PAPERS IN ENGLISH

SAFETY OF HUMAN ACTIVITY

DOI - 10.32743/UniTech.2023.110.5.15516

STUDY OF AN INTERACTIVE TRAINING SIMULATOR OF FIRE FIGHTERS-RESCUERS

Akramjon Nabiyev
PhD, Associate Professor,
Head of the Department of Life Safety
Namangan State University,
Republic of Uzbekistan, Namangan
E-mail: akramjonnabiyev1980@gmail.com

Sevara Sobitova
Student
of Namangan State University
Republic of Uzbekistan, Namangan
E-mail: sevarasobitova2003@gmail.com

Azimjon Botirjonov
Student
of Namangan State University
Republic of Uzbekistan, Namangan
E-mail: abotirjanov2002@gmail.com

ИЗУЧЕНИЕ ИНТЕРАКТИВНОГО ТРЕНИРОВОЧНОГО ТРЕНАЖЕРА ПОЖАРНЫХ-СПАСАТЕЛЕЙ

Набиев Акрамжон Ботиржонович
PhD, доцент,
зав. кафедрой безопасности жизнедеятельности,
Наманганский государственный университет,
Республика Узбекистан, г. Наманган

Собитова Севара Собиржон кизи
студент
Наманганского государственного университета,
Республика Узбекистан, г. Наманган

Ботиржонов Азимжон Азамжон угли
студент
Наманганского государственного университета,
Республика Узбекистан, г. Наманган

ABSTRACT

In this article, the newly opened "Simulation innovative training centers" in the educational and training institutions of the Ministry of Emergency Situations, Health and other ministries of the Republic of Uzbekistan, about some types of modern interactive simulators and simulators available in them, as well as the knowledge and skills of the personnel of firefighting and rescue structures. information about the interactive training simulator "MKP-02/OG", which is an effective training tool for development work. By using this simulator, it was found that the skills of the rescuers increased significantly, and the number of injuries in emergency situations was reduced by 22-24%.

Библиографическое описание: Nabiyev A., Sobitova S., Botirjonov A. STUDY OF AN INTERACTIVE TRAINING SIMULATOR OF FIRE FIGHTERS-RESCUERS // Universum: технические науки : электрон. научн. журн. 2023. 5(110). URL: *https://7universum.com/ru/tech/archive/item/15516*

АННОТАЦИЯ

В данной статье рассказывается о вновь открытых «Симуационных инновационных учебных центрах» в учебно-воспитательных учреждениях МЧС, Здравоохранения и других министерств Республики Узбекистан, о некоторых видах имеющихся в них современных интерактивных тренажеров и тренажёров. , а также знания и навыки личного состава пожарно-спасательных структур. сведения об интерактивном тренажере «МКП-02/ОГ», который является эффективным средством обучения для опытно-конструкторской работы. При использовании этого тренажера было установлено, что навыки спасателей значительно повысились, а количество травм в чрезвычайных ситуациях сократилось на 22-24%.

Keywords: emergency, fire, firefighter-rescue, structure, training, facilities, interactive, knowledge, skills, training tool, simulator.

Ключевые слова: чрезвычайная ситуация, пожар, пожарно-спасательный, структура, обучение, объекты, интерактив, знания, навыки, средство обучения, тренажер.

Introduction

In recent years, a lot of work has been done to develop the field of education in Uzbekistan on the basis of scientific and innovative ideas and technologies, therefore, great progress is being made in the field. Currently, along with many higher educational institutions of our country, modern information and communication technologies are widely used in educational institutions belonging to the Ministry of Emergency Situations of the Republic of Uzbekistan. In particular, various types of simulators and simulators are used in the educational environment of the Institute of Civil Protection under the Academy of Civil Defense of the Republic of Uzbekistan. This, in turn, is one of the main factors in improving the quality of education. One of the main reasons for using simulators and simulators is that they allow you to conduct virtual laboratory work without real equipment and supplies. The use of simulators provides an opportunity to research and study complex processes relatively quickly and without large costs, in safe conditions for human life and health. Therefore, modern interactive simulators and simulators are being used in the education system of the Ministry of Emergency Situations of the Republic of Uzbekistan.

Literature analysis

The Simulation Center of the Institute of Civil Protection under the Academy of the Ministry of Emergency Situations of the Republic of Uzbekistan has an earthquake simulation device, which is placed in a separate classroom. Also, the device creates an artificial earthquake based on a special electronic program. In this, students develop skills on how to move during an earthquake. This device was installed in 2015. The creation of the material and technical base of the simulation center was supported by the United Nations Development Program and the Department of the European Commission on Humanitarian Aid. Also, the Simulation Center has "Relaxation", "Island Ecology", "Vehicle Accident", "Fire Safety" and other similar simulation training rooms equipped with 3D interactive simulators. This will help the visitors to the center to understand more about the scope of various emergency situations and to develop the skills to act properly in them [1].

