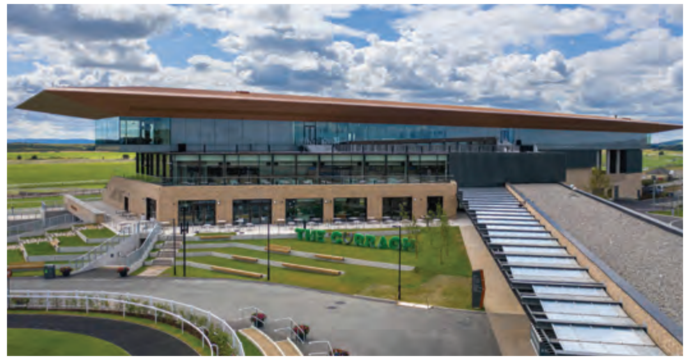

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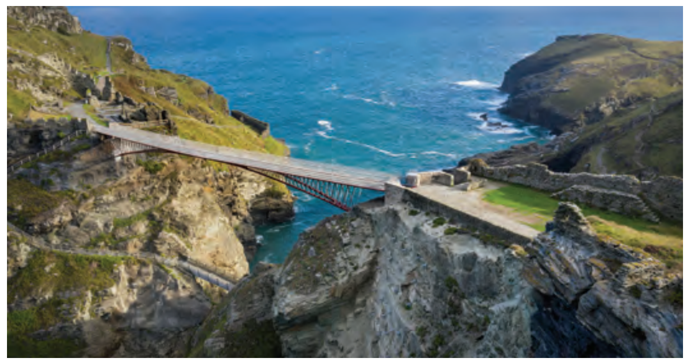

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Introduction

In their 52nd year, the Structural Steel Design Awards continue to shine a spotlight on quality

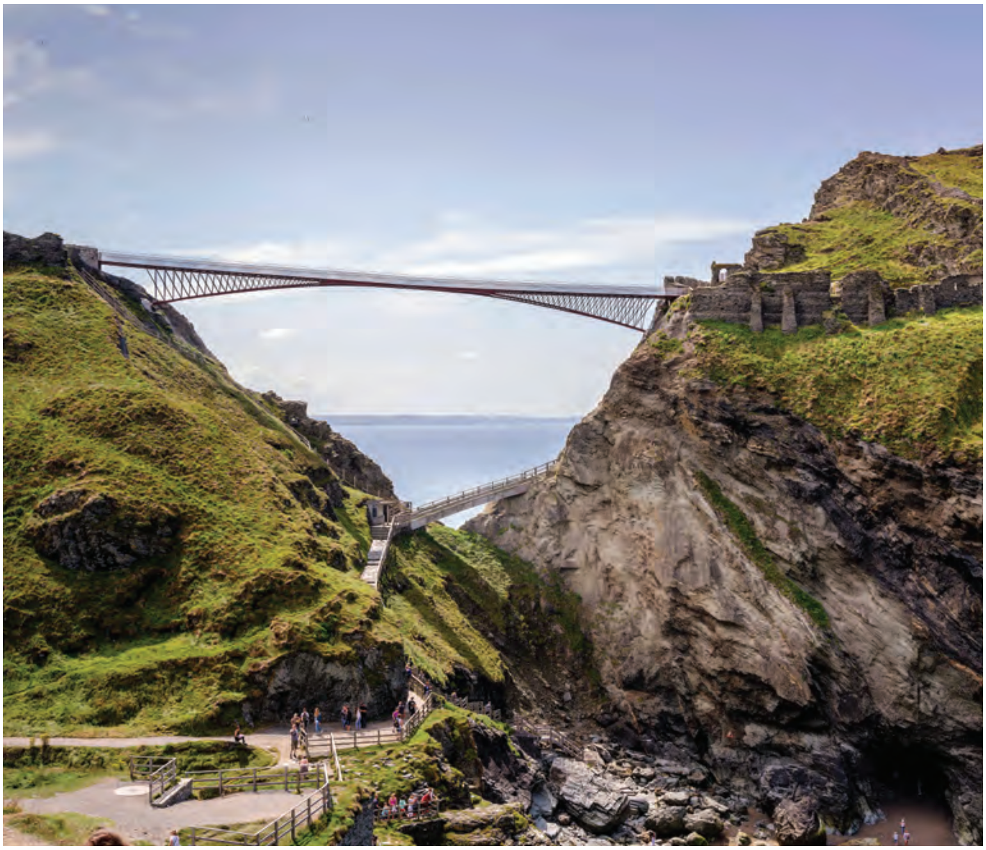
Over the years, the Structural Steel Design Awards (SSDA) have highlighted and rewarded many of the best examples of excellence, ambition and innovation in our built environment. Now celebrating their 52nd year, the 2020 Awards, jointly sponsored by the British Constructional Steelwork Association and Trimble Solutions (UK) Ltd, continue that great tradition. This year's collection of entries demonstrate UK excellence in steel fabrication, design and construction.

Once again, there has been a high number of quality entries and this year there are a wide variety of projects entered. Scales of entry ranged from sports grandstands, through prestige office buildings, to smaller educational and leisure projects and spectacular footbridges.

Twenty-two projects made the shortlist, from which the judges presented six awards, six commendations and two merits. Due to covid-19 restrictions, there was no gala presentation this year, while the judging panel, who normally visit the shortlisted entries, had to interview project team members via Microsoft Teams and Zoom.

The SSDA's cross-industry judging panel comprises: chairman Chris Nash, Bill Taylor and Oliver Tyler representing the Royal Institute of British Architects; Richard Barrett representing the steelwork contracting industry; Paul Hulme representing the Institution of Civil Engineers; and Sarah Pellereau, Professor Roger Plank and Julia Ratcliffe representing the Institution of Structural Engineers.

MAIN PHOTOGRAPH: JIM HOLDEN; OPPOSITE PAGE PHOTOGRAPHS: HUFTON+CROW



HISTORIC LINK RESTORED

A STEEL FOOTBRIDGE HAS RECONNECTED THE TWO HALVES OF TINTAGEL CASTLE FOR THE FIRST TIME IN MORE THAN 500 YEARS

Tintagel Castle in Cornwall is one of the UK's most popular historic sites and draws more than 200,000 visitors a year and up to 3,000 a day in the peak summer season.

Positioned on two rocky coastal outcrops, Tintagel Castle is a spectacular site, divided by a steep gorge. The main part of the castle is on a headland, which was once linked to the mainland and its gatehouse by a narrow strip of land that was lost to erosion sometime during the 15th or 16th Century.

Subsequently, visitors crossed a wooden bridge at the foot of the void and climbed a series of vertiginous steps onto the island. This restricted access caused significant congestion in the summer months and detracted from the visitor experience.

