a development pitching itself as the City's first 'six-star advanced business life environment.' In comparison with most City towers Heron meets the ground well with a lofty entrance colonnade framed by a noble screen of steel columns.

UK contractor secures multi-million pound Sri Lanka bridges deal

Cleveland Bridge has won a £35M contract to build 210 road bridges for the Sri Lankan Government.

The contract was awarded following detailed negotiations with the Sri Lankan Government to provide essential communication links, improve rural infrastructure and help relieve poverty.

"The deal will ensure a steady supply of work at our Darlington plant for 12 to 18 months," commented Andy Hall, Cleveland Bridge General Manager. "We will be undertaking superstructure design and fabrication of the steel bridges, which will then be exported in kit form to Sri Lanka, with erection supervised by us."

The 210 road bridges will have various spans, but they will all consist of a single carriageway with pedestrian access on either side. Detailed site analysis and substructure design will be undertaken in Sri Lanka, and the first fabricated steelwork is expected to arrive on site early next year.

The scheme has had the assistance of Export Credit Guarantees Department of the British Government and the British High Commission in Sri Lanka.

"We are delighted to have secured this prestigious overseas contract," summed up Mr Hall. "We are pursuing similar overseas projects and negotiations continue and we anticipate being able to announce these in the near future."

Steel raises the Belfast skyline

Designed by artist Wolfgang Buttress, a new 37.5m high steel sculpture is currently taking shape in Belfast city centre.

Working on behalf of main contractor Graham Construction, Highland Galvanizers & Colour Coaters has been contracted to protect all of the steelwork for the RISE sculpture.

The team at Highland have colour coated 1,600 steel discs (400mm x 8mm) and 2,400 steel poles (average length 2m) in textured white, using its innovative Colourgalv system.

Paul McCafferty, Sales Director at Highland Galvanizers & Colour Coaters said: "Coating the Belfast RISE sculpture has allowed Highland to continue and extend its work with cutting edge artists throughout the UK. "Wolfgang's creations are tremendously impressive and RISE in particular has such a strong and positive message.

The new sculpture is not only the largest sculpture to pass through Highland's hands, it will be the tallest piece of public art in Northern Ireland, dwarfing the Beacon of Hope which stands at 19.5 metres high.

Belfast City Council hopes RISE will be embraced as a symbol for the city and help to revitalise the area by bringing new focus and projecting a vibrant and confident image of Belfast.

All steelwork was fabricated and erected by M Hasson & Sons.

Westfield Stratford City completes construction

Known as the gateway to the London 2012 Olympic Park, the £1.45bn Westfield Stratford City retail, leisure and business destination has officially celebrated completing its construction phase with a commemorative event held on the site.

The retailers and occupiers of the site's 300 shops now have six months to fit-out their premises prior to the scheme's opening this September.

Work to clear the former industrial site started in 2008 and initially Westfield started the base build with the installation of 14,000 structural piles, each driven 22m into the ground.

Once foundations had been laid Severfield-Reeve Structures was able to begin its steelwork programme which involved erecting some 44,000t of steel (see NSC May 2010), all of which was completed last year.

Keith Whitmore, Director of Design and Construction at Westfield, said: "We are delighted to deliver the base build on time and on budget. We have applied Westfield's unique range of expertise and talent right across the project, and our team can be truly proud of their achievement."

Structural steelwork was chosen as the main framing material for its speed and flexibility, added Mr Whitmore. "With steel you can change things quickly and we have to be flexible around our clients demands."

BCSA to host Liverpool seminar for architects

The BCSA and Tata Steel will run a free afternoon seminar for architects on Thursday 23 June at the Radisson Blu Hotel in Liverpool.

The seminar is aimed at informing architectural professionals of the latest developments in the steel construction sector. During the afternoon there will be six lectures delivered by industry experts.

Topics covered will include:

- Sustainable construction through the building's lifecycle
- Fire regulations in England and Wales, and the advantages of different forms of structural fire protection
- The Target Zero low carbon buildings project and the three key areas for achieving higher BREEAM ratings at lower cost
- Conservation of fuel and power and the most cost effective method when complying with Part L2A 2010 Building Regulations
- Tubular steel and its aesthetic appeal
- 21st Century design using standing seams

The Liverpool architects seminar, follows on from that morning's Steel Essentials half day seminar for engineers, taking place at the same venue. At the time of going to press, the Steel Essentials first series of seminars for 2011 will have already concluded its Southampton and Bristol events, but two remaining seminars are planned for the end of June.

Wednesday 22 June
Menzies Strathallan Hotel, Birmingham

Thursday 23 June
Radisson Blu Hotel, Liverpool

All of these events are free of charge and aimed at keeping construction professionals aware of the latest developments in steel construction.

To find out more or to reserve a place contact *events@steelconstruction.org* or Tel: 0207 747 8131.

Wing heralds new era for famous circuit

Containing 1,200t of structural steelwork and representing the second phase of a multi-million pound investment, Silverstone's new pit, paddock and conference complex has been officially opened.

Known as the Silverstone Wing, the steel framed structure includes 41 garages, a race control building, a podium, media centre, hospitality and VIP spectator zones.

With three large halls, a conference facility, business centre and a 100-seat auditorium, the Silverstone Wing has been designed to accommodate conferences and events, and will be the largest covered exhibition space between London and Birmingham.

Measuring 390m in length, the undulating shape of the structure is said to mimic the sleek lines of modern racing cars. Its dips and troughs culminate at a 16.5m long fin-like structure, known as the blade, that juts forth at 40 degrees from one end of the building.

The blade, which has a tip 30m above ground, was one of the most challenging aspects of the project, according to steelwork contractor Barrett Steel Buildings. It was formed from four 16.5m long steel trusses, all of which were 2.18m deep at their widest point. Overall more than 300 individual steel pieces were used to construct the fin.

SCI maintains leadership in composite construction

Graham Couchman, CEO of SCI as been appointed the new Chairman of The European Technical Committee responsible for Eurocode 4 (design of composite steel and concrete structures).

Over the coming years this committee will consider feedback from early users of the code, as well as latest technical developments, and inform designers of the content of a revised code that is due sometime before 2020.

Mr Couchman carries on a long tradition of key influence from the UK, with Professor Roger Johnson (Warwick University) having been the first incumbent of the Committee.

His first experience of design in the late 1980s involved a very early draft of EC4, which was used for the design of Sizewell B nuclear power station. Mr Couchman's doctorate in the early 1990s was concerned with composite beam behaviour, and he has written a number of composite related SCI design guides over the years.

"I'm delighted to take up the new Chair and I look forward to carrying on the good work of the Committee, especially as composite construction has always been such a central part of my career," said Mr Couchman.

NEWS IN BRIEF

This year's annual **SCI** members event will be held at the Brooklands Museum, Surrey on 27 September. The event, also open to non SCI members, will include presentations from member companies, and full information will be sent out in the coming weeks. To register contact Lis Oliver on 01344 636525.

For the first time steel, concrete and timber are coming together to present a one day course on **Eurocodes**. The course is aimed at busy practitioners and provides a concise introduction to loading, load combinations and design in the primary structural materials. The course will cover key issues, with comprehensive notes for future reference, as well as tips and techniques to support practical implementation of Eurocode design. For information, dates and registration contact Jane Burrell on 01344 636600.

The **Tekla** UK model competition is open to all structural engineers until the 29 July closing date. The winners will receive a trophy, website publicity and a free advert. To find out how to enter your structural model please visit *www.tekla.com*

To meet increasing customer demand, **Andrews Fasteners** has set up a solely owned factory, Andfast Malaysia. The factory will enable Andrews to stock and supply a large range (from M6 to M64) of assembled products in different finishes in accordance with Andrews Fasteners' Quality Approvals. The company has also recently updated its website with information on the correct appliance of preload and non-preload fasteners and direct tension indicators.

Lindapter has designed a high capacity support assembly to secure a new baggage system to existing steel beams as part of the £31M Gatwick North Terminal baggage handling upgrade. The brief required a method of connecting vertical SHS hollow sections with stiffened end plates to various types of structural sections, including cellular beams, while delivering a safe working load capacity of 250kN per connection. Lindapter's technical support engineers proposed the use of Type AF24 clamps with grade 10.9 bolts.

Using a new and refreshed publications style, SCI's ***'Design of Composite Beams with Large Web Openings'*** is now available. To order a copy - full price £70 and £35 for members - call SCI on 01344 636505.

SCI aids school win in regional competition

Two SCI engineers, Philip Francis and Dimitrios Moutaftsis, have supported local students from Charters School, Ascot to help them become south east regional winners of the ICE (Institute of Civil Engineers) Create Sport challenge competition.

Working with the engineers, the students were crowned regional champions after impressing the judges with their innovative designs and model of a velodrome. The winning team will now go forward to the grand final at the Institute of Civil Engineers headquarters in London on June 27 to compete for the national trophy.

The ICE Create Sport project, aims to raise awareness of engineering career options among 12 to 13 year olds by challenging teams across the UK to plan, design and construct a model for a new sports venue in their region.

Graham Couchman, CEO, SCI commented: "Engaging pre-19s is vital to ensuring new talent is attracted into the engineering profession, SCI are proud of the contribution Phil and Dimitrios made to this project."

Subsequently, Mr Francis and Mr Moutaftsis have both been nominated by the Charter's School for the 2011 ICE Outreach award for their work with the school' pupils for the ICE Create Sport initiative.

The ICE Outreach award celebrates the work of individuals and companies who have shown outstanding commitment to promoting the civil engineering profession at events and in schools across south east England.

New range of purlin and rail sections developed

SCI has been involved in the development of ProSigma+, a new range of light gauge steel purlin and rail sections for Duggan Profiles (part of Duggan Steel), as well as producing design data in the form of safe load span tables.

SCI's work focused predominantly on testing of the sections to determine their actual performance. This resulted in obtaining optimal values for product strength, stiffness and load bearing properties.

Cathal Ware of Duggan Profiles & Steel Service Centre said: "SCI fine tuned our existing products, developing them further and adding value through testing and analysing activities such as establishing the maximum load capacity for the sections. This has enabled us to promote this enhanced benefit to the marketplace. SCI Assessed status also helps us to differentiate ourselves."

Although primarily focused on the purlin sections, the work programme also included the provision of guidance on sleeves, cleats and other ancillary components. The project involved six main areas of work;

- Guidance to Duggan Profiles on the optimum section shape
- Guidance to Duggan Profiles and the testing organisation on test method, setup and programme
- Analysis of test results to obtain data required for the design model
- Development of design model to predict the behaviour of the purlins under gravity and uplift loading
- Production of design data in the form of load/span tables
- Guidance on sleeves, cleats and other ancillary components

The steel construction industry is preparing for the requirement for CE marking of structural steelwork from July 2013.

One of the changes to be introduced is the requirement for a knowledgeable and competent welding co-ordinator. The BCSA provides members with the necessary technical support and guidance to set up and implement CE Marking required welding quality management systems.

The photograph shows Kevin Campbell of Billington Structures receiving his Responsible Welding Co-ordinator (RWC) certificate from BCSA President Jack Sanderson.

AceCad Software announces extended engineering capabilities

AceCad has announced that it is in the final stages of development of its new StruConnect integrated moment connection design system for the EC3 standard. This new software functionality is intended for release later this year.

The company also said a StruConnect integrated moment connection design system for the AISC standard is also in development. Together with soon to be released enhanced third party integration facilities, users will be able to collaborate further with engineering colleagues.

A spokesman for AceCad commented: "These exciting developments will benefit our clients globally, while also increasing AceCad's footprint within the engineering sector and further reinforcing our commitment to an integrated structural lifecycle approach across disciplines."

Diary

For all SCI events contact Jane Burrell, tel: 01344 636500 email: *education@steel-sci.com*
For Steel Essentials: To reserve your place e-mail your contact details to *events@steelconstruction.org* quoting your preferred venue e.g. 'Birmingham'. For queries, please contact the event team on 0207 747 8131.

14 June 2011
Steel Building Design to EC3
Bristol

22 June 2011
Steel Essentials
Half day morning seminar - Free
Birmingham
Menzies Strathallan Hotel, 225 Hagley Road, Edgbaston, Birmingham B16 9RY

23 June 2011
Steel Essentials
Half day morning seminar - Free
Liverpool
Radisson Blu Hotel, 107 Old Hall Street, Liverpool L3 9BD

23 June 2011
Seminar for Architects
Half day afternoon - free
Liverpool
Radisson Blu Hotel, 107 Old Hall Street, Liverpool L3 9BD

30 June 2011
Steel Connection Design
London

5, 12 & 19 July 2011
On-line Steel Building Design to EC3 Part 1
Internet

13 July 2011
Eurocode Design of Concrete, Steel and Timber
London

14 July 2011
Floor Vibrations
Birmingham

Olympics showcase steel

The lightest ever Olympic stadium is now ready to host test events

Centrepiece stadium up and ready

The London 2012 Olympic stadium has been completed on time and under budget, emerging as a shining example of how the city is primed to host the greatest sporting show on Earth.

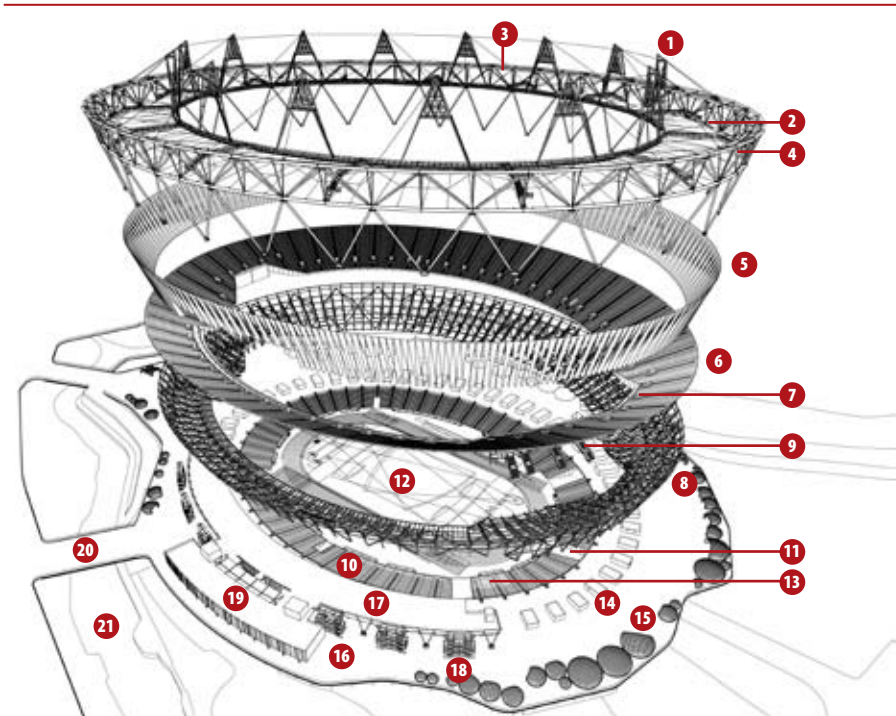
FACT FILE
London 2012 Olympic Stadium
Main client: Olympic Delivery Authority
Architect: Populous
Main contractor: Sir Robert McAlpine
Structural engineer: Buro Happold
Steelwork contractor: Watson Steel Structures
Steel tonnage: 10,000t

On a former run-down industrial site in Stratford, east London, the lightest Olympic Stadium ever built has now been completed. Containing a little over 10,000t of structural steelwork, the project stands as a testament to steel's speed of construction and ultimately its flexibility.

Once the games are over, the 80,000 capacity stadium can be demounted, with the upper tier being removed, leaving a legacy venue with a 25,000 capacity. However, in February West Ham United Football Club and Newham Borough Council won the right to convert the stadium into a football venue, incorporating the athletics track. Consequently these design plans and changes have yet to be finalised, but needless to say, the choice of a steel frame for the initial structure will aid whatever alterations are to be made.

Steelwork has played a prominent role during the construction programme and 112 steel rakers were installed to support the two tiers of seating. Circling the stadium at high level, a steel roof compression truss, made from 28 individual steel sections, each one 15m high by 30m long and weighing 85t, supports a cable net roof and 14 lighting towers.

As the centrepiece for the Games, the stadium will host the opening and closing ceremonies as well as the athletics programme. It sits on 40 acre island site which is surrounded by water on three sides. Five new steel bridges have been erected to enable spectators ample access to the site, as well as providing views across the Olympic Park and London.



