

When bad things happen to good bearings

When problems arise, get the answers to a handful of key questions before indicting the machine, bearing or lubricant.



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Contributing Editor

At STLE's 2006 Annual Meeting & Exhibition, May 7-11 in Calgary, we are offering an American Bearings Manufacturers Association (ABMA) education course titled, "Bearings and their Lubrication." As I was thinking about how to write a very basic article on the subject, I was taken by both the difficulty and simplicity of the subject for the average person responsible for equipment that has bearings. Rather than exploring the nuances of all the different kinds of bearings, techniques, equipment for lubrication and so forth (you can get that from the ABMA

course), let's take a look at how to walk calmly through that maze of difficulty and simplicity with some level of dignity.

First, what about all those different kinds of bearings? While it is important to at least know the basic types, designs and functions, unless you are designing the equipment or work for a bearing company a fundamental knowledge should be enough. When you purchase equipment, the manufacturer, working with a bearing company, will have figured out the proper bearings and, assuming you use the equipment as intended, it should work out. Likewise the

manufacturer also will have recommended, or at least should recommend, a maintenance cycle and procedure; again, it should work out if you are using the equipment as intended.

So what if it doesn't work out and you are having bearing failures? I can't help but think back to my earlier days in my first assignment as a plant technical chemist for DuPont. Our job was to assist the plant when problems occurred. Stan, my unflappable lab partner and mentor, was an aged sage with many years of experience and flawless technical ability.

On one of my first days on the assignment, the doors to the lab burst open and in exploded a sweating, out-of-breath production supervisor holding a dripping sample bottle and exclaiming, "You gotta do something! The new product in K-5 is off spec, the process is no good! We've made 100,000 pounds of junk! Analyze this sample and find out what's wrong!"

Stan, slowly turning in his chair, quietly asked, "Did you run the process?"

"Of course!" screamed the supervisor.

"Bring me all your records to verify that you ran the process," Stan instructed, "then we will begin our work."

Well, as you might imagine by now, the problem was that, for one reason or another, we didn't "run the process" as intended. Perhaps it was because a sensor malfunctioned, a valve stuck, a raw material was off spec or an operator or lab technician made a mistake. Stan's lesson was burned into me on countless occasions. I would guess that 90% of the time when we had problems it was because we hadn't "run the process."

So, going back to bearings, when we have problems, our first temptation, like the aforementioned production supervisor, is to assume, "The lubricant is no good!" or "The bearings are no good!" Rather, we must first ask, "Did we run the process?"

In order to determine this, we need to ascertain such things as:

- Was the right bearing installed (size, type, etc.)?
- Was the installation correctly carried out (seated properly, alignment

checked, etc.)?

- Was the bearing correctly lubricated with the right lubricant, and did the lubricant meet proper specifications for the service?
- Were the seals the right type, properly installed and adjusted?
- Was the equipment operated within design limits?
- Was there any chance for contamination during any of the above?

There also are more obscure failure modes such as pitting due to electrical arcing across the bearing and false brinnelling. The latter occurs when machinery travels long distances in shipping cars and the machine bounces or rocks back and forth on the bearings. Perhaps you can think of other examples.

It is not until these kinds of questions are answered that we can start to become suspicious of the equipment, bearing or lubricant. One of Stan's further lessons was,

"When all the above has been verified, someone just might have made some mistakes and isn't talking, in which case the problem sometimes will mystically go away with no explanation." In the chemical industry, that can mean we suddenly make a bad batch and all subsequent batches are on specification.

However, in our industry, there is usually damage to the equipment requiring some level of repair. The first line of defense is a fully functioning proactive maintenance program capable of assuring proper installation and operation and able to detect the onset of malfunction, regardless of the cause, before it becomes a problem. <<

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