3D Transmission of the Seated Human Performing Upper Limb Reaching Movements in Vehicle Operations

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Reaching movements is the primary activity in manual operations in vehicle operations, and whole-body vibration commonly interferes with the performance of reaching movements. For the enhancement of operator’s safety and performance, vibration transmission to the seated operator is analyzed with consideration of the dynamic aspect of upper limb reaching movements. Compared to earlier studies quantifying one-dimensional vibration transmissibility of the seated human or analyzing reach kinematics in a static environment, the present work investigates three dimensional transmission propagated through body segments under sinusoidal vibration exposure during reaching movements. The analysis of vibration propagation through the torso and upper limb segments shows the influence of movement direction as well as vibration conditions. The results from this work may provide in-depth insight for improvement of vehicle design and man-machine interface design and adaptation of movement strategies to limit the influence of vibration.

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