

Thelwall Viaduct, UK



Flint & Neill Limited was appointed by the Highways Agency to carry out the independent review of the emergency replacement of the bearings for the 1300m long Thelwall Old Viaduct in Manchester, England. The viaduct carries the Northbound carriageway of the M6 across the Manchester Ship Canal and the River Mersey.

In mid 2002 a number of roller bearings were found to have cracks in both the rollers and the bearing plates. A subsequent, complete failure of one bearing necessitated emergency repair of all eight bearings at the Manchester Ship Canal support. Flint & Neill carried out an independent assessment of the loading on the structure and of the effects of jacking up the support bearings in groups of four to facilitate replacement.

Given the high transverse stiffness of the deck, accurate models of load sharing between the bearings were required to ensure even loading between the bearings. Non-linear spring models were developed which showed very close agreement with force displacement data gathered during bearing jacking.



The assessment work was extended substantially as further roller failures were discovered, resulting in complete bearing replacement. This work showed that there were a number of shortfalls in the capacity of the sub and superstructure and a complete Category III Independent design check was undertaken of Atkins assessment of the viaduct.

Deficiencies were found in a number of web panels which required the provision of additional longitudinal web stiffeners to reduce stresses to acceptable levels. The substructure pier cross beams were also shown to be heavily overloaded and required the addition of post tensioning bars to boost the bending capacity of the concrete beams.

The work was all carried out to a very tight schedule to minimise the costs of delay on this unscheduled closure of one of the UK's major arterial route. Much of the work was successfully completed ahead of schedule to allow a partial reopening of the structure with three lanes of traffic for Christmas 2004.