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Erasmus+ CBHE Project:
CREATING THE NETWORK OF KNOWLEDGE LABS
FOR SUSTAINABLE AND RESILIENT ENVIRONMENTS
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WB Institution: **Higher technical professional school in Zvecan [HTPSZ]**

Formation of centre for sustainable and resilient environments

Center for training and fire protection services

SPECIALIZED LABORATORY
Center for training and fire protection services

Location of laboratory: HigherTechnical Professional School Zvecan

Courses: Fire dynamics, Inspection and maintenance of fire protection systems, Design and maintenance of fire alarm systems, Stationary fire protection equipment, Firefighting basics, Fire alarm systems, Mobile fire extinguishing equipment.

The center for training and fire protection services is composed of two separate units:

- Specialized classroom for fire alarm system simulation

Laboratory for inspection and testing of mobile fire extinguishers and hydrant networktesting and maintenance

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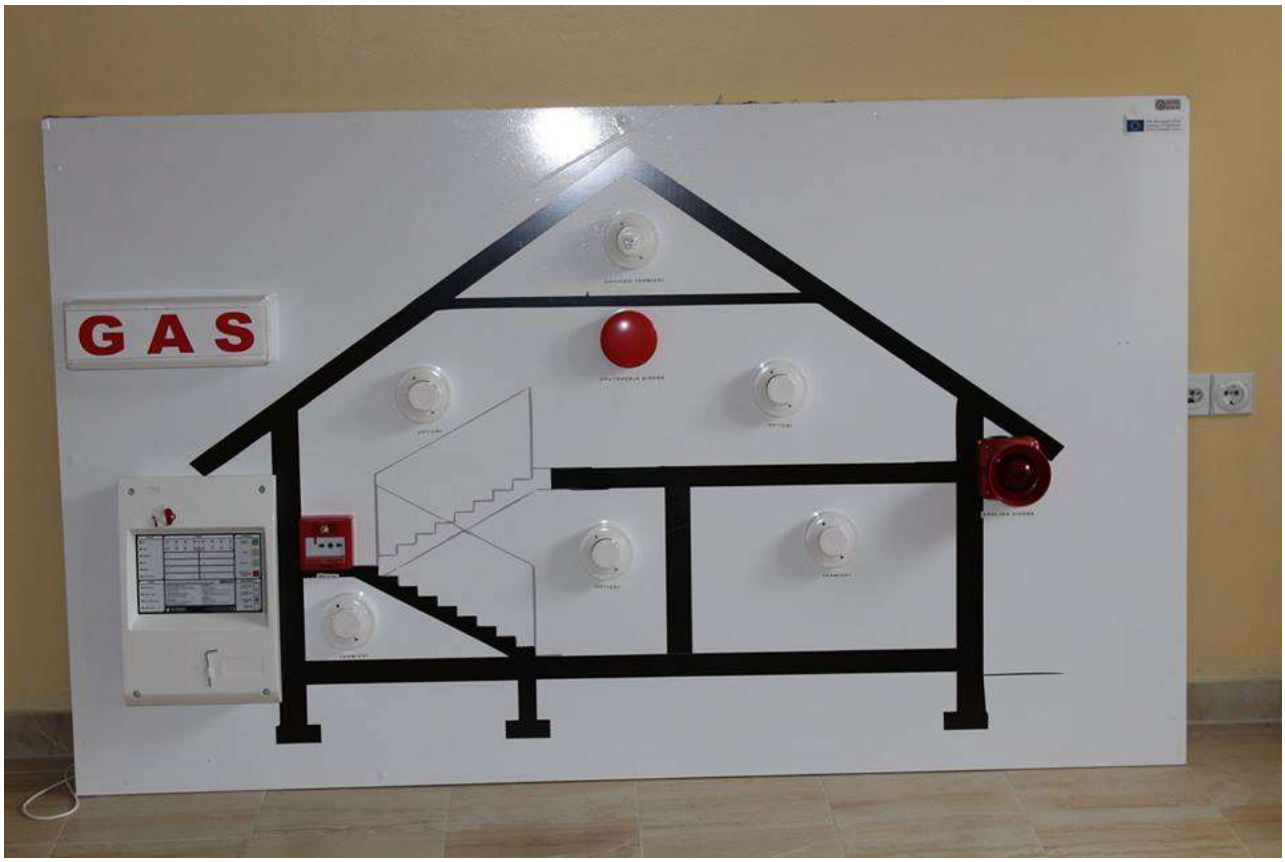
A specialized classroom for fire alarm system simulationis a room with installed model of fire detection and alarm system that can simulate an alarm and fire alarm system. The classroom shall be used by students.

