



FastEDR Aerospace Applications

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01

Rivet and seized fastener removal is a major headache in MRO operations

02

Techniques with hand tools are imprecise and often result in damage

03

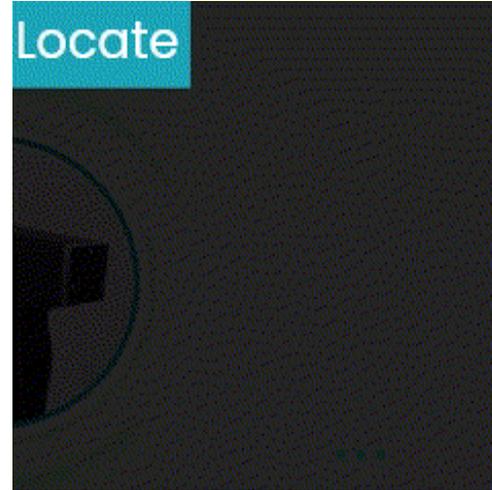
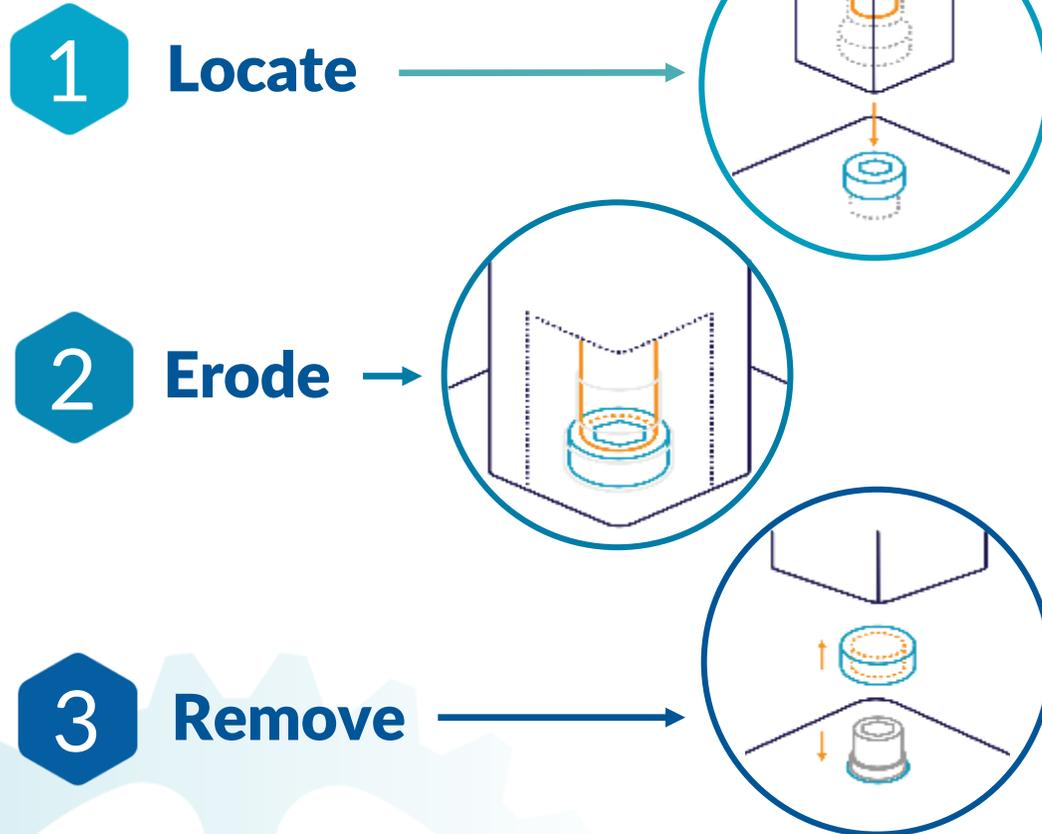
If using CNC machines, the process is time consuming with lengthy transport and fixturing times

