

The importance of Earth fault rectification in ships



Introduction

Earth leakage levels on ships are subjective and generally work on the principle of a monitor reporting the fault but not tripping the supply. This works for a single fault to earth and allows the vessel to continue operations. This is of benefit should the fault occur on an important piece of apparatus like a steering gear.

Should two faults occur with leakage from different phases then the likelihood is the current levels will rise and fuses will blow or circuit breakers will trip in the lowest rated circuit, and for this reason it is important to closely monitor and trace earth leakages as they develop. The settings of the monitor are adjustable, but should be in the region of 100 – 300mA in line with shore based distribution protection equipment. The lower the mA reading the better the insulation resistance value.

Types of distribution networks

Fully isolated distribution networks. These networks consist of poles or phases completely isolated from the superstructure of the ship. This is advantageous over a referenced network whereby if an earth fault develops on a single pole or phase, a short circuit does not, maintaining supply to the equipment or circuit. An earth fault would need to be present on two or more poles or phases to cause a short circuit.

Referenced or earthed networks. These networks consist of a neutral or DC negative pole connected to the general mass of the vessels hull. If an earth fault were to develop on a phase or positive pole in this type of system, a short circuit is created between the phase or pole and the referenced point causing the circuit protective devices to break the supply to the equipment or circuit. In essence, a single fault can cause a short circuit.

In conclusion

It is essential that earth faults are closely monitored and are not allowed to develop to multiple circuits and consumers. Rectification of earth faults on DC distribution networks that utilise multiple supply sources, yet use a common negative arrangement can be particularly tricky to rectify.

Some marine DC distribution networks do not have earth monitoring equipment in use, therefore the only way to effectively negate the consequences of earth faults would be via periodic inspection and testing.

Kind regards,
AMEA Services



