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Structural Steel Design Awards 2023

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Introduction

Celebrating their 55th year in 2023, the Structural Steel Design Awards continue to shine a light on examples of innovation and excellence in modern steel construction

Jointly sponsored by the British Constructional Steelwork Association (BCSA) and Steel for Life and celebrating their 55th year, the 2023 Structural Steel Design Awards (SSDA) have once again highlighted and rewarded many of the best examples of excellence, ambition and innovation in our built environment.

The entries this year reflect the wide geographical spread of steel's appeal for a variety of projects, which include prestigious mixed-use schemes, office buildings, entertainment venues and beautifully designed footbridges.

The judges were particularly interested in projects that reflected a reuse of existing structures and showed a commitment to lessening a project's embodied carbon.

Twenty-one projects made the shortlist, from which the judges presented five awards, six commendations and three merits.

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



PHOTO: WILLIAM HARE

London icon reborn

Structural steelwork has been extensively used to transform Battersea Power Station into a multi-use destination that sits in the middle of a large swathe of regenerated land on the capital's south bank

Completed in two phases either side of the Second World War, Battersea Power Station has been one of the capital's iconic landmarks for decades. Its four chimneys are instantly recognisable to millions of people.

Before being decommissioned in 1983, the Grade II*-listed power

station once supplied around one-fifth of London's electricity needs, consuming more than one million tonnes of coal annually.

Having stood derelict for many years and after a number of failed attempts to redevelop the site, the landmark structure has now been transformed into a huge mixed-use scheme, which is served by the

▲ Steel trusses are positioned within the former power station

Award: Battersea Power Station, London
Architect: WilkinsonEyre
Structural engineer: Buro Happold
Principal structural steelwork contractor: William Hare
Architectural structural steelwork contractor: CMF Ltd
Main contractor: Mace
Client: Battersea Power Station Development Company

Northern Line underground extension and sits at the heart of 17ha of regenerated former brownfield land.

The construction programme included rebuilding the four iconic chimneys and the retention of the building's exterior. Inside the structure, new steelwork, sitting alongside more retained elements, forms space for 252 apartments, restaurants, shops, cinemas, six floors of office space and an entertainment venue capable of accommodating 2,000 people.

The building can be divided up into a number of elements, including a central boiler house, turbine halls, a switch room and annexes on both sides – east and west. Each element is separated from the adjoining areas by internal walls, largely retained from the original building.

Erecting new steel-framed elements was not a straightforward procedure. The entire programme had to be coordinated around a vast array of temporary works and bracings that were installed to support the existing structure after a partial demolition programme had been completed.

Within the boiler house there are five different elements, including car park, retail, public/event spaces, offices and residential apartments – all stacked vertically

on top of one another. Each required a different column grid pattern and, through frame optimisation and organisation of spaces, these stacked usages were achieved with only two structurally super-efficient transfer levels, one of which doubles as a plantroom.

In the historic turbine halls, a new structure was introduced behind the retained heritage fabric, allowing features such as the new retail gallery decks to be introduced.

Pinpoint accuracy was required to introduce columns set 75mm away from the existing structure that support new cantilevering turbine hall walkways and a new 13-storey building infill inside the adjacent boiler house.

