Measuring Devices of Non-Invasive Form for the Study of the Psychophysiological State of the Driver of Motor Vehicles

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Authors:

K. K. Abishev A. Zh. Kasenov A. N. Baltabekova

Abstract

The necessity of psychophysiological selection of a motor vehicle driver is substantiated. Among the types of professional selection, psychophysiological selection has a special place due to the fact that psychophysiological studies make it possible to quickly and objectively measure a large number of psychophysiological properties. Psychophysiological characteristics of a person can be a quantitative measure of professionally important qualities, and have a sufficiently high prognostic value for occupations related to "man—machine" systems. The necessity of using non-invasive measuring devices to determine the degree of reliability of a motor vehicle driver is justified. Analysis of the statistics of road accidents gives reason to believe that the biggest number of accidents is observed on road sections where the drivers experience biggest tense anxiety and mental stress. This confirms that the reliability of the driver's work is consistent with one of the main laws of psychophysiology: the outcome of the work correlates with mental stress. According to this pattern, there is optimal level of emotional tension of a person, at which he or she performs the work with the greatest efficiency. Exceeding this optimal level, as well as reducing it, is accompanied by deterioration in performance. In psychophysiological studies, the assessment criteria of the impact of various road conditions on the driver are the values of psychophysiological indicators corresponding to the optimal level of emotional stress. Based on this, one can determine the degree of reliability of the driver's actions. When conducting an experiment to determine the psychophysiological characteristics of the driver, the use of non-invasive measuring devices makes it possible to assess the degree of reliability of the driver. The review of measuring devices for psychophysiological measurements of noninvasive form is given. The article also describes the most popular measuring methods, such as electroencephalography, electrocardiography, electromyography, eye tracking. The principle of operation of each non-invasive measuring methods is considered in detail, the advantages and disadvantages of each method are described. It is proposed to synchronize the measuring devices and use them comprehensively regarding the functional power of universal computing tools for a more accurate assessment of the psychophysiological condition of the driver of the vehicle.