

Application of Simulator Complexes as an Innovation Method for Improving the Preparedness of Fire Rescue Department Members of Emercom of Russia for Emergency Response



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Abstract: *The paper describes the necessity to use simulator complexes simulating the extreme conditions of execution of professional applied tasks as an innovation method for developing professionally important qualities of fire rescue department members of the EMERCOM of Russia. The main parameters of professionally important qualities of fire rescue department members of the EMERCOM of Russia are shown in detail. The level of importance of professionally important qualities and their characteristics were evaluated. The importance of professional training and also the necessity to constantly develop and improve the practical skills and knowledges of fire rescue department members of the EMERCOM of Russia by means of systematic trainings using simulators and simulator complexes were grounded. The innovation methods of education were described basing upon the simulator complexes simulating the extreme conditions of execution of professional and applied tasks by a member of the fire rescue department of the EMERCOM of Russia.*

Keywords : *simulator complexes, professional preparation, fire rescue departments, emergency situation.*

I. INTRODUCTION

The necessity and importance of the professional training of fire rescue department members of the EMERCOM of Russia cannot be overestimated. The variety of emergency situations of the natural and technogenic character arising during the emergency response make high demands to the level of professional preparedness of fire rescue departments. Being under the impact of a huge amount of heavy

psychological irritants, members of the EMERCOM of Russia have minimal time for evaluation of the situation and taking the right decision.

II. PARAMETERS

The training of fire rescue department members is the most important task of the educational institutions of the EMERCOM of Russia. The main direction of professional training is the formation and improvement of individual psychophysical qualities that allow a member to perform his professional obligations promptly, efficiently and qualitatively in the extreme conditions of emergency situations. The individual psychophysical qualities of fire rescue department members of the EMERCOM of Russia can be combined into five groups of professionally important qualities (PIQ): psychological qualities; medical (physiological) qualities; ergonomic qualities; social and psychological qualities; engineering and psychological qualities. Let us explain some of the main parameters of the PIQ [1].

The group of psychological qualities includes such qualities of a fire rescue department member (FRD) as attention, memory, the way of thinking, will and self-esteem. One more important condition of the successful execution of rescue and salvage operations (RSO) in the conditions of emergency situations by the FRD members is their confidence in their capabilities, ability of the independent execution of their professional obligations.

The next medical (physiological) group of PIQ characterizes mainly the degree of correspondence of the capabilities of the member's organism to the content and condition of execution of RSO. The qualities of this group characterize the complete condition of the functional systems of the body (cardiovascular system, respiratory system, musculoskeletal system and sense organs). Besides, the evaluation of the quality characteristics of the considered group allows revealing the presence of pathologies of the members impeding the execution of professional obligations under the conditions of emergency situations.

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The ergonomic group includes the following qualities: the condition of the central nervous system; monotony resistance; impulsivity (reflexivity). The efficiency, quality and reliability of a rescuer's work depend upon these characteristics when interacting with the technical means.

The capability of rescuers to interact successfully with the local population in the disaster area during RSO in emergency situations is determined by the PIQ of the social and psychological group.

This group is characterized by such qualities as: cognitive style and interpersonal skill.

Using the engineering and psychological qualities, the operator activity component of the fire and rescue department member is accounted; this activity is developed during the work with the control box of the technical means, control and measuring devices, etc. The engineering and psychological group includes the quality of condition of the musculoskeletal system and its characteristics.

The condition of the musculoskeletal system is determined by the following characteristics: coordination of movements, quickness of motor response, accuracy of motor response and tremor. The insufficient level of development of the said characteristics can lead to the partial and sometimes complete incapability to act.

The primary evaluation of the level of development of the considered PIQ and their characteristics is performed at the stage of recruiting FRD members within the framework of psychological selection. However, the considered PIQ shall be constantly developed and improved during the service. Systematic trainings using simulators, simulator complexes, etc., where the conditions accompanying the fires and accidents are simulated, are necessary for the development and maintaining of the high degree of general physical capability and formation of the professionally important skills. The application of simulators allows forming the required skills and knowledges of FRD members, as well as improving the mastership during the competitions and trainings.

III. METHODS

The Federal Law No. 151-FZ regulates the issues of the obligatory professional training of FRD members [2].

