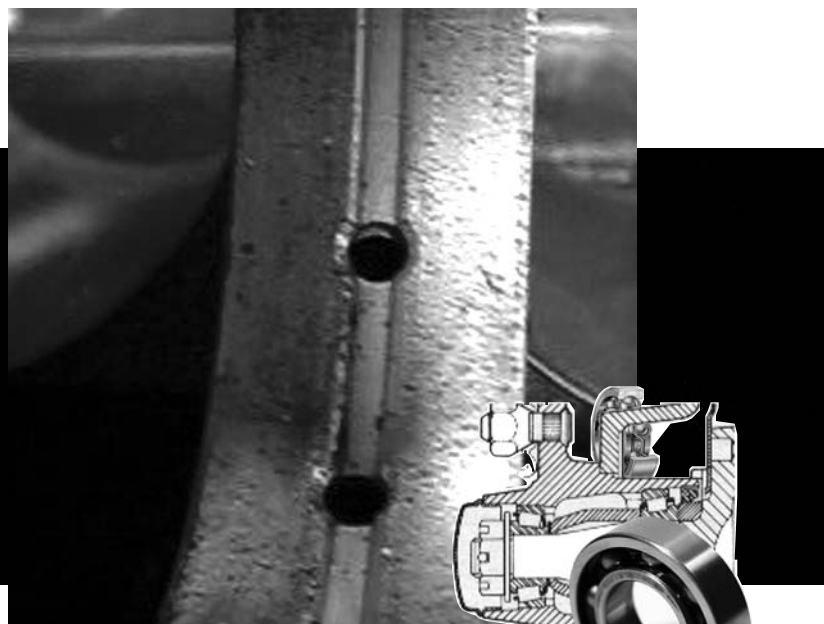


keeping your bearings



With all the state-of-the-art technology and metallurgy can't they make bearings that will last!

A legitimate sentiment considering that most repairs to rotating equipment involve replacing the bearings. The truth is that bearings have improved. There are charts and graphs showing the theoretical and real world life cycles of bearings and these figures look damn impressive.

What do they make these things out of?

But even with that improvement they are at the mercy of the real world. Based on the design parameters they look invincible. However, bearings might be compared to tires. You can buy a premium 75,000 mile street tire for your SUV and you should get close to that mileage before you have to replace it. But, if you don't watch the inflation pressures and decide to do some off road excursions and drive like you are in a 2500 lbs sports car and not a 4,500 lbs behemoth...there is no way you will see 75,000 on those tires.

The actual impact of outside forces on the life of a bearing can be illustrated by this example of misalignment. If the force of misalignment is twice the allowable amount, the life of the bearing is cut to one eighth; three times the allowable amount, the life expectancy drops to one twenty-seventh or the cube of the increased force.

Although they are designed to work in some pretty tough conditions, bearings can be a bit sensitive too. Between leaving the bearing factory and arriving in a repair shop for a rebuild, bearings may be subject to all sorts of

abuse. And all of that abuse is outside the realm of the bearing manufacturers. Before the installation there can be problems such as bearings that are dropped/hit or specifications not being accurate. The installation can be a problem and then there is lubrication--too much grease, too little grease or the wrong kind of grease.

At Longo we do our best to give these bearings the best shot at longevity by paying attention to details during the assembly. To begin with, the specifications of the new bearings have to match the shaft. Sounds pretty basic, but assuming the shaft has remained at its OE dimension can be mistake number one. Mic it to be sure. If the bearing needs to be heated to mount on the shaft, pay attention to the temperature and use the temperature cones/markers to be sure.

It is certainly possible to heat an undersized bearing until it fits, and if an untrained mechanic does that ("Hell, it fits now!") there are consequences. The excessive heat can burn or mar the bearing creating spots that will attract an assortment of wear bits and cause it to wear out prematurely. Although the bearing may appear to fit nicely on the shaft, once it cools it never really fits. Since it was too small to begin with, the inner race will remain stretched and never come back to its correct dimension or the bearing can assume an egg shape. Depending on the

extent of the stretching, the effect may be heard immediately upon startup or it may be small enough to get the unit into service and quietly, at first, begin its self destruction.