Above: Two 33m steel cantilevers project from the rocky outcrops

Produced by the BCSA and Steel for Life
in association with Construction Manager

What the judges said
"Every steel component has been carefully detailed for constructability and durability, elevating the graceful aesthetic"

The opening of the new footbridge has alleviated this problem and restored the original link, allowing visitors to once again walk in the footsteps of the site's medieval inhabitants.

Project architect William Matthews says: "The design of the footbridge is relatively simple – two 33m-long cantilevers which reach out from each abutment and don't quite meet in the middle.

"The central gap serves two functions; technically it allows each bridge half to expand and contract with variations in temperature; and poetically it creates a threshold between the mainland and the island. A series of 16m-long rock anchors tie the bridge halves into each cliff face."

Top right: Steel was chosen for its durability in a harsh environment

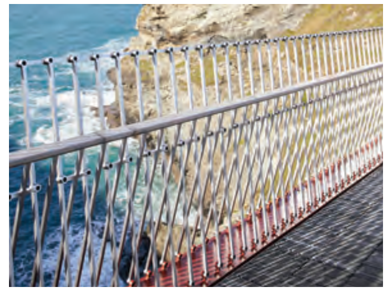
Below: The bridge is finished with a slate deck and English oak handrail

The palette of materials is equally simple. Painted mild steel has been used for the main chords, duplex stainless steel for the cross bracing, deck trays and balustrading, with Delabole slate laid 'on edge' for the deck finish, and untreated English oak for the handrail.

Each material was selected for its durability as the site is in an extremely harsh marine environment. Architecturally the aim was to create a bridge which was resolutely contemporary in its design and fabrication, but also timeless and complementary to its setting.

The steel element was chosen as a lightweight solution and one that could be fabricated offsite into deliverable pieces. Getting the steel elements to site was just one of the challenges that needed to be overcome, as the gatehouse can only be accessed by one narrow lane. A multi-axle vehicle was used to deliver the steelwork and navigate the winding road.

Lifting the steel into place was another significant challenge, with no room or access for a crane in the gorge, which is more than 60m-deep. A cable crane was installed, more commonly used in mountainous regions such as the Alps, to supply materials and even personnel to otherwise inaccessible locations.



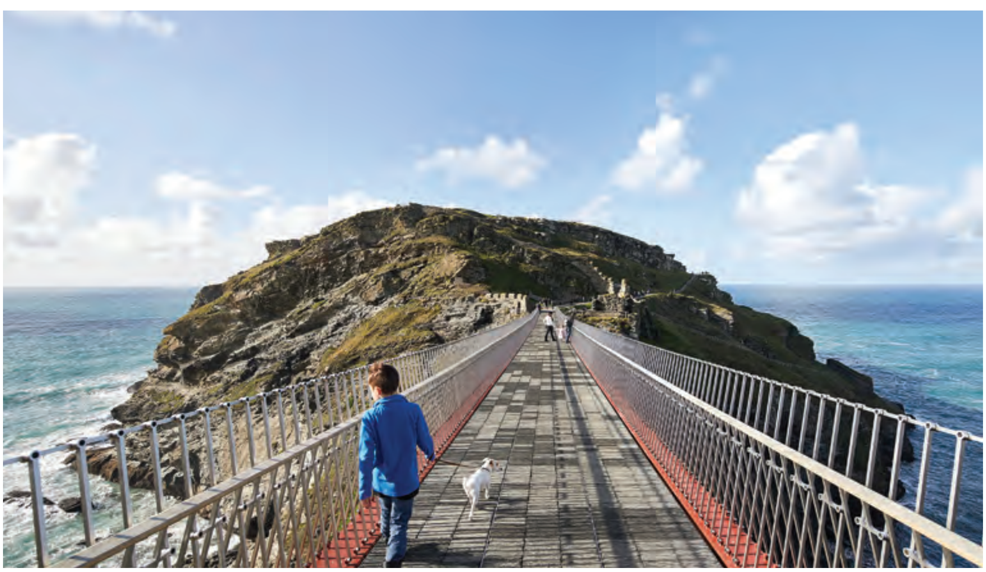
The cable crane had a 5 tonne lifting capacity, could pick up steel elements from a small holding area on the headland and subsequently fed the construction of the bridge's two cantilevers.

All of the steel elements were fabricated by Underhill Engineering into fully assembled and erectable pieces; that included top and bottom chords, bracings and cross members.

Summing up, the judges said every steel component has been carefully detailed for constructability and durability, elevating the graceful aesthetic.

The project is a triumph: a credit to English Heritage's vision and the entire team which employed mostly local fabricators, supported by Alpine construction specialists.

Award: Tintagel Footbridge, Cornwall
Lead architect: Ney & Partners
Co architect: William Matthews Associates
Steelwork contractor: Underhill Engineering
Main contractor: American Bridge UK
Client: English Heritage



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EXTERIOR PHOTOGRAPH: CHRIS WAKEFIELD; INTERIORS: PAUL RAFTERY

STEEL PASSES SCHOOL EXAMINATION

OLD AND NEW STEELWORK ELEMENTS HAVE BEEN COMBINED TO CREATE A MODERN EDUCATIONAL FACILITY

Originally opened in 1976 as a Herman Miller furniture factory, this Grade II listed industrial building was purchased in 2016 by Bath Spa University and converted into a new home for Bath Schools of Art and Design.

One of the key ambitions of the project's design was to retain as much of the existing steel-framed building as possible, and to this end the original steel facade frame has been kept. It supports a flexible modular system of glazed and solid panels, as well as the primary structure of continuous secondary roof beams that create 20m-long internal spans.

Beyond the challenges of retaining and refurbishing the existing frame, a new steel structure raises the roof by 1m, supports a new roof deck for extensive plant equipment, supports a rooftop extension above the existing building, and encloses two wings of flexible workshops and studios, as well as providing a substantial new mezzanine level.

Above: The original steel facade frame now supports a modular system of glazed and solid panels

Grimshaw Architects' principal Ben Heath says: "The use of steel delivered the large uninterrupted flexible volumes which allow for its adaption over time. It also provides the aesthetic for the building at a number of scales from the structural frame and expressive structural connections right down to the steel brackets which support the services, lighting, signage and furniture."

The project's unique design has also become a mandate to teach differently. In the past, teaching practices adapted to suit the

What the judges said
"Structural additions were separated from the existing, requiring careful installation, and the facade sensitively upgraded... The result is a building of exceptional quality"

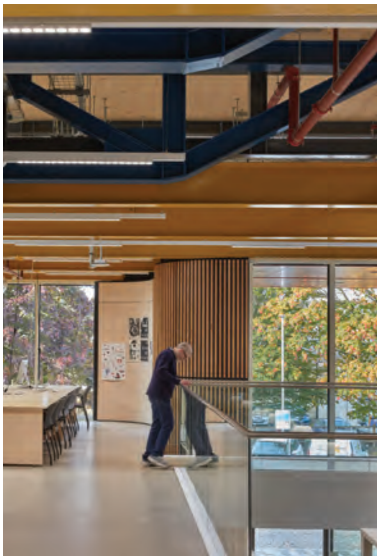
building, but this building informs teaching in a different way – putting flexible creative enterprise at its heart.

