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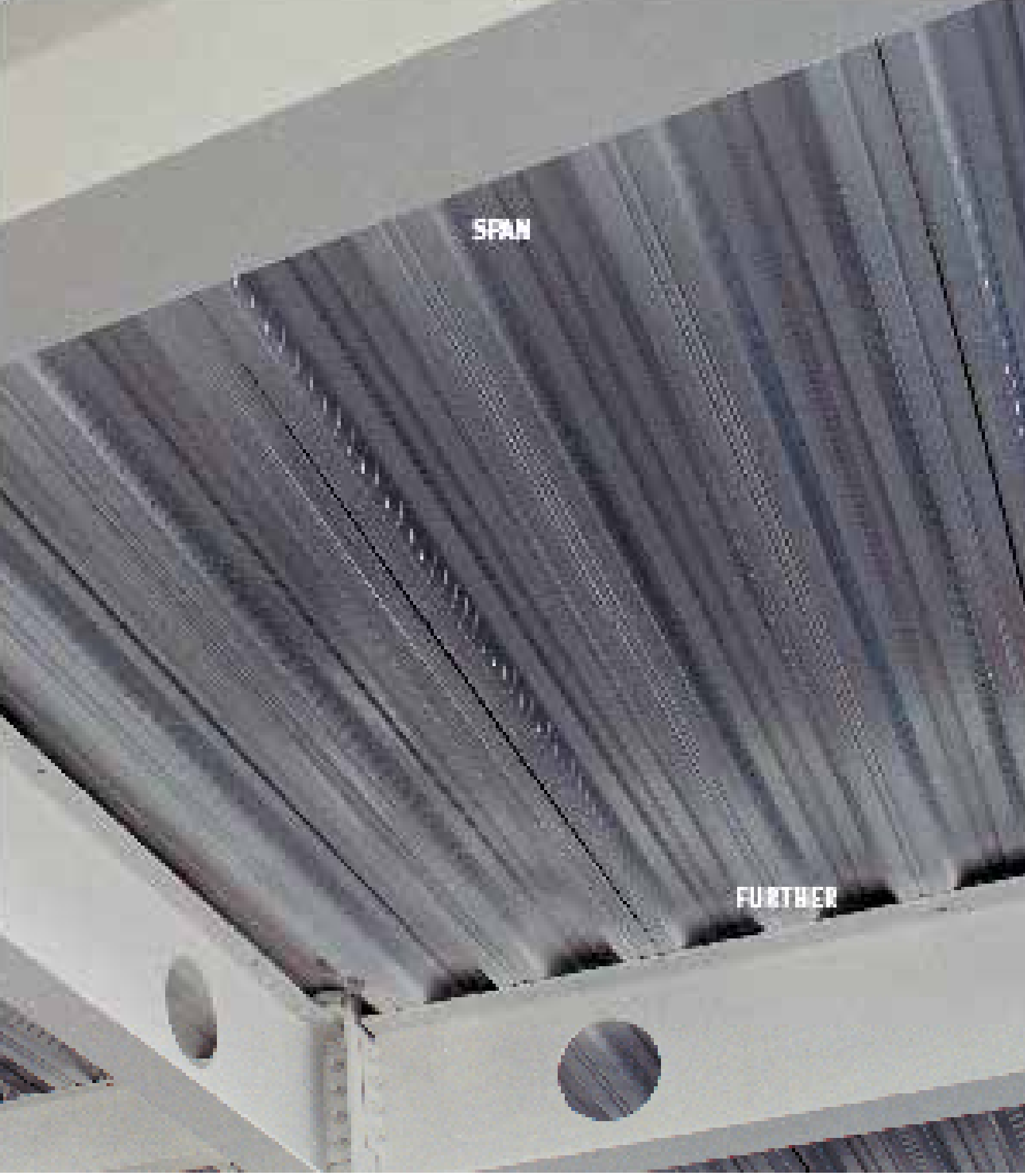
corus

BCSA **The British Constructional Steelwork Association Ltd**

The Steel Construction Institute



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Kingspan

Steel to earn Olympic gold

Nick Barrett - Editor

After the initial euphoria, some comment on London's success in winning the right to stage the 2012 Olympics turned to focus on the threats, particularly construction projects being delivered late and/or over budget. Thankfully, the curmudgeons seem to have been seen off, but they will be back and the industry must be armed with the ammunition to see them off again.

That means ensuring that the best possible start is made to the design and construction of the infrastructure and arenas on whose success the whole venture depends. The best possible start has been made in many instances because the preferred material has already been chosen, and it is often steel.

The opportunities for showing what the steel sector can deliver are immense. Most of the Olympics-related work will be infrastructure and carried out in London, but not all of it.

The whole country can be said to benefit at least indirectly from the completion of key infrastructure projects that will be brought forward. But choosing steel has meant that the entire UK will benefit from Olympics-related investments.

Many communities far away from the hub of Olympics action will benefit from new sports facilities that can be easily transported after Olympic use from London, thanks to the demountable stand concept which is being used at venues like the 80,000 seat Olympic Stadium. This will heighten awareness of the flexibility of steel in general. This flexibility was a major driver of the design brief. It avoids the potential creation of a white elephant stadium which would have little use after the games, by allowing up to 45,000 of the seats to be re-erected elsewhere. London gains permanent 25,000 seat athletics stadium and a home for a major rugby club. The flexibility is such that about 20,000 seats could be added again for any special events.

The design for the steel framed Aquatics Centre has already been seen in NSC and is to be the first of the Olympic structures to be completed. Temporary grandstands will be removed after the games and water polo pools lifted out for use elsewhere.

Steel will also be used for the relocatable indoor handball arenas. Shortened construction times, reduced need for onsite labour and onsite quality control are other attractions reported by the designers of these and other steel structures.

Clearly, steel is set to be one of the best performers at these Olympic games. We look forward to reporting on the new records that steel will set.

Young designers take inspiration

The impact of the games on the UK's younger generations could be immense in terms of inspiring young athletes to dedicate themselves to their sports. The legacy of facilities should help the UK's athletes for many years to come. The impact on the country's young architects and engineers will be no less significant, if the entries to two recent steel industry sponsored competitions are anything to judge by.

The Corus Undergraduate Architects Awards and the Undergraduate Engineering Design Awards (see features on pages 22-24) each attracted a high number of high quality entries.

The engineers' brief in the structural steelwork category was to design a tennis stadium for the Olympics and the winners responded with a visually striking entry with an innovative engineering solution. The architects designed a culturally adaptive public space for a city such as would be considered for hosting the Olympics.

Is the message about steel being communicated to the designers of tomorrow? Looking at these awards the answer has to be an emphatic yes.

First UK contract for Corefast

Corus Bi-Steel has won its first contract in the UK for its Corefast prefabricated core system. It will provide lift and stair cores on the Forty Springardens office development in Manchester.

The 9,385m^2 speculative office development will have two basement storeys and nine storeys above ground. Langtree is the developer with Balfour Beatty Construction as main contractor.

Corefast will be used to provide a four-bank central lift core and a separate combined lift and stair core running through the basement storeys and the first six storeys above ground. The top three storeys will be constructed as a traditional braced steel frame. Construction is due to start in November.

Corefast uses Corus Bi-Steel panels consisting of pairs of steel plates connected by an array of bars and then filled with concrete on site.

Balfour Beatty's Project Manager for the development Rob Todd said: "The specification of Corefast will greatly simplify the supply chain for this project. With the cores being delivered to site as prefabricated modules, the system will provide significant time, labour and plant utilisation benefits." There will also be less congestion at the busy inner city site and less need for working at height.

The first project to use Corefast was at the £276M Dundrum Town Centre development near Dublin where a six storey core was completed in five working days (NSC February 2005).

Forty Springardens was designed by Aedas Architects. Structural engineer is White Young Green and steelwork contractor is APC.

New delay as government fails to publish Part L

Implementation of the new Building Regulations thermal requirements looks certain to be delayed following the Government's failure to publish the documents.

The new Part L covering conservation of fuel and power will make radical changes from the design philosophy of the existing 2002 version. Most importantly the method of calculating insulation and thermal performance for each element individually will be replaced by a 'whole building' approach. The Approved Documents, detailing guidelines on how to meet the regulations, are eagerly awaited by the industry.

It had been expected that the documents would be laid before Parliament ahead of the summer recess with the aim of implementing the regulations by 4 January next year, the last date for putting the EU Energy and Performance of Buildings Directive into effect. It now appears this will be missed, with April 2006 seen as the most likely implementation date.

It will be practially impossible to meet the targets for improvement in energy performance through higher insulation alone. An improvement of 22% for domestic buildings and around 25% for non-domestic, compared with a 2002-compliant design, is called for.

Steel Construction Institute Senior Manager for Construction Technology Graham Raven said: "The pursuit of higher insulation as the major source of savings has reached the point of diminishing returns." Though up to 10% of the improved performance can be achieved through the use of renewable energy, improving building airtightness will become significant, especially for industrial sheds.

For domestic houses, however, a steel-framed design will comply more readily than traditional brick and block, in which the need to add more insulation is leading to unacceptably thick walls.

A new Standard Assessment Procedure (SAP 2005) will be used for designing domestic buildings. BRE is developing software for the National Calculation Method, applying the whole building approach to designing non-domestic buildings, but following delays in awarding the contract, a test version of the software is not expected till October.

Newport landmark fabrication under way

Rowecord Engineering began fabrication of a new footway and cycle bridge over the River Usk in Newport in mid-August. The £4.9M bridge is set to play a key role in the city's regeneration, and will significantly improve access to the city centre from the east of Newport.

Newport's new bridge follows the success of the River Usk Crossing, one of the winners in this year's Structural Steel Design Awards. The foot and cycle bridge is aimed at linking the two sides of the city together, to create a sense of Newport on Usk rather than a city divided by its river.

The bridge consists of four crane-like masts up to 70m long, which are erected in pairs, both on the west side of the estuary. These masts will be anchored at ground level and supported by a total of 12 cables, eight of which will support the 145m long and 5m wide bridge deck. Assembly of the structure is due to start next January.

The design team was led by the WS Atkins special structures group in Oxford, with Nicholas Grimshaw & Partners providing the concept and design for the bridge. Rowecord, based in Newport, is subcontracted by Alfred McAlpine Capital Projects to build the structure, which will use 850 tonnes of Corus steel. The scheme is a joint project led by Newport City Council, the Welsh Development Agency and urban regeneration company Newport Unlimited.

A year to clear stocks as Europe introduces CE marked steel

CE marking for structural steel sections is introduced across Europe from 1 September. In a year's time it will become compulsory in many European markets, making it illegal to sell a wide range of steel sections without a CE mark.

The new regulations apply to flat and long products of hot rolled structural steels – including universal beams and columns – but not structural hollow sections and tubes.

CE marking is a declaration by the manufacturer that a product meets all appropriate provisions of relevant European directives, in this case the Construction Products Directive. The CE mark gives companies easier access to sell their products in the European market without adaptation or rechecking. In many European countries, but not the UK, CE marking is mandatory.

Corus intends to mark all its steel sections that fall within the scope of the European harmonised standard that implements CE marking, EN 10025-1.

For non-marked sections there will be a 12-month period of grace when steel specified to the old and new standards can both be sold. From 1 September next year, in countries where CE marking is mandatory it will be illegal to sell sections to the old standards, so stockholders have a year to sell existing stocks.

The CE mark may appear on the product, the packaging, in manuals or other supporting documents. For Corus steel it will appear on the test certificate, which will be supplied free with steel bought directly from Corus Construction & Industrial but for which a charge will be made in the case of steel bought from Corus distribution.

Shopping centre's fast floor

Installation of a mezzanine floor at the White Rose shopping centre in Leeds has created an extra 3000m^2 of retail space.

A total of 6.5km of 300mm deep Metsec lightweight steel lattice joists were used to create the floor, designed for a total imposed load of 5.0kN/m^2 and spanning a maximum of 7.3m.

Flush fitting timber inserts to the top and bottom chords allowed easy fixing of the chipboard floor finish above and plasterboard ceiling underneath.

Metsec joists were specified because their high strength-to-weight ratio meant shallow beams could carry the high imposed load. The open webs of the beams also made service installation easy and will allow flexibility to change the services later.

Metsec introduced a special night shift as the most efficient way of manufacturing and delivering over 1000 joists within a tight eight-week deadline.

More space for M&S

Business is continuing as usual at Marks & Spencer's Plymouth city centre store while Bourne Steel erects steelwork for an extension to the side and above the existing structure.

The work is part of the Drake's Circus retail development and involves construction of a new steel frame with three floors and a roof adjacent to the existing building, and a new floor over the existing roof.

Construction work is being carried out while Marks & Spencer remains open as normal. Demolition and internal work is being carried out at night.

Space on site is very restricted and a tunnel for public access to the store has been constructed by main contractor Bovis Lend Lease so that materials can be lifted on to site from an adjacent storage area.

Bourne Steel will need to work closely with Bovis Lend Lease later in the project on the area over the existing roof, when services such as air-conditioning units must be moved. Extensive investigation and inspection of the building's steel frame is needed to allow Bourne to design and construct a grillage, connected to the existing frame, for this operation.

AROUND THE PRESS

New Civil Engineer
14 July
Plans to use temporary venues and demountable grandstands played a vital role in helping London win the right to host the 2012 Olympics… London bid officials said they believed the idea of re-using facilities particularly impressed International Olympic Committee members. Ideas developed by London could help poorer countries assemble a successful Olympic bid in future.

Construction News
14 July
One steel erector said: "Some of the bigger jobs like T5 and Wembley were coming to an end and some of the lads were talking about going off to Liverpool to chase the work there. But now London has won the Olympics, there will be work everywhere and we'll stay in the capital."

Building
15 July
Steel has been the material of choice for prefabrication for many years. Unlike other framing or carcassing materials, it has the advantage of strength and reliability combined with relative low weight. Even thin-walled steel components can achieve structural performance levels well in excess of other systems. Its strength makes it an ideal choice for larger projects with several floors and potentially larger modules.

Building
15 July
On the first steel-framed volumetric modular apartments for sale built by a private developer:
Modular housing has at last found a place within the aspirational world of the young urban professional.

Building
29 July
On Madrid's new steel-framed Barajas Airport terminal, designed by Richard Rogers Partnership and Estudio Lamella:
The combined effect is a building that is awesome in scale, yet refreshingly light, airy, spacious and entirely open to view… Barajas promises to be a model of legibility and clarity, despite its immense scale.

McCormack takes up Presidency

The British Constructional Steelwork Association elected its first Irish President at its AGM in July. Donal McCormack, Managing Director of the Terence McCormack Group, studied civil engineering at the University of Ulster and worked for consulting engineer Dr I G Doran & Partners before joining his father's firm in 1976. He will preside over the launch of the BCSA's Sustainability Charter and the association's centenary next year. He has identified improving co-operation and the flow of information within the construction industry as a key issue to be addressed.

Richard Barrett, Managing Director of Barrett Steel Buildings, was elected Deputy President.

Speaking at the association's annual lunch immediately afterwards, outgoing President Tom Goldberg said: "Recognition of the benefits of steel in construction is spreading among designers and architects."

Principal guest Desmond Scott, Chairman of the Association for Consultancy and Engineering, said teamwork and collaboration was growing in the construction industry. "Increasingly, I believe, stakeholders in our industry are coming to realise that working together is the best way to achieve success."

At last year's BCSA awards, Mr Scott's predecessor as ACE chairman David Upton had proposed a joint initiative to bring consultants and steelwork contractors together to look at the communication of information between the design and construction stages of a project. Mr Scott said that the two organisations were now working together on a project "to identify design activity and information exchange requirements on steel construction contracts and to develop good practice guidance". The Institution of Structural Engineers and the Construction Confederation were also involved, and the aim was to report by June 2006.

"Teamwork and collaboration is key to moving our industry forward and key to achieving successful outcomes for our clients and our businesses," he said.

Donal McCormack profile, page 12

New on the edge protection

Conder Structures and SGB have launched a new edge protection system which is being used for the first time on Conder's Darlington Learning Centre contract. The development of Extraguard has been driven by the Work at Height Regulations, as well as Conder's obligation as a steelwork contractor to supply safety edging.

