Construction industry

Dean and Dyball Civil Engineering

SKF spherical roller bearings

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SKF bearings take the load on Pont Y Werin bridge

Advanced spherical roller bearings, developed and manufactured by SKF, the knowledge engineering company, are playing a vital role in supporting a 40 tonne, 30m opening deck on the Pont Y Werin bridge in South Wales. The bearing units form part of a powerful hydraulic system that is capable of lifting the bridge deck safely and efficiently in just two minutes to a vertical position of 75 degrees, while withstanding wind speeds of up to 25m/sec.

Pont Y Werin or 'The people's bridge' has provided a much needed pedestrian and cyclists' link from the city of Cardiff to Penarth, across the newly developed Cardiff Bay area, spanning the river Ely and just a stones throw away from the iconic Welsh Assembly. The bridge opens and closes to allow river traffic to pass and was built thanks to a large lottery grant in 2007.

It took three years from planning to construction and is one of the key strategic development projects being carried out as part of the ongoing regeneration of the Cardiff Bay and surrounding region.

The design and construction contract, awarded to civil engineering group Dean and Dyball Civil Engineering, was for a 130m bridge, comprising four equal sections, one of which is a lifting span that maintains a clear 20m navigational channel below, and opens to 15 degrees from the vertical position.

The company worked closely with engineering consultants KGAL to design sophisticated and reliable mechanisms to control the movement of the lifting span. Dr Arash Farahani of KGAL explains that, *"We developed a system that allows the lifting span to be controlled by two hydraulic rams, with its base end being hinged by means of pairs of 440mm diameter SKF spherical roller bearings, set into a specially engineered deck trunnion. Additional bearings are fitted at the top of the hydraulic rams to enable them to pivot smoothly as the span opens and closes".*

Dr Farahani adds, *"The bearing units are key to the efficiency and safety with which the span moves, as they have to take almost the entire load of the span, which is around 40 tonnes, and withstand the effects of wind forces; these can be particularly high when the span is fully opened and can gust from any direction. Additionally, the bearing units have to resist extremes of temperature and the effects of both rain and salt water".*

The SKF spherical roller bearings have been designed to provide extremely high load carrying capacities, while being robust, easy to fit and inspect, with little or no maintenance under these operating conditions. Highly efficient contact seals on both sides of each bearing unit retain the grease inside, while reliably excluding moisture and other contaminants. The SKF bearings used for the Pont Y Werin Bridge were of CC design type, with symmetrical rollers, two window-type steel cages and an inner ring centred via a floating ring between the two rows of rollers.

Neil Chambers, Project Manager at Dean and Dyball, is delighted with the performance of the system, *"Although the bridge has only been open for a short period of time, it has already had extensive use, with a large number of shipping movements requiring the lifting section to be raised and lowered at regular intervals. This takes a maximum of 11 minutes, from the sounding of pedestrian alarms to the final release of the safety barriers. The actual open and close time of the bridge span itself is just four minutes which, given its length and weight is relatively fast, and could not have been achieved without the performance, precision and reliability of the bearing units."*

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A large number of bascule bridges across the world now rely on SKF spherical roller bearings thanks to their outstanding in-built features and proven reliability. The cyclists and pedestrians of Cardiff and the surrounding area can be confident that their bridge will stand the test of time, providing a much needed link for many years to come.

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