

M1 Tinsley Viaduct Strengthening & Upgrading

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The Tinsley Viaduct is the country's first-ever double-deck steel box girder bridge. As such it was a UK pioneering project when built in the 1960's with a troubled history and numerous engineering reviews and actions. Darlington based bridge builder Cleveland Bridge UK Ltd commenced the building programme in 1965 after winning the contract on price against an alternative pre-stressed concrete design. Although the first cars passed over the lower deck of the viaduct in March 1968 it was to be more than a decade before Tinsley was fully opened to traffic on both decks. Only two years later, the year 1970 was disastrous for steel box girder bridges. Two collapses prompted more stringent design standards and between 1976 and 1980 a series of inverted triangular trusses were added to strengthen the viaduct's main piers.

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Expansion joints at the road surface allow movement between consecutive bridge spans or between span and abutment. The Tinsley Viaduct has large roller shutter type expansion joints- on two levels with 650mm movement. These endure after being refurbished by EKSPAN 17 years ago.

Perhaps less generally known is the fact that the viaduct carries both gas and water mains pipelines under the lower deck that are supported by special bearings. These too must allow complex differential movement. In 1998, EKSPAN acting as principal for Transco, designed, manufactured and installed new bearings for the gas main pipeline on the viaduct. The bearings had to accommodate the thermal expansion effects of both the bridge and the gas in the pipeline.

Temporary TV telemetry was installed to monitor relative movements of the pipeline to bridge deck and pipeline to ground. This enabled continuous monitoring and validation of performance of the bearings against calculations as installation progressed over the length of the structure.

During the current strengthening works on the viaduct, EKSPAN was awarded the contract to refurbish the water main pipeline bearings. Working with Yorkshire Water, consultants Owen Williams and Cleveland Bridge, EKSPAN has undertaken the work for removal, refurbishment and re-installation of the pipeline bearings. This has required a close cooperation with the steelworks contractor to complete the work in sequenced phases as new cantilever structures were added to the decks. The whole structure is articulated upon Glacier Bearings. This range is now manufactured and supplied with full service from EKSPAN Ltd. from plants in Sheffield and Ilminster.

JOB BRIEF

- Job Brief
- Supplied: Refurbishment of Pipeline Bearings (1998-2004) and Expansion Joints (1986)
- Project Team
- Clients: Highways Agency
- Yorkshire Water
- Design Consultants: Owen Williams Ltd
- Main Contractor: Edmund Nuttall Ltd
- Sub Contractors: Cleveland Bridge UK
- EKSPAN Ltd.
- Start Date: 1986
- Completion Date: 2004



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