

M4 BOSTON MANOR VIADUCT - BRIDGE JACKING & ROLLER BEARING REMEDIAL WORKS



Project Brief

Bridge jacking and remedial / replacement works on mechanical roller bearings.

Project Team

Client: Geoffrey Osborne Ltd.
Main Contractor: USL Ekspan

Background Information

Boston Manor Viaduct, located just off Boston Manor Road, is a 1km long, steel, 17 span elevated section of the M4 motorway in west London. The Viaduct carries the M4 motorway into London and is the main route from central London to Heathrow airport.

An inspection carried out by a third party revealed the existing roller bearings required immediate remedial works. During the emergency works USL Ekspan designed and installed temporary packers capable of both supporting and allowing the structure to articulate should the bearings fail. Geoffrey Osborne Ltd employed USL Ekspan to fabricate and install temporary jacking frames to allow access to the roller bearings for the remedial works to be carried out.

USL Ekspan's Workscope

Following a full survey of the bearings, bearing shelves and bridge beams, USL Ekspan supplied and installed bespoke temporary jacking frames and hydraulic cylinders to transfer the bridge dead load from the permanent bearings to be fully supported by the temporary works. USL Ekspan also manufactured new bearing components to enable replacement of the existing worn components only and interface with the remaining bearing parts.

The remedial works to the roller bearings were carried out one at a time, each completed during a single night shift. The structure was jacked up, the hydraulic cylinders were mechanically locked off, and the hydraulic equipment and temporary support packing plates were then removed. The bearing top plate, roller top, bottom plate, and the top and bottom racks were all removed, the existing components were cleaned and inspected, then the removed bearing components were replaced with new components manufactured by USL Ekspan. De-jacking the structure could then commence, with transfer of the dead load back onto the roller bearings.

USL Ekspan's expert knowledge in this area of work and precision planning were essential requirements for this project - as associated hazards such as working at height, lifting, propping and jacking, are potentially highly hazardous to both the structure and personnel.

The successful completion of this project resulted in USL Ekspan being invited to the Atkins Bridge Engineering awards in Birmingham. M4 Boston Manor Viaduct bearing renewal was given the Special Award for Best Collaborative Approach to Safe Design. The judges identified this as a fantastic example of all parties in the scheme working together to implement a solution, which considered the logistical constraints of the site, the risk to the structure, stakeholders and the detailed planning that went into measuring and recording the activities during the jacking works.



Jacking of twin bridge beams with bespoke temporary works



Bearing height monitoring of vertical deflection

Head Office

Kingston House, 3 Walton Road, Pattinson North, Washington, Tyne & Wear, NE38 8QA, UK
t: +44 (0) 191 416 1530 e: info@uslekspan.com www.uslekspan.com