WIND TURBINE SHAFT INSPECTION

Application Brief

Phased Array Ultrasonic Testing (PAUT) for Automated Wind Turbine Shaft Inspection

MISTRAS Group was successful in performing Phased Array Ultrasonic Testing (PAUT) of wind turbine shafts for a major service provider.

Problem

A wind turbine shaft failed in service, causing the blade assembly to fall to deck level. The turbine shafts are forged steel 4.0m long x 1.5m diameter. The scan area at the large diameter end of the shaft is approx. 75cm diameter.

Solution/Process

PAUT was decided on as the employed method. MISTRAS worked with the client to develop and verify a Nondestructive Testing (NDT) procedure that complied with the relevant specifications and delivered the required testing method and inspection report.

The turbine shaft testing was carried out using an MX2 with TomoView software, 5Mhz Compressional wave probe, and a Phoenix Bi-axial encoded scanner to record the completed scan, verify test coverage, and capture data prior to de-mobbing from the site.

Testing required only one hour pre-inspection preparation by the site's maintenance team. MISTRAS accessed the large diameter end of the shaft through the turbine module. The isolation, inspection, and reporting resulted in the loss of less than eight hours operational time for each turbine shaft tested.

Results

MISTRAS provided one disciplined rope access engineer (per turbine), PCN / IRATA / GWO compliant to deliver the scope of work.

The engineer delivered detailed inspections and reports on a turbine-by-turbine basis. These NDT inspections help assess the condition of turbine shafts and the reports provide the evidence to justify the continued operation of the wind turbine or identify defects that require repair and/or monitoring.

Customers Benefits

- To ensure the wind turbine shaft(s) are fit for continued service and have not substantially deteriorated over the wind turbine's lifetime.
- The outcome of the inspection reports determine the client's. action plan for remedial works and inspection monitoring strategy.

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