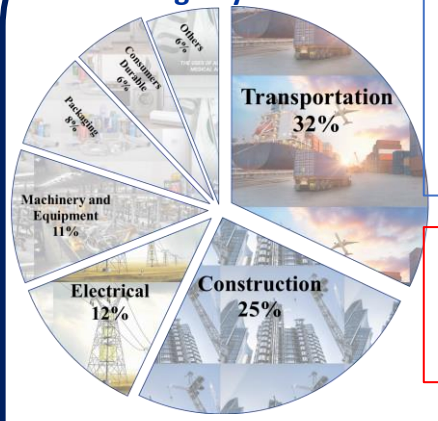
Assessment of Al 6063 alloy Fatigue behaviour processed with different Techniques

The challenge

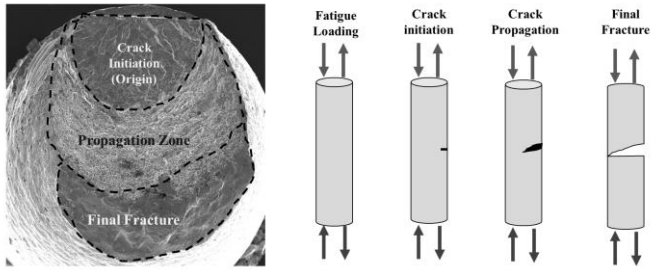
Al usage by 2022



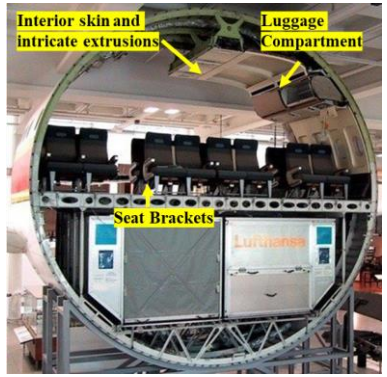
Al Requ.
89.3 MMT (2022)
⬇
120 MMT (2030)

Al prod. - 3% of total CO_2 Emission

Stages of Fatigue failure



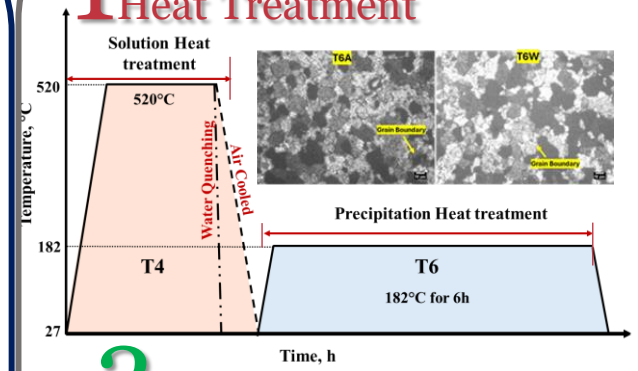
Al 6063 as Non-critical parts



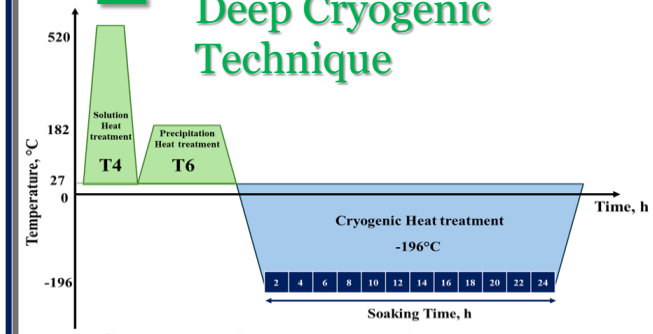
55% of total failures in aircraft are caused by fatigue

The Approach

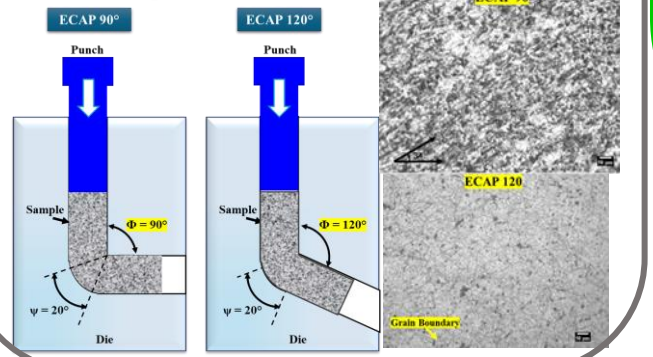
1 Heat Treatment



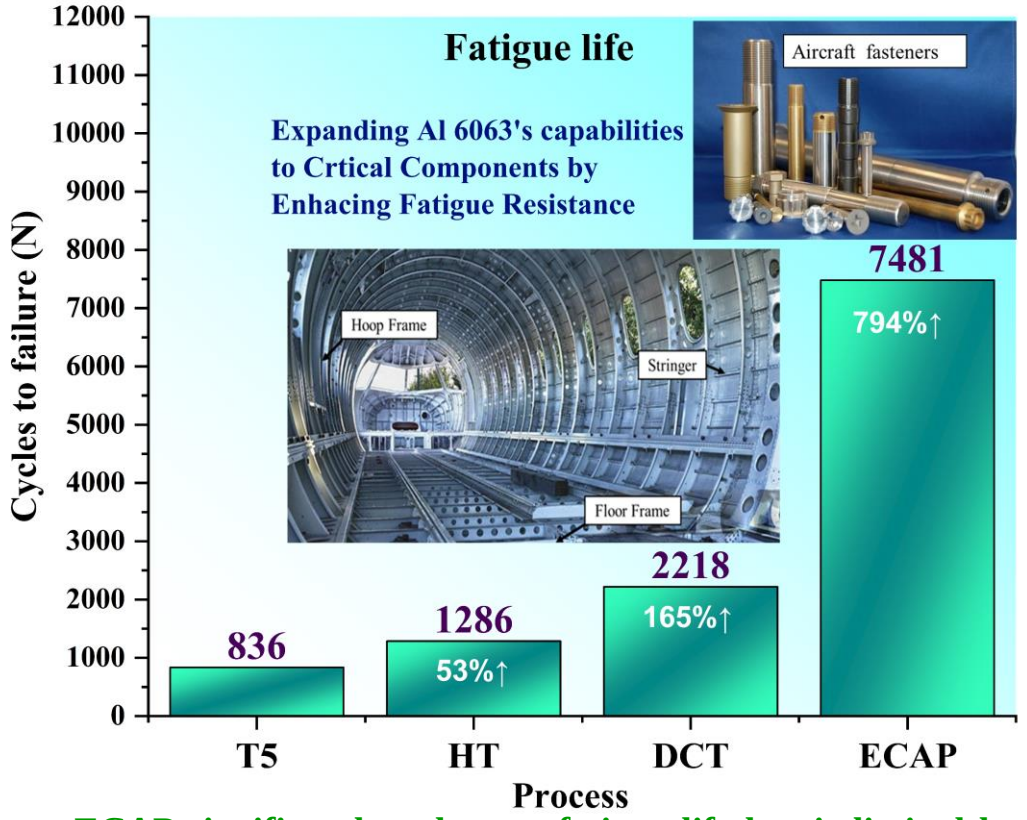
2 Deep Cryogenic Technique



3 Equal Channel Angular Pressing



The Result and the future



- ECAP significantly enhances fatigue life but is limited by size constraints.
- Selecting the appropriate processing technique depends on the specific stress environment of the component

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