The experience shows that the optimal results of training are reached using the specialized simulator complex instead of separate simulators [3]. The advantage of the complex approach to the training system is the use of special technical means of training – simulators that provide the possibility of the maximal approaching of the educational process to the real conditions, simulation of almost all emergency situations and their multiple repetitions.

The tasks, which require the designing of a simulator complex are as follows:

- adaptation of a man to the work in various conditions of emergency situations;
- development of skills of movement and overcoming of obstacles;
- training to work in the constraint environment and closed space;

- development of skills of using tools, devices, machines, mechanisms, apparatus, protection means;
- development of skills of interaction during group works;
- development of skills of search for injured people, their unblocking, rescuing, determination of the condition, first aid treatment, transportation;
- training to work at height.

Upon completion of training according to the training programs for rescuers of the EMERCOM of Russia and practicing their skills on the simulator complexes, FRD members shall possess such qualities as:

- capability to perform monotonous work for a long time at heavy physical and emotional loads;
- capability to move fast in different conditions and also in case of real and potential danger;
- capability to choose independently the optimal rate of work, compare it with the rate of work of the other rescuers, devices and equipment;
- capability to accept and process information quickly in the conditions of poor visibility, sound noise, sudden changes of lighting, dust content, smoke content and other distractions;
- capability to evaluate and distinguish the rate and direction of the objects movement;
- capability to react adequately to the sudden danger;
- capability to observe several objects or their parts simultaneously;
- capability to stand the short significant physical and nervous-emotional overloads, to shift attention quickly, readiness to accept new loads;
- capability to compare their forces with the expected work;
- capability to act quickly and accurately and maintain the stability of motor responses under impact of the extreme factors, under conditions of the time deficit;
- capability to coordinate one's activity with the work of the other rescuers;
- ability to perform works safely, etc. [4].

Basing upon the above said, it means that a simulator complex shall include the following working areas:

- 1) the area of skill training of RSO in the conditions of the anthropogenic debris;
- 2) the area of skill training of operation of hydraulic rescue instrument;
- 3) the area of skill training of RSO at height;
- 4) the area of skill training of movement along the mountain relief (bouldering, crossing, areas for taking of the injured down and up);
- 5) the area of skill training of direct deployment from the helicopter (site imitating the exit from the helicopter MI-8) [4].

Taking into account the modern requirements to improving the efficiency of FRD, the management of the EMERCOM of Russia pays special attention to improving the training of students of the higher educational institutions of the EMERCOME of Russia.

According to the state assignment, there is a transfer from the "specialist's degree" to the "bachelor degree" and this makes increased requirements to the level of the practical preparation of students of the educational institutions of the State Fire Service of the EMERCOM of Russia [5], [6]. Only the introduction of innovation methods of education into the educational process, based on simulator complexes simulating the extreme conditions of the execution of professional and applied tasks by a FRD member, will allow forming the required competences of the students, such as:

- capability to use the methods and means of physical training to provide the complete social and professional activity;
- capability to act in nonstandard situations, to bear the social and ethic responsibility for decision-making;
- capability to use the first aid techniques, protection methods in the emergency situations.

IV. RESULTS

During the practical lessons on the simulator complex simulating the extreme conditions of execution of professional and applied tasks, students develop the right skill in the activity management, the certain principles of professional consciousness. First, the motor skills and psychological principles are formed, that are different from tourism and sport. The main focus is made upon the solution of the task quickly and efficiently using the available set of technical means maximally safely for the FRD member as well as for the injured person. The evaluation of the result of such work will be faster from the position of the quality and professionalism.

The well-known postulate says "In a critical situation the fighter will be not at the level of his knowledge, but at the level of his preparedness" – therefore, many motor skills shall be matrixed into muscle memory and this will enable the rescuer not to be lost in stress situations and execute the work correctly and exactly. Regarding the work at height, these skills will include: the order of preparation of the munition and outfit, work with the special equipment, first aid treatment and transportation of the injured people.

V. CONCLUSION

Thus, the training of the students of the Saint Petersburg University of State Fire Service of EMERCOM of Russia and the FRD members of the EMERCOM of Russia on the simulator complex simulating the extreme conditions of execution of professional and applied tasks will improve significantly the efficiency of training within the limited training time and allow forming and developing the required PIQ that the FRD members of the EMERCOM of Russia shall possess.

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