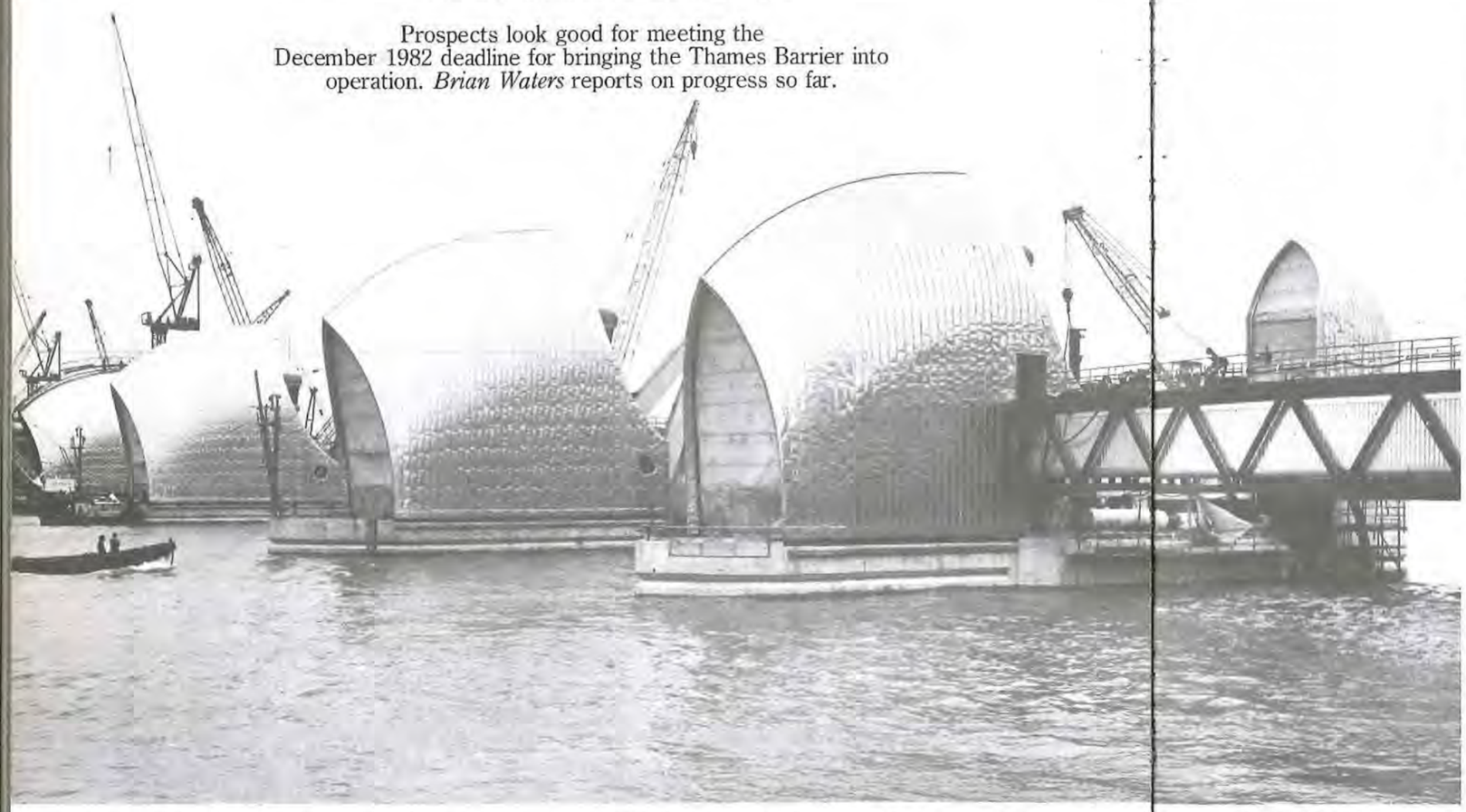
RISING AGAINST THE TIDE

Prospects look good for meeting the December 1982 deadline for bringing the Thames Barrier into operation. *Brian Waters* reports on progress so far.



The critical condition for a London flood in the winter of 1982-83 would be created by the superimposition on a spring tide of a tidal surge produced by a trough of low pressure travelling clockwise round the British Isles, a circumstance which would be accentuated by the funnel effect of the North Sea and the Thames estuary leading to London. Adrian Franklin, project manager for the CTH consortium, is optimistic about the prospects of meeting the December 1982 deadline for bringing the Thames Barrier into operation and averting any possibility of such a disaster. "We now have two cills to be installed and only one gate of each type still to go," he says.

