

Torque

Pipe Laying Vessel Propulsion Thruster



Coflexip Stena Deep Blue

Coflexip Stena contacted us to perform an on-site torque trial aboard their newly build pipe-laying vessel the "Deep Blue". Coflexip's engineers wanted to verify that power output from a propulsion thruster motor was up to the required specification.

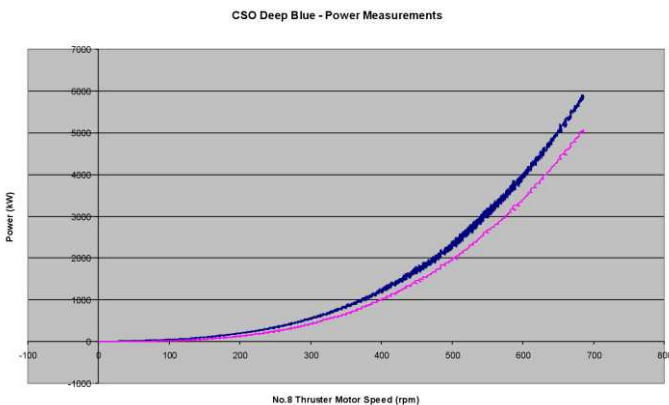
Strainstall UK provided and commissioned a monitoring and recording system which gave real-time graphical displays of shaft torque, speed, power and battery life. Torque was measure directly in the propulsion shaft using strain gauges bonded directly to the shaft's surface. Speed sensing was a simple proximity devise counting pulses per second.

The signals were transmitted by battery powered infra-red telemetry, chosen for its capacity to give good rejection of electro-static noise. The infra-red pulse code modulated signal was decoded to give 0 to 5 volt signal to a portable DAS and PC located adjacently. A simple DAS management program processed, stored and displayed the data. A light operated switch mounted on the shaft provided ready means to conserve battery life, more than 6 days capacity was provided.

Strainstall can provide multi-channel infra-red telemetry systems with full data acquisition and analysis services. Typically a system might comprise two

torque, one speed, two acceleration and two temperature sensors.

The values measured during the trails for Coflexip "Deep Blue" compared favourable with those taken from the propulsion motor control system.



The World of Load
Measurement and
Stress Analysis

System Features:

- Direct Torque by Bonded Strain Gauges
- Shaft Mounted Infra-red Telemetry
- Battery Powered with Remote Switching
- Simultaneous Shaft Speed Monitoring
- Compact High Speed DAS
- Windows NT Software

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Due to the in-service failure of a centrifuge spindle, a strain investigation was carried out by Strainstall on the spindle adjacent to the centrifuge location slot. Strain gauges were bonded at several positions around the slot's head, to establish if a stress concentration existed. The gauges were monitored using a multi-channel infra-red telemetry system to collect, condition and transmit the signals, with a high speed 300Hz data acquisition system doing the front end display and recording.



Torque trials on marine vessels are often in tight spaces where there is little space to fit the equipment. One such project involved strain gauges bonded to a 250mm dia tubular prop shaft rotating at 5500rpm. Connections to the strain gauges were via epoxy coated leadwires. An infra-red telemetry system was used with the shaft mounted units fitted inside a 30mm wide split aluminium ring clamped around the shaft to secure them against the high G forces. The aerial and infra-red emitters were also mounted inside the aluminium ring for protection. Three weeks from placement of order to installation of two systems.



A simple test to confirm peak torque levels applied by a gearbox. Slow speed of rotation enabled use of a simple portable load indicator which was strapped onto the shaft. The gauges were bonded onto the shaft surface and wired directly as a torque bridge. The load indicator was fitted with a peak hold facility and scaled to read directly in units of newton metres. Installation set-up and testing completed in one day.



The complexities of marine craft design occasionally cause engine horse power and craft speed to be questioned. Strainstall can perform torque measurements on your craft to check the performance. We'll measure the torque, shaft speed, vibration and may other parameters which provide answers to loss of power. A twin channel inductive loop powered system takes approximately half a day to install, including strain gauging and set-up.