

Drive train solutions for cost-effective materials handling

MechChem Africa talks to BI's Ross Trevelyan, business unit head at the company's Parkhaven distribution centre, about Cooper and FAG bearings and power pack components, which he recommends for materials handling equipment such as conveyors and crushers operating under South Africa's harsh conditions.

The reliability of bulk materials handling equipment at underground and open cast mines and quarries is critical for the productivity and cost-effectiveness of the operation. Every breakdown results in downtime and production losses, and if total losses are evaluated, lost production together with reparation

costs will almost always dwarf the original or replacement costs of the failed component.

Hence the need to use the best possible rotating shaft and power pack components on critical systems such as conveyors, crushers, mills and safety-critical equipment such as hoists and fans.

"BI excels when it comes to arduous requirements," says Trevelyan. "We offer some of the world's best brands along with the technical support to help equipment operators to achieve the best reliability and the lowest ownership costs possible," he tells MechChem Africa.

He cites two ways in which this can be achieved. First is to choose components that can be quickly and easily changed out in the event of a failure or, preferably, when nearing the end of their life.

Second, he recommends that plant operators strive to deliberately select and use a set of compatible components that are chosen to best suit the demands of the applications and the arduous environment: components that will give the longest possible life.

From a bearing perspective, Trevelyan lifts out Cooper split cylindrical roller bearings



from the UK; and the FAG SNS range of roller bearings and housings from Germany as ideally suited to achieving these respective goals. "Both of these brands offer highly competitive solutions for the likes of the conveyor manufacturing segment as well as for high impact applications such as crushers and mills," he notes.

Cooper: for easy maintenance and longer life

Cooper is a bespoke niche bearing solution designed to make it easier to fit a bearing onto a shaft. Cooper bearings are horizontally split all the way to the shaft, which allows the bearing, cartridge and pedestal to be fitted without accessing the shaft end or uncoupling motors and gearboxes for access to the bearing.

"Cooper split cylindrical roller bearings are ideal for people wanting to simplify maintenance and they have proved successful in the conveyor manufacturing segment for this reason. With fewer connected motors and

gearboxes to remove from the shaft and less shaft lifting required, Cooper bearings can be quickly fitted using only basic lightweight tools. Also, because the individual split-bearing components are smaller, the fitting operation can be done far faster and by fewer people," Trevelyan explains, pointing towards a single page poster entitled: *Easy assembly in 7 easy steps*. The steps listed are:

- 1 Clean the shaft and check the diameter, roundness and parallelism.
- 2 Position the matched halves of the inner race on the shaft and ensure there is a gap at the inner race joints.
- 3 Fit the clamping rings, making sure the joints are at 90° to the inner race joints and tighten screws.
- 4 To ensure correct seating, tap down the clamping rings with a soft-faced hammer and re-tighten the screws. Repeat until the bearing parts are fully seated. Ensure there is a gap of equal amount at each race joint.
- 5 Coat the roller cage and the inner race with grease and assemble the cage around the inner race. Insert 'U' clip where supplied, or snap the two halves together if plate or pressed steel type cages are being used.
- 6 Fit the outer race into the appropriate cartridge halves, noting that the lubrication hole is in the upper half of the outer race. Fit radial screws where appropriate and side screws on fixed-type cartridges.
- 7 Install the seals having followed the appropriate recommendations for the seal type. Coat the outer race and seals with grease. Close the cartridge and tighten the joint screws. Then lubricate the spherical seating as recommended.

Simple indeed! And the tools required? Allen keys; a flat bladed screwdriver; a micrometer; a soft-faced hammer; and a torque wrench.

As well as fitting simplicity, according to Trevelyan, Cooper split roller bearings offer better life than premium brand spherical roller bearings and housings, in large measure due to an improved sealing arrangement and alignment capabilities.

Explaining how this is achieved, he says that these bearings have a sphered cartridge that the rollers fit into and this cartridge fits onto a pedestal housing that can swivel. "Unlike fixed housings, the Cooper bearing allows the whole bearing unit to align to the shaft through the swivelling action of the pedestal and cartridge interface. This means that the labyrinth seals on either side of the bearing remain aligned and in contact, even if the shaft is misaligned to the pedestal," Trevelyan explains.

On a conventional bearing, although the roller bearings can accommodate misalignment, the seals will open up on one side and form a pinch on the other, leading to a greater possibility of contaminant ingress. "In gen-

eral, this helps the Cooper bearings to have a longer life than equivalently rated non-split bearings and we know of Cooper split spherical roller bearings that have been running for over 40 years," he notes.

Further supporting easy fitting, the Cooper bearing range now also features an angled support as standard stock, which is being well received in the local market. This allows the bottom half of the bearing pedestal to slide underneath the shaft for even easier removal and refitting, which further accelerates change-out times," Trevelyan adds.

"Local demand for this solution has now made it a standard stock item in our range and, as well as for the complex power packs such as those driving mine ventilation fans, mills and conveyor drive pulleys, this solution is also being seen as advantageous for simpler installations such as tail-end conveyor pulleys with stub-end tensioning systems," Trevelyan informs MechChem Africa.