▼ Cantilevered interior walkways were installed in the turbine halls

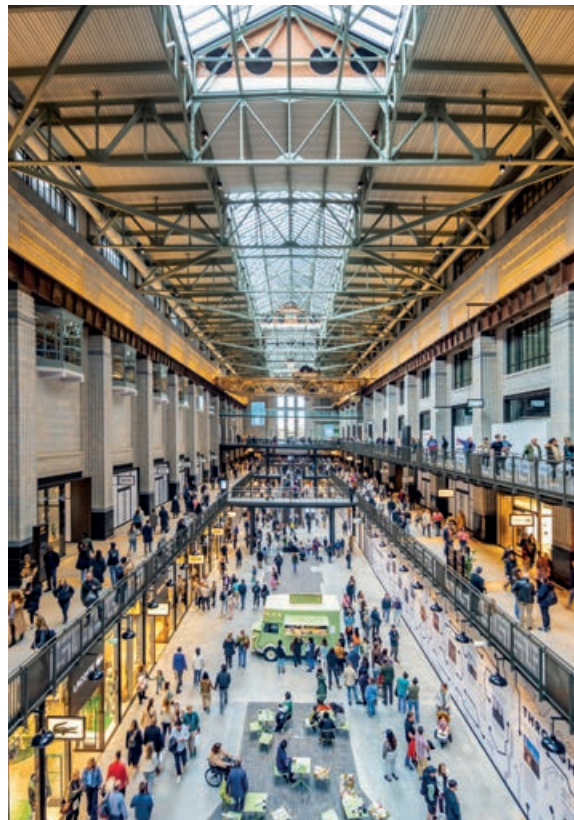


PHOTO: JOHN STURROCK

From robust steel tree columns supporting heavy loads to intricate tensile restraint frames and footbridges, every element exudes an elegant touch showcasing a harmonious blend of design and functionality

SSDA judges



To facilitate this proximity without compromising existing foundations, buried concrete-encased 24 tonne steel beams cantilever over new piles to support the new columns.

At the northern end of the boiler house, framing the entrance to the main retail zone and events space, is a large 27m-long x 2.6m-deep plated girder weighing a massive 62 tonnes, which is positioned at the underside of the fifth floor. As well as helping to create the large open space below, it also transfers a load in excess of 2,000 tonnes down the building, while supporting eight floors above.

The beam – one of the largest single pieces of steel manufactured in the UK in recent times – was brought to site in one section.

Working in conjunction with the large beam, and also helping to create the events space's column-free interior, are two feature 12m-high steel trees that each support a 30m x 30m floor area.

Summing up, the judges say the newly revealed steel structures reflect the industrial legacy, seamlessly integrating with the building's aesthetics. From robust steel tree columns supporting heavy loads to intricate tensile restraint frames and footbridges, every element exudes an elegant touch, showcasing a harmonious blend of design and functionality. ●



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PHOTOS: HUFTON+CROW

Golden bridge signposts regeneration

An eye-catching 49m-long steel bridge connects Swansea city centre with its seafront and a large urban regeneration scheme

Creating a highly visual statement, a gold-painted pedestrian and cycle bridge connects Swansea city centre to the Copr Bay phase one scheme, which includes a state-of-the-art 3,500 capacity arena, a new public realm including the city's first new coastal park since Victorian times, new social housing and retail space for local businesses.

Designed by local artist Marc Rees and architectural practice ACME, the single span bridge is 12m wide x 7.5m high and has a structural skin of 15mm-thick steel plate. Featuring a distinctive gold paint finish, the side panel plates are perforated with numerous laser-profiled cut-outs and pressed into complex shapes.

The design is said to balance a contemporary aesthetic with

▲ The perforated and gold-painted bridge links the city centre with the Copr Bay scheme

references that celebrate the city's heritage. The 2,756 laser-cut origami-inspired shapes, dispersed across the panels, create a visually interesting pattern. The perforations are abstracted and exploded silhouettes of swans, inspired by the emblematic Swansea bird.

The bridge structure offers a degree of protection from the elements. The steel has been

Dublin shops for steel

Department store refurbishment creates new city-centre destination



Commendation: Clery's Quarter, Dublin
Architect: Henry J Lyons
Structural engineer: Waterman Moylan
Steelwork contractor: Kiernan Structural Steel Ltd
Main contractor: Glenbrier Construction
Client: Oakmount

A major refurbishment has brought back to life Clery's department store, a Dublin landmark that originally opened in 1853, but closed in 2015.

The building has been vertically extended to create a new mixed-use scheme. New third, fourth and fifth levels have been added, along with a glass cylinder atrium, lift cores and a bespoke curved roof structure.

The floor area has increased from 10,000 sq m to 16,500 sq m. The new steel frame had to be threaded through the existing structure and supported on new micropile foundations. Perimeter columns were positioned behind the old facade to minimise their impact.

"The scheme could only have been realised utilising a structural steelwork framing system," says Waterman Moylan associate Anthony Byrne.

"The ability to retain over 60% of the existing structure through application of the steel framing meant that the upfront embodied carbon for the development was limited to approximately 400kg CO₂e/m²."

Award: Copr Bay Bridge, Swansea
Architect: ACME
Structural engineer: Ney & Partners
Steelwork contractor: S H Structures Ltd
Client: City & County of Swansea

rolled into a double curved surface and butt-welded into a single tube. Openings have been cut into the sides where the structural stresses were lower, offering glimpses across the road, the arena and the new coastal park and to allow the bridge to glow at night from within.

