

Target Status

Joe Langlands

University of Sheffield, Department of Physics and Astronomy

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CM43

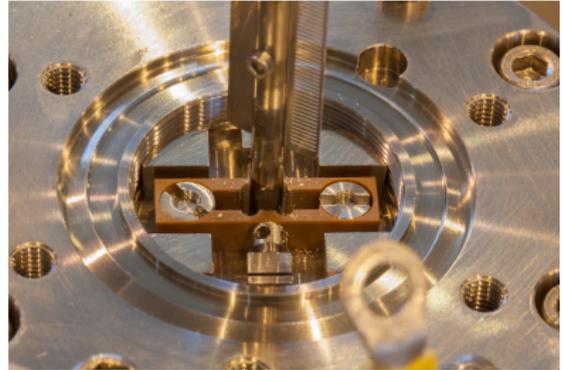
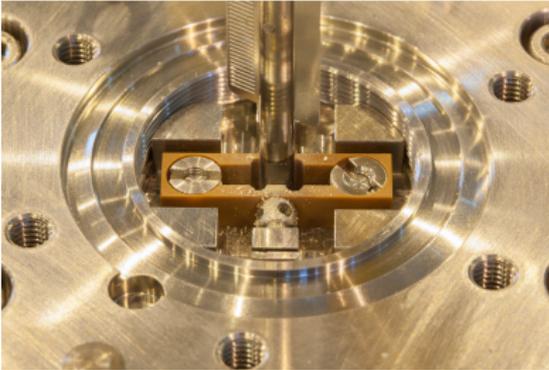
R78 Test Program

- There is a complete mock setup of the target in building R78.
- Stators with bearing and shaft undergo routine testing.
- Test program involves running continuously except with a one hour break each day at 11.00-12.00.
- Testing runs until the actuation rate drops dramatically, or a regular inspection is carried out.
- One ISIS user run amounts to around 2.5 - 3 million actuations running 24/7. So inspections are carried out at around this number of actuations to check for particulate matter.

S31

- Testing of the new stator S3 begun at around Jan 2015.
- It runs significantly hotter than S1 that is currently installed in ISIS (at $\sim 80^{\circ}\text{C}$).
- It is suspected that a different potting compound was used. (Currently under investigation)
- However, further analysis shows that it runs well. (See plots later).
- It did >5 million actuations after which it was inspected (Note it was decided to run this one beyond the standard inspection number because the performance looked very good).

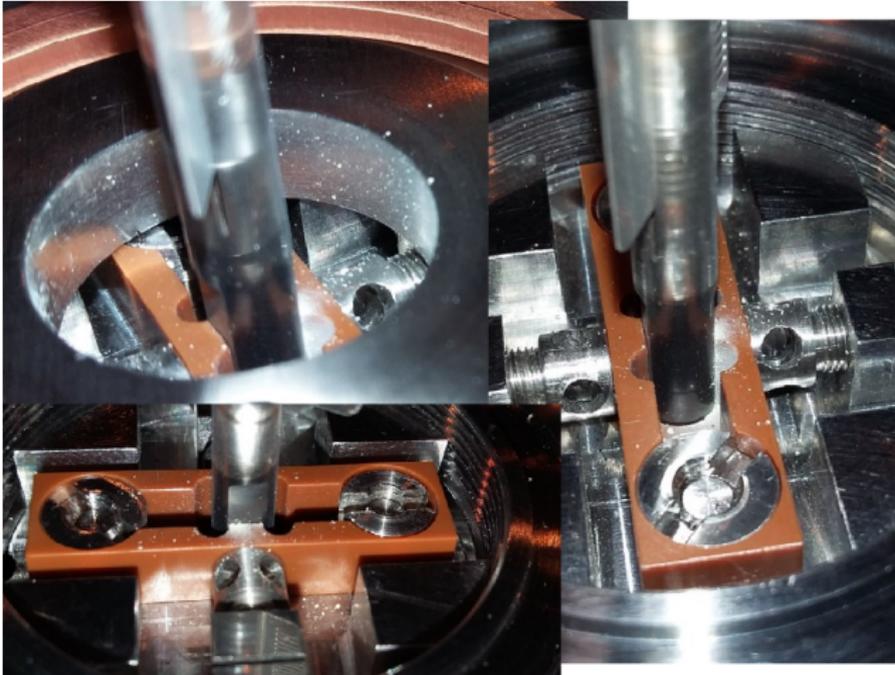
S31 Inspection at 5 million actuations



S31c

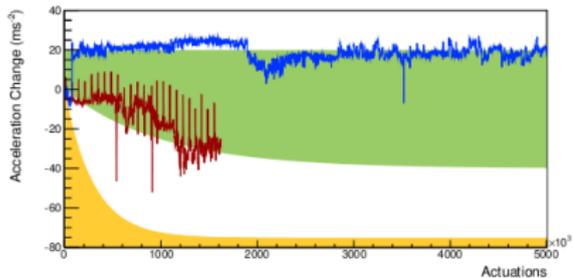
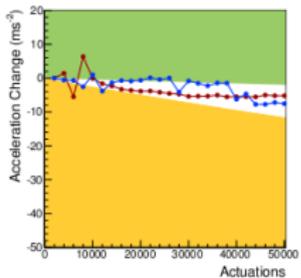
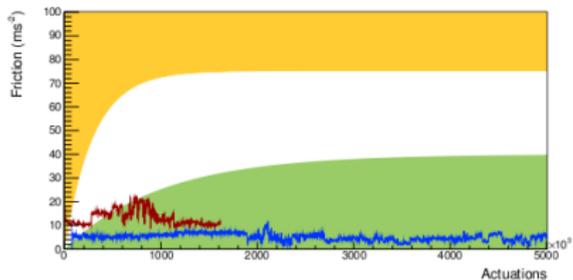
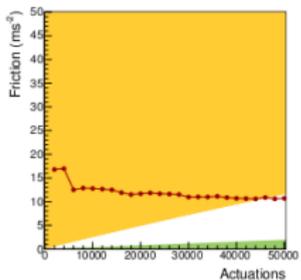
- As can be seen, there was noticeable amounts of particulate matter!
- It was decided that rather than a new shaft and bearings be installed, the old shaft and bearings would be cleaned up and re-installed...
- ...and this was meant to be S31b but a slight error during installation made the target not run at all!
- This was noted straight away and so it is impossible to have this error occur on a target running in ISIS since we always test in R78 before installing into ISIS!
- So the shaft and bearings were cleaned up and reinstalled as S31c.
- It has performed around 2 million actuations and it was decided to open up at this number.

