Achieving reliability through applications engineering

MechTech talks to Sarel Froneman (right) of SKF about the global group’s redirection towards its core strength in bearings and the role of engineering services and customisations in resolving bearing reliability problems, optimising asset management and minimising the maintenance and ownership costs of rotating machinery.

“With the retirement of Tom Johnstone as president and CEO of SKF in December 2014, his successor, Alrik Danielson has set up a new management team with a fresh and strong direction,” begins Froneman. Danielson worked for SKF between 1987 and 2005 and held a number of executive positions, including president of the group’s Industrial Division.

“Danielson believes that, when it comes to bearings, SKF needs to return to being the undisputed Number 1 in the world. We are already considered by many to be the market and innovation leader with respect to bearings, but we now want this to be 100% undisputed,” Froneman tells MechTech.

“For the past nine years or so, we have been focusing on the services side, but we have sometimes forgotten that bearings are the central core of all our offerings. So Danielson has asked us all to raise the profile of SKF bearings, regardless of whether we are involved with seals, lubrication solutions, condition monitoring, engineering services or mechatronics,” he explains.

Describing a local condition monitoring success, Froneman says that a coal mine in Limpopo has installed 78 condition monitoring systems – based around the SKF IMx multi-log online condition monitoring unit – which are being used to protect the mine’s critical rotating equipment assets. “And this is only the initial installation phase. We expect over 100 systems to be onsite by the time the mine is fully operational,” he says.

“This project has a focus on bearings because rotating machinery is involved and we are confident that this will lead to ongoing bearing business. But this is not always the case. SKF IMx units have also recently been used in a much bigger project in the oil and gas industry to monitor valves and piping. In this case, the plant uses very few bearings and while it is a successful contract, several SKF engineers had to be on site installing a system that offered no long-term benefit to our specialist bearing products. Contracts such as these do not help us to become the undisputed Number 1 in bearings,” he argues.

Application engineering and whole shaft solutions

From an application engineering point of view, SKF sees its offering as an integrated range of products designed to support the integrity of rotating machines, with bearings as the most critical components. While bearing selection is at the starting point, application engineering tends to deal with the more complex requirements, those that need a little engineering – upgrades, customisations or non-conventional applications.

“If a bearing load is excessive or a shaft diameter is too big for a standard bearing, we can do an investigation, a redesign and, in consultation with the client, develop a solution. If a mill, crusher or fan is 50 or 60 years old, for example, and the pinion or drive needs to be replaced, then we can do that. We have the industry knowledge to design

Specific services offered by the application engineering/solutions factory team include modifications to standard SKF products.
Proactive maintenance, lubrication and contamination management

Above and right: Another highly specialised capability of SKF’s application engineering team is spindle remanufacture, customisation or redesign for machine tools such as lathes and milling machines.

Left: Through SKF’s bearing remanufacturing process, unused bearings that have reached their shelf life can be restored using SKF’s basic level of remanufacturing service to ‘as-new’ at around 15% of the cost of a replacement.

Below: A new coal mine in Limpopo has installed 78 condition monitoring systems based around the SKF IMx multi-log online condition monitoring unit.

and manufacture a custom-fit solution that will be as good or better than the original.

“In these cases, we strive not to simply copy the system we are replacing. We strive to put an optimised solution on the table that, while using as many standard components as possible, is engineered to better suit the real application requirements of the machine being refurbished.

“Having done a customised drive-train design for a mill, crusher or fan, we can also do the mechanical installation, shaft and/or geometric alignment, balancing, lubrication and condition monitoring. Then we stand alongside our customers to measure and monitor how the machine actually responds and we make sure that the solution is successful. For all practical purposes, this is what our engineering offering is about. We have been calling this service ‘Solution Factory’, but this can be confusing to some customers and the name is likely to be changed in the near future,” Froneman reveals.

As the manager for the SKF Services and Solutions’ team in Southern Africa, Froneman reminds MechTech that seals, lubrication, condition monitoring and asset management services all need to be underpinned by SKF’s bearing offering. “Bearings are our Number 1 priority, but not in the sense that we want to sell as many bearings as possible. It is more about building partnerships where companies are unwilling to buy anyone else’s bearings, because SKF’s optimised offering results in the best uptime and the lowest total costs of ownership. Long-term machine life is most important for us and this is summarised in the new SKF Group vision – a world of reliable rotation.

“At the pinnacle of this approach is the SKF asset management service – “and we are currently involved in the biggest contract in our local history”.

“With rotating machinery as the core focus, we develop maintenance solutions based on asset criticality, to most cost effectively maximise uptime and minimise failure risks and ownership costs.

“At the start of implementing an asset management solution, we bring in the client’s top management along with the buyer, production and maintenance manager and, together, we analyse the plant’s operation philosophy. Based on the mandate received, we break production processes further down with the engineering and maintenance teams. What happens if a production line stands idle because of a pump breakdown? If it is critical, then we do what we can to prevent failures and/or to react to them in the fastest possible time.

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Proactive maintenance, lubrication and contamination management

of equipment that can affect production – valves, sensors, flanges, switches, bearings, pumps, fans, motors, etc – as critical, very important, important or not important. If a machine component is considered critical, then it needs, for example, a proactive maintenance strategy, with redundancy, so that unexpected downtime risks are eliminated,” Froneman explains, adding, “This system gives the maintenance manager a new way of implementing focused plant maintenance and a way for plant reliability and availability to be measured, tracked and improved.”

On the other side of SKF’s applications solutions are problem-solving services. “Typically a product fails prematurely, sometimes repeatedly, and we are called in to find out why. We would then do a root cause analysis and re-engineer, change the bearing or seal specifications, lubrication strategies, installation routines or maintenance procedures to prevent a repeat failure.

“Our field service teams might be tasked with regularly monitoring the machine – taking infrared images, ultrasound, vibration or temperature readings or even oil samples – to see how the solution performs under real conditions and how it is being treated in the field. And 90% of all this effort focuses on helping the bearings achieve the longest operating life possible,” Froneman reiterates.

Describing some of the specific services offered by the application engineering/solutions factory team, he says that all modifications to standard products – manufacturing of special sealing arrangements, bore-size changes on standard couplings, inspection or service opening modifications, even entrances for condition monitoring or lubrication systems – are all accommodated by his team.

“Bearing remanufacture is also a key activity. The protective coating on a new bearing left on a shelf, in its original factory packaging, will only last for three to five years depending on humidity and temperature fluctuations. Generally, we say that it then has to be scrapped. But a large spare bearing can be a substantial investment – anything from R100 000 to R800 000 – so nobody wants to be throwing it away,” he suggests.

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