To facilitate this, the new steel roof is raised by Vierendeel steel trusses, allowing a flexible network of 'plug and play' services to run at high level. This allows the spaces below to be reconfigured as required. The modular facade system also allows the elevation to be easily reconfigured to respond to changing internal requirements.

The mezzanine floor beams have additional web openings to allow for future servicing and both the mezzanine and rooftop pavilion are designed to allow the internal layout to be reconfigured to suit future needs. All structures are framed to be independent of the existing frame to allow for future removal or adaption without detriment to the original.

Within the building, reflective areas encourage students to indulge in discourse outside of their usual disciplines. Communal open spaces encourage 'bumping into' of staff, students, professionals and visitors, providing unknown opportunities, while professionalised spaces – such as the gallery, art shop, rooftop, a publicly accessible cafe and riverside landscape – are designed to engage enterprise activities and the local community.

In summary, the judges said this project involved a major repurposing of a Grade II-listed industrial building, thus validating key concepts of the original 1970s design – adaptability and sustainability. Structural additions were separated from the existing, requiring careful installation, and the facade sensitively upgraded to improve performance. The result is a building of exceptional quality ideally suited to its new use.



Above: Flexible structures allow the internal layout to be reconfigured

Below left: Exposed steel brackets support the services, signage and lighting

Award: Bath Schools of Art and Design
Architect: Grimshaw Architects
Structural engineer: Mann Williams
Steelwork contractor: Littleton Steel
Main contractor: Willmott Dixon
Client: Bath Spa University

Steel exoskeleton lights up LSE

Exposed steelwork plays a structural and aesthetic role in this educational building

AKT II

Commendation: Centre Building, London School of Economics
Architect: Rogers Stirk Harbour + Partners
Structural engineer: AKT II
Steelwork contractor: Billington Structures Ltd
Main contractor: Mace
Client: London School of Economics

Constructed in two parts, with a six-storey and 13-storey element, and interlinked by an atrium, the Centre Building project replaces four previous buildings that were demolished on the London School of Economics (LSE) campus.

The overall superstructure system of steel beams and columns, concrete cores and precast concrete floor slabs facilitates simple and flexible floorplates, which can easily be adapted for future uses.

Exposed steelwork, internal and external, gives the building a distinct and contemporary appearance. At either end of each block, exposed SHS bracings bookend the project and form a highly visible steelwork element. This exoskeleton bracing, which sits approximately 300mm outside of the building envelope, is also a structural requirement, sharing the stability with two concrete cores.

The judges said it is a carefully crafted building, worked into an extremely constrained site. Close collaboration between the design team and steel fabricator has produced a high-quality appearance to the steelwork with careful attention to the connection details and paint finish.

BRIDGES EASE CONGESTION

STEELWORK PROVED TO BE THE IDEAL MATERIAL TO CONSTRUCT THE LONGEST BRIDGES ON A MAJOR £1.5BN ROAD IMPROVEMENT SCHEME

Opened earlier this year, Highways England's £1.5bn A14 improvement scheme between Cambridge and Huntingdon is said to have relieved congestion, unlocked economic growth, improved safety and enhanced the local environment.

There are numerous bridge structures along the route of the scheme including the scheme's showpiece bridge, a 750m-long viaduct over the River Great Ouse, and two identical 1,050-tonne bridges to carry a major roundabout at Bar Hill Junction over the new A14.

Weathering steel was used for all three structures to provide the required durability with minimal future maintenance.

The River Great Ouse viaduct required 6,000 tonnes of steel, comprising 76 separate main girders and 800 cross girders. The ladder deck bridge spans the river itself and a large area of floodplain on either side.

Supported on 16 pairs of piers, most of the main girders required were 40m long, 2m deep and weighed 50 tonnes. The section of bridge that crosses the river has a longer span requiring more complex girders, with larger, deeper haunches to carry the greater load.

A time-saving construction method adopted on this viaduct was the use of precast concrete slabs for the deck rather than the more traditional insitu concrete deck slab. This meant that the concrete deck units could be installed

JAMES WALKER

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What the judges said
"Innovative solutions were employed by the design team to minimise disruption and optimise the programme"

simultaneously while steelwork erection was still in progress further along the bridge.

This construction sequence demanded close coordination and also meant that every piece of steelwork had to be fabricated to extremely tight tolerances to ensure a precise interface with the precast concrete slabs.

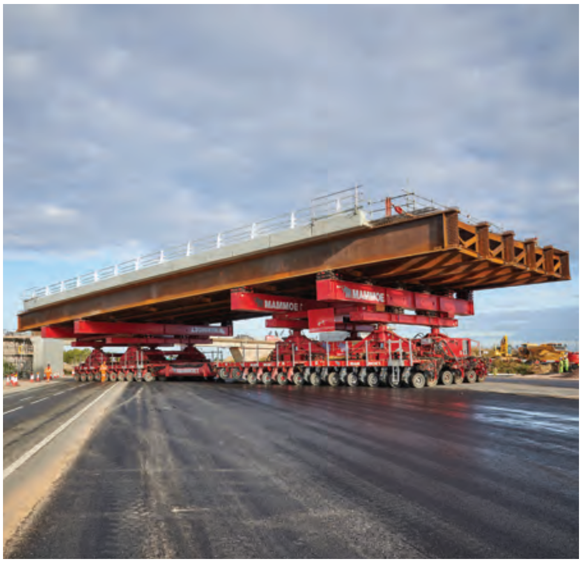
The viaduct was completed on budget and ahead of schedule.

The installation of the twin bridges at Bar Hill Junction over the new A14 maximised the advantages of offsite steel fabrication and rapid assembly to improve programme times, reduce environmental impacts and minimise disruption to road users.

The multi-girder bridge decks, each measuring 47.5m in length comprise three pairs of braced main girders supporting GRP permanent formwork and an insitu concrete deck slab. Overall, each deck contains 330 tonnes of steel and 720 tonnes of concrete.

The original plan was to erect the bridges piece-by-piece using a crane. This would have involved closing the A14 for a number of weekends, causing significant disruption. However, a more cost-effective scheme was developed that allowed both bridges to be constructed offline prior to installation, and then installed using self-propelled modular transporters (SPMTs).

The A14 was closed to traffic at 9pm on a Friday to allow the sections of the existing A14 carriageway to



be infilled and surfaced. The fully concreted bridge decks were then lifted from the trestles onto the SPMTs, and manoeuvred at less than 1mph onto and along the carriageway. The decks were positioned by the SPMTs and lowered precisely onto the concrete abutments.