The specialized classroom has a control panel with installed:

- A signaling center with various types of fire detectors.



1. A stable fire alarm system must be designed and installedso that proper selection, number and distribution of the fire alarms allows the signaling of fire at the earliest possible stage, with sufficient security to prevent false alerts.

Automatic fire detectors, according to the principle of operation, are divided into:
a) thermal detectors that react to temperature increase;
b) smoke detectors, which react to combustion products and / or particles floating in the atmosphere, the diameter of which varies from 10 km (visible smoke) to 1 km (invisible smoke);

- ionizing smoke detectors, which react to combustion products that affect the ionizing currents in the radioactive chamber of the detector;
- optical smoke detectors that respond to combustion products that lead to absorption or disperse of light in the infrared, visible and / or ultraviolet range of the electromagnetic spectrum;

c) gas detectors that react to gaseous combustion products and / or heat dissipation products;
d) flame detectors that react to the emitted radiation from the flame.

The following detectorshave been placed in the laboratory:

	Optical detector
	Thermal detector

	Optical-thermal detector
	Manual detector

A signaling center gets fire data from the connected detectors and includes audible and light signals, thus, determining the location of danger. The signaling center transmits information on fire through a remote signaling device to the fire service and / or turns the extinguishers through an automatic fire alarm control unit. The signaling center continuously controls the proper operation of a stable fire alarm system and provides audible and light warning signals for any malfunction. The audible alarm signal (alarm) must be different from the noise signal for malfunction.

The signaling centerhas to be comprised of:
1) alarm indicator (red);
2) alarm zone indicator (red);
3) malfunction indicator (yellow or white);
4) turn on- status indicator (green);
5) turn off -status indicator of alarm zone or part of a fire alarm system (yellow color);
6) power supply indicator from backup source (green);
7) function controldevice.

The ORION center, produced by Global, is located in the laboratory

File alarm center

According tocurriculum and laboratory programs, students ofundergraduate (basic) and specialist studies,as well as others interested, will be able to practically learn on the model of the fire alarm system installed in a specialized classroom about the basics of fire alarm designing and installation, which can be used in theory or practice in the design of specific preventive protection systems in buildings.

Laboratory for inspection and testing of mobile fire extinguishers is a functional block containing equipment for inspection and testing of mobile fire extinguishing equipment.

It contains the following equipment:

1. A device for transport of powdery substances (a device for discharging and charging a powder-type Fire Extinguisher) type "C" with powder;
2. Combined system-device for maintenance and testing of type S and CO_2type FE devices, as well as testing hydrant hoses on CWP (cold water pressure) of all types
3. Caps for bottle inspection of FE devices type S and $CO_2$and hydrant hose
4. Pressure gauges for FE device, type S, that is under constant pressure
5. Combined system for the transfer of $CO_2$from the packaging bottle into the bottles of CO_2,as well as bottling of the CO_2-type FE devices with CO_2.
6. Manual clampwith folding spindles, exchangeable packs and built-in bottle holder for disassembling andinstallation;
7. Set of keys for unscrewing all types of valves;
8. Digital scale

Equipment	Photo
Device for transport of powder substances (a device for "S" type FE discharging and filling with powder)	
Combined system-device for FE devices maintenance and testing of types S and CO_2, as well as testing hydrant hoses on CWP (cold water pressure) of all types	

Caps for bottle inspectionof FE devices type S and CO_2 and hydrant hose	
Pressure gauges for FE device, type S that is under constant pressure	
Combined system for the transfer of CO_2 from the packaging bottle into the bottles of CO_2, as well as bottling of the CO_2-type FE devices with CO_2	

Digital scale		

Manual clampwith folding spindles, exchangeable packs, built-in bottle holder for disassembling (unscrewing) and installation (screwing) of device valve $CO_2$of 1.5 - 50 kg and caps of all “S” device types	
Set of keys for unscrewing all types of valves	

Combined system for transfer of CO_2 from the packaging bottle into the CO2 bottles, as well as bottling of CO_2 type FE devices with CO_2, is a charging and transfer device for CO_2, for “S” type of FEdevices of various types and manufacturers. With a movable tensioner, the device provides slots for wide variety of bottles of different lengths. It consists of:

- Connections for charging all sorts and types of bottles
- Built-in safety protector.