SGB developed the edge protection over the last 12 months and has been working closely with Conder on its application. The triple mesh Extraguard panels are a combination of horizontal steel bars that sandwich vertical bars and have 300mm high integral steel toe guards.

The 1150mm high panels are said to be straightforward to install, hung from standard cherry pickers and slotted onto upright Extraguard guardposts that have a special J-shaped locking feature.

The state of the art Darlington Learning Centre forms part of the £170M regeneration of Central Park, a brownfield site in Darlington.

Conder has supplied 1,245 tonnes of steelwork for the seven separate buildings of the learning centre that occupy 6.4ha of the 30ha site. The largest structure is the two level circular main hub and learning research centre with a unique vestibule, featuring a steel 'tree' with four support columns.

Steel supports Olympics

Steel will play a leading role in the construction of venues for the 2012 London Olympics, particularly as many of the venues will be designed to be demountable after the games.

Plans to allow some of the facilities to be reduced in scale or re-used elsewhere was thought to be a factor in London prevailing over rival bids.

Facilities for previous Olympics have been criticised for becoming under-used white elephants after the events.

Steel construction lends itself readily to the design and construction of lightweight structures which can be dismantled, transported and rebuilt.

Many of the new venues are designed so that they can be partly or completely dismantled. The top tiers of seating of the main 80,000 seat Olympic stadium will be removable for re-erection elsewhere, leaving a stadium of around 20,000 ot 25,000 capacity.

The steel-framed aquatics centre will contain two demountable water polo pools, leaving two 50m pools and a diving pool and allowing the building to be used as a 3,500 seat competition venue alongside a leisure facility.

Two of the four multi-sport arenas for fencing, modern pentathlon, volleyball, handball and basketball, with 10,000 to 15,000 capacity, will be lightweight steel-framed structures capable of being taken down and re-erected elsewhere in the UK.

Speaking at the British Constructional Steelwork Association annual lunch the week after the announcement that London's bid had won, Association for Consultancy and Engineering chairman Desmond Scott said: "Our industry must now rise to the challenge of delivering the infrastructure and facilities needed to make the 2012 Olympics the best the world has ever seen."

Winning the Games could be "a real boost" to the industry, he said, calling on all sections to come together to map out a strategy for building the necessary infrastructure on time.

"Construction, despite the bad press it sometimes receives, usually does deliver. But make no mistake, we will be watched by the world on this one and we must come up with the goods."

EvadX at Chandlers Wharf

EvadX has completed erection of the steelwork for Chandlers Wharf, a new residential development in a prestige location adjacent to Albert Dock and the marina in Liverpool.

The project consists of two east wing, both five levels high, with a seven-storey main centre section. There are two levels of basement car parking. A total of 750 tonnes of steel has been used for the 63 apartment development. Main contractor is J. Armor.

NEWS IN BRIEF

A topping-out ceremony on 16 August marked the completion of the roof at **Arsenal FC's new Emirates Stadium.** Sir Robert McAlpine Project Director Rolv Kristiansen said: "We are extremely pleased with the progress... we are looking forward to completing the construction in time for the start of the 2006/07 season."

Metsec's lattice beams division has bought Stratford Joists, making the company the UK's largest manufacturer of proprietary steel lattice joists and trusses. The two products are complementary, with Metsec's lattice joists being made from high yield, light gauge steel while Stratford's are fabricated from hot rolled steel. Bernard Mitchener, who ran Stratford Joists for the last 30 years, has joined Metsec.

Atlas Ward has been chosen as a partner by Willmott Dixon to fabricate and erect 450 tonnes of structural steelwork for the Elmbridge Leisure Centre in Surrey. The £12M PPP project for Elmbridge Borough Council will include two swimming pools, a climbing wall, squash courts and fitness studios.

Corus has awarded a contract to Danieli to install a new caster, furnaces and a seven-stand breakdown mill as part of its £130M investment programme at Scunthorpe steelworks.

The caster will directly feed the rod mill and also the medium section mill, and will allow the introduction of rail manufacture on the site as well as improving process efficiency for wire rod manufacture.

British Land chief to be Keynote Speaker at the Steel Construction Conference

Richard Elliot (left), Head of Construction for British Land, will be keynote speaker on the client's view of sustainable steel construction and will take part in the debate on the future of the construction market at the Steel Construction Conference and Exhibition on 15 November.

Mr Elliot is responsible for the procurement and implementation of all construction work associated with British Land's development activities, from the selection of the design team onwards.

Prior to joining British Land, Mr Elliott was Project Director for the consultant team on the Plantation Place development which incorporated design and fire engineering innovation. He has spent most of his career working for developers, including Rosehaugh in the late 1980s, and Hongkong Land, the property investment arm of the Jardine Matheson Group.

The debate will be chaired by the BBC's John Humphrys.

Professor Roger Plank of Sheffield University will launch the Steel Construction Sustainability Charter. Project case studies will be given on the Swale Bridge and Blackburn Hospital. David Moore of the BCSA and David MacKenzie of the Flint & Neill Partnership will speak on Eurocodes for Buildings and Eurocodes for Bridges..

Bourne Steel Managing Director David Sands will deliver an address on steel in residential construction. Tickets are £160 + VAT. For contact details see Diary, below.

Coal-cutting machinery inspired heritage centre roof

Construction is well under way of a project which will transform Woodhorn Colliery in Northumberland into a major cultural attraction. Focal point of multidisciplinary consultant RMJM's design for the £17M project, near the mining town of Ashington, is a combined mining museum and county archives building.

RMJM UK Managing Director Tony Kettle said the inspiration for the building's dramatic serrated roof structure came from coal-cutting machinery.

The roof is formed by seven tapered steel roof blades of varying length and pitch which cantilever between 15m–22m. The roof will be supported by triangular steel feature columns, which will also taper in section. "It certainly set a challenge for RMJM's structural engineers," said Mr Kettle.

RMJM, as architect, structural engineer and building services engineer, sought to reduce both the energy use of the building and the embodied energy used in its construction.

Bovis Lend Lease is main contractor and SH Structures is steelwork contractor.

The site, to be known as Woodhorn: Northumberland Museum, Archives and Country Park, also houses a number of listed buildings, six of which from part of a Scheduled Monument.

Barrett chooses Ficep

Barrett Steel Buildings has placed an order with Ficep UK for machinery including two new 1101DZB CNC drilling and sawing lines and the latest plasma coping machine technology.

The new system incorporates a Schlick shot blast machine to clean the material before processing in a new purpose-built facility.

Diary

6 September
Fire Engineering and Fire Resistance: an alternative approach
Stirling Highland Hotel, Stirling
RICS Scotland Building Control Forum seminar with speakers from the Scottish Building Standards Agency, Corus and Buro Happold FEDRA.
Further information: 0131 240 0899

20 September
Fairfield-Mabey Open Day
in North Kent, with a visit to the new Swale Crossing on the A249 Stockbury to Sheerness DBFO. Contact: tracy.booth@fairfieldmabey.com

20-21 September
Architecture and Steel International Symposium,
Palace de la Méditerranée, Nice (part of the ECCS 50th anniversary event).
Presentations will be given in English.
Further details available at www.scmf.com.fr

26-29 September
The Fifth China International Steel Construction Expo, Beijing.
The accompanying Congress runs from 27–28 September. Further details: www.constex.com/en/home.asp

4, 5 & 6 October
Innovative Design in Composite Steel Floors,
Cork, Dublin and Belfast
Technical seminars hosted by Kingspan for structural engineers and contractors, with speakers from Kingspan, Westok, CSC and Corus. Free.
Further details: 01630 673247

10 November
SCI Annual Dinner
Landmark Hotel, London.
Guest speaker, John Sergeant
Further details: Liz Chamberlain
l.chamberlain@steel-sci.com

15 November
Steel Construction Conference and Exhibition
The Brewery, Chiswell Street, London EC1.
Organised by BCSA. Contact: Gillian.mitchell@steelconstruction.org

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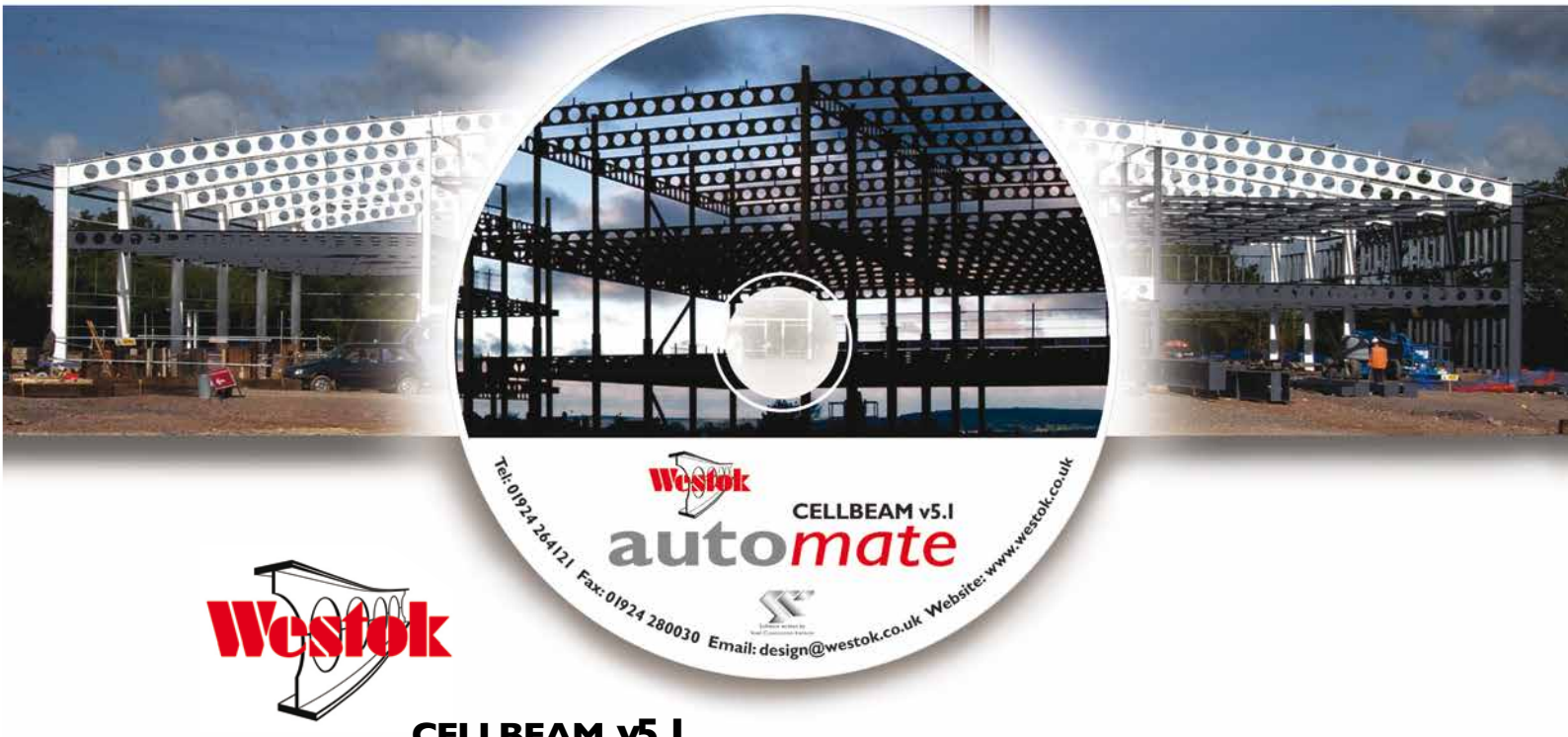

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BCSA's first Irish President brings Gaelic grit

Irishman Donal McCormack has surmounted serious obstacles in getting to where he is now. BCSA's latest President speaks to Ty Byrd.

Donal McCormack walks into the room with the aid of a stick, the consequence both of a childhood disability and the more recent breaking of his hip. "You'll laugh when I tell you how I broke it," he says. I will not, I say. "Well, I missed a step while in the Guinness brewery." I try to smother a smile. "The worst of it is that I'm a teetotaller. I was only there negotiating sponsorship for a Gaelic football tournament."

In a curious way, the tale is highly revealing of Donal McCormack, BCSA's new President, the first one ever from Ireland. Unable ever to take a physical part in sport, he is deeply involved in sports administration. The same approach serves him well in business: as Managing Director of steelwork contractor Terence McCormack Group, he looks after costings and contracts while brother Ruairi runs the workshops and attends site.

Adversity is always met with good humour and determination. The broken hip hurt like hell but the necessity to use a stick has never stopped him fulfilling to the full his allotted role with McCormacks, often through difficult times; and nor will it prevent him from having what he hopes will be an enjoyable and effective term in office at the BCSA. "The Presidency is a challenge to rise to and I want to do well," he says.

Donal McCormack was born in 1952 at Warrenpoint, County Down, the son of a blacksmith and farrier who, although having left school at 14, was well read, had a good mathematical mind and considerable ambition. Terence (or Terry) McCormack's smithy eventually evolved into a fabrication shop; and work with horses gave way to steelwork. His steelwork company came formally into being in 1953 on the back of a contract to provide railings around Warrenpoint's municipal park.

As the company grew, so did the family of Terry and his wife Moya, who brought a total of three boys and a girl into the world. Father and mother were ambitious for all four children, not least Donal. Having attended Abbey Christian Brothers Grammar School in Newry, he was encouraged to become an engineer and took himself off to the University of Ulster, Jordanstown, to study civil engineering.

He qualified in 1974, having had vacation stints with contractor Gilbert-Ash (NI) and consulting engineer Dr IG Doran & Partners in Belfast. "My father was keen for me to have design experience and I returned to Dr Doran's after leaving university to improve my knowledge of structures."

There he worked under Stanley Taggart, "the best engineer I have ever known and a close friend to this day". Mr Taggart was not just a good engineer, apparently, but a fine motivator of staff with a positive attitude especially towards negative circumstance. "If something had gone wrong, he would always say: 'I wonder why we decided to do that?' and 'let's work out the easiest way for us to get around this'.

"It was always 'we' and 'us', never 'you'. I learned much from Stanley but the Samaritan culture, as I call it, was the most important." It remains every bit as useful and pertinent today as it did in the 1970s, he believes (see below).

Donal McCormack joined Terence McCormack Ltd as an engineer in 1976, by which time there were 16 people on the payroll and turnover stood at around £300,000. Two years later he was Technical Director and six years after that, Managing Director, on the death of his father. His brother became Operations Director – on a par with Donal.

"My father never lost his interest in horses, nor his mathematical quickness," he says. "Just days before he died, very unwell, he could still find it in himself to shoe a friend's horse. And even with the most convoluted bets, he could work out his winnings in a flash." Donal McCormack as a boy and young man was pushed hard but benignly by his father, who made little concession to his – Donal's – disability, to his benefit. You can sense the affection.

By this time, Terence McCormack Ltd based in Newry, County Down had been joined by Terence McCormack (Ireland), based in Dundalk, County Louth. Donal and Ruairi became aware that Northern Ireland's economy was slowing down in the late 1970s but saw opportunities to develop in the Republic. The decision to open up down south was a good one: Eire's economy has grown greatly in the last two decades, with lots of incoming

industry, including IT business. The market there for steel frames has been a healthy one.

So it has been in Northern Ireland, up to a point, although the troubles tended to narrow the marketplace and make working life difficult at times. "You just had to grit your teeth and learn to live with the conditions," Donal McCormack says now. "It was a matter of keeping your spirits up and getting on with things the best you could."

Overall, the Terence McCormack Group has prospered, with work throughout Ireland and some in Britain. The Group deals with all types of structural steel framed buildings, provides design and erection services, and has carried out many large cladding contracts. "The company now employs close to 40 people, including – since the early '90s – our technical director PJ Burns. My mother has served many years as Company Secretary and remains in that post," Donal McCormack says.

"Turnover is roughly £5M, split two fifths in the north, three fifths in the south. Most of our work is industrial buildings but we have seen a big increase in residential buildings – for instance, we've recently put 600t of steel in student accommodation for Cork University, 400t of the same in Dublin – and health and education also seem to be growth areas."

A big problem is not the quantity of work but the price of it, he says. "We do things by the book, look carefully at health and safety, at training, have the right quality assurance procedures in place, and are honourable members of BCSA." There is a cost to this, not borne by those who do not do things by the book. "It galls me when I am told by clients, 'I don't want to give this work to them. I'd rather give it to you, but at their price'."

