



RUBIX

Are Your Bearings Tough Enough?

4 key challenges in
Construction & Aggregates and how to
ensure your bearings are up to the job



SKF

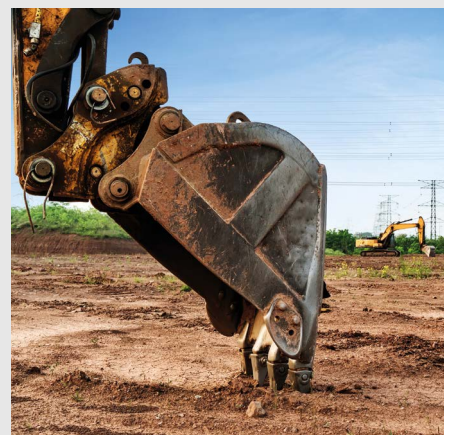
Authorized
Distributor

Bearings in Construction & Aggregates: Unique Challenges in Demanding Conditions

Bearings keep machinery moving. Wherever there is a machine or vehicle that has rotating parts, you will find bearing units. Across all industries, bearings are one of the most often replaced components, but in construction and aggregates all the more so due to the exceptionally harsh operating conditions. Here, bearings face multiple challenges, from ingress of dirt and dust, through to very heavy loads and frequently working in extreme temperatures.

As with any component, you want your bearings to provide trouble free performance and have a long operational life. To maximise lifetime expectancy, the bearing must be correctly installed, lubricated and maintained. It is also vitally important to select the correct bearing for the application at hand. Different bearing types are designed

specifically to suit different operating load conditions, whilst components such as rolling elements, cages and seals of different design and material are available to accommodate various operating speeds, temperatures and contamination levels, all of which can have a dramatic effect on bearing performance and service life.



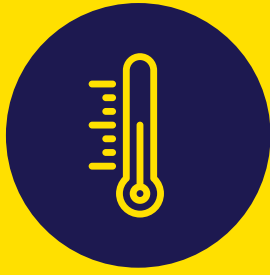


Rubix and SKF: *Providing Solutions*

At Rubix we have extensive experience of working with some of the biggest names in the construction and aggregates sectors and also of working with the leading bearings manufacturers, including world-renown SKF. An SKF Authorised Distributor across Europe, we have been supplying SKF bearings for decades and have an in-depth understanding of the company's extensive product range. Our joint experience means that we are able to better understand the

unique and special needs that relate to your business and your processes and to provide bearings that meet those needs.

In this document, together with SKF, we look at the key challenges faced in construction and aggregates, and suitable bearing options to meet those challenges.



Challenge 1: Operating Conditions



Construction and aggregates sites are notoriously wet and dusty and are often impacted by extreme temperatures. Furthermore, the machinery and vehicles in operation are heavy duty, placing substantial loads on to the bearing units.

CONTAMINATION

The business of extracting minerals and aggregate materials from the ground and processing them is not a clean one. The very act of extraction results in large amounts of dust being generated, which swirls around the air and lands on everything in sight. That dust can be highly abrasive and damaging to your bearings. The smaller dust particles, when falling onto bearings lubricant, will become a grinding medium that wears down the components, causing them to deteriorate. Larger dust particles create indentations on the bearing rolling surfaces, causing failure. An incredible 51% of bearing failures are due to contamination and ineffective lubrication.

But it's not just dry, dusty environments that are a problem. Water can also act as a contaminant, especially salt water, corroding metallic parts and negatively impacting lubricant properties.

HEAVY MACHINERY & HEAVY LOADS

By its very nature, construction and aggregates sites are home to a wide range of heavy machinery, frequently moving hefty loads. Some of this machinery, such as conveyor belts, vibrate considerably, which has a direct impact on reliability; according to an SKF survey, 44% of mining operators ranked conveyors as the most problematic asset in terms of reliability. Whilst many operate at relatively low speeds, such as off-road construction machinery, they can perform quick reversals, abrupt changes in direction and frequently stop and start. All of this can have a detrimental effect on the performance of the bearings in use.