Both bridges were installed during a single 11-hour period and the road was clear for reopening at noon on Sunday, an incredible 18 hours ahead of schedule

The judges were impressed with the innovative solutions the project team employed to minimise disruption, optimise the programme and ensure flawless execution on site.

Award: A14 Cambridge to Huntingdon Improvement Scheme
Structural engineer: Atkins, CH2M Hill Joint Venture
Steelwork contractor: Cleveland Bridge
Main contractor: A14 Integrated Delivery Team
Client: Highways England

Above: One of the Bar Hill Junction bridges is manoeuvred by self-propelled modular transporters (SPMT)
Opposite: The River Great Ouse Viaduct required 6,000 tonnes of steel

Steel bridges Cork's River Lee

Steel was used to create an elegant bridge with an uninterrupted 66m span, which provides a practical and visually appealing new pedestrian and cycle route in the heart of the city

Commendation: Mary Elmes Bridge, Cork City
Architect: WilkinsonEyre
Structural engineer: Arup
Main contractor: Keating
Client: Cork City Council

Honouring Mary Elmes, known as Ireland's Oskar Schindler, this transformative bridge link is part of Cork's drive to become a more accessible, sustainable city.

The design features a central spine beam that transitions from below to above the deck along the span introducing a small arch effect, which increased stiffness in bending and contributed to the slender appearance of the bridge. To further increase the structural efficiency, the pedestrian walkway is integrated into the structural system.

Meanwhile, combining the shallow slender arch with transparent mesh parapets allowed the design team to deliver an understated but visually appealing design with uninterrupted views of the river and cityscape.

The bridge was fabricated offsite in nine sections, assembled at a shipyard downriver from its eventual home and transported up the River Lee on a custom-made barge. It was then lifted into position by cranes located on each quay during an overnight road closure in a tandem lift.

Summing up, the judges said the elegant and deceptively simple design of this bridge has turned a new pedestrian and cycle city centre river crossing into something of a destination in its own right.

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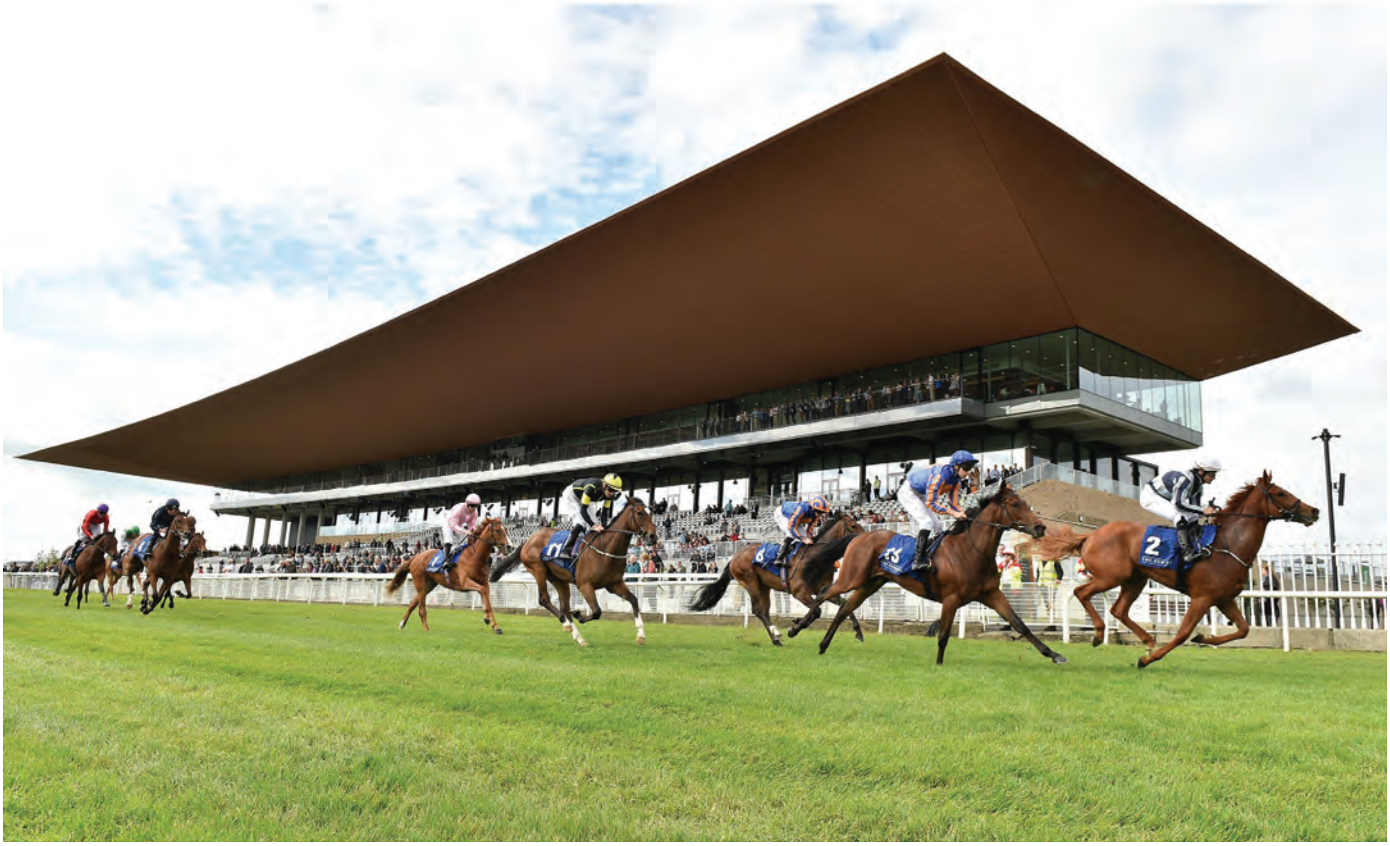
THIS PAGE: MATT BROWNE SPORTSFILE; OPPOSITE PAGE: ROGER O'SULLIVAN (TOP); AECOM (BELOW)



STEEL IS FIRST PAST THE POST

THE REDEVELOPMENT OF IRELAND'S CURRAGH RACECOURSE HAS RELIED ON STEEL CONSTRUCTION TO CREATE ITS CENTREPIECE GRANDSTAND ROOF

Above: A steel cantilever roof crowns the new grandstand

In order to maintain The Curragh's position as one of the world-leading racecourses, a redevelopment of the spiritual home of Irish flat racing has been undertaken to meet anticipated future demands.

At the heart of this scheme is a new grandstand, which is crowned with a dramatic soaring cantilever roof that recognises the planar landscape in which it is set.

According to project architect Grimshaw, the 7,200 sq m cantilever roof design was key to creating the architectural vision, with the envelope surfaces tuned to mask the depth of the structure and create a gravity-defying illusion with cantilever spans ranging from 27m in the central area to 45m in the double-cantilevered corners.