Another pitfall is the improper use of force when mounting the bearing on the shaft. The shock of a hammer blow can create an instantaneous load force in excess of the bearing's design. The load can force the balls into the race creating permanent dents that will create noise and eventually spalling. If the bearing needs some assistance onto the shaft a tubular drift will apply the force evenly not only preventing the denting of the race, but preventing the bearing being askew. Under load, the parts of the bearing can be forced together squeezing out any of the lubricant, another side effect that will lead to premature wear.

Once the bearings are properly secured on the shaft they are subject to the various problems that plague motors and pumps: vibration, heat, dust, poor lubrication and contaminants. These problems are fairly common and need to be addressed to eliminate them. The one interesting area of concern is lubrication. *It is common sense that the bearings require the correct lubrication to maximize their life cycle.*

Why is it then that this responsibility is often placed with people on the maintenance team who are new and untrained in the intricacies of how to lubricate bearings.

As the importance of proper lubrication becomes more understood

there are high tech solutions that remove this responsibility from the fallibility of individuals. Complete plant/facilities systems can be employed to ensure the lubricant is supplied on time and with the correct amount. This is not a modest investment, but it does indicate the importance that is placed on proper lubrication. Obviously down time is critical here, with profits at risk more than just an inconvenience.

Another problem that can arise is current leakage through the bearing. The damage can range from pitting to fluting depending on how high the amperage is.

Bearings kiss and tell...

One good thing about bearing failure is that it will usually give you some hints at what has been going on. Depending on the severity of the damage, there usually is a smoking gun if you or your experienced engineer/mechanic can read it properly. There are as many terms and descriptions of bearing damage as there are types of bearings. Determining the reason for the failure will have you half way to preventing it from occurring again.

Take this opportunity to address the root cause of the failure instead of "throwing on a new set of bearings and closing it up." By doing this, your bearings will have a good chance of surviving to their designated life expectancy. Ignore the root cause and you'll be ranting and raving again about how those "bearings aren't worth a damn."

Bearings from a top line manufacturer will do their job if you give them a fighting chance.

Leading causes of bearing failures

Poor Lubrication - 36%
Although 'sealed-for-life' bearings can be fitted and forgotten, over a third of premature bearing failures are caused by incorrect specification and inadequate application of the lubricant. Because bearings are usually the least accessible components of machinery, neglected lubrication frequently compounds the problem. Effective lubrication, using only recommended greases and techniques, helps to significantly reduce downtime.

Fatigue - 34%
Whenever machines are overloaded, incorrectly serviced or neglected, bearings suffer from the consequences, resulting in a third of all premature bearing failures. Sudden or unexpected failure can be avoided, since neglected or overstressed bearings emit 'early warning' signals, which can be detected and interpreted using various preventive maintenance techniques

Poor Fitting - 16%
Around 16% of all premature bearing failures are caused by poor fitting (usually due to brute force) and being unaware of the availability of the correct fitting tools. Individual installations may require mechanical, hydraulic or heat application methods for correct and efficient mounting or dismounting.

Contamination - 14%
A bearing is a precision component that will not operate efficiently unless both the bearing and its lubricants are isolated from contamination. And, since sealed-for-life bearings in ready-greased variants account for only a small proportion of all bearings in use, at least 14% of all premature bearing failures are attributed to contamination problems.

The scent of a woman.

Cosmetics and fragrances to sweets, engineered air is the answer to more and more production needs. If you have ever watched "How do they make that?" it is amazing how many production steps are controlled by air pressure. As more and more industries convert to centrifugal air compressors for this type of control, Longo has also adapted by becoming a certified distributor of FS Elliott centrifugal air compressors.

FS Elliott centrifugal air compressors are sophisticated, hi tech machines. These compressors are not only designed to be extremely efficient, but they are also very maintenance friendly. One of these machines is in use by a major cosmetic house in the NY area and it was due for maintenance.