Two temporary stands are positioned on either side of the venue

Iconic roof dives into action

With its unique sweeping and curving roof the Aquatics Centre will form the main gateway to the Games and is the second largest venue in the Olympic Park

1 Sportslight towers
2 Access gantries over roof fabric for access, maintenance and ceremonies activities
3 Roof tension ring
4 PVC coated polyester fabric membrane roof supported by cable net structure
5 336 Wrap fabric panels, each 25m high and 2.5m wide twisted by 90º
6 Upper tier, gross capacity: 55,000
7 Large format video screens and scoreboards
8 Upper tier supporting steel structure
9 Stairs to the upper tier from concourse level
10 Lower tier, gross capacity: 25,000
11 Field of play access tunnels for athletes, officials and ceremonies
12 Athletics field of play
13 Head-on photographers' platform
14 Internal toilet pods
15 External 'Pod Village' for spectator concessions, being developed by Locog
16 Public circulation podium
17 Level 02 concourse and hospitality terrace
18 West stand external escape stairs
19 Tensile fabric canopy over the escalator void areas for hospitality and VIP
20 River Lea
21 Venue entrance bridge

Designed by Zaha Hadid, the Aquatics Centre will mark the gateway into the Olympic Park for those entering via Stratford Station and the giant Westfield shopping centre. With its eye-catching sweeping steel roof, measuring 160m long x 80m wide, the structure has already become an iconic structure, not just for Londoners, but also for the wider sporting community.

The large steel roof structure is only supported at three points and spans the column-free space for the venues two 50m swimming pools with their moveable floors and separator booms, and the adjacent diving pool.

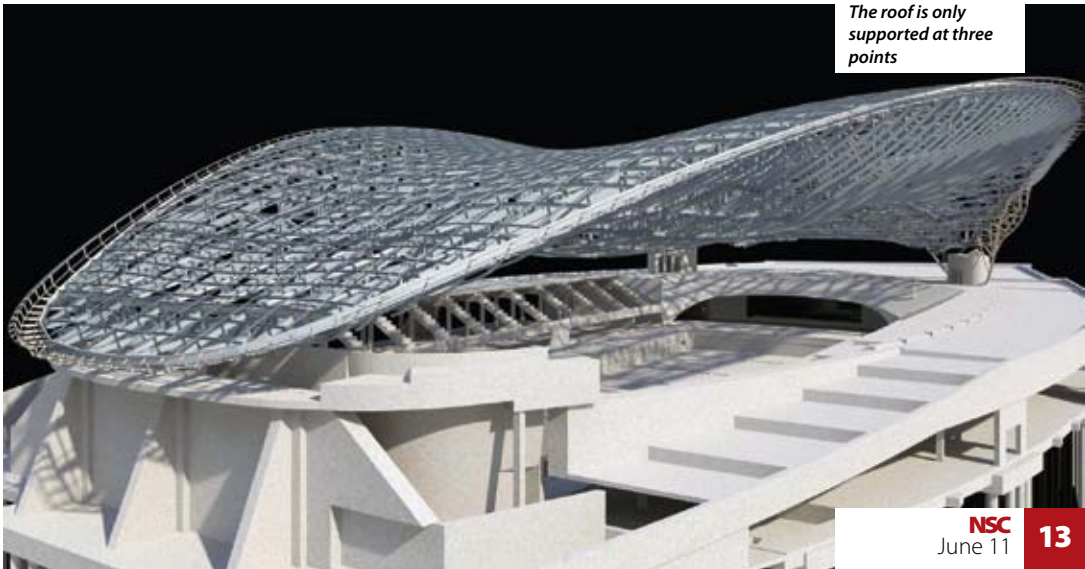
Forming the roof are a series of long span trusses, erected in a fan arrangement to create the plan geometry of the structure. The middle truss has a span of approximately 120m to a primary truss, which in turn spans 54m in a transverse direction between two concrete cores. These centre fan trusses cantilever beyond the primary truss to form a 30m overhanging canopy at the northern end.

In legacy the venue will boast a capacity of 2,500, but during the Games two temporary steel framed stands will increase the capacity to 17,500. Structurally the Aquatics Centre, including its temporary elements, is now complete and test events are scheduled for later this year.

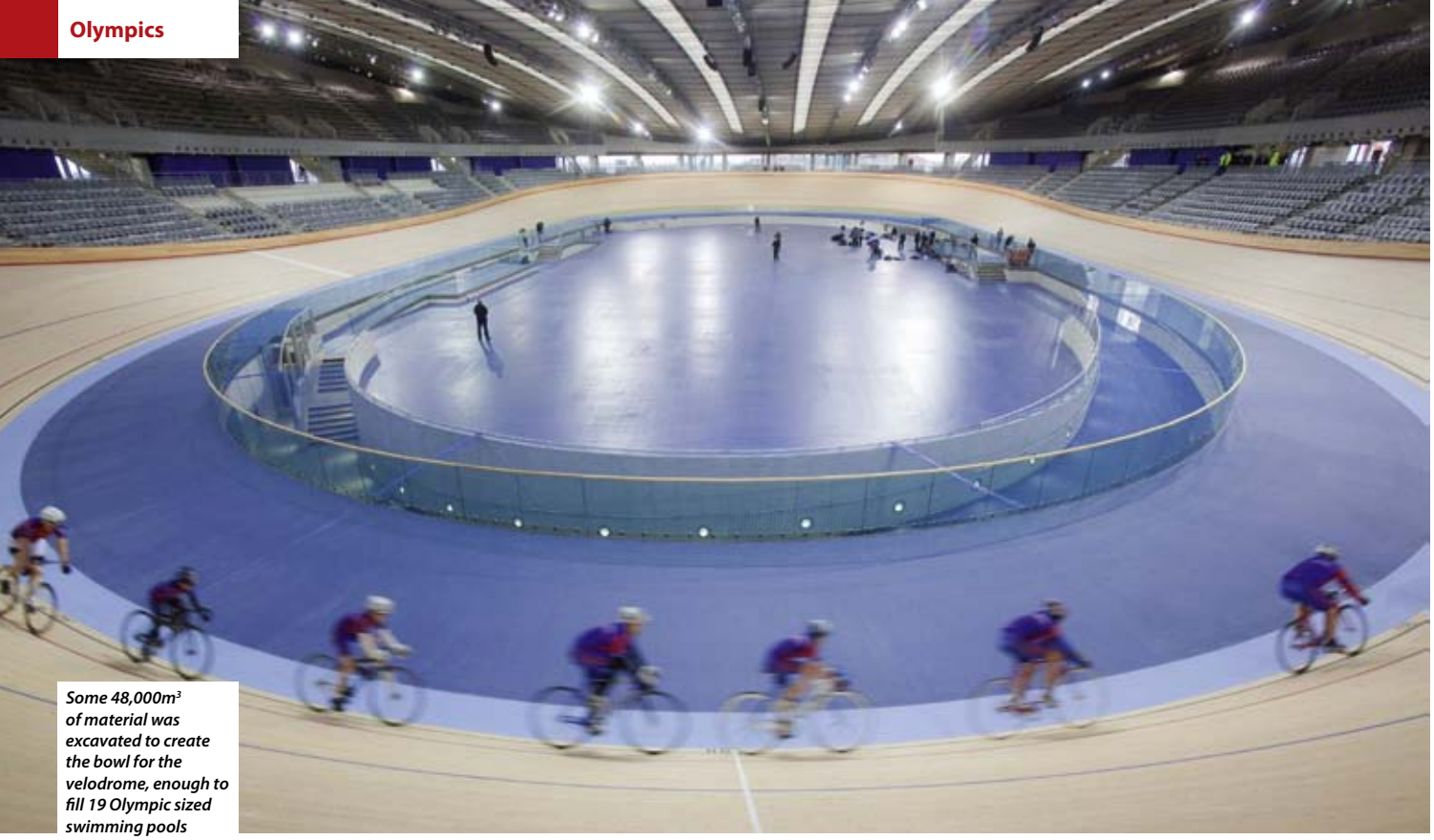
FACT FILE

Aquatics Centre

Main client: Olympic Delivery Authority
Architect: Zaha Hadid Architects
Main contractor: Balfour Beatty Construction
Structural engineer: Arup
Steelwork contractor (Permanent roof structure): Rowecord Engineering
Steelwork contractor (Temporary structures): Watson Steel Structures
Steel tonnage: (Permanent structure) 2,800t
(Temporary structure) 3,200t



The roof is only supported at three points



Some 48,000m³ of material was excavated to create the bowl for the velodrome, enough to fill 19 Olympic sized swimming pools

Cycling venue on track

FACT FILE
London 2012 Velodrome
Main client: Olympic Delivery Authority
Architect: Hopkins Architects
Main contractor: ISG
Structural engineer: Expedition Engineering
Steelwork contractor: Watson Steel Structures
Steel tonnage: 1,100t

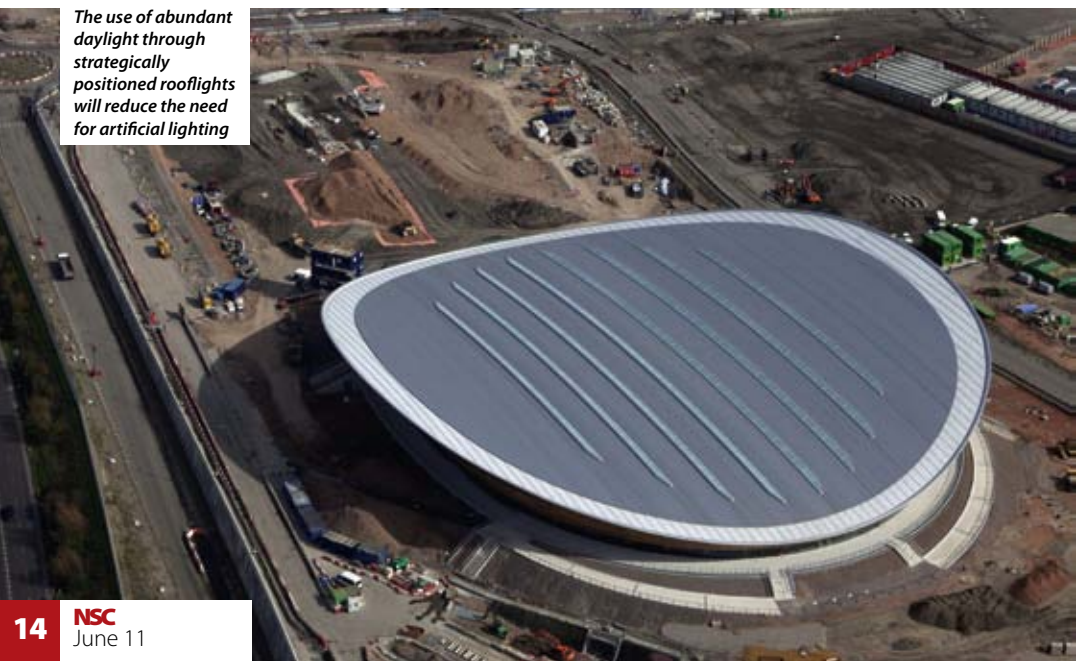
Featuring a double curved steel roof, the London 2012 Velodrome had the honour of being the first venue to be completed in the Olympic Park

Steelwork has played a crucial role in the construction of the London 2012 Velodrome. This venue, where GB has high hopes of winning medals, can be divided into two main elements; a concrete base and lower tier, and an upper steelwork portion forming the mid level concourse, the upper tier seating and the curved roof.

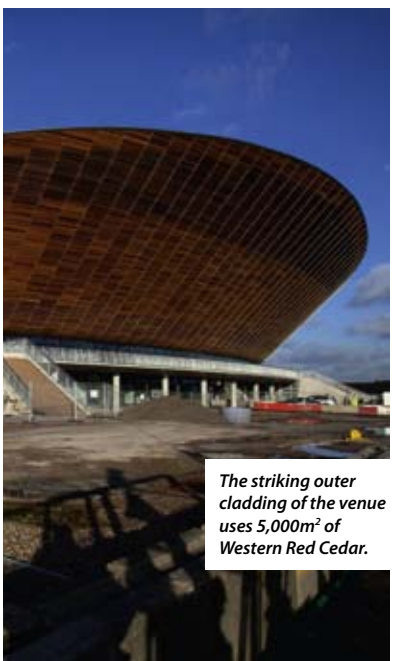
The upper tier of the Velodrome is formed by 48 inclined steel trusses (varying in size from 2m high to 16m high) connected to concrete piers. The lower parts of the truss form the steel rakers supporting the upper tier's precast terrace units. Because of the shape of the roof structure, the Velodrome has two upper seating areas positioned on either side of the track and suspended within the two curves of the roof.

A tubular steel ring beam sits on top of the steel trusses and goes around the entire perimeter of the structure, in a rollercoaster fashion, supporting and helping to form the distinctive double-curved roof. The ring beam rises in height by 12m from the shallowest point to the highest part. Off-site construction played a crucial role as much of the steelwork for the ring was pre-assembled into bays, and once erected only the steel bracing needed to be added.

The project's overall steel tonnage was made up of 2,500 sections, and its use contributed to the venue's lightweight and efficient design which is said to reflect the efficient use of a bicycle.



The use of abundant daylight through strategically positioned rooflights will reduce the need for artificial lighting



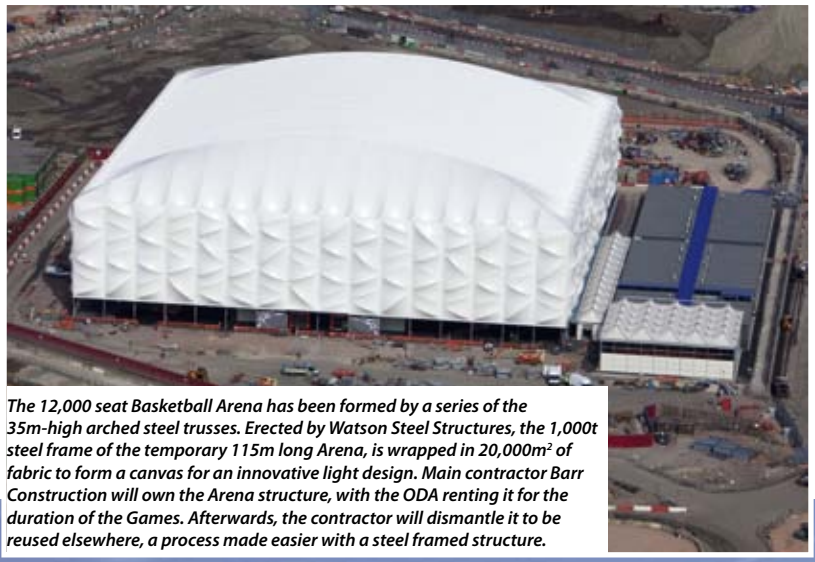
The striking outer cladding of the venue uses 5,000m² of Western Red Cedar.

The Olympic Park

As well as the three main venues, the Olympic Park also includes a raft of other structures, all of which are essential for hosting a successful Games. Steel has and is playing a key role in the construction of many of these structures, some of which are temporary and consequently rely on steel's lightweight construction and the ease with which it can be disassembled.

Temporary structures include the Basketball and Water Polo arenas, while important permanent buildings include the completed Energy Centre (right). This facility will provide an efficient low carbon heating and cooling system across the site and will contribute towards the ODA's overall target to reduce carbon emissions by 50% across the Olympic Park. The AA Group supplied and erected 500t of structural steelwork for the state-of-the-art Energy Centre, a building which will also provide the energy for new buildings and communities that will occupy the site after the Games.

Another similar energy centre has been constructed on the adjacent Stratford City development, supplying the power for Westfield's large retail site (a project which has seen Severfield-Reeve Structures supply in excess of 40,000t of steel). Steelwork has also been used for the construction of the International Broadcast Centre/Main Press Centre (steelwork supplied and erected by Severfield-Reeve Structures) and a host of bridges - needed for access into and around the Olympic Park. Many of the site's bridge structures have been erected by Watson Steel Structures and Mabey Bridge among others.



The 12,000 seat Basketball Arena has been formed by a series of the 35m-high arched steel trusses. Erected by Watson Steel Structures, the 1,000t steel frame of the temporary 115m long Arena, is wrapped in 20,000m² of fabric to form a canvas for an innovative light design. Main contractor Barr Construction will own the Arena structure, with the ODA renting it for the duration of the Games. Afterwards, the contractor will dismantle it to be reused elsewhere, a process made easier with a steel framed structure.

International Broadcast Centre/Main Press Centre

Steel's inherent sustainability and flexibility has come to the fore on the Olympic Park's Handball Arena. Already completed, the venue - which contains 1,000t of structural steelwork erected by Watson Steel Structures - will seat up to 7,000 spectators and host qualifying games for the handball competition as well as modern pentathlon fencing and goalball during the Paralympic Games.

After the Olympics, the sustainable arena will become a multi-sports venue with retractable seating for around 6,000 spectators and flexible facilities catering for training and competition for all levels of indoor sport.

