



RACE

Supporting ESS

Shaft Cutting Station (SCS) - ACF cutting trials in July 2022

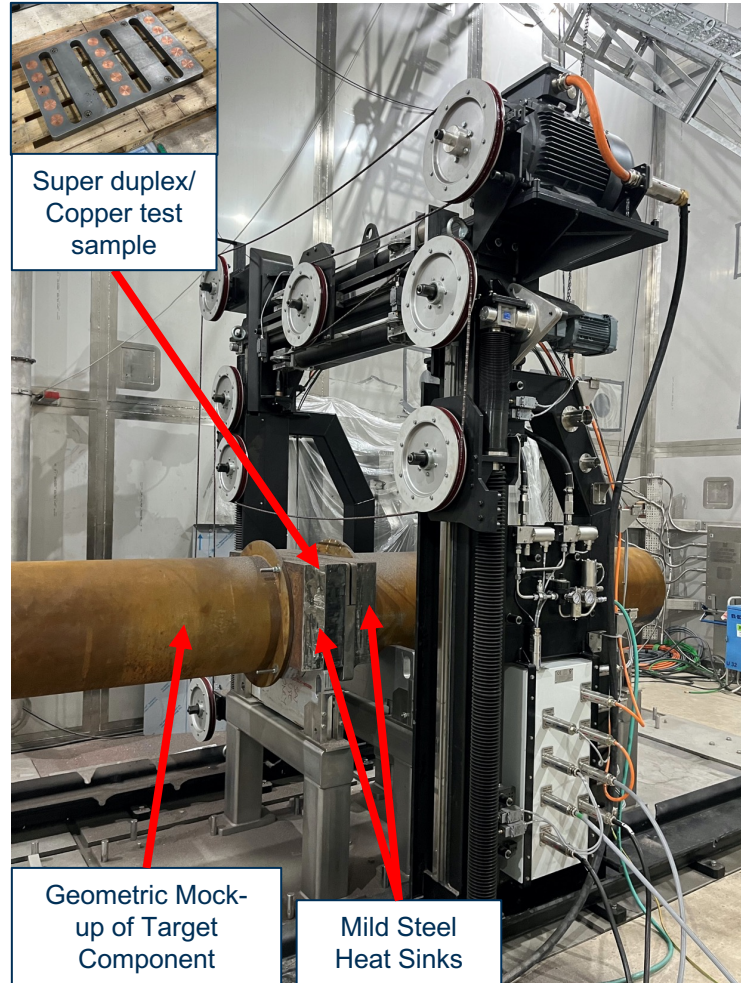
Dr Carwyn Jones (ESS),
Suppliers include: Aquila Nuclear Engineer/BD Nuclear/SMO

UKAEA: Harry Robinson, Dr William Blyth, James Davies

J-PARC visit to ESS - 11th October 2022



Saw Test Sample



800mmx500mmx50mm Super Duplex Stainless Steel, with machined voids and copper inserts. This is designed to be a reasonable mock-up of the cut required between the MRP frames post irradiation.

The test plate is clamped between 3 mild steel blocks to aid heat dissipation, and then attached to a mild steel pipe that replicates the remaining MRP or other Target Station component shaft geometries.

These are then supported by the permanent portal frames and component adaptors.

Saw Assembly – Main Frame



Main Saw assembly from two legs and centre beam – design is compatible with RH, but due to limitations on the spider crane used for initial assembly this cannot be properly assessed until the RHS Grapple is commissioned later in the year.



