

DISCUSSION **360°**



5 MAIN

**CHALLENGES FOR
BEARINGS
IN THE PAPER &
PACKAGING
INDUSTRY**



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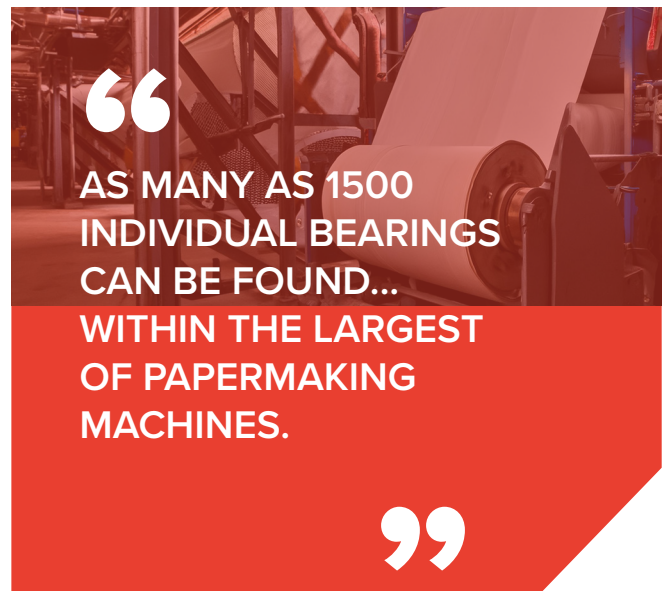
Pulp and paper processing facilities are challenging environments for bearings to operate effectively in. Paper machines are giants of the engineering world, with dimensions often measuring up to 200 metres long, 20 metres high, and 10 metres wide. The paper webs passing through these colossal machines can sometimes be 2000 metres long, which puts a significant strain on rollers, cylinders, and bearings, especially considering these machines are often operational 24/7/365.

Due to the many different stages involved in turning raw pulp into the final paper product, as well as both the vastness and unrelenting nature of production involved, the life of a paper machine bearing is incredibly difficult. It's some of those main challenges that bearings face along the production line, from the wet end forming section to the reel and winder section that we highlight in this article.

High operating speeds can generate considerable amounts of friction within bearings, increasing the working temperature, reducing oil films, and causing premature wear and failure. Therefore, the ability of rolling bearings to cope with large paper webs passing over them at a high speed needs to be taken into consideration when selecting and arranging units within machines.

1. MOISTURE

The presence of water in paper manufacturing poses a real threat to bearings. Raw pulp material entering the forming section of the paper machine is composed of 99% water, with the water content of the paper needing to be around 80% by the time it exits the section. This is to ensure that the paper web is strong enough to move to the press section. Further water content is removed here. The exposure to water in the forming and press sections means that bearings and the lubricants used alongside them must be carefully selected to limit the impact that contamination and corrosion can have.



2. HIGH SPEEDS

Paper mills operate with the pressures of having to process huge volumes of large format products on a round-the-clock basis, to satisfy unrelenting demand. This means that extremely high speeds are required of papermaking machines, and this affects the components within, including bearings.

3. HEAVY LOADS

Due to the vast dimensions and quantities of product involved in paper production, bearings must be able to accommodate heavy radial loads in combination with axial loads. Without having these characteristics, the service life of rolling bearings will be compromised through material fatigue or damage to structural integrity. Calculations to arrive at a basic dynamic load rating (the expression of a rolling bearings' capacity to support a dynamic load) must be made to ensure appropriate selection for the application's requirements.

This is why spherical roller bearings dominate in papermaking machines; because of their ability to accommodate loads in both directions and therefore adequately support the various rolls and cylinders involved.

4. MISALIGNMENT/ DEFLECTIONS

As many as 1500 individual bearings can often be found mounted, spaced far apart, within the largest of papermaking machines. Because of this reason, selected bearings must be able to permit misalignment between the shaft and housing, compensate for misalignment between bearing placements, and withstand continuous shaft deflections. This is another reason why spherical roller bearings (SRBs), lend themselves to paper industry applications.

With misalignment a regular cause of roller bearing failure in such environments, it is something that should always be considered when selecting an appropriate solution, to keep operations running smoothly.

5. HIGH TEMPERATURES

The drying process involved in the production of paper brings about another challenge for the bearings operating in this particular section; high temperatures. In this section, paper runs over steam-heated dryer rolls, guided by dryer wires. With dryer rolls operating under temperatures often reaching 200°C, inner-ring fractures, temperatures often reaching 200°C, inner-ring fractures, flaking, and creep on bearings here are common symptoms. Modern papermaking machines have adapted to reduce the impact of high-temperature steam on bearings by insulating the journal through which it flows to reach the paper. However, it is still important to consider the danger that the temperatures involved at this point in the process can have, especially in older machines.

In conclusion, paper mills are an incredibly tough environment for bearings. The challenges faced are largely a result of the material being processed and the processes required to take raw material and turn it into usable paper products. Alongside bearing selection, correct lubrication for bearings operating within each application is vital, to ensure that your operation can continue to run constantly at an efficient rate.

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