



Protecting VFD-Driven Motors In: Container Port Cranes

Grounding Ring Solves Chronic Bearing Damage In Crane Motors at Container Ports

At the Pacific Container Terminal in Long Beach, California, huge cranes lift boxcar-sized containers, arranging them neatly on trains, trucks, and the decks of ships. If the cranes are not working, the whole process shudders to a halt.

SSA Marine, owner of the cranes, is just emerging from an ordeal. For years, every one of the company's 10 cranes, each capable of lifting 50 tons, was plagued with chronic bearing damage. But Reed Electric & Field Service, a Los Angeles motor repair plant, has finally found the cure — the AEGIS® PRO Series Shaft Grounding Ring manufactured by Electro Static Technology.

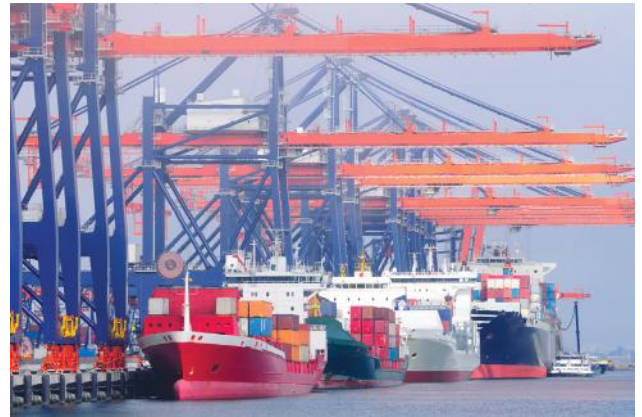
Baffling Problem

Each crane has two 650-HP, DC, constant-torque motors that control lifting and lowering. At first, Reed Electric simply replaced the bearings when these motors failed. But soon after these repairs, the new bearings would begin to make the telltale screeching sound of fluting. It only took 1-2 months for the new bearings to fail.

Replacing an 8-ton motor with a spare motor is no simple task, and puts the crane out of commission for 16-18 hours each time causing thousands of dollars in downtime. Damaged motors were usually trucked to Reed Electric's plant for repair. It was an inefficient solution to a baffling problem, costing a ton of money.

"You have no idea how frustrating it was," says Robert Martinez, field service manager for Reed Electric. "We could hear those bearings growling, and we were trying to figure out what the problem was."

Martinez and his crew determined that the bearings were being pitted by stray shaft currents. Reed Electric installed grounding brushes in an attempt to combat these currents.



But this was a severe case, and conventional grounding brushes were not enough to prevent such currents from discharging through the bearings of these motors.

Solving the problem in the big motors was a challenge. Next, Reed experimented with insulated bearings on the outboard end of a motor. This worked for the outboard end, but, blocked by insulation, the shaft currents followed the path of least resistance, shifting the damage to the bearings on the inboard end.

The distributor from which Reed Electric purchases bearings came to the terminal to evaluate the problem with Martinez and other Reed Electric experts. The consensus was to try an AEGIS® Shaft Grounding Ring on the inboard end of one motor, but after consulting the manufacturer, it was determined that the high current PRO Series would be needed in such a large motor.

The AEGIS® PRO Series, specially designed for high-current applications, is ideal for protecting large DC motors, medium-voltage motors, generators, and turbines against electrical bearing damage. It improves the reliability of systems by safely channeling harmful electrical currents away from bearings to ground.





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Sigh of Relief

In early 2012, Reed Electric installed the first AEGIS® PRO ring on the inboard end of a crane motor. Because the shaft had a long keyway, a collar was added to ensure sufficient contact with the ring fibers. This also allowed a larger ring, capable of handling higher currents, to be used. An insulated bearing was installed on the opposite end of the motor in accordance with best practices. The motor was put back into service, and Martinez waited. Two months went by, and the motor was still problem-free. After three months, Martinez breathed a sigh of relief.

*"We're going to keep using
the PRO ring because it is working.
It's really doing the trick."*

By August 1, Reed Electric had overhauled five more motors in the same manner — now standard procedure. All six motors equipped with the AEGIS® PRO ring are running smoothly with no sign of bearing damage. SSA Marine wants Reed Electric to give the remaining 14 crane motors the same treatment when their bearings are next replaced. And word of the company's success prompted the owner of several cranes at another California facility to contact Reed in hopes that they could help him break the vicious cycle of bearing damage.

Maintenance-Free

The maintenance-free AEGIS® PRO Series is available in a range of sizes to accommodate generator/motor shafts up to 30" in diameter. To facilitate field retrofits, the PRO split-ring comes in mating halves that simplify the ring's installation.

Embedded securely in the AEGIS® FiberLock channel along the inner circumference of the PRO ring, six rows of conductive microfibers completely surround the motor shaft, providing millions of discharge points for harmful shaft currents and effectively diverting these currents to ground.

Compatible with current monitoring equipment, the AEGIS® PRO Series is the longest-lasting and most effective shaft



grounding device on the market today. It works even in the presence of oil, dirt, grease, or other contaminants. As part of a preventive maintenance program, it can be installed on in-service motors or whenever bearings are replaced.

"It's Really Doing the Trick"

Skeptical at first, Martinez is now a believer in the PRO ring. "We used to pull the motors out every one or two months," he says. "To date, we have installed the AEGIS® ring on six motors, and we haven't had a single problem with any of them since." SSA Marine is pushing to get all of the remaining motors protected. Comments Martinez, "We're going to keep using the PRO ring because it is working. It's really doing the trick."

Martinez can only estimate the savings that SSA Marine will reap in the long run from the new overhaul procedure. "When you consider all the labor hours required to keep pulling those motors and reinstalling them over and over again, and the costs of bearings and downtime," he observes, "the savings have to be huge."

AEGIS® Rings are available through: