

Socio-Psychological Study of Factors Affecting the Success and Reliability of Professional Activities of Oil Industry Workers

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Abstract–The article presents the results of socio-psychological study of external factors affecting success/failure and reliability / unreliability of professional activities of staff of hazardous production facilities. The psychological substantiation of expediency of research of their individual-personal features is given, the content of representations of subjects of work about the importance of individual-psychological properties is described, and the hierarchy of these properties in connection with features of professional activity is estimated. In addition, the identified relationship of individual and personal characteristics of staff of hazardous production facilities and methods of stimulating the quality and reliability of professional activity is analyzed. The authors developed guidelines to preserve the reliability of professional activity of employees working at hazardous production facilities.

Keywords–*professional activity, satisfaction, reliability, individual and personal characteristics, external and internal factors*

I. INTRODUCTION

Oil industry occupies a leading position in the national economy of Russia in particular in the KHMAO-Yugra, being the basis of all forms of its life. Currently, the social, psychological, information load on a person increases due to the need for rapid adaptation to changes in the organization, in society, as well as to changes in the intellectual potential in production. As a result, the staff, performing its main functions, must simultaneously compensate for all the shortcomings of the equipment in order to maintain its performance, as well as to use the adaptive resource of the body for permanent changes. All this leads to an increase in the role of personnel of objects (fields) in ensuring reliable operation of the equipment, requires further scientific identification of factors affecting the reliability and performance of personnel in real working conditions.

Human capabilities in professional activities and technical means of this activity are the main sources of contradictions in

the complex ergatic systems of modern production of the oil industry. No matter how much more complicated and improved technology, the human factor remains the main cause of efficiency - the inefficiency of the use of technical means in production activities. There has been a steady complication of the technical means, which in turn reinforces the importance of operating labor and, consequently, imposes high requirements to the level of intellectual, emotional and psycho-physiological preparedness of the employee of the oil industry.

At the same time, it is experimentally proved that the person becomes less reliable link, than a technical component of ergatic systems [1–4]. Therefore, the solution of the problems of psychological and psycho-physiological support of labor operators of complex ergatic systems becomes a priority for oil companies.

In oil industry, as in any other system of ergatic type, a person performs the role of a manager. Consequently, the key condition for the optimal functioning of ergatic systems is the adequacy of the coordination of "management" characteristics, technical and biological elements of the system. To ensure the reliability and safety of professional activity of oil industry workers, it is necessary to create an integrated system of human support in its production activities. A special place in this system should be given to the segments of selection, placement, professional adaptation, adaptation and rehabilitation of physical and mental health of oil industry personnel. The key in this system should be psychophysiological ensuring the reliability of professional activities of personnel in the oil industry [5].

Based on the above mentioned aspects, it becomes obvious that the psychological support of the subject of professional activity is a progressive "build – up" of its reliability at all stages of professionalization: from professional selection, training and adaptation to professional activity to the stage of stable professional functioning, including both maintaining the

required level of professional skill and its continuous improvement. Reliability of professional activity is the ability of a person to reliably perform professional duties for a certain period of time in regular and emergency situations [6, 7].

In this case, a person is considered not as an element of the structure, but as a non – renewable resource – an element of social organization in the unity of the three main components- labor function, social relations and psychophysiological state of the employee and personal resource - non-specific individual psychological characteristics that facilitate activity performance and well-being [8]. It is experimentally proved that the human factor remains the main source of accidents at work (neglect of rules and their non-fulfillment, lack of competence of workers, unsatisfactory psychophysiological indicators of workers, etc.). In other words, accidents and accidents at work – a consequence of inefficient management of personnel in General and reliability management of its professional activities, in particular. It becomes obvious that it is necessary to connect safety and reliability of professional activity with a condition of the person, with his stability, working capacity, adaptability, responsibility, motivation and self-regulation [9].

In the process of professional adaptation, special attention should be paid to the personal-individual determinants of stress resistance as an individual psychological feature, consisting in a specific relationship of multi-level properties of integral individuality, which provides biological, physiological and psychological homeostasis.

Thus, the system of psychological and psychophysiological ensuring the reliability of professional activities of operators enables the leaders of the oil industry:

- ✓ to consider when designing measures of psychophysiological and medical indicators of individual employees;
- ✓ optimal use of personal and individual determinants of the employee in order to form stress resistance in professional activity;
- ✓ effectively use social funds of the enterprise for purposeful improvement of collective.