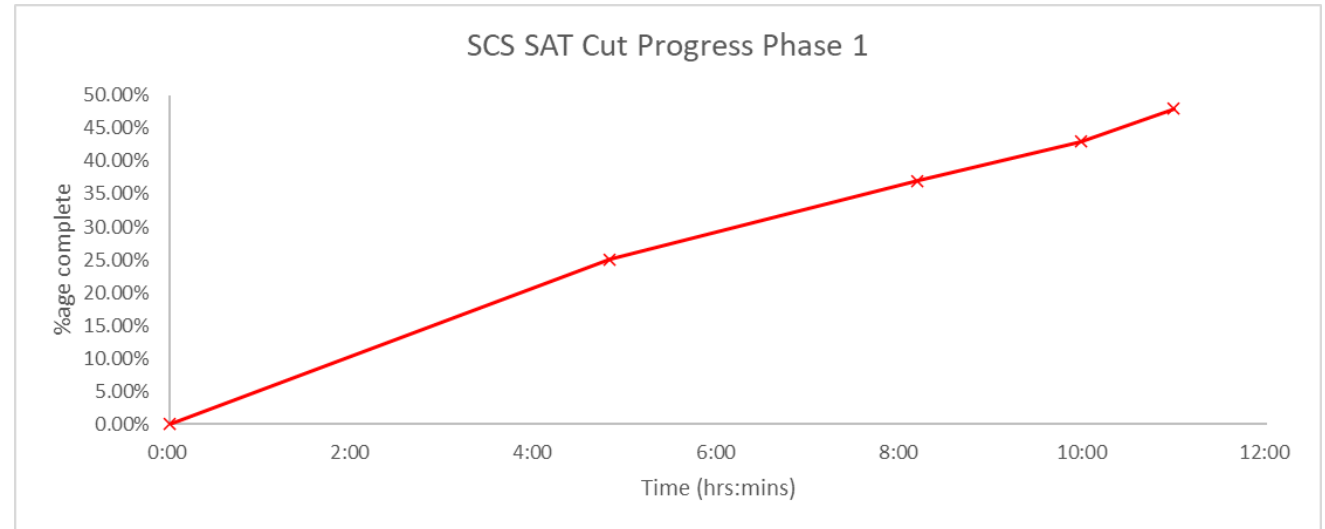
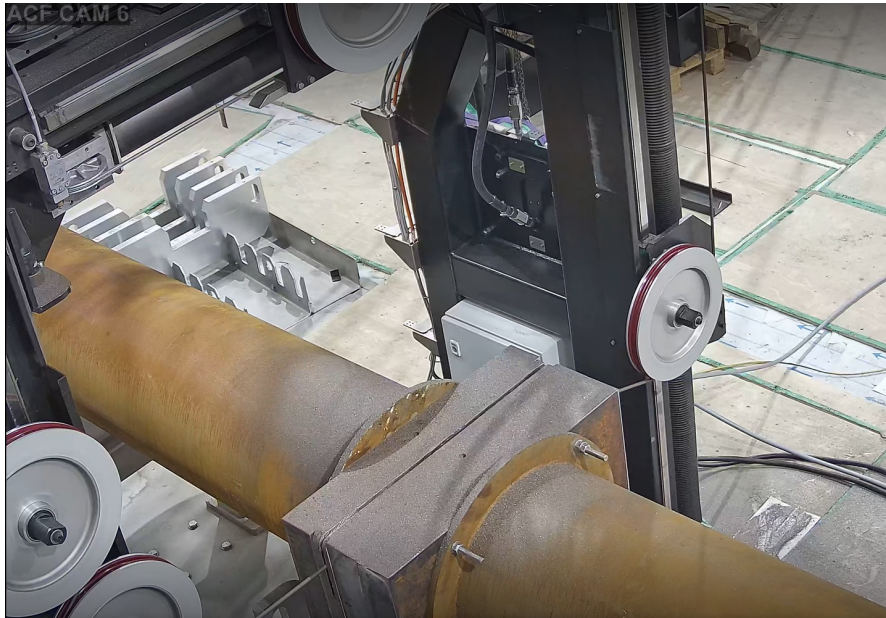
Saw Assembly – Small LRUs



Individual LRUs were assessed for remote handling compatibility, though some elements remain to be assessed due to time constraints.

