

Upper Kilmacud Bridge - Dublin



Parapet Wall Strengthening

The parapet walls of Upper Kilmacud Bridge were allocated for strengthened as part of the Dublin Light Railway Project. The single span brick structure carries a two-way carriageway approximately 5.5m wide and two footpaths of 1 and 1.5m in width. The parapets themselves are of granite block masonry some 0.4m in thickness and varying between 1 and 1.5m in height.

The bridge has a 30 mph (48kph) speed imposed limit, however in order to ensure greater safety, and following a collision in which a section of the wall was damaged, a vehicle containment level of P6 was requested. Such a high containment rating required extensive engineering to not only strengthen the parapet walls, but also to upgrade the barrel of the masonry arch in order that it absorb the forces of an impact without causing major structural damage. Drilling and anchor installation was undertaken by TST Ltd during the summer of 2003. The project involved a total of No.98 Cintec anchors all made of ribbed bar high-grade stainless steel. Using stone of similar type and appearance, each wall was heightened to a uniform 1.5 metres and then strengthened horizontally with No.5 13m long anchors 16mm in diameter and installed into 50mm diameter core drilled holes (Fig 1). These anchors ran the entire length of the parapet walls. In turn, the horizontal anchors were supplemented with vertical anchors of 32mm diameter reinforcement bars installed from the top of the parapet walls and down into the barrel of the arch. Their lengths varied from 5.1m to 2.7m according to location (Fig 2). Finally, No.8 transverse anchors were installed through the fill and No.15 9.4m long transverse anchors installed through the entire width of the barrel and so unifying the various structural elements of which the bridge is comprised (Fig 3).

