White structure flaking: causes 60-85% of gearbox bearing failures

- Butterflies & white etching cracks (WEC) propagate subsurface causing spalling.
- Occur at depth of >1mm below contact.
- Slip and hydrogen are quoted drivers.
- Formation of WEC is not well understood.
- A two roller rolling contact fatigue machine is being used to replicate WEC in lab.

Results and future work

- Tribological test conditions which drive white structure formation are being systematically investigated in laboratory.
- Spalling failure can be produced in laboratory using transient test conditions.
- Metallography is being conducted to determine if spalls are caused by WEC.
- Novel materials and oils are being investigated as potential solutions to WEC.