FAG bearings: the solution for high loads

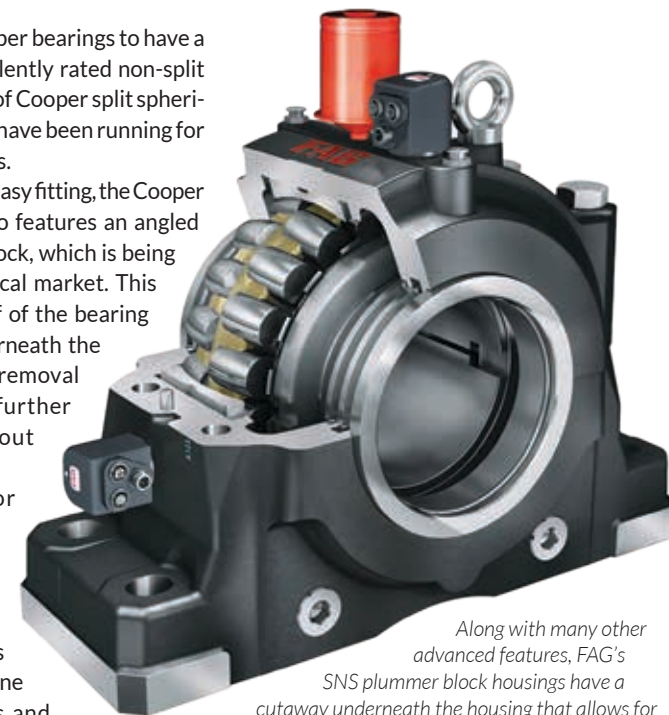
FAG bearings with SNS plummer block housings from Schaeffler in Germany are a premium self-aligning spherical roller bearing solution that offers a 50% increase in life compared to traditional plummer block designs. "This is due to a unique SNS housing design, which proactively self-adjusts under load to achieve a load zone that allows better load distribution. Technically, this is among the best housing designs on the market," Trevelyan believes.

A cutaway underneath the housing allows for the distribution of the load more evenly through several rolling elements and prevents the roller at the apex from carrying the peak load. For a given duty, this significantly enhances bearing life.

As well as extended life under heavy loads, these units are interchangeable with all competing brands from Series 222 to series 240 for shaft sizes from 115 to 530 mm.

Predefined lubrication ports and vibration sensing positions for condition monitoring are incorporated into the units for condition monitoring using systems such as FAG SmartCheck and GreaseCheck, while lateral location faces are machined into the units for easy dismantling and reassembly, and notches on the lower housing section enable accurate repositioning of the housing.

"With a standard housing, the original bearing will need to be replaced up to five times across the housing's life. With the SNS



Along with many other advanced features, FAG's SNS plummer block housings have a cutaway underneath the housing that allows for the distribution of the load more evenly through several rolling elements, significantly enhancing bearing life.

housing, however, only three replacements will be necessary to achieve the same life, significantly reducing downtime a maintenance costs," Trevelyan points out.

This makes these FAG units ideal for the heaviest applications: crushers and tube mills; belt conveyors and hoisting plants; paper mills; bucket wheels; fans, turbines and heavy mechanical machinery.

A single-source supplier

Not only can BI supply other complementary products such as the ROCOL range of greases, "we can also supply a full range of support products, such as centralised lubrication systems where a single source of lubricant is piped to each grease point of a system or machine.

"In addition, we are very strong on the power pack side, which includes all of the shaft connected units needed to drive the system: electric motors and gearboxes from Bauer in Germany; fluid or other types of couplings; as well as all of the V-belt, chain and other transmission components needed for a complete drive solutions," Trevelyan notes, adding that BI's custom-made Bauer power packs can be custom-designed and manufactured to offer a drive solution for most requirements.

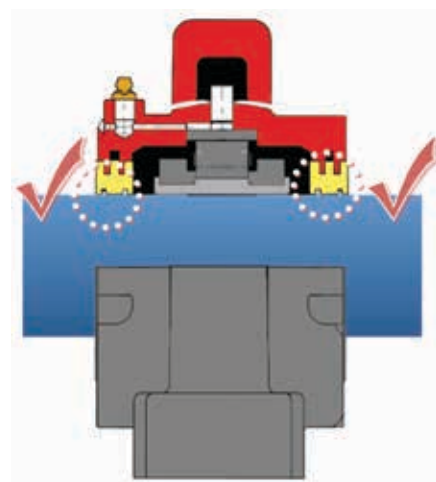
"Together with our after sales service solutions, we have the products and brands to enable the best possible life to be extracted from materials handling assets on client sites. And by careful selection of the right products for the applications, we can assure high reliability, minimum downtime, faster maintenance turnaround times and the lowest possible total ownership costs," Trevelyan concludes. □



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The Cooper bearing allows the labyrinth seals on either side of the bearing to remain in sealing contact with a misaligned shaft.