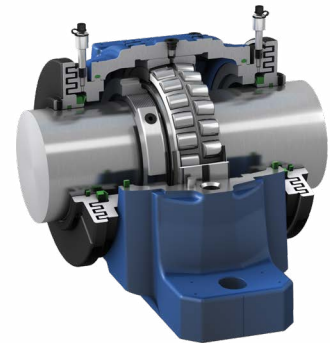
> Meeting the Challenge



SKF Taconite seal for better protection



Sealed variant of SKF's Explorer Spherical Roller Bearings



SKF's Three-Barrier Solution

SEALING SOLUTIONS

For highly contaminated environments, open bearings quickly become damaged from ingress of dirt. Using proper sealing solutions such as sealed bearings and shaft seals is therefore essential for construction and aggregates sites. Sealed bearing units are initially lubricated and then sealed, preventing dirt from entering and mixing with the lubricant.

The sealed variant of SKF's Explorer Spherical Roller Bearings, for example, features contact seals fitted in recesses in the outer ring, which keeps lubricant inside the bearing and contaminants out. The resulting benefits include improved reliability and uptime, reduced noise and vibration levels and excellent wear resistance. A specialist version for vibratory applications, such as vibrating screens, is also available which is proven to last twice as long as other screen bearings and also operates at lower temperatures.

For the best protection against contaminants, SKF's Three-Barrier Solution consists of a bearing housing – with labyrinth S seals (or Taconite seals for the ultimate protection), a lubricant to act as a contamination barrier and sealed spherical roller bearing. These three barriers protect the bearing from contaminants, leading to extended bearing service life on average three times longer than standard open bearings. It is particularly well suited to conveyor systems.

HIGH LOAD CAPACITY BEARINGS

To function in applications where heavy loads are the norm, you want a bearing that is both hard and tough. In the past, hardened steel did not have all of the necessary properties to make it optimum for use in such environments. With new heat treatment processes, this is no longer the case. SKF's improved heat-treatment process for bainite steel, for example, has resulted in bearings that are much less prone to wear. SKF Explorer Spherical Roller Bearings, CARB Toroidal Roller Bearings and Spherical Roller Thrust Bearings have all benefited from this improved heat treatment.

Also, consider both axial and radial loads when choosing your bearings. Double row tapered roller bearings are a good option they accommodate combined loads and can locate a shaft axially in both directions with a precise axial clearance or preload. SKF versions, designed to withstand

the demands of the mining sector, can carry heavy loads and have high stiffness. SKF's Explorer Spherical Roller Bearings, as mentioned above, are also ideally suited to this environment as they accommodate axial and heavy radial loads prone to misalignment or shaft deflections.



Spherical Roller Thrust Bearing



SKF Explorer Spherical Roller Bearing



CARB Toroidal Roller Bearings



Challenge 2: Remote Locations

Remote locations, especially when it comes to aggregates, are common in this sector, making next day part delivery doubtful. Businesses therefore need to ensure maximum bearing life to minimise costly downtime.



GETTING PARTS TO SITE

Replacing bearings on a regular basis is undesirable in any industry due to the cost of the part and its fitting, plus the inconvenience and downtime. When the site is located miles from anywhere those costs, inconvenience and downtime soar. Not only is there a delay in getting the replacement bearing to site, but frequently these are specialist products that may not always be held in stock, thus extending that delay even further. Holding expensive stock of this nature on site is rarely an option for most businesses.

APPROPRIATE LUBRICATION

When you are miles from anywhere, relubrication can present a number of challenges. You need to have the appropriate lubrication on site at all times and people who can reapply it regularly and correctly. With a variety of machinery in operation and requiring different lubrication practices, it's not simply a case of slapping on grease in an ad hoc manner. Using the wrong lubrication or too little may well impact the bearings performance and life expectancy. However, using too much brings its own set of problems and will quickly deplete your stock.