**Problem
definition**

Portable Solution

Dissolving fasteners electrically

FastEDR – Portable
fastener removal system



Safe



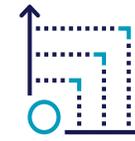
Time saving



Damage free



Portable and
adaptable



Predictable, reliable
and repeatable

At no stage is there any machining of the workpiece. The only machining is of the fastener head

Core of the Technology



Universal Power Unit

- Compact, fully enclosed EDM system
- Portable housing for electronics, control, and fluid supply
- Weight: 95kg (130lbs)
- Castor wheels for mobility
- User friendly touchscreen interface



Tool Heads

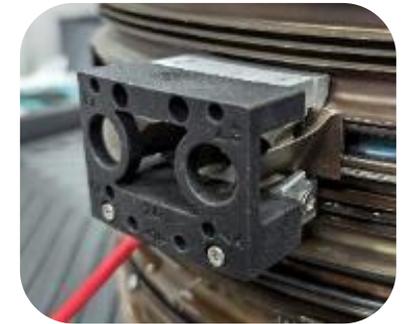
- Hand-held EDM tools
- Quick change adapters for multiple fastener types
- Supplied with 3m (10ft) umbilical for easy reach



Vacuum fixture for panels



Aero engine fixtures



Fixtures and customisation

- Designed and manufactured for complex geometries

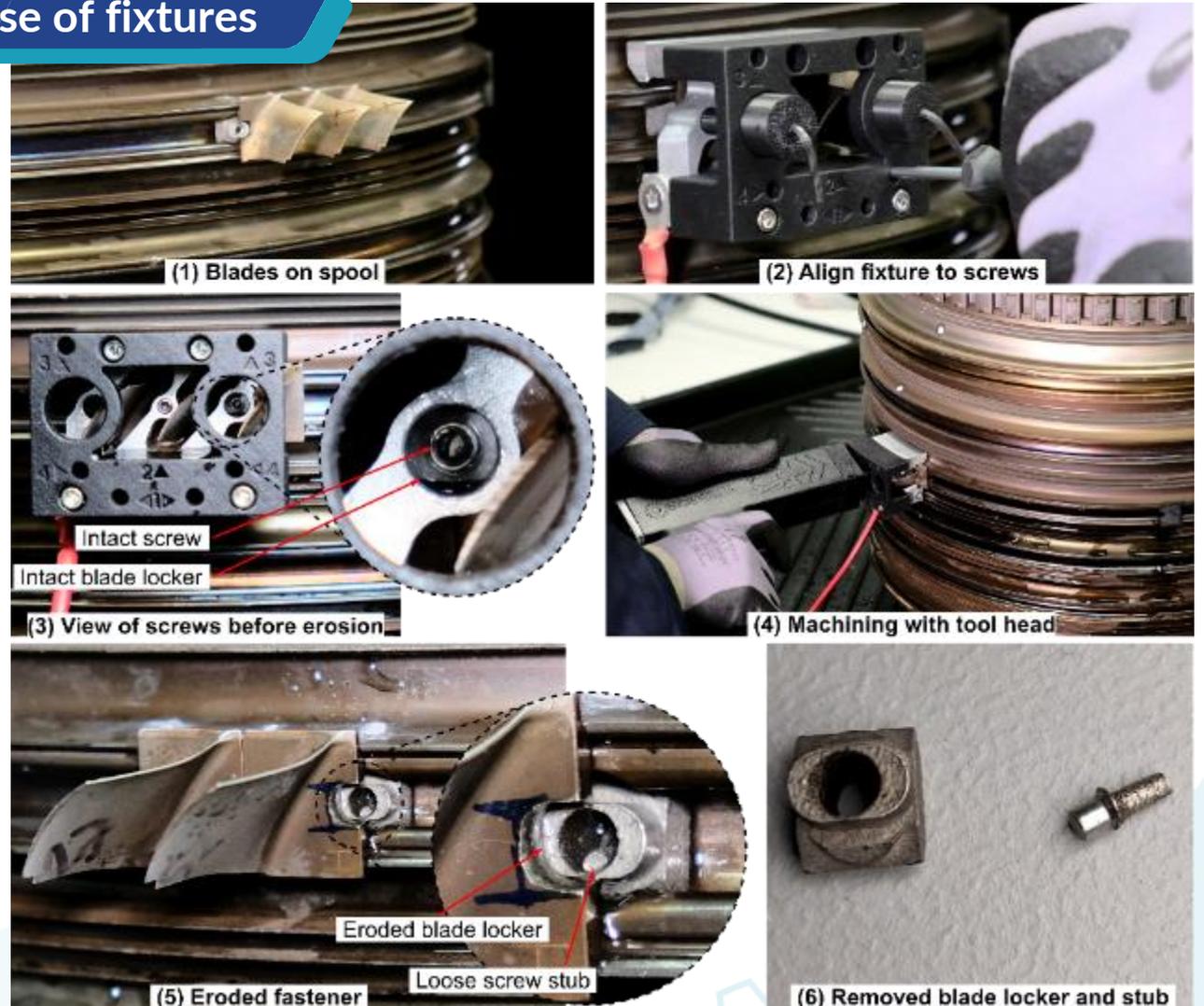
Blade Lock Case Study (CFM56)

