A new footbridge designed by Wilkinson Eyre Architects over the Manchester Ship Canal uses steel to create a structure that is both functional and visually appealing.

**Cable technology gets Salford in the swing**

**STEELE DECK STRUCTURE**

This deck is an aromatic steel box, which means that the structural crosssection forms the actual surface of the bridge, with differential expansion between the structural steel and the concrete deck box that covers it. The design ensures the steel box is protected from the elements, which is important. The deck is a high-performance concrete mix, and the surface is a very thin layer, which helps to reduce the weight of the approach ramps that are supported on the bridge deck. The bridge deck is designed to be able to carry live loads of 60 tons, which is in line with the expected traffic volume.

**CABLE-STAYED BRIDGE**

The cable-stayed bridge is an elegant solution to the problem of supporting the weight of the concrete deck box. The cables are anchored to the main towers and support the deck, ensuring that the structure remains stable and safe. The bridge is designed to be able to carry heavy loads, including trucks and buses, while still maintaining a smooth and level surface. The design was inspired by the traditional tower crane, with its large, vertical columns that support the deck. The bridge is a masterpiece of engineering, combining beauty and functionality in a unique and innovative way.
Auditorium structure

The auditorium seating is arranged in three levels and is divided into a 7.5m-wide, 12.6m deep thrust stage that provides views of the acting area from the auditorium. The fully supported steel structure holds the entire seat, stage, and machine areas above the concrete frame of the building.

The perimeter columns support the lightweight steel structure that holds the thrust and upper seating areas. The lightweight structure is increased in height to 10m by 10m by 7m, breaking the scale of the existing auditorium. This creates the possibility of approximately 400 seats, giving an overall capacity of 3400 seats.

Stage and flytower structure

Steelwork contractors Gardiner & Theobald were responsible for the exposed steelwork in the auditorium, which had a team of 80 people involved in the steel fabrication and assembly.

The steel structure is left exposed, including the ribs of the underside of the circle balconies, which have painted un-finished foyer areas.

Fire on stage, Buro Happold was able to show that the trusses and other technical elements did not need a fire protective coating — which would have been problematic given that they are constantly handled and damaged when in use. Critics may argue that the need for a safety curtain between the stage and auditorium floor level, and are set approximately 4.5m apart, breaking up the large number of seats.

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STEEL FOCUS: TARGET ZERO

New research will help architects maximise low-carbon design

Target Zero guidance on achieving low-carbon buildings has been launched by the BCSA and Tata Steel. Here are three steel-framed projects featured in the research

What is Target Zero?

Target Zero is a £1 million research programme set up to provide free guidance on the design and construction of sustainable, low- and zero-carbon buildings in the UK. It is funded by Tata Steel and the British Construction Steelwork Association (BCSA) and has been carried out under the auspices of 13 sustainable construction organisations including AECOM and Cyril Sweett.

The guidance analyses five non-domestic buildings — a school (Christ the King Centre for Learning, Knowsley), a distribution warehouse (DC3, Prologis Park, Stoke, Staffordshire), a supermarket (ASDA food store, Stockton-on-Tees), a medium-to-high-rise office (One Kingdom Street, Paddington) and a mixed-use building (Holiday Inn, Salford Quays).

In each case, the designs are modified to a base level compliant with 2006 Part L before introducing the latest Building Regulations changes.

The research focuses on how Very Good, Excellent and Outstanding BREEAM ratings can be achieved and at what cost, quantifying energy-efficiency measures and low- and zero-carbon technologies.

What to know more?

The first three guidance reports — Schools, Warehouses and Supermarkets — can be downloaded now from the Target Zero website with the final three reports to follow.

One Kingdom Street: target zero

One Kingdom Street is designed around two central atriums, which help reduce solar gain.

Steel was the only structure able to span the gaps between the podium over the route for Cross-rail and the west end to east end of the site. This has been achieved with geothermal piles to provide ground source cooling and the use of renewable energy such as solar panels.

The building is designed to the south because it offered a better buffer to solar gain, says Sheppard Robson partner Mark Homan.

The main structural system at ground level is formed of steel beam columns supporting a lightweight concrete slab on a profiled steel deck. The east and west core service cores are at the east and west ends to minimise sun penetration.

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