ACME design director Friedrich Ludewig says: "The iconic arch stabilises the super-slender bridge deck and creates a new urban space floating over the road, enclosed by patterned steel offering glimpses across the road, the arena and the new coastal park.

"Steelwork was chosen primarily because of its structural properties and ability to span large distances. It gave the design flexibility to work with an interesting structural solution – essentially a deformed bow truss formed of plate steel – allowing the creation of the sculptural form, super-thin bridge deck and the opportunity to create a clear identity through the development of perforations in the truss walls and application of a gold paint finish."

The 140-tonne bridge was fabricated, supplied and installed by S H Structures on behalf of the main contractor. It was delivered to site in sections, consisting of four deck pieces, six roof sections and 11 side panels. The roof sections measured

10.5m x 4.1m x 600mm and the side panels were 2.8m x 6.9m x 15mm.

The largest steel elements to be transported to site – and also the heaviest – were the deck sections, measuring 24.5m x 6m x 2m and weighing 24.6 tonnes each.

Once on site, the bridge deck was assembled on temporary works adjacent to the bridge's final location. The curved plates, which form the sides, arch and roof, were then welded into place, before the complete structure was given its final topcoat of gold paint.

The completed structure was then lifted onto self-propelled modular transporters (SPMTs) and manoeuvred onto its two concrete abutments during a Saturday night road closure.

Rees says: "It has been the thrill of a lifetime to be involved in such an iconic part of the regeneration of my hometown. Dylan Thomas famously described Swansea as an 'ugly, lovely town' – whatever the merits of that when he said it, Swansea's aspiration to change, grow and flourish is more than apparent now."

In summary, the judges say the Copr Bay Bridge provides a dramatic new gateway to Swansea, with its striking form and colour acknowledging the bay's history as a centre of coal and copper production. ●



The Copr Bay Bridge provides a dramatic new gateway to Swansea, with its striking form and colour acknowledging the bay's history as a centre of coal and copper production
 SSSA judges

▼ The perforations are abstracted and exploded silhouettes of swans



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



PHOTO: GRANT SMITH

Getting taller

An outdated 1960s tower block has been reimagined with the addition of 13 new steel-framed upper floors and enlarged lower-level podiums

Just north of the City of London's northern boundary and a short walk from Old Street station, a tired 16-storey office block has been refurbished by stripping back the original concrete frame and adding 13 new steel-framed floors to create a 21st century 29-storey tower.

As well as enlarging two podiums adjacent to the lower levels of building, the existing cores were removed and replaced, while substantial strengthening works were undertaken to allow the existing columns to support the new upper floors.

Overall, the scheme delivers flexible workspaces together with

▲ Thirteen new steel-framed floors have been added to create a 29-storey tower

25 units of affordable housing, and introduces a new public arcade with shops, cafes and restaurants.

The decision to refurbish and enlarge the building, instead of demolition, had a number of benefits.

AKT II associate Michael Hynd says: "It is more sustainable to refurbish and enhance the building as opposed to undertaking a large demolition programme, which was something the local authority and the client was keen to avoid."

This solution has doubled the leasable area, from 12,000 sq m to 25,800 sq m, while saving 35% of the 'upfront' embodied carbon in comparison with an equivalent new construction.

Information on the existing building was compiled from a series of engineering record drawings, and a fundamental redesign of the existing building followed an exercise which back-analysed the structure, verifying initial assumptions.

This showed that the original building had residual capacity within the floor slabs – believed to have been designed to accommodate printing works on some floors – and also the large diameter under-ream piles, which meant that large portions of the existing building, basement and foundations could be retained and reused.

“This analysis, with finite element modelling of the existing structure and foundation system, were key to delivering the 13-storey extension. The whole project represents a best practice approach for the retrofit and large-scale retention and expansion of existing structures,” says HCL managing director Stephen Cherry.

Structural steelwork was chosen for the new upper floors due to the material's lightweight attributes,

▼ The beams are all custom-made plate girders

“**This exemplary transformation of an obsolete 1960s concrete ‘monolith’ was made viable only by the ambition of the client**”
SSDA judges

Award: HYLO, London
Architect: HCL Architects
Structural engineer: AKT II
Steelwork contractor: Bourne Group Ltd
Main contractor: Mace
Client: CIT Group

which minimised the additional loading and speed of construction.

