

The effects of posture on suspension seat transmissibility during exposure to vertical whole-body vibration

ABSTRACT

Suspension seat is used in the off-road condition to attenuate excessive vibration exposed to the human body. The efficiency of a seat reducing vibration not only depends on the dynamic characteristics of the seat, but the dynamic characteristics of human body and the characteristics of the input vibration as well. Tractor drivers adopted different postures during their farm work activities, which may influence the dynamic characteristics of the human body. However, the influenced of the driver's posture on suspension seat transmissibility has received less systematic attention. Thus, this study is carried out with the objective to investigate the effect of different postures on seat transmissibility when seated on a suspension seat. Three male subjects were exposed to random vibration at 2.0 m/s² r.m.s with frequency ranging from 1-20 Hz, while seated on a vibration simulator for 60 seconds. The subjects adopted four seating postures: (i) relaxed, (ii) slouched, (iii) tensed and (iv) with backrest support. The study found that relaxed and slouched postures have a resonance frequency at 2.0 Hz. However, as the posture changed to backrest support, the resonance frequency of the seat transmissibility slightly increased by 0.25 Hz. This study suggested that changing the postures caused changes in the dynamics of human body, and thus affected the suspension seat transmissibility. It is concluded that, non-linearity in suspension seat transmissibility is influenced by the changes of body postures.

Keyword : Suspension seat transmissibility; Vibration