

Extreme working conditions of recovery train personnel

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Abstract – Professional psychological selection has become an integral part of personnel management in many sectors of the economy. At the same time, despite the apparent need, such selection is not carried out in such an emergency area as the elimination of the consequences of accidents on the railway. The purpose of our study is to justify the necessity for the selection of workers of recovery trains on the railway in terms of the formation of their professionally important qualities (PIQ).

Keywords – *psychological selection, professionally important qualities, workplace, activity, working conditions.*

I. RELEVANCE OF THE STUDY

Ensuring the safety of rail transport is a matter of concern for practical psychologists all over the world. The rail network is enormous and is continuing to expand. At the same time, the risks of accidents and tragedies in rail transport are increasing. That is due to a number of reasons. First of all, the speeds of both the freight and the passenger trains increase; traffic intensity increases; railway track and rolling stock are wearing out. All this provokes possible tragedies on the railway. In addition, such events are often due to the human factor: insufficient professional training of locomotive crews, heavy-load working conditions, functional disorders. The faults may be caused by the work of railway station personnel, duty officers and other personnel. Many railway accidents occur in the world, almost every year, claiming human lives. Thus, in 2016 and 2017, major disasters occurred in Egypt, India, Italy, Iran and other countries. There have been also the railway accidents in our country, for example, the crash of the "Nevsky Express" between Moscow and St. Petersburg in 2009.

To eliminate the consequences of disasters on railway transport, special recovery trains are designed with intent to go to the crash sites. The task of the workers of the recovery train is to restore the railroad tracks in a limited time, lift the cars that have derailed, restore the power supply, and assist the injured people. All that may happen in different climatic conditions, at different times of the day. Heavy-load activity conditions impose special requirements on workers of the recovery trains. Despite the obvious necessity to accompany

these specialists with practical psychologists, until recently they have been deprived of such kind of attention. The practice of professional psychological selection and motivation of personnel has not been implemented into the scope of work of recovery trains.

It is well known that effective work in many professional areas, including on the railway is due to the professional suitability of specialists, the formation of their required professionally important qualities. The issue of professional suitability of employees has been intensively studied by psychologists of our country in the period of technological revolution, since the 60-ies of the last century, when the complex technical systems under people control had appeared. The management of such objects initially caused a number of mistakes of the experts, and the consequences of such mistakes have been terrible. B.F. Lomov, while having justified the emergence and formation of engineering psychology, has noted on the necessity to study the psychological characteristics of people, as the price of their erroneous actions has been too high [4]. From that certain moment the development of the branch of psychological knowledge, called professional suitability, has begun. Our compatriots K.M. Gurevich [2], V.A. Bodrov [1], E.P. Ilyin [3] and others have made a significant contribution to the development of this area. At present, professional suitability is understood as the psychological characteristics of people, professionally important qualities that ensure reliable and effective functioning of workers in intensive and extreme conditions. The notion of professionally important qualities in extreme activities now usually includes the emotional stability, the characteristics of attention, memory, thinking, and especially temperament and character. However, it should be noted that the list of professionally important qualities is determined by the specific character of the activities performed by the worker. There is no once and for all ready list of professionally important qualities (PIQ) which provides an effective work in any profession since any kind of professional activity imposes its own requirements on the qualities of the worker. There is a vital necessity to study the professional activities of employees in order to determine the requirements it imposes on the employees. All

that constitutes the base of the psychological description of the activity, the development of professional and psychogram, on the basis of which the list of PIQ in the profession under study is revealed. The psychological study of the activities of workers of the recovery train so far. Therefore the goal of our research has been formulated as to study this activity and on the basis of this study to develop practical recommendations for professional psychological selection of workers of the recovery train.

II. ORGANIZATION AND IMPLEMENTATION OF EMPIRICAL RESEARCH

The presented empirical study was conducted in twelve recovery trains of the Directorate of emergency and recovery facilities of the October railway. The study involved 112: 12 people – heads of the recovery trains acting as experts; 60 people are train crane operators and 40 people are bulldozer drivers. The average age of employees is 42 years, the average length of service is 16 years, their education is secondary special (technical).

The purpose of the study was to identify those professionally important qualities of workers of the recovery train, that determine the effectiveness of their professional activities, and to identify the characteristics of the workplace, that are negatively assessed by employees.

To accomplish this goal, the activities of the workers have been analyzed with the help of study of job descriptions, work observations, talks to the employees.

On the base of the results of this review we developed: (a) at first – a priori-psychogram and later – (b) empirical psychogram.