From level 16 upwards, new steel columns were installed on top of the existing concrete members. However, the existing grid pattern is based around a column spacing of 6.1m x 7.6m. This was deemed restrictive for the new floorplates, so some column positions have been omitted: the upper floors have just one row of internal columns and spans of up to 12m.

All steelwork is standard S355 grade, and the beams are all custom-made plate girders, with depths ranging from 525mm to 665mm. Modular pieces for the perimeter, weighing up to 7 tonnes, were introduced to reduce crane lifts. The floorplates are generally repetitive up to level 25, but level 26 has a step-back, creating a terrace.

As the line between corporate and creative becomes more integrated, HYLO delivers a workplace that offers flexible spaces that embrace collaboration and connectivity.

In summary, the judges say this exemplary transformation of an obsolete 1960s concrete ‘monolith’ was made viable only by the ambition of the client, the skill of the team and the use of structural steel. Unrecognisable today and 13 floors taller, this now elegant and permeable building creates high-quality spaces both internally and externally in the surrounding neighbourhood. ●

Steel adds up

Unique steel structure provides support for Ed Sheeran world tour



PHOTO: CUNDALL

Commendation: Ed Sheeran Mathematics Tour
Architects: Mark Cunniffe Ltd, WonderWorks
Structural engineer: Cundall
Steelwork and main contractor: Stage One Creative Services Ltd
Client: 1325 Productions

Ed Sheeran's recent Mathematics world tour featured a unique steel structure that allowed the artist to appear in the round, with the audience surrounding the stage – adding intimacy to each performance.

It consists of six 30m-tall steel truss masts, positioned around the central stage, supporting a 60m-span cable net constructed of 22mm diameter galvanized steel spiral strand cable.

This in turn is used to suspend the central 21m-diameter, 45-tonne circular transparent LED screen over the stage, as well as 10 tonnes of audio systems.

Additional audio systems and double-sided LED screens shaped like plectrums, both weighing 22 tonnes, are suspended from the top of each mast, adding cutting-edge production.

The entire structure was trial erected and load tested one month before the start of the tour. This provided an opportunity to practise the erection process and hone the erection riggers' experience to achieve the fastest possible build time – 15 hours for 180 tonnes of steelwork.



PHOTO: MICHAEL COCKERHAM



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

Exposed frame presents a city first

Part of phase two of Birmingham's Paradise masterplan, a 13-storey steel-framed office block, spans one of the city's main thoroughfares



PHOTO: GREG HOLMES

Featuring an expressed steel exoskeleton on all four elevations, Birmingham's One Centenary Way is a standout commercial development in more ways than one. Below ground level, the steelwork is equally impressive. Just over 60% of the total footprint sits on top of a series of storey-high trusses that span the A38 dual-carriageway tunnel.

"One Centenary Way is an important building for Birmingham, not least for its green credentials, but it's also the first commercial exoskeleton building in the region," says Dav Bansal, partner at Glenn Howells Architects.

Approximately 1,950 tonnes of the 7,450 tonnes of structural steelwork was used to fabricate the 12 trusses, which are up to 34.5m long and weigh up to 130 tonnes.

Fabricated at BHC's Lanarkshire facility, the trusses were transported to site as complete sections, up to 6.15m wide. On site, a 1,200-tonne capacity mobile crane – one of the largest in the UK – erected the trusses.

The trusses form part of the basement level and their top chords help create a platform to support the majority of the building's structural frame. One of the two basement levels is accommodated within the trusses' depth. This upper basement floor houses a well-equipped and accessible cycle hub for the estate.

Steel celebrates industrial heritage

Exposed steelwork creates new offices, retail outlets and a warehouse in Shoreditch



PHOTO: TIMOTHY SOAR

Commendation: Montacute Yards, London
Architect: Allford Hall Monaghan Morris
Structural engineer: Heyne Tillett Steel
Main contractor: ISG Ltd
Client: Brockton Everlast

Montacute Yards celebrates the industrial heritage of Shoreditch through the creation of a two-storey warehouse featuring a steel exoskeleton. Two new office and retail buildings with a glazed connection are also being created, while an adjacent Grade II-listed townhouse has been refurbished.