A unified approach to ensuring the reliability of professional activities of operators involves the following subsystems in the management of human resources:

1. "Professional selection on psychological and psychophysiological indicators and primary adaptation";
2. "Special professional, psychological and physical training";
3. "Ecological-hygienic, engineering-psychological and ergonomic support of professional activity and optimization of work and rest modes";
4. "Control and forecasting of psychological and psychophysiological adaptation and state of health of the personnel";
5. "Functional rehabilitation, health insurance and treatment"

6. "Reporting and investigation of accidents and accidents";

7. "Internal audit of reliability and safety and assessment of health and safety risks".

Thus, within the professional competence of the psychologist is the first and fourth subsystems and partly the second, third and seventh subsystems.

II. METHODS

A. Nature of research (Nature of the study):

What provides or what factors depend on the reliability of the staff? To begin with, let us consider the fact that in modern industrial oil production two subsystems constantly interact: technical (equipment, technology) and social (stimulation of labor, management knowledge, organizational structures, management style, and methods of training and development of personnel, organizational culture). Reliability in such an oil industry is a complex category, consisting of the reliability of technical equipment, controls and reliability of personnel, respectively. The analysis of the situation at the enterprise allowed allocating the reasons of strengthening of influence of "human factor" (a complex of external factors and to put forward the assumption of psychophysical and psychological features of behavior of a person in the working environment) in emergence of accidents, decrease in working capacity and, consequently, and decrease in reliability of activity. The study took place in several stages.

At the first stage, direct work was carried out with the surveyed, who were asked to answer the questions presented in the questionnaires.

At the second stage, quantitative data were calculated in accordance with such indicators as: labor safety, social benefits, job satisfaction, salary satisfaction, relationships in the team and with the immediate supervisor, etc. The Description of the data obtained, in accordance with the indicators, was carried out at the third stage of the study.

B. Context and participants:

The study was conducted in oil company in order to identify external factors affecting the success/failure and reliability/unreliability of professional activities of operators of hazardous production facilities. The study involved 58 workers ' organizations, working at hazardous production facilities.

Research work was carried out within the framework of the implementation of the contract №1618 for the implementation of research work from 16.11.2015 "assessment of the dependence of the reliability of professional activity of workers serving hazardous production facilities (OPO), on individual and psychophysical characteristics" (UDC 159.9: 331.101.3 R & d Registration number: AAA-A16-116012210096-1)

C. Research questions and data generation instruments (research Questions and data generation tools):

The main issues of the study were: the definition of factors affecting the reliability of professional activity of employees and their experience of using tools and methods of maintaining efficiency. For this purpose, the analysis of the content and

conditions of activity, motivation, system of professional retraining, as well as the dynamics of accidents, breakdowns, violations of TB, and taking into account seasonal, weekly, daily biorhythms. The main tools in solving these issues were: work with the documentation of the enterprise, visits to the places of work of oil and gas production operators in order to conduct a sociological survey on improving the work of trade Union organizations in the field of labor protection in the territory of the Khanty-Mansiysk Autonomous Okrug – Ugra, questionnaires on the problem of employee satisfaction with working conditions.

The study of individual personality characteristics of employees working at hazardous production facilities and the issue of the relationship between safety and reliability of professional activity with the human condition (its stability, performance, adaptability, responsibility, motivation and self-regulation) was carried out using the personnel profile analysis test (questionnaire O. Lipman), aimed at studying representations of the subject of labour necessary for the selected activities of their personality.

III. RESULTS

First of all, the satisfaction of employees with working safety conditions at the enterprise, safety of technological equipment and provision of personal protective equipment were analyzed. The data obtained are presented in Fig. 1.

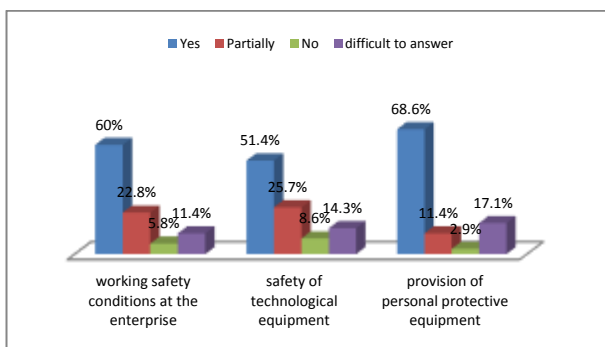


Fig. 1. Satisfaction of employees with working safety conditions at the enterprise, safety of technological equipment and provision of personal protective equipment

As it can be seen from Fig. 1, for all three indicators, the largest number of surveyed workers determines the highest degree of satisfaction: 60% of employees noted that they are fully satisfied with the safety conditions at the enterprise; 51.4% – with the safety of technological equipment and 68.6% are satisfied with providing them with personal protective equipment. At the same time, for each indicator, there are those employees who note complete dissatisfaction with safety at the enterprise: 5.8%, 8.6% and 2.9% of the total number of respondents in the workplace, respectively. Among these indicators, the highest percentage of dissatisfaction and partial satisfaction (25.7%) with the safety of technological equipment, compliance with which safety requirements is dissatisfaction with the quality of clothing.

