

عنوان مقاله:

Analysis of the effects of flexural modes of carbody on vertical vibrations of a high speed railway vehicle

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خلاصه مقاله:

The current trend in railway rolling stock production is toward lighter structures. In addition to lowering the cost of production, this can lead to the increased operating speed, decreased energy consumption, etc. In a conventional railway vehicle semi active and active secondary suspension control systems are used for improving the ride quality. However, in lighter high speed railway vehicles performance of such control systems will be affected by the flexural modes of the carbody. Therefore, an understanding of the effects of the flexibility of carbody on its vertical vibrations is necessary. In this article, dynamic equations for the vertical and pitch motion of a wagon including carbody and two bogies are obtained. This is based on Euler-Bernoulli beam theory. The modeling includes the flexural vibrations of carbody and its effects on vertical vibrations of a high speed railway vehicle. The equations of motion are solved by using Matlab Engineering software. It is observed that the first bending mode of the flexural vibrations of carbody has a significant effect on the vertical vibrations of the vehicle.

کلمات کلیدی:

flexural vibration of carbody, Euler-Bernoulli beam, natural frequency of beam

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