One of the last structures to get underway, the temporary Water Polo Arena is adjacent to the Aquatics Centre and designed to be dismantled after the Games. Steelwork is currently being supplied by Caunton Engineering for the asymmetric venue which will be wrapped in a silver rippling roof made of air inflated recycled pvc cushions.

Large bearings isolate the upper levels of the building

Hybrid design for prime location

Occupying a prestigious central London site, Park House will accommodate retail, offices and residential apartments, a combination of uses that required innovative design work. Martin Cooper reports.

FACT FILE
Park House, London
Main client: SFL3
Architect: Robert Partington Architects
Main contractor: Mace
Structural engineer: AKT II
Steelwork contractor: Severfield-Reeve Structures
Steel tonnage: 3,300t
Project value: £130M

Described as Oxford Street's largest development in 40 years, Park House is set to transform the western end of Europe's busiest high street. Located on the south side of this world famous shopping street and backing onto the exclusive area of Mayfair, the mixed-use development is set to be one of the most sought after commercial and residential addresses in this part of the capital.

Scheduled for completion by November 2012, Park House will consist of three levels of retail - with many of the ground floor units featuring shop fronts twice the average height for the area. Above the retail zone the building is split in two, with seven floors of office space occupying the western half of the structure and 39 apartments housed in the upper eastern portion of the building.

The development is also big, occupying an entire 150m-long city block. To the rear of the building, along North Row, there will be an entrance for the exclusive use of residents; the offices will be accessed via an entrance on the eastern elevation.

A building such as this, with multiple uses is not unique. But the relationship between the three uses (retail, commercial and residential) was certainly one of the main drivers for the project's structural design.

"The challenge was to devise a rationale which met three different uses, and what we came up with was a hybrid design for a hybrid building," explains Alex Hanna, AKT II Project Engineer.

For the ground and first floor retail levels, which sit atop two concrete basement levels, steel was the chosen framing material. Above the retail zone is where the structure becomes interesting, at least design wise, as here the building is split in half, with an expansion joint separating the upper commercial floors from the adjacent apartments.

The commercial portion of the building is also steel framed, meaning the western half of Park House is constructed with the same framing material from ground level up to the roof. However, the other half of the structure, housing apartments is a reinforced concrete frame.

In order to facilitate this change, not only in framing material from steel to concrete, but also the differing column lines, a large steel transfer structure has been installed

ASD Westok Design Suite...

...bringing your designs to life

ASD Westok
klöckner & co multi metal distribution

www.asdwestok.co.uk

Tel: 01924 264121 Fax: 01924 280030 Email: info@asdwestok.co.uk
ASD Westok Limited, Charles Roberts Office Park, Charles Street, Horbury Junction, Wakefield, West Yorkshire WF8 5FH

An expansion joint divides the building in half between residential and commercial sections

to support the residential portion. A 12m x 12m grid pattern has been adopted for the shops, but this was deemed to be too large for apartments and so the grid reduces to a 4m x 8m pattern.

"To support the different concrete column lines above, we had to install much deeper and heavier beams for one portion of the second floor level," explains Jim Graham, Severfield-Reeve Structures Contracts Director.

The transfer structure consists of beams weighing up to 30t

The transfer structure consists of beams weighing up to 30t and these large sections were too heavy for the on-site tower cranes, which were used for the majority of steelwork erection. Severfield had to use two 250t capacity mobile cranes to erect these pieces, with one crane positioned in North Row and the other sat on the concrete slab.

"It was vitally important that this part of the steelwork was erected as quickly as possible due to critical path activities running through the residential section of the building," says Mace Operations Director, Dean Emblin.

The transfer structure is not the only interesting feature incorporated into the second floor steelwork. As Park House is situated directly above the Central Line underground railway, vibration could have been an issue, especially for the offices and apartments. For this reason, the entire structure upwards from second floor level has been isolated from the lower two levels of steelwork. Large 1.5m x 1.5m rubber and steel bearings have been incorporated into the main frame steelwork, and these will absorb any vibrations from the underground railway and from Oxford Street's considerable amount of traffic. Isolating the upper floors also meant that the two main concrete cores had to be constructed on top of some similar bearings; these ones located at sub-basement level.

Another interesting steel element of the project is the shape of Park House, which completely lacks any sharp corners. Both ends of the building are rounded and curve upwards towards a sloping roof, while the two main elevations start inclining at second floor level. As well as curving in

An important ingredient called teamwork

With two framing materials going up simultaneously on one project, teamwork has played an important role on this project. Once the steel transfer structure was erected on level two, concreting works for the residential portion of the building started to be constructed in tandem with the steelwork for the commercial floors.

"Teamwork between all of the on-site trades has played an integral role in this project. Steelwork and concrete tie-in together at five levels, so working together is necessary for a speedy construction programme," explains Dean Emblin, Mace Operations Director.

As well as working in tandem with the concrete contractor for the upper levels of the building, Severfield-Reeve's steel erection team has also maintained a quick and safe delivery of the overall steel package.

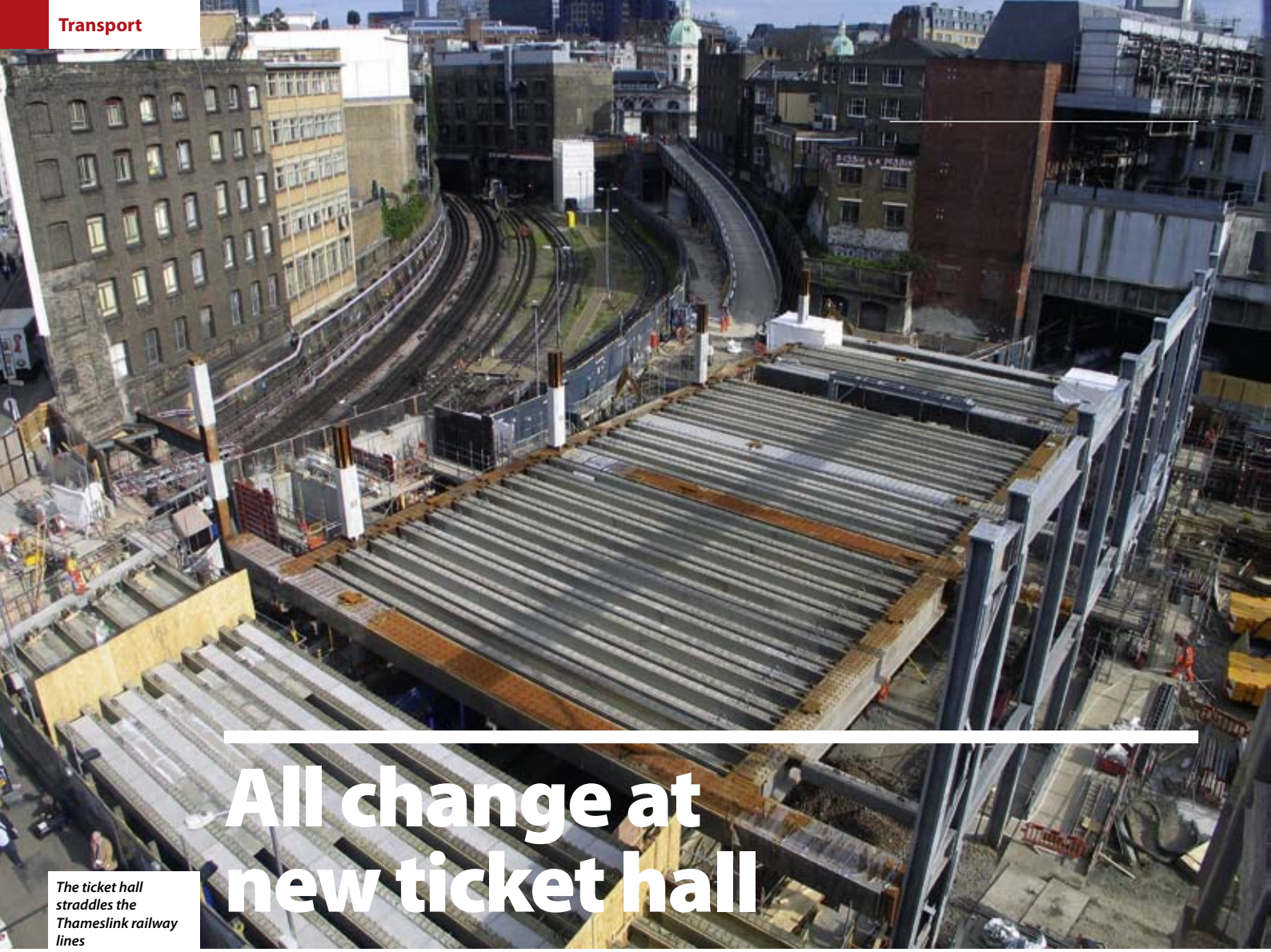
To help maintain a safe working environment for all of the follow-on trades, steelwork erection and metal decking has always maintained a two floor buffer zone. In this way the completed steelwork forms a crash deck and safety zone between the erection process and other trades.

two directions, the roof also slopes down, west to east, to incorporate the higher commercial section of the building.

The commercial section of the building extends up to level nine (level eight being the last office floor and nine being a galvanised plant mezzanine floor), while the residential part of Park House is slightly lower, only extending up to level seven.

To form this complex shape, the perimeter columns, always remaining at 12m centres, are facetted at approximately 3m intervals. These column lines then carry on and over the roof to form the sleek shape of the structure, which has been described as mimicking the outline of a racing car.

In order to support the residential zones' smaller grid pattern a transfer structure has been installed at second floor level



All change at new ticket hall

The ticket hall straddles the Thameslink railway lines

A steel framed ticket hall is central to Network Rail's plans for Farringdon Station, which is set to become one of London's busiest transport hubs. NSC reports.

FACT FILE
Farringdon Station redevelopment, London
Main client: Network Rail
Architect: Atkins
Main contractor: Costain/Laing O'Rourke (CoLOR) jv
Structural engineer: Atkins
Steelwork contractor: Bourne Steel
Steel tonnage: 1,500t

Construction projects in city centres invariably throw up logistical challenges, sometimes associated with the busy location and sometimes because of traffic or nearby transportation infrastructure.

Getting materials and equipment on to these sites can also be problematical and so deliveries are usually made on a just-in-time basis, as city building sites generally have little or no room for storage. Once everything is on-site, issues such as noise, excessive dust and how to lift materials without overslewing busy streets or occupied buildings must also be taken into account.

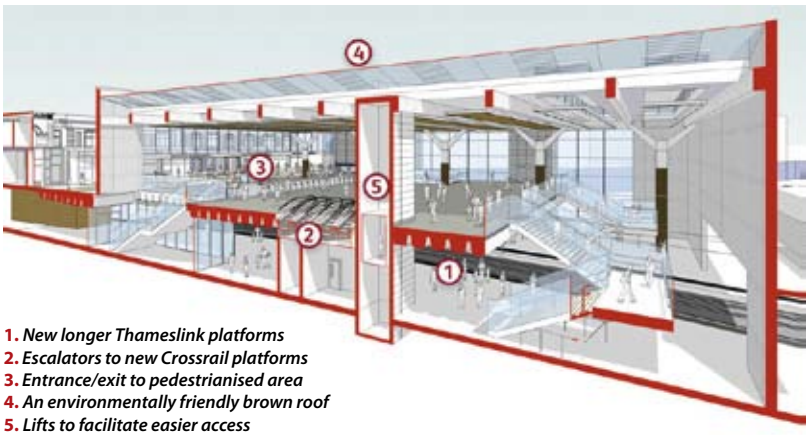
A project in London has had to deal with all of these issues, and some more, while redeveloping one of London's oldest stations. Farringdon was originally built in 1863 and serves the capital's underground and overground networks. It is currently being transformed in readiness for more services and longer 12 car trains on the Thameslink route.

The station, located just north of the City of London in Clerkenwell, will on project completion in 2019 become one of the city's busiest hubs, handling London Underground trains, Thameslink overground services as well as being a stop on the brand new Crossrail line.

This will make it the only station serving all three of these services, and with over 140 trains every hour there will be direct connections to four of London's major airports (Gatwick, Luton, Heathrow and City) and two international rail stations (St Pancras and Stratford).

Work on Farringdon's new Crossrail platforms, which will be located approximately 25m below the existing station, has yet to commence, but at ground level a number of project elements are in progress including the construction of a new Integrated Ticket Hall (ITH).

Situated on the opposite side of Cowcross Street from the original Grade II listed station



1. *New longer Thameslink platforms*
2. *Escalators to new Crossrail platforms*
3. *Entrance/exit to pedestrianised area*
4. *An environmentally friendly brown roof*
5. *Lifts to facilitate easier access*

building, the ITH will provide a unique link between three rail services and help to draw new people and businesses to the area.

The steel framed ITH straddles the southern end of the station's Thameslink platforms (which are being extended to accept the longer trains) as well as a section of the adjacent underground lines. This position has probably had the biggest influence on the project's construction programme, as Nick Hayes, Bourne Steel Operational Director explains: "We are erecting steelwork over 'live' railway lines, which are subject to two separate possession orders – Network Rail and London Underground.

"Consequently, the majority of our erection work is being carried out during weekends, Bank Holidays and at night, making our programme a lot slower than we would normally expect."

The site, bounded by busy streets on all sides, was also short of large access points, until a temporary steel framed slip road was installed opposite Smithfield Market. This large ramp allows equipment and materials to be delivered to site without interfering with rail services.

Some of the first steelwork to be erected were a series of eight 27m-long prismatic girders which form the ground floor level of the ITH. These girders, weighing 60t (40t of steel), were pre-encased in high-quality concrete for corrosion and fire protection purposes. All were lifted into position during successive night time possessions, using the on-site 600t capacity crawler crane.

The large crane has been used for all steelwork erection as it has the reach and capacity to lift to all points of the site without overslewing any of the adjacent streets or rail lines. The crane is currently positioned on the part of the site that will be the Crossrail half of the ticket hall.

As the Crossrail contract had not been given the go ahead when work initially started at the station, the ITH steelwork has been designed in such a way that a second portion can be bolted on at a later date. For the initial steelwork programme, grid line K marks the final line of steel for the first phase. The extra loadings an extension will exert have been accounted for by 'beefing up' many of the steel columns and beams along this grid line.

Also in preparation for the Crossrail addition to the station, lift shafts have already been dug and pre-assembled steelwork inserted.

"Off-site construction is important on this job as space is at a premium, so for logistical reasons we have to do as much as possible," explains Mr Hayes. "Off-site work has included all of the concrete encasement of the steelwork, and fully assembled and glazed rooflights as well as feature stairways."

Prior to the prismatic girders being installed (the prismatic shape was chosen as it matches the precast beams they will support) two rows of 15m-high columns and connecting box girders were erected either side of the 'live' rail lines. Again, this work was carried out during weekend and night time possessions.

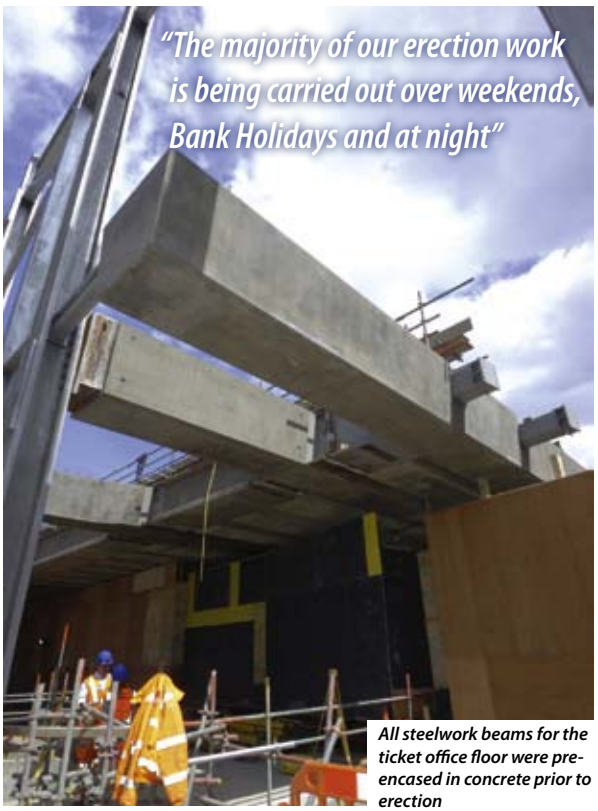
Once the ITH's floor has been cast, work will then continue almost unhindered. The concrete level will act as a crash deck and allow steelwork erection for the remainder of the ticket hall to be done during normal working hours.

Two rows of 12m-high Y-shaped columns will support the ticket hall's roof, creating the large open column free area. Spanning between the feature columns will be another series of 28m-long beams, these ones supporting the structure's environmentally friendly brown roof.

Although the ticket hall is central to Farringdon's overall redevelopment, to the average passerby work looks like it is moving very slowly.

