



DISCUSSION **360°**

4 MAIN

**CHALLENGES
FOR BEARINGS
WITHIN MINING &
QUARRYING
ENVIRONMENTS**

DP021



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HAYLEY DEXIS BEARINGS

Bearings that operate within the mining and quarrying sector have to function effectively in an environment seemingly doing everything to prevent them from working to their full potential and service life.

Along with other key components, in these harsh working conditions, bearings have to face numerous challenges associated with their (mostly) outdoor locations, the nature of the materials being handled, and the high production demands of an industry that measures daily output in thousands of tonnes. With this in mind, careful bearing selection is vital to ensure that they meet specific needs and are robust enough to withstand whatever is thrown at them, and help to keep vital high-volume production running.

It is these challenges that we explore in this article.

1. CONTAMINATION

Due to the outdoor nature of mining and quarrying operations, critical machinery and components, including bearings, are exposed to the elements 24/7/365. This creates a suboptimal environment for effective performance and reliability, as bearings are often at the mercy of whatever the weather throws at them, including heavy and persistent rainfall. Conditions both during and after rainfall are a key concern for engineers, with effective sealing solutions on spherical and housed bearings proving to be popular solutions. Products such as the SKF Triple Barrier solution and RHP Self-Lube Triple Lip Seals are on the market to help keep contamination of both liquids and solid particles out of bearings, prolonging their service life as a result.

Another external contamination threat that bearings are subjected to in these applications is the high levels of dirt and dust that are ever-present. Sand, dirt, and dust particles, bi-products of mining and quarrying activity, can result in excessive abrasion, capable of creating misalignment and ultimately reducing service life. Larger particles of grit and chippings can also cause pitting and bruising (dents) if they progress into bearing enclosures, resulting in premature spalling and failure.

NTN-SNR® ULTAGE® KIZEI® spherical roller bearings have been specifically developed to withstand extremely challenging applications. The bearing's unique metallic shield design creates an armour against solid contamination and offers a robust and durable solution.

2. HEAVY LOADS

The nature of the product excavated from mines and quarries means that bearings will need to be able to deal with very heavy and variable loads. Take for example the critical application of bearings within conveyors, used to transport high volumes of material across frequently long distances. These conveyors are intrinsic to the operation, and the bearings within them must be robust enough to withstand the loads involved. Any length of downtime affecting these critical applications can harm production and revenue, with the costs quickly mounting.

NSKHPS™ (high-performance standard) spherical roller bearings have a dynamic load rating up to 20% higher than conventional spherical roller bearings, making them an ideal choice for applications where a heavy load capacity is a requirement. Available with a steel or brass cage for standard or large-sized bearings respectively, they are also suitably strong for tough applications.

3. VIBRATION

Perhaps the most challenging of applications for bearings operating in the aggregates industry is in vibrating screens (sometimes called shaker screens). These machines are usually substantial in size and vibrate continuously to move products along a length, separating materials such as solids from liquids and dividing them by size along the way.

The non-stop and vigorous vibration that bearings are in contact with here is regarded as a dynamic force that has the potential to inflict damage and impact bearing performance.

Bearings selected for use in vibrating screens must have a high load and speed rating, strong misalignment capabilities, and generate minimal friction to operate smoothly.

FAG special spherical roller bearings with Durotect® coating are a specially designed solution for vibratory machinery applications. These bearings can withstand the severe stresses involved in vibrating screens, whilst the Durotect® hard chromium coating helps to prevent the common issue of fretting corrosion between bore and shaft.

4. DIFFICULT ACCESS AND MAINTENANCE

Bearing positions within mining and quarrying applications have a reputation for being some of the most difficult to access and therefore to carry out maintenance on. This is because they are often in trapped or enclosed parts of the machinery, that themselves are not the easiest to gain access to. As the demands on continuous production are so strong in the industry, the amount of downtime required to complete any maintenance needs to be kept to an absolute minimum.

The SKF Cooper split spherical roller bearing offers a solution that reduces the meantime to repair (MTTR) by 70%. With no need to dismount the drive coupling or the cantilevered drive when replacing the bearing, productivity is improved with less downtime needed. Maintenance engineers' exposure to potential accidents and injuries is also reduced as a result.

It is evident that bearings operating in machinery such as conveyors, vibrating screens, and crushers in the polluted and exposed environments of the aggregates industry, face a range of challenges. Settings like mines and quarries are therefore some of the most inhospitable for bearings and most other engineering components such as transmission products and motors. HAYLEY DEXIS Bearing

Solutions work in partnership with world-leading bearing manufacturers to support our customers and deliver solutions.

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