عنوان مقاله:

Fatigue life estimation of MD36 and MD523 bogies based on damage accumulation and random fatigue theory

محل انتشار:

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خلاصه مقاله:

Bogies are one of the multifunctional parts of trains which are extremely subjected to random loads. This type of oscillating and random excitation arises from irregularities of the track including rail surface corrugation, rail joints, variance in super-elevation, and also wheel imperfectness like wheel flats and unbalancy. Since most of the pre-mentioned sources have random nature, a random based theory should be applied for fatigue life estimation of the bogie frame. Two methods of fatigue life estimation are investigated in this paper. The first approach which is being implemented in time domain is based on the Damage Accumulation (DA) approach. Using Monte-Carlo simulation algorithm, the rail surface roughness is generated. Finite Element (FE) model of the bogie is subjected to the generated random excitation and the stress time history is obtained and then the fatigue life is estimated using the rain-flow method. In the second approach the fatigue life is estimated in frequency domain. Power Spectral Density (PSD) of the stress is obtained using FE model of the bogie and the fatigue life is estimated using Rayleigh technique in random fatigue theory. A comprehensive parametric study is carried out and effects of different parameters like train speeds and level of the rail irregularities on the fatigue life are investigated.

کلمات کلیدی:

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