

# **Low Cycle Fatigue Behaviour of Friction Welded Beta Titanium alloy Titan 1023**

**D B Anant Sagar**

**RCMA(Materials), CEMILAC, DRDO, Hyderabad, India**  
*anantnani15@gmail.com*

**B Saha<sup>1</sup>, M S K Rao<sup>1</sup> & N Narasaiah<sup>2</sup>**

**1 - RCMA(Materials), CEMILAC, DRDO, Hyderabad, India; 2 – NIT- Warangal, India**

## **ABSTRACT**

Low cycle fatigue behaviour of the friction welded beta titanium alloy Titan 1023 was investigated in the current study. LCF tests were carried out on samples in STAW (Solution treated + Aged + Weld) condition under strain controlled mode with strain amplitudes ( $\Delta\epsilon_t/2$ ) ranging from  $\pm 0.6\%$  to  $\pm 1.2\%$  at room temperature. The location of the fatigue failure was found to be away from the weld affected zones. Welded samples displayed cyclic hardening when tested at lower strain amplitudes and softening at higher strain amplitudes. Cyclic hardening parameters were also obtained from the analysed data and presented. The fractured samples were examined using SEM and the fractographs of samples at lower strain amplitudes displayed rosette patterns and higher strain amplitudes displayed several micro cracks grown in to a macro crack leading to failure.

*Keywords: Strain amplitude, Cyclic hardening, Solution treatment and Aging*