The roof structure, supported on the exposed precast concrete grandstand frame below, consists of a regular arrangement of steel cantilever trusses tapering into open plated sections at the tips to create the razor-sharp leading edge as well as simplifying fabrication. Additional spine trusses follow the diagonal hip line of the roof corners, creating a two-way lattice frame with optimised planar geometry.

Aecom project engineer Michael Orr says the main challenge for the Curragh Racecourse was the design of the steelwork forming the doubly cantilevered roof and specifically the detail design and fabrication of the

What the judges said
"Behind this bold architectural statement lies a highly accomplished level of detailed design, precise fabrication and accurate construction"

complex three-dimensional nodes supporting the dramatic overhangs.

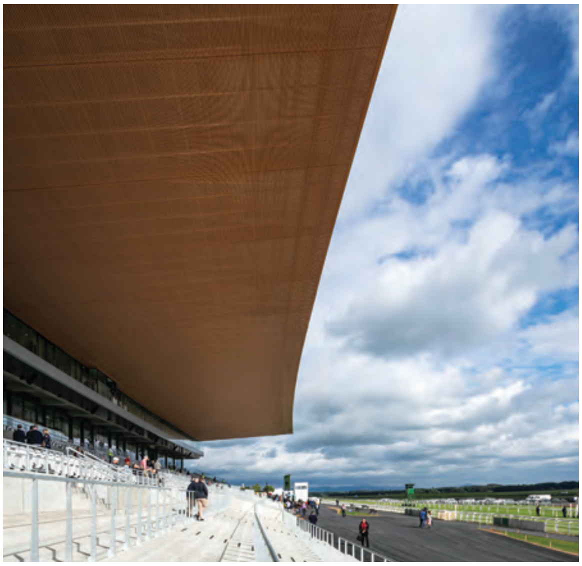
"The nodes, and their interfaces with the exposed concrete structure below, required intensive collaboration between Aecom's designers and the steelwork contractor to resist the high concentrations of load from the two-way spanning structure, and to ensure all tolerances and pre-setting requirements could be achieved," he explains.

The roof design also allowed the MEP plant to be concealed within the roof space with no detriment to the overall form. The result is a total steelwork mass of approximately 115kg/sq m for the majority of the roof area.

Integrating the structural solution with the building envelope was also key to the success of realising the team's mutual vision. For the long-span double-clad roof, Aecom's structural engineers and facade engineers worked hand-in-hand to deliver a holistic design solution, minimising the overall quantities of structural steelwork by ensuring all steel surfaces were fully coordinated with the cladding fixing requirements. This included integrating with the MEP, lighting and rainwater collection systems without compromising the structural or visual integrity.

"Structural steelwork was used as it was the only cost-effective solution that could meet the demands of the design, in terms of achieving structural performance and creating the architectural drama of the slender cantilevered roof," adds Orr.

Summing up, the judges said a blade-like aerofoil roof is now the dramatic centrepiece to this open landscape and world-famous sporting venue. Behind this bold architectural statement lies a highly accomplished level of detailed design, precise fabrication, and accurate construction to the most demanding of tolerance requirements. A great team effort.



Above: The complex roof design involved careful coordination with the facade

Below left: Steel cantilever trusses taper at the tips to create a sharp edge

Award: The Curragh Racecourse Redevelopment, Kildare
Architect: Grimshaw Architects
Structural engineer: Aecom
Steelwork contractor: Kiernan Structural Steel Ltd
Main contractor: John Sisk & Son
Client: The Curragh Racecourse Ltd

High Standard

A 1970s concrete-framed former council office has been reinvented as a boutique hotel

TIMOTHY SOAR

Commendation: The Standard Hotel, London
Architect: Orms
Structural engineer: Heyne Tillett Steel
Main contractor: McLaren Construction
Client: Crosstree Real Estate Partners LLP

Before construction work began on the Standard Hotel on London's Euston Road, structural engineer Heyne Tillett Steel (HTS) tested the capacity of the structure, foundations and ground to reveal their spare capacity. Once complete, they were confident that the concrete frame and under-reamed piles could be pushed to allow the conversion of the building and a three-storey extension to be added to the structure.

To support the required three additional floors that start at level nine, new supporting steel perimeter columns from the first-floor transfer slab was the preferred option. Adding the three storeys, a 30% increase to the weight of the building, only required discrete strengthening to four existing columns.

HTS says the use of steel enabled the new floors to be lightweight and shallow in depth. Steel also adhered to tight hotel vibration criteria and the long-span existing office column grid below.

The judges said through forensic analysis of the existing building and highly intelligent design responses, this project showcases the role of structural steel in repurposing and enlarging this existing building, maximising the retention of embodied carbon. This has created a new landmark on one of the capital's principal arteries.

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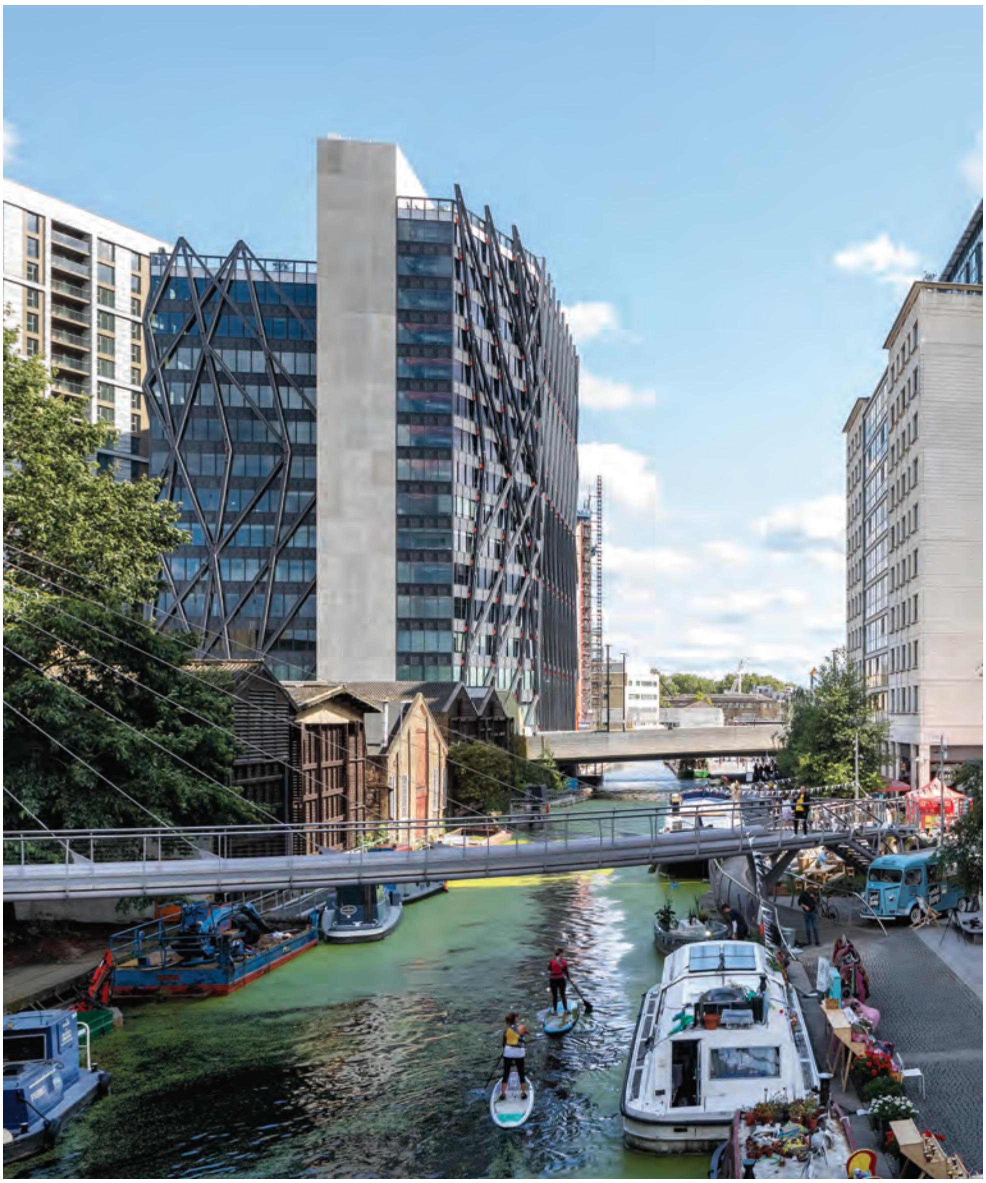
A NOD TO A FAMOUS ENGINEER

