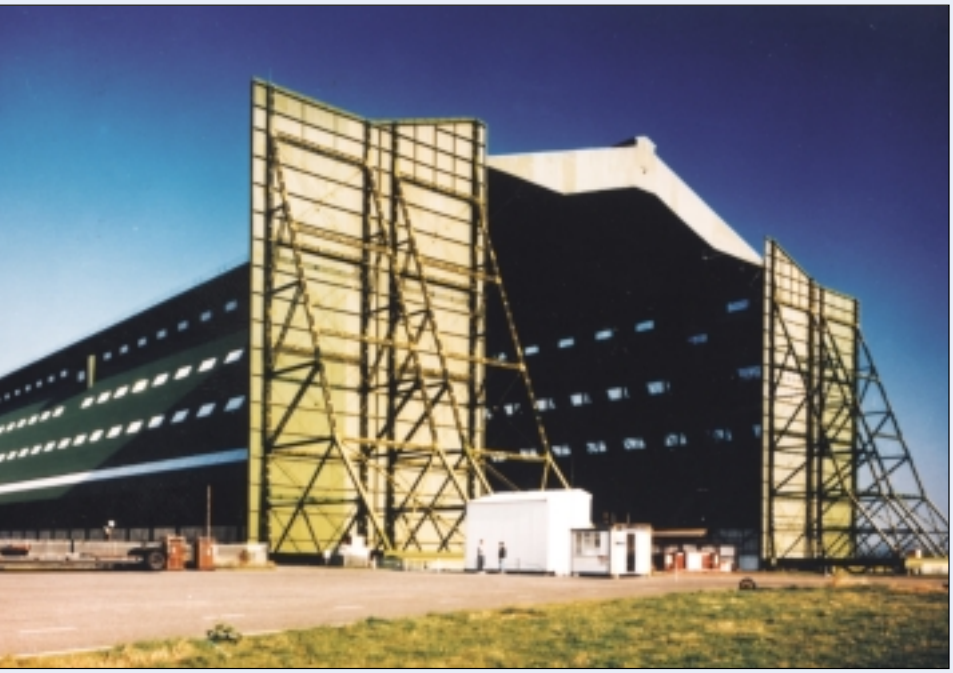
SKF Reliability Systems



An open and shut case for SKF

When engineers started to have problems opening one of the giant-sized sliding doors of the world famous Cardington Airship Hangar, it was SKF's spherical roller bearings that provided the solution.

In the late 1920s, the Cardington Airship Hangar, in Bedfordshire, housed the Barnes Wallis-designed R100 airship. Such is the size of the hangar that it could easily house both Nelson's Column for height, as well as the aircraft carrier Ark Royal. It has a floor area twice the size of Wembley football pitch and a volume equal to 8,338 double-decker buses. The hangar is a Grade II listed building and is currently used by the Building Research Establishment (BRE) to house the largest enclosed laboratory in the world.

Although the hangar was subjected to a major refurbishment programme in 1993, engineers from BRE recently experienced difficulties sliding aside the southern hangar door. With the doors requiring to be opened, on average, once a day, the problem had to be rectified quite urgently. As each hangar door measures a massive 55 metres high by 24 metres wide and weighs some 470 tons, the bearing refurbishment programme required to solve the problem turned into a major engineering exercise.

The hangar doors run on a twin track system using four, four-wheeled bogies mounted on each track. On close examination of the bogies on the inner track, BRE engineers detected that the bearings were in a state of collapse and obviously the reason for the difficulty to move the door. This problem had also created flats on some of the 760mm diameter wheels, due to skidding instead of rotating. One bearing was removed, stripped for examination and found to be a ‘home-made’ needle roller bearing design which had disintegrated. Most of the rollers were in bad shape and the side plates were almost worn right through.

continued overleaf…

Engineering solutions

- Proactive Reliability Maintenance (PRM)
- Integrated Maintenance Solutions (IMS)
- Condition monitoring services
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While BRE could have tried to simply replace the bearing arrangement with a similar system, it was concerned about the degree of wear on the side plates and contacted SKF, along with other bearing manufacturers, to see what benefits modern bearing arrangements could provide, and how the wear problem could be overcome. SKF took a positive approach to the problem and proposed new designs, using heavy duty spherical roller bearings along with adaption and re-use of existing bogie components where possible, to give the best all-round solution.

After tests on site, SKF and BRE engineers determined that the inner bogies were carrying three-quarters of the door's weight, which equated to a load of some 33 tons on each of the wheels. In high winds, this load could almost double. Track measurements also revealed that the side plate wear was caused by a difference of 20mm in the height level of the inner and outer rail tracks.

The SKF refurbishment included detailed redesign, in order to accommodate the massive loads involved, plus shaft, housing and wheel re-machining, and complete assembly of wheel units. At the end of the project, SKF had refurbished all 16 wheels on four bogies on one door and fitted a total of 32 new bearings.

Where possible, the existing shafts and wheels were used. As well as being cost-effective, the SKF solution ensured that all loads were held within the wheeled units. This contained the high static loads and particularly, the lateral forces, avoiding the original wear problems.

Throughout, SKF and BRE worked closely together to co-ordinate the progressive removal and re-machining of individual wheel sets so that the door still remained fully operational. The result is that the application of SKF's modern bearing technology will ensure that the door will open and close for at least another 50 years.

For further information on how SKF Engineering solutions can benefit your company, please contact your SKF Reliability Systems representative or visit us on-line at www.skf.co.uk/reliability

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