

An Innovative Approach to Selection and Improving the Effectiveness of the Personnel During the Implementation and Nuclear Operation of Power Industry

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Abstract— Selection and professional retraining methods like design, building, operation in the field of implementation nuclear power industry are considered in the article. Necessary conditions for high work efficiency at the appropriate stages for specialists, motivation methods like incentives, career development and team support, requirements for their skills and experience are also noted. Working conditions influence on mental health and work efficiency. The better they are, the higher an interest of personnel in the process. The article notes the high degree of responsibility for selecting highly qualified personnel due to the increased level of danger of nuclear facilities. Specifically it analyzes the personnel selection and teaching system, using the example of state corporation Rosatom and IAEA. Based on this information, conditions that help to realize the potential of both, employee and personnel team, are proposed. An innovative personnel selection system, including the process of learning the personality of employee and his family, integration of the team and the new personnel during the interview is also considered.

I. INTRODUCTION

The dynamic development of the modern world to a large Special attention is paid to the nuclear industry. It should be noticed that it is much wider than it might seem at first glance.

We are talking directly about both: NPP facilities (the level of responsibility of such buildings and structures is extremely high, and the safety of human and the environment depends on the quality of the implementation of the facilities) and about solving more global problems, for example, achieving sustainable development goals, that is widely spread modern trend. So, the role of the sphere of nuclear energy is very high, therefore, it is necessary to select staff accurately to ensure their competence and reliability (Fig. 1)[1]. In the article we will concentrate specifically on nuclear power industry.

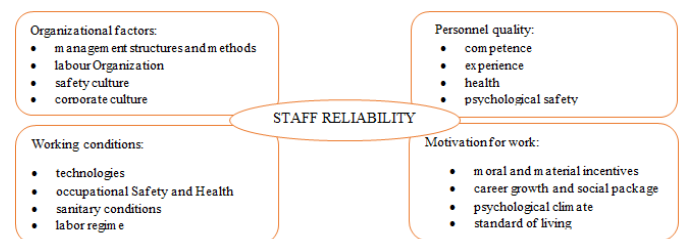


Fig. 1. Scheme of personnel reliability

The relevance of the chosen topic is explained by the highly qualified personnel need in the nuclear industry [2] for the most efficient and safe work and implementation nuclear facilities. Currently, there are many examples that are in need of repairing and construction, operational and technological measures, as well as those that are during the construction process.

The aim of this work is to identify key factors for the formation of an effective system of selection, training, motivation and professional retraining in the field of implementation and operation nuclear power industry.

We analyze the existing system for working with personnel in the field of nuclear energy to achieve the goal of this work [3]. Then we will formulate proposals for optimizing the training and selection process for the personnel.

II. METHODS

The choice of personnel during the implementation and operation on the specific stages of the work. So, at the design stage, we consider personnel with sufficient design experience and skills. Methods of the execution of process and the effectiveness of its use are important.

At the construction stage an experience in the production of specific types of work is important, as well as the ability to organize the production process effectively with observing the requirements of safety and labor protection, to carry out the necessary control for establishing high quality standards. The construction management, competent organization of communications among manufacturers of various types of work, their coherence and logistics are also important.

The operation stage requires specialists to have the same experience, skillful organization of repair work, which the operation process always implies [4]. The specialist must select the necessary material, analyze the types of future work, draw up work production plan and do many related activities. All this requires a specialist to a wide range of specific skills in construction, organization and management.

Look at organizational and technological measures are necessary for the selection, training and education of personnel, increasing its effectiveness at the stages of implementation and operation of building.

The first thing you should pay attention to when choosing an employee is his experience [5]. When implementing projects of nuclear power industry, due to the high level of facility responsibility experienced employees are required. Their work experience can be identified by interviewing with the working team directly [6]. During such a conversation, the employee tells about his career and demonstrates relevant knowledge in the field of implementation and operation of building. A distinctive features of this method are the possibility of an objective assessment of the employee's experience by personnel, directly involved in the production sphere, and integration with the team for compatibility.