S31c Inspection



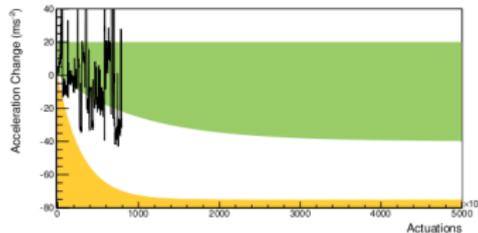
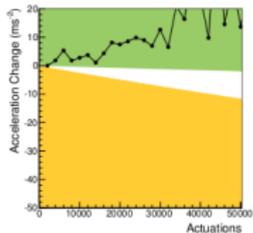
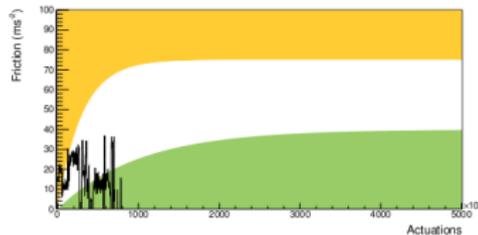
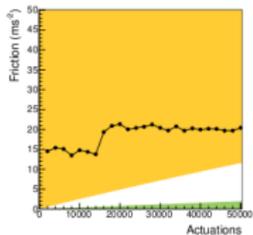
- Significantly less particulate matter! Acceptable levels.
- No evidence of migration of matter down the target into the vacuum chamber.
- Plan is to run S31c further with more inspections. (The bearing was NOT cleaned before it was closed back up).
- However, the control computer crashed and is under repair and will be re-installed ASAP since it is also the hot swap for the control computer on ISIS.

Performance of S31 and S31c



Status of target on ISIS - S19

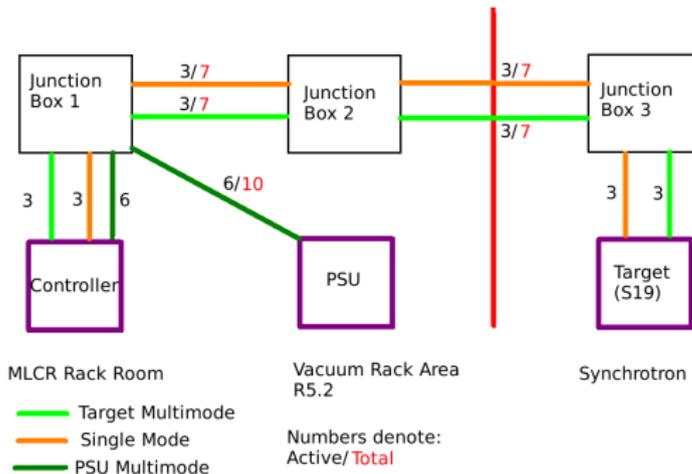
- Data is copied back to Sheffield for analysis.
- When actual running is taking place, this will become a regular occurrence (and possibly automated).
- S19 has ran for over a million actuations! And still looks good according to the analysis plots.
- Confident that it will last for next ISIS user run at least.



Target Optical Fibre Works

- Originally, 7 Single mode and 7 Multimode fibres going to/from the target/controller in RR1. (~ 100 m lengths)
- And 8 Multimode going from the controller to the PSU in the Vacuum rack area (6 in use with 2 spare).
- Hypothesized that radiation damage could 'darken' the fibres.
- Brand new fibres installed between vac rack area, under the synchrotron wall to the target. (7 SM and 7 MM)
- The old fibres were cut at the vac rack and then spliced to the new short fibre runs.
- 2 new MM fibres laid from controller to vac rack as PSU spares.

- New fibre connectors have been spliced to the 4 spare PSU fibres. The old two spares appear to be broken elsewhere.
- Increase in light levels observed although it appears that light levels are dominated by patch fibre quality.



- We have made more working spares for ourselves!
- The mess of fibres under the rack room floor is now tidy and protected into a patch panel box! Less risk of breakages.
- Plenty of headroom on laser levels on active fibres.
- This shutdown was too short to do full light testing especially since target area is hot after activation run.
- Next shutdown when synch is sufficiently cool it is planned to do this light level testing and checking the mapping.
- This will appear in a MICE note before CM44!

Conclusions

- MICE note on completed fibre replenishment works to be done.
- Continuously running loopback test to be set up.
- R78 testing to resume.
- Possibility of making a new Stator S4 – most materials are present.
- Confident that S19 will last at least the next user run. S3 on standby.
- Optical position system in a good state with plenty of headroom on laser levels.

Acknowledgments

- Thanks to the target team!
- Thanks to Paul Smith for outlining the original plan!
- Thanks to Craig and Henry for their help.
- Thanks to Fujikura for letting us borrow a multimode splicer (free of charge for a few weeks!) and showing us how to splice!