SKF Speedi-Sleeve

Shaft repair sleeves

Summary

A worn shaft in rotating machinery can be the root cause of bearing failure. That’s because seals designed to protect the bearing from contaminants and lubrication leakage can’t perform properly if they are running on a suboptimal shaft counterface. Refurbishing or replacing a worn shaft can be expensive and time consuming, resulting in extended downtime and lost productivity. SKF Speedi-Sleeve shaft repair sleeves offer an alternative to shaft refurbishment or replacement.

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1. An alternative to shaft refurbishment or replacement

A worn shaft in rotating machinery can be the root cause of bearing failure. That's because seals designed to protect the bearing from contaminants and lubrication leakage can't perform properly if they are running on a suboptimal shaft counterface. Refurbishing or replacing a worn shaft can be expensive and time consuming, resulting in extended downtime and lost productivity. SKF Speedi-Sleeve shaft repair sleeves offer an alternative to shaft refurbishment or replacement.

Fast, easy and effective

SKF Speedi-Sleeve is a thin-walled sleeve that solves the problem of worn seal counterfaces. Simply pushed into position over the worn area of the shaft, SKF Speedi-Sleeve provides a sealing surface that is as good as a new shaft, sometimes even better. This solution eliminates the need to refurbish or replace a damaged shaft, saving costly downtime, and allowing machines to be up and running again very quickly. By providing an optimized seal counterface, SKF Speedi-Sleeve helps restore a functional sealing system so that the bearing will be protected from contaminants and lubrication leakage.

Combined with the appropriate radial shaft seal, SKF Speedi-Sleeve helps to provide a more consistent and durable sealing system,. This enables more stable maintenance planning with improved predictability of the system service life. Benefits include:

- Cost savings vs. shaft refurbishment or replacement
- Minimized maintenance
- Improved productivity
- Reduced environmental impact

New generation SKF Speedi-Sleeve offers optimized wear resistance

SKF was the inventor of shaft repair sleeves, having introduced SKF Speedi-Sleeve more than three decades ago. Continual product improvements have led to a new generation of SKF Speedi-Sleeve featuring optimized materials designed for enhanced wear resistance and significantly longer performance of the sleeve surface as well as the sealing lip.

SKF Speedi-Sleeve material difference

Many sleeves currently on the market are made of chromium-plated stainless steel. Chromium is a very hard material, but like many materials with extreme hardness, it can be very brittle. Routine flexing of the sleeve during shipping and installation can easily result in cracks in the chromium plating. When this happens, the surface of the sleeve is no longer smooth. Instead, it becomes jagged and sharp. The seal running on it can be cut and sliced, and will pare away at the sealing lip. The result is seal failure, often within a very short period of time.

New generation SKF Speedi-Sleeve is designed with extended sealing system life in mind. The new generation combines a premium stainless steel material with a precisely controlled surface finish for a counterface engineered to minimize wear on both the sleeve and the sealing lip. The result is optimized performance of the overall sealing system.

This proprietary material provides increased strength and excellent ductility properties of the sleeve. Imperceptible pockets enable the lubricant to reside on the sleeve and prevent dry running of the sealing lip that could otherwise create excessive wear. The sleeves are thin-walled (0,28 mm/0.011 in.) and the contact surface is wear resistant and manufactured to minimize directionality (0° ±0,05) with a finish of Ra 0,25 to 0,5 µm (10 to 20 µin.). This is, in fact, a better counterface than can often be achieved on a shaft.

2. Materials comparison

The following images in Figure 1 below, from a scanning electron microscope (SEM), show the micro-cracks that typically form on the seal counterface of a chromium-plated sleeve.