THE BRUNEL BUILDING HAS AN EXPOSED STEEL DESIGN AND IS NAMED IN HONOUR OF ISAMBARD KINGDOM BRUNEL, WHO BUILT THE ADJACENT PADDINGTON RAILWAY STATION



The exoskeleton extends beyond roof level to create sheltered gardens

PHOTOGRAPHS: DIRK LINDNER (THIS PAGE); JACK HOBHOUSE (TOP, OPPOSITE PAGE)

With his tall stovepipe hat, Isambard Kingdom Brunel is an instantly recognisable figure from history. As well as his headwear, the engineering innovator was famous for his bridges, tunnels and ships – and now an eye-catching commercial block, next to his Great Western Railway terminus in west London, has been named in his honour.

Known as the Brunel Building, the structure would have undoubtedly delighted the engineer with its exposed engineered steelwork and multiple connections.

"As well as offering recognition to Brunel, as his first-ever bridge was once located on the northern boundary of our site, the steel design has enabled us to express the structure in a contemporary way and create the desired clear internal spans," explains Fletcher Priest Architects' senior project architect Chris Radley.

The architectural brief was to create a landmark building which provided a high-quality, innovative, people-centred workspace and which would re-engage the site with the canal.

Within the structure, services are exposed to maximise flexibility and workspace volume. This logic is continued externally with an exoskeleton positioned outside the facade.

The exoskeleton structure extends beyond roof level to create glazed, wind-sheltered gardens on the 15th and 17th floor levels. It also shades the large expanses of glazing, affording scenic panoramic views across the west London skyline.

What the judges said

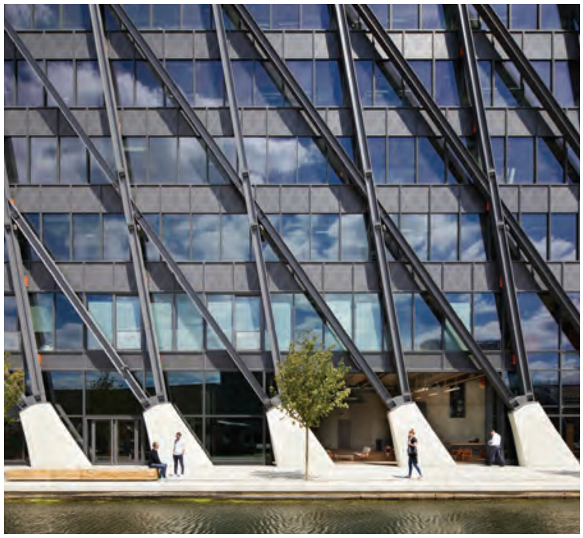
"Expressed structural steelwork in the external frame and floor structures is dramatic and dynamic; all is detailed with great care and attention"

Despite the bespoke nature of the building, a regular 6m floor beam spacing was used with precast lattice slabs set down into the web zone of the supporting steel plate girders. The services and structure are seamlessly integrated, enabling a more efficient use of the available structural depth and maximising floor-to-ceiling heights.

A semi-unitised curtain-wall cladding system with an insulated strong-back system provided a considerable amount of repetition, together with flexibility where required.

For the steelwork design, floor beams span directly from core wall out to the exoskeleton. One consequence of this is that the location of the floor beams on each level varies to meet the exoskeleton support. This means that beam location varies slightly on each floor and thus beam spans and service opening locations also vary. The project team used digital workflows to optimise and communicate plate thicknesses, weld sizes, connection designs, pre-cambers, movements, and fabrication and installation information.

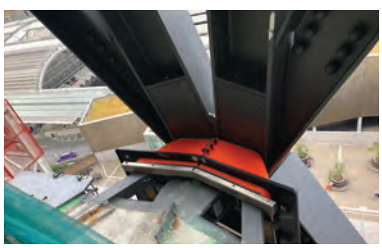
Close collaboration between all parties allowed the various stiffness factors, tolerances and construction sequence impacts to be considered and individual pre-camber values agreed for each beam. This provided a challenge for the contractor and MEP subcontractors, which they solved, in part, by projecting the MEP subcontractor information onto the relevant ceilings while the operatives installed the required equipment and service runs.



In summary, the judges said this project shows how a proactive client working with a talented team can produce a commercial office building of the highest integrity. Expressed structural steelwork in the external frame and floor structures is dramatic and dynamic; all is detailed with great care and attention. A roof garden provides a welcome extension to the public domain. ●

Above: The curtain-wall cladding of the facade is wrapped by the exoskeleton

Below: Floor beams meet the exoskeleton support



Award: Brunel Building, London
Architect: Fletcher Priest Architects
Structural engineer: Arup
Steelwork contractor: Severfield
Main contractor: Laing O'Rourke
Client: Derwent London

Changing station

A steel-framed link connects Waterloo's former international terminal with the main station

© MICHAEL COCKERHAM

Commendation: Waterloo Station Roof Infill
Architect: Aecom
Structural engineer: Mott MacDonald
Steelwork contractor: Bourne Group Ltd
Main contractor: Wessex Capacity Alliance
Client: Network Rail

London's Waterloo Station has been transformed by the Wessex Capacity Alliance's (WCA) programme of works, which included rebuilding the former international terminal (WIT), allowing its platforms to be brought back into use.

