

Case Study: Smart Motor Testing & Client Engagement

Date: July 2025

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Background

In June 2025, a KPMUK technical team visited a key deck machinery customer to assist with testing and evaluating the new Staffa Smart Motor on a marine towing winch with a 100t maximum pull force. The visit aimed to validate the Staffa Smart Motor's performance in demanding real-world conditions and build client confidence in its operational capabilities.

Technical Objectives

Auto-tensioning:

The first aim was to assess the Smart Motor's response under sinusoidal and step-change motion inputs while attempting to maintain constant tension in the winch line. By working against a second winch, which provided the simulated motion, the towing winch was able to demonstrate constant tension operation at operator-determined tension levels. When the sinusoidal motion, designed to simulate wave dynamics, was replaced with a much harsher step-change forward-reverse motion, the winch performed impressively to maintain constant tension in the line.

Variable line pull (bollard pull):

The test winch was connected via a rope and load cell to a large hydraulic cylinder allowing low-speed dynamics to be tested up to a line pull of 60t. The heave/render hysteresis was measured and speeds down to zero were tested. It was found that the winch exhibited excellent control at all speeds and pull force levels, even at zero speed.

Interactions of Multiple Motors:

With two motors connected to the winch drum via the same gearbox, it was found that there was a measurable interaction between the motors. The default factory settings of the controller were tuned slightly to improve the stability of the displacement control. Adding a D-component to the PID control helped to reduce the oscillations in this test winch where there were two motors on the same gearing.

Outcomes Captured

All key performance tests were recorded on video for future reference and end-user distribution.

Kawasaki Heavy Industries, Ltd.

Demonstrating functionality and performance is essential with innovations like the Staffa Smart Motor, building user confidence in new equipment.

Client Sentiment

The customer's engineering team expressed strong satisfaction with both the product's technical capabilities and the collaborative support offered by KPMUK. Their confidence in the new technology increased significantly prompting discussions with external clients about incorporating Staffa Smart Motors in future projects where the proven advanced functionality is required.