Analyzing the percentage of high, medium and low levels of satisfaction (for example, the first indicator – 60-22.8 and 5.8), it is possible to say that the majority of respondents are

satisfied with the safety conditions at the enterprise and are fully familiar with the documentation.

At the same time, among the surveyed workers were those who, when answering questions, chose the option of "difficult to answer" from the proposed answers. Provided that the analysis of questions about the awareness of employees of the company about the rights to safe working conditions, training or instruction on safety rules, the adequacy of the level of information provided on the rules and obligations of compliance with safety at work, showed a high level of satisfaction in providing information (100% of the respondents), it can be assumed that this category of workers did not consider it necessary to answer the questions and chose the simplest (easy) answer.

While working with the respondents, the authors noted a large amount of information about the rules and safety (posters, leaflets, brochures, etc.) directly at the workplace, which once again confirms the high level of awareness and as a result of the satisfaction of all employees of information security on the safety rules of the enterprise.

In general, it is possible to talk about the partial satisfaction of employees of the organization of working safety conditions in the enterprise, which directly include what and how the employee of the enterprise carries out its activities. With a sufficiently large amount of information and the work carried out in the organization in this direction, is determined by the insufficient level of satisfaction with the conditions of safety.

The analysis of these indicators is quite important in relation to the category of work, which includes the work of the subjects. All respondents, answering the question "what category of working conditions is your work" noted such positions as: harmful, dangerous and difficult working conditions. Most of the employees surveyed are satisfied with their working hours. At the same time, 54.8% of respondents note the possibility of going to work outside working hours or outside working days (on Sunday or holidays), explaining this by production necessity. However, when asked about monetary compensation and additional benefits for overtime work, 35.5 per cent (out of 54.8 per cent) noted the volatility of compensation for this type of work. (Which does not correspond to the Labor Code of the Russian Federation) at the same time, 19.3% regularly receive payment for overtime. In general, the satisfaction with the salary of employees of the organization is presented in Fig. 2.

The ratio of percentages allows speaking about below average level of satisfaction of employees of the organization with a salary. When explaining the reasons for their dissatisfaction, employees note the discrepancy of wages in its category (100% of respondents). Due to the insufficient level of wages, 27.3% of the surveyed indicate a possible transition to another job (in another organization), explaining their dissatisfaction with the level of the financial situation in the country as a whole (increase in product prices, housing and communal services, etc.).

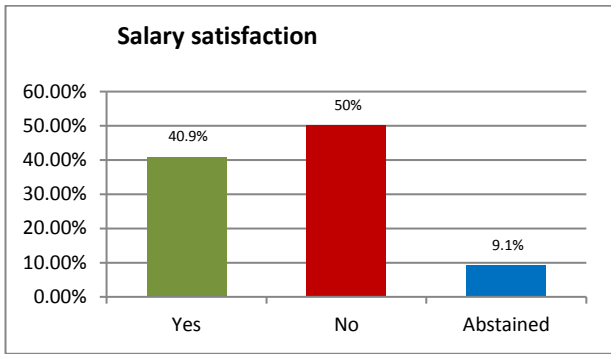


Fig. 2. Employee satisfaction with wages

Despite this, the degree of job satisfaction in this organization is quite high for the majority of employees (90%). The data is presented in Fig. 3.