Maintenance procedures can vary from a cleaning to a major tear down where some components are sent back to the factory for evaluation. The various levels can include the opening up of the gear cases and the removal of the impeller, replacement of the bearings, seals etc.. There is also the cleaning of the intercoolers and oil changes. Since the entire assembly is designed for easy access, the specific maintenance procedures are up to the time frame and schedule of the customers.

Although this specific model was a smaller one,

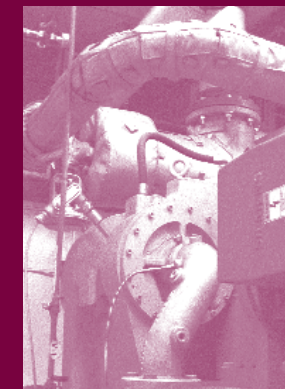
the attention to detail was intense. Longo's factory trained technicians, along with a representative of FS Elliott opened up the 3 compressor casings and did a cleaning. The small tolerances being what they are, the build up of corrosion on the inner surfaces, impeller and volutes will impair the overall performance of the compressor so maintaining a clean environment is critical.

Mr. Spock begin cleaning.. Instead of a dirt zapping Star Trek laser cleaner, it came down to wire brushes, sand paper and a lot of hand work. Once the components were thoroughly cleaned and coated, the reassembly began. Liquid gasket material was applied at each stage. The final closure was completed with factory designed and marked shims. These are not replaced with new ones, but retained to ensure exact closing dimensions.

Attention to detail is

paramount on a unit that spins up to 65,000 rpm. If there was an error in a component or setup there isn't enough time to even reach the controls to shut down the compressor. At those speeds things happen very quickly.

This is the reason it is a must that anyone working on your compressors is certified and trained for those specific machines.



Above right are photos showing the impeller casing before and after a thorough cleaning. At right, a Longo technician checking the compressor prior to disassembly.



Current, colors and critters...

Longo's tag line, "from line to load" was originally intended to focus on our overall electrical mechanical services. Everything from motors and pumps to switchgear and controls.

However, in our effort to do whatever it takes to do the job right for our customers we have extended our services into the decorator and varmint control areas! Once our electrical repairs were completed on a 5KV disconnect setup it was apparent that the units needed to be refinished. So, as part of our service we arranged to have the units scraped, cleaned and repainted. The end result really reflected the quality of the overall repairs.



Now that we had it serviced and looking very good there was still one slight problem, not uncommon to outdoor electrical facilities...fried varmints. Squirrels, raccoon, rats and other critters that find their way into high voltage areas soon pay the price, but they also end up shutting down equipment.

Longo came up with a simple but effective devise designed to prevent rodents and such from climbing up and over transformers and other outdoor electrical equipment. At the end of the day our customer had a refurbished transformer setup that not only functioned like new, but looked like new and was even critter proof.

If you are interested in these unique "line to load" services send us an e-mail message at info@elongo.com and put "critters" in the subject line.



Top: Refurbished transformer

Right top: The like-new look after Longo made sure the outside of the equipment matched the inside. Here are a bank of 5KV non-walk-in disconnects that got the special treatment. Actually it is not all cosmetic as there were problems of corrosion and possible leaks that were taken care of during the face lift. Once the job was complete its impact on the facility was very noticeable and welcome.

Right: The animal guard that Longo placed on the transformer towers. This simple device removes the threat of varmints electrocuting themselves and shutting down power at the same time.



Not every job is about performing exotic techniques or rewinding for 48 hours straight to get Mega Manufacturing back up and building those deluxe widgets...

JUNKYARD RESCUE

Recently we were contacted by a junk yard operator, or "recycling center," in upstate NY inquiring about a new or used motor. Seems his had finally given up after how many Pintos, washing machines and refrigerators! This business has some of the toughest, oldest, and meanest motors imaginable. You can throw in paper and concrete as far as nasty goes, but crushers are the meanest.

Without a maintenance team, VP of Facilities Management or just an engineer, we couldn't get the data we needed to find a replacement motor that would match up with his equipment. We contacted American Pulverizer and were able to get the information we needed from them. Through our contacts we were able to locate a 1500 hp, 720 rpm motor to match the specifications of his older motor. It was a refurbished unit, not new, and it was just what he needed. A new motor or rebuilding his old motor was not an option due to cost and time. The motor was set up for his operation and shipped directly to the site.