In recent years, "Simulation innovative training centers" have been opened as part of a number of medical institutions of higher education and treatment centers in Uzbekistan, which provide practical training, assessment of knowledge and skills of students, doctors, nurses and technical staff, development of unique clinical decision-making skills, as well as advanced foreign serves to implement experiments.

For example, in September 2018, a training-simulation center was established at the Andijan State Medical Institute, where adapted anesthesiology-resuscitation, surgery, obstetrics-gynecology, ophthalmology, otorhinolaryngology, therapy, pediatrics-neontology, anatomy and patient simulation rooms were organized. model medical equipment, equipped with necessary educational equipment [2]. In October 2021, as a result of mutual cooperation between Uzbekistan and the Republic of Korea, the Children's National Medical Center was established in Tashkent, which included the "KOICA Simulation Innovative Training Center". The training center has 1 conference hall, 3 laboratories, and the staff of the center improves their skills by testing various surgical procedures on dummies [3].

Research methodology

The article provides information on the interactive simulator of firefighters and rescuers, and discusses the rules for their effective use. All the capabilities of this simulator are also described. National and foreign experiences on proper movement during an emergency were studied and advanced foreign experiences were analyzed.

Analysis and results

In order to improve the firefighter-rescuer training system, taking into account the best practices of developed foreign countries and the features of emergency situations, to establish targeted measures to gradually provide training centers with modern simulators and simulators, and to accelerate the introduction of scientific approaches and advanced technologies in these directions as well. Some features of the interactive training simulator of the firefighter-rescuer "MKP-02/OG" developed abroad were studied, and it is proposed to gradually put it into practice in our country in accordance with local conditions.

Figure 1. "MKP-02/OG" model interactive training simulator

The MKP-02/OG firefighter-rescuer interactive training simulator is a special complex designed to develop and strengthen knowledge and skills in using a fire extinguisher. It is possible to gain knowledge and skills on how to act in the event of a fire and how to use a fire extinguisher (ognetushitel). This simulator can be used to train cadets of special educational institutions, as well as to improve the training of personnel of firefighting and rescue structures.

Technical characteristics

The MKP-02/OG interactive training simulator of the firefighter-rescuer is a single complex consisting of a rack with a projection screen and a stand equipped with equipment, including a wireless control panel and a wireless keyboard controlled by the instructor (operator). In the body of the training simulator there are also various types of fire extinguishers, a prector and a computer unit with an acoustic system.

Complex opportunities

The firefighter-rescuer interactive simulator provides a simulated model of a real fire situation during training. During training, the electronic program simulates the sounds of the surrounding fire, including the noise of fire, wind, damage and fractures. When the fire extinguisher - the rescuer works directly, the system imitates (imitates) the sounds of the fire extinguisher, the jet hitting the fire, hissing and all other components of the real situation. Such virtual voice support is designed to bring the training as close as possible to the conditions of the real situation, and provides an opportunity to psychologically prepare the specialist for emergency situations. The complex has a special image projection system on a large screen, which creates a virtual environment for training. The screen is large enough (180 x 180 cm) in size, so that the student is as tightly occupied with the visual image as possible without distracting his attention to extraneous things.

An image is projected on the screen using a special projector controlled by the training program. In order to bring the situation as close to reality as possible , the program was specially developed as a training material. A certain room with objects inside is visible on the screen, and in some places there are fire and smoke sources. Depending on the actions of the learner, the spray stream of the fire extinguisher (ognetushitel) is visible on the screen, the fire either decreases or increases, the area of burning and smoke changes. The display on the screen looks convincing enough to make one feel psychologically close to the real job of putting out a fire. All this, as mentioned above, is accompanied by a special voice track that is fully synchronized to the display on the screen.

Firefighter - rescuer interactive trainer software

If necessary, the system can be activated in test mode — this means watching special videos on fire safety, as well as checking the student's knowledge later. The video contains all the necessary information about the basics of fire extinguishing, identifying the sources of fire, localizing the fire, turning off this or that device, and more. If you put the system into practice mode, the software gives you the opportunity to familiarize yourself with the details of the scenarios, as well as to distribute these scenarios using a special menu. Firefighter simulator software allows you to prepare and edit test questions and answers. At any time, you can change the set of test tasks, as well as update them if necessary.

The peculiarity of the system is that it depends on the innovations in the current legislation, including the regulations specific to the firefighter-rescuer. Thus, it will be possible to change the test tasks at each change of legal documents.

Components and principle of operation

The MKP-02/OG interactive simulator of the firefighter-rescuer includes OVE, OVP, OP(D), OP(AVSE), OU, OX fire extinguishers with a capacity of 4-5 liters . These are not real options, but models — the nozzle of each of them is equipped with a special sensor that determines the distance to the sonar. Sonar is a transmitter that sends signals to the environment, which serves as a "fireplace". The system also has a marker that detects when the "fire extinguisher spray jet hits" the "fire" directly. The marker is a laser beam that determines the level of signal hitting the sensor.

