SPECIALIST PACKAGE

POWER GENERATION

SONOMATIC

THE PURPOSE

This document is composed to assist our clients and the supply chain to understand our group operating structure along with a high-level understanding of the benefits, services and specialist packages associated with our NDE and asset integrity management services.

WHO WE ARE

CWL GROUP

The CWL Group is an international consortium of companies that delivers a comprehensive range of asset integrity, inspection, maintenance and specialist access services across a wide range of industries and sectors.

SONOMATIC
VERTECH GROUP
BLUE OCEAN MARINE SERVICES
GEO OCEANS
FTI-INTL
ABSEIL ACCESS

SONOMATIC

Sonomatic is a subsidiary of the CWL group specialising in NDT inspection design, development and application combined with integrity engineering capabilities, and have been servicing many industry sectors since the 1980s.

Sonomatic Power Generation brings innovation and proprietary inspection solutions to the power generation industry through in-house development capabilities, thoughtful kit design, and combined decades of power generation NDE experience.

Sonomatic is committed to providing accurate proactive inspection and engineering solutions that enable clients to manage the integrity of newly constructed and maturing assets, while making informed and cost-effective decisions crucial to the life extension and safety of asset life.

GLOBAL FOOTPRINT

POWER GENERATION

Sonomatic Power Generation Division employs seasoned professionals who have decades of experience in advanced turbine/generator NDE. We offer a full range of automated and manual techniques to examine the integrity of your turbines and generators; with many of our inspections being used to support engineering remaining life assessments. In addition to our 'standard' offerings, such as boresonics, wheel-sonics, blade attachments, generator rotor retaining rings, etc. we also have developed unique, proprietary inspection techniques for specific applications, such as curved axial-entry last stage blade roots on specific OEM blade variants. We also work on all OEM rotors. We work closely with the Electric Power Research Institute (EPRI) by assisting them on various R&D projects specific to turbine & generator NDE; EPRI has also provided independent third-party evaluations on some of our inspection techniques.

Sonomatic bring innovation, value and integrity to the power generation NDE industry. We provide high-end, high-value inspection solutions at reasonable rates. We do so by capitalizing on technology, thoughtful kit design, and efficient work practices. Our moto is 'Cut Costs, not Quality'.

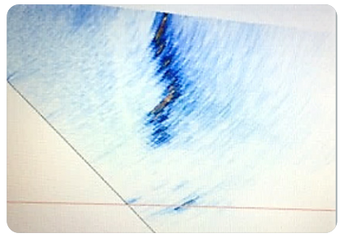
KEY OFFERINGS

TURBINE AND GENERATOR NDE

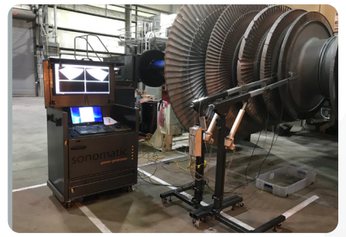


PIPING AND BOILER NDE


ADVANCED ULTRASONICS



BLADE ATTACHMENTS



SONOCAM

ADVANCED NDE TECHNIQUES

BORESONIC EXAMINATIONS

In-service turbine rotors can often suffer from cracking due to wear. The consequences of failure associated with this are significant, making regular integrity inspections essential. For more than a decade, Sonomatic has been providing fully automated hollow rotor bore examination services to customers worldwide. Our Boresonic systems reliably and accurately detect and size both near and far - surface fatigue cracks in hollow turbine and generator rotors.

Our unique focused probes minimize the near-surface dead-zone, which affects performance of other systems. An automated high-frequency Eddy Current surface exam is performed concurrent with the UT examination. The Sonomatic boresonic system is capable of examining bores from 2 to 10+ inches in diameter. Many bottle bores and steps can also be reliably inspected.

A condition assessment of a turbine rotor can be conducted based on the ultrasonic data. This assessment would typically include material evaluation, stress analysis, and fracture mechanics analysis. The purpose of these examinations and assessment is to establish the next rotor bore inspection interval/date and/or life expectancy.