Problem



HPC blade lock screws seize in place meaning the blades cannot be removed

Use of fixtures



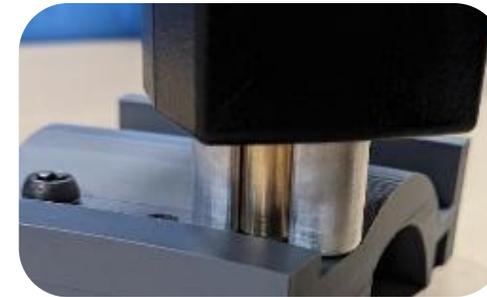
CF6-80C2 HPC/HPT Flange:

EDM drilling a feature and then snapping head

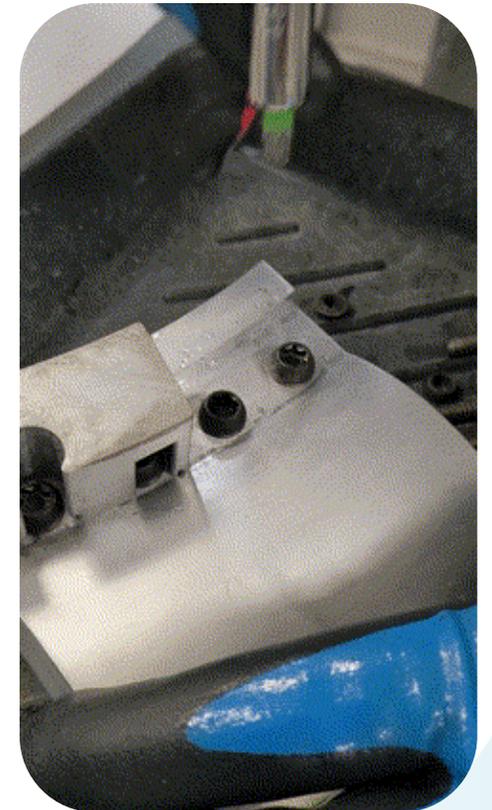
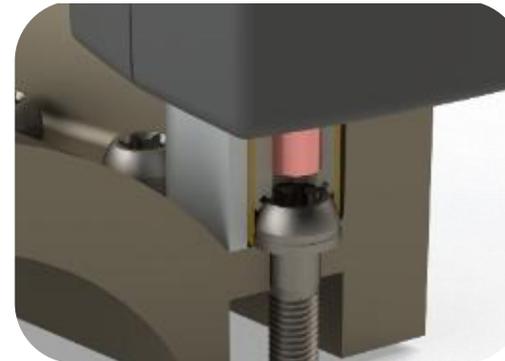
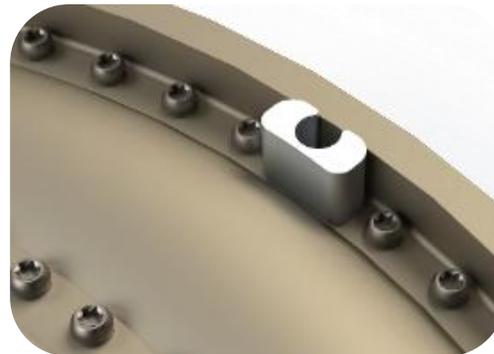
Problem