Marker and sensor (sensor) work separately from each other. Communication between them is provided by a Wi-Fi module. In the same way, the elements are connected to the computer control unit. Communication is reliable and accurate thanks to the powerful transmitter-conductor.

The simulator fire extinguishers in the interactive simulator are models equipped with similar sensors. Each of them not only looks like a real analogue, but also has the same application elements. In other words, simulator fire extinguishers are exact replicas of real fire extinguishers. They weigh the same as real fire extinguishers. The principles of use are similar, as are the controls:

- the handle of the stop and start device;
- retaining ring;
- special nozzle.

The MKP-02/OG interactive firefighter-rescuer trainer is equipped with simulator fire extinguishers, which are stored in separate compartments on a special shelf. A training rack looks like a typical storage area for firefighting equipment. It is equipped with a convenient transport system, which allows you to easily move the entire head unit during training.

A trainer work with a fire extinguisher?

The fire extinguisher simulator system works based on programmable scenarios. The main role in the scenarios is played by the levels of fires, which are set by software for the need to extinguish. There are many levels of fires (A, A1, A2, B, B1... D, E, etc.), scenarios and programming elements are also sufficient.

As for the tasks in the execution of the scenarios, they mean the assessment of the fire level, the correct actions with the fire extinguisher, as well as the full control of the developing situation in the "object".

The sequence of actions of a trainee in a simulator with a fire extinguisher

The simulator is designed in such a way that the scenario requires the listener to follow the usual rules of fire detection. Actions should be as follows:

- notify the "101" or "1050" service about the incident (the system is designed to respond to the dispatcher, including all possible question-and-answer options);
- close the special tap of natural gas supply;
- turn off the electricity supply in the specified place;
- further actions to eliminate the fire.

The system works by receiving a signal from a sensor (from a laser marker) and then displays it on a computer. Thus, the system determines the location point of the fire extinguisher in relation to the "fire".

The process of using the fire extinguisher (pressing the spray button) is also recorded and transmitted via radio channel to the computer, where the type of means used and the indicators of "extinguishing" the fire are visible. Thus, the system determines the degree of effective use of fire extinguishers by the learner.

The "MKP-02/OG" interactive trainer system analyzes the test parameters by itself without human intervention, assigns a "satisfactory" or "unsatisfactory" rating and presents these results to the learner.

References:

1. Law of the Republic of Uzbekistan dated August 20, 1999 "On protection of population and territories from natural and man-made emergency situations".
2. Law of the Republic of Uzbekistan dated September 28, 2006 "On industrial safety of hazardous production facilities".
3. Abidova F.A., Abidov A.B. "Characteristics of potent toxic substances". - UzR FVV FMI: 2013. - 530 p.
4. Sevastyuk T.V. "Silnodeystvuyushchie yadovytie veshchestva i zashchita ot nix". - M.: Voenizdat, 1989.
5. Turagalov T.J., Ilyasova Z.F. "Emergencies". (short Russian-Uzbek encyclopedic annotated dictionary). - T.: FMI. 2016 - 220 p.
6. Sharipov A.Kh. "Storage of highly toxic substances in a chemically hazardous facility and in rail transport", methodical guide. Tashkent Institute of Railway Engineers, 2010. - 23b.
7. Akramov Kxusniddin Muxitdinovich, and Shokhrukh Bakhodirjonovich Mamadboev. "Fire resistant properties of construction structure." Asian Journal of Multidimensional Research (AJMR) 9.5 (2020): 415-419.
8. Кадиров У.Б., Исмоилов С.Ж., & Мамадбоев Ш.Б. ОСНОВЫ МОНИТОРИНГА ТЕХНОГЕННЫХ ОПАСНОСТЕЙ В ОПАСНЫХ ПРОИЗВОДСТВЕННЫХ ОБЪЕКТАХ.
9. Курбонов А.Ж., & Мамадбоев Ш.Б. СЕЙСМОЛОГИК КЎРСАТГИЧЛАРНИ МОНИТОРИНГ ВА ПРОГНОЗ ҚИЛИШДАГИ ВАЗИФАЛАР. ЎЗБЕКИСТОН РЕСПУБЛИКАСИ ФАВҚУЛОДДА ВАЗИЯТЛАР ВАЗИРЛИГИ АКАДЕМИЯСИ, 89.
10. Эргашев О.К., Эгамбердиев А.А. У., Хамдамов А.М., & Маллабаев О.Т. (2022). ИССЛЕДОВАНИЕ ПРОЦЕССА СУБЛИМАЦИОННОЙ СУШКИ ПЛОДОВ СЛИВЫ. Universum: технические науки, (12-4 (105)), 22-25.
11. Oybek E., Azizbek E., & Mirazam M. (2023). STUDY OF ENERGY AND RESOURCE EFFICIENCY OF SUBLIMATION DRYING OF FRUITS AND VEGETABLES. Universum: технические науки, (3-5 (108)), 15-18.