The design by consulting engineers Rendell Palmer and Tritton divides the navigation channel into two pairs of 61 metre spans using rising sector gates. These provide a differential head of 8.4 metres between downstream and upstream water levels, imposing a maximum 9000 tonnes of hydrostatic load, the weight of gate and arm being 3200 tonnes. The gates swing on permanently lubricated bearings mounted on 40 tonne forged steel stub-shafts, which are in turn secured by bolts supporting units weighing up to 150 tonnes passing right through the piers and cast into the pier concrete.

Construction work is divided into a number of contracts, the principal ones being for the gates, for operational machinery and for the main civil engineering works. The civil works contract is being carried out by a joint venture (known as CTH) between Costain Civil Engineering, Tarmac Construction and HBM of Holland.

The major constraint on construction of the barrier has been the need to maintain a navigational channel at all times. To achieve this passage of river traffic, construction has been divided into two stages: the first provided for construction of the southern structures, piers six to nine and the south abutment; and the second for the northern diversion channel. A dry dock was formed on the north bank for casting the concrete cills of the rising sector gates. When the first four pre-cast cills had been built and floated out from the dry dock, work commenced on the remaining two cills and also on construction of piers one and two and the north abutment. Final removal of the dry dock has now taken place. The remaining civil engineering work to follow structural completion of the last two piers will be the removal of temporary structures before final installation of the cills and protection of the river bed. Details of earlier stages of construction were reported in *Building* "On site" on 3 August 1979.

Setting out tolerances have had to be unusually fine since there is a close fit between the gate support and machinery bolts. Electronic distance measuring equipment is being used to subdivide the distance between survey towers on north and south banks. The cills are guided down into position to span between the piers beneath the river bed with only a 50 millimetre tolerance. The cills are being floated into position against guiding members and sunk into their final locations, after which sand is pumped underneath and inside as ballast.

A major element of the civil work still to be completed is the protection of the river bed on both sides of the barrier against scour. Dredging has commenced to form the required profile using a back-hoe dredger. Mattresses consisting of filter cloth reinforced with reed and willow will then be floated into position, lowered and ballasted with filter stone. Stones ranging in weight from 400 kilograms to six tonnes, depending on the scour anticipated in the various spans, will then be placed on the filter stone either by self-propelled dumping vessels or by a barge mounted grab crane.

Two major concerns of the consortium thoughout the contract have been safety and labour relations. Adrian Franklin explains: "Excavation and foundation work and locating the cills has involved teams of divers working in black water conditions and in strong currents. Fortunately we have had a good safety record on the project, the main problem being minor cases of bends. I think we have achieved possibly half the accident rate of the national average, and this on a site where a changing pattern of work makes it less easy than with a repetitive production process." CTH's handling of safety matters is assisted by a safety committee which meets on a monthly cycle.

Explaining labour relations, Mr Franklin continues: "There has been a works committee on the project since day one, made up of seven men and led by representatives of the two major unions on site, UCATT and TGWU. There is a shop stewardship of 22 covering all trades and including a senior steward on each shift. The subcontracting element is very small and it generally involves off-site fabrication." An exception is the dredging work being carried out by a Dutch specialist under a waterman's agreement with the Dutch.

There were of course early problems with labour relations on the site, particularly with demarcation. "The job started in 1974 when the building industry was at full peak and we had to search the country for people capable of heavy temporary works. We still have to cope with differences between structural and civil engineering agreements," explains Adrian Franklin.

The Conservatives at County Hall set up a new agreement with CTH which came into force in January 1979 and was then confirmed between CTH and the unions. Its main aim was to bring the barrier into operation by the end of 1982, and financial incentives are being paid for meeting this target and various stages leading up to it. The scheme is clearly working and the project is on target, working round the clock on three shifts on a 5½-day week ●

Far left: up-river view of the piers clad in stainless steel on laminated timber frames to protect the operating machinery. The concrete has been detailed to disguise waterline staining. Reminiscent of Sydney Opera House, the shells are being fixed in place by Tysons of Liverpool.
Above left: the site seen from the south bank with two short spans in the foreground. Both floodgates are in the over-water maintenance position.
Below left: a giant Dutch barge crane being used to lower the steel rising sector gates into position.
Below: a 61 metre span cill being towed into position between the piers before lowering to the river bed.

Credits
Thames Barrier
projected cost
£341 million
client
Greater London Council
architects (superstructure)
GLC architect
consulting engineers
Rendell Palmer & Tritton
civil works contractor
CTH joint venture
(Costain Civil Engineering, Tarmac Constructon, Hollandsche, Betton, Maatshappij BV)
gates and machinery contractor
Davy-Cleveland Barrier Consortium, joint venture
bearings
Merriman Inc (USA)
stub-shafts
British Steel Corporation
support structures
Voest-Alpine (Austria)

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