

MODELING AND SIMULATION AS A WAY TO IMPROVE THE PRACTICAL COMPONENT OF SPECIALISTS IN THE FIELD OF CIVIL DEFENCE

Hubanova A., Rashkevich N.

National University of Civil Defence of Ukraine

E-mail: alina22gubanova@gmail.com, nine291085@gmail.com

The paper reveals the issues of the need to improve and introduce model and simulation complexes using innovative technologies in the educational and practical sphere of activity of private and commanding officers. Specialists in the field of civil defence must own and apply information technologies to solve the problems of timely warning and ensuring the elimination of emergency situations with the least number of dead and injured people, material damage.

A significant increase in natural and man-made threats requires an urgent review of conceptual approaches to improving the ability of the State Emergency Service to ensure the national security of Ukraine, the effective protection of our citizens and the state's economy.

Every year, about 300 emergencies occur in the country, 100 thousand fires at work, at home and in natural ecosystems. Every year, about 3,000 citizens die from the damaging factors of emergencies and fires, several thousand forest hectares, agricultural and steppe plantations are destroyed, and the human and budgetary resources of the state are critically depleted.

It is possible to qualitatively change the situation in the field of response to emergencies and fires only with the constant attention and support of specialists in this area.

Modeling and simulation techniques are used to improve the learning process, the work process and the quality of the work performed in emergency response.

Simulation and modeling are methods that allow you to build models that describe processes as they would actually take place. Such models can be "played" in time for both one test and a given set of them. In this case, the results will be determined by the random nature of the processes. Based on these data, fairly stable statistics can be obtained. Modeling is a research method in which the system under study is replaced by a model that describes the real system with sufficient accuracy and experiments are carried out with it in order to obtain information about this system. Experimenting with the model is expressed in understanding the essence of the phenomenon without resorting to experiments on a real object. This model can be used for experimentation on a computer in order to design, analyze and evaluate the functioning of an object. Simulation is used when:

- it is expensive or impossible to experiment on a real object;
- it is impossible to build an analytical model;
- it is necessary to simulate the behavior of the system in time.

The purpose of modeling is to reproduce the behavior of the system under study based on the results of the analysis of the most significant relationships between its elements, or in other words, to develop a simulator (simulation modeling) of the studied subject area for conducting various experiments. This type of modeling allows you to simulate the behavior of the system in time. Moreover, the advantage is that the time in the model can be controlled: slow down in the case of fast processes and speed up for modeling systems with slow variability. It is possible to imitate the behavior of those objects with which real experiments are expensive, impossible or dangerous.

An example of software systems that carry out the process of modeling and simulating emergency situations can be the developments presented by the National University of Civil Defence of Ukraine [1]:

- a software simulator for the formation of fire extinguishing management skills on the railway (this software simulator allows you to work out the skills of a fire extinguishing manager on the railway);

- a software simulator for the formation of fire extinguishing management skills in a shopping center (this software simulator allows you to work out the skills of the head of a structural unit for fire extinguishing management in a shopping center);

- educational and training computer system (network model) for the elimination of the consequences of natural emergencies (the network model of the educational software complex allows you to work out the skills of managing the elimination of a natural emergency) and others.

A striking example of the use of software in the educational process in the preparation of applicants for higher education (study of academic disciplines, writing qualification papers, optional and other practical activities, writing competitive papers) are the programs:

- PyroSim, which is designed to simulate the spread of fire hazards;

- Pthfinder, which is designed to simulate the evacuation of people in case of fire and others.

Thanks to these software systems, the practical component is developed.

The professional activity of specialists in the field of civil defence refers to dangerous, intense and difficult types of work, containing a significant risk to life and health. The influence is exerted by working conditions, features of official activity, the nature of the functions performed and other factors.

To minimize the influence of the above factors and work out the main points provided for by functional duties, it is necessary to carry out further development and subsequent use of software systems during educational activities, service training, advanced training courses, etc.

References

1. Національний університет цивільного захисту України. Центр навчально-інформаційних технологій та телекомунікаційних систем. URL: <https://nuczu.edu.ua/ukr/prohramni-trenazhery>.