Capturing Bankside’s X factor

The diagonal steel bracing on Rogers Stirk Harbour & Partners’ Neo Bankside is a core part of its identity — and because of its prominence, it had to look exactly right.

Text by Pamela Buxton  Photography by Edward Surman

When Rogers Stirk Harbour & Partners engaged construction services company Balfour Beatty to build the Neo Bankside development, the client wanted an extruded grid of structural steelwork that would reflect the glass and steel of the diagrid façade of apartments in the building and stand out architecturally as the signature feature of the scheme.

“Towards the end of the design process,” says CUH.SE DESIGN structural engineers senior engineer Simon Davis, “we went from a computer-generated diagrid grid that came from a parametric system to a freehand drawing of an X pattern that could be interpreted and put into the drawing package.”

The freehand X pattern is a nod to the fundamental geometry of the diagrid, which is a structure that uses diagonal bracing to resist lateral loads and maintain stability. The diagrid is a design that was developed in the 1960s to provide a more efficient and lightweight alternative to traditional shear walls and other methods of lateral load resistance.

The X pattern is a simple representation of the diagrid’s geometry, with each X symbolizing a node where the diagonal bracing is connected. The pattern is symmetrical and can be scaled up or down to fit the size of the building.

The diagrid’s strong visual structure gives it an overriding framework that is robust enough to take the wind load. The lift tower’s steel bracing, lining up with high-rise flats with great views of the Tate, the River and beyond, demonstrates the diagrid’s strong visual structure.

LIFT CORES

The close proximity of the bracing to the building and architecturally aims to enhance the diagrid’s presence, says CUH.SE DESIGN structural engineers senior engineer Simon Davis. “We wanted to use the diagrid to enhance the diagrid’s presence, and this is one way we did it.”

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WELDED JUNCTIONS

The primary concern for housing the lift core that would accommodate the lift shaft was to create a quality junction to connect the lift core and the diagrid bracing. “We needed to create a junction that was robust enough to take the wind load and minimal in its visual impact,” says CUH.SE DESIGN structural engineers senior engineer Simon Davis. “We needed to create a junction that was robust enough to take the wind load and minimal in its visual impact.”

The lift core was designed to be inserted into the diagrid’s strong visual structure to create a robust and minimal visual impact. The lift core junctions were sealed using a combination of welded and bolted connections to create a robust and minimal visual impact.

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Symphony in steel

When designing a new music department for Birmingham University, Glenn Howells Architects faced the double challenge of creating a new brick-clad building that would live in harmony with its Edwardian neighbours, and introducing a complex steel-framed dome to the design.

Visualisation showing the Bramall Music Building completing the crescent terrace.

The dome contains more than 500 individual steel elements.

### STEEL FOCUS: BRAMALL MUSIC BUILDING

The Bramall Music Building is a complex steel-framed project located at the University of Birmingham. The building is designed to accommodate a 450-seat auditorium, a domed rehearsal room, and various studios, offices, and teaching rooms. The building is steel framed to support the wings and is supported on eight steel columns. The roof steelwork is a unique lattice grid that can be walked on.

### STEEL DOME

The dome is the most complex part of the project. It is a reverse carafe-shaped plan, in contrast to the crescent-shaped plan of the auditorium. The design makes the dome as a lantern, to catch the light of the auditorium at the rear.

The building is steel framed to support all five floors of accommodation and accommodation. The structure is supported on the site's own foundations and the project is located at the rear of the auditorium, where there is a crescent of grand deep Vierendeel trusses, which incorporate 500 individual segments of steelwork.

The ribs were then tied together with a compression ring at the apex. Only when the very last piece of steelwork had been bolted and tightened could the support tower be removed.

### PROJECT TEAM

- **Client**: University of Birmingham
- **Structural engineer**: URS Scott Wilson
- **Steelwork contractor**: Robinson Steel Structures

### AUDITORIUM STRUCTURE

- **450-seat auditorium**: A crescent-shaped brick-clad building containing studios, plant, and control rooms. The construction team had to consider the steel framing of the auditorium to make it as lightweight as possible. The steel seating towers at either side of the stage can be moved to different positions.

### STEELWORK

- **Segments assembled in situ**: Segments were assembled on site to complete the dome's ribs. These were pre-assembled and then lifting the dome into place. The ribs were then tied together with a compression ring at the apex. Only when the very last piece of steelwork had been bolted and tightened could the support tower be removed.

- **Steel columns**: The building is steel framed to support the wings and is supported on eight steel columns. The roof steelwork is a unique lattice grid that can be walked on.

- **Plant room**: The plant room is located at first-floor level, housing various systems such as heating, ventilation, and air conditioning.
A guide to fire protection for architects

Even where specialist advice is available, a working knowledge of regulations and performance is crucial when choosing the right design decisions.

Tata Steel

When to call an expert

For most projects, the complexity of the building and the size of the building means that an architect or engineer will be required to produce a fire protection specification. In some cases, this will be a basic understanding of fire engineering, but in many cases, the architect or engineer will need specialist advice from a specialist engineer. In these cases, it is important to call the expert to the project at an early stage to ensure that the fire protection design is appropriate for the building.

Building Regulations

The Building Regulations for England and Wales set out the legal requirements for buildings in the UK. The regulations are designed to protect the health, safety, and welfare of people using the building. The regulations cover a wide range of topics, including fire safety, and require buildings to be designed and constructed in a way that minimizes the risk of fire.

Fire engineering

Fire engineering is the design of fire safety systems to protect people and property in buildings. It involves the use of fire protection systems, such as fire-resistant materials, intumescent coatings, and sprinkler systems, to prevent the spread of fire and to protect the occupants of the building. Fire engineers are trained to design these systems and ensure they are installed correctly.

Building fire performance

The Building Regulations for England and Wales set out the legal obligations for building owners and developers. The regulations are designed to protect the health, safety, and welfare of people using the building. The regulations cover a wide range of topics, including fire safety, and require buildings to be designed and constructed in a way that minimizes the risk of fire.