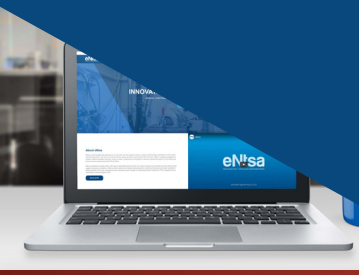

eNtsa

INNOVATION THROUGH ENGINEERING

Specialised Engineering Services

eNtsa specialises in a number of technologies that have been designed and built in-house with the aim of servicing amongst others the power generation and petro-chemical industries.

WeldCore®

WeldCore® is a Proudly South African material sampling and repair technology for the power generation and petro-chemical industry. Sampling can be performed up to 23mm deep (8mm diameter).

This technology through the efforts of the eNtsa team received international accreditation from the American Society of Mechanical Engineers (ASME) in 2015. This status has sanctioned the application of the technology in high integrity plants and equipment designed and manufactured in accordance with the ASME Boiler and Pressure Vessel Code (BPVC).

This friction taper hydro-pillar welding and repair process has saved the local power generation and petro-chemical industries hundreds of millions ZAR.

Internationally accredited by the American Society of Mechanical Engineers (ASME)

Turbine Serration Grinding System

eNtsa has developed and implemented a customised solution for refurbishment of Steam Turbine Rotors used in the power generation industry. The system allows for the removal of surface cracks at the blade mounting serrations of fir-tree type blade attachments.

This technique allows the component to return to service without any heat input or weld build up following traditional removal and repair welding. This technique effectively resets the stress corrosion cracking life to day zero on the rotor.

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Small Punch Test (SPT) and Small Punch Creep Test (SPCT)

The Small Punch Testing facility at eNtsa provides creep rupture and materials characterisation data using small sample testing methodologies.

Through small sample methodologies eNtsa is able to extract material property information from in-service components without compromising the component structural integrity, and can highlight/map plant degradation to serve as a ranking tool to assist with determining remnant life of high value engineering components.

Small Punch Test (SPT)

- Deflection rate controlled test (similar to a tensile test)
- The deflective vs load is recorded, and through FE modelling, the yield strength and tensile strength is derived
- Can be adapted to test high temperature properties

Small Punch Creep Test (SPCT)

- Constant load application with a ceramic ball-punch configuration with argon purged furnace
- Inline load and deflection monitoring via punch rod
- Dual, indirect sample temperature control & monitoring
- Test performed at high temperature (Max 625°C)
- The deflection vs. time is recorded
- Using developed SPCT reference creep rupture curves, remaining life is predicted

Whip Peening

The whip peening innovation was first conceived as a theoretical solution having specific ties to the unique peening requirements associated with steeple groove surface treatment. It could also be feasibly implemented with the existing equipment developed by eNtsa to perform the serration grinding procedure.

This innovation involves a series of small high-strength tungsten beads, which are spun at a pre-determined peripheral velocity to obtain a desired kinetic energy. The beads are constrained in a rotational center by means of a strong, but flexible link (wire, thread or line) allowing partial degrees of freedom to the rotating beads. The beads travel in a planar circular motion owing to the centrifugal reaction force of bead mass and centripetal acceleration creating a whipping action.

When the whipping beads are brought into contact with a target surface, the kinetic energy of the beads is transferred to the local contact area resulting in a peening action. With accurate position control, machine parameters such as peening intensity and indentation spacing can be repeatedly achieved regardless of the whip radius.

EDM Scoop Sample

Electro Discharge Machining (EDM) is another technique refined by eNtsa to remove metallurgical samples from materials/components which are difficult to sample using traditional or WeldCore® methods.

This technique erodes a pre-determined sample shape from a component which can be utilised for analysis in the laboratory. This technique does not require weld repair and associated heat treatment and therefore reduces the cost significantly.

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