The characteristics of this appliance, its rigid construction, ensure safe and secured operation. The device provides tight clamping and tightening of the nuts on the bottle neck and its sealing.

Charging gauges of the S-type FE device that are under constant pressure are used to charge powder into FE devices that are under constant pressure.

Combined system-device for maintenance and testing of type S and CO_2 FE devices, as well as testing hydrant hoses on CWP (cold water pressure) of all types has electric piston pump for testing on hvp CO2 bottles up to 400/600 bars, which also contains a valve for testing FEdevices of type CO2 on cold water pressure (CWP).
The device works independently, and can be connected to a ramp to test several devices at the same time.

Accessories:
- supply hose with connections
- drain hose V2 (high pressure) with adequate connections.

There is a possibility to install contacting manometer.

It is used for testing FE-device of type CO_2on cold water pressure (CWP). The device works independently, and can be connected to a ramp to test several devices at the same time.
The device can be used to test ripping - raptures.

Accessories:
- supply hose with connections
- drain hose V2 (high pressure) with adequate connections

which has a separate power supply system.

A device for transport of powder substances (a device for FE discharging and filling with "S" type powder) is used for a workshop or on-site maintenance and transport of powder materials. This device can fill with powder and emptyFE- devices "S" type and has a built-in reversible filter cleaning device, and there is also a variant of the filler with electric height adjustment.

Manual clampis used for disassembling and installation of the CO_2devicesvalve from 1.5 to 50kg, as well as the cap of all types of "S" devices. The clamp can tighten the bottles from Ø140 to Ø270 mm. As an auxiliary tool with a manual clamp, there is also a set of keys for unscrewing all types of valves.

Digital scale is used to measure mobile devices after maintenance.

In the center, students of undergraduate and specialist professional studies will be able to practically apply the knowledge acquired according to the curriculum and courses in this field and they will be trained to work in specialized institutions in the field of fire protection.

The Center for Training and Fire Protection Services could provide quality services to third parties in the field of design and services in the field of fire protection, such as:

1. **Drafting of normative acts**

- the Master fire protection project
- fire protection plans
- preparation of a sanitary plan for fire protection
- elaboration of fire protection rules with evacuation plans
- creation of graphic representations of evacuation plans
- development of a basic training program in the field of fire protection
- basic training of employees with a fire safety test

2. **Maintenance and testing**
   - Regular (six month) maintenance of all kinds of fire extinguishers
   - Testing on CWP (cold water pressure) of all sorts and types of fire extinguishers
   - Measurement of flow capacity, operating and static pressure on Hydrants

1. **Equipment specification**

O. No	**Name**	**Unit**	**quantity**
Laboratory for inspection and testing of mobile fire extinguishers			
1.	Device for transport of powder substances (a device for "S" type of FE discharging and filling with powder)	piece	1
2.	Combined system-device for FE devices maintenance and testing of type S and CO2, as well as testing hydrant hoses on CWP (cold water pressure) of all sorts and types	piece	1
3.	Caps for bottle examination of FE devices type S and **CO_2** and hydrant hose	piece	8
4.	Pressure gauges for filling FE device, type S, that is under constant pressure	piece	1
5.	Combined system for the transfer of CO_2 from the packaging bottle into the bottles of CO_2, as well as bottling of the CO_2-type FE devices with CO_2	piece	1
6.	Manual clamp with folding spindles, exchangeable packs, built-in bottle holder for disassemblingand installation	piece	1
7.	Set of keys for unscrewing all types of valves	piece	9
8.	Digital scale	piece	1
A specialized classroom for fire alarm system simulation			
1.	Fire Alarm Center with accessories **GLOBAL**	piece	1
2.	Optical detector	piece	2
3.	Thermal detector	piece	2
4.	Optical-thermal detector	piece	2
5.	Manual detector	piece	1
6.	Out-door siren	piece	1
7.	In-door siren	piece	1