A steel-framed solution was chosen as it provided the desired industrial look, was lighter than alternative solutions, suited the transfer structures that frame the elevations of the building and reduced the foundation costs.

Structural thermal break pads, carefully detailed into the connections at the facade, allow the exoskeleton to be achieved without affecting thermal performance.

The heavily constrained site and limited loading space required a building that could be erected quickly, with bulk deliveries at appropriate times – which again suited a steel-framed solution.

For fabrication and erection, the structural frame was modelled in 3D in both analytical and BIM formats, allowing coordination between the design team to be fed back into the structural design model seamlessly.

Award: One Centenary Way, Birmingham
Architect: Glen Howells Architects
Structural engineer: Ramboll
Steelwork contractor: BHC Ltd
Main contractor: Sir Robert McAlpine Ltd
Client: MEPC

The result is a high-quality office building with excellent sustainability credentials which has helped transform this area into a pedestrian friendly campus
 SSSDA judges



Due to the tight site constraints, a typical load-bearing core with columns going into the ground to hold the building up and give it stability was not an option. The project's design team's solution was to use the building's facade to provide the stability in the form of a Vierendeel exoskeleton.

As well as the stability provided by the exoskeleton, a centrally positioned steel braced core provides rigidity. "The exoskeleton on its own doesn't provide enough stiffness for the overall structure, so the two stability systems work in tandem," explains Ramboll principal engineer Daniel Yoxall.

The project used a steel core, instead of a concrete one, as a lighter solution. This was important, as the core had to be positioned on top of the trusses, so it could sit in a central position within the building to satisfy the internal office layout.

The Vierendeel exoskeleton is formed with a series of vertical and horizontal steel sections forming 12m-wide rectangular boxes. The rectangles incorporate 3m-wide horizontal windows, encased within an exposed structural steel facade.

The interior of the building offers large office floorplates, as well as retail space at ground floor level. The column grid is based around a 12m x 9m spacing, as this layout requires minimal internal columns, to provide an open-plan office layout.

The ground floor also has a triple-height reception area with a floor-to-ceiling height exceeding 9.5m. To accommodate this impressive reception, the first floor does not cover the entire building footprint. The upper floors have a standard 3.8m floor-to-ceiling height.

Summing up, the judges say this elegant, exposed steel structure springs off a system of trusses spanning a busy road tunnel. Despite depths of over 6m and the biggest weighing 130 tonnes, the trusses were transported to site and installed fully assembled.

The result is a high-quality office building with excellent sustainability credentials, which has helped transform this area into a pedestrian-friendly campus. ●

▼ 3m horizontal windows are incorporated in the 12m rectangular boxes of the exoskeleton



PHOTO: SRM



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PHOTO: PETER SANDGROUND

Community asset

Funded by the Scottish Government through Sustrans, and Glasgow City Council's Vacant Derelict Land Fund, a new bridge reconnects the communities in north Glasgow and completes the last link in the Forth and Clyde Canal towpath

Allowing pedestrians and cyclists to cross a canal at towpath level, instead of having to use a potentially dangerous road tunnel, the £13.7m Stockingfield Bridge has opened up routes for leisure and employment in Glasgow.

The 3.5m-wide bridge comprises two curved single-span decks

suspended on a network of cables connected to a single inclined pylon situated on the east bank of the canal.

The client was keen that community engagement played a vital part in the project's ultimate success. Residents and community groups were consulted from concept to completion, giving them

a real sense of ownership. High on the residents' original wish list were attractive landscaping, a viewing point and the inclusion of public art, all of which have been provided.

In addition, to ensure that the space is safe for female users, the project team worked with a Glasgow violence against women and girl's charity, Wise Women. As part of this collaboration, local women visited the site and provided feedback on lighting, access and layout.

Following the initial community engagement 14 submissions were received for potential artwork to be included on the site and eight were selected. These include ceramic

▲ The Stockingfield Bridge crosses the Forth and Clyde Canal in Glasgow

That's entertainment

Music, arts and culture are at the heart of a four-building development in central London



Commendation: The Outernet, London
Architect: Orms
Structural engineer: Engenuiti
Steelwork contractor: Severfield
Main contractor: Skanska UK
Client: Consolidated Developments Ltd

Entertainment spaces form a key element of central London's The Outernet, which provides around 23,230 sq m of mixed-use space, spread across four buildings and a large combined basement.

