

The normal vehicle forces effects of a two in-wheel electric vehicle towards the human brain on different road profile maneuver

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ABSTRACT

Noise, harshness and vibrations are a non-trivial aspect of ride or human comfort, and car manufacturers often sought to improve the aforesaid comfort level. In previous studies, human biodynamic model and vehicle model are often modelled separately. Human model is used to study human alertness level and health while vehicle model is used to study on the car vibration to specifically understand the impact of vibration towards the model independently. In this study, a twelve degrees of freedom (12 DOF) human biodynamic model is incorporated with a two in-wheel electric car model to investigate the effect of vertical vibration towards the human brain based on different types of road profile and maneuver. MATLAB simulation environment is used to carry out the investigation, and it was established from the present study that the proposed model is able to provide significant insights on the impact experienced by the human brain to the skull based on the given vertical input of different road profile. The impact on the human brain to the skull is often associated with human alertness while driving where vibration exposure towards human driver influence the sleepiness level, human reaction times and lapses of attention which may lead to road accidents.

Keywords Vibration; Electric vehicle; Human biodynamic model; Comfort

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