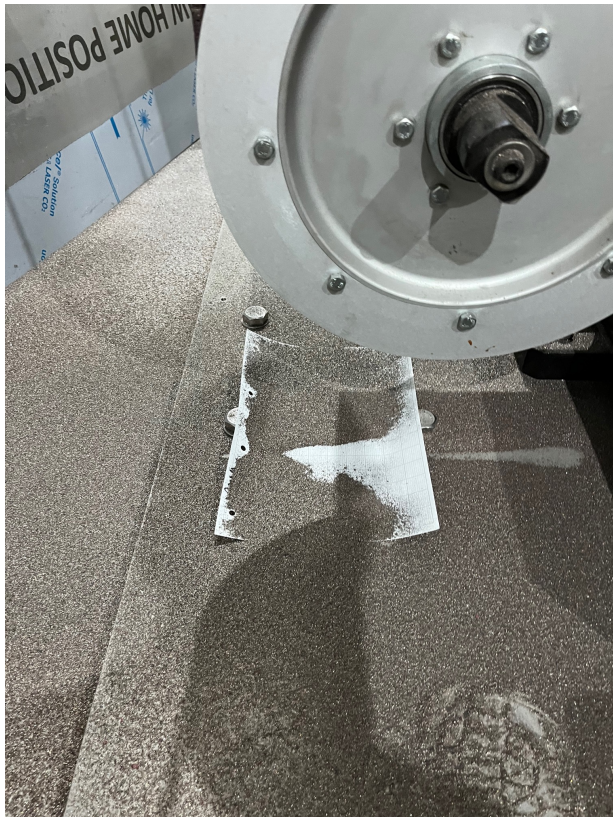


Cutting



- A total of 11 hours of cutting took place over the course of two days. The cut progressed 50% of the way through the test sample. 2 wires were used to accomplish this.
- Due to delays in initial assembly, and running out of fresh cutting wires, there will be a second cutting session to complete the SAT and determine the total cutting time.

Swarf distribution during cutting was documented – a full report is to follow with recommendations.

