



## Protecting VFD-Driven Motors In: Commercial Ships



### Without Bearing Protection for Critical Systems, Commercial Ships Can End Up Dead in the Water

When a bulk carrier experienced electrical erosion in the main auxiliary reduction gears that drive the ship's 1.5 MW generator, power to the ship's many electrical motors was lost. The motors operate a variety of pumps, conveying equipment, and ventilation equipment in onboard systems as well as unloading and loading conveyors. Without the generator, the ship would not have been able to leave port, much less transport bulk materials.

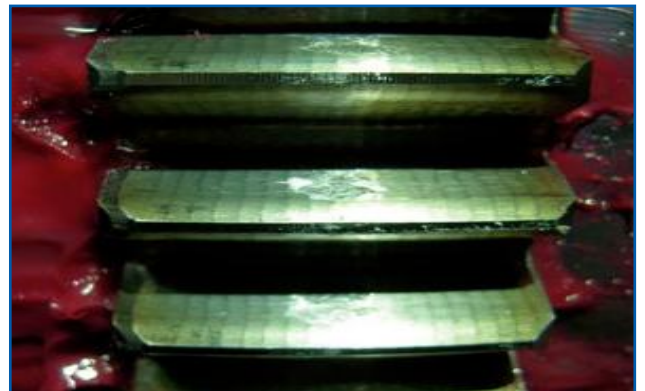
The problem was discovered when, after an overhaul, the auxiliary reduction gears failed only 120 days out of port. The ship was forced to return to the Shanghai shipyard for repairs to the reduction gears. But, the shipping line soon realized that the damage to the gears was merely a symptom of larger problem — electrical arcing in the gearbox. The shipping line needed to find a permanent solution to this problem before the ship could leave port. And a cost of \$10,000 per day for every day the ship remained in port, the shipping line needed to find a solution fast.

To assess the situation and recommend a fix, the shipping line called in Xview, the master distributor for AEGIS® Shaft Grounding Rings in China. After taking readings from the shaft of the generator, Xview technicians determined that high-frequency voltage spikes (4-6 volts) were being passed from the generator to the gearbox and were causing arcing in the gearbox and bearings.

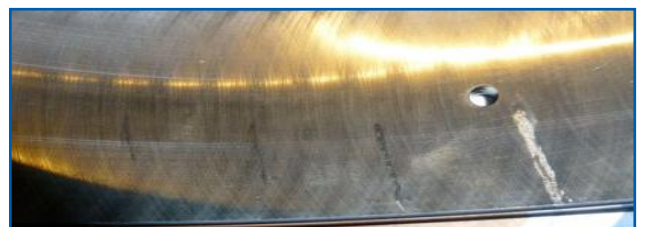
Xview recommended an AEGIS® PRO Ring, a bearing protection ring with multiple rows of conductive microfibers to bleed these voltages from the shaft safely to ground. The PRO ring was installed on the generator shaft with colloidal

silver coating. New measurements taken after the ring's installation showed readings of less than 2 volts. Based on these successful results, the shipping company installed AEGIS® PRO Rings on four other ships in its fleet.

Although the cost to repair the gearbox was over \$1 million, installing the AEGIS® PRO ring saved the shipping line hundreds of thousands of dollars in repair costs and lost revenues.



Above: Pitting of auxiliary reduction gears due to electrical arcing  
Below: Pitting of bearing sleeve on high-speed side of gearbox



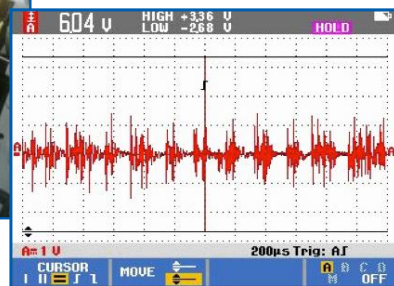
### The Problem:

Voltages on generator shaft were causing arcing in and damage to the ship's auxiliary gearbox



Measuring damaging voltages on generator shaft to auxiliary gearbox

Without AEGIS® PROSL: 6.04 V peak-to-peak



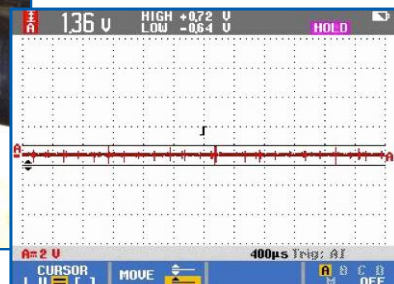
### The Solution:

Installing an AEGIS® PROSL on the generator shaft channeled voltages safely to ground, preventing arcing and damage to gearbox



AEGIS® PROSL installed on generator

With AEGIS® PROSL: 1.36 V peak-to-peak



### Applications:

- Electrical generators
- Propulsion gearboxes
- Propeller angle control motors
- Bow thrusters
- Rudder control motors
- Fuel pumps
- HVAC chillers
- Refrigeration compressors
- Desalinization pumps
- Potable water pumps
- Black water tank pumps
- Ballast water treatment pumps
- Bilge pumps
- Onboard cranes and winches
- Materials handling pumps and conveyors
- Hold hatch motors
- Anchor winch motors

AEGIS® Rings are available through: