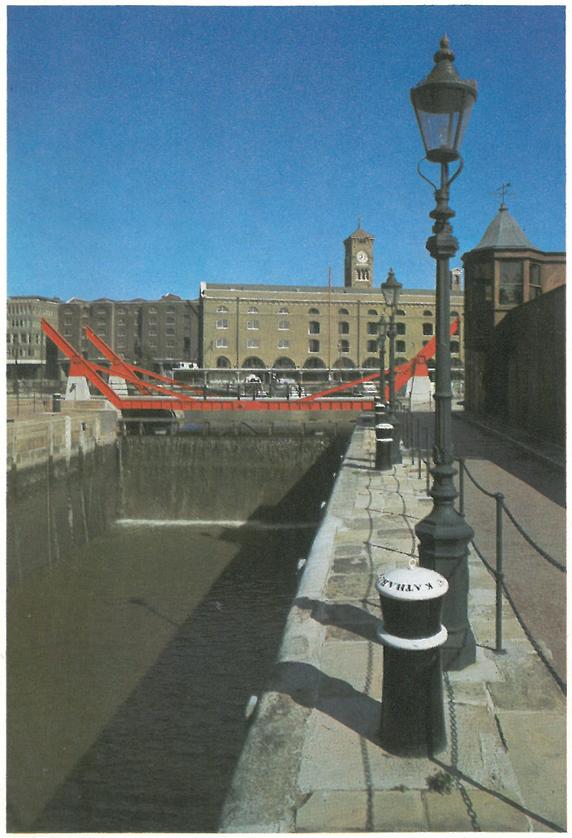

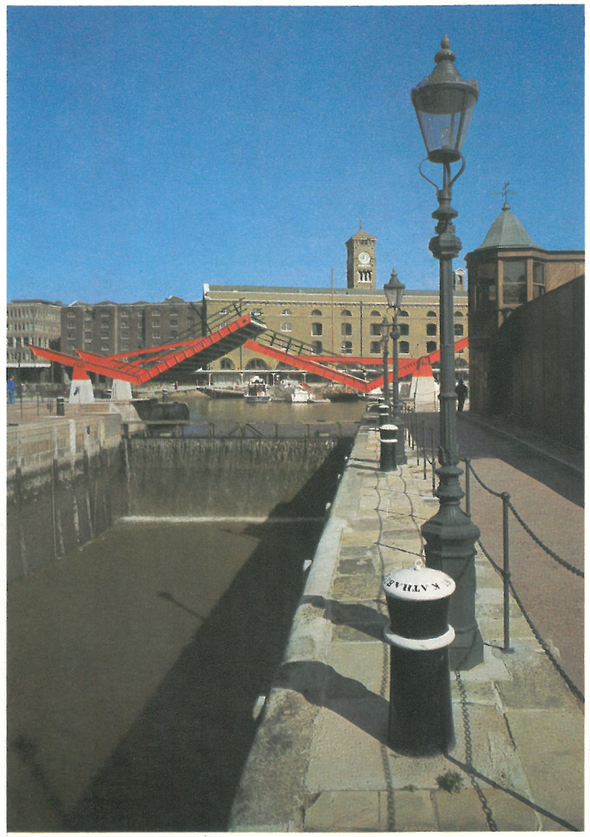

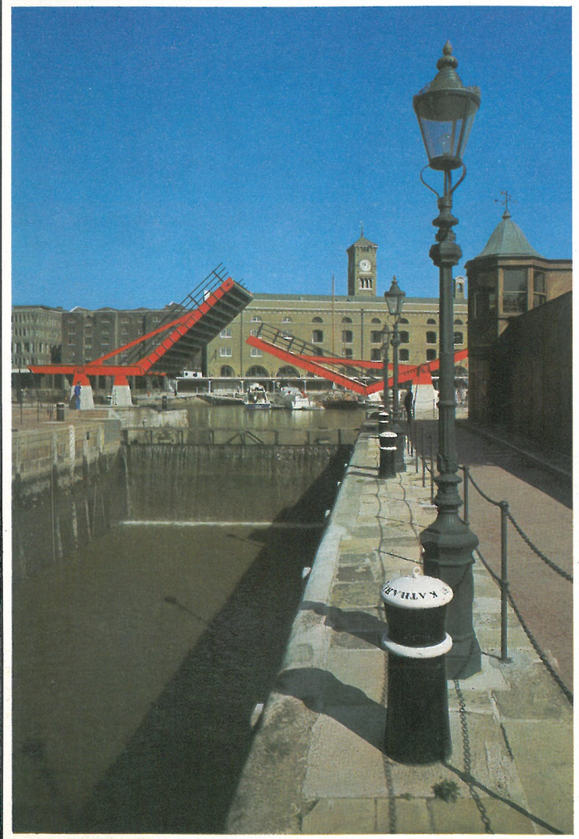

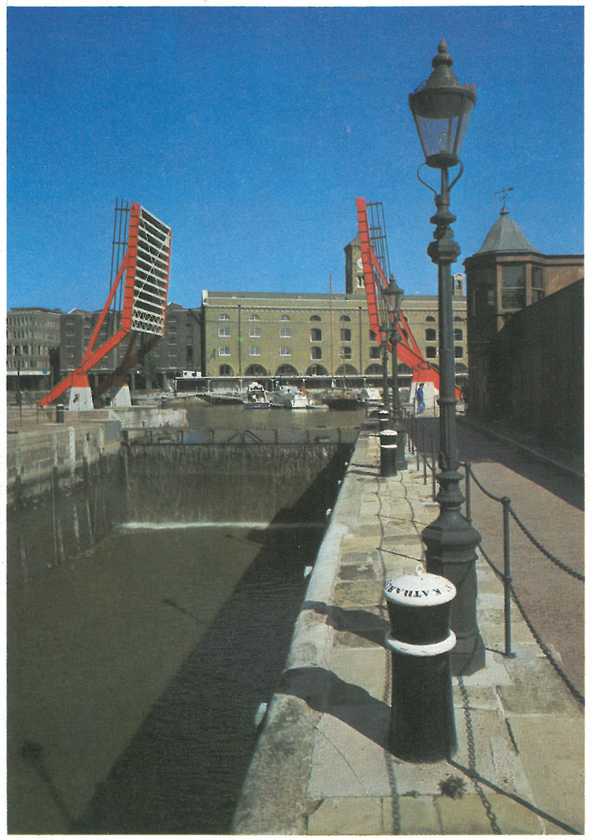

St. Katharine - by - the - Tower Inner Lifting Bridge

At St. Katharine Docks, London, for Taylor Woodrow Property Co

Structural Engineers

OVE ARUP & PARTNERS

Steelwork Contractors

BOULTON AND PAUL (STEEL CONSTRUCTION) LTD AND MOLE-RICHARDSON (STAGE AND STUDIO ENGINEERING) LTD

Judges Comments

This moving bridge is simple, functional and matches its attractive setting. The open steel grid for the carriageway and the direct action lifting mechanism are novel and contribute to the overall success of a cleverly designed structure.

The client required a bridge which was simple and inexpensive and which would add some character to the St. Katharine Docks development. There was no room for a bascule bridge or a drawbridge.
Generally a large part of the cost of lifting bridges is in the operating machinery so it was decided to try and reduce this element to a minimum. The use of cables to raise and lower the bridge enabled a very economical solution to be found. The geometry of the bridge is arranged so that the centre of gravity is always sufficiently outboard of the pivot to keep the cables in tension up to and beyond the design wind speed of 60mph. The bridge will not be raised if this speed is reached (it will not be practical to use the lock in these conditions anyway).
The cables are used only to raise and lower the bridge and are controlled by hydraulic rams, one for each arm. Hydraulically operated nose locks are used to line up the two leaves in the down position and form an effective pin-joint at the centre. When the bridge is down and carrying load, each half acts as a cantilever from the dock wall with a shear key between the ends of the two leaves to keep them in alignment. The bridge is operated from a central control panel and the whole sequence can proceed automatically. Because the pivots are higher than the noses one leaf has to start lifting before the other (see opposite) and this is ensured by the operating sequence.
Each of the main side frames is carried by a shaft rotating between two standard spherical bearings. When the bridge is down the bearings transmit the necessary holding down force from the concrete pedestal. The other force of the stabilising couple is a compression reaction transmitted through rubber pads to the face of the quay wall.
The main side frames and the deck crossbeams are made from universal sections of high yield steel. The steel mesh deck was chosen for lightness and its low wind resistance and performs the double function of supporting traffic and stiffening the deck. Together with the cross bearing beneath the deck it forms a torsion box.