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Тому граничне значення витрат при поліпшенні параметра ефективності відновлення ДТТ прагне до нескінченності, тобто при  $K_{p6} \rightarrow 1$  витрати на забезпечення ефективності відновлення ДТТ збільшуються  $Z_{xp6} \rightarrow \infty$ .

Характер залежностей  $E_{\pi}$  і  $Z_{xp6}$  від параметра  $K_{p6}$  обумовлює екстремальний характер кривої сумарного економічного ефекту  $E$ , що дозволяє оптимізувати величину рівня працездатності парку ДТТ за максимальним значенням економічного ефекту його ввідновлення.

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## ROLE OF A HUMAN FACTOR IN ROAD TRAFFIC SAFETY

### РОЛЬ ЛЮДСЬКОГО ЧИННИКУ У БЕЗПЕЦІ ДОРОЖНЬОГО РУХУ

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*The problem of influence of a human factor on road traffic safety is considered. It is shown that the studying of psychological and psycho-physiological characteristics of human as an integral part of the system "driver-car-road-environment" is needed for optimization of road transport environment and decreasing of risks caused by the human factor.*

According to official statistics, as well as reports from international organizations (WHO, World Bank, Global Road Safety Partnership), Ukraine fills leading position among countries of the European region in amount of road traffic injuries and deaths. The number of deaths as a result of road accidents is on the average of 11-13 people per 100 thousand population, while in the countries of the European Union – 5.5 people [1]. A transport risk is 35 cases, when in the EU countries is 18 cases. Ukraine has the highest number of deaths pedestrians that accounting about 47% of fatal accidents. These facts indicate the ineffectiveness of existing road traffic safety measures.

Solving of general road traffic safety problems, that associated with a high level of road traffic injury and death, requires more attention to human as a part of the "driver-car-road-environment"



system (DCRE). Thus, traditions and stereotypes, education and culture, range of interests, worldview, etc. have a significant influence on human behavior. It has been scientifically proven that people with higher education are more rarely to get into accidents than people with secondary or primary education. Therefore, solving of a complex systemic problem of safety of DCRE should include a number of measures of engineering, information, educational, social-medical, legal, psychological and psychophysiological nature [2, 3]. For example, the ergonomic direction of research in the field of safety and management is based on the understanding that accounting of psychophysiological state of an operator of the system "man - technics - environment" (for example, pilot, driver, dispatcher) in the process of activity is the basis for ensuring the reliability of the ergatic systems functioning. According to this, researches of the approaches to accounting of the human individuality and its functional state as the main risk-generating factor of road accident is of great interest. For driver is important such psychophysiological characteristics as measuring by eye, reaction, high concentration of attention, mental and physical hardiness, emotional stability, caution, patience, etc. It is foreseen a presence of these qualities on a professional that makes decisions in a road environment. However there is no control for these qualities in training course of drivers and getting by them of a driver's license. But at the same time, human gets the right to act in the DCRE system and significantly increasing the risk in this system. Also, the fact, that a decision in the DCRE system is taken by pedestrian, is not taken into account, but from this depends often on probability of the accident. Therefore the driver must understand the psychology of human behavior on the road. Today, the intensity of interactions in the road transport environment does not correspond to the individual psychophysiological capabilities of human - both the driver and the pedestrian. disregard of human individuality leads to the emergence of statistics, according to which human factor is the cause of 80 ... 90% of accidents [4]. Thus, the unresolved part of the problem: the imperfection of accounting of human individuality in the management of processes in the system DCRE.

The experience of forming a safe model of driver behavior based on the consideration of psychophysiological risks. The international and domestic experience shows that the technical means of ensuring road traffic safety have reduced the level of accidents on the roads. But for today these means have exhausted themselves [1, 2]. The problem of safety on the road is much deeper because it locates at the intersection of the areas of social and individual consciousness, the psychology of participants of road traffic, social and individual behavior and individual psychophysiological human features. At the same time the problem of psychophysiological impossibility of performance of certain norms and rules road traffic by separate types of participants in road-transport relations is almost unexplored.

Risky behavior of human is a multifactorial and almost unforeseeable phenomenon that arises for many reasons. The most significant problem is the critical growth of the psycho-emotional and informational load on a human in the system of road-transport relations, which leads to the aggregated effect of the violation of individual mechanisms of human stressful adaptation and its inadequate adaptive behavior in stress. According to this, it is necessary to take into account the psychophysiological features of road traffic participants who make decisions in the DCRE system: driver and pedestrian, whose activity consists of a temporary existence in road traffic system.

Systemic causes of dangerous or risky human behavior in the DCRE system are at the intersection of areas of awareness people, their desire to use existing information and psychophysiological features. According to this, the means of their regulation should be chosen taking into account the peculiarities of these influences. It is proved that increasing traffic safety is based on the programming of a model of safe human behavior in a changing road environment [1]. One of the variants to improve safety in the road environment for account of the influence on the human factor is the driving school at National Aerospace University "Kharkiv Aviation Institute" (KhAI). At this school is implemented a system of individualization of training students on the basis of psychophysiological technologies. The aim is to increase the effectiveness of driving instruction by taking into account individual human psychophysiological features. The essence of this introduction is



the change at the structure of training process in the direction of creating an individual training trajectory and controlling the formation of stress tolerance.

The implementation of the individuality methodology includes a series of interconnected stages:

1) division of students into the groups according on the results of the analysis of psychophysiological testing and identification of the basic properties of the human that are necessary for the driver;

2) creation of psychophysiological profile of each students.

3) individual recommendations to the students about formation a driver's skills on the road, taking into account the peculiarities of his psychophysiological profile.

4) further individualization and information support of the process of acquiring knowledge and skills by students by practical recommendations of instructors that are based on understanding of human individual characteristics

Particular attention is also paid to the problems of human behavior psychology in stressful conditions that allows to students better to understand other participants of road traffic.

Researching of the psychological characteristics of the students by means of subjective testing provided the individualization of theoretical training on the basis of psychophysiological data that forms the individual profile. Individualization of practical skills was achieved by selecting of the corresponding routes of training trips according to the psychophysiological profile of student. Training routes were different on the level of complexity, the degree of traffic strains, the number of "risk points" in the training route.

The main result of individualization of training for students is the development of an individual approach to the formation of skills and abilities of driver, taking into account their properties for the further formation of a culture of safe functioning in the road-transport environment. In general, the opportunity of optimization the organization of training process of drivers as operator-researchers within a framework of the concept of individualization was achieved [4, 5].

Thus, the most effective means of preventing risky behavior human is the formation of individual installation, for what it is necessary taking into account the features of biochemical, psychophysiological, socio-psychological and macrosocial levels of behavior regulation.

Therefore, further systematic studies of the problem of human factor in the DCRE system are needed, which will allow:

1) to develop a scientific basis for the implementation of effective mechanisms of the creation of road safety;

2) to propose methods of individual psychological, psychophysiological, social adaptation of traffic rules to human consciousness;

3) to monitor the actual legislation that regulates traffic safety in Ukraine on corresponding to the psychological needs of society and people.

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