The following psychodiagnostic procedures were used in the study:

- 1) The survey for the identification of the professionally important qualities (modification of the Lipmann questionnaire), consisting of 45 statements;
- 2) A modified version of the "Ergonomic checklist" consisting of 171 statements;
- 3) Methodology of "Needs satisfaction or paired comparisons" (by V.V. Skvortsov);
- 4) Methodology of "Job Satisfaction" (by V.A. Rozanova);
- 5) Biographical questionnaire.

III. THE DISCUSSION OF THE RESULTS

Empirical data were processed using the SPSS program V. 22.

A. *The results of the detection of PIQ in a modified version of the Lipmann questionnaire*

The PIQ structure of workers of a recovery train is as follows (in points) – from most significant to less significant:

- endurance – 2.0 points from 2 possible;
- emotional stability – 1.878 points;
- psychomotor properties – 1,862 points;
- mental properties – 1.863 points;
- mnemonic properties – 1.820 points;

- attention – 1.8 points;
- perception – 1.730 points;
- speech characteristics – 1.674 points.

Let us comment on these results: workers of a recovery train are in extreme conditions of activity, while the effect of adverse factors can last from several hours to several days (depending on the nature of the problem). In such conditions, workers must be resilient and emotionally stable throughout all the time of disaster elimination. Psychomotor properties, which manifest themselves in the form of motor actions on sensory stimuli, are an integral part of the work of such specialists – as a matter of fact, that is the hard physical labor associated with lifting, carrying weights. Mental and mnemonic properties are important for memorizing and reproducing those actions that are reflected in the regulatory documents on crash recovery. The speech characteristics are less important for workers of recovery trains, since in the conditions of intense external noise and a significant distance between speakers the workers may not see or hear the people around them. In this regard, speech interaction is almost impossible and minimized. The heads of the recovery train cannot manage the workers during the liquidation of the consequences of the disaster by giving them commands in speech (verbal) form. The interaction between workers in such conditions is possible with the help of sound or light signals, That is why the sensory-perceptual processes are more important for workers than speech characteristics.

B. *Assessment of the workplace using the "Ergonomic control card"*

The use of the "Ergonomic Control Card" was aimed at identification of those characteristics of the workplace and working space that, from the viewpoint of workers of the recovery train, negatively affect their work, cause a feeling of discomfort. The results of the study revealed the following adverse factors related to the workplace and the working space: workers noted among the most significant – limited cabin space (bulldozer and crane) – 22% of respondents; harmful factors of the working environment (gas, smoke, dust) – 19% of respondents; the complexity of manipulating controls – 18% of the respondents; non-optimal location of controls and instruments – 16% of respondents; high mental load – 13% of respondents and unsatisfactory configuration of controls – 12%.

The dissatisfaction of workers with factors of the workplace and the environment is due to a number of circumstances. Firstly, bulldozers and cranes have a fairly long lifespan on the railway; they are usually not the new units. In addition, the traction machinery, which was made in Russia seven or more years ago, has been developed without taking into account the ergonomic factors. Only recently the developers of such machinery began to take into account the necessity for optimization of the workplace in order to increase in the long run the workers job efficiency.

C. *The results of diagnosing the needs of workers according to the method "Needs or paired comparisons" (by V.V. Skvortsov)*

The results of the diagnostics of the needs of workers have shown that the most relevant for workers are material needs (36 points out of 42 possible). That is an unmet needs zone. In second place are the needs for security and recognition (by 21 points, respectively). These needs are

partially met, that can be explained by external factors for the workers protection (special clothing), but one cannot expect full confidence in his (her) safety in such conditions. The need for recognition is associated with the assessment by managers and colleagues of the results of the work performed. Social needs and the need for self-expression for these workers are not typical, that can be explained by the urgent to rely in difficult working conditions on their own professional training and formed skills – all phases of work shared between employees in advance, and each employee knows his area of responsibility.

D. Analysis of the results of job satisfaction (methodology, by V.A. Rozanova)

It turned out, that the workers of the recovery train were only partially satisfied with all the indicators of this technique; they were not satisfied with the size of the salary and relations with the heads of the division.

IV. CONCLUSIONS

Based on the analysis of literature data and the results of the performed empirical research, we can formulate the following conclusions:

- Professionally important qualities of workers of the recovery train have been identified. These qualities should form the basis of professional psychological selection of these specialists. These qualities include: endurance, emotional and resolute stability, sensorimotor and mental characteristics.
- To optimize the work it is necessary to use technical equipment and mechanisms, that meet appropriate ergonomic requirements. Limited working space (cabin of bulldozers and cranes), inconvenient for use controls and instruments, high mental stress reduce the labor efficiency of workers of the recovery train.
- Stimulation of labor of workers of the recovery train must be carried out on the basis of the unmet needs identified in the study. Namely – on the basis of material, safety and recognition needs.
- To ensure job satisfaction, special attention should be paid to the relationship between employees and the heads.

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