



This 1000m long double deck steel box girder viaduct carries the A631 and the M1 motorway through a region of industrial and urban development in Sheffield and is a critical link in the UK trunk road network.

As the bridge was originally constructed in 1960s, it has already been subject to reinforcement as part of the Merrison Strengthening Works in the mid 1970s.

This complex structure is very heavily trafficked and the columns supporting the upper deck are vulnerable to collision impact from heavy vehicles using the lower deck. The assessment identified a number of deficiencies in the webs, flanges, cantilevers and support diaphragms, and problems with shear connection to the composite concrete decks. All strengthening and refurbishment works had to be designed and planned in such a way as to enable implementation with minimum disruption to traffic.

F&N's work included the assessment of the structure to resist the blast loading arising from the use of explosives to demolish cooling towers adjacent to the viaduct.

F&N's approach enabled the client to consider a number of strengthening options which could provide considerable savings to be made to the cost of strengthening. This was made possible due to F&N's in-depth knowledge of the background to the steel box girder bridge design and assessment codes of practice enabling us to adopt a bridge specific assessment philosophy, an approach we would recommend to owners of such structures.

Client:
Highways Agency

Location:
Sheffield, UK

Service Dates:
2003-2008

Services:
Independent design check;
Structural assessment under
blast loading;
Design of strengthening