> Meeting the Challenge

MAXIMISE BEARING LIFE

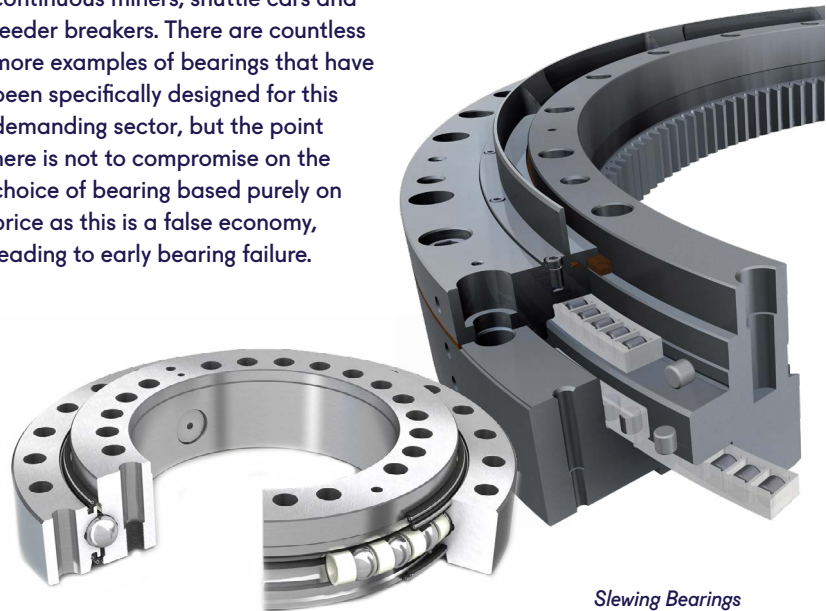
Ultimately, when you are working on a site that is a considerable distance from your nearest stockholder, longevity and reliability of machine life and component parts are key.

When it comes to bearings, this means using product that is fit for purpose: a bearing that has been designed to cope with the strain of this specific environment and its heavy loads. This applies to the bearing itself, plus sleeves, housings, seals and transmission protocols.

SKF's Slewing bearings, for example, have been designed with a high carrying capacity and high resistance to overturning moments in excavators, bucket wheel excavators and stocker / reclaimers.

The company's Cylindrical roller bearings accommodate heavy radial loads, rapid accelerations and high speeds, making them ideal for continuous miners, shuttle cars and feeder breakers. There are countless more examples of bearings that have been specifically designed for this demanding sector, but the point here is not to compromise on the choice of bearing based purely on price as this is a false economy, leading to early bearing failure.

Of course, the bearings must also be correctly mounted using the right tools and maintained.



Slewing Bearings



LUBRICATION STRATEGIES

Relubrication may not seem like the most important aspect of your machinery maintenance, but ineffective lubrication represents over half of all bearing failures. That's why we recommend having a Lubrication Strategy in place.

As part of that strategy, it may seem obvious, but check that you have the right lubrication for each application. One lubricant will not work for all! If in doubt, refer back to the machine manufacturer to identify the correct lubricant. Keep lubricants clearly labelled so mistakes are avoided.

Ensure your staff are trained in lubrication application and therefore apply the right amount of lubricant when it is needed. Alternatively, consider the use of single point or multi-point automatic lubrication systems which will safely apply the correct amount of lubricant, regardless of where the site is located.

A further option is to simply avoid relubrication issues altogether by

opting for sealed bearing units. This has the added benefits of reducing maintenance costs and grease consumption.





Challenge 3: Health & Safety

Health & safety concerns are key in the construction and aggregates industries. Working with heavy equipment in often remote, dangerous locations makes injuries more likely to be potentially life changing or threatening.

REGULATIONS

Worker safety is paramount in the construction and aggregates industries. The Health and Safety at Work Act 1974 imposes a duty of care on employers to ensure safe working conditions for all its staff. This means ensuring staff are not exposed to undue risk. In particular, they must provide and maintain:

- safe plant and safe system of work;
- safe handling, storage, maintenance and transport of work articles and substances;
- necessary information, instruction, training and supervision;
- a safe place of work, with safe access and egress; and
- safe working environment with adequate welfare facilities.

In addition, quarry operators also have to comply with Quarries Regulations 1999.

EQUIPMENT FAILURE

The main cause of casualties in the construction and aggregates industries occurs during maintenance and repairs, with maintenance on conveyors being one of the major culprits. Every time a piece of equipment fails, safety is compromised.

