Co-funded by the European Union

Project: Let's cooperate!

No: 2024-1-PL01-KA210-VET-000256641

Course programme: “Lift Equipment Installer and Service Technician”

Duration: 70 teaching hours

1. Programme characteristics

The course curriculum provides knowledge and practical skills in the assembly, commissioning and maintenance of lifting equipment in accordance with health and safety standards and regulations. The programme is a simplified version of the qualification for the profession of "Lift Equipment Installer and Service Technician" and requires prior technical preparation in the following areas:

1. Technical drawing
2. Basics of electrical engineering and electronics
3. Basics of mechanics
4. Basics of automation

The required knowledge is tested by an initial online test on the Google Forms platform containing 160 questions. To participate in the course, you must obtain 120 points, which is 75% of positive answers.

The programme content is delivered in the form of theoretical and practical classes, which end with an exam. The final exam is designed to confirm the knowledge and skills acquired. After completing the training and passing the exam, the student receives a certificate confirming the competences acquired.

Duration: 70 teaching hours.

2. Programme objectives

In recent years, our country has seen dynamic growth in the lift equipment industry. Currently, there are over 110,000 passenger and freight/passenger lifts installed in Poland, and this number is constantly growing. Every year, the Technical Inspection Authority registers several thousand new devices, mainly electric-powered, while a significant proportion of the devices currently in use require replacement, modernisation or adaptation to current safety regulations, requirements, standards and regulations, as well as accessibility for people with disabilities.

This creates a demand for specialists qualified in the installation, commissioning and maintenance of lift equipment.

The conditions for placing new lift equipment on the market are regulated by the following directives: Lift Directive 95/16/EC and Machinery Directive 2006/46/EC.

The conditions for the operation of material handling equipment, including lifts in Poland, are regulated by the Regulation of the Minister of Economy, Labour and Social Policy of 29 October 2003 (Journal of Laws of 2003, No. 193, item 1890). Among other things, it specifies the forms of technical supervision and the dates of periodic inspections, as well as the dates of maintenance inspections.

3. List of main course modules

- Health and safety at work for lift installers and maintenance technicians.
- Characteristics of lift equipment
- Mechanical installation of lift equipment
- Electrical installation of lift equipment
- Theoretical and practical exam

Lp.	Tematyka	Ilość godz.
I	**Health and safety at work for the position of "Lift Equipment Installer and Service Technician"**	**3**
1	Characteristics of safety hazards when performing tasks related to the installation and maintenance of lifting equipment	1

2	Safety rules at work	1
3	First aid in accidents involving, among other things, electric shock, falls from height, crushing, etc.	1
II	**Characteristics of lifting equipment**	**37**
1.	Classification and identification of lifting equipment	1
2.	Parameters of lifting equipment	1
3.	Standards for lifting equipment	1
4.	Technical documentation for lifting equipment	2
5.	Mechanical components of lifting equipment and their purpose	2
6.	Equipment components for lifting equipment	1
7.	Components of electrically powered lifts	1
8.	Electrical components of lifting equipment	1
9.	Electric drive units	1
10.	Power supply and safety systems for lifting equipment	2
11.	Contactor-relay control systems	1
12.	Microprocessor control systems	1
13.	Electrical circuits of lifting equipment	1
14.	Electronic circuits of lifting equipment	1
15.	Installation of power supply, safety, control and regulation systems for lifting equipment.	2
16.	Rules and conditions for the assembly and disassembly of lifting equipment	4
17.	Tools and measuring instruments used for the assembly and disassembly of lifting equipment	1
18.	Working with technical documentation, assembly instructions and operating instructions	2

19.	Checking the technical condition of lifting equipment	3
20.	Periodic inspections and technical testing of lifting equipment	3
21.	Maintenance inspections of lifting equipment	3
22.	Diagnosing and repairing the most common failures and faults	2
III	**Mechanical installation of lifting equipment**	**12**
1.	Health and safety rules during the installation of mechanical parts of lifting equipment	2
2.	Assessment of the conformity of the installation site with the technical documentation	2
3.	Installation of mechanical components of the shaft equipment	2
4.	Installation of mechanical components of the machine room equipment	2
5.	Installation of cabin components	2
6.	Installation of lifting ropes and belts	2
IV	**Electrical installation of lifting equipment**	**14**
1.	Health and safety rules during the installation of electrical components	2
2.	Analysis of electrical connection diagrams for lifting equipment	2
3.	Installation of power supply and safety systems for lifting equipment	2
4.	Installation of control and regulation systems for lifting equipment	2
5.	Installation of safety circuits for lifting equipment	2
6.	Installation of contactor-relay control systems for lifting equipment	2
7.	Installation of speed control systems for lifting equipment	2
V	**Theoretical and practical exam**	**4**

4. Programme requirements

After completing the course, participants will be able to:

- comply with health and safety, fire and electric shock protection, environmental protection and ergonomic requirements,
- use technical documentation for lifting equipment during installation,
- organise the installation site for lifting equipment,
- select tools for the installation and maintenance of lifting equipment,
- install mechanical and electrical components of lifting equipment*,
- install power supply, safety, control and regulation systems for lifting equipment*,
- perform activities related to the commissioning and putting into operation of lifting equipment*,
- start up systems used to control lifting equipment*,
- assess the technical condition of lifting equipment on the basis of maintenance inspections,
- locate and remove faults and replace damaged parts and components of lifting equipment,
- adjust the technical parameters of lifting equipment,
- perform electrical measurements,

* under the supervision of and in cooperation with a person qualified and experienced in the work of a lift installer/maintenance technician,

5. Teaching methods

All classes will consist of a theoretical introduction and a practical part. It is recommended to use informative, expository and problem-based methods for theoretical classes, such as:

- informative lecture,
- demonstration with explanation,
- problem-based lecture,
- educational film,
- educational discussion,
- brainstorming.

For the practical part, practical and problem-based methods are recommended, including:

- demonstration with instruction,
- subject-specific exercises,

- project method,
- guiding text method.

Problem-based learning with a particular focus on activating methods also works very well in vocational education:

- case method,
- situational method

6. Teaching aids

Educational classes should be conducted in a laboratory equipped with a computer station for the teacher and a multimedia projector, measuring stations equipped with laboratory tables, powered by 230/400V alternating current and 24V or 48V direct current, protected by electric shock protection, equipped with: emergency switches and a central emergency switch, as well as elements of lifting equipment, an example model of lifting equipment with access to individual systems and circuits, electrical wires and cables, connectors, contactors, tools, measuring instruments, teaching models, industry catalogues, industry magazines, diagrams, demonstration systems, guiding texts, educational films and multimedia presentations on lifting equipment, illustrative charts, sets of tasks and exercises.

7. Organisational forms

Classes should be conducted using a variety of organisational forms. It is important to individualise the work of students. In order to adapt to the abilities and needs of students in terms of methods, means and forms of vocational education, teachers should:

- adjust the difficulty level of planned exercises to the abilities and needs of students,
- prepare topics of varying degrees of difficulty and complexity,
- encourage students to use various sources of information,
- motivate students to work during classes.

8. Evaluation of acquired knowledge

t is recommended to use mainly qualitative methods (interviews, observation, document analysis), an important element of which is the assessment of the correctness of task performance. During the evaluation process, multiple research methods should be used. When using qualitative methods (interviews, observation, document analysis), it is important to assess the correctness of the task performance. This allows the data and information obtained using one or more methods to be extended and elaborated upon, and, importantly, promotes objectivity. In carrying out the assessment process for practical teaching departments, it is recommended to use mainly qualitative methods (interviews, observation) and, to a lesser extent, quantitative methods (surveys). The trainer should evaluate the teaching materials available: tools for electrical installation, control elements for lifting equipment, installation switches, control boxes, contactors, relays, safety switches, magnetic and optical sensors, signalling elements, three-phase induction motors, three-phase induction motors with DC electromagnetic brakes, sets of tools for manual processing and mechanical assembly, measuring instruments for mechanical quantities, mechanical lift components, speed governors, shanks, instructions and work cards, or available workshop equipment, with particular emphasis on technological development and progress in the lift industry.Due to the dynamic nature of these changes, self-assessment is essential for the subsequent evaluation of the relevance of the knowledge imparted to the student. The key skills to be evaluated within the course include:

1) application of health and safety rules,
2) knowledge of electric shock and fire protection
3) providing first aid in emergency health situations.

4) preparing the workplace in accordance with safety rules,
5) using technical documentation,
6) selecting tools for assembly work,
7) organising the mechanical assembly of lifting equipment,
8) performing the mechanical assembly of lifting equipment
9) organising the electrical assembly of lifting equipment,
10) performing the electrical assembly of lifting equipment
11) performing mechanical and electrical connections of measuring systems,
12) performing the assembly of safety systems,
13) performing measurements in electrical and electronic systems
14) starting up control systems
15) performing maintenance on electrically driven lifting equipment
16) checking the technical condition of maintained lifting equipment,
17) locating and removing faults in maintained lifting equipment,
18) replacing consumable parts of lifting equipment

9. Recommended literature

1. Buczek K., Obsługa dźwigów, Wydawnictwo i Handel Książkami KaBe s.c., Krosno, 2007.
2. Chimiak M., Konserwacja dźwigów elektrycznych, Wydawnictwo i Handel Książkami KaBe s.c., Krosno, 2008.
3. Kwaśniewski J., Dźwigi osobowe i towarowe, budowa i eksploatacja, wyd. AGH, Kraków 2006.
4. Praca zbiorowa pod redakcją M. Szymańskiego, Dźwigi elektryczne. Podstawy budowy, zasada działania, wyd. PSPD, Warszawa 2020

Industry magazines:

1.”Dźwig” magazine, wyd. EWIT, Radom