"Because of the need to erect steel during possessions, maybe only one column or beam is erected in a certain week," says Tim Harman, CoLOR Engineer. "Also the work needs to be intergrated with construction of the new platforms and complex re-routing of the train services, electrical and control systems. So it may look like the project is progressing slowly, but everything is on schedule."

The Thameslink platforms and the new train shed roof will be ready for the 12 car trains which will come into service this December.



All steelwork beams for the ticket office floor were pre-encased in concrete prior to erection

A 600t capacity crawler crane is positioned on land soon to be occupied by the Crossrail project

Station connections

As well as the ticket hall being erected by Bourne Steel, it's sister company Bourne Special Projects is carrying out construction of a new entrance building on Turnmill Street, refurbishment of the existing Grade II listed station building and the construction of a new North Train Shed roof (left).

The northern end of the station's platforms are uncovered and the new train shed roof will link up to the existing roof structure. The new roof has an approximate area of 1,680m^2 and is formed by a series of 18 tubular columns supporting 19 cross beams and 140 glazed panels.

Aside from the tubular columns, the roof structure is being delivered to site in fully assembled sections fabricated from box sections. These pre-assembled sections are 28m long by 3.5m wide and are curved in plan, to take into account the platform's curvature.

Student investment the key to the future

It took the pain of a gruelling hike across Dartmoor with a full pack on his back to make the 16 year old Roger Plank decide to study mathematics and physics rather than modern languages; which has been immensely to the benefit of structural engineering.

Roger is now several months into his Presidential year at the Institution of Structural Engineers, having recently retired from full time academic life after a career mostly spent at Sheffield University, where he and the Department of Civil and Structural Engineering played a significant role in the development of steel construction design over the past 30 years or so. He cites the collaborations between the department and the steel sector as one of the major highlights of his successful career.

'I was doing the Dartmoor hike as part of my Duke of Edinburgh award and it was a good opportunity for thinking about my future,' he remembers. 'Languages had looked like the most likely course for me to take as I was studying French, German and Russian and enjoying it. But I realised that I liked mathematics even more and there were more career opportunities, so the decision was made.'

From there it was a short step to discovering an interest in applying maths to model real behaviour, which led to a choice of engineering as a career. 'I'm not one of those engineers who spent hours as a child playing with Lego or Meccano sets,' he confesses. 'Interest in engineering grew from an interest in maths and physics.' The great outdoors once again played a key role in his career choices:' I found that I liked mechanical as well as civil engineering, but civils meant that I might be outdoors a bit more, which was what I wanted.'

The influence of inspirational teachers while studying at Birmingham University, where he eventually took his PhD, led him towards structural engineering, and also towards an academic career. 'I felt more comfortable with the structures stream, it seemed to me to be a more pure discipline whereas I always felt that there were more fudge factors in fluid dynamics.

'The high profile projects always seemed to involve structures, either buildings or bridges, so it seemed an easy choice.'

A short period in practice with a small Birmingham consulting engineer was time well spent. 'It was a fantastic experience. We were involved with small projects but the variety of experience was excellent, involving all aspects of design and all stages of the construction process. It was ideal. Had I been on a big project I would probably only have experienced one small aspect of it.'

Roger joined Sheffield University in 1976 as a lecturer in a department that was already strong on the structural use of steel. By the time he retired from his post as professor last year the department was one of the biggest and liveliest in the UK with close ties to industry, particularly the steel industry. British Steel, and later Corus, sponsored two teaching posts as well as a Chair in Structural Engineering and Architecture, which was occupied by Roger.

Structural fire engineering soon became his principal interest, following a meeting with Jef Robinson, a metallurgist from British Steel, who challenged the traditional approaches which today look expensive and time consuming. 'Great advances have been made in this area and we have come a long way from what was the traditional approach 30 years ago,' says Roger, helped in no small part by the research undertaken by him and his students over the years modelling structural response to fire. 'New design methods mean that the amount of fire protection can be significantly reduced, and it can be easily applied offsite during fabrication.'

Significant knowledge was gleaned from the Cardington programme of large scale fire tests which Roger was closely involved in planning. Data was used to validate design models and subsequently used to develop Vulcan fire engineering software which is in widespread use today. Although structural fire engineering is well

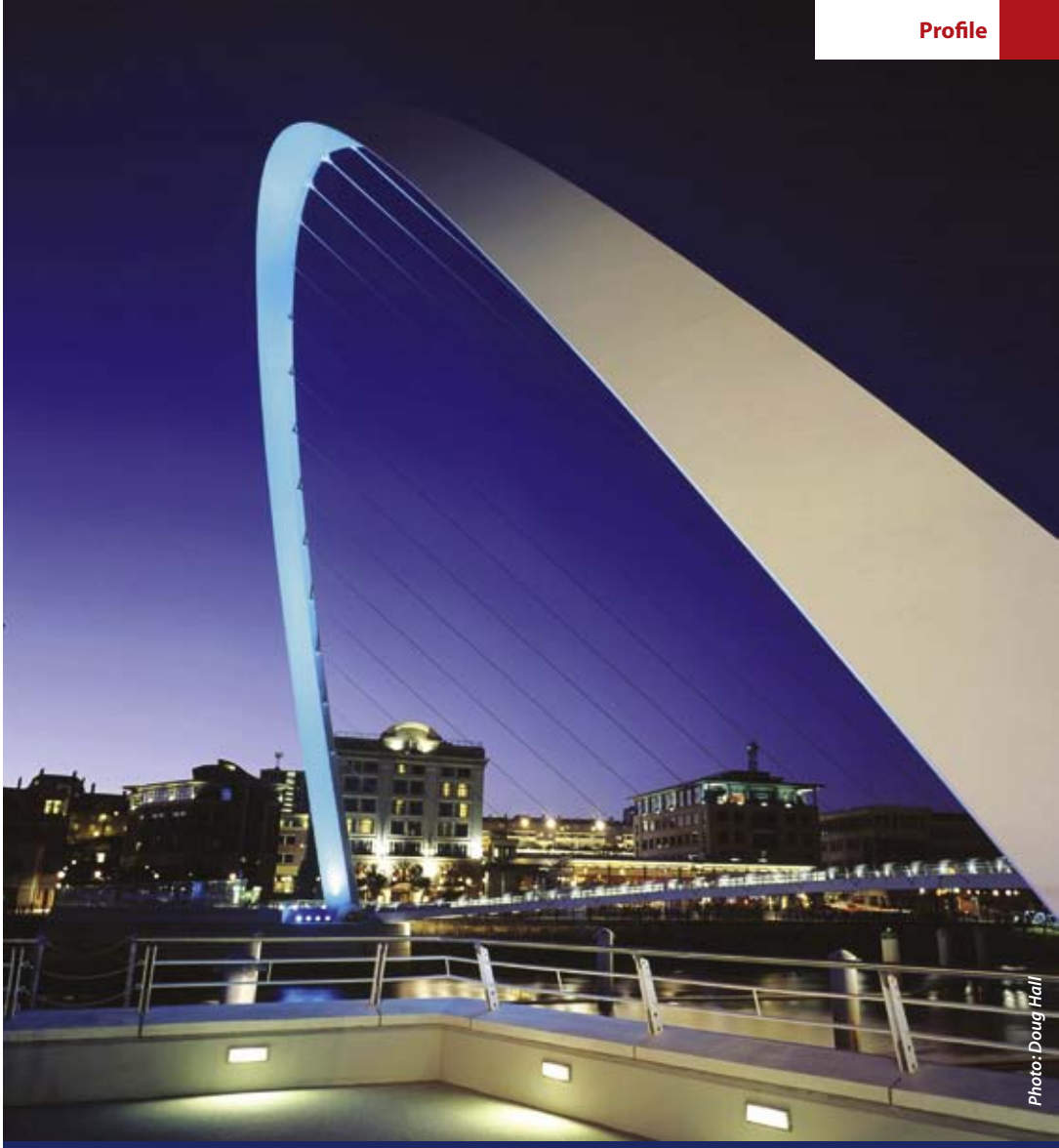


Photo: Doug Hall

"If I had a single message for the industry then that is it – make sure that you maintain your investment in students."

appreciated for use on large projects, Roger says there is potential for a lot more use of it on smaller projects where a prescriptive approach still prevails.

Future research might also focus more on sustainability he suggests, as developers and other building owners come to realise that it is a market opportunity rather than a cost. 'There is still a lot of confusion on sustainability though and a lot of work needs to be done.'

A post retirement career in consultancy promises to keep Roger busy after what will be an extremely busy year as President of the IStructE. He has several themes to pursue during his Presidential year. A key message is that the future depends on investments made now in young engineers, and Roger stresses the importance of getting the right messages across to students. 'One of the things we did successfully over the past 30 years or so was to focus on undergraduates, making sure that teaching materials on the structural uses of steel were widely and easily available.

'If I had a single message for the industry then that is it – make sure that you maintain your investment in students. That is what has been done over the past 30 years and it has certainly paid dividends for the structural use of steel.'

Not surprisingly perhaps, a list of favourite structures is topped by three significant steel projects - two buildings and one bridge.

No 1 Finsbury Avenue, on the western edge of the Broadgate development in the City, is widely acknowledged as a trailblazer of its day, built in the early 1980's. It incorporates several structural innovations; it has a full height central atrium and was the first composite floor steel framed building in the City. Unusually for the time, a trial erection was undertaken to ensure that work would proceed with minimal risk of delay on this high profile, developer funded project.

Waterloo International Station (below), opened in 1994 but not used as a railway terminus since 2007, is another favourite which was hailed as a monument to a new railway age of cross channel rail travel. The future of the structure is uncertain but the engineering and architectural achievement remains. Its most striking feature is the glazed train shed roof which rises more steeply at its western side to accommodate the height of the trains.

'They prove the value of investing time and money up front in planning and design and in thinking about how best to build a structure,' says Roger.

The Gateshead Millennium Bridge (designed by Wilkinson Eyre and pictured above) over the Tyne is his bridge choice, the twin 100m span steel arch structure with its famous opening 'eye' being nothing if not iconic. Its deck is a stiffened steel box suspended by steel cables from a parabolic steel arch. It represents a unique collaboration between architect and engineer to provide a visually striking and innovative engineering achievement. 'It is elegant and ingenious engineering, adding to its environment in a very positive way,' he says.


Photo: Jo Reid and Jon Peck

North lights will be installed on the building's roof

Smart building aims for excellence

Forming part of a multi-million pound project, an innovative teaching and workshop centre aimed at supporting low carbon enterprises is making use of a number of sustainable features including a steel frame.

FACT FILE
SmartLIFE Low Carbon Centre, Cambridge
Main client: Cambridgeshire County Council and Cambridge Regional College
Architect: Pick Everard
Main contractor: Kier Marriott
Structural engineer: Pick Everard
Steelwork contractor: H Young Structures
Steel tonnage: 85t
Project value: £2.6M

Educating tomorrow's workforce in the necessary skills for building a low carbon environment is gaining in importance year on year. Local authorities are keen to promote and invest in their environmentally sustainable future, and to ultimately achieve this a raft of new learning facilities are likely to be needed.

One such establishment is the SmartLIFE Low Carbon Centre, a joint venture between Cambridgeshire County Council and Cambridge Regional College, under construction on the outskirts of Cambridge. Here the skills needed for constructing low carbon buildings and installing renewable energy solutions will be taught. The Centre will also deliver new jobs and help reduce the impact of CO_2 locally.

The project has been designed as a low impact and highly sustainable building which is aiming for a BREEAM 'Excellent' rating. To achieve this desirable rating the building will include solar thermal water heating, highly efficient heat recovery systems, rainwater harvesting, solar shading, photovoltaic arrays for electricity generation and automated lighting.

The visual character of the building, according to project architect and engineer Pick Everard, is strong, simple and modern. There are sharp, clean lines from contrasting anthracite fibre cement panels with light coloured profiled aluminium cladding.

The 1,221m^2 steel framed structure will incorporate skills and training areas, with a dedicated workshop area for practical learning, classrooms and support areas where advice for local businesses will be available.

Internally, the structure is divided into two different blocks, one three-level part housing flexible teaching areas, research facilities, seminar rooms and a second floor roof terrace; and a single storey area given over to a renewables workshop.

With so many sustainable features attached to the Centre, deciding on which framing material to use for the construction programme was another important design decision.

"It all came down to speed of programme and weight," says Ravi Vyramuthu, Pick Everard Project Engineer. "Steel offered us a much quicker programme, which obviously

TATA STEEL

TATA

SEA CHANGE

ComFlor® Composite Floor Decks

Weston-Super-Mare's main tourist attraction, the iconic Grand Pier, has risen like a phoenix from the ashes of a fire that completely destroyed it in 2008.

A stunning new pier has been constructed to up to the minute standards, featuring 4,200m^2 of ComFlor® 60 composite floor decking.

In order to get the Pier re-opened as soon as possible, it was decided that the steel frame and floor decking would be simultaneously installed.

ComFlor® 60 was selected as it offers the ultimate in lightweight steel decking for all multi-rise buildings.

It combines exceptional spanning capabilities with reduced concrete usage, for a cost-effective and attractive floor solution that's fast and easy to install.

For more information contact:
T: +44 (0)845 30 88 330
F: +44 (0)845 30 11 013
comfloruk@tatasteel.com

Scan the code to visit our mobile site

www.tatasteelconstruction.com/comflor

The building is split between three storey and single storey zones

The building will include solar thermal water heating,highly efficient heat recovery systems, rainwater harvesting, solar shading, photovoltaic arrays for electricity generation and automated lighting

drove the overall cost down, while the site's poor ground conditions were better suited to a steel frame as it's lighter and needed minimal foundations."

The overall main frame consists of a fairly straightforward design with a centrally located braced lift core and some perimeter bracing giving the structure its stability. Because many of the structural bays contain windows or doors, the locations suitable for bracing were few and far between, so the majority of bays, at either end of the building, incorporate moment frames to take lateral loads.

The three-storey element (classroom area) has been erected around a regular grid pattern which is uniform for all three levels. The arrangement of columns and beams is incorporated with ComFlor 46 metal decking from Tata Steel, which was installed for the structure's two floors and the roof, with its composite action adding to the overall stability.

Explaining why this decking system was used, Pick Everard Structural Engineer Sarah Parker, says: "The economic project design required the floors to be as slim as possible."

ComFlor 46 is a simple trapezoidal composite deck with a strong and reliable shear bond performance. The shallow shape reduces the volume of concrete needed, with resultant savings in structural and foundation costs.

Externally, the three-storey block will have 'punched' floor to ceiling windows for a strong vertical emphasis and projecting window pods and screen walls for variety. Fibre cement cladding, laid in random coursing will create a vibrant façade and backlit polycarbonate on a prominent corner of the site will act as a beacon and focal point for the development.

The other portion of the structure, containing the renewables workshop, is currently a double height space, but one which can be easily reconfigured into a two-storey building. First floor steel beams have been installed - some of which support a mezzanine level - and these beams could be utilised for an increased mezzanine, or even a first floor level, if the need arises.

The workshop is topped with a sawtooth roof profile, which not only provides the structure with definition, but also allows glazed north lights, photovoltaic cells and solar water panels to be installed on the slopes. This part of the Centre also features long horizontal windows at high level with narrow slit windows for tutorial bays. Large areas of the external walls will be glazed to allow activities inside to be visible.

Steelwork for the project was completed earlier this year and all 85t was erected in under two weeks.

Summing up the job, Ian Peachment, H Young Structures' Managing Director, comments: "It's a very economic design and we designed all of the connections. Using just one mobile crane, the erection sequence presented no problems, as the site was clear of any obstructions and the weather stayed fine."

A steel frame was chosen for economic reasons

A future hive of activity

The SmartLife Low Carbon Centre is part of The Hive, a proposed multi-million pound education and enterprise park that will eventually include a SmartLife eco-homes park and a Future Business Centre. The site is located to the north of Cambridge city centre, adjacent to Cambridge Regional College and close to the Science Park Campus.

Steel is expected to play a significant role in the construction of any new developments within The Hive, a site which will have significant benefits for the local community.

What will make this business park different to others, according to Cambridgeshire County Council, will be its overarching focus on business that is good for society and the environment.

KBS1051 band saw; as viewed by IPS 2011 visitors; seen repeatedly cutting a HEM400 beam in 83 secs

Industry know how

Kaltenbach's International Partners in Steel event in Germany featured a raft of new and upgraded machines for the steel construction industry.

The KWR 601, a newly developed robotic welding system, shown for the first time at IPS 2011. It enables perfect seam, robotic welding of lugs, end plates and webs or similar items to columns and beams

This year's International Partners in Steel (IPS) event was held at Kaltenbach's Lörrach headquarters in Germany between May 9-13. Under the banner of 'We know how: Logistic Process Control' the biennial event showcased innovations for improved efficiency, not just from Kaltenbach, but also from the 40 partner companies that took the opportunity to exhibit their products.

