

ABSTRACT

Vibration, Performance,  
and Personality (May, 1977)

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If the International Organization for Standardization (ISO) boundary for preservation of work efficiency, i.e., the "Fatigue Decreased Proficiency Boundary" (FDPB) has been appropriately set, then no human performance impairment would be observed under 8 Hz at that level of vibration when compared to 0 Hz conditions. As well, human performance would be consistent between two test sites, if care has been taken for standardization. Subjective evaluation of the vibration conditions would not correlate with performance but would correlate with the personality characteristic, degree of introversion vs. extraversion.

To investigate these matters, the present study was conducted using 16 Subjects, two test sites and two levels of vibration. The Subjects were qualified physically fit for exposure to whole-body, z-axis vibration. The test sites were the Western Gear and C-5A in the Aerospace Medical Research Laboratory, Area B, Wright-Patterson AFB. They were selected to accommodate all the vibration frequencies used in an entire series of studies conducted by the University of Dayton Research Institute in conjunction with the National Institute of Occupational Safety and Health.

Performance, physiological, and subjective measurements were taken in five test sessions for each subject individually. The performance

measures included a one-dimensional, foot-controlled tracking task, the Hockey test of attentional selectivity, and the Landolt broken ring test of visual acuity. The physiological measure was one channel of EKG to monitor heart rate and ectopic beats. The subjective measures were modified versions of the NASA nine-point rating scale used to obtain the Subject's evaluations of motion severity and task difficulty. At a time unrelated to the regular experimental periods, the Institute for Personality and Ability Testing Sixteen Personality Factor Questionnaire (IPAT 16 PF) was administered.

From the results of the analyses of variance and rank-order correlation coefficients obtained, it was concluded that vibration induced at the level of the ISO FDPB did not affect human performance on the tracking task, the Hockey test of attentional selectivity or the Landolt broken ring test of visual acuity at intervals of 16-minutes. Motion severity and task difficulty were rated significantly higher under the 8 Hz condition than under the 0 Hz condition and were significantly correlated to each other. No differences emerged between the test results obtained at the two different vibration sites. A few significant correlations between personality characteristics and performance measures as well as between personality characteristics and subjective measures were shown. The introversion vs. extraversion scale was not significantly correlated to the motion severity nor the task difficulty scale as hypothesized. The introversion vs. extraversion scale was significantly correlated with all the measures of heart rate. That is, the Subjects who exhibited highest heart rates tended to score on introversion end of the Factor  $Q_I$  scale.