The largest venue is the Urban Gallery, a four-storey column-free space that forms part of Building A, which is a seven-storey steel-framed structure that also contains hotel, office and restaurant spaces. It is a flexible, interactive events space that contains one of the world's largest LED screen installations.

"The Urban Gallery's concept is built on the musical and creative past of Denmark Street and provides a venue relevant for the 21st century," says Andrew McEwan, project architect and associate with Orms.

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

Award: Stockingfield Bridge, Glasgow
Structural engineer: Jacobs
Steelwork contractor: S H Structures Ltd
Main contractor: Balfour Beatty
Client: Scottish Canals

panels and paving stones based on community-produced artworks.

The steel fabrication and assembly of the bridge and mast presented a number of challenges. Heavily plated structures, such as the bridge's curved, tapering, trapezoid-shaped twin decks, are prone to weld shrinkage and distortion during fabrication.

The use of bespoke jigs, welding control and dimensional monitoring were all employed to eliminate the risks. The project team also redesigned the internal stiffening configuration of the bridge decks to reduce the number of longitudinal stiffeners and transverse diaphragms, used to control plate buckling, by up to 50%.

This reduced not only the steel weight, saving both cost and carbon, but also, crucially, the amount of welding required, which in turn reduced heat-induced distortion.

"Other materials for the bridge were considered, such as concrete and timber," says S H Structures sales director Tim Burton. "Steel was selected as it was the most structurally efficient and cost-effective solution."

The construction team considered various options for the installation methodology. Taking into consideration time, cost, safety and environmental issues, the solution chosen required the temporary closure of the canal. The waterway's

sides were protected with sheet piles and, using carefully selected fill material, temporary working platforms, or causeways, were created within the waterway to facilitate the bridge construction.

The desire to reduce carbon within the project's construction programme played an important part in the design and the selection of materials.

Various initiatives were introduced to reduce the project's carbon footprint. As well as the redesign of the bridge decks' internal stiffening, these included the reuse of the temporary causeway material as part of the site's landscaping, the use of recycled materials in the asphalt and sustainable cement replacements in the concrete mixes.

Summing up, the judges say this is a well-conceived, finely executed project providing significant practical and social value, with new links between disconnected communities and much-needed pedestrian and cycle routes across a canal and adjacent road. ●



This is a well-conceived, finely executed project providing significant practical and social value, with new links between disconnected communities and much-needed pedestrian and cycle routes
 SSSA judges

▼ The curved single-span decks were fabricated off site



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



PHOTO: CENTRAL PHOTOGRAPHY, LONDON

Midlands' longest railway bridge

Steelwork forms Birmingham's HS2 line approach

Commendation: SAS13 Bridge Replacement, Birmingham

Structural engineer: Tony Gee & Partners LLP

Steelwork contractor: Severfield

Main contractor: Skanska UK
Client: Network Rail

Located close to Birmingham city centre on the Stechford to Aston (SAS) line, the SAS13 bridge is a single-span weathering steel Warren truss structure spanning 92m.

With limited time available to install the bridge, the scheme was designed to make the structure buildable within a short rail

blockade. This led to the decision to build offline and use self-propelled modular transporters (SPMTs) to lift and transport the bridge into its final position.

The replacement bridge comprises 1,095 tonnes of weathering steel, chosen because it will require less maintenance in the future compared to other grades of steel.

Once the steel bridge structure was assembled offline, it was jacked up to a height of 5m from a build height of 1.5m. The fibre-reinforced concrete deck slab, upstands and walkways were then cast, comprising 3,601 cu m of concrete, which added a further 1,600 tonnes to the overall weight of the bridge.

Once the deck was completed, 18 SPMTs were used to lift and transport the bridge into its final position.

Twin offices for Dublin

Two modern office blocks are connected at ground, third and fourth floor levels

Commendation: Tropical Fruit Warehouse, Dublin

Architect: Henry J Lyons

Structural engineer:

Torque Consulting Engineers

Steelwork contractor: Steel & Roofing Systems

Main contractor: PJ Hegarty & Sons

Client: IPUT Real Estate

Block 2 has been constructed over the footprint of an existing two-storey protected warehouse, with minimal structural columns to allow the structure to cantilever over the structure to achieve the appearance of a floating glass box.