He describes the Irish market place as "healthy, if not buoyant", with Northern Ireland's growth rate positive but continuing somewhat behind that of the Republic.

Moving on from talking about his own company and into his new role as BCSA President, he is very bullish about the advantages of building in steel and the prospects for steel framed construction; and well versed in what needs to be said.

"There is no question that steel is the better economic option. We've got to get this message across, that it is less expensive despite recent price increases, that it is more flexible, quicker to put up, recyclable. We have to combat the disinformation put around by steel's competitors."

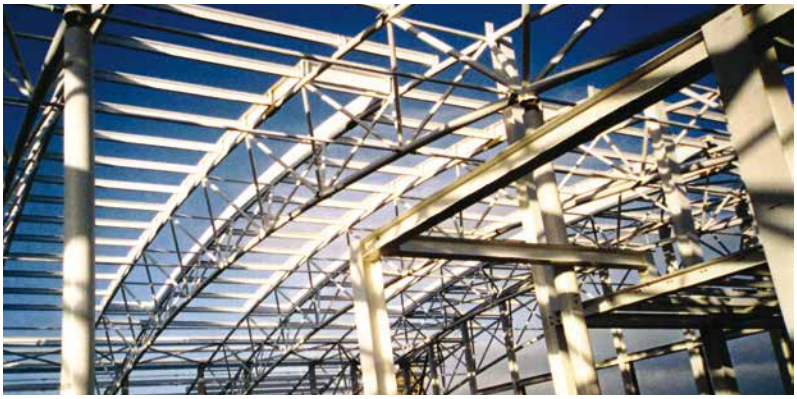
BCSA Presidents remain in office for two years. Events Donal McCormack will preside over include the Steel Construction Conference & Exhibition in

November, to include launch of the Association's Sustainability Charter; and those to celebrate the BCSA's centenary next year. Important issues with which he has to get to grip include the Construction Act, in particular those bits of it relating to payment; and promoting harmony – or in Donal's parlance, the Samaritan culture – within the construction Industry.

"An important project," he says, "is the one being conducted jointly with the Association for Consultancy & Engineering, to define the information needed at the contract stage of steel construction projects." As he says, incomplete information tends to promote disharmony.

There are also issues of health and safety and education which need to be addressed, as usual, on a continuing basis. He points to a specialist course set up by Northern Ireland's Construction Steel Group to properly train draftsmen in 2D and 3D drafting and would like to see this made more broadly available.

"We can't rest on our laurels as an association," he says. "One advantage we enjoy is a secretariat which – while small – is highly efficient and effective. It ensures the Association punches above its weight. I'm really looking forward to the next two years."



Projects undertaken by the Terence McCormack Group include the Catholic Church, Hollywood and Dundalk Swimming Pool.

Courtrooms will be housed in cantilevered fingers, glazed at the end

Manchester's new Civil Justice Centre dramatically rethinks what a court building should look like.

Courtroom appeal

Think of a court building and the image that comes to mind is most likely a forbidding, staid, perhaps intimidating mass.

The new Civil Justice Centre currently under construction in Manchester is a decisive break with tradition. One elevation is given over to a light, airy atrium in which triangular columns soar to the full 11-storey height; the main block, which contains 47 courtrooms, features dramatic cantilevering 'fingers' up to four storeys high projecting from each end.

The design was chosen in an international competition, won by a team comprising Connell Mott MacDonald, the multidisciplinary building design alliance of the UK's Mott MacDonald and Australia's Connell Wagner, with architect Denton Corker Marshall.

DCM Associate Wojciech Pluta says: "We were trying to break down the old model of court buildings being imposing and monolithic."

He adds that one reason he believes the consortium won the competition was a decision to move the main entrance, which the client originally asked to be on the minor Hardman Street elevation, to Bridge Street, one of Manchester's main thoroughfares. "One of the main functions of the building is that it will be a marker on the way into the city, approaching along Bridge Street, a historic main route. Having the main entrance on Bridge Street gives it a link to the Town Hall and Art Gallery."

The building is conceived as different 'layers' with different functions and degrees of transparency. The atrium contains the public areas, including a 3.2m wide concourse at each level which provides for horizontal circulation around the building, and is designed to allow members of the public to orientate themselves. 'Pods' within the atrium will provide self-contained meeting rooms for solicitors

The complex service layouts of the pods were modelled with the structure in 3D

Part of the service

Connell Mott MacDonald's multidisciplinary approach to structure and services paid dividends, says Principal Engineer Mark Thompson.

The client called for the building to be naturally ventilated as far as possible, which meant the structure had to be designed to accommodate a complex web of ductwork to allow air taken in at the sides of the atrium, through vents facing the direction of the prevailing wind, to circulate through the entire building.

"We did a lot of modelling of how the wind and air was distributed through the building," says Mr Thompson. The natural ventilation system is designed to maximise free cooling potential and comfort in mide-season. An intelligent building management system brings in a backup forced ventilation system if the wind speed is too slow to achieve this.

"Co-ordinating the structure and services as well as meeting the architects' requirements was a big challenge," says Mr Thompson. In locations such as the pods, a 3D model of the structure and services was created. "We even had to co-ordinate the secondary purlins with the services," says Mr Thompson. "If there had been separate M&E and structures firms it would have been substantially more challenging."

FACT FILE
Manchester Civil Justice Centre
Developer: *Allied London Properties*
Design & build contractor: *Bovis Lend Lease*
Architect: *Denton Corker Marshall*
Structural and services engineer: *Connell Mott MacDonald*
Steelwork contractor: *William Hare Ltd*
Steelwork tonnage: *3,000t*
Contract value: *£165m*

Triangular hollow section columns in the atrium rise 60m

and their clients, and are designed to appear as if suspended in mid-air.

A solid spine forms the next layer and contains lifts and stairs as well as more meeting rooms. It acts as a link to the next layer, containing the courtrooms, judges' chambers, administrative offices and a library.

The cantilevering fingers are fully glazed, though since they contain courtrooms this will have limited transparency. However Mr Pluta stresses that there will be views from the end of each courtroom and the sky will be visible through high level glazing along each side.

The final layer, 600mm outside the line of the Bridge Street façade, is the metal 'environmental veil', whose different panels have varying degrees of perforation to suit the rooms behind, providing shading or reflecting natural light into the building as required.

The building has an irregular grid, and floor to ceiling heights of 5.6m up to level 11, the court areas. The administrative offices are mainly on the four floors above and have more usual ceiling heights.

Maximum floor span for the courtroom areas is 11.5m, and the vibration response of these long span areas was looked into in detail. "We did a lot of modelling of floor vibration," says CMM Principal Engineer Mark Thompson. CMM bridge engineers wrote specialist software to model the resonances, peak amplitudes and so on generated by a person walking around the floor.

"We developed the design requirements with DCM and with an acoustics company assisting in establishing what the design criteria should be," says Mr Thompson. A response factor twice as stringent as the normal standard for offices was adopted. To achieve this, a vibration damping beam has been added in the 11.5m span areas, consisting of a 600mm square mass concrete 'beam' contained in permanent shuttering fabricated from folded steel sheet.

Perhaps the most complex aspect of the building structurally was the cantilevering fingers.

"These are designed as trusses," says Mr Thompson. High tensile forces are produced at the top of each finger and high compression at the bottom. These forces are distributed through the composite steel deck floors, via tension reinforcement where appropriate, to the main slipformed concrete core.

The component members of each finger are made from plated sections generally 450mm deep and 220mm wide. Typically the flanges are in 30mm plate with 15mm webs.

Two headaches were the construction sequence and the issue of progressive collapse. "The initial design required all the concrete floor plates of the main block to be cast and to have reached their 28-day strength before erecting the fingers. To save time we developed a temporary works solution with William Hare to allow faster erection." This allowed for every third floor to be cast, with the introduction of temporary diagonal props from each finger down to the concreted level.

To meet the requirements for progressive collapse, the structure has to be capable of continuing to stand up after the removal of one element. Key elements of the structure can be designed to withstand the notional force of an explosion, or alternative load paths have to be found.

"We looked at designing the truss members as key elements," says Mr Thompson, "but it wasn't practical. Instead, we designed it so that if you lose

The environmental veil (above) adds shading; Pods in the atrium (below) provide meeting rooms.

any member it would support the load through moment frame action. There would be increased distortion but it would remain stable."

The complete trusses, up to four storeys high, were fabricated and welded together at William Hare's works with the correct built-in precamber. The whole unit is too heavy to lift as one, so each truss was then cut through the diagonals into sections to be bolted together again on site.

Because of their size, each unit needed a police escort and had to be delivered to site after 7pm. Because the site is extremely cramped it had been expected that it would be necessary to close Bridge Street while the fingers were lifted into place. "In the end, up to level nine we put up with a mobile crane either side from within the site boundary. For the rest the site tower cranes were used," says Mr Moylan.

The pods were also assembled on site and lifted into place as a unit.

Rising the full height of the atrium is a row of 700mm hollow equilateral triangular columns. These are restrained at irregular intervals by the beams which also support the pods. Generally they are designed to run for three storeys between restraints — nearly 18m because of the height of the courtrooms. Differential thermal movement between the columns and the façade of the atrium had to be provided for, using sliding movement joints between the façade support structure and the main structure.

The cantilevers were assembled at the works, cut into sections for delivery to site and bolted together (above) before lifting into place (left)

The columns are made from steel plate 15mm, 20mm or 35mm thick depending on the load on the column, welded together at each vertex of the triangle. Achieving the sharp edge detail the architect wanted at each corner of the columns was a challenge for steelwork fabricator William Hare. A number of solutions were mocked up and eventually a detail in which the welded joint is squared off to 15mm wide, rather than attempting to achieve a perfect point, was adopted.

With 2500m of welding in total, getting a consistent finish was a worry, admits William Hare Project Manager Dave Moylan. "We were concerned about getting consistency, but in he end there wasn't the degree of difficulty we expected. The consistency was very impressive." He adds: "In the first week we did one column; the second week we did two, the third we did three, and after that we managed four a week."

There are two splices in the 60m high columns; a temporary bolted joint is used during erection, and the joint is site-welded later. For fire resistance the columns are filled with concrete to the height of the bottom storey.

William Hare's designers worked closely with the rest of the design team from an early stage, constructing a model in Strucad. This included details such as the frame for the glazing system and allowed areas of conflict and missing information to be identified and resolved prior to fabrication.

Bovis Lend Lease project manager Peter Foy says the project has run extremely smoothly because of early involvement with CMM and William Hare. "We had 12 months' discussion with CMM and the steelwork contractor, and we spoke to the market place about buildability and methodology. We spent time setting up the site and building a service road as the focal point for the logistics operations." The service road is a substantial construction, built on piles after the demolition of a former car park, which took place during a 26 weeks of enabling works at the start of the 156-week contract.

There were also early discussions and presentations to the Health and Safety Executive on proposed working methods as part of Bovis Lend Lease's Incident and Injury Free campaign.

Following a topping out ceremony in July, the main structure was on track for completion last month, on the way to an opening date in spring 2007.

BCSA

Steel Construction CONFERENCE & EXHIBITION

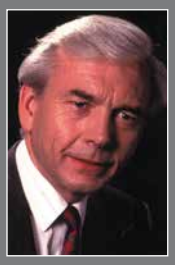
This image courtesy of Nick Guttridge

THE WAY AHEAD

Tuesday 15 November 2005

at The Brewery, Chiswell Street, London EC1Y 4SD

The aim of the "Steel Construction – The Way Ahead" Conference and Exhibition is to review the latest developments in the design and construction of steel structures.



The Conference is aimed at clients, designers, main contractors, steelwork contractors and suppliers.

John Humphrys, TV Presenter, will Introduce and Chair a Panel Discussion on "The Future Construction Market".

All delegates will receive a copy of a comprehensive new book "Steel Details", to be published by BCSA at the Conference. This new book will illustrate steelwork detailing as design decisions in context, not solely as calculation methodologies. It will include extensive case study material and reference data.

The Exhibition will open at 0930 hrs and will close at 1715hrs.

Exhibitors will include: steelwork contractors, suppliers of steel, software, purlins, cladding, decking, stud welding, bending, cellular beams, fabrication machinery, corrosion protection.

The Conference will commence at 1030hrs and conclude at 1615hrs.

The Conference fee is £160, plus VAT = £188. The fee includes attendance at the Conference and Exhibition, lunch, documentation and a copy of the new "Steel Details" book.

The event is being held at The Brewery, which is Samuel Whitbread's origional London brewery, built by John Smeaton and James Watt in 1750.

For Booking Forms contact: Gillian Mitchell MBE, Deputy Director General, BCSA 4 Whitehall Court, Westminster, London SW1A 2ES
Direct Tel: 020 7747 8121 **Fax:** 020 7839 4729 **email:** gillian.mitchell@steelconstruction.org **Web:** www.steelconstruction.org

Cork development rises quickly

Steel construction has allowed fast track development of six multi-storey blocks on a commercial site in the Irish Republic

The construction team of a retail park in Cork has met the developer's ambitious programme deadlines thanks to steel construction.

Blackpool Commercial Park, set in a suburb of Cork city in Ireland, consists of six multi-storey blocks with retail space on the ground floor and a mixture of offices, residential, car parking and a cinema above. Retailers include Atlantic Homecare, Argos Extra and Reid Furniture.

Four blocks, A, B, C and F, were completed between August 2003 and autumn last year. Block E, which began in February 2005, is structurally complete, and steel erection for Block D is due to start in September, with completion due in June next year.

"Speed was the main driving force," says Joe O'Brien of architect Kelly Barry O'Brien Whelan. "You have to open retail in November — if you miss you're in trouble."

Under a construction management contract awarded to PJ O'Hegarty a fast track approach to construction was adopted with building work closely following design.

Block	Use	Area (m^2)	Steel Tonnage (T)
A	Multi-storey car park over retail	33,250	2,800
B	Cinema over retail	4,330	620
C	Offices over retail	7,673	770
D	Offices over retail	18,690	1,700
E1	Offices over retail	7,726	500
E2	Apartments over retail	3,069	—

"Speed of construction was an important aspect of design and the use of structural steel with beams at centres close enough to avoid propping of the metal decking was generally specified," says Jerome O'Donovan, Project Director of structural engineer John O'Donovan and Associates.

The exception to this was Block A, a five storey building containing four levels of car parking with 1740 spaces in total over retail space on the ground floor. The structure is a braced structural steel frame with a column grid of 16m x 15m at ground floor and 16m x 7.5m above.

Large transfer trusses 3m deep at first floor level support point loads from the columns overhead. The top floor of the car park was added after the original building was completed with the retail space and lower floors of the car park already in use.

The client wanted the car park to be as user-friendly as possible. Cellular beams spanning 16m with precast slabs spanning 7.5m between them and acting compositely kept the number of columns to a minimum. Combined with good quality lighting, this gives the car parking areas a bright and open feel.

60-minute fire protection at ground level was provided by concrete encasing and intumescent paint.

Block B contains the cinema. Again, retail space occupies the ground floor. The seven screen cinema is on the first floor, with offices and projector rooms about.

The structure is a braced steel frame with composite steel beams spanning 12.6m at 2.4m centres. Floors are composite construction using steel decking.

Block E is a six storey office building with retail space on the ground floor. Steel stairs were used for speed. The development is on the main Cork-Limerick road adjacent to the Blackpool Shopping Centre

The first floor of the building is designed to support the cinema seating, and the projection rooms and offices of the cinema which are constructed in timber framing.

Block C was originally designed for multiple use over a ground floor retail area with open plan and private offices, a hotel and a leisure centre and swimming pool, which resulted in a heavy structure. Eventually it was decided to use the entire building above ground floor for open plan offices. The steel frame is based on a grid of 14.2 x 6.5m with composite steel beams at 2.2m centres.

Block D, which will be the last to be built, was originally intended to be a hotel and at one time a concrete flat slab structure was considered. However plans were changed to make it a six-storey office block over ground floor retail space with concrete stair and lift cores, and the material reverted to steel.

"The client wanted long spans, and the frame provided a saving in programme when compared with concrete construction," says Mr O'Donovan of JODA.

