

PERSONNEL QUALIFICATION MANAGEMENT APPROACHES IN MARINE ORGANIZATIONAL AND TECHNICAL SYSTEMS

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Analysis of many organizational and technical systems associated with complex processes of interaction of material objects and human resources indicates the need for approaches to assess the quality of the main processes of functioning. However, due to the multi-criteria nature of the construction of models for the functioning of organizational and technical systems, there are limitations associated with uncertainty factors.

It should be borne in mind that the higher the influence of the human factor on the quality of the organizational and technical systems processes, the more difficult it is conceptually and algorithmically to build an adequate model of the entire system. It can be unambiguously stated that the influence dependence of the human factor on quality of marine transportation exists and plays a key role [1-5].

In turn, the formation of the qualification elements of a marine specialist depends on a number of chronological stages, from educational to training in the course of practical activity. To a large extent, due to its specificity and efficiency, the level of qualification is influenced by simulator training using navigation simulators and virtual (augmented) reality systems [6-11]. Considering that the degree of influence of each such process on the quality of functioning of the organizational and technical system, we can conclude that the final qualification level is difficult to predict.

From the basic descriptive principles of organizational and technical systems, it can be concluded that in order to manage the development of the skill level, it is necessary to develop a system of aggregate information functions and transformations – operations.

Thus, the purpose of the study is the formation of operations aimed at creating a target strategy for the dynamic growth of qualifications of the subjects of maritime organizational and technical objects to reduce risk factors when transporting goods by means of automation.

Within the framework of the research goal, it is proposed to form a structural-logical scheme of influence on the indicators of personnel qualification growth in the elements of marine organizational and technical facilities such as: training centers and retraining centers for marine specialists; educational organizations and institutions; forums and symposia from international and domestic employers; port control services; stages of interaction between pilots (superintendents) and captains.

At the same time, the organization of strategically directed activities depends on a set of material objects such as: navigation simulators, machine room simulators and electrical installations; laboratory equipment; practice base courts; port infrastructure and lifting and crane equipment.

Taking into account the fact that organizational and technical objects of the maritime industry are difficult to formalize, it is necessary to develop mathematical and software to analyze their state and schemes of information relationships.

Thus, in order to achieve the goal of the study, it is necessary to complete the main task: to develop methods for optimizing the processes of fulfilling qualification requirements for the personnel of marine organizational and technical objects synthesized under conditions of formal uncertainty in the dynamics of transformation processes.

To determine the sequence of actions in solving the problem, we define their structure schematically (Fig. 1.)

