The CARB bearing solution

Discover the ultimate self-aligning bearing system from SKF

SKF

Look inside the CARB bearing solution

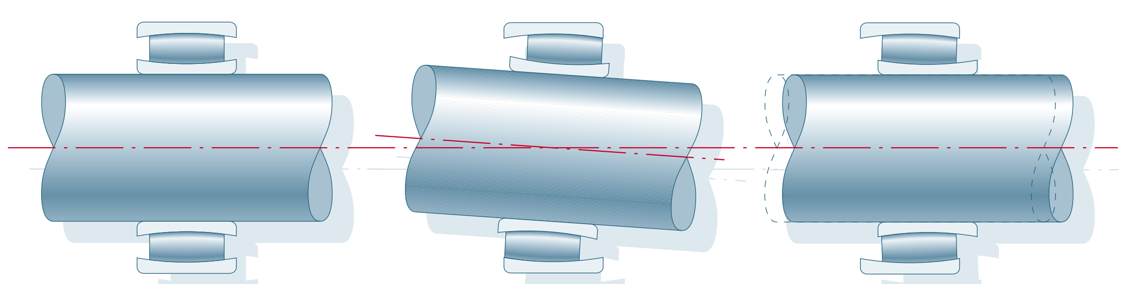
Imagine a bearing so versatile that it can accommodate misalignment like a spherical roller bearing and axial displacement like a cylindrical roller bearing. This bearing, called a CARB® toroidal roller bearing, exists today and has been so successful that it has revolutionized self-aligning bearing systems.

Problem

The bearing arrangement in a typical industrial application has to accommodate misalignment, shaft deflections and thermal expansion of the shaft. To cope with misalignment and shaft deflections, design engineers use a self-aligning bearing arrangement consisting of two spherical roller bearings or self-aligning ball bearings. However, thermal expansion of the shaft is a more complex issue that requires one of the bearings to be a "locating" bearing and the other to be a "non-locating" bearing. In most cases, the locating bearing must be secured in the housing and on the shaft. The non-locating bearing is designed to move axially on its seating in the housing. When this non-locating bearing moves in the housing, it generates a considerable amount of friction, which then induces vibrations, axial forces in the bearing arrangement, and heat – all of which can significantly reduce bearing service life.

Solution

The solution to the conventional "locating/non-locating" bearing arrangement is to use a self-aligning bearing in the locating position and a CARB bearing in the non-locating position. The CARB bearing is a self-aligning radial bearing with an inner ring that moves independently of the outer ring – like a cylindrical roller bearing – enabling the shaft to move smoothly without inducing internal axial loads. And because both the inner and outer rings of a CARB bearing can be mounted with an interference fit, problems associated with a loose outer ring, such as fretting corrosion and distortion of the ring are avoided.



Under normal operating conditions the rollers position themselves so that the load is evenly distributed over their entire length.

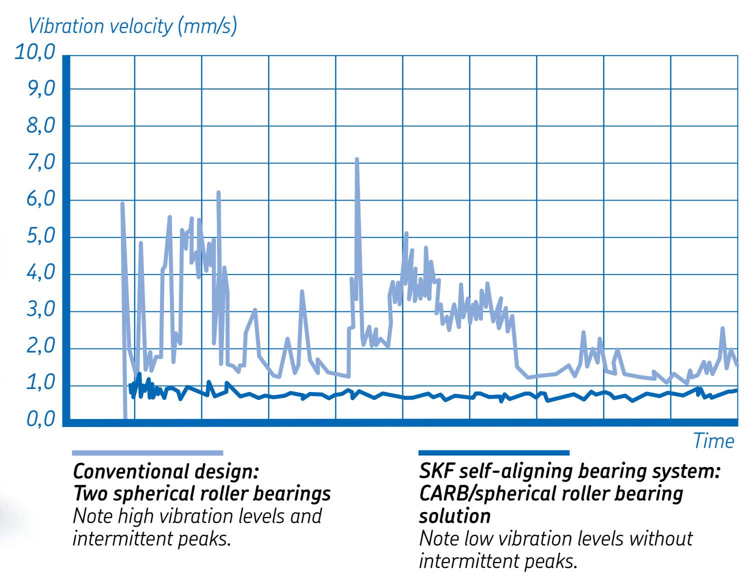
The CARB bearing can accommodate 0,5° of misalignment – 10 times the angular misalignment of a cylindrical, taper or needle roller bearing.

With typical operating clearance, the bearing can accommodate axial displacement up to 10 % of the bearing width – 100 times greater than the axial displacement of a spherical roller bearing.

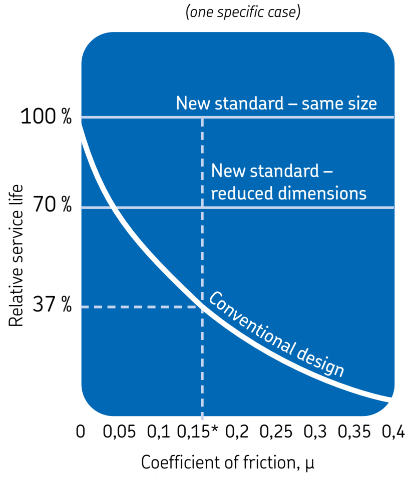
About the CARB bearing

The CARB bearing, developed by SKF®, incorporates the best features of different bearing types and combines them into a single, compact solution. This unique bearing accommodates axial displacement like a cylindrical roller bearing and the misalignment capabilities of a spherical roller bearing while providing extremely high load carrying capacity. What makes this bearing so unique is the design of its rollers and raceways.

The CARB bearing is a single row roller bearing with relatively long, barrel shaped rollers. The inner and outer ring raceways are correspondingly concave and symmetrical. The bearing has been designed so that the rollers will always position themselves in the raceways for optimum load carrying performance. It is this unique roller-raceway design that enables the bearing to accommodate misalignment and axial displacement without affecting bearing service life.



Comparison of the SKF self-aligning bearing system (new standard) vs the conventional design
(one specific case)



CARB bearings provide design options

The CARB bearing solution eliminates the problem of induced axial loads resulting from thermal expansion of the shaft. This enables two options:

- Keep the current bearing dimensions and radically increase bearing service life.
- Downsize and achieve the same or better operational reliability.

For additional information, ***contact your local SKF representative.***

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