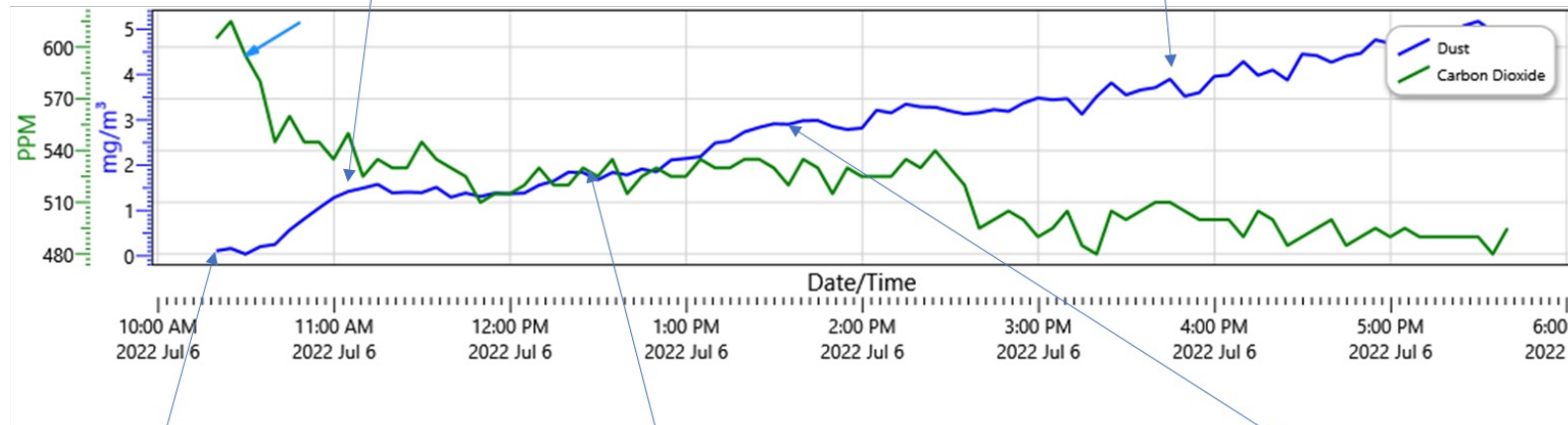


Dust – Day 1

Day 1 – Airborne Dust Levels

1201 Swedish Time - Cut stopped for lunch

1650 Swedish Time – Dust Monitor moved directly next to saw.



Total Cutting Time: 4:49

1125 Swedish Time – Cutting begins. Dust Monitor 1m from saw.

1323 Swedish Time – Cut restarts. Dust monitor 2m from saw.

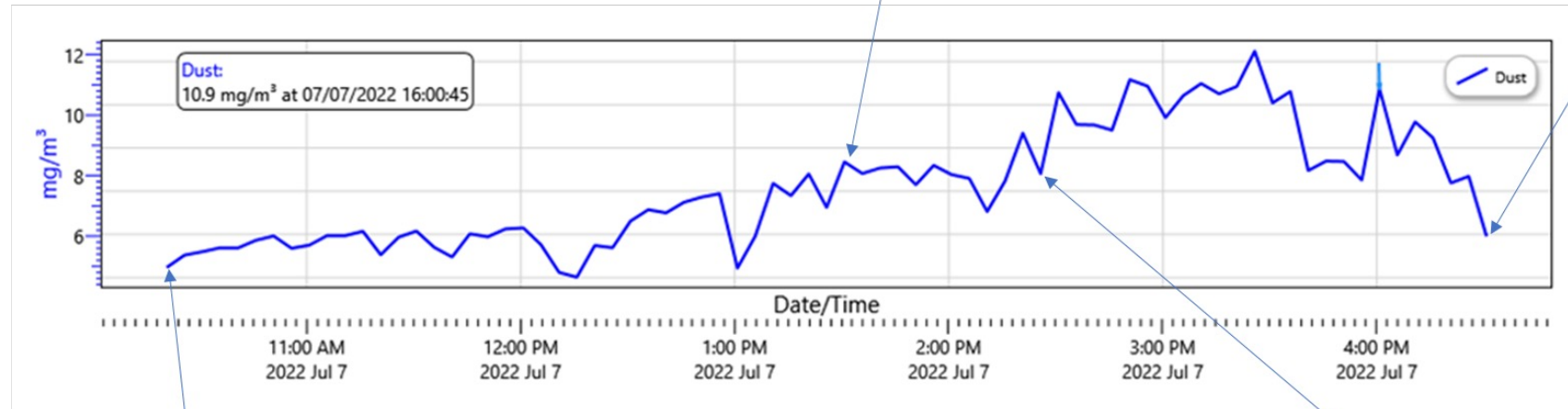
1430 Swedish Time – unexpected raised dust levels noted, masks required for cell entry before it settles.

Dust – Day 2

Day 2 – Dust Levels

1430 Swedish Time - Cut stopped and EVM moved to PC floor, 3m from saw. Cut then restarts.

EVM retrieved.



