

PUTNEY BRIDGE, FULHAM, LONDON

STRENGTHENING OF PIERS FOR LONDON UNDERGROUND / TRANSPORT FOR LONDON

Background – Bridge Piers

- The piers are formed of Cast Iron caissons which are made up of 1 1/4"thk radial segments of 9' length, bolted together with cross section made of:
 - 7 No. at 14' OD section,
 - and 5 No. at 10' OD section.
- The caissons were sunk, dewatered and subsequently filled with concrete at section below the river bed. The rest of the caissons were filled with stock bricks in Portland cement. The brickwork was capped with Dartmoor Granit to house the bearings.



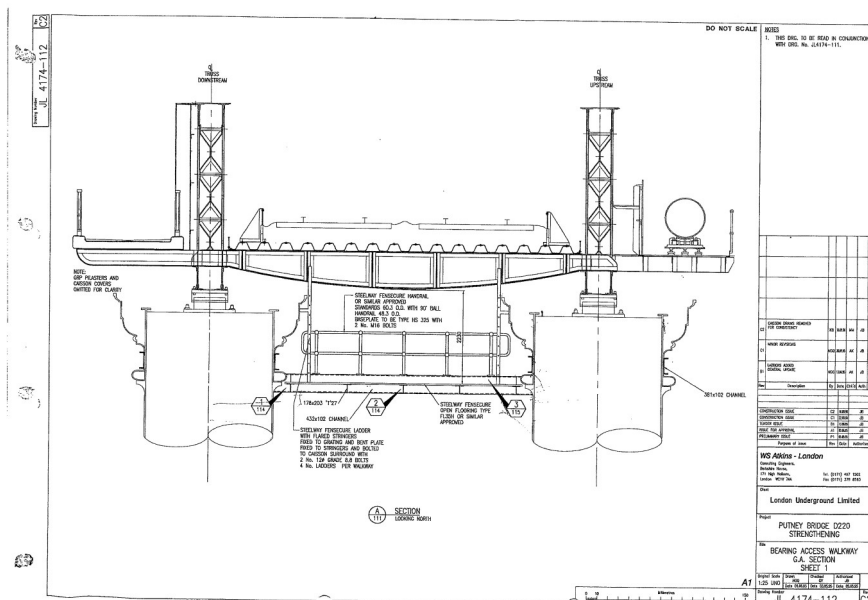
The piers, which are constructed using cast iron have developed vertical cracks. As you are aware, trying to repair any cast iron elements is next to impossible.

The client wanted to know if it would be a viable solution is to drill in cintec anchors from the top of the pier to ensure its stability.

Having carried out similar vertical reinforcement projects in brickwork in the past the Cintec team were confident that this could be achieved.



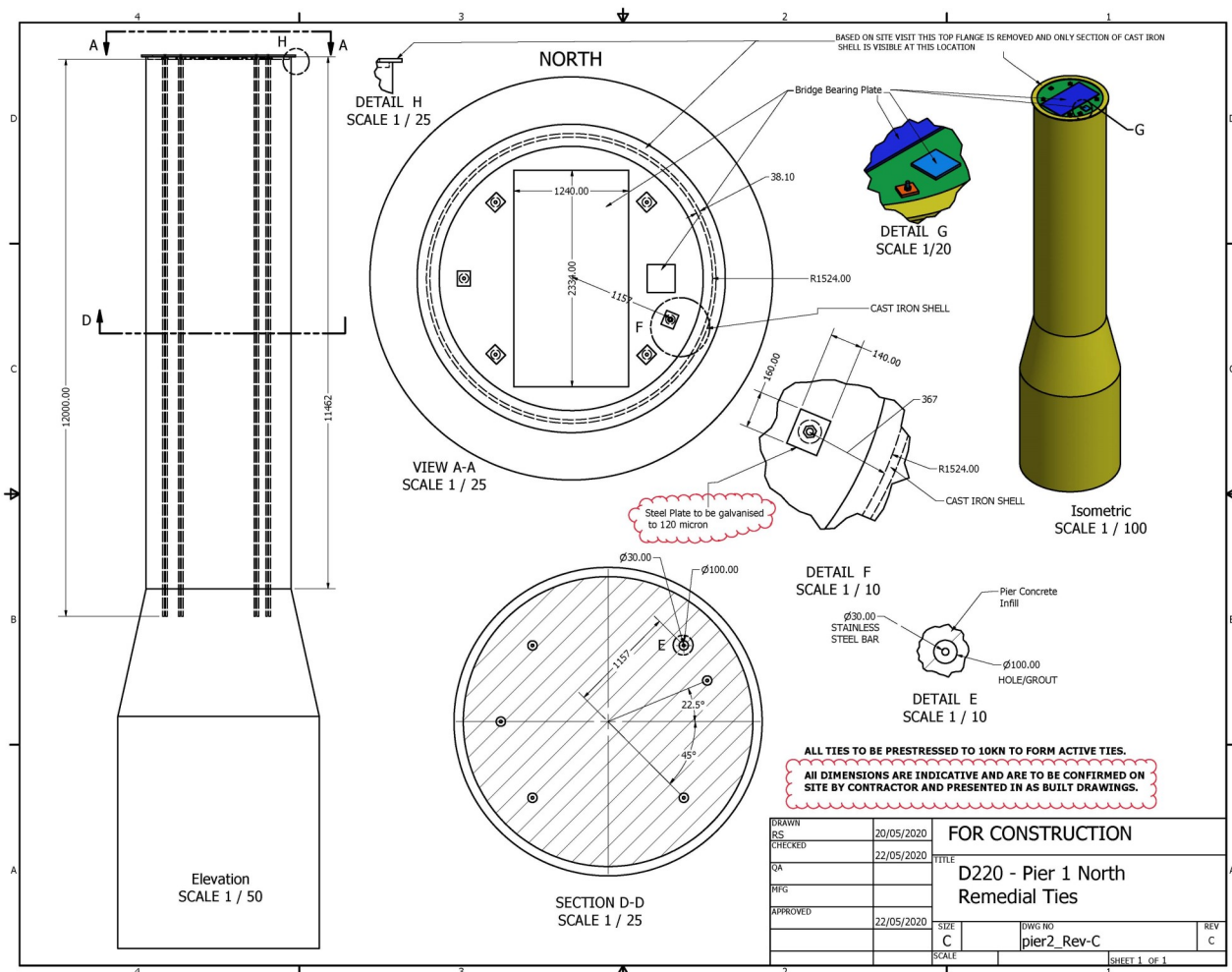
The cast iron pier caisson had developed major structural cracks which contained the mass brickwork fill and concerns were that there would be a major failure of the support structure for the railway bridge.



Archive drawings revealed the construction and details of the pier in relation to the railway above and the associated structural steelwork.

A site inspection and survey followed and it was determined that there would only be 1.60m of headroom above the pier cap available as working space.

The 12m long anchors which were specified by the client would be sectionalized to permit insertion.



The Transport for London chief engineer for Bridges and Structures issued a design calling for 6 number Cintec anchors consisting of 30mm Grip Bar in 101mm diameter diamond core drilled holes x 12 metres long set vertically to reach the lower end of the parallel sided caisson at which level it was believed that solid concrete would be found.



Drilling was accomplished with sectional mining barrels and continued to a depth in excess of 11.00 metres when extremely hard and dense concrete was encountered which was approved by the client as the termination point.

All anchors were post-tensioned by having two separate socks and allowing the lower end sock to cure prior to applying a tensile load of 20kN. The project was completed on time and within budget.