With more than 3,000m^2 of exhibition space and international visitors from 52 countries attending the event, the overriding atmosphere was one of confidence that the worst of the economic downturn had past.

In tandem with this upbeat outlook Kaltenbach representatives reported a strong order book and plenty of interest from UK stockholders and steelwork contractors.

New Kaltenbach machines on show included the KBS 1051 band saw. This unit fully exploits the marked cutting performance benefits of TCT blades (bi-metal blades can also be used), using powerful and proven servomotor, ball-screw down-feed technology. Combined with Kaltenbach's unique AFC (Auto Feed Control), which achieves dynamic, auto-sensing and adjustment of the band-cutting angle 'during' the cutting cycle, throughout a changing cross-section, optimised cutting performance is achieved, with minimum cutting edge contact area. The KBS 1051 has a high-speed, multi-positional mitring range of -30°/ 90°/+45°, with maximum material capacity of 1030mm x 500mm down to 30mm × 10mm minimum. The first of these machines have been installed in the UK this year, with Kaltenbach reporting considerable worldwide demand.

On show for the first time was the KBS 2101 DG, Kaltenbach's largest high power band saw. This machine can handle welded beams with dimensions up to 2,050mm × 800mm, has a bevel facility and can swivel via a CNC control.

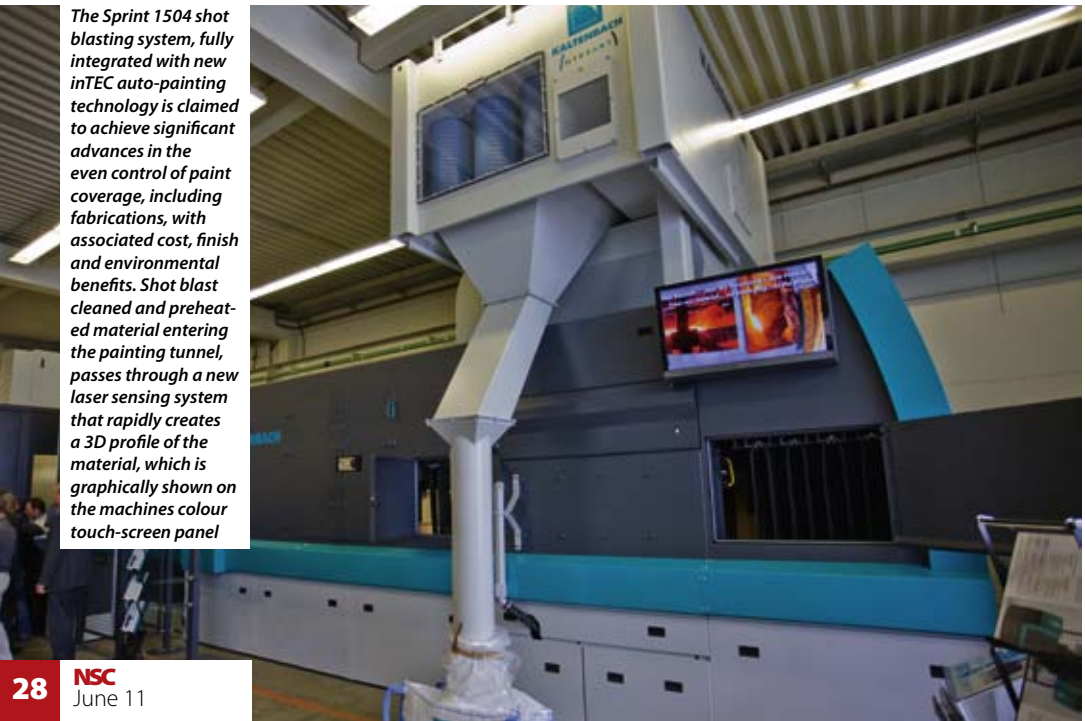
The company's entire drilling machine range (KDE, KDM and KDL machines) has been redeveloped during the last couple of years resulting in efficiency improvements across the board. Kaltenbach's flagship KDL series now has a tool magazine with six tools in each of its three working axes. The series of drilling machines can handle beams up to 2,000mm × 700mm in size.

Another new addition to Kaltenbach's offering is the robot welding system KWR 601, which can automate existing manual assembly processes.

Continuing the automation theme, the KF 1606, a fully automated plate processing centre with a robot for part removal and sorting, was also on display. This machine has been developed specifically for the demands of fabricators and stockists, where accurate profiles and drilled, counter-bored and tapped holes can be rapidly achieved in strip-fed material from 6-60mm thick and up to 1.6m wide, using acetylene or high-speed plasma.

Speed and efficiency are combined with the new KKS 463, a universal circular sawing machine. A continuous one-piece machine box enables the aberration-free alignment of automatic feed, saw and the cut-off gripper. This is said to create the right conditions for highly precise cut-offs.

KKS 463's material feed gripper has robust linear guides and is driven by ballscrew spindles with brushless servomotors. The machine's positioning speed is automatically selected depending on material weight, but it can reach speeds of up to 60m per minute.



The Sprint 1504 shot blasting system, fully integrated with new inTEC auto-painting technology is claimed to achieve significant advances in the even control of paint coverage, including fabrications, with associated cost, finish and environmental benefits. Shot blast cleaned and preheated material entering the painting tunnel, passes through a new laser sensing system that rapidly creates a 3D profile of the material, which is graphically shown on the machines colour touch-screen panel

BARRETT
STEEL LIMITED

OVER 80,000 TONNES OF STEEL STOCK

CONSTRUCTION SECTOR EXPERTISE

Barrett Steel has worked in successful partnership with customers in the structural fabrication and construction markets for many years. We are known throughout the UK and overseas as trusted suppliers of premium quality, competitively priced raw materials and finished products. Our General Steels and Tubes Divisions combine extensive stocks, state-of-the-art processing facilities and the prompt and reliable distribution service you would expect from a leading steel stockholder.

WHY BUY BARRETT?

Barrett Steel provides a one-stop-shop for all of your steel requirements. We hold over 80,000 tonnes of general steel and complementary products across our country-wide network of 25 depots. Our in-house delivery fleet provides a cost-effective and timely delivery to sites across the UK.

BARRETT
General Steels

- Full range of structural sections.
- Shotblasting & priming.
- Sawing & drilling.
- Punching & shearing.
- Flat bed profiling in plasma, gas & laser.

BARRETT
Tubes Division

- Hot finished & cold formed hollow sections.
- Laser profiling in 2D & 3D.
- Profiling up to 508mm OD, 400mm x 400mm or 500mm x 300mm.
- Shotblasting & priming.

We're more than happy to have a no-obligation discussion with you about your current or future plans. Call us today - we're waiting to hear from you.

For more information visit us on-line at
www.barrettsteel.com

BARRETT
General Steels

T: 01274 682281
F: 01274 651205
E: sales@barrettsteel.com

BARRETT
Tubes Division

T: 0121 601 5050
F: 0121 601 5051
E: sales@tubes-uk-steel.co.uk

Enhanced design of ultra shallow floor beams

Shallow floors are playing an increasingly important role in the steel construction sector. Mark Lawson of SCI and Professor of Construction Systems, University of Surrey, explains how new research has led to improved design rules for ultra shallow floor beams.

Introduction

An enhanced form of Ultra Shallow Floor Beam (USFB®) has been developed and patented by ASD Westok Ltd . This is aimed at shallower floor constructions than is possible with other forms of slim floor beams or also with reinforced concrete flat slabs. The Steel Construction Institute worked with ASD Westok Ltd and with City University on the testing of USFB® beams to develop a design method for composite action based on the 'plugs' of concrete and reinforcement through the openings in the beam.

The nature of ASD Westok Ltd's cutting and re-welding of rolled sections is that regular openings are created over the full length of the beam. In USFB® construction, reinforcing bars are passed through alternate openings, and are anchored into the ribs of the composite decking or the filled hollowcore precast units. The generic form of construction is illustrated in Figure 1, indicating the effective area of concrete acting with the USFB®. The 'plugs' of concrete through the web of the beam are now designed to act as effective shear connectors.

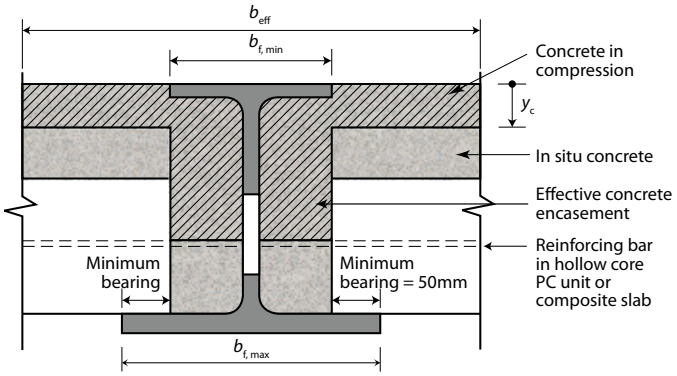


Figure 1: USFB® with bar reinforcement in the concrete 'plug'

USFB® beam tests

To understand the structural behaviour and to develop a design model, load tests were carried out on a partially encased USFB® beam of 6 m span with both unreinforced and reinforced openings. Other tests were performed on beams of 1.5 m span with and without partial encasement to identify the increase in the shear resistance due to the influence of the encasement of the perforated beams. The beam tests were carried out at City University, London.

The key data from the beam test is:

- Depth of beam h = 230 mm
- Depth of opening h_o = 150 mm
- Spacing of openings s_o = 265 mm
- Top Tee 305 × 165 × 40 kg/m UB (in S355 steel)
- Bottom Tee 305 × 305 × 97 kg/m UB (in S355)
- Concrete slab 1000 mm wide × 215 mm deep (C30 cube strength)
- Reinforcement 16 mm dia. bars in 5 openings on one half span.

Two tests were carried out; one with a pair of load points at distance of 2.5 m from the supports, and one with a single point load at 1.4 m from one support. The first test caused longitudinal shear failure of the unreinforced 'plugs' and the second test with a shorter shear span caused failure of the reinforced 'plugs'.

It was found that the bending resistance of the USFB® was increased by 83% due to composite action without reinforcement in the 'plugs' and 138% with reinforcement compared to the bare steel beam. In both cases, the mode of failure satisfied the deformation capacity limits for ductile shear connection in accordance with the principles of BS EN 1994 1 1.

Figure 2: USFB® Test 2 at City University showing the single off centre load point

Additional push out tests were carried out on 254 UKC sections with three 150mm diameter openings and Table 1 presents the average and characteristic shear resistance per 'plug' based on the 4 tests in each series. The variability of the failure loads for the reinforced 'plugs' was within 10% , and the slip at failure was over 8mm in all of these tests.

Table 1 Summary of push out test results on column sections with reinforced and unreinforced 'plugs'

Case	Average failure load per 'plug'	Characteristic shear resistance per 'plug'
Unreinforced 150 mm dia 'plug'	190 kN	131 kN
Reinforced 'plug' (with 16 mm dia bar)	365 kN	322 kN

All data for C30/37 concrete

Plug composite action in USFB® beams

Composite design of USFB® sections may be carried out using plastic analysis principles to Eurocode 4, in which the effective slab width may be taken as for a composite beam and is equal to beam span/8 on either side of the centre-line of the encased beam. USFB® beams may be designed with transverse

reinforcement through alternate openings, and the longitudinal shear resistance arises from a combination of mechanisms:

- Bearing of the concrete on the edge of the web at the openings
- Friction between the concrete and both sides of the web due to the confining effect on the concrete when the reinforcing bar acts in tension close to failure. This friction effect may be assumed to occur in combination with dowel action.
- Additional shear resistance of the bar reinforcement over two shear planes, one on either side of the opening. This is known as 'dowel' action and occurs at relatively large deformation.

The longitudinal shear transfer is firstly to the concrete encasement between the flanges of the USFB®, which provides some composite action. Longitudinal shear is then transferred to the effective width of the concrete topping through its junction with the concrete encasement. This mechanism is assisted by the reinforced ribs of the composite decking or by the hollowcore units. However, it is assumed conservatively that the transfer of longitudinal shear forces from the concrete encasement around the USFB® is limited by the critical shear planes through the concrete topping.

Shear resistance assisted by concrete encasement

USFB® beams are highly perforated and so the shear resistance of the remaining web is potentially limited. However, the concrete encasement between the flanges of the beam significantly increases the shear resistance of the beam. Three further tests were carried out on USFB® beams, which were designed to fail in vertical shear by Vierendeel bending at the openings. The tests were carried out on 305 × 165 × 40 kg/m UKB sections with 230 mm dia. openings, and the series included bare steel beams and beams in which concrete was placed between the flanges.

The two tests on beams with concrete between the flanges failed as shown in Figure 3, and it was apparent that considerable 'strut' action occurred through the concrete encasement. The measured shear resistances of the partially encased beam were 302 to 312 kN, in comparison to 130 kN for the test on the bare steel section (i.e. an increase of 130 to 140% due to the partial encasement).

Figure 3: Failure mode for partially encased beams at opening after removal of the damaged concrete

At an opening, the concrete encasement acts as a 'strut' in compression that is confined between the flanges and inclined diagonally across the opening, as illustrated in Figure 4. The magnitude of this strut action depends on the ability of the flanges to resist the local compression forces. Normally in USFB®, the top flange is thinner than the bottom flange and is the weaker element. The vertical component of the triangulation of forces is resisted by tension in the web post between the openings. The horizontal component of force acts on the bottom flange by a combination of friction due to the strut force and shear- bond.

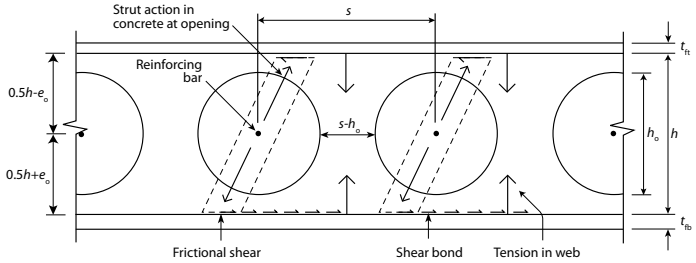


Figure 4: Simple model of the compression 'strut' acting in the concrete encasement across the openings

A simple model for the vertical shear resistance of the concrete encasement is to consider the vertical component of this strut force, F_b as a bearing force which causes transverse bending in the flanges. From these tests, it was concluded that the shear force V_c that is resisted by the concrete encasement is dependent on the top flange dimensions and may be taken as:

$$V_c = 0.83\,(h_o / b_{f,min})\, t_{ft}^2 f_y \leq 0.2 b_{f,min}\, h_o\, f_{cu}$$

For thick flanges, the compression resistance of the concrete 'strut' may control. The reinforcing bars assist in preventing separation of the concrete encasement from the beam.

Summary of design using USFB®

The common range of application of USFB® beams is for slab depths of 180 to 300mm, in which the concrete is placed flush with top flange. Regular openings are created by the cellular beam fabrication process, and 16mm diameter reinforcing bars are placed in alternate openings at not more than 600mm spacing. The nature of the choice of UKC sections for the bottom Tee and UKB sections for the top Tee is that the asymmetry in flange areas can be over 3 to 1. Composite action reduces this effective asymmetry and optimises the bending resistance. Full shear connection can be achieved through the reinforced 'plugs'.

SCI has developed design software for USFB® based on this model of composite action and shear resistance, which is conservative relative to these tests. In practice, the span :depth ratio of USFB® beams is generally in the range of 25 to 30, which means that serviceability rather than bending or shear resistance will control. The tests showed that the USFB® beams act compositely with the concrete encasement and topping without slip at service loads.

Acknowledgement

This article uses test information provided by Dr Cedric D'Mello and Mr Bing Yu Huo at City University, and the technical work was funded by ASD Westok Ltd.

A Monitor Roof using Castella Beams

From Building with Steel, May 1961

Castella beams are used to considerable advantage in the roof construction of a very large Design Office which forms part of the new offices of Messrs Hawker Aircraft Ltd (Now incorporated in the Hawker Siddley Group) at Richmond Road, Kingston-upon-Thames.

The site for the new offices was created by the demolition of several bays, formerly used as stores, of the existing factory. The area provided was approximately 120ft deep by 500ft wide and the new multi-storied offices occupy the whole site in the shape of a hollow U, in the arms of which is contained a new stores for the factory and ground floor with the design office at first floor level above the stores.

The planning of the design office was severely restricted. In addition to the central area above the stores the design office floor extends lengthwise into the main block, forming an area of approximately 80ft x 500ft with as little encumbrance from columns as possible.