Some screws connecting the HPC and HPT are seized or stripped in attempts to loosen them. Access is challenging due to the shrouds around the screws.



Solution



- Using a foot piece and an extended nozzle a new hexagonal feature is eroded to just above the shank without damaging the flange. Only the internal of the screw is machined
- The screw heads are then easily snapped off using an Allen wrench

Removing stuck and stripped screws

Using square-shaped electrodes, it is possible to remove bolts and screws with stripped heads



Suitable for cruciform, slot, TORQ-SET, Torx, etc



Vacuum fixture aligned to screw using sight glass



Remove sight glass, and machine fastener using FastEDR toolhead



Unscrew using the new deep square feature

Removal of Titanium Airframe Rivets

Using FastEDR to remove airframe rivets from a carbon fibre plate



- Vacuum fixture with magnifying eye-piece used to accurately locate toolhead



- Centre of rivet machined out
- No contact with the plate



- Rivet with centre removed



- Remainder of rivet removed with automatic centre punch

Removing broken seized carbide drills

- Vacuum fixture located using a magnifying reticule
- An electrode smaller than the drill erodes through the centre
- Spiral cutting features fall out



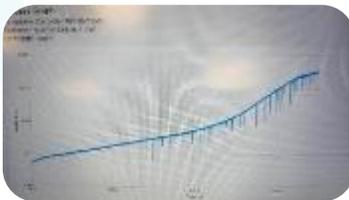
Stuck broken drill



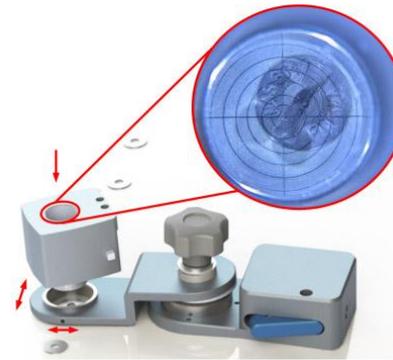
After erosion



Carbide slivers



Erosion process graph

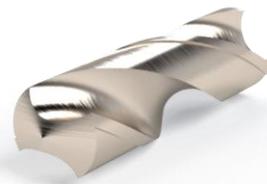


1) Locate fixture over hole with broken drill using magnifier

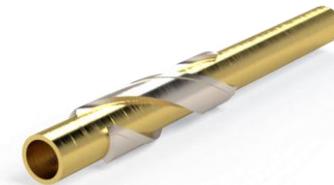


2) Replace magnifier with FastEDR hand tool

3) Start erosion process on broken drill



3a) Broken drill prior to erosion



3b) Electrode erodes tube shaped hole in drill

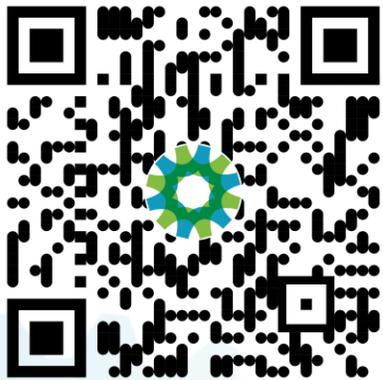


Remove remaining pieces of drill

Applications to come



- Several collaborations with MROs on application development
- Open to work with MROs to design bespoke fixtures for their issues
- Please come and talk to us at stand 814



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CFM 56 blade lock



Airframe rivet removal