BUROHAPPOLD ENGINEERING

PULLING THE PIN ON OLD STYLE SWING BRIDGE DESIGN

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COPENHAGEN, DENMARK

Spanning across a busy harbour close to Copenhagen city centre, the new bridge at Vester Voldgard combines sleek design with unique technical solutions. The design enhances urban life and vibrancy on the waterfront, creating connections and ensuring a safe and accessible crossing for the use of pedestrians and cyclists, in order to strengthen cycling culture in the city.

BuroHappold Engineering won the international design commission for this vital new structure at Copenhagen Harbour, working in collaboration with Wilkinson Eyre Architects and mechanical engineers Eadon Consulting.

Our engineers needed to devise a plan that would see the client's vision of a striking footbridge meet practical and inspiring engineering. In response, our team designed a striking and beautifully engineered, double-opening swing bridge that clears 35 metres to allow ships to pass underneath. It is curved in plan, and incorporates a cycle way and a footpath, which provides a safe route for users to cross the harbour, improving access between the two sides of the water.

A key feature of the design is the development of the bridge's moment connection. The opening and closing mechanism consists of two horizontally rotating elements, mounted on slewing rings, which when closed fit together seamlessly. Working with Eadon Consulting, we designed an innovative structural moment connection that locks the two moveable parts together using mechanical and hydraulic components.

This is imperative to achieving the architectural intent, as it avoids the need to raise the height of the bridge over the supports, allowing the structural depth to be kept to a minimum so that users can enjoy views across the harbour.

By creating a reliable moment connection at the centre of the bridge, our team has achieved an important innovation in moving bridge structures. We used tried and tested equipment in a new way to

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DURATION
2015 - 2019

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deliver many benefits over a traditional locking pin arrangement. Achieved via a system of hydraulic cylinders, the connection not only supports the visual concept for the bridge but also offers key engineering benefits. As well as offering protection against excessive wear associated with locking pins, we carefully designed the structure so that it was as simple as possible to allow for maintenance in the future.

The project also includes refurbishment of the quaysides and landscaping by a local architect, with the bridge providing a focal point to the improvements and enhancing the waterfront for users. The BuroHappold team managed the project team throughout, and full regulatory and technical approvals have now been received.

The newly completed bridge reconnects the urban spaces on both side of the harbour, offering the community safe passage over the water, while creating more opportunities for recreation. Combining bespoke, clever engineering with sophisticated design, this elegant structure provides an iconic footpath into the city.

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