Westok cellular beams span 15m at 2.5m centres with steel deck composite floors. Cell beams were chosen to provide access for services while optimising the efficiency of the floor-ceiling heights. The beams act compositely with steel deck floors.

Trevor Irvine of steelwork fabricator Walter Watson was interviewed by the client and design team during pre-contract discussions and helped to make the case for steel. He stressed the advantages of cell beams for accommodating services and providing long spans, achieving a shorter construction period, and the fact that a steel structure would make it easier to alter or adapt the building internally later in its life if needed.

"Steel has different implications for health and safety and metal deck floors avoid the need for shuttering. There's also a shortage of site labour for shuttering. It's a congested site bounded by roads and a river, but we were able to use just-in-time delivery and didn't need the space that building a concrete structure would need," he says.

Block E is really two buildings immediately adjacent to each other, E1 a six storey office building and E2 residential, both with retail space at ground level. The residential building adopted concrete flat slab construction, partly to suit the contractor's programme and because of the shape of the building. Mr O'Donovan points out that residential blocks in Ireland outide Dublin have traditionally been four storeys or less and have been built in blockwork with precast floors. There has thus been little demand for residential developments in either steel or concrete, by comparison with the UK where the techniques of detailing steel frames to prevent sound transmission are well established.

For E1, the office building, a steel frame with a 10m x 7m grid features composite steel beams at 2.4m with a composite steel deck floor. Westok cellular beams are again used to achieve the most efficient use of floor to ceiling height.

When candidates for the management contract were interviewed they were asked about their preference for building material. "All favoured steel on Block D and the offices," says Mr O'Donovan.

The need for speed affected all aspects of the project. "We even used steel stairs, not precast," says Walter Watson's Mr Irvine. "We erected them as we went up so there was no need for scaffold towers for access to the floors, and we didn't have to leave off roof purlins to drop in precast units afterwards."

Speed has influenced the choice of cladding on Blocks D and E. "We're using a completely prefabricated external envelope," says architect Joe O'Brien. The system is supplied by Prince Cladding of Holland. "It's hugely important from the point of view of speed."

He adds: "When you prefabricate the façade it's assembled in factory conditions and you avoid the need for scaffolding to erect it. It's the way construction is going in Ireland."

FACT FILE
Blackpool Retail Park, Cork
Developer: *Blackpool Developments*
Project manager: *P J O'Hegarty*
Architect: *Kelly Barry O'Brien Whelan*
Structural and services engineer: *John O'Donovan & Associates*
Steelwork contractor: *Walter Watson Ltd*
Steelwork tonnage: *6,390t*

Undergraduates show design flair

Judges were impressed by the quality of achievement in this year's Undergraduate Engineering Design Awards and, they suggest, rewarding careers await the participants. Paul Wheeler reports

The Undergraduate Engineering Design Awards are sponsored by Corus, organized by the Steel Construction Institute (SCI), and supported by the British Constructional Steelwork Association Limited (BCSA), The Institution of Civil Engineers, The Institution of Structural Engineers and *New Civil Engineer* Magazine. Corus also sponsors the Undergraduate Architect Awards.

Students' submissions to the this year's Corus-sponsored structural steelwork and steel bridge design competitions demonstrated superb work and highly sought-after skills, the judges said.

Undergraduates from 17 UK universities submitted entries to the competitions, the results of which were announced in July.

Antony Macey, Robert Kettleborough and Mike Butler from the University of Sheffield won the structural steelwork design award, while Dennis Maand Hui Sze Ki from the University of Birmingham took first prize in the bridge design section.

The competition concept is that the student teams act as design consultants working to a client brief. The awards were set up in 1990 to motivate and challenge engineering undergraduates and promote the use of steel in structural design and are open to undergraduates enrolled on UK university courses in civil and structural engineering.

The task in this year's structural steelwork category was to design a 10,000-capacity Olympic tennis stadium. The bridge competition called for a structure to carry a two-lane dual carriageway over a 440m wide gap, including a central 120m wide ship canal in which no supports were allowed.

Entrants were expected to demonstrate individuality and flair, in addition to showing an understanding of structural design, and to communicate their ideas in a written report with calculations and drawings.

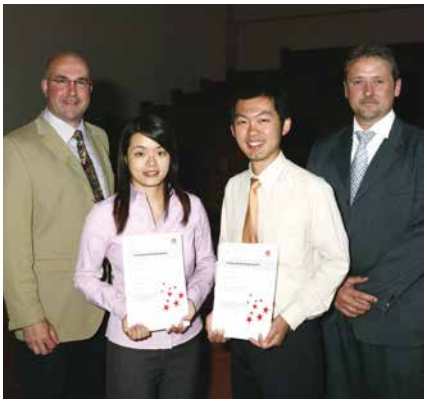
For the structural competition, basic information such as the size of the court area was given, but the brief was left deliberately open. For instance students were given an option of whether to design an open structure or one with a closing roof.

The winning Sheffield team, made up of fourth year MEng students, developed a stadium design based on four principal supporting arches that intersect to frame the tennis court. They support the front edge of the roof and remove the need for a cantilevered system, as commonly used in sports venues. In addition the huge arches, which span 150m and reach a height of 24m, provide a striking visual impression befitting an Olympic venue.

Four intersecting arches support the roof of the winning entry in the structural steelwork competition (top). Bristol University's entry was runner up (below)

Right: The winning team (l-r) Mike Butler, Antony Macey and Richard Kettleborough, with (far left) Roger Steeper, Corus Market and Product Development Manager.

Left: Arches also featured in the winning design of the Bridges section



Right: Corus Regional Technical Manager Dave Chapman, winning team Erica Hui and Dennis Ma, and Corus Training and Education Manager Andy Graves

Dr Buick Davison, course tutor at Sheffield, says the competition gives students the opportunity to follow a structural design from the initial concept through to production of design calculations and construction drawings. This year's brief, he says, called for "imaginative and innovative use of steelwork and also addressed buildability, deconstruction, health and safety and aesthetic concerns".

Furthermore, he adds, "the students benefitted from tutorial support from engineers, some of whom were former Sheffield students, at Buro Happold, Arup and SKM Anthony Hunt, who came into the university and ran workshops for the students." Two of the students from the winning team are already working with participating companies.

According to Dr Davison, the winning team covered all aspects of the brief well. The solution was very well designed and presented, and the drawings were "of a professional quality". The inclusion of dynamic analysis, he said, "applied knowledge gained from previous studies and was good to see, as it showed they could apply what they had learned elsewhere."

This observation is supported by the judges who were impressed by the level and wide range of research demonstrated in many of the entries on a diverse range of topics from seating geometry to international case studies.

However the judges did observe that while presentation standards were very good and continue to rise, entrants need to be reminded that "elaborate rendering must be accompanied by sound engineering back-up". Conversely, in some cases they felt calculations were too voluminous to assimilate.

Overall the judges felt the submissions in the structures competition were of the highest standard in recent experience and "all demanded serious consideration and appraisal". They said: "the effort expended on the submissions was outstanding. All entrants are to be commended — they produced a rewarding and inspiring set of submissions that were a delight to assess".

The standard was extremely high in the bridge competition too.

Dr Arun Kamtekar, tutor of the winning team from University of Birmingham, explains the approach. "The design provided by our students was symmetrical and could be divided into two parts — the region over the canal and the region either side of it."

A deck consisting of a six longitudinal steel plate girders acting compositely with a reinforced concrete slab was supported on steel cross girders. Over the canal, each cross girder was supported by four columns each of which bore on to a shallow, three-pin arch spanning 240m across the canal. The load from the arch ribs was carried to the ground via end abutments on a pile cap over several vertical and raking piles.

For the approaches either side of the canal, each cross girder was supported by two columns that carried the load directly to the foundations. Each end of the road was supported on a reinforced concrete abutment. Design of expansion joints and bearings was included.

Dr Kamtekar believes all participating students benefitted greatly from the competition, in particular because it helped them appreciate that a lot of lateral thinking is needed to produce a successful scheme.

Much of this came about through the process his students applied to the brief. Computer calculations were not allowed in the early stages of the project and students had to develop their concepts through sketches and group discussion.

This, says Dr Kamtekar, allowed the students to understand better a number of key messages such as the need to think about the whole structure and not concentrate on just one element of it; and that a number of schemes should be considered before making a decision about which scheme to adopt.

But above this, he believes, the students developed an appreciation that designs evolve gradually and cannot be done in a short time — and that complicated structures can be idealised in a way that allows them to be designed initially by hand.

The judges described the winning entry from Dennis Ma and Erica Hui Sze as "superb undergraduate work". They felt that the submission demonstrated an excellent development from concept through to the final scheme, with appropriate comments on the reasons for the changes and the implications for structure, cost and aesthetics.

Dr Graham Owen of the Steel Construction Institute said: "I was most impressed by the quality of achievement by a wide range of students from many different backgrounds and universities. The entrants, he said, "demonstrated skills highly sought after by the design profession. I am certain all the finalists can look forward to very rewarding careers."

Structures competition

Winners:
University of Sheffield
Antony Macey
Robert Kettleborough
Mike Butler
(Tutor: Buick Davison)
Second:
University of Bristol
Jeremy Henley
George Domeyer
Preston Lee Chenk
Philip Man Kin Fung
(Tutor: Colin Taylor)
Third (joint):
University of Nottingham
Robert Hazelhurst
Amanda Chapham
Andrew Buck
Joe Berrisford
(Tutor: Walid Tizani)
Third (joint)
University of Leeds
Dimitrios Karypudis
(Tutor: Dennis Lam)

Bridges competition

Winners:
University of Birmingham
Ma Chun Hang
Hui Sze Ki
(Tutor: Arun Kamtekar)
Second:
University of Edinburgh
Susan Deeny
Kate Anderson
Niall Corrigan
Richard Morgan
Kenneth Taylor
(Tutor: Tim Stratford)
Third:
Queens University Belfast
Peter Carson
Martin Kelly
Keith Robson
(Tutor: David Sloan)

Architects rise to Olympic challenge

The winning entry fused high tech steel design with multimedia

The theme of the 2012 Olympics was also adopted as the brief of this year's Corus Undergraduate Architect Awards

Entrants to the prestigious pan-European undergraduates architecture competition were asked to design a culturally adaptive space to suit an urban site in one of what were then the potential Olympic host cities — London, Paris, New York, Moscow or Madrid.

The winning team, Blanca Pedrosa Santamaría and Ignacio Nieto de la Cal from the Architecture Polytechnic University in Madrid, beat off strong competition to scoop the top prize of £2.500. Their design, a fusion of high-tech steel designs and functional space, incorporated a simulation canopy, multimedia lighthouse and 'telematic' café that promised to turn a whole city into an interactive venue for watching the athletes.

The competition is designed to give architecture students a creative vehicle for learning about the use of steel in buildings, and to showcase the future talent of the industry. Both the architectural and the engineering undergraduate awards form part of Corus's wider strategy within the education sector, which is designed to bring the industry and its future employees closer together.

Now in its 17th year, the Corus Undergraduate Architect Awards is the longest established competition of its type. It provides a creative stage for discovering more about the use of steel in 21st century buildings and aims to encourage new ways of looking at steel as a construction material.

Richard Dixon, Corus's Construction Support Manager, said: "The prize-winning design was both creative and functional, encapsulating the themes of celebration and congregation, which are characteristic of such a world-class event. The winners have shown an understanding of the qualities of steel in the context of a complex brief in what was clearly a high quality set of entries. The awards have become synonymous with high quality, forward-thinking designs. It demonstrates the wealth of talent that is coming through into the industry."

Second place was awarded to the Scottish-Irish-German team Finn Williams, Andrew Griffin and Julius Kranefuss, who met while working in Holland. This design focused around event sites connected by light beams, and also won them the British Constructional Steelwork Association's prize.

The judging panel included Bryan Avery of Avery Associates, Yasmin Shariff of Dennis Sharp Associates, David Bonnett of David Bonnett Associates, Paul Finch of Architects Journal, Chris Nash of Nicholas Grimshaw & Partners, Terry Raggett of Arup Associates, Dr Olga Popovic Larssen of the University of Sheffield, and Matthew Teague of Corus Construction Centre.

Summing up both the architectural and engineering awards, Mr Dixon said: "Forging links between ourselves and the education sector is critical to the industry's future. Recent figures show that by 2010 more than 430,000 employees will be required by the construction industry to keep pace with Britain's spiralling demands. These awards are part of Corus's portfolio of initiatives to attract quality undergraduates and encourage the assured first steps to a promising career."

The winning entrants

Corus Undergraduate Architect Awards

Winners

Ignacio Nieto
Blanca Pedrosa

Second place and winners of the BCSA prize

Andrew Griffin
Finn Williams
Julius Kranefuss

Commendations

Oscar Pardilla
Isabel Fernandez

Alfredo Cadenas-Santiago

The Corus Undergraduate Architect Award is supported by the Steel Construction Institute, the British Constructional Steelwork Association, and *Architects Journal*. The competition is approved by the Royal Institute of British Architects.

The briefs for next year's UGDA and UGAA awards are available from http://www.corusconstruction.com/

Digitally enhanced

Software for steelwork designers becomes increasingly sophisticated. Whether the aim is to automate detailed design of individual components, or create a model of an entire structure, software providers continue to make great strides. In the first part of a software round-up, New Steel Construction looks at some of the latest releases for designing cellular beams and for 3D modelling.

Added floor options for ASB software

Corus's latest version of its free Slimdek ASB asymmetrical beam software is helping the structural steelwork industry compete in both the commercial and residential markets.

Asymmetrical beams allow the service zone to be kept to a minimum while still allowing easy access to services which typically have a design life of about 15 years to the building's 60.

ASBs rely on the floor to restrain the top flange from buckling and until the latest release, the software only covered design with deep steel deck floors.

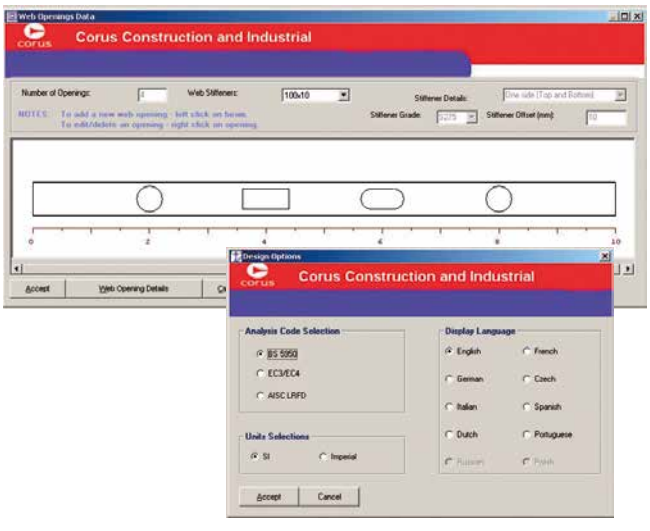
The new version 4.1 allows ASBs to be designed with precast units from all the major manufacturers. "The advantages of precast units is that you're unlikely to have to prop, and you can get above a 9m x 9m grid," says the Steel Construction Institute's Senior Manager for Information Technology John Moran. It also allows highly unequal spans to be modelled.

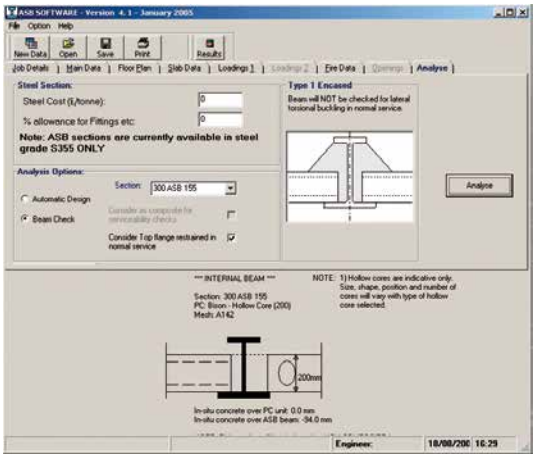
Also recently issued is a new version of the composite beam design program BDES. There was surprise at how much this was missed when it was left off the last free Corus CD in 2003. Evidently, though, its ability to produce rapid designs for composite and non-composite beams is valued by engineers. It allows primary and secondary beams to be modelled, with a concrete slab or steel deck floor acting compositely with the beam. BDES permits the modelling of a wide variety of load configurations together with flexible layout of beam openings.