As part of this, an infill roof structure has been delivered, bridging the gap between the three-pin arch roof of Grimshaw's WIT terminal, and the trussed 1920s steel roofs forming the main station concourse.

The infill roof is a rectangular steel-framed box, 52m long by 18m wide and 26m high at the western end, tapering along one side to accommodate the shape of the former Eurostar structure and oversailing the two station roofs.

It requires two 508mm-diameter circular hollow section (CHS) columns to support it in the middle. As well as providing support to the roof, the CHS columns allow a central area with a 26m clear span. Forming the main span of the roof is a 4.2m deep x 52m long spine truss, weighing 27 tonnes.

The central spine truss supports eight pairs of gullwing trusses sitting perpendicular to the main structure, forming overhangs on either side.

The judges noted that the steel frame, sympathetically designed to reflect the detailing of the existing structure, and ingeniously erected in a live station, facilitates a huge increase in station capacity.

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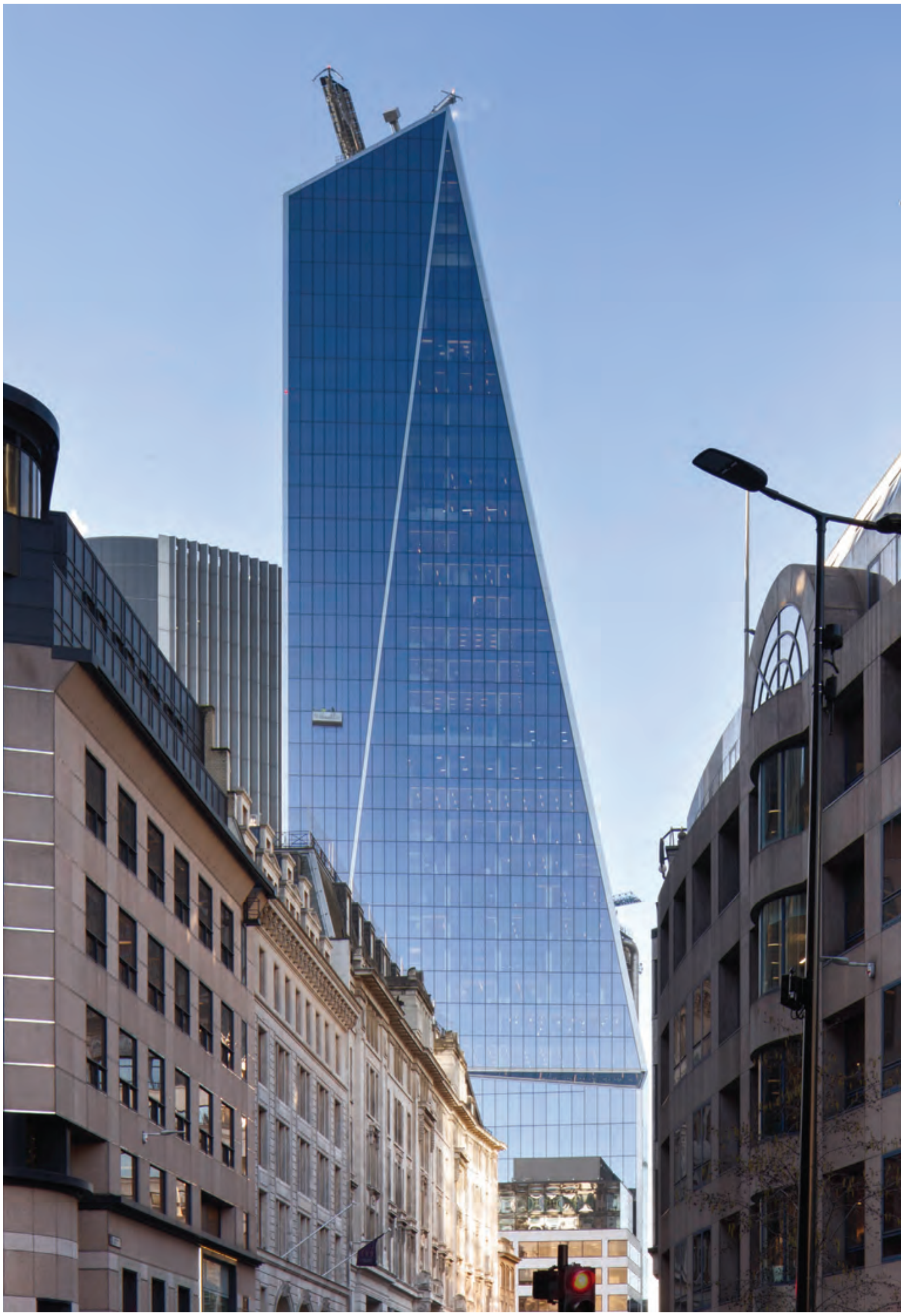


CONSTRUCTION SHOTS ON OPPOSITE PAGE: SIMON CARR PHOTOGRAPHY

CUTTING EDGE DESIGN

KNOWN AS THE SCALPEL, 52 LIME STREET IS A DRAMATIC, SLEEK AND GEOMETRICAL ADDITION TO THE HIGH-RISE CITY OF LONDON LANDSCAPE

Rising to 42 storeys high, 52 Lime Street has since its inception been dubbed the Scalpel, because of its dramatic architectural shape that features an inclined northern facade, which has a diagonal fold line running from top to bottom.

This striking facade is formed by a series of cranked plate girder columns, spaced at 6m centres. For the double-height ground floor these columns are vertical, but from the first floor they are cranked and slope inwards all the way to the building's pointed top.

The tower leans in such a way that it is invisible behind the dome of St Paul's Cathedral when approached from the west along Fleet Street, while the roofline falls away sharply to the south in recognition of the overall composition of the City cluster.

The structural frame consists of a composite design with steelwork supporting metal decking and a concrete slab. All of the floor beams are 670mm-deep fabricated plate girders with service holes to allow service integration within the structural void.

The use of steelwork is said to have allowed the scheme to achieve a greater

What the judges said
"Ground-breaking savings in both costs and embodied carbon have been achieved by innovative solutions"

floor space, which was one of the client's specifications, while steel's speed of construction is always an important consideration on a city-centre project.

Unlike many commercial buildings, the Scalpel's main core is offset and positioned along the south elevation, which allows the structure to maximise its internal floor space with spans of up to 20m.

Cost also plays an important role in any project and the use of a BIM model helped the team ensure the steel frame was as efficient as possible.

"We made a considerable weight saving as all of the beams have varying flanges and webs depending on the relevant loadings," explains Arup project engineer Steve McKechnie. "All of this was worked out automatically via the BIM model."

