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Electrical, Mechanical & Electronic Sales & Service
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THE LONGO LETTER

June 1998

CURRENT EVENTS
by
Joseph J. Longo
President

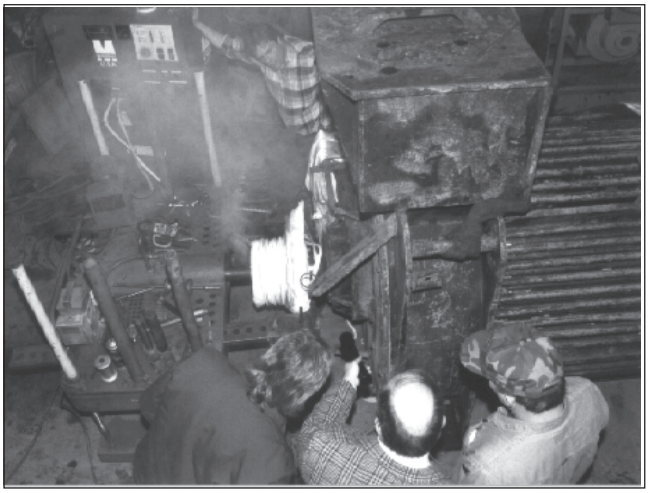
THE RIGHT TOOLS!

My father used to say: "With the right tools anyone could do the job, but with the tools you had, a mechanic could do the job." In the good old days, that may have been true, but it's certainly not so today.

Envision a coupling with a minor diameter of 14 inches with a flange of 24 inches which is shrunk onto a shaft. Further envision it having run under sea water on a dredge pump for years. The "good old days" say put a puller on with some heat . . . a sure way to deform and ruin the unique coupling. The "modern days" say use a high frequency generator with a coil around the coupling with an insulating blanket over it to contain the heat. Then, using a normal puller, ease off the unit when it was hot enough. Voila! . . . done!

So, Dad, let me say, you were right, **but** there are many exceptions.

Protection of electrical equipment and safety of personnel is assured when adequate properly applied protective devices are used. In this issue, we discuss various methods and apparatus which address these issues. It was interesting to learn that these units have finite lives depending on how many and the severity of the surges they see. The same applies to similar units used for computer power supplies.



Removing coupling using high frequency induction heating

The rotors of electric motors frequently go bad, even though their windings are more rugged than that of their complementary stator windings. Rugged though they are, they do fail, since they get very hot, especially during the starting period which can be extensive due to load inertia. These elements have unique materials and geometries. When apprised of a motor's application, we frequently modify the design to accomplish customer's objectives . . . *more inside.*

The specially formulated epoxy resins being used in our vacuum pressure impregnation system have served us well. Designed to provide flexible-rigidity, clients are most pleased with it and with our proprietary coil restraint system. Believe it or not, the electric coils in **your** machine do move. When they do, the insulation materials crack, contaminants enter, and the rest is history.

Recall with me the famous Zenith slogan—"The quality goes in before the name goes on!"

. . .detail! . . . quality! . . . **LONGO**!

P.S. Ask your sales rep to show you the "Drop Test."

Transient Voltage
Surge Suppression

Variable frequency drives, computers, programmable logic controllers and all other electronic devices are susceptible to damage. However, protection is achieved using transient voltage surge suppression (TVSS).

The Problem

Voltage Transients and High Frequency Noise.

The quality of power feeding sensitive electronic loads is critical to the reliable operation of any facility. In modern offices, hospitals, and manufacturing facilities, the most frequent causes of microprocessorbased equipment downtime and damage are voltage transients and electrical noise.

High Energy Transients

Sources of high energy transients include lightning induced surges and power company switching. These high energy transients can destroy components instantly.

Low Energy Transients and High Frequency Noise

More frequently the electrical system experiences low energy transients and high frequency noise that originate from the basic nature of AC current. Continuous or momentary surge sources from 250 to 3000 volts can be present from the operation or switching of electric motors, air conditioner compressors, or other inductive loads.

The effects of continual low energy transients and high frequency noise can cause erratic equipment performance or sudden failure of electronic circuit board components.

The Need

To Protect Sensitive Electronic Equipment from the Damaging Effects of Voltage Transients and Electrical Noise . . .by Providing Clean and Reliable Electronic Grade Power

The Solution

The Clipper Power System

The Clipper Power System (CPS) consists of Transient Voltage Surge Suppression (TVSS) and active hybrid filtering. The CPS protects sensitive electronic equipment from the damaging effects of high and low energy transients, as well as high frequency noise.

Electrical loads and sensitive microprocessor-based equipment are highly susceptible to both high and low energy transients.

This protection can be integrated into new equipment or your existing equipment can be retrofitted with the proper device.

Rotor Rebuilding
. . . Repair or Not

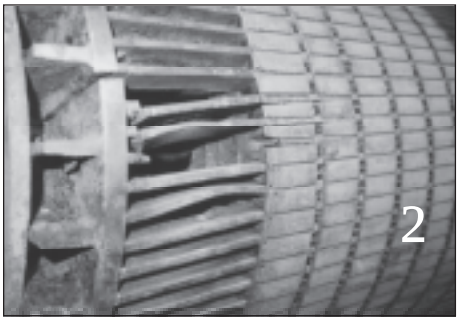
The rotating electrical part of most three-phase and single-phase motors is a squirrel cage rotor. These rotors will be either of fabricated or diecast construction. The fabricated rotor is made up of individual bars that are inserted in slots in the iron core. The bars are then connected to end rings by either brazing or welding. The diecast consists of bars and endrings that are cast under pressure to form an assembly on the rotor's iron core. Diecast construction is more common in smaller motors and fabricated construction is used on large motors.