Changes in the new version 7.3 include analysis to the provisional Eurocodes, ENV 1993 and ENV 1994, improved capabilities to deal with a wider range of web openings, and the inclusion of Hilti shear connectors as well as welded studs.

Both the new offerings have been brought into the SCI's new quality management regime. "What users see is software that 'knows' when it needs to be updated," says Mr Moran. In addition, behind the scenes is a quality audit trail for all software development which is being offered for ISO 9001 accreditation."

Corus software is available as free downloads from www.corusconstruction.com/page_9033.htm





Latest version of Slimdek ASB includes data for design with precast floors (top right); BDES provides rapid designs for composite floors (left and bottom right).

New look, new links

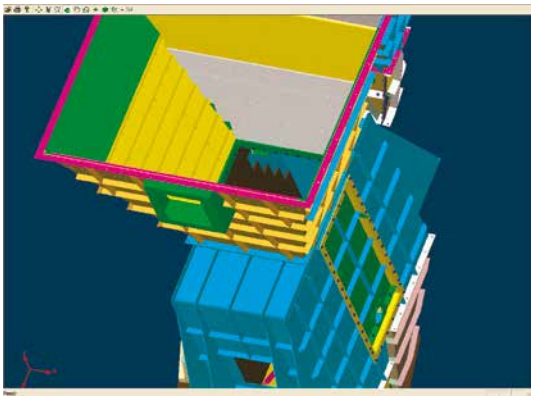
AceCad has introduced a range of improvements to the latest release of its StruCad 3D modelling package, version 11, which came out last month.

The most obvious is a complete update of the user interface so that the package now has the look of a modern Windows application. Standard Windows toolbars are employed, which can be customised to suit the individual user. Existing users who are happy with the old interface can continue to use that instead, though, if they prefer.

There are a number of other improvements. Among them is an increase in the maximum number of members that a model can include. Previously this was limited to 10,000, which meant that very large projects had to split into separate chunks. In version 11, modelling limits have been virtually removed. Memory is allocated dynamically so that only the memory necessary for the number of items is used.

There is now the ability to include references to external drawings in 2D or 3D, in SPF or DXF file formats. This is useful for bringing in architectural models or when using a combination of materials.

AceCad's Charles Wilby says that the limit to the big productivity gains that can be achieved from CAD, purely through automation of the drawing process and by adding new features, is being reached. "The hold-ups these days are in information flow between companies and between departments of the same company." The company is thus concentrating its efforts on improving StruCad's ability to link to other packages, to check information and communicate; and on developing StruM.I.S, which provides a complete management package of the whole fabrication process from estimating to production control.



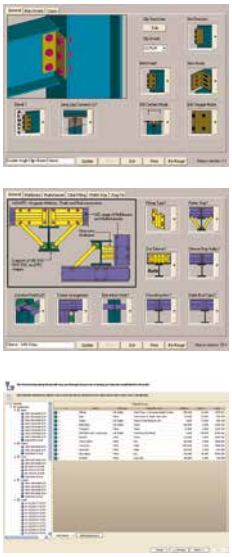
"The big gains in future will come from management of information systems," he says.

Ability to import and export via StruCad's Analysis and Design option or StruCad Engineer has been improved, with support for the CIS2 neutral file format (designed to become a standard for date exchange between different software packages). There is also a direct link to the widely-used analysis package Staad.

AceCad has worked closely with manufacturers of cold-rolled sections to improve its ability to model cold-rolled purlins, including a new side rail support system.

Links to StruM.I.S have been enhanced, and an estimating module has been built into Strucad which can calculate not only the price of the steelwork, but also fabrication, painting, transport and erection costs.

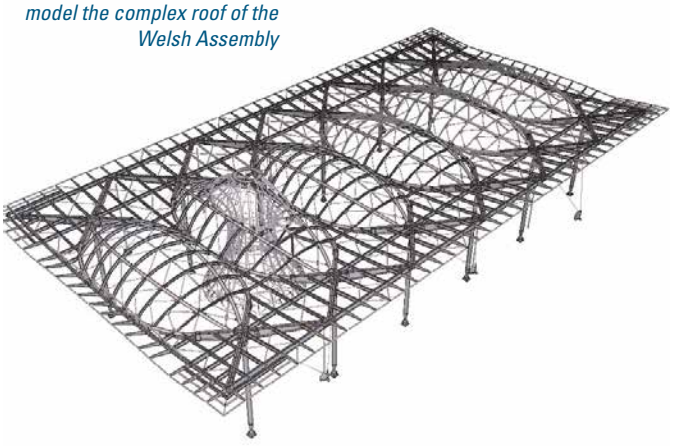
Wilby stresses: "As opposed to our competitors, a significant difference we have is that we concentrate on the steel market and the steel industry's needs solely."



Solid modelling package Strucad v.11 gets an improved interface and includes automatic connectability, cold-rolled section design and an estimating module.

One model for all

Tekla Structures was used to model the complex roof of the Welsh Assembly



Talk to steelwork detailers and you'll soon find that Xsteel is one of the most popular steelwork modelling and detailing packages.

These days Xsteel is better known as Tekla Structures Steel, or more accurately as one configuration of the Tekla Structures Suite, which now covers a much broader range of capabilities. Tekla (UK) Managing Director Chris Moor says that the software has evolved into a completely integrated structural model that effectively forms a building information model for structural engineering projects.

BIM systems are the Holy Grail of construction software developers. A BIM is a single 3D model covering the entire design process from concept to detailing, fabrication and construction, containing all the geometric, structural and project information, and allowing multiple users to work on the model simultaneously. In manufacturing, automotive and aerospace companies have for some time been using single computer models, but these industries have supply chains dominated by a few powerful companies such as Ford or Boeing who are able to impose standards on their suppliers.

In construction, a more fragmented situation means a single BIM containing all architectural, structural and services information is still a few years away, according to Moor. However, argues Moor, a structural BIM, containing all the information an engineer, detailer, fabricator or project manager needs (including drawing and report production) is provided by Tekla Structures now.

As well as providing an integrated model for the structural engineer, the software will readily link to other programs such as Autodesk and Bentley, commonly used to model piping and M&E details.

"That's our concept," says Moor. "It allows everyone to talk to each other and everything in the project is coordinated."

Though the main customer base is steel fabricators, detailers and structural engineers, Tekla has been successful in selling specific Tekla Structure configurations. "They appreciate the ability to collaborate with the steel frame suppliers and exchange models, because clashes between the frame and precast flooring or cladding are a common source of trouble."

Rare problem can be easily avoided

BCSA and the Galvanizers Association have published a guide on minimising the risk of a rare phenomenon, liquid metal assisted cracking (LMAC). BCSA's Director of Engineering David Moore outlines the practical steps to take.

LMAC is an uncommon form of cracking and because of this it will be new to many engineers. A new guide from the BCSA and the Galvanizers Association contains practical advice to clients, designers, steelwork contractors and galvanizers to assist in the development of designs and details with low susceptibility to LMAC, and gives an appreciation of the relative importance of the factors adding to that risk from practical experience.

The galvanizing of structural steelwork is a long established and cost-effective way of providing economic and long-lasting protection against corrosion, with low maintenance requirements and good damage resistance. Indeed, the UK galvanizing industry galvanizes some 800,000 tonnes of steel annually, an increase of a third over the past decade. Furthermore, larger zinc baths have been introduced in response to the construction industry's needs to hot dip galvanize longer and larger components. The UK boasts the longest bath in Europe (at 21m) and there are another twelve baths in the UK and Ireland in excess of 10m long. Figure 1 shows a typical steel section being galvanized.

Figure 1 Steel sections being hot dip galvanized

In recent years the phenomenon known as Liquid Metal Assisted Cracking (LMAC) has been recognised as a form of cracking that may under some circumstances occur during the galvanizing of structural steelwork. Although this form of cracking is uncommon, if it is not detected and repaired it can compromise the performance of the structure.

Certain solid metals when in contact with other liquid materials can give rise to a reaction, which will affect the parent solid metal. Susceptibility to these conditions occurs only in specific metals and environments, and is known under the generic title of liquid metal embrittlement. One of the situations where this can occur is when structural steel is stressed and in contact with liquid zinc as happens during the galvanizing process. This form of cracking is characterised by a crack through the entire cross-section (an example of LMAC is shown in figure 2).

Figure 2. An example of LMAC

Generally, such cracks are initiated at fabrication details such as welds, gas-cut edges, holes etc.

The occurrence of LMAC is sufficiently uncommon that no coordinated programme of research or information gathering has been put in place in the UK. However, some research is ongoing at present in the UK. While evidence from Germany, Japan, the USA and other countries has highlighted the occurrence of LMAC, an authoritative understanding of the circumstances that may trigger the cracking remains elusive.

It is, however, recognised that a range of factors can and do influence the onset of LMAC, and that the inter-relationship of these factors is also of crucial importance to any understanding of the phenomenon. The relative weighting of these factors has yet to be defined but what is clear is that all the partners in the supply chain

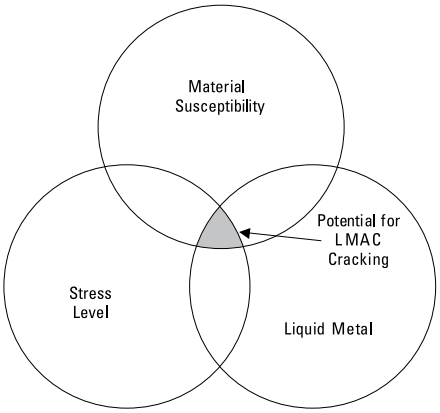


Figure 3. Interaction of stress level, material susceptibility and liquid metal

for galvanized articles have some part to play in influencing the level of risk associated with LMAC.

It is generally accepted that there are three main prerequisites for LMAC to occur. These are:

- stress level
- material susceptibility
- liquid metal

It is also self evident that all three may, on rare occasions, be present at a required 'critical combination' when fabricated structural steelwork is hot dip galvanized thereby exposing the article to risk of LMAC occurring.

It is perhaps more important to recognise the individual and independent factors within the three prerequisites given above. Table 1 shows the breakdown of these three prerequisites into their constituent factors. The lack of knowledge surrounding LMAC has to do with the inter-relationship of these individual factors, and their relative 'weighting' in increasing the risk of LMAC. So, although the basis of the mechanism is recognised, the details of how material susceptibility and liquid metal (severity) factors may vary and affect the 'risk' are not known.

To help minimise the risk of LMAC occurring the new publication gives practical guidance on each of the following topics to identify circumstances where any increased risk of LMAC can be ameliorated.

- Design and detailing,
- Type and quality of steel
- Quality of fabrication
- The galvanizing process

A post-galvanized inspection regime is suggested as a pragmatic approach to further reducing the potential consequences of LMAC on the structure. It is recommended that the Engineer should specify 100% visual inspection after galvanizing for all structural steelwork that is to be utilised in building construction. This should be written into the Project Specification so that all parties are fully aware of the requirement. In the event that some LMAC defects are found, then it is important that the Engineer should consider the potential implications of such cracking and modify the Project Specification as required to include further non-destructive testing in critical areas. The Engineer should also agree with the Steelwork Contractor and then instruct under the contract appropriate repairs to be completed on any defects that have been found.

Stress level	Material Susceptibility	Liquid Metal
Internal material stress	Steel chemical composition	Impurities
Cold deformation / Prior Strain	Yield Strength	Temperature
	Carbon equivalent value	Intentional additives
Welding residual stress	Residual stresses Hot rolling process	
Restraint Fabrication process	Hardness	
Thermal stress: immersion rate variable thickness differential temperature		

Table 1. Prerequisites for LMAC subdivided into their constituent parts

Practical Factors
Thickness Ratio
Welds: fillet/butt
Depth of member (stiffness)
Holes: drilled/punched
Member profile Type of section/component
Type of truss
Pre-heat
The presence of a notch, shelling or other steel defects

The advice given in the new publication is applicable, primarily, to galvanized structural steelwork for building construction in the UK. It is based on steel grades S275 and S355, although the principles, if used with care, can be applied to the management of higher strength grades of steel. The methodology may also be modified for bridge structures or series-production of steel 'components'. However, if the structure is to be subjected to fatigue loading the consequences of structural defects are far more critical and the Engineer must consider the inspection regime in the light of these consequences.

The occurrence of LMAC depends upon a range of factors coming together at the same time. These factors derive from the design and detailing of the component, the condition and quality of the steel, detailing and fabrication and the galvanizing process. The weighting of the individual contributions from each of these activities is not known and no single factor, at this time, can be identified as the major contribution to LMAC. By following the guidance given in this document and by committing a modest amount of attention to detail at each stage of the construction process the chances of LMAC occurring can be substantially reduced.

Galvanizing structural steelwork - An approach to the management of liquid metal assisted cracking
Price: £15(UK), £18(EU/ overseas), £21(outside EU)
Member £11.25(plus P&P)
Author: BCSA and GA
ISBN: 0850730481
A4: paperback

Copies of the publication can be obtained from:
The British Constructional Steelwork Association Ltd (Publications Dept)
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Fax: 020 7976 1634
Email: don.thornicroft@steelconstruction.org

Alternatively it can be downloaded from BCSA's web site – www.steelconstruction.org

Steel in Fire: the latest news

The performance of steel in fire has been proven through comprehensive tests worldwide. In the first of a series of fire engineering articles John Dowling of Corus Construction and Industrial assesses the impact of recent real life events on our knowledge of how steel behaves in fire.

Two recent events have focused attention on the performance of steel structures in fire.

The first of these is the publication of the draft official report from the National Institute of Standards and Technology (NIST) in the United States into the collapse of the World Trade Centre towers in September 2001; and the second is a fire at the Windsor Torre Building in Madrid in February 2005. Both events have excited considerable comment, in the latter case, a great deal of it speculative.

The official NIST report is the latest in a wide ranging series from that organisation and pulls together thirty recommendations on changes to existing practice and future research. The report pulls no punches in laying the blame for the collapses. The executive summary states that: "The WTC towers likely would not have collapsed under the combined effects of aircraft impact damage and extensive multifloor fires if the thermal insulation had not been widely dislodged by impact." This had been suspected for some time and supports an opinion previously expressed by NIST in their building performance report, that: "The structural damage sustained by each of the two buildings as a result of the terrorist attacks was massive. The fact that the structures were able to sustain this level of damage and remain standing for an extended period of time is remarkable, and is the reason that most of the building's occupants were able to evacuate safely."

The findings of the draft NIST report into the WTC collapses will be discussed in detail in a later article in New Steel Construction. The issue of stickability of fire protection has already been addressed however by two UK fire protection manufacturers, Leigh's Paints and Cafco International who have carried out explosion tests at the Advantica facility at Spadeadam in Cumbria. In all the tests, the protection retained its integrity and survived subsequent fire testing.

Large fires in modern office buildings are rare events and are often the subject of intensive investigation, especially when things go wrong. In such cases they can often act as the catalyst for changes to regulations and practice. What cannot be denied is that, in the Madrid fire, something went seriously wrong. Part of the building from the 17th floor upwards collapsed.

This fire has been the subject of intensive press speculation as to the chain of events and the nature of the structural frame. Against that background it is informative to read this summary of an investigation carried out by Arup Fire.*

"The building had a concrete central core with two rows of reinforced concrete columns aligned with the core side walls. The structure above ground was characterised by two transition floors at 3rd and 17th floor levels. The typical floor

Above: View of Madrid fire from the East side. This appears to show that part of the floor had collapsed internally although the perimeter columns are still intact at this stage

*"The full document can be found at www.arup.com. Views and opinions expressed by the author of this article are not necessarily those of Arup, although text taken from the Arup report is reproduced with permission."

slab construction was reinforced concrete bi-directional ribbed slabs, spanning onto composite steel beams. The slabs were supported along the perimeter by steel columns, supplemented by RC columns on two sides below 17th floor level.

The transition floors were formed with solid RC slabs and deep beams. The original facade mullions and transoms were fixed to the steel perimeter columns, and a new facade structure had been added to outside of old facade. The perimeter columns in turn were supported by the transition structures at 3rd and 17th floor levels.

