Prediction of residual stress relaxation of shot peened 2024-T351 aluminum alloy: part 2

ABSTRACT

The initial compressive residual stresses induced or inherent in a component will not remain stable during the life of the component, it relax and redistributed. In design of the component, it is important to consider the relaxation of residual stress phenomenon. In this study, equations to predict residual stress relaxation of 2024 T351 aluminium alloy specimens were proposed. The equations developed from the experimental data of 2024 T351 aluminium alloy specimens that were shot peened under three different shot peening intensities and undergoing cyclic tests for two load magnitudes for 1, 2, 10, 1000 and 10000 cycles. The residual stress, cold work and microhardness results were recorded after each cyclic load as well as the initial state. The presented model incorporates parameters including the degree of cold work, initial induced residual stress and the number of applied loading cycles.

Keyword: Residual stress; Residual stress relaxation modelling; Shot peening