

Accelerated durability evaluation of steering knuckle under fatigue loading

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Abstract

Accelerated durability evaluation aims to quantify the fatigue damage of components in a shorter time. The quality of accelerated editing directly affects the evaluation's efficiency and accuracy. This paper proposes an accelerated spectrum editing method based on the multiaxial rainflow counting theory, then derives an equivalent fatigue damage model for the components. Take the steering knuckle of a passenger car as the research object, the fatigue damage caused by the original and the accelerated spectrums are evaluated by the proposed method. The evaluation results show that the proposed method has apparent advantages in compression efficiency, damage consistency, and retaining the frequency domain impact on the component. The research of this paper can provide a theoretical and practical reference for accelerated fatigue testing.

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