The Madrid regional code does not require sprinkler protection for buildings with an evacuation height of less than 100m so active measures were limited to automatic detection and alarm, fire hose reels and a dry riser system.

The exact state of the passive measures in place is not known but it would appear that the precautions included an unspecified fire resistance period for the concrete structure and steel columns which were protected below the 17th floor and unprotected above that level. [Note from the author: the reason why the steel columns above the 17th floor were not protected is unknown at this time. In the UK, they certainly would have been protected.]

The first alarm was raised at just after 11pm. By about 1.15am the fire had spread to most of the floors above the floor of origin, the 21st, resulting in a 10-storey blaze. Soon afterwards the first chunks of facade started falling off, taking the perimeter bay of the RC slab with it in places. The spread of fire downwards to the remainder of the building was gradual at first, probably due to burning embers dropping through services penetrations, through slab edge openings and through other openings in the concrete slabs caused by core wall expansion.

The fire led to the collapse of virtually all the slab edge bay above 17th floor as well as one internal bay on the north side due, it would appear to the failure of the supporting columns. The transition floor resisted the impact of the partial collapses. Below this level there was substantial structural damage and deformation, but no significant collapse. What is clear is that the concrete perimeter slab could evidently not remain in the place without the support of the steel perimeter and concrete internal columns..

The reason the collapse of one internal bay on the North side supported by concrete columns is not immediately apparent but could be attributable to any of a number of factors: less concrete cover, more intense heat exposure, and the increased likelihood of concrete spalling this would create and/or momentum of adjacent bay collapse, amongst others.

The reduced damage below the 17th floor

Right: The Mercantile Credit Building on fire in Basingstoke.

Below: The building survived a four hour fire with complete burnout on two floors with minimal structural damage.

can be attributed to a function of the more robust structure below this level, the existence of fire protection and a less intense fire due to the more gradual fire spread.

In summary, where the steel frame was fire protected, it survived a complete burnout. Where the columns were not protected, they collapsed, together with some internal concrete columns. This supports evidence from a number of major fires, including the Churchill Plaza fire in Basingstoke, where a protected steel frame survived complete burnout on two floors with little or no structural damage. It also supports the results of the steel construction sectors' own tests.

Over the past twenty years, the sector has conducted a comprehensive programme of testing, research and development on its products in fire far beyond that to which any other framing material has been subjected. This was begun by Corus who carried out over a hundred fire tests on individual beams and columns, and was completed with the Cardington fire tests, a series of seven tests carried out (with the Building Research Establishment) on an eight storey, composite metal deck building between 1994 and 2003. In addition to these, extensive tests on large scale structures were also carried out in Australia, Germany and France. These all added to our knowledge of steel in fire, allowing accurate judgments to be made of failure temperatures and improving our understanding of the role of loading, restraint and thermal deformation in structural behaviour. They also demonstrated that the behaviour of steel in restrained frames is much better than is suggested by tests on single elements of construction, a fact on which UK construction is now beginning to capitalise in its use of advanced structural fire engineering.

This commitment to fire testing extends to new products and variations on existing products. They are all extensively tested. Fire is too serious an issue to rely on broad based assumptions of performance based on similarities with other forms of construction. It is a core principle of the way that the sector operates that all claims regarding fire resistance are extensively supported by testing.

This testing and development of knowledge has been instrumental in diminishing the old concerns which some in the construction industry at one time expressed about steel in fire. It has been a key factor in the year on year increase in the use of steel in multi-storey construction, a rise which has created a virtuous circle as more and more manufacturers of fire protection materials have been tempted into the market. This has created pressure to push down prices, which has improved the economic benefits of steel in construction, which has increased the market share, and so on. The UK steel construction market is now served by a large number of efficient fire protection manufacturers which is one reason why the costs of fire protection are estimated to be less than 30% of what they were in real terms twenty years ago.

New and Revised Codes and Standards

(from BSI Updates June and July 2005)

BS EN PUBLICATIONS

The following are British Standard implementations of the English language versions of European Standards (ENs). BSI has an obligation to publish all ENs and to withdraw any conflicting British Standards or parts of British Standard. This has led to a series of standards, BS ENs using the EN number.
Note: The date referenced in the identifier is the date of the European standard.

BS EN 1991:-
Eurocode 1: Actions on structures
BS EN 1991-1:-
General actions
BS EN 1991-1-4:2005
Wind actions
supersedes DD ENV 1991-1-4:1997

BS EN 1993:-
Eurocode 3: Design of steel structures
BS EN 1993-1:-
General rules
BS EN 1993-1-2-:2005
Structural fire design
supersedes DD ENV 1993-1-2:2001
BS EN 1993-1-1:2005
General rules and rules for buildings
Supersedes DD ENV 1993-1-1:1992
BS EN 1993-1-8:2005
Design of joints
Supersedes DD ENV 1993-1-1:1992
BS EN 1993-1-9:2005
Fatigue
Supersedes DD ENV 1993-1-1:1992
BS EN 1993-1-10:2005
Material toughness and through-thickness properties
Supersedes DD ENV 1993-1-1:1992

BS EN 1998:-
Eurocode 8: Design of structures for earthquake resistance
BS EN 1998-1:2004
General rules, seismic actions and rules for buildings
no current standard is superseded
BS EN 1998-5:2004
Foundations, retaining structures and geotechnical aspects
supersedes DD ENV 1998-5:1996

AMENDMENTS TO BRITISH STANDARDS

BS 8100:-
Lattice towers and masts
BS 8100-1:1986
Code of practice for loading
Amendment 1 AMD 15197

DRAFT BRITISH STANDARDS FOR PUBLIC COMMENT

05/30112697 DC
BS 5400-3 AMD 1 – Steel, concrete and composite bridges. Part 3. Code of practice for design of steel bridges

05/30132585 DC
EN 10083-1 – Steels for quenching and tempering. Part 1. General technical delivery conditions

05/30132598 DC
EN 10083-2 – Steels for quenching and tempering. Part 2. Technical delivery conditions for non-alloy steels

05/30132603 DC
EN 10083-3 – Steels for quenching and tempering. Part 3. Technical delivery conditions for alloy steels

05/30132920 DC
EN 1090-2 – Execution of steel structures and aluminium structures. Part 2. Technical requirements for the execution of steel structures

BUILDINGWITHSTEEL

Football stand for 1966 World Cup Series

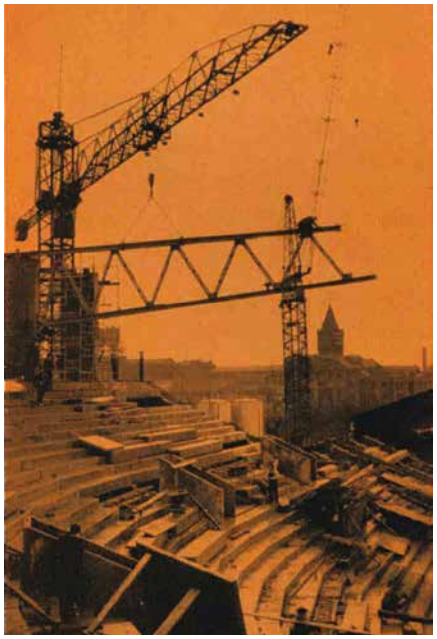
The directors of Manchester United Football Club had for some time been thinking in terms of developing the north side of the ground but it was not until late in 1963 that their architects got a go ahead for a definite scheme.

This was to accommodate 10,500 seats without reducing the capacity of the ground and was achieved by building out over the ground level concourse at the back of the existing terraced bank as far as the boundary wall. As the scheme also included the unique feature of private boxes with rear entrance at the back of the stand and necessitated a cantilever roof it presented a difficult structural problem in the limited space available for counterbalancing the cantilever.

Many structural forms were explored, particular efforts being made to devise a stayed cantilever solution. The lack of space coupled with reversal of forces by wind uplift defeated such a scheme and the form adopted is basically the simplest possible. various materials of construction were considered and several subjected to cost by tender. It became very evident that maximum economy would be achieved by choosing the cheapest and lightest satisfactory roof sheeting – 18 gauge long length aluminium trough section – and designing the roof structure around that.

Initially it was felt that sections of tubular steelwork would prove economical and the

Stages in the erection of the new Stand for Manchester United Football Club.
Below: Twin pairs of channel shear connectors embedded in top of concrete columns.
Right: Lifting the first section of the truss by tower crane.
Far Right Top: Hinge connecting bottom boom to concrete column.
Far Right Bottom: The first quadrant of the Stand sheeted.



first truss design was based on them. Tenders showed, however, that the fabrication, erection and protection factors outweighed the saving in materials and therefore standard steel sections were used instead, with universal columns for the top and bottom booms, starred angles for the latticing members and universal beams for the purlins. Mild steel was adopted in preference to high yield stress steel in order to limit deflections. Welding runs along the main axis have been used for shop connections and high strength friction grip bolts for site fixing. Welds were satisfactorily subjected to radiographic examination. Protection of the steelwork was achieved by blast cleaning followed immediately by weldable zinc rich epoxy priming and later by micaceous iron oxide finishing paint.

The roof decking has been placed at the bottom of the truss for several reasons – compression boom restraint for the natural gravitational condition, internal appearance, easy access for maintaining the majority of the steelwork and natural roof drainage.As wind uplift can almost completely reverse the maximum stress distribution the top boom also required buckling restraint. Locally high wind pressure from gusting is spread by the fascia and two inclined transverse stiffening girders. The fascia also breaks up laminar wind flow and reduces air pressure on the roof.

AD 289
Joints in Steel Construction: Simple Connections (P212) - Corrigendum 1

This advisory desk note (AD289) is the first in a series relating to SCI publication P212. Corrigendum 1 to P212 (which is reproduced below) was originally disseminated in October 2002 but was not issued as an advisory desk note. This note serves to highlight the existence of Corrigendum 1 to those who may have missed it in 2002.

Corrigendum 1 to P212 relates to the tabulated tying capacity values (yellow pages) for fin plate connections with a single vertical line of bolts. Some of the originally tabulated values overstated the connection tying capacity because the check of the horizontal shear capacity of the bolt group was not included. The tabulated tying capacities of connections with two vertical lines of bolts are correct.

Corrected capacity tables, taking account of corrigendum 1 (and corrigendum 2), are available on www.steelbiz.org.

Corrigendum 1 - Tying Capacity of Fin Plate Connections with Single Line of Bolts

The values of tying capacity given in Table H.27 (pages 410 to 414) and Table H.29 (pages 420 to 424) should be amended to values that are the lesser of the tabulated values and the shear capacity of the bolt groups. The shear capacity of the bolt group = $n.P_S$ where n is the number of bolts and P_S is the shear capacity per bolt (= 91.9 kN for M20, grade 8.8 bolt from Table H.49).

The reason for this change is that, as stated in Table H.24, the tabulated tying capacities for fin plate connections were based on the minimum values from Checks 11(i), 11(ii), 12(i) and 12(ii). None of these checks relate to the shear capacity of the bolt group. Where there is a single line of bolts, the shear capacity of the bolt group may be less than the tabulated tying capacity.

When carrying out the full design procedure (in accordance with Section 6.5) an additional check for "structural integrity" should be made for the shear capacity of the bolt group. This additional check, which may be referred to as Check 13, is: Tie force $\leq n.P_S$.

In practice these changes will only be of significance in the unusual case when the tie force is greater than the shear force on the beam.

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AD 290
Joints in Steel Construction: Simple Connections (P212) - Corrigendum 2

This advisory desk note (AD290) is the second in a series relating to SCI publication P212. Corrigendum 2 to P212 (below) is new and has not previously been disseminated.

Corrigendum 2 relates to the tabulated values for (a) shear capacity and (b) minimum support thickness of fin plate connections (Tables H.27 to H.30). The values for (a) and (b) in the published capacity tables (SCI-P212, 2002) are either correct or conservative.

Corrected capacity tables, taking account of corrigendum 2 (and incorporating corrigendum 1), are available on www.steelbiz.org.

Corrigendum 2 – Shear Capacity and Minimum Support Thickness of Fin Plate Connections

(a) Shear capacity of the connection

In some cases the tabulated shear capacity values in P212 (2002) for fin plate connections to S355 beams (Tables H.29 and H.30) should be increased to take full account of the material strength of the beam. The changes should be made when check 2 (bearing of bolts on fin plate or beam web) is quoted as the critical design check. Where the capacity is increased, there will be a corresponding decrease in the maximum notch length.

The reason for this is that even for S355 beams; the tabulated values (P212, 2002) assumed S275 beam strengths for check 2.

(b) Minimum support thickness

The tabulated minimum support thicknesses in P212 (2002), Tables H.27 to H.30 for fin plate connections should be amended. All the changes increase the value of the minimum support thickness.

There are three reasons for the amendment:

Firstly, and most significantly, in the calculation of the minimum support thickness (using check 10) the shear force (F_V) was not divided by two, to allow for the two shear planes either side of the fin plate.

Secondly, the shear force (F_V) was taken as the double notch shear capacity, whereas it should be taken as the un-notched/single notch shear capacity.

Thirdly, some shear capacity values have been amended, as noted in (a) above.

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AD 291
Joints in Steel Construction: Simple Connections (P212) – Supplementary capacity tables for flexible end plates

This advisory desk note (AD291) is the third in a series relating to SCI publication P212.

It has been suggested by some users of SCI publication P212 (2002) that the information given in Tables H.20 and H.21 (pages 387 to 396) could be improved in order to provide further assistance to the designer. The maximum notch length for double notched flexible end plate connections is generally given as zero. A set of supplementary tables has now been produced.

The supplementary tables (pages 387-S to 396-S) give the double notch shear capacity with the corresponding critical design check, based on a standard double notch length, hence eliminating all the zero values in the current tables.

The supplementary tables are available on www.steelbiz.org as part of this advisory desk note.

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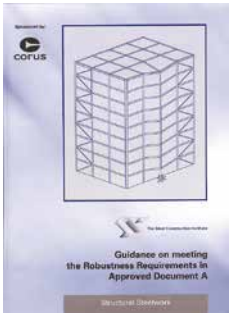

Guidance on meeting the Robustness Requirements in Approved Document A (2004 Edition)
Author: A G J Way
ISBN 1 85942 163 6,
52 pp, A4 paperback,
Jul 2005

REVISED EDITION

Guidance on meeting the Robustness Requirements in Approved Document A (2004 Edition)

"Disproportionate collapse"

The 2004 Amendments to the Building Regulations (for England and Wales) include important changes to Part A (Structure). The changes mean that since 1 December 2004 all buildings must be designed to avoid disproportionate collapse. The 2004 edition of Approved Document A, which accompanies the Building Regulations, specifies four distinct classes of building each of which must have a different set of structural provisions for the prevention of disproportionate collapse.

This new publication from the SCI provides designers of steel framed buildings with the necessary guidance to enable them to ensure compliance with the disproportionate collapse requirements of the revised regulations. The reader of the publication is guided through the revised regulations and Approved Document A with each requirement, and how to satisfy it, explained in detail.

The publication includes sections on:

- Building classification including non-standard cases such as mixed use
- The regulatory requirements for each building class
- Practical details for meeting the requirements of each building class
- Design guidance for each building class including which clauses of BS 5950-1:2000 are applicable.

A worked example demonstrating the design calculations required for a Class 2B building is included.

PRICES: Non-member £30. Member £15 (plus P&P)

Mini piles and composite ground floors for housing
Authors: A R Biddle and M T Gorgolewski
ISBN 1 85942 152 0, 96 pp,
A4 paperback, Jul 2005

NEW BOOK

Mini-piles and composite ground floors for housing

This publication explains the advantages of the use of mini piles and composite ground-floor slabs in housing construction. It offers cheaper and reliable options particularly on poor ground or 'brownfield' sites". It can minimise excavation, avoid spoil to tip and landfill tax. Also, the advent of climate change with periodic droughts and floods can badly affect supporting soils and this requires changes to traditional methods of house foundations to prevent structural damage; mini-piling provides a more reliable foundation.

A new generic type of suspended ground-floor construction for housing comprising a composite light gauge steel decking with concrete slab topping is described. This offers many potential benefits for house building (particularly on 'brownfield' sites).