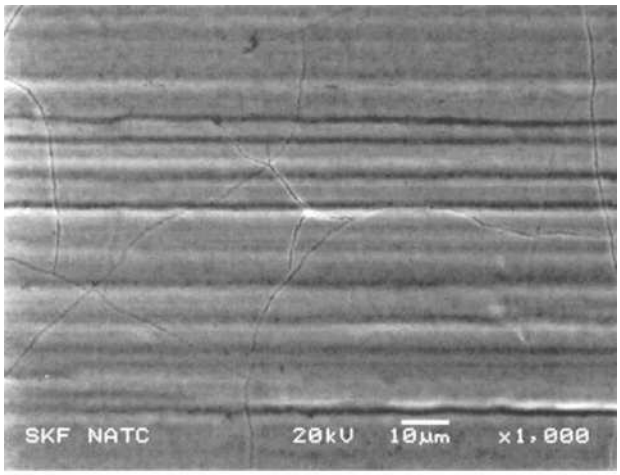
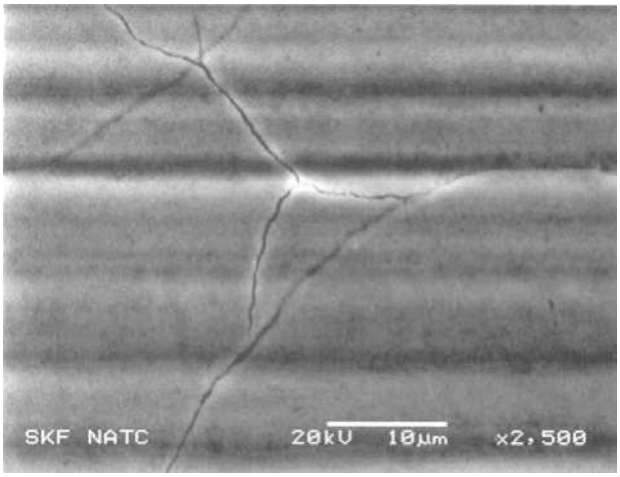


Figure 1. Chromium-plated sleeves

In contrast, new generation SKF Speedi-Sleeve (Figure 2 below) offers a premium seal counterface finish, which optimizes lubrication film thickness and minimizes sealing lip and sleeve wear while maximizing seal life .

Figure 2. New generation SKF Speedi-Sleeve

In Figure 3 the top image shows a close-up of the razor-sharp micro-cracks in the hardened chromium surface. The image below it shows a cross-sectional cut of the same surface. As shown, the chrome layer forms micro-cracks while the stainless steel layer remains intact.



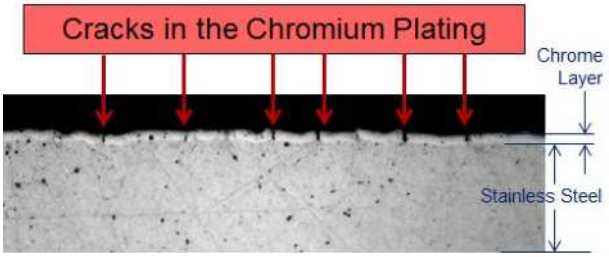


Figure 3. SEM image of cross section.

3. Test results

Sealing effectiveness

The chart at Figure 4 below shows the effects of micro cracks on sealing lip wear. A 2 000-hour life test was performed to test sealing system effectiveness. The test compared a chromium-plated sleeve surface to new and previous generations SKF Speedi-Sleeve products. Results showed that the chromium-plated sleeve wears an FKM sealing lip 4 times faster than new generation SKF Speedi-Sleeve.