Six fabricated plate girder columns and one central concrete core provide structural support to the building, which measures approximately 19.5m x 40m in plan. The longest cantilevers are on the north-east and south-east corners of the building and measure 10.35m on the diagonal.

For Block 1, a steel-framed solution was chosen to facilitate the long spans and shallow depths required to meet the client's brief and keep within planning constraints for building height.

Incorporating much of the fabric of an original 19th century structure, the Tropical Fruit Warehouse project comprises a five-storey (Block 1) and a two-storey (Block 2) office block that are connected via a two-floor glazed link bridge as well as a ground floor atrium.



PHOTO: ENDA CAVANAGH PHOTOGRAPHY

Other National Finalists

- Arbor, Bankside Yards, London
- Church of Oak Distillery, Ballykelly, Co. Kildare
- Dukes Meadows Footbridge, Chiswick
- Farringdon Crossrail Station, East & West Ticket Halls
- The JJ Mack Building, London
- M8 Footbridge, Sighthill, Glasgow
- The National Robotarium, Edinburgh



PHOTO: GG ARCHARD

Rolling bridge

Complex and unique engineering challenges were overcome to design and install a new steel bridge spanning the entrance to Cody Dock

- Merit:** Cody Dock Bridge, London
- Architect:** Thomas Randall-Page
- Structural engineer:** Price & Myers
- Main contractor:** Gasworks Dock Partnership
- Client:** Gasworks Dock Partnership

Complex engineering challenges were overcome to install a new steel bridge spanning the entrance to Cody Dock in east London.

With a brief for a footbridge that would not hinder the movement of vessels within the tight confines of a dock entrance, a unique rolling design, where the deck can turn upside down, was chosen.

The footbridge is a simply supported structure with a monocoque steel deck spanning 7m over the dock mouth and tapering in depth from 400mm to 550mm at midspan.

Two 5.5m rounded square portals at each end allow it to roll along undulating concrete abutments, cast into the existing masonry walls. The upper section of each portal is counterweighted so that the centre of gravity is raised to the midpoint of the frame.

Most of the structure is weathering steel, which offers strength, durability and minimal maintenance requirements.



Shipbuilders stand tall

A pair of 10m-high stainless steel figures celebrate a rich shipbuilding heritage

- Merit:** Shipbuilders of Port Glasgow
- Sculptor:** John McKenna Sculptor Ltd
- Structural engineer:** Narro
- Main contractor:** John McKenna Sculptor Ltd
- Client:** Inverclyde Council

steel plates that are welded to a steel subframe and associated ribs. This aims to maximise the mass of the structure, while minimising the weight of steel required to create it.

The primary skeleton comprises a series of circular hollow sections (CHS), with flanged bolted connections. Welded to this are square hollow sections (SHS) and steel rod secondary elements that act as outriggers to reach the SHS tertiary outer sub-frame located just under the stainless-steel faceted surface 'skin'.

"The use of steel bolted connections to join the segments of the primary frame together meant that test builds could be carried out at sculptor John McKenna's workshop, prior to them being transported to site in segments and reconnected," explains Narro senior associate Ian Downie.

Located in Coronation Park, Port Glasgow, two steel figures of workers about to strike their hammers has been installed to pay tribute to the area's shipbuilding history.

The structural form of the large figures echoes the technique of building ships. The surface skin is made up of



PHOTO: DAVE SHOPLAND/SHUTTERSTOCK

Stand up for Fulham

With little road access, steelwork for Fulham's new stand arrived by river

- Merit:** New Riverside Stand at Fulham FC
- Architect:** Populous
- Structural engineer:** WSP
- Steelwork contractor:** Severfield
- Client:** Fulham FC

A new stand at one of the country's oldest continuously used football grounds was constructed while the club carried on playing at home.

"One of the main challenges for the design team was the extremely tight site, flanked by the pitch to the north and the river to the south, as well as designing a stand that would contribute and enhance the heritage and historic nature of the ground," says Populous principal Marian Moravek.

To overcome the constrained nature of the site, a significant portion of the steel frame, all precast concrete elements and a large quantity of the cladding was transported by river, reducing the impact of road traffic on the neighbourhood.

Steel roof trusses, spanning 35m, were assembled in pairs at Tilbury Docks and fitted with roof finishes and MEP. They were then lifted onto barges, sailed up the river before being craned into position.