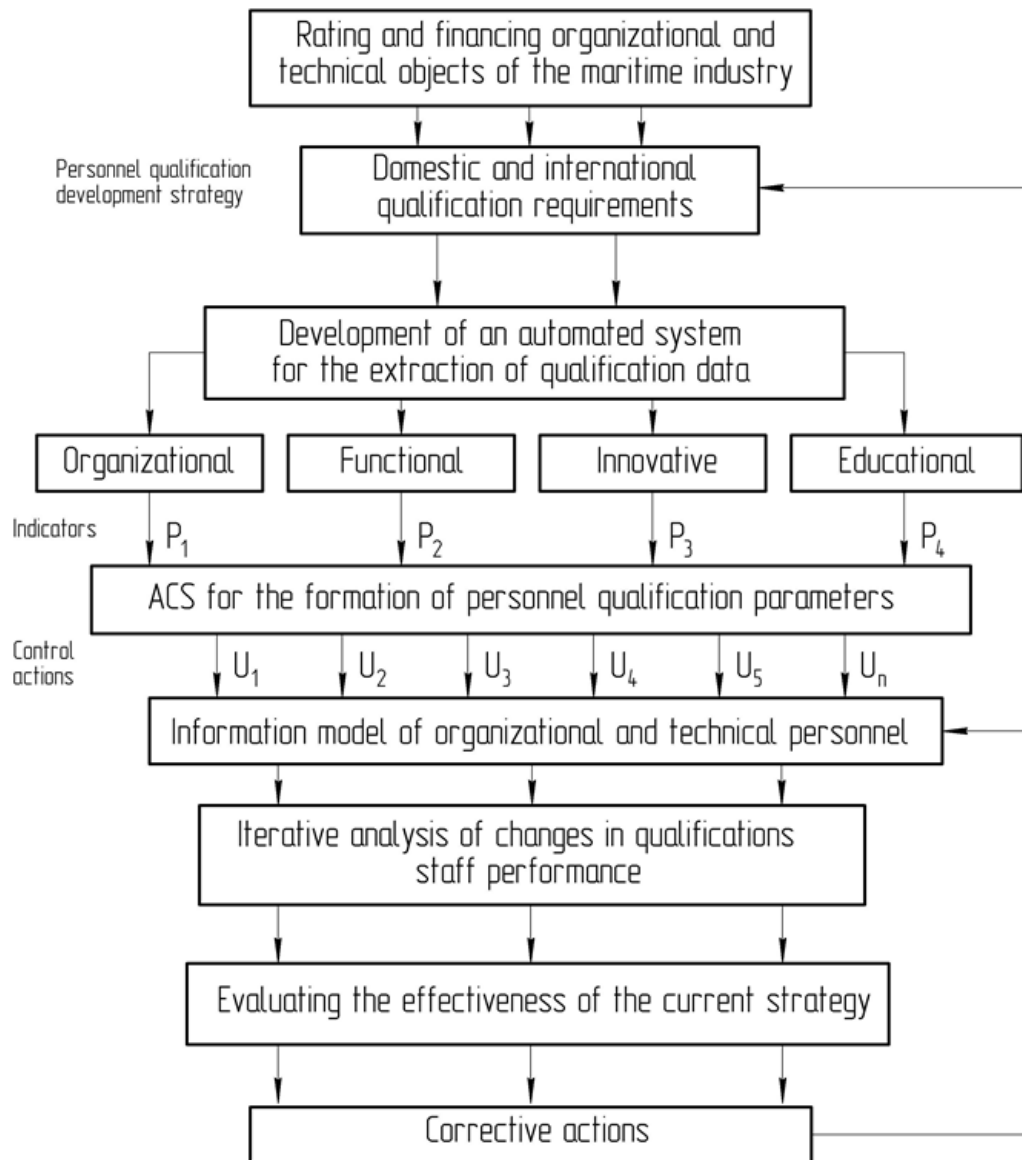


Figure 1 – Scheme of processes optimization for fulfilling qualification requirements for personnel of offshore organizational and technical facilities

According to the scheme, an important step is to determine the current requirements on the part of organizational and technical objects of the maritime industry in order to determine the target strategy for the formation of qualification indicators of P_i personnel. By managing the set of U_i influences on the part of maritime organizations, it becomes possible to form a personnel model in the context of the dynamics of the development of the industry as a whole.

An important feature is the determination of the step of exposure in time. Depending on the category of personnel, such a step will be different and not always discrete. In turn, it is also necessary to take into account the psychological component when working with personnel for its goal-orientation in the time frame [12]. In this case, the formalization of the problem in general form will be as follows:

$$F = (P - P^*),$$

$$F(U_1, U_2, U_3, U_4, \dots, U_n) \rightarrow \min,$$
$$P \geq P^* \Rightarrow P(U_1, U_2, U_3, U_4, \dots, U_n) \geq P^*$$

Then, the parameters can be approximated with respect to the increment:

$$P(U_1, U_2, U_3, U_4, \dots, U_n) = \frac{\partial P}{\partial U_1} U_1 + \frac{\partial P}{\partial U_2} U_2 + \dots + \frac{\partial P}{\partial U_n} U_n$$

In this case, the introduction of the gain k , will make it possible to obtain:

$$P = k_1 P_1 + k_2 P_2 + \dots + k_n P_n \rightarrow \min, F \rightarrow \min,$$

Consequently, it becomes possible to determine the sensitivity coefficient of the influence

$$\frac{\partial P}{\partial U_i} = k_1 \frac{\partial P_1}{\partial U_i} + k_2 \frac{\partial P_2}{\partial U_i} + \dots + k_n \frac{\partial P_n}{\partial U_i}$$

U_i on P:

Obtaining experimental data, as well as their statistical processing, will make it possible to determine the weighting factors of the influence of factors on the processes of managing the state of qualification parameters in relation to the personnel of the organizational and technical systems of the maritime industry.

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