

Great Eastern Quay

London, United Kingdom



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Type of building:
Office building

Building contractor:

Great Eastern Quays is a mixed-use masterplan for a 6.2ha site and forms part of the Royal Albert Basin area at the eastern end of the Royal Docks complex.

The scheme is being marketed as Royal Albert Wharf and seeks to enhance the East Beckton community by delivering an integrated, high quality and sustainable residential-led, mixed-use development that takes advantage of the river and dockside setting.

The masterplan has been designed around three distinct character areas; the Dockside, the Riverfront and the residential heart. The proposal connects with the existing adjacent community, extending the active dockside, and seeks to create a vibrant commercial core, providing the start of a sustainable development that will allow for a sense of community. The Riverfront has been designed as a semi-wild landscape, extending the capital ring and will offer access to the spectacular, expansive views along the river towards the Thames estuary. Residential squares are domestic in character and provide an intimate counterpoint to the exposed Dock and Riverfront. The proposal utilises innovative duplex typologies to create affordable family homes, accessible from the main street.

The design challenge for this development was to allow movement in a large footprint podium slab. Several buildings consisting of smaller footprints were designed above the underground car park. This resulted in the podium slab being partially situated within the external area, and partially within the internal area. The location of the movement joints were designed by Structural Engineers at Conisbee to allow movement longitudinally and laterally in the plane of the slab. Any vertical movement in the slab was to be resisted.

Traditional RC construction uses corbels or downstands as the most common method of transferring loads across a joint. Additional columns can be used to separate concrete members. **These**

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methods, which fulfil all requirements for allowing movement and transferring the load, come with some significant disadvantages:

- Complicated reinforcement details.
- Complex formwork required, which can affect the construction programme.
- Downstands are visually not appealing.
- Additional columns and downstands involve further materials and costs.

Therefore, in modern concrete construction, Shear dowels are commonly used as a time and cost-saving method. These engineered products consist normally of a dowel bar, with corrosion protection (as the joint is not serviceable at a later stage) and some form or anchoring body that allows the efficient transfer of the load into the concrete member. Enabling the challenge to be solved in a more efficient way with the use of shear dowels.

In many cases, such as the Great Eastern Quays project, a change in direction of the movement joints is required – posing a further design challenge, as shown in figure 4. Therefore, in addition to shear dowels for longitudinal movement, MAX FRANK developed the ‘Q-type’ Egcodorn® for transverse movement. This product allows sideways movements with the use of a rectangular dowel sleeve instead of the usual round sleeve.

During the course of the project, MAX FRANK’s technical team worked closely with the Structural Engineers at Conisbee to optimise the design. **Egcodorn’s high grade steel core, enclosed by a stainless steel airtight shell, allows the transfer of extremely high loads.** In this case, each dowel was designed to transfer 370 kN at a joint opening of 20mm. The dowel centers were set at 800mm in accordance with the design guidelines, as provided by the design software. Then the slab reinforcement was optimised to allow transfer from the patented anchoring body of the Egcodorn® into the slab.

As an additional challenge, the project required 2 hours fire protection in the movement joints, which was achieved with fire collars positioned around the dowels. These fire collars are easy to install on site and are tested to provide a **fire rating of R120**.

During the Great Eastern Quays project, a total length of just over 230 linear metres of expansion joints were designed and built with this innovative way of construction. As well as making the design easier, the use of Egcodorn® shear dowels enabled the project team to progress the development according to the planned schedule. Therefore, shear dowels are considered as a great advancement in modern concrete frame construction, for all parties involved.

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Products used:



Shear force dowel Egcodorn®



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