SOLID ROTOR EXAMINATIONS

Sonomatic has developed specific ultrasonic techniques for evaluating axial and circumferential indications from the external surface of solid turbine rotor bores. Specific applications vary depending on configuration, failure mechanisms, etc. However, typically, a combination of Phased Array (PAUT), Pulse-Echo and TOFD (Time-of-Flight Diffraction) techniques are used. We are adept at designing specialized techniques to fit almost any application.

GE TIL 1292

Large GE steam turbine generator rotors and 324 generator rotors with diagonal flow cooling are prone to potential cracking in the rotor tooth dove-tail area due to fretting (the relative motion between the wedge and slot dovetail). Experienced Sonomatic technicians can detect minute cracking before it propagates into something more serious. When the wedge bars are removed, wedge slots are carefully examined using a specially designed surface eddy current probe. And for those situations where it is impractical to remove wedge bars, specialized ultrasonic techniques have been developed.

SONOCAM

SonoCAM is a unique automated phased array technique that combines pulse-echo phased array with a distinctive pitch-catch technique for far-superior detection of radial-axial indications on wheel-like components. This is the ideally suited detection technique for shrunk-on disk-bore/keyways & radial-axial cracking on blade attachments. The technique also improves data collection speeds, boasting up to 50% faster data acquisition by multiplexing than from single channel scanning.

Early detection of flaws is critical, placing greater emphasis on improved flaw detection capabilities. The SonoCAM detection technique is singularly unique in that it has the remarkable ability to exaggerate true reflectors while greatly reducing unwanted background noise.

CIVA INSPECTION MODELLING

The Civa inspection modelling software can be used to simulate specific turbine geometries. The software can then be used to simulate the responses obtained using different inspection strategies for a variety of flaws. This allows the responses from a variety of inspection techniques to be validated and optimized. The output from the Civa inspection modelling can be used as part of a technical justification for a proposed inspection.

TURBINE DISK INSPECTION (TIL 1904)

Turbine disk bores are subject to circumferential radial cracking at the disk-bore to rotor interface. In addition, the keyways are subject to heavy stresses which may allow fatigue cracks to originate and propagate. Sonomatic has developed a phased array technique for inspecting disk bores/keyways; the automated phased array technique utilizes our proprietary disk bore scanner. This technique was evaluated by EPRI in a blind trial exercise in a 2019 report 'Management of Fossil Wheel Keyway Cracking Risk'. EPRI, Palo Alto, CA: 2019. 3002014721. Scan plans are developed for each individual disk to optimize coverage, with 100% coverage often being achievable.

GENERATOR RETAINING RING EXAMINATIONS

Generator retaining rings are subject to high operational stresses which may result in service indications such as arcing and stress corrosion cracking generating while in operation, when poor environmental conditions are present. Traditional inspection methods require extensive dismantling of the rotors to remove the end rings for inspection.

Sonomatic offers fully automated inspections utilizing digital data storage and displays, that can be performed with the end rings on the rotor, removed from the rotor or limited in-situ inspections. The techniques used when carrying out the automated ultrasonic inspection of austenitic Generator Retaining Rings are ToFD, Pulse Echo, Creep Wave and Eddy Current, selected in consideration to the end rings specific material type i.e. 18:4/5 or 18:18 materials.

DOVETAILS

Without disassembly of the buckets from the disk, the only practical and effective means for detecting service induced discontinuities of turbine dovetails is by use of an ultrasonic examination technique. Disk rim blade attachments and blade roots are susceptible to stress corrosion cracking due to high stress concentrations inherent with geometry and steam cycle chemistry. Effective inspection of dovetails is challenging due to non- concentric, and sometimes un-favorable geometries. Sonomatic has developed an assortment of automated phased array techniques for inspecting dovetails in a range of applications: disk dovetails (tangential-entry and axial-entry) blade dovetails (tangential- entry, axial-entry and T-root) and curved axial-entry last stage blade roots.

BLADE INSPECTIONS

On-site, high sensitivity liquid penetrant or eddy current array inspections of high stress components such as rotating and stationary blades, generator retaining rings, etc.

CONTACTS

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IMPROVED CAPABILITY + EFFICIENCY = TIME SAVINGS = VALUE

VALUE THROUGH EFFICIENCY

CLIENT FOCUS · PEOPLE · SAFETY · QUALITY · INNOVATION

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