The composite ground floor is suitable for support to all types of wall construction and can be used equally well on strip footings or mini-pile foundations. The light steel edge beams provide the accurate template required for internal timber or light steel wall frames to minimise fitting time and eliminate rework. The floated slab surface will accept floor finishes directly and thermal insulation can be easily fitted beneath the floor, thus avoiding the cost of floor screeds and damp proof membranes (dpms).

A research study, contributed by BRE on the geotechnical design rules for mini-piles. Advice on the design of mini-piles to cater for shallow heave and subsidence effects in swelling and shrinking clays is also included.
It is hoped that this guide will help builders and specifiers to become more familiar with mini piling methods and to encourage their use.

PRICES: Non-member £45 Member £22.50 (plus P&P)

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For detailed information and programmes for all courses please see www.steel-sci.org/courses

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Curved Steel - Angle Ring	**22 Sep 05**	**Tipton**
BS 6399	**5 Oct 05**	**London**
Composite design	**12 Oct 05**	**Manchester**
Designing connections	**13 Oct 05**	**Southampton**
Disproportionate collapse and the revised building regulations	**18 Oct 05**	**Swindon**
Floor Vibrations	**26 Oct 05**	**London**
Steel in Construction	**27 Oct - 1 Dec 05**	**Bristol, Sheffield Southampton**

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To register for any of these seminars contact: Janice Radford Tel: +44(0)1724 404863 or email: janice.radford@corusgroup.com

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Fire Engineering	**27 Sep 05**	**Manchester**
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Steel: The Show	**12 Oct 05**	**Durham**
Steel: The Show (with optional steelworks tour)	**19 Oct 05**	**Scunthorpe**

The British Constructional Steelwork Association Ltd

You can find out email and website addresses for all these companies at www.steelconstruction.org

BCSA is the national organisation for the construction industry; its member companies undertake the design, fabrication and erection for all forms of construction in building and civil engineering. Associate Members are those principal companies involved in the purchase, design or supply of components, materials, services etc, related to the industry. Corporate Members are clients, professional offices, educational establishments etc, which support the development of national specifications, health and safety, quality, fabrication and erection techniques, overall industry efficiency and good practice. The principal objectives of the association are to promote the use of structural steelwork; to assist specifiers and clients; to ensure that the capabilities and activities of the industry are widely understood; and to provide members with professional services in technical, commercial and quality assurance matters.

Details of BCSA Membership and services are available from: Gillian Mitchell MBE, Deputy Director General, British Constructural Steelwork Association Ltd, 4 Whitehall Court, Westminster, London SW1A 2ES. **Tel** 020 7839 8566 **Fax** 020 7976 1634

KEY

Categories
- **A** All forms of building steelwork
- **B*** Bridgework
- **C** Heavy industrial plant structures
- **D** High rise buildings
- **E** Large span portals
- **F** Medium/small span portals and medium rise buildings
- **H** Large span trusswork
- **J** Major tubular steelwork
- **K** Towers
- **L** Architectural metalwork
- **M** Frames for machinery, supports for conveyors, ladders and catwalks
- **N** Grandstands and stadia
- **S** Small fabrications

Quality Assurance Certification
- **Q1** Steel Construction Certification Scheme Ltd
- **Q2** BSI
- **Q3** Lloyd's
- **Q4** Other

Classification Contract Value
- **10** Up to £40,000
- **9** Up to £100,000
- **8** Up to £200,000
- **7** Up to £400,000
- **6** Up to £800,000
- **5** Up to £1,400,000
- **4** Up to £2,000,000
- **3** Up to £3,000,000
- **2** Up to £4,000,000
- **1** Up to £6,000,000
- **0** Above £6,000,000

Notes
1. Applicants may be registered in one or more categories to undertake the fabrication and the responsibility for any design and erection of the above.
2. Where an asterisk (*) appears against any company's classification number, this indicates that the assets required for this classification are those of the parent company.

* For details of bridgework sub-categories contact Gillian Mitchell at the BCSA.

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PENCRO STRUCTURAL ENGINEERING LTD (Q4)
Orpinsmill Road, Ballyclare, Co. Antrim BT39 0SX
Tel 028 9335 2886 **Fax** 028 9332 4117

QMEC LTD
Quarry Road, Bolsover, Nr Chesterfield S44 6NT
Tel 01246 822228 **Fax** 01246 827907

RSL (SOUTH WEST) LTD (E F H M 6)
Millfield Industrial Est., Chard,
Somerset TA20 2BB
Tel 01460 67373 **Fax** 01460 61669

JOHN REID & SONS (STRUCSTEEL) LTD (A 1)
296-298 Reid Sreet, Christchurch BH23 2BT
Tel 01202 483333 **Fax** 01202 499763

REMNANT ENGINEERING LTD
Unit 161, Lydney Industrial Estate, Harbour Road,
Lydney, Gloucestershire GL15 4EJ
Tel 01594 841160 **Fax** 01594 843208

RIPPIN LTD
Thistle Ind. Est., Church Street,
Cowdenbeath KY4 8LP
Tel 01383 518610 **Fax** 01383 513099

ROBERTS ENGINEERING
16D Bergen Way, Sutton Fields Ind. Est.,
Hull HU7 0YQ
Tel 01482 838240 **Fax** 01482 830697

J. ROBERTSON & CO LTD (L M S 9)
Mill Lane, Walton-on-Naze CO14 8PE
Tel 01255 672855 **Fax** 01255 850487

ROBINSON CONSTRUCTION (C D E F H 1 Q1)
Wincanton Close, Ascot Drive Industrial Estate,
Derby DE24 8NJ
Tel 01332 574711 **Fax** 01332 861401

ROWECORD ENGINEERING LTD (A B 0 Q1)
Neptune Works, Uskway, Newport,
South Wales NP20 2SS
Tel 01633 250511 **Fax** 01633 253219

ROWEN STRUCTURES LTD (A 1)
Fulwood Road (South),
Sutton-in-Ashfield, Notts NG17 2JW
Tel 01623 558558 **Fax** 01623 440404

S H STRUCTURERS LTD
Moor Lane Trading Estate, Sherburn-in-Elmet, North
Yorkshire LS25 6ES
Tel 01977 681931 **Fax** 01977 681930

SELWYN CONSTRUCTION ENGINEERING LTD
Tarron Road, Tarron Industrial Estate, Moreton, Wirral
CH46 4TU
Tel 0151 678 0236 **Fax** 0151 678 8959

SEVERFIELD-REEVE STRUCTURES LTD (A 0* Q2)
Dalton Airfield Industrial Estate, Dalton, Thirsk, North
Yorkshire YO7 3JN
Tel 01845 577896 **Fax** 01845 577411

SHIPLEY FABRICATIONS LTD
Maddocks Park, Ancaster, Grantham,
Lincs NG32 3PL
Tel 01400 231115 **Fax** 01400 231220

SNASHALL STEEL FABRICATIONS CO LTD
Pulham Business Park, Pulham,
nr Dorchester, Dorset DT2 7DX
Tel 01300 345588 **Fax** 01300 345533

SOUTH DURHAM STRUCTURES LTD
South Church Enterprise Pk, Dovecot Hill, Bishop
Auckland, Co. Durham DL14 6XR
Tel 01388 777350 **Fax** 01388 775225

TAYLOR & RUSSELL LTD
Stonebridge Mill, Longridge PR3 3AQ
Tel 01772 782295 **Fax** 01772 785341

THE AA GROUP LTD
Priorswood Place, East Pimbo,
Skelmersdale, Lancs WN8 9QB
Tel 01695 50123 **Fax** 01695 50133

TRADITIONAL STRUCTURES LTD
(E F H J K M N 6 Q1)
Findel Works, Landywood Lane, Cheslyn Hay, Walsall,
West Midlands WS6 7AJ
Tel 01922 414172 **Fax** 01922 410211

TUBECON
Badminton Road, Yate, Bristol BS17 5HX
Tel 01454 314201 **Fax** 01454 273029

WARLEY CONSTRUCTION COMPANY LTD
Swinborne Road, Burnt Mills Industrial Estate,
Basildon, Essex SS13 1LD
Tel 01268 726060 **Fax** 01268 725285

WALTER WATSON LTD (Q4)
Greenfield Works, Ballylough Rd, Castlewellan,
Co Down BT31 9JQ
Tel 028 4377 8711 **Fax** 028 4377 2050

WATSON STEEL STRUCTURES LTD (A B 0* Q1)PO
Box 9, Lostock Lane, Bolton BL6 4TB
Tel 01204 699999 **Fax** 01204 694543

WESTBURY PARK ENGINEERING LTD
Brook Lane, Westbury, Wilts BA13 4ES
Tel 01373 825500 **Fax** 01373 825511

WESTOK LTD (Q2)
Horbury Junction Ind Est, Horbury Junction, Wakefield
WF4 5ER
Tel 01924 264121 **Fax** 01924 280030

JOHN WICKS & SON LTD
Unit 1, Crabbers Cross, Rattery,
South Brent, Devon TQ10 9JZ
Tel 01364 72907 **Fax** 01364 73054

WIG ENGINEERING LTD
Barnfield, Akeman Street,
Chesterton, Oxon OX26 1TE
Tel 01869 320515 **Fax** 01869 320513

H. YOUNG STRUCTURES LTD (C E F H J N 6)
Ayton Road, Wymondham, Norfolk NR18 0RD
Tel 01953 601881 **Fax** 01953 607842

ASSOCIATE MEMBERS

BUILDING COMPONENTS

ALBION SECTIONS LTD (Q4)
Albion Rd, West Bromwich,
West Midlands B70 8BD
Tel 0121 553 1877 **Fax** 0121 553 5507

AYRSHIRE METAL PRODUCTS
(DAVENTRY) LTD (Q1)
Royal Oak Way, Daventry NN11 5NR
Tel 01327 300990 **Fax** 01327 300885

BARNSHAW PLATE BENDING CENTRE LTD
Corporation Rd, Audenshaw,
Manchester M34 5LR
Tel 0161 320 9696 **Fax** 0161 335 0918

CELLBEAM LTD
Unit 516, Thorp Arch Estate, Wetherby,
West Yorkshire LS23 7DB
Tel 01937 840614 **Fax** 01937 840608

CORUS PANELS & PROFILES (Q1)
Severn Drive, Tewkesbury Business Park, Tewksbury,
Glos GL20 8TX
Tel 01684 856600 **Fax** 01684 856601

FABSEC LTD
Brooklands Court, Tunstall Road, Leeds LS11 5HL
Tel 0113 385 7830 **Fax** 0113 272 7587

HI–SPAN LTD
Ayton Rd, Wymondham NR18 0RD
Tel 01953 603081 **Fax** 01953 607842

KINGSPAN METL-CON LTD (Q4)
Sherburn, Malton, N. Yorkshire YO17 8PQ
Tel 01944 712000 **Fax** 01944 710555

RICHARD LEES STEEL DECKING LTD
Moor Farm Rd West, The Airfield, Ashbourne,
Derbyshire DE6 1HD
Tel 01335 300999 **Fax** 01335 300888

MSW STRUCTURAL FLOOR SYSTEMS
Acton Grove, Long Eaton, Nottingham NG10 1FY
Tel 0115 946 2316 **Fax** 0115 946 2278

METSEC PLC (Q2)
Broadwell Rd, Oldbury, West Mids B69 4HE
Tel 0121 601 6000 **Fax** 0121 601 6181

STRUCTURAL METAL DECKS LTD
Mallard Hse, Christchurch Rd, Ringwood BH24 3AA
Tel 01425 471088 **Fax** 01425 471408

STRUCTURAL SECTIONS LTD (Q1)
PO Box 92, Downing St,
Smethwick, Warley B66 2PA
Tel 0121 555 1342 **Fax** 0121 555 1341

STUDWELDERS LTD
Millennium Hse, Severn Link Distribution Centre,
Newhouse Farm Ind Est, Chepstow, Monmouthshire
NP16 6UN
Tel 01291 626048 **Fax** 01291 629979

COMPUTER SOFTWARE

ACECAD SOFTWARE LTD
Truro House, Stephenson's Way,
Wyvern Business Park, Derby DE21 6LY
Tel 01332 545800 **Fax** 01332 545801

COMPUTER SERVICES CONSULTANTS (UK) LTD
Yeadon House, New St, Pudsey, Leeds, LS28 8AQ
Tel 0113 239 3000 **Fax** 0113 236 0546

PSYCLE INTERACTIVE LTD
The Stable House, Whitewell, Whitchurch, Shropshire
SY13 3AQ
Tel 01948 780120 **Fax** 08701 640156

RAM INTERNATIONAL (EUROPE) LTD
4 Woodside Place, Glasgow G3 7QF
Tel 0141 353 5168 **Fax** 0141 353 5112

TEKLA (UK) LTD
Tekla House, Cliffe Park Way,
Morley, Leeds LS27 0RY
Tel 0113 307 1200 **Fax** 0113 307 1201

DESIGN SERVICES

ARRO-CAD LTD
Bretby Business Park, Ashby Road,
Bretby, Burton-on-Trent DE15 0YZ
Tel 01283 558206 **Fax** 01283 558207

ODDA DESIGN LTD
The White House, Clifton Marine Parade, Imperial
Business Park, Gravesend, Kent DA11 0DY
Tel 01474 352849 **Fax** 01474 359116

STEEL PRODUCERS

CORUS CONSTRUCTION & INDUSTRIAL
Frodingham House, PO Box 1,
Brigg Road, Scunthorpe DN16 1BP
Tel 01724 404040 **Fax** 01724 404229

CORUS TUBES
PO Box 101, Weldon Rd, Corby,
Northants NN17 5UA
Tel 01536 402121

MANUFACTURING EQUIPMENT

FICEP (UK) LTD
10 The Courtyards, Victoria Park, Victoria Road,
Leeds LS14 2LB
Tel 0113 265 3921 **Fax** 0113 265 3913

KALTENBACH LTD
6-8 Brunel Road, Bedford MK41 9TJ
Tel 01234 213201 **Fax** 01234 351226

PEDDINGHAUS CORPORATION UK LTD
Unit 6, Queensway Link,
Stafford Park 17, Telford TF3 3DN
Tel 01952 200377 **Fax** 01952 292877

VOORTMAN UK LTD
Unit 8, Mercian Park, Felspar Rd,
Amington Rd, Tamworth B77 4DP
Tel 01827 63300 **Fax** 01827 65565

PROTECTIVE SYSTEMS

AMERON INTERNATIONAL
Blackwell Road, Huthwaite,
Sutton in Ashfield, Notts NG17 2RL
Tel 01623 511000 **Fax** 01623 559616

FORWARD PROTECTIVE COATINGS LTD
Vernon St., Shirebrook, Mansfield,
Notts NG20 8SS
Tel 01623 748323 **Fax** 01623 748730

INTERNATIONAL PAINT LTD
Protective Coatings, Stoneygate Lane, Felling,
Gateshead NE10 0JY
Tel 0191 469 6111 **Fax** 0191 495 0676

LEIGH'S PAINTS
Tower Works, Kestor Street, Bolton BL2 2AL
Tel 01204 521771 **Fax** 01204 382115

SITE COAT SERVICES LTD
Unit 11, Old Wharf Road, Grantham,
Lincolnshire NG31 7AA
Tel 01476 577473 **Fax** 01476 577642

JACK TIGHE LTD
Kirk Sandall Ind. Est., Kirk Sandall,
Doncaster DN3 1QR
Tel 01302 880360 **Fax** 01302 880370

WEDGE GROUP GALVANIZING
c/o Worksop Galvanizing Claylands Avenue,Worksop,
Notts S81 7BQ
Tel 01909 486384 **Fax** 01909 482540

SAFETY SYSTEMS

EASI-EDGE
Ollerton Rd, Tuxford, Newark, Notts NG22 0PQ
Tel 01777 870901 **Fax** 01777 870524

STEEL STOCKHOLDERS

ADVANCED STEEL SERVICES LTD
South Ribble Industrial Estate, Capitol Way,
Preston, Lancs PR5 4AJ
Tel 01772 259822 **Fax** 01772 259561

ASD METAL SERVICES – EDINBURGH
24 South Gyle Crescent,
Edinburgh EH12 9EB
Tel 0131 459 3200 **Fax** 0131 459 3266

