

Fatigue of beta processed and beta heat-treated titanium alloys

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Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20398290&lokasi=lokal>

Abstrak

This publication reviews most of the available literature on the fatigue properties of β annealed Ti-6Al-4V and titanium alloys with similar microstructures. The focus is on β processed and β heat-treated alloys because β annealed Ti-6Al-4V has been selected for highly loaded and fatigue-critical structures, including the main wing-carry-through bulkheads and vertical tail stubs, of advanced high-performance military aircraft.

An important aspect of the review is a concise survey of fatigue life assessment methods and the required types of fatigue data. This survey provides the background to recommendations for further research, especially on the fatigue behaviour of β annealed Ti-6Al-4V under realistic fatigue load histories, including the essential topic of short/small fatigue crack growth. Such research is required for independent fatigue life assessments that conform to the aircraft manufacturer's design requirements, and also for life reassessments that most probably will have to be made during the service life of the aircraft.