Case Study - Bearings & T-Mat Expansion Joints

NORTHERN HUB PROJECT - USL EKSPAN SUPPLY & INSTALL BEARINGS & EXPANSION JOINTS

Project Brief

Design, manufacture, supply and installation of 152 no. mechanical and elastomeric bearings on 7 structures.
Supply and installation of 13 no. T-Mat expansion joints on 9 structures.

Project Team

Client: Network Rail
Main Contractor: Skanska Bam Nuttall JV
Sub Contractor: USL Ekspan

Background Information

The Northern Hub, operated by Northern Hub Alliance and Network Rail, was a programme of planned work schemes for major improvements and upgrades to the rail infrastructure in the north of England. The Northern Hub project would provide improved and increased rail travel/services and connectivity, and in turn stimulate economic growth.

Skanska BAM Nuttall JV, one of the alliance partners, were awarded a number of key structures, including the Ordsall Chord - the installation of a new 300m-long twin-track rail link crossing the River Irwell. The Ordsall Chord will provide a direct connection between Manchester Piccadilly, Manchester Oxford Road and Manchester Victoria stations for the first time ever.

T-Mat expansion joint installation works

USL Ekspan's Workscope

USL Ekspan were contracted by Skanska BAM Nuttall JV to supply and install bridge bearings and expansion joints to numerous structures during the construction phase of the project.

In total USL Ekspan designed, manufactured and supplied a total of 152 mechanical and elastomeric bridge bearings all to the relevant EN1337 standard. The bearings range in vertical capacity from 380KN to 22,500KN ultimate limit state. Due to high horizontal forces exerted by moving rolling stock and the geometry of certain structures, bespoke mechanical bearings with 5755KN horizontal capacity were produced. The largest bearing supplied was a guide bearing on Trinity Way Structure (OCD6) measuring 1300 x 1200 x 380mm, weighing approximately 2,600kg.

Mechanical bearing installed

In addition to the bridge bearings, USL Ekspan supplied and installed 13, T-Mat expansion joints over an eighteen-month period. The expansion joints varied in length and size to suit specific structure geometry and movement range with the longest expansion being 12.5m and able to accommodate movement of +/- 130mm. This type of expansion joint was selected, not only to accommodate the movement range, but also as it features a flush finish at deck level, with no recesses, allowing ballast to be laid without obstructing the traditional expansion joint gap/recess.

USL Ekspan completed their works on The Ordsall Chord in August 2017, with the new rail viaduct opened in December 2017 on completion of all the external contractors' associated works.

Elastomeric bearings installed

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