Steelwork contractor William Hare undertook a complex construction sequence to complete the project. One of the main challenges was one of the final elements – the iconic triangular attic.

Positioned at the peak of the structure, the 10-storey triangular attic houses the plant and maintenance walkways. To make the erection of the attic structure as smooth as possible, it was trial erected in the fabrication yard, so the extremely complex fabrication and tight tolerances could be fully tested and proven.

Following the trial assembly, the structure was dismantled and transported to London in the largest possible pieces, in order to reduce the piece count and allow for erection on site by tower cranes.

Taking its place within the cluster of prestigious tall buildings in London's financial centre, the distinct inclined outlines of the Scalpel complement the surrounding profiles.

Ground-breaking savings in both costs and embodied carbon have been achieved by innovative solutions, while maximising letting areas, the judges said. They also praised the project's advanced use of BIM and full-scale trials.

Award: 52 Lime Street, London
Architect: Kohn Pedersen Fox
Structural engineer: Arup
Steelwork contractor: William Hare
Main contractor: Skanska
Client: WRBC Development UK Limited

Opposite: The Scalpel's distinctive shape above the City
Top: The glazed elevation is fitted to the steel frame
Below: The use of steel enabled faster construction

Barts goes big on flexibility

Steel is central to this new office building's flexibility

Commendation: One Bartholomew, Barts Square, London
Architect: Sheppard Robson
Structural engineer: Waterman
Steelwork contractor: William Hare
Main contractor: Mace
Client: Helical

One Bartholomew is a 12-storey building offering approximately 20,000 sq m of Grade A office space with a BREEAM 'Excellent' rating and is the latest element of Barts Square, a new mixed-use development in Farringdon, central London.

Flexibility is at the heart of the building's steel-framed design. The structure is adaptable to the anticipated changing requirements of its users, as there are generous floor-to-ceiling heights, alongside an efficient floorplate.

William Hare erected 2,350 tonnes of steel for the scheme. The steel frame gains its stability from a reinforced concrete core and the diaphragm action of the floor slabs.

Some of the project's largest steelwork elements are at ground floor, where a series of deep cantilever transfer beams extends the facade to the boundary and above the basement perimeter piles.

These deep beams required extensive work to ensure they could be lifted into position, while the design had to make sure the splice connections did not interfere with the large service holes.

The judges said the project showcases how steel can deliver a highly flexible long-span commercial building within an urban context.

Other finalists:

- The Balfour, Kirkwall, Orkney
- Barton Square, Intu Trafford Centre, Manchester
- Boeing GoldCare Aircraft Hangar, Gatwick Airport
- Bridgewater Place Wind Amelioration Scheme, Leeds
- One Bank Street, Canary Wharf
- Drake Circus The Barcode, Plymouth
- National Infrastructure Laboratory, University of Southampton
- The Wave, Coventry

Produced by the BCSA and Steel for Life in association with Construction Manager

Steel gives new life to London's Post Building

A new steel frame incorporates retained elements in a former sorting office

Commendation: The Post Building, London
Architect: Allford Hall Monaghan Morris
Structural engineer: Arup
Steelwork contractor: BHC Ltd
Main contractor: Laing O'Rourke
Client: Brockton Capital LLP and Oxford Properties Group

Located on London's New Oxford Street, this former Royal Mail sorting office has been redeveloped into a new mixed-use scheme by incorporating large retained steel elements within a new steel frame.

A horseshoe-shaped zone in the middle of the site containing ground, first and second floor levels was left in place. These floors were originally used for mail sorting duties, while the building's upper four floors, now demolished, accommodated administrative offices and a plant level.

Retaining a large steel frame required steelwork contractor BHC to use more than 200 tonnes of temporary steel propping and bracing, as the frame's original stability system had been demolished.

A series of existing transfer beams have been slimmed down from 2.0m-deep to 600mm-deep members to allow mezzanine floors to be inserted and maximize the available headroom within the existing floor-to-floor heights.

An entirely new steel frame has been erected around the retained portion completing the lower three floors and filling up the entire site's footprint.

In summary, the judges said this is a great example of a steel-framed building being adapted to give a new life for a different use.

York's sustainable bridge solution

Using weathering steel for a pedestrian and cycle link minimises weight and disruption

Said to be reminiscent of Viking longships, Scarborough Footbridge spans the River Ouse in York providing a new pedestrian and cycle link between the city centre and main railway station.

The weathering steel bridge comprises two 22m-long main river spans which are formed of prefabricated box girders with integral curved parapets and cantilevered deck plates.

Meanwhile, two 10m-long side spans cross over the existing river footpath and are formed of prefabricated u-troughs with integral parapets and deck plate to match the main river spans.

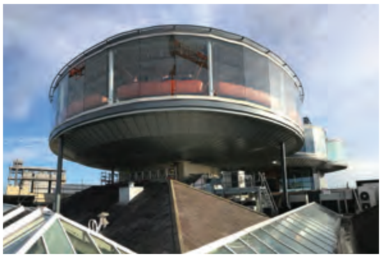
Stability of the cantilevered main spans was achieved with mechanical uplift bearings. Tensioned straining wires run through integral eyelets on the parapets, which are anchored into masonry-clad anchor blocks at either end of the structure.

Aecom regional director, transportation, Peter Robinson says: "To minimise weight and maximise prefabrication, steel was the obvious choice for the scheme.

"Steelwork was also beneficial as it helped form a lightweight, aesthetic structure that required minimal work at height over water and therefore caused minimal disruption to the operational railway."

The judges said the bridge wholly fulfils the brief, promoting sustainable transport for all users through the city.

Merit: Scarborough Footbridge, York
Architect: Network Rail
Structural engineer: Aecom
Main contractor: AmcoGiffen
Client: City of York Council



Defying Gravity

A steel-framed extension looks out over the rooftops of Dublin

The Gravity Bar that sits atop the Guinness Storehouse in Dublin has undergone an expansion in order to accommodate an ever-increasing number of visitors.

Opened in 2000 and offering views across the Irish capital, the Gravity Bar needed more space and the solution was to build a rooftop extension. This consists of a new steel-framed structure that links to the existing bar and more than doubles the available floor space.

The extension is a disc-shaped structure, connected to the existing bar via a new semi-circular structure.

The main steel frame is supported on four CHS columns, supported from the existing structure. Before these were installed, the Edwardian steel columns below were strengthened with stiffener plates. The floor of the new bar structure is formed from a grillage of box girder beams and UB section infills.

In summary, the judges said this popular bar sits above Dublin's most visited tourist attraction and the works were carried out with the building remaining operational throughout.

Merit: The Gravity Bar, Guinness Storehouse, Dublin
Architect: RKD
Structural engineer: Arup
Steelwork contractor: Steel & Roofing Systems
Main contractor: PJ Hegarty & Sons
Client: Diageo