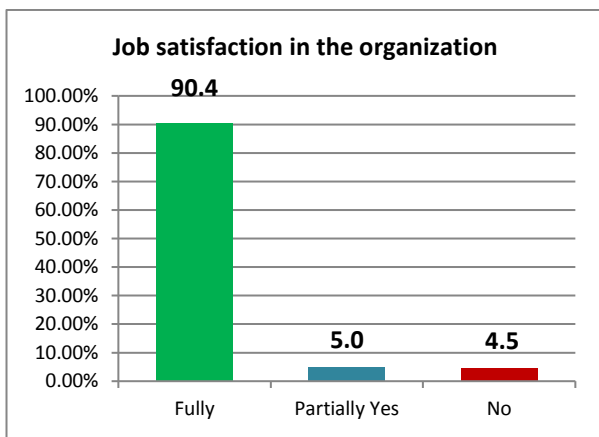


Fig. 3. Job satisfaction in organization

At the same time, noting this position, the surveyed employees identified the following "problem points" in the organization that cause some concern among employees: the level of wages, the ability to communicate their views to management, a neutral attitude to initiative employees, there is no system of encouraging the best employees, etc. When calculating data on these parameters, the results of 45.4% of the surveyed from the total number of respondents were not taken into account, as they refused to answer these questions. The data obtained are presented as a percentage in Fig. 4.

Analyzing the indicators presented in Fig. 4, the authors distinguish three main parameters ("problem points") in respect of which employees of the organization (among the respondents) express "concern": the level of remuneration (75%), logistics (50%) and the system of encouragement of the best employees (66.7%).

Each subject was asked to identify the specifics of the "concern" with respect to each position by describing it. As a result, it can be said that the greatest interest of the surveyed is the system of encouragement of the best employees, which, in their opinion, is either absent in the organization, or it is forgotten by managers. Absolutely all employees note the desire to receive not moral stimulation in the format of "Thank

you for your work", which, in their opinion, they receive enough from the immediate supervisor (master), and financial encouragement.

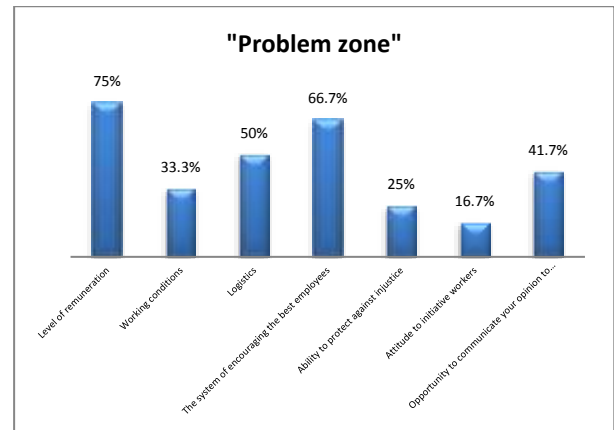


Fig. 4. "Problem points" in the organization in the views of employees

When analyzing the aspects of work that are important to the quality of the work, interest in work activities, are the following: interesting work; high salary levels; favorable conditions of work; friendly staff; possibility to earn more someone who puts more effort in the work; take into account the opinion of the personnel when making decisions, friendly attitude of managers to subordinates; avoidance of excessive disparities between employees.

In accordance with the aim of the socio-psychological study, external factors ("problem areas") affecting the success/failure and reliability/unreliability of professional activities of operators serving OPO and their justification from the point of view of the employees of the enterprise: dissatisfaction with the ratio of wages and labor costs, lack of professional development, monotony of work, logistics and the system of encouraging the best employees were identified.

A positive aspect is 100% satisfaction in providing information to employees (respondents) of the enterprise: on the rights to safe working conditions, on training or instruction on safety rules, on the adequacy of the level of information provided on the rules and obligations of compliance with safety at work.

At the next stage, the task was to study the views of the subject of labor on the importance of individual psychological properties (sensory, motor, attentional, MNEMIC, mental, speech, emotional, volitional, imaginal, communicative properties of the individual) and to assess the hierarchy of these properties in connection with the characteristics of professional activity.

Qualitative analysis of quantitative indicators, which were interpreted in the ratio of their representation in the hierarchical structure of significance, allowed determining the degree of severity of individual psychological properties. The data obtained are presented in Fig. 5.

