Turbine Inspection Field Services

Sonomatic employs an unrivalled team of experienced inspection technicians and engineers with a proven track record of providing innovative, often unique inspection solutions for our clients worldwide. Sonomatic designs and builds much of our own equipment thus ensuring quality and ease of operation as well as software compatibility and continuity. Through our effective and efficient services our clients gain tangible cost benefits by minimizing risks and realizing meaningful and accurate inspection results from which reliable decisions can be made.

Sonomatic offers unique ultrasonic inspection technologies for turbines from the outer surface to the bore surface and the volume of metal in between. The inspections are applied in both the radial-axial and radial-circumferential directions, and various techniques are used to inspect the three different regions of the rotor shaft. Our services also include inspection of turbine discs and retaining rings.

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Sonomatic has offices in strategic global locations so we can respond quickly to customers' requirements wherever they may be situated. Our high quality products are matched only by our customer service. In addition to our field services, we offer training and consultancy at our sites in the UK or at clients' premises anywhere in the world. Sonomatic is committed to improving asset performance through applied and innovative technology; to delivering these benefits to our customers in the products and services that we provide; and to working with our customers, as value-added partners, to realise the maximum benefits of inspection technology.
Hollow Rotor Bore Examinations

The most critical flaws in terms of effect on the remaining life of the rotor are bore surface-connected fatigue cracks. For more than a decade, Sonomatic has been providing fully automated hollow rotor bore examination services to customers worldwide. Our newest Boresonic system reliably and accurately detects and sizes near-surface fatigue cracks as well as processing flaws in hollow turbine and generator rotors.

Our unique focused probes nearly eliminate the near-surface dead-zone, which is so prevalent in 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.

Sonomatic offers fully automated inspections utilizing digital data storage and displays that can be performed with the rings attached, removed, or even in-situ. In-situ inspection offers considerable time savings and cost benefits to our customers. Retaining rings may be inspected by the Pulse Echo Eddy Current and/or ToFD techniques. The precise Eddy Current used depends upon the particular design of the retaining ring.

Turbine Disk Bore Inspection

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 developed a multi-tiered approach to inspecting disk bores/keyways. A combination of manual Pulse-Echo, Automated Pulse-Echo and Automated ToFD scans are performed based on a scan-plan developed for each individual disk to achieve 100% coverage of the critical areas. Disks and keyways can typically be fully inspected at a rate of one disk per shift or faster.

Dovetails

The problem with blade root inspection is that the scanning surface changes constantly with probe position and there are numerous direct and indirect geometric responses. This renders interpretation very difficult and many beam angles are required to provide full coverage. The Sonromatic approach is to use a very small, high output transducer with a wide beam spread to flood the blade root with energy, and image the responses using grey-scale imaging technology. By utilizing a miniature scanning frame, which is hooked onto each blade in turn, a characteristic set of signals are generated. Cracked roots show disturbances or a different pattern of signals.

Solid Rotor Bore 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 Pulse-Echo and ToFD (Time-of-Flight Diffraction) techniques are used. We are adept at designing specialized techniques to fit almost any application. Sonomatic has recently used similar techniques to inspect submarine propeller shafts for circumferential-radial cracking resulting in detection of 1mm deep indications up to 8 ft away.

Generator Retaining Ring Examinations

Generator retaining rings are subject to high operational stresses which may result in stress corrosion cracking when poor environmental conditions are present. Traditional inspection methods require extensive dismantling of the plant, and even standard ultrasonic techniques require the rotor to be removed from the stator.

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.

QA and HS&E

It is Sonomatic’s ongoing commitment to supply services and products, through the application of technical and engineering excellence, which complement both the customer’s and our own QA and HS&E requirements.

Sonomatic’s commitment to quality is maintained through continuous assessment and review of our Quality Management Systems to BS EN ISO 9001:2008. Sonomatic actively promotes the development, implementation and improvement of our QMS as a part of our ongoing drive to enhance customer satisfaction by meeting or exceeding customer requirements. In 2009 Sonomatic achieved UKAS accreditation as an Inspection Body to BS EN ISO/IEC 17020 (UKAS BS4276).