

Selection of Roller Bearings

The Challenge of Bulk Material Conveyor Systems

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When it comes to conveyor systems in particular, the choice of rolling bearings depends on knowing precisely what their future application will be. Indeed, when the many components of conveyor systems are assembled for optimum interaction they allow a diverse range of goods to be moved.

To select the correct bearing for a certain application, knowledge about the precise conditions in which it is to be used is indispensable. Of course, LFD's engineers know from experience the different conditions that apply, for example, for unit loads or bulk materials and heavy bulk materials compared to airport baggage conveyors or even applications in the food industry.

Bulk materials with different flow and pouring properties are divided into stockpiles – or, in the case of fine bulk materials, held in silos – and put into temporary storage in order to make it easy to distribute and transport them later on. This means that in some cases the transfer point at the end of the conveyor system needs to be positioned at a much higher level than the head station.

Mining Applications

In mining, whether underground or open cast, in gravel pits – in short, when extracting minerals of all types – a robust and intelligent conveyor system is one of the key components for trouble-free distribution of the bulk materials that have been extracted.



Material transfer points are sometimes located at very high positions.

The key option here is to use open LFD deep-groove ball bearings, as the rollers are completely enclosed. For this roller manufacturers use various interleaved labyrinth seals which prevent direct contamination during use. When it comes to conveyor systems specifically for bulk materials, there are even self-cleaning rollers which work by means of rubber gaskets fitted in a spiral shape.

Another key factor when using rolling bearings in conveyor systems for bulk materials is the use of lubrication specific to the application. Special cages are used for the rolling bearings used in this sector of industry. As a rule, these are steel cages; however, in mining glass fiber-reinforced polyamide cages are used in most cases. Selecting the correct bearing clearance (ie. C3, C4) here is key. This helps to compensate for shaft deflections as well as

temperature differentials and thus ensures functionality of the bearing.

Integrated Protection

The cages LFD fabricates in glass fiber-reinforced polyamide are frequently used in underground mining to prevent sparking between the cage and the rolling elements. Sparking could result in explosive gases being ignited and the consequences would be fatal. In electric motors, manufacturers ensure the equipment is protected from explosions by incorporating a safety gap in the design, for example. This prevents explosive gases from igniting through sparking in and around the rolling bearing. There are, of course, other options for preventing sparking and arcing where explosive gases

are present. For example, motors can be designed with a fully flameproof enclosure.

Cages are very important for the function of rolling bearings, as not only do they keep the rolling elements (taper, cylindrical, ball bearings) apart so that they do not come into contact with each other, but they also ensure that the rolling elements maintain the same distance from each other to achieve a more even load distribution. Of course, the cage also prevents the rolling elements from falling out, which is of particular practical importance for detachable bearings. Polyamide is an outstanding material due to its high elasticity, minimal weight and excellent running properties, all of which have a positive impact on the service life of rolling bearings.

The glass fiber-reinforced polyamide cages supplied by LFD are also suitable for use in temperatures that consistently reach up to 120°C. Further incursions on the bearing's service life can be prevented by selecting the correct lubrication grease for the job. Old oil can also limit the cage's useful life at higher temperatures; hence the need to carry out oil changes at precisely the right intervals.

Meeting the Standards

Manufacturers of conveyor belt systems are continuously expanding and optimising their product ranges. Development and production need to take account of the latest state-of-the-art technology,



Transportation of sand is a demanding application for roller bearings.

Robust conveying systems are decisive for the success of mining operation.

Picture: Thomas - fotolia.com



while extreme reliability and a long service life under harsh operational and environmental conditions also need to be assured. Where conveyor systems are used on a global basis, this also requires compliance with a wide variety of standards, such as UNI-DIN, ISO, Afnor, Cema and BS standards.

The most diverse industries depend on elaborate conveyor systems in their operations. Port facilities, mining, the chemical and fertilizer industry, cement industry, steel industry, glass industry – and not to forget the huge recycling sector – all rely on their systems functioning without problems. Stoppages are costly, and so it is important to keep these costs as low as possible and even to avoid them altogether.

Rolling bearings that have been selected as best suited to the application are an effective support to achieving these aims. They can also reduce maintenance requirements considerably and at the same time are significant for safety – a factor that should not be overlooked. LFD meets the highest safety standards and has consequently succeeded in maintaining a reputation for safety in this industrial sector for decades. The company's high-quality rolling bearings are used in a wide variety of roles, as typical applications for bearer rollers include mining, tunnel construction, cement production, animal feed industry, recycling and port facilities.

Bearings Protection

Special sealing systems for use with idler rollers are ideal because of their resistance to environmental conditions such as exposure to dust, contamination, water contact and high temperatures, especially

where day time and night time temperatures differ widely. For operating temperatures in the –40 to 100°C range, the appropriate lubrication grease needs to be used, while higher temperatures require the use of special greases, rolling bearings and seals.

In this case, however, the grease used is not a decision for the roller bearing manufacturer, as the manufacturers of the conveyor systems themselves lubricate the open bearings during fitting into the idler rollers according to their future conditions of use. As a rule, no requirement for pre-lubrication is placed on the bearing manufacturer in these cases.

In conveyor belt systems that carry aggressive substances, plastic idler rollers are generally used. The salt-mining, chemical and fertilizer industries, for example, need plastic rollers, as well as conveyor systems at sea and at port, as special precautionary measures are called for where there is direct contact with saltwater.

These idler rollers are highly resistant to moisture, water and aggressive environmental conditions and/or materials. Plastic is used for the critical parts of these bearer rollers to reduce the use of expensive materials such as stainless steel and aluminium. ■

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