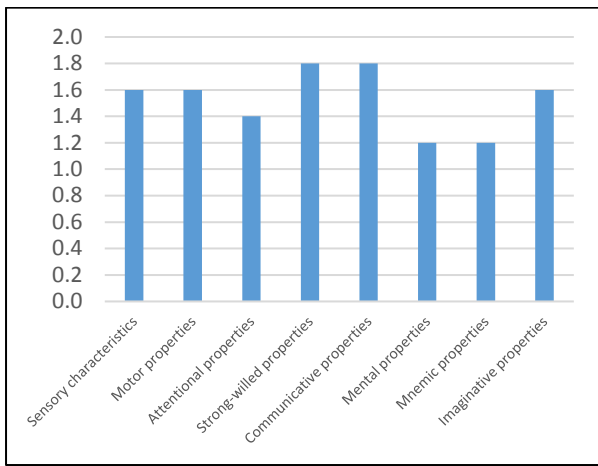


Fig. 5. Severity of individual psychological properties of the person

As it can be seen from Fig. 5, indicators of individual-psychological characteristics of employees of the organization are heterogeneous in severity in respect of such properties as: touch (1.6), the motor (1.6), attenzione (1.4), mnemic (1.2), mental (1.2), amanitine (1.6). In this case, the volitional and communicative properties of the individual are determined by the value of 1.8 out of 2.0 of the maximum possible. The specificity of the presented severity of the indicators on the scales allowed determining their hierarchical structure, which is reflected as a graphic element for visual representation (Fig. 6):

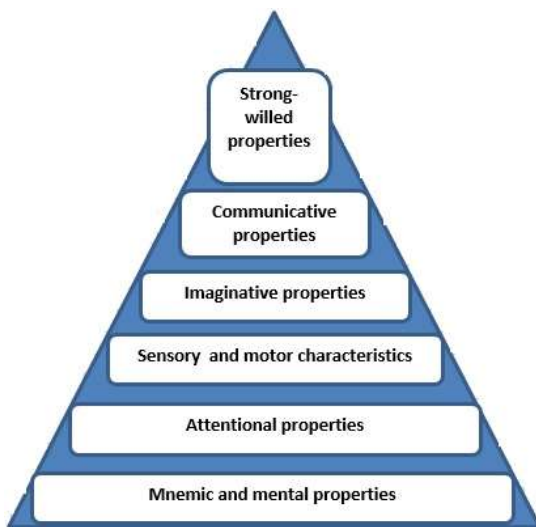


Fig.6. Hierarchical structure of individual psychological properties of personality in relation to professional activity

Analyzing the presented hierarchy, it is possible to distinguish those groups of individual psychological properties that are subjectively professionally significant characteristics for respondents, on which the success of their professional activity depends. So, for dominant properties, they took strong-willed, communicative and imaginative properties. The role of volitional properties is quite large in overcoming external and internal difficulties in the implementation of labor activity and also in the leveling of individual psychological properties that are inherent in the employee, but negatively affecting the

effectiveness of professional activity. The set of volitional properties (qualities), forming a dynamic structure, should be determined by the optimal (objective) conditions of activity. To less significant properties that determine the reliability and success of professional activity – sensory and motor properties. The lower value determines a group of individually-psychological properties (attenzione, mnemic and intellectual) to reflect specific characteristics influencing the effectiveness of the implementation of the labor action enshrined the professional standard "the operator is dewatering and demineralization plant" (order of March 10, 2015. No. 154n), "production operator of oil, gas and gas condensate" (order of 18 November 2014. No. 898n). What determines the typical underestimation of the actual individual-personal properties that are important for solving professional problems?

Further decrease in the importance of these properties can lead to the implementation of their professional activities only due to the dominant properties (volitional and communicative), and this means a further decrease in efficiency and intrapersonal conflict.

This hierarchical structure, determining the inconsistency and imbalance in the ratio of safety and reliability of professional activity with the human condition, with its stability, efficiency, adaptability, responsibility, motivation and self-regulation, allows predicting the high quality of professional performance.

IV. CONCLUSION

As a result of psychological research the factors influencing reliability of professional activity of the workers serving dangerous production objects (OPO) were defined: external (lack or lack of training of the personnel and lack of necessary experience at workers; non-observance or ignoring of rules and instructions; omissions of management in the organization and management of activity of the processing equipment and production personnel; the increased fatigue or the worsened state of health of workers; unsatisfactory psychophysiological indicators of workers; the absence or insufficiency of control systems that would take into account and prevent the possibility of individual errors of personnel, disregard for the rules and their failure, lack of competence of employees, poor psychophysiological indicators of employees).

The internal factors were related to psychological and physiological characteristics that influence success/lack of success and the reliability/unreliability of professional activity of operators: the syndrome of psychoemotional tension, forced the circle, "circular migration" (partial issue only of the frequent change of workers), low motivation of labor activity and its results, the complexity of considering the opinions of the labor collective in the decision.

It becomes obvious that the hierarchical structure of individual psychological properties of a person in relation to professional activity, built as a result of empirical research, allows, on the one hand, determining the inconsistency and imbalance in the ratio of safety and reliability of professional activity with the state of a person-with his stability, efficiency, adaptability, responsibility, motivation and self – regulation,

and on the other – predicting and regulating the high quality and efficiency of professional activities.

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