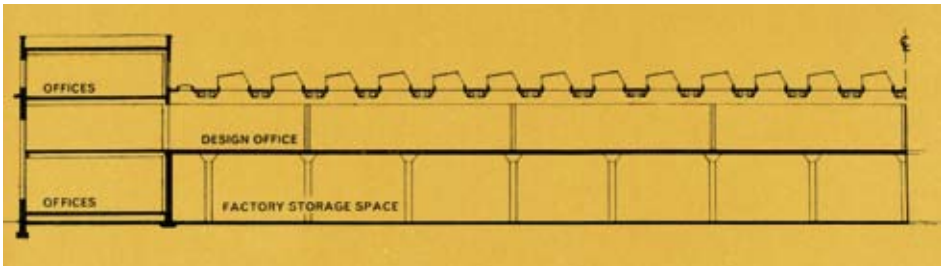
Only the short end walls to the Design Office provide natural lighting, one long wall being common with the factory, and the other with the administrative offices. Uniform high-intensity natural lighting is of prime importance. Heating, artificial ventilation and acoustical isolation from factory and external noises also made demands on the structural solution.

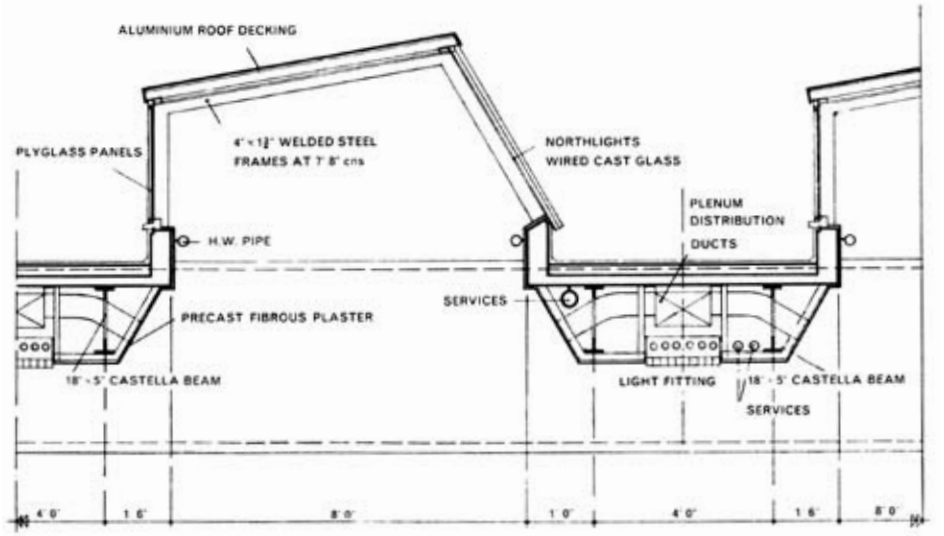
A detailed investigation of various structural systems to provide adequate natural top light was carried out. As it had been decided that a minimum clear height of 15ft was desirable in such a large office, the overall construction depth of the roof had to be limited to around 6 ft to avoid obstruction to the second floor windows of the main office block. For this main reason, and other considerations, many of the more conventional North-light steel or concrete shell types of structures were abandoned.

The monitor type of roof, steel framed as was the main office block, offered many advantages in time, money and performance. By adopting shallow monitors every 15ft a very even distribution of natural lighting with a satisfactory depth of construction was achieved.

One development of this system was the use of trusses of inverted triangular cross section spanning 80ft with the monitor framing bridging the gaps between the trusses. As the problems of artificial lighting and the ventilation system were pursued, however, the development was superseded by the scheme as constructed using Castella beams.

This was made possible by the introduction of a central spine beams with columns at 50ft centres. The central beam, a welded plate girder, carries pairs of Castella beams between each line of monitors, of 40ft span. The introduction of one interior column for every 400 sq foot of floor space has placed little or no restriction on the maximum efficiency of floor usage.





The standard of finish required was very high and so determined efforts were made to design the roof as a complete unit rather than, as is seen too often in similar buildings, a non-cohesive compromise of structure, cladding and services. The architectural and engineering design team were able, as indeed they should, to achieve a very satisfactory solution.

The monitors run from east to west and to prevent a build up of summer heat, and to prevent direct sunlight from upsetting the very uniform level of daylighting, the vertical southern faces of the monitors were glazed with 'Plyglass' panels in metal window frames. These provide a diffused light with some heat insulation. On the northern faces of the monitors, standard patented glazing is used but no opening lights are provided in the monitors, which are made dust proof. A heating coil is provided to compensate for thermal losses.

The monitors are framed by 4 in × 11¾ in joists, welded to shape, with longitudinal angle rails at their top corners. They are roofed with patented aluminium decking finished with bituminous felt on insulation board. A fibre board soffit is provided to the decking to increase the reflective value in natural light and to reduce reverberation.

The pairs of Castella beams forming the main structural carriers are covered by a concrete deck, screeded to falls and weatherproofed with asphalt. As designed it was intended that precast concrete units should be used, but with an in situ concrete deck the advantages of composite construction in which the deck forms the table to a Tee beam of which the Castella beam is the stalk would undoubtedly provide an even more economical solution.

Between the pairs of Castella beams run the distribution ducts of the plenum ventilation system and beneath these ducts are mounted the housings for the fluorescent lighting tubes. Other services are mounted on the Castella beams and the whole is encased in prefabricated fibrous plaster units. The discharge branches from the plenum ducts are led through the openings in the Castella beams to grilles in the fibrous plaster cladding.

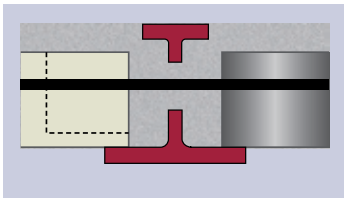
The roof of the Design Office at the offices of the Hawker Aircraft Co Ltd.

There's a new type of plug in use.

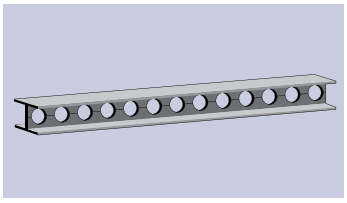
USFB Version 2 Software

Westok USFB
ULTRA SHALLOW FLOOR BEAM
Plug Composite

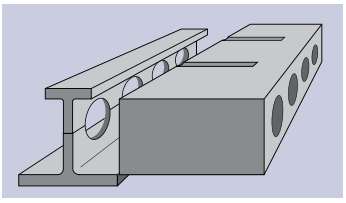
USFB™ has gone Plug Composite



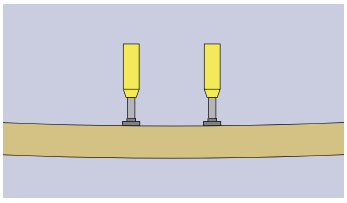
Plug composite action of slab proved to increase strength.



Plug composite USFB designed weights up to 30% lighter than non composite designs.



Steel deck + PC slabs (with structural topping) both benefit from plug composite design.



Tested & proven by SCI at City University, London.

New USFB plug composite software by SCI now available.

For more details, to get your CD or to talk to our structural advisory engineers please call **01924 264121**. Alternatively visit us online at **www.asdwestok.co.uk**

Now you can go Plug Composite

ASD Westok
klöckner & co multi metal distribution

Fax your request to ASD Westok on 01924 280030

Name:_____ Position:_____

Company:_____

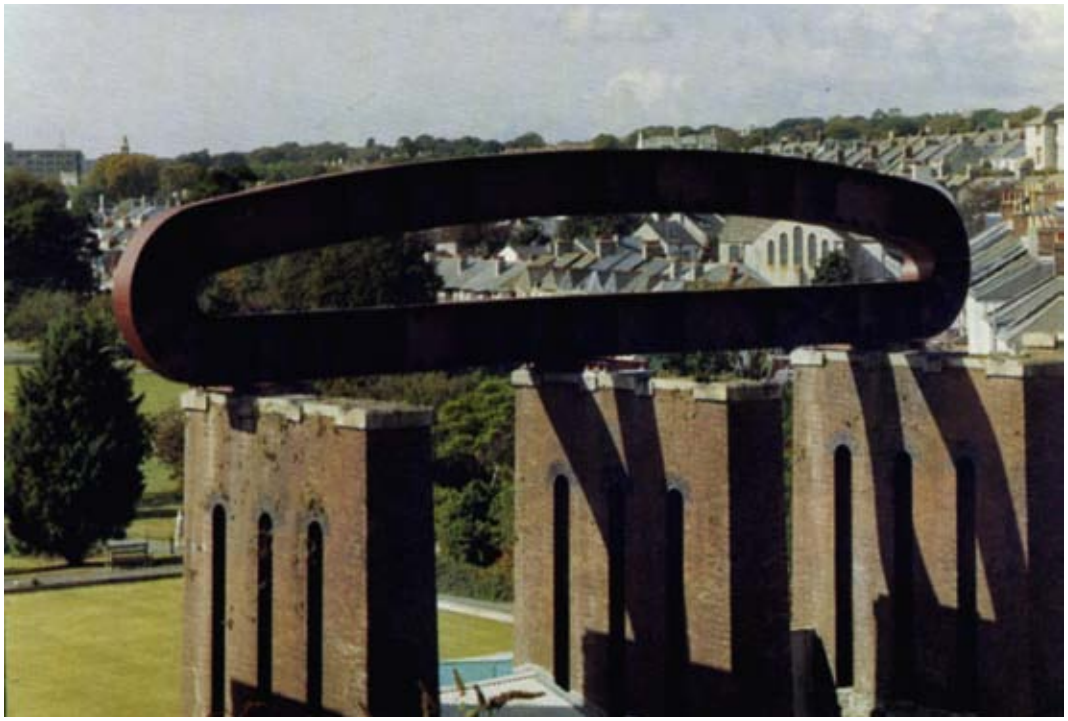
Address:_____

_____ Postcode:_____

Email:_____

Taken from STEEL CONSTRUCTION, February 1991

BCSA sponsor Plymouth steel structure



This series of red brick columns standing close to the existing Penzance line are all that remain of a viaduct which once carried the boat train to Millbay Docks. Here travellers would have boarded one of the great cruise liners ploughing its trans-atlantic route. Richard Deacon's large steel sculpture sits aside three of these columns as if they were plinths for sculptures in a vast open air gallery. The artist has provided a new function for these otherwise obsolete piers.

The organic shape of the sculpture, which is nearly 100ft long, recalls the shape and construction of the coastal railway running from Exeter to Plymouth, it also echoes the extraordinary architecture of Brunel's great bridge across the River Tamar a few miles down the line. Though abstracted, the sulture derives both from Richard Deacon's childhood memories of Plymouth, where he grew up, and his fascination with the great engineering achievements of the 19th century.

Richard Deacon often makes sculptures which refer to real objects. In this case, the references could be to the industrial fabrication of a temporary bridge of the sectional construction of an aircraft fuselage. The changing form only becomes aparrent on exploring the sculpture from all sides.

Richard Deacon is acknowledged as one of Britain's leading contemporary sculptors. His interest in making large sculptures for both rural and urban landscapes continues a rich tradition in British sculpture, exemplified by the outdoor works of Barbara Hepworth and Henry Moore. The sculpture was comissioned by TSWA in partnership with British Railways Board Corporate Community Fund. With thanks to Royal Mail, Blight and White Ltd, (Dr Roger Pope, Bob Hyrdziuszko), Kenchington Little plc, Nick Hanika, The British Constructional Steelwork Association Ltd and Lisson Gallery (Nicholas Logsdail).

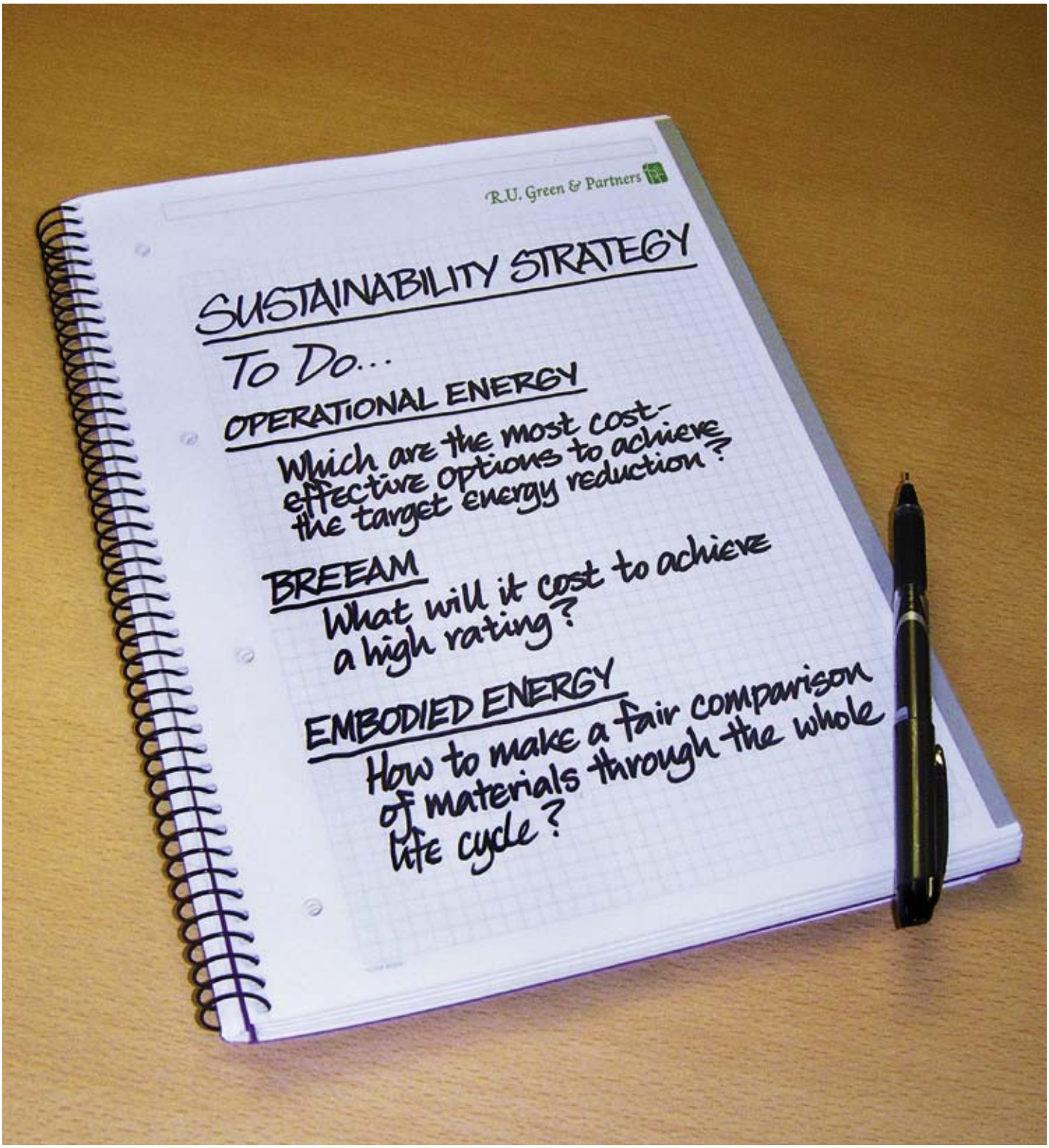
250 tonnes of steelwork erected in 12 hours

Robert Watson & Co (Constructional Engineers) Ltd commenced erection of steel on Rosehough Stanhope's Holborn Viaduct Development on Saturday 17 November, 1990.

The £3.8M steelwork contract for the fabrication and erection of the raft structure which will support the Ludgate Place Office development spanning the Thames Link Railway Line started at midnight when the first 250 tonnes of fire protected, shaped bridge girders, along with the steel plate permanent formwork were erected in a 12 hour period using a 500 tonne telescopic mobile crane.

Bovis Construction are Construction Managers for the project, while Ove Arup & Partners are Consulting Engineers for this part of the development.

Robert Watson & Co (Constructional Engineers) Ltd is a member of the AMEC Group.



The Target Zero study provides designers with free guidance on the cost-effective methods to reduce operational energy, embodied energy and achieve higher BREEAM ratings for five building types – schools, offices, supermarkets, warehouses and mixed use.

The fully costed guidance has been produced by AECOM, Cyril Sweett and the Steel Construction Institute and is available at **www.targetzero.info**

TARGET ZERO®

TATA STEEL

BCSA

AD 359
Weathering steel bolts

European bolt standards do not specifically cover weathering steel bolts – i.e. bolts of material similar to that of 'structural steels with improved atmospheric corrosion resistance' to EN 10025-5. The execution standard, EN 1090-2, notes in Clause 5.6.6 that Type 3 Grade A fasteners to ASTM standard A325 would be suitable. There is limited availability of such fasteners in the UK; the only metric size that is (sometimes) available is M24; in imperial sizes, only the 1 inch size is readily available. The Advisory Desk has been asked on several occasions to clarify the consequences on design of using imperial size bolts to this standard as preloaded bolts.

