# ERIKS Delivers Transformer Overhaul at Critical UK Defence Facility

Industry Sector:
**Defence**

Application:
**Submarine power supply**

Ref PS315

## Problem

In 2018, ERIKS was engaged to support the life-extension programme of a strategic UK defence site. The facility's infrastructure included eight legacy generator sets, each comprising of four motor-generator units responsible for supplying power to docked submarines. These large, high-load systems – each motor and generator weighing up to five tonnes – were well beyond their original 25-year service life.

Of particular concern were the frequency changers at the end of each set. These units, used to convert electrical frequency for specialised onboard equipment, relied on high-voltage transformers that were only energised briefly during start-up but, in that moment, were subjected to current surges exceeding 10,000 amps.

While undertaking early-stage refurbishment, one of the transformers catastrophically failed during start-up. With no viable data remaining to confirm the root cause and the original manufacturer no longer in operation, ERIKS had to act quickly. A second failure shortly after led to a complete system review and a decision to replace all eight critical transformers.

## Solution

Working with a specialist electrical engineering partner, ERIKS commissioned a like-for-like replacement transformer design. The new units matched the original footprint and ratings – approximately 3.5 tonnes each – and included high-stress windings and insulation designed to handle peak transient loads during energisation. Because the site is subject to nuclear-grade regulations, seismic compliance became a crucial requirement. Initial seismic assessments from the overseas manufacturer were deemed insufficient.

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ERIKS sourced a UK-based seismic consultancy to conduct advanced dynamic simulations, including finite element analysis and 3D movement modelling, to validate the structural integrity under extreme stress. The result was a set of tailored reinforcement recommendations – including precision-fabricated stiffeners and anti-movement brackets – which ERIKS retrofitted to each transformer unit in collaboration with a steel fabrication partner. These modifications were fully documented and approved by the site's engineering authority.

In parallel, ERIKS was commissioned to refurbish the white metal bearing assemblies within the frequency changer units, an additional scope valued at around £30,000 per set. This included removal, precision machining, reassembly and reinstallation across eight locations. Despite restricted access windows, COVID-related delays, and evolving site requirements, the first two units have now been installed and tested, with six more staged for installation over the next two years.

Given the sensitive nature of the site, all works included full CDM-compliant documentation, RAMS, and Gantt-linked project plans, which were collated and submitted through the site's contractor management system. ERIKS also took on the coordination of approved rescue and support contractors, reflecting its growing role as principal contractor on-site.

This project showcases ERIKS' deep-rooted industry expertise – going far beyond part replacement to deliver tailored engineering solutions for mission-critical electrical challenges, all while navigating the complex compliance, security and documentation demands of the defence sector.

"We're not just providing transformers – we're providing confidence. Every spec, every bolt, every document is aligned to the highest standard because that's what this site demands." – Alan Burnett, ERIKS

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