

Schaeffler Global Technology Solutions

Civil Engineering

Mannesmann Dematic Madrid (Spain)

Maintenance-Free Spherical Plain Bearings for Footbridge “Puente de la Mujer”

Until its takeover in 2000, Mannesmann Dematic was one of the global leading providers of logistics and production automation systems. As a system integrator, the company offered the whole range of products and services – from individual products and systems to complete turnkey solutions – as a general contractor.

Challenge for Schaeffler

In the old harbour of Buenos Aires a new pivoting footbridge was planned. Mannesmann Dematic Madrid was chosen for the engineering of the complete drive unit with the load-supporting vertical pivoting axle. The distinctive feature of this pivoting bridge, which was designed by the Spanish architect Santiago Calatrava, should be a 35 meter high pylon. Due to this asymmetrical design, the total weight of the bridge was distributed in a ratio of 1 : 3.4. The challenge was to find the appropriate maintenance-free spherical plain bearings for the weight and resulting moments. The construction required bearings that reach a service life of 50 years without maintenance.

Schaeffler Solution

Schaeffler experts recommended to use X-life generation ELGES bearings. The entire weight of the bridge is supported by a maintenance-free axial spherical plain bearing whereas the moments are taken by two maintenance-free radial spherical plain bearings from the Schaeffler large-bearing program. To prevent constraining forces from developing inside the construction, the radial bearing and the axial bearing were arranged in such a way that they share a common centre. For easier mounting the inner ring bores were also coated with ELGOGLIDE®. To obtain a constantly low coefficient of friction, the sliding coating was optimised for minimal loading.



Technical Information about the Plant

Total weight:

1093 t

Bridge length:

88 m (68 + 20 m)

Bridge width:

5 m

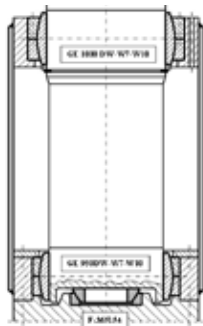
Distance between bearings:

2 100 mm





Spherical plain bearing before mounting



Design drawing



ELGES Large spherical plain bearing of series C
GE...-DW-2RS2

Customer Benefit

ELGOGLIDE® coated bearings require absolutely no maintenance, which means significantly reduced maintenance cost. Even though – or precisely because – ELGOGLIDE® coated bearings do not need any lubricant, they have low coefficients of friction ($\mu \leq 0.05$). As a result, the drives require less power. Vibrations, which can cause flutes to form in rolling bearings, do not represent a problem for spherical plain bearings. The whole construction benefits from the ELGOGLIDE® coating's good damping properties.

What's special

All production operations in Steinhagen (Germany) were monitored and documented in detail and filmed for quality assurance and traceability purposes. The preassembly of the sub-assemblies, especially that of the pivoting axle, was supervised on location by experienced ELGES engineers. The close and precise cooperation between all ELGES divisions ensured a smooth and on-time production and mounting procedure.

Technical Information about the Solution

Axial spherical plain bearing:

F-365154

One GE360-AW bearing, dimensions slightly modified without changing the main dimensions specified in DIN ISO 12240-3.

The shaft washer is stabilised by a press-fitted bolt with an interference of $360 - 0,04$ over the bore; the bolt's length is equal to the height of the shaft washer.

Radial spherical plain bearing:

GE950-W-W7-W10

according to DIN ISO 12240-1, series C

Radial spherical plain bearing:

GE1000-DW-W7-W10

according to DIN ISO 12240-1, series C