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# ABOUT SOME ASPECTS OF PROFESSIONAL RELIABILITY OF LOCOMOTIVE DRIVERS

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## ABSTRACT

Increased requirements to certain professionally significant qualities (PSQ) are shown by a trade of the locomotive driver, and it means, what not every physically and mentally healthy person can successfully seize the given trade and provide further necessary level of professional reliability and safety on a railway transportation.
Professional reliability of locomotive driver – ability to preservation of demanded PSQ in extreme conditions of activity. The close interrelation and interdependence's degree of development PSQ and professional reliability allows considering process of their formation, perfection and development as the system which backbone factor is its purpose - formation of professional reliability, and a feedback mechanism - result - the level of the articulation PSQ.
The most effective way of development PSQ – special exercises prior to the beginning of activity, on separate actions of forthcoming activity.
Specific feature of labour activity of the locomotive driver of the main movement is work in the conditions of long influence of monotonous factors, as serves as the incentive reason causing a condition of monotony at which the mental activity directed on regulation and control over activity decreases.
Different in degree of monotony of working conditions cause also distinctions of characteristics of a condition of monotony, but the picture of this condition in the main will be same. Hence, stability formation to monotony and knowledge of ways and means of improvement of mechanisms of self-checking and self-control can raise efficiency of professional work not only locomotive drivers, but also other experts whose activity is realized in the conditions of monotonously operating factors.

**Keywords: reliability, professionally significant qualities, self-checking, self-control**

## 1 INTRODUCTION

The problem of professional reliability of locomotive drivers concerns complex problems. The organization of researches in this area is extremely difficult, but it is represented absolutely necessary as professional reliability in many respects is a guarantee of successful activity of locomotive drivers.

The individual and typological features refracting external influences of activity and promoting its best development, in the process of specialization are realized in PSQ [2].

Specificity of requirements to PSQ of the locomotive drivers depending on a kind of movement and working conditions is expressed both in criteria of professional suitability, and in updating of spent tests.

Allocation of high degree of readiness for emergency action in the conditions of monotonously operating factors (REA) as one of psychological correlations predicting success of activity in conditions of monotony [1], has allowed to receive not only the qualitative and quantitative characteristics of its PSQ at locomotive drivers, but also to develop techniques of its formation and correction [3-5].

Essential necessity of professional work of the locomotive driver is the requirement to long concentration of attention with simultaneous ability to its emergency switchings, and the exit over frameworks of optimum values can even interfere at achievement of high level of professional skill.

The raised indicators of emotional stability in extreme conditions of activity are observed at the most reliable locomotive drivers. It is possible to ascertain that this mental phenomenon becomes professionally significant quality of the locomotive drivers which is shown in extreme conditions of activity [1, 4].

The level of uneasiness raises and mental function of self-checking is overloaded because of insufficiently developed PSQ. On the one hand, it partially helps to compensate insufficiently developed PSQ, but on the other – the level of pressure raises up to intensity. It is expressed in infringements of logic structure of operating actions, and also in increase in time of their performance. It happens also because in normal conditions repeatedly and regularly fulfilled actions lead to formation of skills which are not enough in extreme conditions of activity. Developing any system of self-control, the locomotive drivers get qualities of actions, skills and the abilities similar professional that help to cope with adverse conditions with smaller expenses, keeping power resources [3].

On possibility of diagnostics, formation, perfection, correction professional reliability (as integrated professionally significant quality) the locomotive driver specified by following positions:

- PSQ is a cash level's possibility of display's function (mental and psychomotor processes), necessary for efficiency of professional work;
- PSQ – the merge of congenital and acquired;

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- PSQ are a part of structure of the person and the general macrostructure of the person;
- Abilities in development and specialization in activity are realized in PSQ;
- Neurodynamic basis of PSQ are typological qualities of nervous system [4].

The work's purpose - formation of professional reliability of locomotive drivers

## 2 METHODS AND THE RESEARCH ORGANIZATION

For objecting view achievement theoretical and empirical methods were used: the theoretical and bibliographic analysis; comparison of independent characteristics that has allowed to receive the objective information on level of professional success of examinees; pedagogical supervision; pedagogical experiment; diagnostics; methods of mathematical statistics.

The estimation of the articulation of PSQ was defined by means of the techniques applied in engineering psychology for carrying out psychophysiological inspections on a railway transportation that has allowed to reveal reliability's interrelation of activity with a level of development of these qualities:

- Technique of an estimation of level of vigilance (Readiness for emergency action) in the conditions of monotonously operating factors (REA).
- Technique of speed's definition of switching attention (SA).
- Technique of definition of emotional stability (ES).
- Technique of an estimation of time sense (TS).
- Technique of an estimation of reaction to moving object (RMO).
- Technique of an estimation of time of simple visually - impellent reaction (SIR).
- Technique of an estimation difficult visually - impellent reaction (DIR).
- Technique of an estimation of volume of attention (Va).
- Technique of definition of individual psychomotor rate – tepping-test (TEPP).