1) At the design stage the employee shows a portfolio of his projects, he participated in. It is also appropriate to provide

an opportunity for a person to analyze one of the company's projects and offer his own technological solution [7].

2) At the construction stage, the worker will tell about the decisions he makes in certain situations, the organization of work, safety standards and rules.

3) At the operation stage, the conversation will be about methods, experience and organization of repair work, implying the optimal operation of the facility.

When selecting a future employee, it is appropriate to learn him fully by providing personal data, as well as passing of all kinds of tests related to the professional sphere, moral and mental health [8].

After choosing an employee, it is necessary to teach him all the organization principles, rules and requirements for construction products, where he is going to work [9]. It is necessary to provide the appropriate conditions and materials, the employee will be able to involve in the production process.

Particular attention should be paid to employee motivation, because his interest directly influence on the quality of work. We are talking about a monetary reward, the possibility of career growth, various benefits and moral spur (verbal or written thanks, insignia, support from the senior manager, cohesion of the team).

It is imperative to provide comfortable working environment for all the personnel [10]. First of all, the office of the project department should be equipped with powerful computers, printing devices, ventilation, air conditioning, lighting systems and a pleasant interior to make a good atmosphere. A system of logistics and warehousing of materials and products, the organization of all types of work and their connection with each other is worked out in order to carry out work on the construction site continuously for convenient production of works. It is necessary to have an access to all facilities in order to carry out repairing works during operation. It is also important to systematize and sort the construction documentation, so that in case of any emergency situation, it what possible to make further decisions quickly.

Much depends on the organization of interaction of production departments, which should be connected closely [11].

The construction and design department must communicate with each other constantly to receive accurate explanations for emerging issues and technical solutions timely.

III. RESULTS

As an example, we can look at the organization of work with staff in the Russian Rosatom company, which is a leader in the international market for the production of nuclear power industry.

Work with staff at Rosatom State Corporation includes compliance with safety and labor protection requirements, the reliability of personnel, engaged in the production and

operation of facilities, their necessary qualifications, is regulated by a number of reference documents and is aimed at:

- ensuring correspondence to the qualifications of hired personnel with the requirements, characteristics and conditions of production;
- the formation of the necessary knowledge and skills before admitting an employee for independent work, including special ones - to service equipment and / or to perform work controlled by state supervision bodies;
- preservation of necessary knowledge and skills, development of production skills during the labor activity;
- improving knowledge and skills when technologies and production conditions change;
- the formation psychological stability and professional communication;
- constant and systematic monitoring of professional knowledge and skills of employee during his labor activity.

Rosatom implements training, retraining and advanced training programs, as well as confirming the competence of specialists in the field of nuclear energy use in accordance with the industry development strategy to solve these problems. A number of organizations specializing on the training and professional development of nuclear industry specialists are elements of this system. The training is held in various areas: construction in nuclear power industry, operation of nuclear and radiation hazardous facilities, ecology, radiation control, economics and safety the nuclear power industry and nuclear weapons complex, workforce management. Training courses, scientific and technical seminars, meetings and conferences, including those with international participation, are organized. Internships are held in various fields.

Target preparation of personnel is implemented by the state corporation for the most effective training of a future employee, that can be taught the profession beginning from the first year of university [12].

Training centers are equipped with training simulators that can simulate any situation that may occur during the operation of a building or structure. Launch operations are also practiced on them.

Annually, emergency response exercises are held at nuclear facilities, which are necessary to inspect personnel for emergency preparedness, effective reaction on emergency situations. Technical equipment, needed to deal with the accident, must also be inspected [13].

The high professionalism of the state corporation when working with personnel should be noted. The corporation covers the full range of tasks in this area, from training a person at an early stage when entering a higher education institution to conducting special exercises for already qualified employees. One of the main aspects of reliability for Rosatom is to maintain the willingness of personnel to any tasks and

emergency situations constantly. The number of various training and education centers for personnel at all sites of the corporation is also impressive. So that special attention can be paid to any human training issue.