LUBRICANT LEAKAGE

Lubricant is essential to keep moving parts in optimal condition, but lubricant is a hazard in itself. If dripped on to the floor during application, or fallen from the machine if too much has been applied, lubricant becomes a slip hazard. Lubricants can also be an accelerant, so a potential fire hazard.

Meeting the Challenge

USE OPTIMISED BEARINGS

Using optimised bearings, sleeves, housings and seals can improve machine reliability and ease of assembly and disassembly. SKF ConCentra Roller Bearing Units (ideal for conveyors), for example, come "shaft-ready", i.e., they simply slide onto the shaft and are locked into place by tightening the screws. It's fast – requiring far less time and skill to install than a split pillow block housing assembly - and helps provide proper alignment while reducing the risk of assembly-related mounting errors.

PLANNED MAINTENANCE

Planned maintenance makes for considerably safer maintenance. Use dedicated maintenance tools to reduce maintenance time and make the work easier, thereby limiting injury risk.

PREDICTIVE MAINTENANCE

Predictive maintenance of machines provides advanced warning of failure, enabling maintenance to be planned ahead. In the case of our own Vibration Analysis service, we are not only able to accurately identify potential problems but also a predicted time to failure in some cases up to one year in advance.

REDUCE LUBRICATION CONTACT

Use of an automatic lubrication system decreases quantity of lubricant, which reduces probability of leakages and also reduces the need for workers to go to hazardous locations for relubrication.

Ensure suitable seals are used to reduce maintenance requirements and leakages. If possible, opt for sealed bearing units to remove the need for relubrication and potential spills altogether.



Challenge 4: Sustainability

Extracting something out of the ground and processing it on an industrial scale is an energy intensive business. At a time when the world is looking to limit its energy usage and impact on the climate, pressure is mounting on the construction and aggregates industries to reduce overall environmental impact.

ENERGY USAGE

Heavy machinery uses significant energy, which comes at a cost, both financially and environmentally. Reducing energy usage is therefore a priority on many different fronts and needs to be applied across all equipment and processes.

REPLACEMENT PARTS

Bearings may not be the most expensive part of your onsite machinery, yet they are in widespread use; bearings are to be found in any machine or vehicle that has rotating parts. Because of their prevalence across site, replacing bearings regularly is to be avoided as it impacts your carbon footprint in terms of the manufacture of new parts and all the resources that uses; the logistics of getting the part to sites that are often miles for anywhere; and the expired product going to landfill.

› Meeting the Challenge

ENERGY EFFICIENT PRODUCTS

Poor bearings performance can directly affect energy usage. Although the amount of energy per bearing is relatively small, when you consider how many bearings are used in machinery on a given site, it starts to mount up.

Choosing the right product makes for a more energy efficient approach. SKF CARB Toroidal Roller Bearings, for example, are self-aligning like a Spherical Roller Bearing, and axially free like a Cylindrical Roller or Needle Roller Bearing. They accommodate up to 3° of misalignment and axial displacement within the bearing, without inducing internal axial loads with virtually no increase in friction. The results are lower operating temperatures and vibration levels, along with improvements in reliability, bearing and lubricant life, and energy consumption.

Ensuring product is correctly fitted also has a part to play. Misalignment can lead to friction and vibration which can significantly increase energy consumption, plus the risk of premature failures. SKF has a range of shaft and belt alignment tools that allows customers to increase their machine reliability through easy to use and accurate alignment. Other options include selecting products that don't require realignment, such as SKF Cooper Split Spherical Roller Bearings that do not require the drive coupling or the cantilevered drive to be dismantled to replace the bearing; these bearing types are easily and safely replaced in situ.

REDUCE, REUSE, RECYCLE

The 3Rs, as they are referred to, apply not only to consumers, but also industry.

Reduce the number of replacement bearings you use by using good quality bearings that have been designed to both do the job at hand and operate in the appropriate environment. This will ensure product longevity. Reduce the amount of lubrication you use through employing automated lubrication systems or sealed bearings such as SKF's Three-barrier solution or Explorer Performance Class bearings.

