

The Basic Relationship between Residual Stress Profile Patterns and Fatigue Life of Precision Machined Surfaces in Rolling Contact

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Abstract

The patterns of residual stress (RS) profiles and their effects on rolling contact fatigue life for precision turned and ground surfaces with a white layer (WL) are very controversial. The key findings of this study are: (a) The basic RS profiles by a sharp tool can be fundamentally changed by a turned WL but not a ground WL; (b) The hook shaped RS profile of a turned surface may have about 40% more fatigue life than a ground one; (c) The white layer may reduce fatigue life as much as 7-8 times despite the deep compressive RS in the subsurface.

Keywords: Residual stress, fatigue, surface, machining

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