IV. FOREIGN WORK EXPERIENCE WITH PERSONNEL

Now we will consider the principle of work with personnel globally with the example of the IAEA. As an international organization, the IAEA has to look for the most effective methods of developing workforce in the field of nuclear power industry [14]. However, the global level of the agency is determined not only by this factor. The organization's goal is to expand the use of nuclear energy for maintaining global wealth. In other words, work is being carried out in a wide range of professional areas (Fig. 2)[15].



Fig. 2. Standard elements of a human resources management strategy

Nuclear power industry carries out long-term projects. This refers not only to the period of construction but also supporting in further decision-making in the nuclear power industry program [16]. It is important to note that the organization work is based on the method of phased development of workforce planning at the nuclear power industry, while maintaining its integrity. Organization has published the document, where workforce planning is considered in details (Fig. 3) [15]. Workforce management is coordinated with other processes, such as advanced training and remuneration [17].

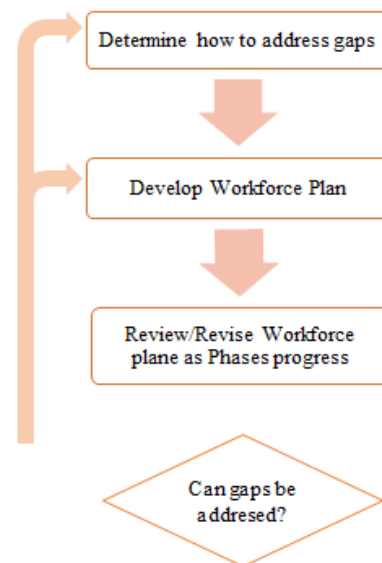


Fig. 3. A simplified diagram of the workforce planning process

The main conclusion is that the most important principle of work organizing abroad in this area is a systematic approach to solving tasks, integration and communication of areas and participants of the process.

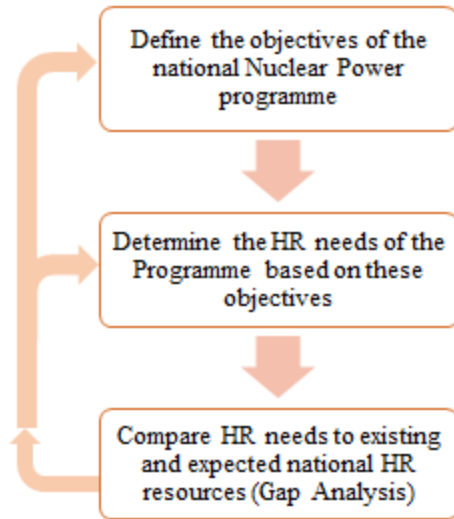


Fig. 4.

V. DISCUSSION

Based on the analysis, it can be noted that the approach to selection of the personnel can be very flexible and depends on the specific stages of the work. Each of them: design, construction, operation, has different criteria for the personnel qualities. The essence of the innovative approach lies in the following aspects: interviewing the employee directly with a potential team without the participation of an HR [18], acquaintance with the family and learning the personality of the employee, his competency, moral and mental health. Such a way of selection of the personnel is spread abroad, but has not covered all the professional areas yet. It is very relevant for the nuclear power industry.

Awareness of personnel about the full work process and the experience exchange is realized by using BIM-technologies, that is creation a single information field in which all information about the project from the idea to the commissioning of the building is accumulated [19]. Expanding their knowledge up to various stages, for example, from designing to solving problems during the operation of building, will expand their professional horizons and also provide an exchange of professional skills with other employees. Integration of all participants at various stages of the working process will significantly increase the efficiency of work, expand the consciousness of workers, as they will be able to see the whole process of work, not only the part they do, and will also let save time in decision making.

In addition, the conditions where the preparation and work process of a person occurs are extremely important. Working conditions and motivation influence directly on the emotional

and mental state [20], and therefore the employee’s working efficiency, interest in the process appears.

Such innovations in selection of the personnel and creation of conditions for their communication could take part in forming a fundamentally different approach in the field of work with personnel.

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