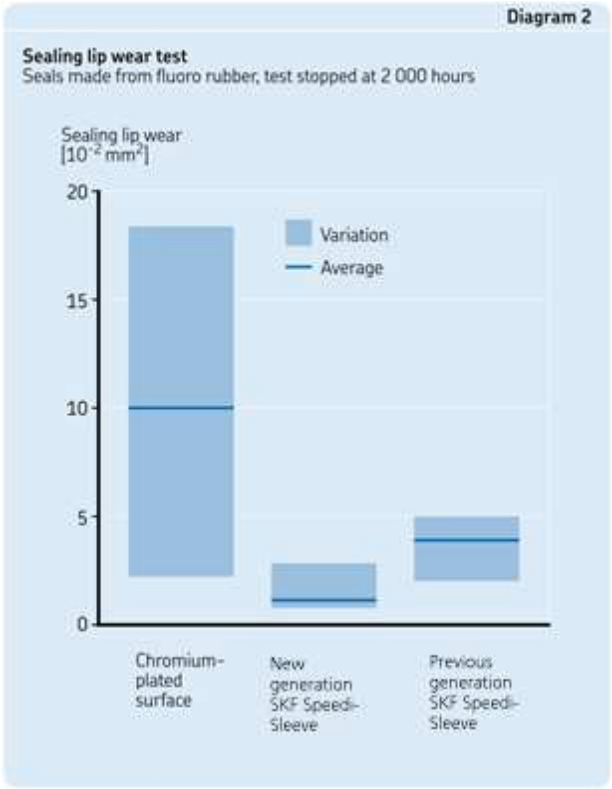


Figure 4. Sealing lip wear test

Abrasion resistance

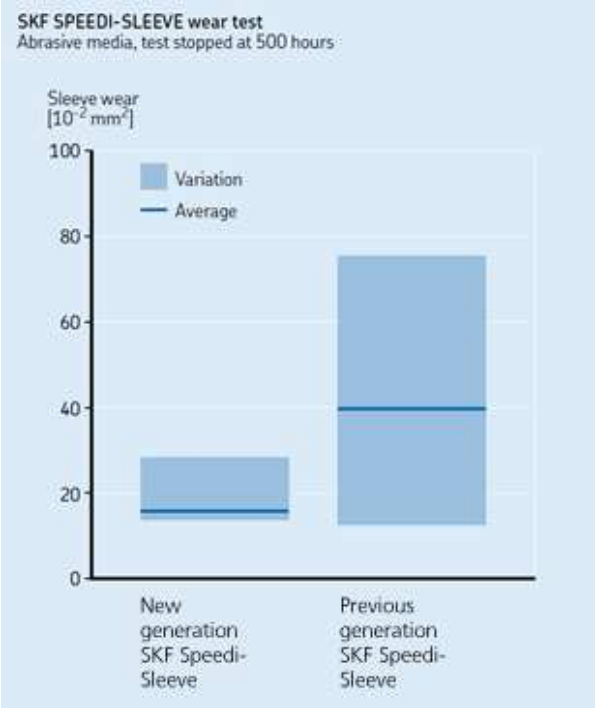


Figure 5. SKF Speedi-Sleeve wear test.

The previous and new generations of SKF Speedi-Sleeve products were tested for abrasion resistance under both coarse and fine dust conditions. A 500-hour contamination test (Figure 5) showed that when compared to the previous generation sleeve, new generation SKF Speedi-Sleeve reduced abrasion by a factor of 1,5 and was still operating efficiently. For highly abrasive applications, SKF also offers new generation of SKF Speedi-Sleeve GOLD, providing significantly increased durability.

Corrosion resistance

In other tests, it was found that continuous salt spray at 35 °C (95 °F) produced no trace of corrosion on SKF Speedi-Sleeve even after 600 hours.

Performance in broad applications

SKF Speedi-Sleeve can be fitted virtually anywhere there is an elastomeric radial shaft seal, including these and many other applications:

- Off-highway construction machines
- Industrial motors, pumps and gearboxes
- Mining, mineral processing and cement production equipment
- Papermaking machines
- Passenger and commercial automobile engines, transmissions and wheel-ends

Whatever the application, the enhanced wear resistance of SKF Speedi-Sleeve improves sealing system performance resulting in improved sealing system reliability, increased mean time between failure (MTBF), and better control of life-cycle costs through simplified maintenance procedures.

Learn more about:

For more information on Speedi Sleeve and product details please see our website as well as the PDF catalogue.
http://www.skf.com/group/knowledge-centre/media-library/index.html#tcm:12-128020