Rotors are the electrical secondary circuit of an induction motor. As such, they carry current and convert electrical into mechanical energy, i.e., they transmit torque. Like their counterpart, the stator, rotors are subject to electrical failure. Repairs are often complex, due to the robust nature of rotor construction.

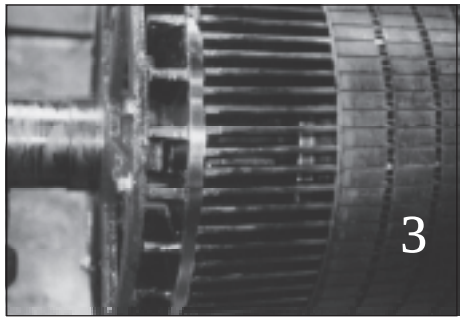
Fabricated rotors which have cracks in them may be rebrazed if the fault is local. This is illustrated in **Photo 1.**

Rebrazing requires controlled conditions to be certain that thermal and mechanical stresses are minimized, and thereafter relieved. Repaired joint integrity must be verified after brazing, using nondestructive techniques such as ultrasonic testing. At best, rebrazing is a "fix", not a cure. The inherent weaknesses that led to the cracking have not been removed.

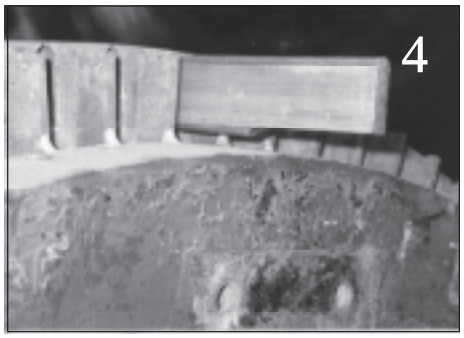
True repair of a fabricated rotor requires rebarring. The most effective approach is to perform an engineering analysis of the rotor design and motor application. **Photo 2** shows a fabricated rotor with



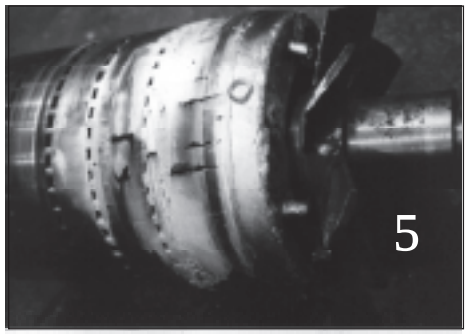
a defect that will require rebarring. Following this, rotor bar and endring materials are selected so as to provide the optimum rotor for the intended use. The same section of the defective rotor of **Photo 2** is shown in **Photo 3**, after rebarring. Construction details, such



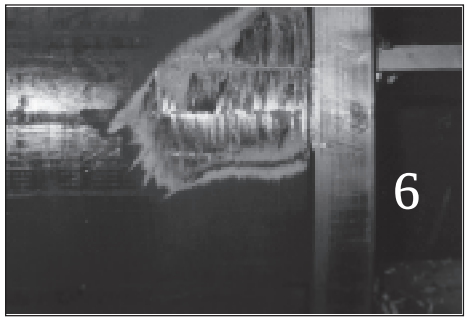
as radiuses at high stress points on the bars, should be built in if the design analysis indicates they are required. A close up of radiusing is depicted in **Photo 4.**



Diecast rotors can not be repaired when defective. They must be either recast or converted to fabricated rotor construction. Recasting requires removal of the original material by chemical means, then recasting with an equivalent conductivity material.



Virtually all diecast rotors are aluminum or aluminum alloy. **Photo 5 is** a defective diecast rotor and **Photo 6** shows part of a recast rotor. Some of the paint on the core



has been scraped away for purposes of illustration. Economically it is usually best to recast a defective diecast rotor. Direct conversion to fabricated construction may be uneconomical due to the cost of dies to extrude complex shaped bars. An alternative, which may be even more costly, would be to design and fabricate a new rotor core as well as bars and endrings. Although relatively expensive, conversion of diecast rotors to fabricated construction may be the only viable option for special application or obsolete motors.

Are You Ready
for the VPI* Solution?

*Vacuum Pressure Impregnation“
(up to 10 foot diameter)

FEATURES:	BENEFITS:
• Solventless varnish eliminates voids and pockmarked areas created during the curing process of standard solvent-containing varnishes.	• Greater heat dissipation in addition to reducing localized hot spot areas in the motor laminations.
• Complete slot fill.	• Superior bond strength while maintaining a flexibility to avoid cracks due to inrush current stress.
• Elimination of moisture-collecting voids.	• Insulation migrationis dramatically reduced.
• Increased chemical resistance.	• Moisture resistant winding integrity.
• Superior mechanical resistance to winding surges.	• Value added to your motor repairs by ensuring long life.
	• Effective barrier from carbon tracking.
	• Improved efficiency with a cooler running machine.

Specify VPI on your next motor rewind and join the growing list of informed buyers!

* * * * * * * * * * * * * * *

Ask your Field Sales Representative for a ***DROP TEST*** demonstration!

SPORTS QUIZ

1. Who had the only winning record on the 1962 Mets?

2. Who played the most seasons in the NFL?

3. Who is the only player in major league history to homer from both sides of the plate in the same inning?

4. Before Babe Ruth hit 60 home runs in 1927, what was the one-season major league record, and who held it?

ANSWERS:

1. Ken MacKenzie was 5-4.
2. George Blanda played 26 seasons, starting with the Bears in 1949 and ending with the Raiders in 1975.
3. Carlos Baerga, who did it for the Indians on April 8, 1993.
4. The record was 59 in 1921, set by Babe Ruth, who broke his own mark six years later.

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“Service Through Knowledge”®

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