

Bearing Materials and Coatings Trends

THE QUESTION

What trends do you see in bearing materials and coatings that will benefit the power transmission industry?

EXPERT RESPONSE PROVIDED BY GUILLERMO E. MORALES-ESPEJEL. In general, many of the mechanical components in the power transmission industry are suffering from harsher tribological conditions, e.g. — rolling bearings and gears need to take/withstand higher power density, higher temperatures, dynamic loads, particle contamination and thinner or insufficient lubricant film. This follows the trend of the current economic constraints and tighter environmental policies. It is common now to see engineers struggling to design power transmission devices that consume less energy, last reliably longer and waste no lubricant. Hybrid contacts (silicone nitride with steel) are excellent solutions in these conditions — in particular, rolling bearings can take advantage of this because they are historically (for the past several decades) manufactured in a reliable way. Costs are also going down, as manufacturing techniques and materials are improved. Bearing life can now be estimated for those hybrid bearings, i.e. — SKF GBLM.

However, today's high speeds or/and high accelerations impose high heat inputs on surfaces, which might lead to adhesive wear and seizure. For that, coatings like special DLCs — that feature wear-resistant, metal-containing hydrogenated amorphous carbon coatings that are applied to the rolling element surfaces — are a good solution. Alternatives that can work well, depending on the conditions, would be black oxide and manganese phosphate coatings. If no coating is used, then steels with high thermal conductivity are preferred, as they can evacuate the heat at the surface in a fast and efficient way. Metal powder technology also offers good solutions here. **PTE**

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Black-oxidized wind turbine gearbox bearings: cylindrical roller bearings without outer ring, used in planetary wheels. (Photo courtesy SKF.)

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