ASD METAL SERVICES – BODMIN
Unit 13, Cooksland Ind. Est.,
Bodmin, Cornwall PL31 2PZ
Tel 01208 77066 **Fax** 01208 77416

ASD METAL SERVICES – LONDON
Thames Wharf, Dock Road, London E16 1AF
Tel 020 7476 9444 **Fax** 020 7476 0239

ASD METAL SERVICES – CARLISLE
Unit C, Earls Way, Kingsmoor Park Central, Kingstown,
Cumbria CA6 4SE
Tel 01228 674766 **Fax** 01228 674197

ASD METAL SERVICES – HULL
Gibson Lane, Melton, North Ferriby,
East Riding of Yorkshire HU14 3HX
Tel 01482 633360 **Fax** 01482 633370

ASD METAL SERVICES – GRIMSBY
Estate Road No. 5, South Humberside Industrial
Estate, Grimsby DN31 2TX
Tel 01472 353851 **Fax** 01472 240028

ASD METAL SERVICES – BIDDULPH
PO Box 2, Tunstall Road, Biddulph,
Stoke-on-Trent, Staffs ST8 6JZ
Tel 01782 515152 **Fax** 01782 522240

ASD METAL SERVICES – DURHAM
Drum Road, Drum Industrial Estate,
Chester-le-Street, Co. Durham DH2 1ST
Tel 0191 492 2322 **Fax** 0191 410 0126

ASD METAL SERVICES – CARDIFF
East Moors Road, Cardiff CF1 5SP
Tel 029 2046 0622 **Fax** 029 2049 0105

ASD METAL SERVICES – STALBRIDGE
Station Rd, Stalbridge, Dorset DT10 2RW
Tel 01963 362646 **Fax** 01963 363260

ASD METAL SERVICES – NORFOLK
Hamlin Way, Kings Lynn, Norfolk PE30 4LQ
Tel 01553 761431 **Fax** 01553 692394

ASD METAL SERVICES – EXETER
Sidmouth Road, Clyst St Mary, Exeter EX5 1AD
Tel 01395 233366 **Fax** 01395 233367

ASD METAL SERVICES – DAVENTRY
Royal Oak Ind. Est., Daventry,
Northants NN11 5QQ
Tel 01327 876021 **Fax** 01327 87612

ASD METAL SERVICES – TIVIDALE
Tipton Road, Tividale, Oldbury,
West Midlands B69 3HU
Tel 0121 520 1231 **Fax** 0121 520 5664

AUSTIN TRUMANNS STEEL LTD
Moss Lane, Walkden, Manchester M28 5NH
Tel 0161 790 4821 **Fax** 0161 799 0411

BARRETT STEEL SERVICES LTD
Barrett House, Cutler Heights Lane, Dudley Hill,
Bradford BD4 9HU
Tel 01274 682281 **Fax** 01274 651205

BROWN MCFARLANE LTD
Ladywell Works, New Century Street, Hanley, Stoke-
on-Trent ST1 5QH
Tel 01782 289909 **Fax** 01782 289804

CORUS SERVICE CENTRE
Farnigham Road Station, South Darenth,
nr Dartford DA4 9LD
Tel 01322 227272 **Fax** 01322 864893

CORUS SERVICE CENTRE
Badminton Rd Trading Est., Yate,
Bristol BS37 5JU
Tel 01454 315314 **Fax** 01454 325181

CORUS SERVICE CENTRE
Spittlegate Industrial Estate, Grantham,
Lincolnshire NG31 7UP
Tel 01476 565522 **Fax** 01476 562459

CORUS SERVICE CENTRE
Blackamore Road, Walker Industrial Estate,
Guide, Blackburn BB1 2LJ
Tel 01254 55161 **Fax** 01254 670836

CORUS SERVICE CENTRE
South Street, Glasgow G14 0BX
Tel 0141 959 1212 **Fax** 0141 959 0111

CORUS SERVICE CENTRE
Moira Rd, Lisburn, Co. Antrim BT28 2SN
Tel 01846 660747 **Fax** 01846 660748

CORUS SERVICE CENTRE
Wakefield Rd, Stourton, Leeds LS10 1AY
Tel 0113 276 0660 **Fax** 0113 272 4418

CORUS SERVICE CENTRE
The Steelpark, Steelpark Way, Wednesfield,
Wolverhampton WV11 3BR
Tel 01902 484000 **Fax** 01902 484041

DUDLEY IRON & STEEL CO LTD
Unit 8, Autobase Industrial Estate, Tipton Road,
Tividale, West Midlands B69 3HU
Tel 0121 601 5000 **Fax** 0121 601 5001

NATIONAL TUBE STOCKHOLDERS LTD
Dalton Industrial Estate, Dalton, Thirsk,
North Yorkshire YO7 3HE
Tel 01845 577440 **Fax** 01845 577165

NEWTON STEEL STOCK LTD
Landshire Lane, Gibbs Marsh Trading Estate,
Henstridge, Somerset BA8 0TN
Tel 01963 365028 **Fax** 01963 365034

RAINHAM STEEL CO LTD
Kathryn House, Manor Way,
Rainham, Essex RM13 8RE
Tel 01708 522311 **Fax** 01708 559024

STEELSTOCK (BURTON ON TRENT) LTD
Ryder Close, Cadley Hill Road, Swadlincote,
Derbyshire DE11 9EU
Tel 01283 226161 **Fax** 01283 550406

STRUTHERS & CARTER LTD
Erimus Works, Valletta Street,
Hedon Road, Hull HU9 5NU
Tel 01482 795171 **Fax** 01482 786186

STRUCTURAL FASTENERS

THOMAS WILLIAM LENCH LTD
P O Box 31, Excelsior Works, Carnegie Road, Rowley
Regis, West Mids B65 8BZ
Tel 0121 559 1530 **Fax** 0121 559 3920

CORPORATE MEMBERS

BALFOUR BEATTY POWER NETWORKS LTD
Tel 01332 661491

GRIFFITHS & ARMOUR
Tel 0151 236 5656

HIGHWAYS AGENCY
Tel 08457 504030

ROGER POPE ASSOCIATES
Tel 01752 263636

The Register of Qualified Steelwork Contractors

BUILDINGS SCHEME

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

A All forms of steelwork (C-N inclusive)
C Heavy industrial plant structures
D High rise buildings
E Large span portals
F Medium/small span portals and medium rise buildings
H Large span trusswork
J Major tubular steelwork
K Towers
L Architectural metalwork
M Frames for machinery, supports for conveyors, ladders and catwalks
N Grandstands and stadia
S Small fabrications

Company Name	Telephone	A	C	D	E	F	H	J	K	L	M	N	S	QA	Contract Value (1)
ACL Structures Ltd	01258 456051				●	●	●				●				Up to £2,000,000
Adstone Construction Ltd	01905 794561														In process of audit
Atlas Ward Structures Ltd	01944 710421	●	●	●	●	●	●	●	●	●	●			●	Up to £6,000,000*
B D Structures Ltd	01942 817770			●	●	●	●								Up to £1,400,000*
B & K Steelwork Fabrications Ltd	01773 853400		●		●	●	●	●	●		●			●	Up to £4,000,000*
A C Bacon Engineering Ltd	01953 850611				●	●	●								Up to £800,000
Ballykine Structural Engineers Ltd	028 9756 2560				●	●	●	●				●		●	Up to £2,000,000
Barrett Steel Buildings Ltd	01274 682281				●	●	●							●	Up to £6,000,000
Billington Structures Ltd	01226 340666	●	●	●	●	●	●	●	●	●	●	●		●	Up to £6,000,000
Bison Structures Ltd	01666 502792			●	●	●	●							●	Up to £2,000,000
Border Steelwork Structures Ltd	01228 548744		●		●	●	●	●				●			Up to £800,000
Bourne Steel Ltd	01202 746666	●	●	●	●	●	●	●	●	●	●	●		●	Up to £6,000,000
Briton Fabricators Ltd	0115 963 2901		●			●	●	●	●	●	●			●	Up to £800,000
CTS Ltd	01484 606416						●	●							Up to £800,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●	●	●	●	●	●		●	Above £6,000,000*
Compass Engineering Ltd	01226 298388		●		●	●	●		●						Up to £2,000,000
Leonard Cooper Ltd	0113 270 5441		●			●	●		●		●			●	Up to £800,000
Curtis Engineering Ltd	01373 462126					●									Up to £400,000
Frank H Dale Ltd	01568 612212			●	●	●								●	Up to £4,000,000
Dew Construction Ltd (Fabrication Division)	0161 624 5631				●	●	●		●					●	Up to £800,000
EAGLE Structural Ltd	01507 450081				●	●	●	●		●					Up to £400,000
Elland Steel Structures Ltd	01422 380262		●	●	●	●	●		●			●		●	Up to £4,000,000
Emmett Fabrications Ltd	01274 597484				●	●	●								Up to £800,000
EvadX Ltd	01745 336413				●	●	●	●		●	●	●		●	Up to £1,400,000
Fairfield-Mabey Ltd	01291 623801	●	●	●	●	●	●	●	●	●	●	●		●	Above £6,000,000*
Fisher Engineering Ltd	028 6638 8521	●	●	●	●	●	●	●	●	●	●	●		●	Up to £6,000,000
Glentworth Fabrications Ltd	0118 977 2088					●	●	●	●	●	●	●		●	Up to £2,000,000
Graham Wood Structural Ltd	01903 755991	●	●	●	●	●	●	●	●	●	●	●			Up to £2,000,000
D A Green & Sons Ltd	01406 370585				●	●	●	●						●	Up to £3,000,000
William Hare Ltd	0161 609 0000	●	●	●	●	●	●	●	●	●	●	●		●	Above £6,000,000
Harland & Wolff Heavy Industries Ltd	028 9045 8456		●		●	●	●	●	●	●	●			●	Up to £6,000,000
James Bros (Hamworthy) Ltd	01202 673815				●	●	●	●				●		●	Up to £2,000,000
James Killelea & Co Ltd	01706 229411		●	●	●	●	●					●			Up to £6,000,000*
Meldan Fabrications Ltd	01652 632075		●		●	●	●	●	●		●			●	Up to £2,000,000
Mifflin Construction Ltd	01568 613311			●	●	●	●				●				Up to £2,000,000
Harold Newsome Ltd	0113 257 0156				●	●	●								Up to £1,400,000
Normanby Wefco Ltd	01724 875555		●						●		●			●	Up to £800,000
Oswestry Industrial Buildings Ltd	01691 661596				●	●	●		●		●				Up to £400,000
Quantrill Steel Ltd	01953 881853				●	●	●	●		●	●			●	Up to £40,000
RSL (South West) Ltd	01460 67373				●	●	●				●				Up to £800,000
John Reid & Sons (Strucsteel) Ltd	01202 483333	●	●	●	●	●	●	●	●	●	●	●			Up to £6,000,000
J Robertson & Co Ltd	01255 672855									●	●		●		Up to £100,000
Robinson Construction	01332 574711		●	●	●	●	●							●	Up to £6,000,000
Roll Formed Fabrications Ltd	028 7963 1631				●	●	●	●		●	●	●		●	Up to £800,000
Rowecord Engineering Ltd	01633 250511	●	●	●	●	●	●	●	●	●	●	●		●	Above £6,000,000
Rowen Structures Ltd	01623 558558	●	●	●	●	●	●	●	●	●	●	●			Up to £6,000,000
SIAC Butlers Steel Ltd	00 353 502 23305		●	●	●	●	●	●				●		●	Up to £6,000,000
Severfield-Reeve Structures Ltd	01845 577896	●	●	●	●	●	●	●	●	●	●	●		●	Above £6,000,000*
Henry Smith (Constructional Engineers) Ltd	01606 592121		●	●	●	●	●	●							Up to £2,000,000
Traditional Structures Ltd	01922 414172				●	●	●	●	●		●	●		●	Up to £800,000
Watson Steel Structures Ltd	01204 699999	●	●	●	●	●	●	●	●	●	●	●		●	Above £6,000,000*
Webcox Engineering Ltd	01249 813225				●	●	●				●				Up to £400,000
H Young Structures Ltd	01953 601881		●		●	●	●	●				●			Up to £800,000

Notes (') Contracts which are primarily steel but which may include associated works. The steelwork contract for which a company is pre-qualified for 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.

RQSC
The Register of Qualified Steelwork Contractors Scheme

BRIDGEWORKS SCHEME

Based on evidence from the company's resources and portfolio of experience, the Subcategories that can be awarded are as follows:

FG Footbridges and sign gantries
PT Plate girders [>900mm deep], trusswork [>20m long]
BA Stiffened complex platework in decks, box girders, arch boxes.
CM Cable stayed bridges, suspension bridges, other major structures [>100m]
MB Moving bridges
RF Bridge refurbishment
X Unclassified

Applicants may be registered in more than one sub-category.

Company Name	Telephone	FG	PT	BA	CM	MB	RF	X	Contract Value (1)
Allerton Engineering Ltd	01609 774471	●	●	●	●	●	●		Up to £1,400,000*
Briton Fabricators Ltd	0115 963 2901	●	●	●			●		Up to £800,000
Butterley Ltd	01773 573573	●	●	●	●	●	●		Up to £3,000,000*
CTS Ltd	01484 606416	●	●		●	●			Up to £800,000
Cleveland Bridge UK Ltd	01325 381188	●	●	●	●	●	●		Above £6,000,000*
Fairfield-Mabey Ltd	01291 623801	●	●	●	●	●	●		Above £6,000,000*
Harland & Wolff Heavy Industries Ltd	028 9045 8456	●	●	●	●		●		Up to £6,000,000
Interserve Project Services Ltd	0121 344 4888						●		Above £6,000,000
Interserve Project Services Ltd	020 8311 5500		●	●		●	●		Up to £400,000*
Mandall Engineering Ltd	0114 243 0001	●	●	●	●	●	●		Up to £800,000*
Meldan Fabrications Ltd	01652 632075	●	●	●	●	●	●		Up to £2,000,000
'N' Class Fabrication Ltd	01733 558989	●	●	●		●	●		Up to £1,400,000
Normanby Wefco Ltd	01724 875555	●	●	●			●		Up to £800,000
Nusteel Structures Ltd	01303 268112	●	●	●	●				Up to £2,000,000*
Rowecord Engineering Ltd	01633 250511	●	●	●	●	●	●		Above £6,000,000
Taylor & Sons Ltd	029 2034 4556	●	●	●	●	●	●		Up to £800,000
Watson Steel Structures Ltd	01204 699999	●	●	●	●	●	●		Above £6,000,000*

Notes (') Contracts which are primarily steel but which may include associated works. The steelwork contract for which a company is pre-qualified for 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.

SCI Members

The Steel Construction Institute

The Steel Construction Institute develops and promotes the effective use of steel in construction. It is an independent, membership-based organisation. Membership is drawn from all sectors of the construction industry; this provides beneficial contacts both within the UK and internationally. Its corporate members enjoy access to unique expertise and free practical advice which contributes to their own efficiency and profitability. They also recieve an initial free copy of most SCI publications, and discounts on subsequent copies and on courses. Its multi-disciplinary staff of 45 skilled engineers and architects is available to provide technical advice to members on steel construction in the following areas:

- Technical Support for Architects
- Bridge Engineering
- Building Interfaces
- Civil Engineering
- Codes and Standards
- Composite Construction
- Connections
- Construction Practice
- Corrosion Protection
- Fabrication
- Health & Safety — best practice
- Information Technology
- Fire Engineering
- Light Steel and Modular Construction
- Offshore Hazard Engineering
- Offshore Structural Design
- Piling and Foundations
- Specialist Analysis
- Stainless Steel
- Steelwork Design
- Sustainability
- Vibration

Details of SCI Membership and services are available from:
Pat Ripley, Membership Manager, The Steel Construction Institute, Silwood Park, Ascot, Berks.
Telephone: +44 (0)1344 623345 Fax: +44 (0)1344 622944
Email: pat.ripley@steel-sci.com Website: www.steel-sci.com

The Steel Construction Institute Institute would like to welcome the following new Corporate Members:

IRELAND
T J O'Connor & Associates

UK
ACE (Leicester)
DGT Steel & Cladding Ltd*
* BCSA Members

All full members of the BCSA are automatically members of the SCI. Their contact details are listed on the BCSA Members pages

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