

Attention Degradation of Military Vehicle Driver According to Vibration Exposure on Cross-country Road

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Extended Abstract

Military vehicles, unlike general commercial vehicles, are usually operated on cross-country of which road condition is hard. The driver in cross-country road condition is heavily exposed to whole-body vibration.^[1] The driver's body responds to the vibration as complex reaction of biodynamics, physiology, and psychology.^[2] And the driver is negatively affected in terms of comfort and health as well as steering stability in case that the driving continues for long time. In addition, the driver who is exposed to the strong vibration in a rugged environment such as a cross-country condition not only increases fatigue but also degrades his attention ability, which negatively affects the performance of his mission. The driver's attention degradation due to the strong vibration of the cross-country condition is studied through perceptual and cognitive approach to the psychological reaction of human vibration. Perceptual ability refers to the automatic reaction of interpreting the information received primarily from the senses of the human body. Cognitive ability refers to the automatic and controlled response to storing, transforming, and retrieving sensory information perceived. The purpose of this study is to analyze the driver's attention degradation due to the strong vibration generated when a military vehicle is operated in a cross-country condition. First, the vibration generated in driver's seat was measured when the military vehicle was operated at 20 kph on cross-country test road. When the measured vibration was simulated using a 6 degree-of-freedom simulator, the subject's attention degradation was tested. Perceptual attention and cognitive attention were used as an attention mechanism of attention test. Three attention tests were developed and conducted through a dedicated website where various professional programs for physiological test are installed.^[3,4,5] A total of 11 subjects were involved in the study. The ANOVA(Analysis of Variance Method) using SPSS was performed to examine the statistical significance of the degradation of attention.^[6] The results of SPSS statistical analysis of attention test showed that there was no degradation in attention due to presence or absence of vibration and vibration exposure time in the test to measure low level of perceptual attention. In the test to measure phased cognitive attention, the degradation in attention due to the vibration and vibration exposure time was all found. In the test to measure the complex attention of perception and cognition, there was a degradation in the attention due to presence or absence of vibration. However, it has been confirmed that the degradation of attention due to vibration exposure time occurs only when cognitive attention is used. This study is a basic study to analyze the effects of driving vibration of a military vehicle on driver's attention. The results showed that strong cross-country driving vibration affected driver's various attention mechanism. In the future, attention test should be designed optimally reflecting driver's driving situation and mission performance characteristics. To obtain statistically higher significance, more subjects should be tested. Also, it is necessary to study how to quantify the degree of driver's attention degradation due to cross-country driving vibration.

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