Our field service team was on site to do the installation which encompassed a new base and modifying the coupling. The installation included a steel conversion base between the motor and the concrete mounting pad to get the motor square and level. Finding a motor to fit the site's needs is one thing. Finding one with the exact same footprint is too much to ask. Our field service team handled the reboring for the mounting bolts and some adjustment to the steel base and the motor was in position.

One last item was modifying the shaft/coupling connection so that the motor, shaft and pulverizer were able to run straight and true. Firmly installed and aligned, the motor and pulverizer can resume shredding those Maytags and minivans for quite a few years to come.

Sometimes it is not so much about heroics as it is about being efficient and expediting the project to meet the customer's needs.



The business center of this recycler with its American Pulverizer Shredder waiting for its new motor.



Preparing the mounting locations on site for the new foot print which included steel plates to ensure the proper alignment of the motor.



The shaft coupling had to be modified to match up with the shaft from the pulverizer.

IN MEMORIAM

On July 22 our company lost a good friend and loyal employee. Mike Stewart, only 51, passed away suddenly of a heart attack at home.



Mike had been with Longo for 18 years as a lead mechanic, someone who could always be counted on to do what it took to get a job done and done right. We will miss him in the shop, but more than that, we will miss one of the good guys, and a wonderful friend to many.

He was a fan, baseball and football were his favorites. But if you asked him who his favorite personality was, it wouldn't be Derek Jeter or Tiki Barber—it was the one and only Marilyn!

Mike is survived by his wife Jean, who he met here at Longo about 12 years ago. It was quite a storybook romance with quiet Mike and the outgoing Jean. It was just one of many things about Mike that would make you smile.

Godspeed Mike.

2008 Seminars...

Our seminar series will resume in the spring of 2008 with new informative subject matter. If there are any specific subjects you would like to see us discuss please let us know at info@elongo.com and put "seminars" in the subject line.

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Please visit our website... www.elongo.com for the latest information on products and services available from Longo... plus the latest case histories and product literature.

+ = 56?

1. If green plus blue makes 89, and red plus black makes 56, what does yellow plus brown make?

2. What number should replace the question mark?
 13 44 88 176 847 ?

3. What is a solid figure with a circular base and one vertex more commonly known as? a. Cylinder b. Cone c. Cube d. Arc

4. What do these people have in common? Brad Pitt, Richard Pryor, John F. Kennedy Jr, Ramses II, Bob Dylan, Ruth Bader Ginsberg

1. 164 Assigning numbers to letters [A=1, B=2, C=3, etc], yellow plus brown will equal 164.
 2. 1595
 Reverse the digits and add it to the original to make the next number. 31 + 13 = 44; 44 + 44 = 88; 88 + 88 = 176; 176 + 176 = 352; 352 + 352 = 704; 704 + 704 = 1408; 1408 + 1408 = 2816; 2816 + 2816 = 5632; 5632 + 5632 = 11264; 11264 + 11264 = 22528; 22528 + 22528 = 45056; 45056 + 45056 = 90112; 90112 + 90112 = 180224; 180224 + 180224 = 360448; 360448 + 360448 = 720896; 720896 + 720896 = 1441792; 1441792 + 1441792 = 2883584; 2883584 + 2883584 = 5767168; 5767168 + 5767168 = 11534336; 11534336 + 11534336 = 23068672; 23068672 + 23068672 = 46137344; 46137344 + 46137344 = 92274688; 92274688 + 92274688 = 184549376; 184549376 + 184549376 = 369098752; 369098752 + 369098752 = 738197504; 738197504 + 738197504 = 1476395008; 1476395008 + 1476395008 = 2952790016; 2952790016 + 2952790016 = 5905580032; 5905580032 + 5905580032 = 11811160064; 11811160064 + 11811160064 = 23622320128; 23622320128 + 23622320128 = 47244640256; 47244640256 + 47244640256 = 94489280512; 94489280512 + 94489280512 = 188978561024; 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