

CARB reduces weight and cost of conveyor pulleys

The Roxon Group in Finland offers a wide range of products for conveying applications of bulk materials. The group has production facilities in Finland, Sweden, Germany, Canada, Indonesia and Australia. Together with SKF they decided to equip a new belt conveyor with the new self-aligning bearing system from SKF (replacing the non-locating bearing with a CARB toroidal roller bearing). A downsized pulley unit, longer service life and cost savings are some of the results.

The challenge

Roxon and SKF have a long-standing technical co-operation and when a new belt conveyor pulley was being developed, SKF was involved.

The Roxon companies are always looking for ways to achieve a competitive advantage in terms of product performance as well as delivering them at the lowest possible cost. As a major bearing supplier to the group, one of SKF's roles is to ensure that Roxon has the most cost-effective bearing arrangements possible for their range of conveyor pulleys. Traditionally, the standard bearing system design has spherical roller bearings at both ends of the shaft, mounted in standard split plummer block housings.

The opportunity

SKF's new self-aligning bearing system solution utilises a spherical roller bearing in the locating position and a CARB toroidal roller bearing in the non-locating position. This new arrangement retains the self-aligning capability and theoretical carrying capacity of the old system, but in addition provides guaranteed, frictionless, axial expansion and contraction of the shaft due to the internal design of CARB.

Operating conditions

Bearing:	C 2220 K and C 3224 K
Bearing housing:	Integrated in the design
Speed:	75 r/min
Bearing temperature:	70 °C maximum
Bearing load max.:	50 and 75 kN respectively
Lubrication:	Grease

CARB advantages

- reduced total costs
- greater reliability of bearing assemblies
- lower running temperatures
- longer grease life and less grease consumption
- reduced power consumption due to smaller bearing size giving lower friction

This means that in all cases, the internal axial forces present in the old system are eliminated, as the non-locating bearing does not slide inside the housing. Therefore, the load distribution within both bearings is optimised, allowing the theoretical calculated fatigue life to be achieved, regardless of the condition and form of the housing seating.

The SKF solution

Roxon recognised that the compromise-free nature of the new bearing system would allow them to eliminate the risk of impaired bearing performance and reduced service life which are always present with the old style arrangement. Therefore, it would be possible for an SKF

Please turn over!

CARB Division

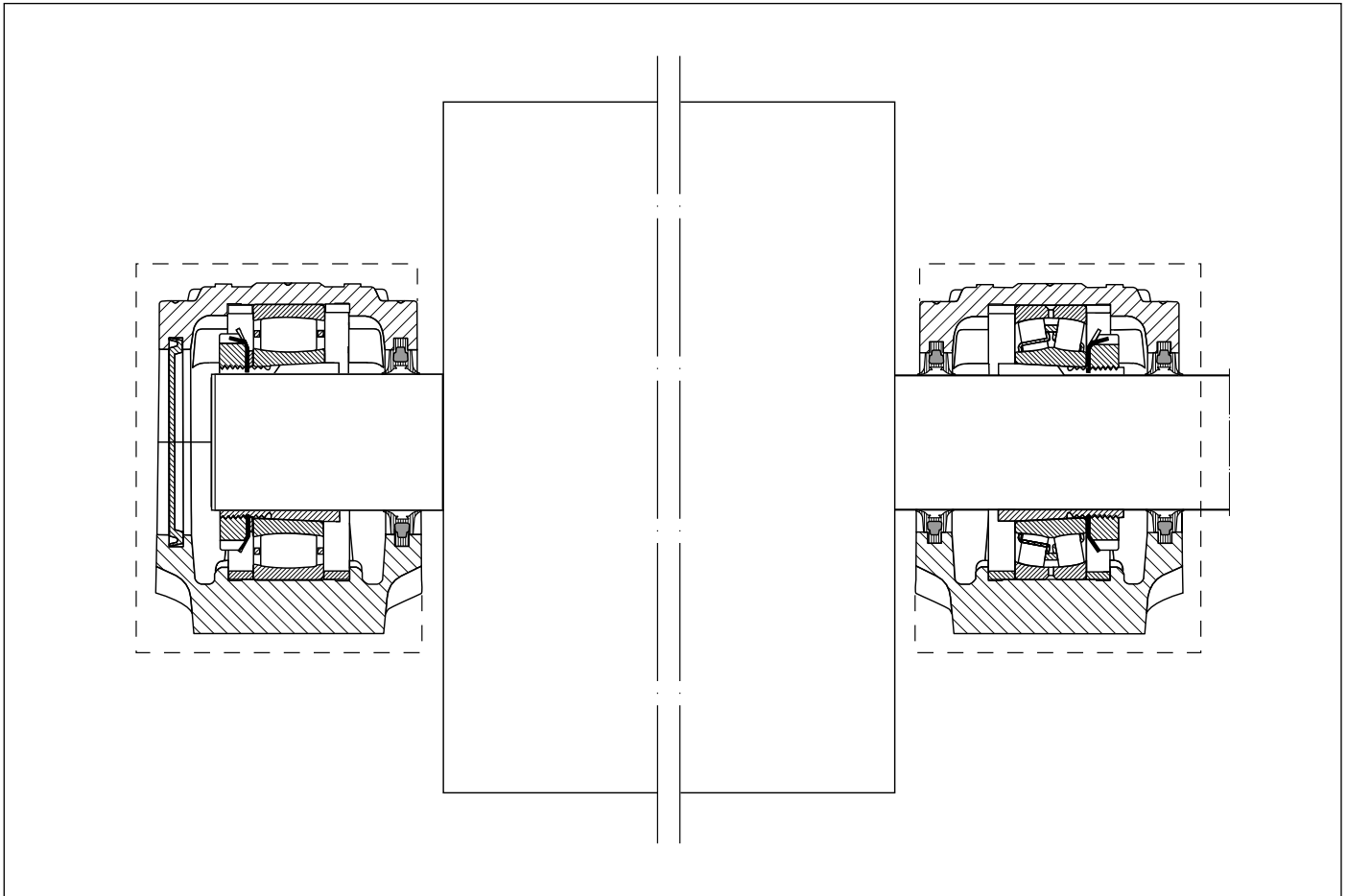
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spherical roller bearing + CARB combination, which always operate with ideal internal load distribution, to achieve the same specified service life target as had larger spherical roller bearing pairs previously.

Furthermore, as no sliding occurs between the bearing outer rings and the housings, the outer rings could be mounted with tighter fits and by this the risk of rotating outer rings was eliminated. The implication was obvious: without sacrificing reliability, Roxon could utilise not only smaller bearings, but smaller housings, adapter sleeves and seal assemblies, to give the same results.

The pay-off

Being able to select smaller bearings provided not only an immediate benefit in purchase price reduction for the bearing assemblies, but also a significant reduction in weight, and in overall size of the pulley units (see schematic drawing), thereby enabling Roxon to have a number of ways to reduce their total costs. The benefits to Roxon's customer will be felt over the life time of the new conveyor system, in terms of a reduced cost of ownership.



Roxon conveyor pulley unit bearing arrangement. The dotted lines mark the previous bearing housings