As criterion of an estimation of level of the articulation professionally significant qualities indicators act:

- readiness for emergency action in the conditions of monotonously operating factors (REA):
  - difference between reactions to signals with the prevention and without the prevention (Prea),
  - number of admissions of signals (Nrea);
- speed of switching the attention (SA):
  - time of performance of the mixed search of black and red numbers (SAt),
  - time of switching attention (Tsa),
  - quantity of errors during performance of the mixed search of black and red numbers (SAer);
- emotional stability (ES):
  - time of performance of the mixed search of black and red numbers at active hindrances (ESt),
  - a difference in time of performance of the mixed search of black and red numbers with hindrances and without hindrances (Tes),
  - quantity of errors during performance of the mixed search of black and red numbers with active hindrances (ESer);
- difficult visually-impellent reaction (DIR):
  - time of performance of difficult impellent reaction (Tdir),
  - quantity of nervous pressing (Ndir);
- time of performance of simple impellent reaction (SIR);
- time sense (TS);
- time of reaction for moving object (RMO);
- attention volume (Va);
- the tepping-test (TEPP);
- an expert estimation (EE).

By the selected techniques 100 machinists have been surveyed. Marks of their professional reliability on a 9-ball scale are put down. As experts locomotive driver instructors have acted.

## 3 RESULTS OF RESEARCH AND THEIR DISCUSSION

The technology of formation of professional reliability of the locomotive drivers is understood as purposeful formation PSQ, individual receptions, ways and their sequence, the set parameters of activity providing preservation in difficult conditions. Following components are included in the structure of the developed technology of formation of the locomotive drivers' professional reliability: target, substantial, organizational, operational, diagnostic.

Ascertaining experiment was spent in vitro with use of the psychological diagnostic complex intended for diagnostics and control of functional conditions.

For revealing of interrelations of expert estimations and professional reliability with indicators PSQ the received results have been subjected to inter correlation analysis. The indicator of professional reliability of the locomotive drivers' activity (n=100) (by an expert estimation) significantly correlated with indicators of readiness for emergency action in the conditions of monotonously operating factors (REA – r = -0,287; -0,350); and emotional stability (ES – r = -0,196) which, in turn, are closely interconnected with indicators SA (r = 0,229-0,664), DIR (r = 0,196; 0,316), SIR (r = 0,560).

The presented results testify the importance of revealed PSQ for success of professional work of the locomotive drivers and possibility of their formation with the help of psychological and pedagogical training.

Various forms and methods of psychological and pedagogical training include as modeling, with working off

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necessary actions, and formation, training and perfection PSQ [3-5]. By working out of pedagogical technology both directions have given the chance diagnostics, formations, perfection, correction to professional reliability, as integrated professionally significant quality of the locomotive driver have been used.

Revealed statistically authentic communications of a professional assessment of locomotive drivers' work (n=25) with indicators REA, SA, ES, SIR, DIR (p<0,05-0,01) after forming pedagogical experiment testify that the selected indicators for locomotive drivers have appeared rather objective and informative (figure 1).

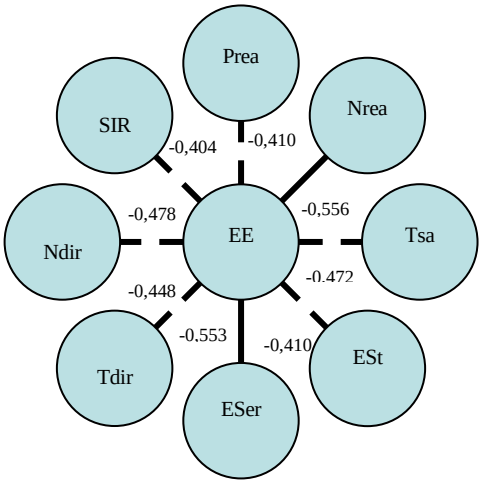


**Figure 1: The Basis of a correlation galaxy round an indicator of an expert estimation of professional locomotive drivers' reliability**

On the basis of results of the spent pedagogical experiment it is possible to take for granted that the technology of formation of locomotive drivers' professional reliability is effective enough. Positive changes after the end of pedagogical forming experiment at locomotive drivers of experimental group (n=25) are observed on indicators of performance of techniques: readiness for emergency action in the conditions of monotonously operating factors (REA), attention switching (SA), emotional stability (ES), simple impellent reaction (SIR), difficult impellent reaction (DIR), attention volume (Va) (p <0,05-0,01). In control group (n=25) the quantity of errors has significantly decreased (p <0,01) during performance of test DIR, on other indicators of significant distinctions is not revealed.

Application of the developed technology of formation of professional reliability has provided achievement diagnostic the purposes and a target component as a whole.

As well as acquisition of professional skill, PSQ locomotive drivers need special regular training.

## 4 CONCLUSIONS

Professional reliability of the locomotive drivers is provided with complex PSQ: readiness for emergency action in the conditions of monotonously operating factors, emotional stability, in the speed of switching attention, stability the intellectual functions, self-checking and the self-control, shown in the conditions of mental pressure, monotony and exhaustions.

Working out the technology of formation of the locomotive drivers' professional reliability is caused by necessity of minimization of failure of activity on the basis of revealed PSQ.

Purposeful development of PSQ promotes additional growth of professional reliability of the locomotive drivers.

### 4.1 Prospects of the further researches

Revealing of adverse factors complicating professional work, the emotional conditions arising under their influence, and PSQ, defining ability to resist to them and providing professional reliability has the big prospects for the further researches in transport sphere.

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