

Design and Development of the Force Plate for the Study of Driving-Point Biodynamic Responses

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Abstract : The evaluation of biodynamic responses of the human body to whole body vibration exposure is necessary to quantify the exposure effects. A force plate model has been designed with the help of CAD software, which was investigated by performing the modal, stress and strain analysis using finite element approach in the software. The results of the modal, stress and strain analysis were under the limits for measurements of biodynamic responses to whole body vibration. The physical model of the force plate was manufactured and fixed to the vibration simulator and further used in the experimentation for the evaluation of apparent mass responses of the ten recruited subjects standing in an erect posture exposed to vertical whole body vibration. The platform was excited with sinusoidal vibration at vibration magnitude: 1.0 and 1.5 m/s² rms at different frequency of 2, 3, 4, 5, 6, 8, 10, 12.5, 16 and 20 Hz. The results of magnitude of normalised apparent mass have shown the trend observed in the many past studies. The peak in the normalised apparent mass has been observed at 4 & 5 Hz frequency of vertical whole body vibration. The nonlinearity with respect to vibration magnitude has been also observed in the normalised apparent mass responses.

Keywords : whole body vibration, apparent mass, modeling, force plate

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