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Quantitative Evaluation of Psycho Physiological Stresses Occurring in the Course of Driving Drills

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Abstract

Students in the course of driving drills are affected by considerable psycho physiological stresses which are decreasing progressively with acquiring confidence and mastering driving skills. However, so far, processes of students' psycho physiological state change in the course of training have not been monitored in spite of the fact that psycho physiological stress amount is directly characterizing the degree of student's readiness for unsupervised driving and, accordingly, affects safety of the other road users. In order to solve the aforementioned problem, the authors elaborated the methodology of person's psycho physiological state objective quantitative evaluation enabling them to perform monitoring of students' psycho physiological state change and to define their professional suitability.

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Keywords: Psycho physiological stress, vehicle, transport, safety.

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1. Main text

Any vehicle is considered to be an enhanced hazard source. This is why; special attention in every country of the world is given to vehicle handling safety. Nevertheless, about 1250 thousand persons per annum become road accident (RA) victims all over the world and the number of fatal cases is not considerably decreasing. One of the main reasons of the above is insufficient accounting for human factor – i.e. for inadequate psycho physiological drivers response to information sources (it applies both to students and to experienced drivers as well).

Purpose of this paper consists in assessment of student's readiness to unsupervised vehicle driving as a result of objective quantitative analysis of their psycho physiological state change in the course of training.

According to RF Government Decree № 1604 dated 29.12.2014, medical contraindications to driving include disorders listed below, Table 1.

Table 1 – Medical contraindications to driving.

Name of disorder	Code of disorder as per ICD-10 <*>
I. Psychosocial disabilities and behavior disorders (in case of chronic and long-lasting psychosocial disabilities with heavy, stable and frequently aggravating symptoms)	
1. Organic (including symptomatic) psychosocial disabilities	F00 - F09
2. Schizophrenia, schizotypal and delusional disabilities	F20 - F29
3. Mood disorders (affective disorders)	F30 - F39
4. Neurotic, stress-related and somatoform disorders	F40 - F48
5. Disorders of adult personality and behaviour	F60 - F69
6. Intellectual retardation	F70 - F79
II. Psychosocial disabilities and behavior disorders associated with: Use of psychedelic drugs (before completion of dispensary observation due to sustained remission (recovery)	
7. Psychosocial disabilities and behaviour disorders associated with psychedelic drugs use	F10 - F16, F18, F19
III. Nervous disorders	
8. Epilepsy	G40
IV. Diseases of the eye and adnexa	
9. Achromatopsia	H53.51
10. Ablepsia (both eyes)	H54.0

Definition of candidates compliance with medical condition requirements demands medical certification to be performed by the following medical specialists: therapeutist, ophthalmologist, psychiatrist, narcologist, neurologist, otolaryngologist accompanied by the following examinations: encephalography (presence of psychedelic drugs) and others.

As reflected by the aforementioned documents, psychophysiological capabilities of candidates and experienced drivers are not evaluated, despite the fact that they considerably affect road traffic safety.

It is related to the fact that for psychological assessment the results of interrogations (questionnaires) are used [Maklakov (2002)] whereas physiological assessment (as required by the document entitled "Guidance on hygienic expertise of working environment factors and working process. Criteria and classification of working conditions (Guidance P.2.2.2006-5)", requires implementation of points system.

Aforementioned methods of psychological and physiological assessment may not be considered reliable quantitative criteria because they do not have metrological justification. This is caused by the fact that psychology and physiology are mostly sciences, which have mainly descriptive features, which fact is displayed by works of F.Z. Meyerson [Meyerson and Pshennikova (1988)]. G.A. Sorokin [Sorokin (2004)] and many other scientists. On the other hand, in order to obtain quantitative evaluation there were attempts to analyze human organism function as a mechanical system [Shibanov (1983), Riznichenko (2003)], not taking into account the change of its features