Total Cutting Time: 7:11

1115 Swedish Time - EVM placed in Intrabay door after 4 hours continuous cutting

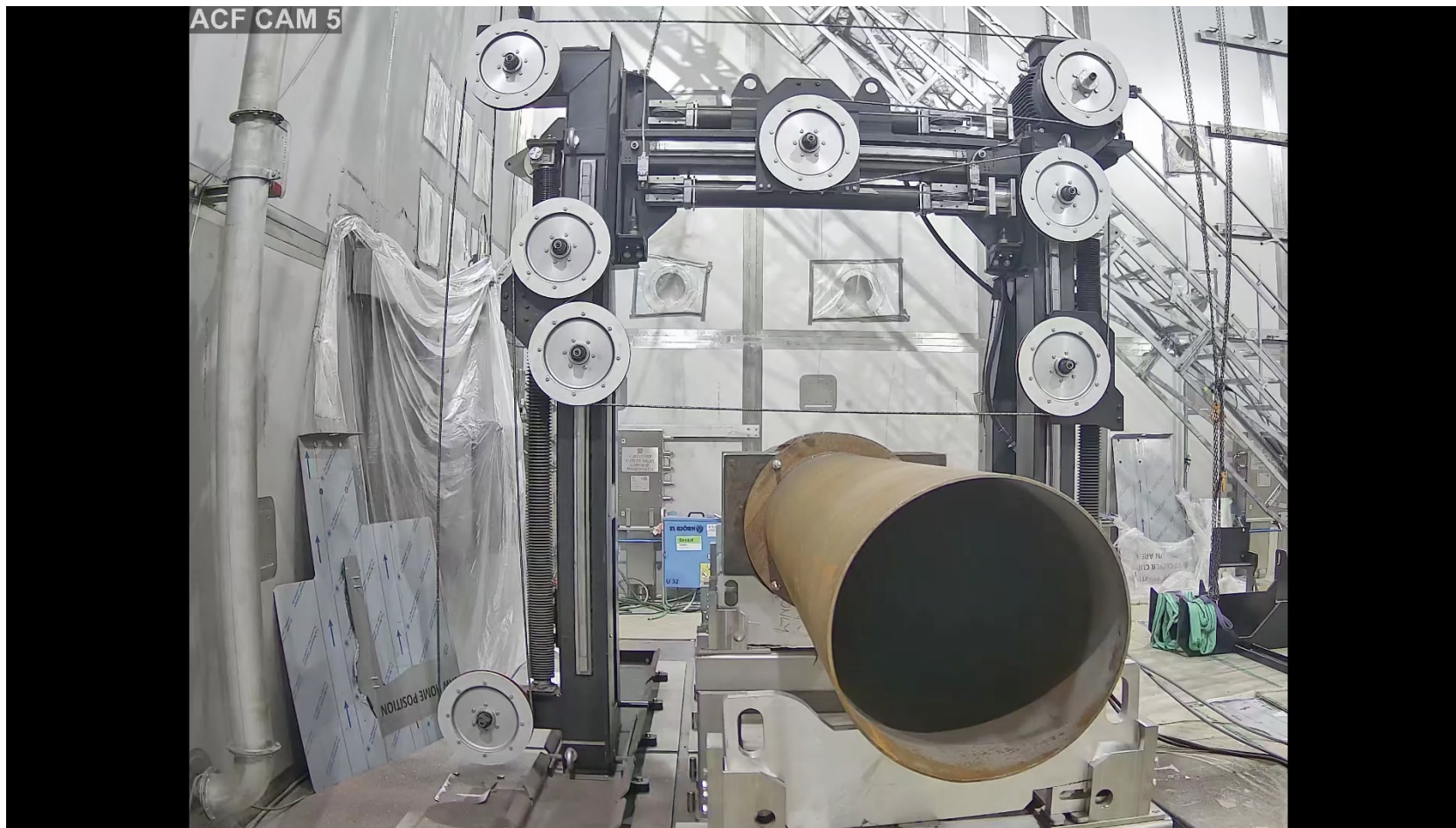
1537 Swedish Time - Cut stopped – end of cutting for the day.

Next Steps for the ACF Shaft Cutting Station

- Return to complete cut.
- Review of swarf distributions and any required mitigations.
- Electrical snagging.
- Completion of integration with ACF HLCS.
- Install of pivot assembly.
- Testing of pivot assembly and lifting attachments.

Cutting trials

Stuck wire recovery



Thank you

Any questions?

Harry Robinson (UKAEA & RACE)
Harry.Robinson@ukaea.uk

Carwyn Jones (ESS)
Carwyn.Jones@ess.eu



Machine Station – JFNL
(next cutting system coming to ESS)