A325 *Standard specification for structural bolts, steel, heat treated, 120/105 ksi minimum tensile strength*, specifies a minimum ultimate tensile strength for 1 inch size bolts that is almost exactly the same as that specified in EN ISO 898-1 for property class 8.8 fasteners and it specifies a proof strength that is 70% of the UTS. Such bolts will therefore conform to the requirements of EN 1090-2 clause 5.6.6. For design to Eurocodes, the characteristic tensile strength to be used in design is therefore the same as that for class 8.8 fasteners. However, the tensile stress area of a 1 inch bolt is 10% greater than that of an M24 bolt and thus its resistance is 10% greater, both in shear and in slip resistance (and in tension).

A 1 inch bolt requires a larger hole size and thus the minimum spacing and edge/end distances are greater; the change would affect the bolt layout and plate size if minimum values appropriate to a 26 mm hole (for an M24 bolt) had been chosen when detailing the connection. It is therefore recommended, when detailing bolted connections in a weathering steel structure, to specify M24 bolts but to ensure that the spacing and edge/end distances comply with Table 3.3 of BS EN 1993-1-8 for a hole size of 28 mm, in case 1 inch bolts have to be substituted. The resistance of the connection should nevertheless be determined on the basis of the resistance of M24 bolts in 26 mm holes (this would be conservative if 1 inch bolts were substituted). However, if it is certain that 1 inch size bolts will be used, the slip resistance and the shear resistance in bearing can be taken as the larger value, which might permit a lesser number of bolts to be used.

Contact: **David Iles**
Tel: **01344 636525**
Email: **advisory@steel-sci.com**

New and revised codes & standards

From BSI Update May 2011

BS EN PUBLICATIONS

BS 7371-8:2011
Coatings on metal fasteners. Specification for sherardized coatings.
Supersedes BS 7371-8:1998

BS EN PUBLICATIONS

BS EN ISO 4014:2011
Hexagon head bolts. Product grades A and B
Supersedes BS EN ISO 4014:2001

BS EN ISO 4016:2011
Hexagon head bolts. Product grade C
Supersedes BS EN ISO 4016:2001

BS EN ISO 4136:2011
Destructive tests on welds in metallic materials. Transverse tensile test
Supersedes BS EN 895:1995

BS EN ISO 8765:2011
Hexagon headed bolts with metric fine pitch thread. Product grades A and B
Supersedes BS EN ISO 8765:2001

BS EN ISO 9016:2011
Destructive tests on welds in metallic materials. Impact tests. Test specimen location, notch orientation and examination
Supersedes BS EN 875:1995

BRITISH STANDARDS WITHDRAWN

BS EN 875:1995
Destructive tests on welds in metallic materials. Impact tests. Test specimen location, notch orientation and examination
Superseded by BS EN ISO 9016:2011

BS EN 895:1995
Destructive tests on welds in metallic materials. Transverse tensile test.
Superseded by BS EN ISO 4136:2011

DRAFT BRITISH STANDARDS FOR PUBLIC COMMENT – ADOPTIONS

11/30239473 DC
BS EN 10025-1 Hot rolled products of structural steels. General technical delivery conditions

11/30239476 DC
BS EN 10025-2 Hot rolled products of structural steels. Technical delivery conditions for non-alloy structural steels

11/30239479 DC
BS EN 10025-3 Hot rolled products of structural steels. Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels

11/30239482 DC
BS EN 10025-4 Hot rolled products of structural steels. Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels

11/30239485 DC
BS EN 10025-5 Hot rolled products of structural steels. Technical delivery conditions for structural steels with improved atmospheric corrosion resistance

11/30239488 DC
BS EN 10025-6 Hot rolled products of structural steels. Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition

11/30239491 DC
BS EN 10149-1 Hot rolled flat products made of high yield strength steels for cold forming. General delivery conditions

11/30239494 DC
BS EN 10149-2 Hot rolled flat products made of high yield strength steels for cold forming. Delivery conditions for thermomechanically rolled steels

11/30239497 DC
BS EN 10149-3 Hot rolled flat products made of high yield strength steels for cold forming. Delivery conditions for normalized or normalized rolled steels

DOCUMENTS NOT ISSUED AS DPCs

EN 1090-2:2008/A1
Execution of steel structures and aluminium structures. Technical requirements for steel structures

This amendment has been issued under the fast track Unique Acceptance Procedure and therefore no DPC could be issued

ISO PUBLICATIONS

ISO 4017:2011
(Edition 4)
Hexagon head screws. Product grades A and B
Will be implemented as an identical British Standard

ISO 4018:2011
(Edition 4)
Hexagon head screws. Product grade C
Will be implemented as an identical British Standard

ISO 8676:2011
(Edition 3)
Hexagon head screws with metric fine pitch thread. Product grades A and B
Will be implemented as an identical British Standard

EUROCODE DESIGN
OF CONCRETE, STEEL AND TIMBER

Aimed at busy practitioners this course provides a concise introduction to loading and load combinations, and design in the primary structural materials - concrete, steel and timber.

The key issues will be covered, with comprehensive notes for future reference.

The course will offer tips and techniques to support practical implementation of Eurocode design.

LOADING

- Imposed actions, snow loads and wind actions to EN 1991
- Combinations of actions to EN 1990

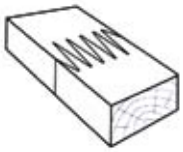
STEEL

- Frame stability
- Axially loaded member and members in bending
- Connections

CONCRETE

- Material properties
- Determination of cover to reinforcement
- Design for flexure, shear deflection and axial loading

TIMBER



- Design for flexure, deflection and vibration
- Axially loaded members
- Connections

Course details

Date: 13 July 2011
Duration: 1 day
Venue: London

Date: 13 & 19 Sept 2011
Duration: 2 half day sessions
On-line Internet course

Cost

Members (SCI & TRADA) £300
Non Members £350

Course Trainers

Owen Booker - Modulus

Dr Keerthi Ranasinghe - Trada Technology

David Brown - SCI
(The Steel Construction Institute)

All three are well known in the industry as experts in their respective fields, with considerable experience in Eurocode training.

For more information and to register contact: 01344 636600

email: education@steel-sci.com web: www.steel-sci.org/courses

Strength from Advisory Service

Designing and building in steel has never been as straightforward as it is today, and steel still remains the material of choice for construction in the UK. The steel sector provides comprehensive and in-depth technical back up to ensure that those using steel have all the guidance and support they could need at their finger tips.

The co-ordinated and comprehensive support provided by the BCSA's Structural Advisory Serivce is free of charge to specifiers, clients and designers. Technical experts are on hand to provide an extensive range of services, including design assistance on structural form, performance of steel buildings, seminars and in-house CPD presentations, etc.

Richard Dixon, Manager, Structural Advisory Services, who heads up the network of Regional Technical Managers throughout the UK and Ireland said: "We have a team of experienced regional engineers who are on hand to offer design support and advice to designers, and to point them to the wide range of technical guidance and resources available to them and inform them in a practical way on key topics like EC3 and the sustainability of steel construction through in-house CPDs."

Colin Smart
London & the South East
+44 (0)788 548 3949
Colin.Smart@steelconstruction.org

Dave Chapman
The West & Wales
+44 (0)773 992 1811
Dave.Chapman@steelconstruction.org

Richard Dixon
The East
+44 (0)771 536 6392
Richard.Dixon@steelconstruction.org

Walter Swann
The North & Scotland
+44 (0)773 498 5140
Walter.Swann@steelconstruction.org

Andrew Bisp
Ireland
+44 (0)788 179 3229
Andrew.Bisp@steelconstruction.org

SCI
Steel Knowledge

MEMBERS' DAY

Tuesday 27th September 2011

SCI will be holding its annual Members' Day Event at the unique venue of Brooklands Museum, Weybridge, Surrey - where the 'Spirit of Brooklands' lives on!

Brooklands - the world's first purpose-built motor racing circuit, constructed at Weybridge, Surrey in 1907 - was more than a great sporting arena. Brooklands was the birthplace of British motorsport and aviation, home of Concorde and the site of many engineering and technological achievements throughout eight decades of the 20th century.

For the first time this event is open to non-members throughout the steel construction community.

Invitations and further information about the programme for the day will be sent out in the coming weeks.

Make sure you have the date marked in your calendar!

For attendance enquiries please contact:
Lis Oliver on 01344 636525
membership@steel-sci.com www.steel-sci.org/courses

Steelwork contractors for buildings

BCSA is the national organisation for the steel construction industry.
Membership of BCSA is open to any Steelwork Contractor who has a fabrication facility within the United Kingdom or Republic of Ireland.
Details of BCSA membership and services can be obtained from
Gillian Mitchell MBE, Deputy Directory General, BCSA, 4 Whitehall Court, London SW1A 2ES
Tel: 020 7839 8566 Email: *gillian.mitchell@steelconstruction.org*

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

- **C** Heavy industrial platework for plant structures, bunkers, hoppers, silos etc
- **D** High rise buildings (offices etc over 15 storeys)
- **E** Large span portals (over 30m)
- **F** Medium/small span portals (up to 30m) and low rise buildings (up to 4 storeys)
- **G** Medium rise buildings (from 5 to 15 storeys)
- **H** Large span trusswork (over 20m)
- **J** Tubular steelwork where tubular construction forms a major part of the structure
- **K** Towers and masts
- **L** Architectural steelwork for staircases, balconies, canopies etc
- **M** Frames for machinery, supports for plant and conveyors
- **N** Large grandstands and stadia (over 5000 persons)
- **Q** Specialist fabrication services (eg bending, cellular/castellated beams, plate girders)
- **R** Refurbishment
- **S** Lighter fabrications including fire escapes, ladders and catwalks
- **QM** Quality management certification to ISO 9001

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	Contract Value (1)
A C Bacon Engineering Ltd	01953 850611			●	●		●										Up to £2,000,000
ACL Structures Ltd	01258 456051			●	●	●	●				●				●		Up to £2,000,000
Adey Steel Ltd	01509 556677				●	●	●	●		●	●			●	●		Up to £3,000,000
Adstone Construction Ltd	01905 794561			●	●	●											Up to £1,400,000
Advanced Fabrications Poyle Ltd	01753 531116				●		●	●	●	●	●				●	✓	Up to £400,000
Angle Ring Company Ltd	0121 557 7241												●				Up to £1,400,000
Apex Steel Structures Ltd	01268 660828				●		●			●	●						Up to £800,000
Arromax Structures Ltd	01623 747466	●		●	●	●	●	●	●		●	●					Up to £800,000
ASA Steel Structures Ltd	01782 566366			●	●	●	●			●	●			●	●		Up to £800,000*
ASD Westok Ltd	01924 264121												●				Up to £6,000,000
ASME Engineering Ltd	020 8966 7150				●					●	●			●	●	✓	Up to £1,400,000*
Atlas Ward Structures Ltd	01944 710421		●	●	●	●	●	●	●	●	●	●		●	●	✓	Above £6,000,000
Atlasco Constructional Engineers Ltd	01782 564711			●	●		●							●			Up to £2,000,000
B&B Group Ltd	01942 676770	●		●	●	●	●	●		●	●	●		●		✓	Up to £1,400,000
B D Structures Ltd	01942 817770			●	●	●	●				●	●		●			Up to £800,000
Ballykine Structural Engineers Ltd	028 9756 2560			●	●	●	●	●				●				✓	Up to £1,400,000
Barnshaw Section Benders Ltd	01902 880848												●			✓	Up to £800,000
Barrett Steel Buildings Ltd	01274 266800			●	●	●	●									✓	Up to £6,000,000
Barretts of Aspley Ltd	01525 280136			●	●	●				●	●			●	●	✓	Up to £3,000,000
BHC Ltd	01555 840006	●	●	●	●	●	●							●			Above £6,000,000
Billington Structures Ltd	01226 340666		●	●	●	●	●	●	●	●	●	●		●		✓	Above £6,000,000
Border Steelwork Structures Ltd	01228 548744			●	●	●	●			●	●				●		Up to £3,000,000
Bourne Construction Engineering Ltd	01202 746666		●	●	●	●	●	●	●	●	●	●	●	●		✓	Above £6,000,000
Briton Fabricators Ltd	0115 963 2901	●		●	●	●	●	●	●	●	●			●	●	✓	Up to £3,000,000
Cairnhill Structures Ltd	01236 449393				●	●	●	●		●	●			●	●	✓	Up to £2,000,000
Caunton Engineering Ltd	01773 531111	●	●	●	●	●	●	●	●	●	●	●		●	●	✓	Up to £6,000,000
Cleveland Bridge UK Ltd	01325 502277	●	●	●	●	●	●	●	●	●	●	●		●		✓	Above £6,000,000
CMF Ltd	020 8844 0940				●		●	●		●	●				●		Up to £6,000,000
Cordell Group Ltd	01642 452406	●			●	●	●	●	●	●	●					✓	Up to £3,000,000
Coventry Construction Ltd	024 7646 4484			●	●	●	●		●	●	●			●	●		Up to £1,400,000
Crown Structural Engineering Ltd	01623 490555			●	●	●	●		●		●			●		✓	Up to £800,000
D H Structures Ltd	01785 246269				●						●						Up to £40,000
Discain Project Services Ltd	01604 787276				●					●	●				●	✓	Up to £1,400,000
Duggan Steel Ltd	00 353 29 70072		●	●	●	●	●	●			●					✓	Up to £6,000,000
Elland Steel Structures Ltd	01422 380262		●	●	●	●	●	●	●	●	●	●		●		✓	Up to £6,000,000
EvadX Ltd	01745 336413			●	●	●	●	●	●	●	●	●				✓	Up to £3,000,000
Fisher Engineering Ltd	028 6638 8521		●	●	●	●	●	●	●	●	●	●				✓	Above £6,000,000
Fox Bros Engineering Ltd	00 353 53 942 1677			●	●	●	●	●			●						Up to £3,000,000
GME Structures Ltd	01939 233023			●	●		●	●		●	●			●	●		Up to £400,000
Gorge Fabrications Ltd	0121 522 5770				●	●	●	●		●				●			Up to £800,000
Graham Wood Structural Ltd	01903 755991		●	●	●	●	●	●	●	●	●	●		●			Up to £6,000,000
Grays Engineering (Contracts) Ltd	01375 372411				●			●		●	●				●		Up to £100,000
Gregg & Patterson (Engineers) Ltd	028 9061 8131			●	●	●	●	●				●				✓	Up to £3,000,000
H Young Structures Ltd	01953 601881			●	●	●	●	●			●						Up to £2,000,000
Had Fab Ltd	01875 611711								●		●				●	✓	Up to £2,000,000
Hambleton Steel Ltd	01748 810598		●	●	●	●	●	●				●		●		✓	Up to £6,000,000
Harry Marsh (Engineers) Ltd	0191 510 9797			●	●	●	●				●	●					Up to £2,000,000
Henry Smith (Constructional Engineers) Ltd	01606 592121			●	●	●	●	●									Up to £4,000,000
Hescott Engineering Company Ltd	01324 556610			●	●	●	●			●				●	●		Up to £4,000,000
Hillcrest Fabrications Ltd	01283 212720				●			●							●		Up to £400,000
Hills of Shoeburyness Ltd	01702 296321									●	●				●		Up to £1,400,000
Company name	**Tel**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**Q**	**R**	**S**	**QM**	**Contract Value (1)**

