



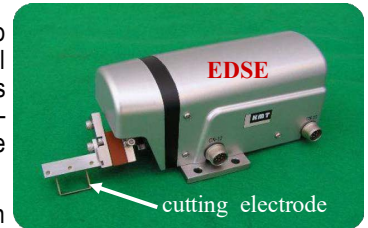
ETD Offering Unique 'Boat Sampling' Services

Using EDSE - *A portable spark erosion machine for cutting out thin slices from critical components for their quantitative life assessment*

Introduction

The Electric Discharge Sampling Equipment (EDSE) has been designed and built to aid in the condition and quantitative/ more accurate life assessment of critical industrial components and metallic civil structures. The sampling of in-service components has long been seen as an effective way of determining actual material properties and sub-surface material condition (microstructural, creep and fatigue strength, and fracture toughness deterioration and sub-surface softening with time).

Many of the existing methods of sample removal require mechanical cutting which can damage the component which usually requires weld repair. With the EDSE sample removal the surface damage, if any, is of the level of only a few microns, a fraction of a grain size.



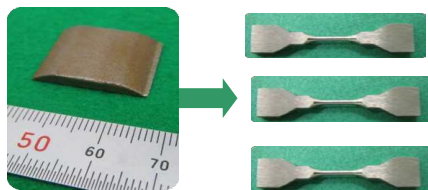
Advantages and Use On-Site

EDSE cuts out small, thin slices of samples (between 1 to 20 mm thick, as needed) without inflicting work hardening on the component surface. ETD's collaborators like Crieipi and KMTL in Japan have now developed ultra-miniature specimen testing techniques which ETD should be offering soon and which will require only 1mm thin slices to be cut out and between 2 to 3 tensile specimens machined from this slice (see Fig. below) for creep strength testing and determining safe remaining life.

The resulting cavity left behind in the component has round edges with a radius of ~4mm, so no sharp stress concentration edges. The EDSE uses a consumable cutting electrode that removes material via electric spark erosion, with clean water to remove debris and provide the cooling medium. Cutting time for a standard specimen is about 1.5 hours. The EDSE can be used on horizontal, vertical and angled surfaces by either strapping it to the component or through powerful magnetic mounts. With innovative design of the EDSE mounting frames, the EDSE can be used in most difficult and confined spaces (including using it upside down) which may not be possible for other boat samplers to achieve

Recent Use of the EDSE

- ETD has repeatedly used EDSE for the sub-surface material characterisation and quality checks of new and in-service **P91 components** and also used it for the quality and ageing deterioration of **Ni-based alloys used in GTs**.
- ETD has widely used EDSE to cut out samples containing crack tips from **industrial and metallic civil structures** (incl. oil & gas industry, Theme Parks etc.) containing **cracks** to study root cause of cracking & assess component integrity.
- Have cut multiple samples from **turbine rotors** (see video below) containing cracks for the examination of crack tips.
- Recently used in the Middle East & Norway to cut out samples from the refining and process plant vessels.



A cut out boat sample. Choice of dimensions:
1-20mm thick x 20mm wide x 25-120mm long



EDSE mounted on a pipe



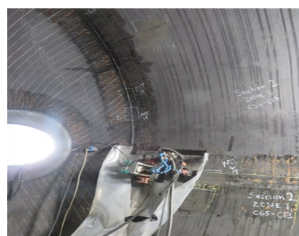
EDSE mounted between 2 discs of
a rotor with magnetic mounts (red)



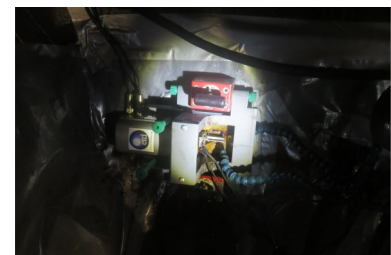
Click on the image above
to see a video of the job
shown on the left



EDSE being used on a pipe elbow



EDSE use inside a pressure vessel



Use of EDSE in confined spaces

Available for purchase or as a part of ETD services. For more information please contact as below.

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