When it comes to Reuse, SKF offers a remanufacture service which can significantly prolong bearing service life, as well as reduce cost and lead times. Bearing remanufacturing can significantly reduce carbon emissions, consuming around 10% of the energy of making a new one.

Recycle bearings at end of life. Not every part of a bearing can be recycled and not every manufacturer can do this. Check to see if your supplier offers this service.

RUBIX

For all your SKF bearings needs, and more.

Rubix is SKF's largest Authorised Distributor across Europe. We have the widest SKF product range, exceptional availability, in-depth knowledge and technical expertise. Talk to us to find out how we can help improve your production facilities with SKF bearings best suited to your needs and budget.

Of course, our product range goes far beyond bearings. We offer more than 5 million different product lines - 500,000 of which are in stock at any one time, all available 24 hours a day, 365 days a year. Available via our centrally-located National Distribution Centre in the Midlands, plus a network of branches across the UK, we'll get it to you on time, every time.

With our specialist expertise, international strength and local presence - combined with our thorough understanding of the food & drink industry - we are ready to become your parts and products partner.

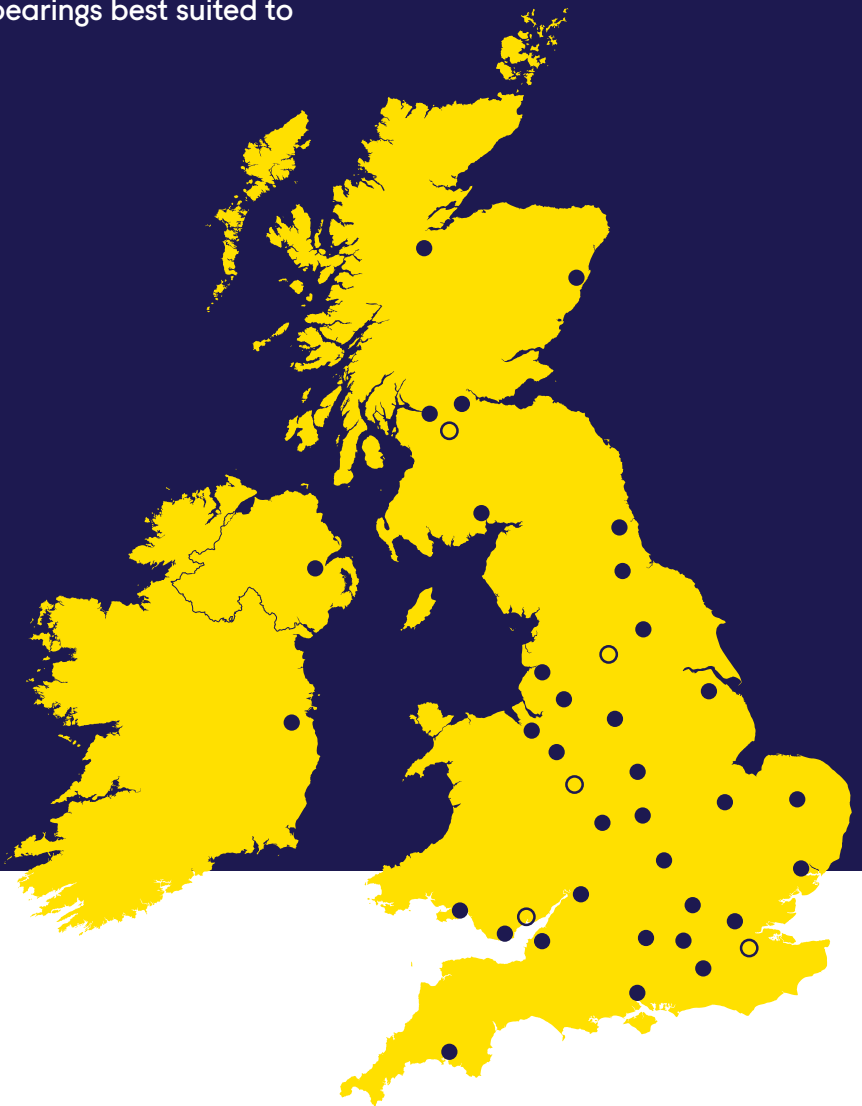


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