Company name	Tel	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	QM	Contract Value (1)
J Robertson & Co Ltd	01255 672855									●	●				●		Up to £200,000
James Killelea & Co Ltd	01706 229411		●	●	●	●	●					●		●			Up to £6,000,000*
Kiernan Structural Steel Ltd	00 353 43 334 1445			●	●	●	●	●	●	●	●	●		●	●	✓	Up to £4,000,000
Leach Structural Steelwork Ltd	01995 640133			●	●	●	●	●			●						Up to £1,400,000
M Hasson & Sons Ltd	028 2957 1281			●	●	●	●	●	●	●	●				●	✓	Up to £3,000,000
M&S Engineering Ltd	01461 40111				●				●	●	●			●	●		Up to £1,400,000
Mabey Bridge Ltd	01291 623801	●	●	●	●	●	●	●	●	●	●	●		●		✓	Above £6,000,000
Mackay Steelwork & Cladding Ltd	01862 843910			●	●		●			●	●			●	●	✓	Up to £800,000
Maldon Marine Ltd	01621 859000				●			●	●	●					●		Up to £1,400,000
Mifflin Construction Ltd	01568 613311		●	●	●	●	●				●						Up to £3,000,000
Newbridge Engineering Ltd	01429 866722			●	●	●	●								●	✓	Up to £1,400,000
Nusteel Structures Ltd	01303 268112						●	●	●	●						✓	Up to £4,000,000
On Site Services (Gravesend) Ltd	01474 321552				●		●	●		●	●				●		Up to £200,000
Overdale Construction Services Ltd	01656 729229			●	●		●	●			●				●		Up to £400,000
Paddy Wall & Sons	00 353 51 420 515			●	●	●	●	●	●	●	●					✓	Up to £6,000,000
Painter Brothers Ltd	01432 374400								●		●				●	✓	Up to £6,000,000
Pencro Structural Engineering Ltd	028 9335 2886			●	●		●	●			●				●	✓	Up to £2,000,000
Peter Marshall Steel Stairs Ltd	0113 307 6730									●					●		Above £6,000,000*
PMS Fabrications Ltd	01228 599090			●	●	●	●		●	●	●			●	●		Up to £1,400,000
REIDsteel	01202 483333		●	●	●	●	●	●	●	●	●	●		●			Up to £6,000,000*
Rippin Ltd	01383 518610			●	●	●	●	●									Up to £1,400,000
Robinson Steel Structures	01332 574711		●	●	●	●	●		●	●	●	●		●	●	✓	Above £6,000,000
Rowecord Engineering Ltd	01633 250511	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✓	Above £6,000,000
Rowen Structures Ltd	01773 860086		●	●	●	●	●	●	●	●	●	●		●			Above £6,000,000*
S H Structures Ltd	01977 681931						●	●	●	●						✓	Up to £3,000,000
Severfield-Reeve Structures Ltd	01845 577896	●	●	●	●	●	●	●	●	●	●	●	●	●	●	✓	Above £6,000,000
Shipley Fabrications Ltd	01400 231115			●	●	●	●		●	●	●				●		Up to £200,000
SIAC Butlers Steel Ltd	00 353 57 862 3305		●	●	●	●	●	●	●		●	●				✓	Above £6,000,000
SIAC Tetbury Steel Ltd	01666 502792			●	●	●	●				●	●				✓	Up to £3,000,000
Snashall Steel Fabrications Co Ltd	01300 345588			●	●		●								●		Up to £1,400,000
South Durham Structures Ltd	01388 777350			●	●	●				●	●	●			●		Up to £1,400,000
Temple Mill Fabrications Ltd	01623 741720			●	●	●	●				●	●			●		Up to £200,000
The AA Group Ltd	01695 50123			●	●	●	●			●	●	●		●	●		Up to £4,000,000
Traditional Structures Ltd	01922 414172		●	●	●	●	●	●	●		●	●		●		✓	Up to £4,000,000*
Tubecon	01226 345261						●	●	●	●				●	●	✓	Above £6,000,000*
W & H Steel & Roofing Systems Ltd	00 353 56 444 1855			●	●	●	●	●						●	●		Up to £4,000,000
W I G Engineering Ltd	01869 320515				●					●					●		Up to £200,000
Walter Watson Ltd	028 4377 8711			●	●	●	●	●				●				✓	Up to £6,000,000
Watson Steel Structures Ltd	01204 699999	●	●	●	●	●	●	●	●	●	●	●		●	●	✓	Above £6,000,000
Westbury Park Engineering Ltd	01373 825500	●			●		●	●	●	●	●				●	✓	Up to £800,000
William Haley Engineering Ltd	01278 760591			●	●	●			●	●	●					✓	Up to £2,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●		●		✓	Above £6,000,000
Company name	**Tel**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**Q**	**R**	**S**	**QM**	**Contract Value (1)**

Corporate Members

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

Company name	Tel
Balfour Beatty Utility Solutions Ltd	01332 661491
Griffiths & Armour	0151 236 5656
SUM	0113 242 7390

Company name	Tel
Roger Pope Associates	01752 263636
Highways Agency	08457 504030

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

Company name	Tel	1	2	3	4	5	6	7	8	9
AceCad Software Ltd	01332 545800		●							
Albion Sections Ltd	0121 553 1877	●								
Andrews Fasteners Ltd	0113 246 9992									●
ArcelorMittal Distribution – Birkenhead	0151 647 4221								●	
ArcelorMittal Distribution – Birmingham	0121 561 6800								●	
ArcelorMittal Distribution – Bristol	01454 311442								●	
ArcelorMittal Distribution – Manchester	0161 703 9073								●	
ArcelorMittal Distribution – Mid Glamorgan	01443 812181								●	
ArcelorMittal Distribution – Scunthorpe	01724 810810								●	
ArcelorMittal Distribution – Wolverhampton	01902 365200								●	
Arro-Cad Ltd	01283 558206			●						
ASD Interpipe UK Ltd	0845 226 7007								●	
ASD metal services - Biddulph	01782 515152								●	
ASD metal services - Bodmin	01208 77066								●	
ASD metal services - Cardiff	029 2046 0622								●	
ASD metal services - Carlisle	01228 674766								●	
ASD metal services - Daventry	01327 876021								●	

Company name	Tel	1	2	3	4	5	6	7	8	9
ASD metal services - Durham	0191 492 2322								●	
ASD metal services - Edinburgh	0131 459 3200								●	
ASD metal services - Exeter	01395 233366								●	
ASD metal services - Grimsby	01472 353851								●	
ASD metal services - Hull	01482 633360								●	
ASD metal services - London	020 7476 0444								●	
ASD metal services - Norfolk	01553 761431								●	
ASD metal services - Stalbridge	01963 362646								●	
ASD metal services - Tividale	0121 520 1231								●	
Austin Trumanns Steel Ltd	0161 866 0266								●	
Ayrshire Metal Products (Daventry) Ltd	01327 300990	●								
BAPP Group Ltd	01226 383824									●
Barnshaw Plate Bending Centre Ltd	0161 320 9696	●								
Barrett Steel Ltd	01274 682281								●	
Cellbeam Ltd	01937 840600	●								
Cellshield Ltd	01937 840600							●		
CMC (UK) Ltd	029 2089 5260							●		

Steelwork contractors for bridgework

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 (eg 100 metre span)
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
MB Moving bridges
RF Bridge refurbishment
AS Ancilliary structures in steel associated with bridges, footbridges or sign gantries (eg grillages, purpose-made temporary works)
QM Quality management certification to ISO 9001

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	Contract Value (1)
B&B Bridges Ltd	01942 676770	●	●	●	●	●	●	●	●	✓	Up to £1,400,000
Briton Fabricators Ltd	0115 963 2901	●	●	●	●	●	●	●	●	✓	Up to £3,000,000
Cairnhill Structures Ltd	01236 449393	●	●		●			●	●	✓	Up to £2,000,000
Cleveland Bridge UK Ltd	01325 502277	●	●	●	●	●	●	●	●	✓	Above £6,000,000
Kiernan Structural Steel Ltd	00 353 43 334 1445	●	●	●	●			●	●	✓	Up to £800,000
Mabey Bridge Ltd	01291 623801	●	●	●	●	●	●	●	●	✓	Above £6,000,000
Nusteel Structures Ltd	01303 268112	●	●	●	●	●		●	●	✓	Up to £4,000,000
Painter Brothers Ltd	01432 374400	●		●					●	✓	Up to £6.000,000
Rowecord Engineering Ltd	01633 250511	●	●	●	●	●	●	●	●	✓	Above £6,000,000
S H Structures Ltd	01977 681931	●				●			●	✓	Up to £3,000,000
SIAC Butlers Steel Ltd	00 353 57 862 3305	●	●	●	●	●		●	●	✓	Above £6,000,000
TEMA Engineering Ltd	029 2034 4556	●	●	●	●	●	●	●	●	✓	Up to £1,400,000*
Varley & Gulliver Ltd	0121 773 2441	●						●	●	✓	Up to £4,000,000
Watson Steel Structures Ltd	01204 699999	●	●	●	●	●	●	●	●	✓	Above £6,000,000
Non-BCSA member											
ABC Bridges Ltd	0845 0603222	●								✓	Up to £100,000
A G Brown Ltd	01592 630003	●						●	●	✓	Up to £800,000
Allerton Steel Ltd	01609 774471	●	●	●	●	●	●	●	●	✓	Up to £1,400,000
Carver Engineering Services Ltd	01302 751900	●	●	●	●		●	●	●	✓	Up to £2,000,000
Cimolai Spa	01223 350876	●	●	●	●	●	●			✓	Above £6,000,000
Concrete & Timber Services Ltd	01484 606416	●	●	●		●	●		●	✓	Up to £800,000
Donyal Engineering Ltd	01207 270909	●						●	●	✓	Up to £800,000
Four-Tees Engineers Ltd	01489 885899	●	●	●	●		●	●	●	✓	Up to £2,000,000
Francis & Lewis International Ltd	01452 722200							●	●	✓	Up to £2,000,000
Harland & Wolff Heavy Industries Ltd	028 9045 8456	●	●	●	●	●		●	●	✓	Up to £6,000,000
Hollandia BV	00 31 180 540540	●	●	●	●	●	●	●	●	✓	Above £6,000,000
Interserve Project Services Ltd	0121 344 4888							●	●	✓	Above £6,000,000
Interserve Project Services Ltd	020 8311 5500	●	●	●	●		●	●	●	✓	Up to £800,000*
Millar Callaghan Engineering Services Ltd	01294 217711	●						●		✓	Up to £800,000
P C Richardson & Co (Middlesbrough) Ltd	01642 714791	●						●	●	✓	Up to £3,000,000*
The Lanarkshire Welding Company Ltd	01698 264271	●	●	●	●	●	●	●	●	✓	Up to £2,000,000

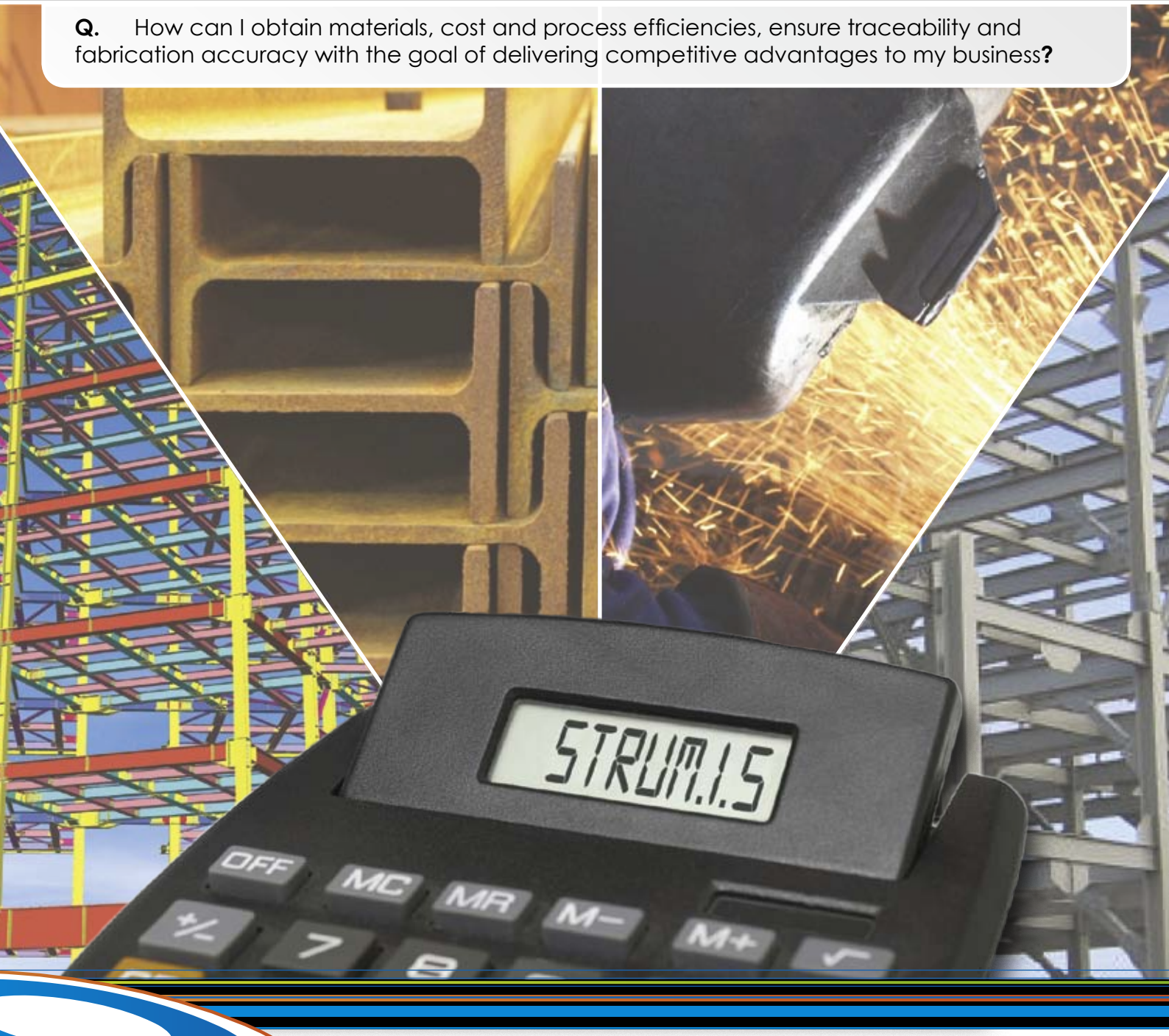
Company name	Tel	1	2	3	4	5	6	7	8	9
Composite Metal Flooring Ltd	01495 761080	●								
Composite Profiles UK Ltd	01202 659237	●								
Computer Services Consultants (UK) Ltd	0113 239 3000		●							
Cooper & Turner Ltd	0114 256 0057									●
Cutmaster Machines UK Ltd	01226 707865					●				
Daver Steels Ltd	0114 261 1999	●								
Development Design Detailing Services Ltd	01204 396606			●						
Easi-edge Ltd	01777 870901							●		
Fabsec Ltd	0845 094 2530	●								
FabTrol Systems UK Ltd	01274 590865		●							
Ficep (UK) Ltd	01924 223530					●				
FLI Structures	01452 722200	●								
Forward Protective Coatings Ltd	01623 748323						●			
Hadley Rolled Products Ltd	0121 555 1342	●								
Hempel UK Ltd	01633 874024						●			
Hi-Span Ltd	01953 603081	●								
Highland Metals Ltd	01343 548855						●			
Hilti (GB) Ltd	0800 886100									●
International Paint Ltd	0191 469 6111						●			
Jack Tighe Ltd	01302 880360						●			
Jamestown Cladding and Profiling	00 353 45 434288	●								
Kaltenbach Ltd	01234 213201					●				
Kingspan Structural Products	01944 712000	●								
Leighs Paints	01204 521771						●			
Lindapter International	01274 521444									●

Company name	Tel	1	2	3	4	5	6	7	8	9
Metsec plc	0121 601 6000	●								
MSW	0115 946 2316	●								
National Tube Stockholders Ltd	01845 577440								●	
Northern Steel Decking Ltd	01909 550054	●								
Panels & Profiles	0845 308 8330	●								
John Parker & Sons Ltd	01227 783200								●	●
Peddinghaus Corporation UK Ltd	01952 200377					●				
Peddinghaus Corporation UK Ltd	00 353 87 2577 884					●				
PMR Fixers	01335 347629	●								
PP Protube Ltd	01744 818992	●								
PPG Performance Coatings UK Ltd	01773 837300						●			
Prodeck-Fixing Ltd	01278 780586	●								
Rainham Steel Co Ltd	01708 522311								●	
Richard Lees Steel Decking Ltd	01335 300999	●								
Schöck Ltd	0845 241 3390	●								
Structural Metal Decks Ltd	01202 718898	●								
Studwelders Composite Floor Decks Ltd	01291 626048	●								
Tata Steel	01724 404040				●					
Tata Steel Distribution (UK & Ireland)	01902 484100								●	
Tata Steel Service Centres Ireland	028 9266 0747								●	
Tata Steel Service Centre Dublin	00 353 1 405 0300								●	
Tata Steel Tubes	01536 402121				●					
Tekla (UK) Ltd	0113 307 1200		●							
Tension Control Bolts Ltd	01948 667700									●
Wedge Group Galvanizing Ltd	01909 486384						●			

StruM.I.S® evolution

The Answer is **StruM.I.S...**

Q. How can I obtain materials, cost and process efficiencies, ensure traceability and fabrication accuracy with the goal of delivering competitive advantages to my business**?**



www.**acecadsoftware**.com

StruM.I.S is defining the standard for steel fabrication management within the structural supply chain for clients around the world.

AceCad Software is a unique software vendor with solutions for AEC and Plant industries; enabling project delivery from concept, through engineering, detailing, estimating, fabrication and construction.

AceCad software