

Professional Education and Licensing of Specialists in Elevator Installation, Maintenance, and Repair

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Abstract

The article examines the system of professional education and training of specialists in elevator installation, maintenance, and repair in Bulgaria, with a focus on the acquisition of professional licensing in accordance with the current regulatory framework. It outlines the structure of professional education, opportunities for training in the specialty Electrical equipment of lifting and elevator systems, and the requirements of Ordinance № 3 of 2001 for obtaining the respective degrees of licensing. Factors influencing the attractiveness of the profession and the formation of a sufficient number of qualified professionals for the elevator industry are analysed. The conclusion emphasizes the importance of cooperation between educational institutions, the state, and industry in ensuring the reliability and safety of elevator operation.

Keywords

professional education, licensing, elevators, technicians, qualification, standardisation, safety

1. Introduction

In recent decades, the intensified construction of modern commercial, business, and residential buildings in Bulgaria has led to a significant increase in the use of elevators as a primary means of vertical transportation of people and goods. Elevators are among the most widely used technical facilities in the modern urban environment, playing a vital role in providing everyday convenience and ensuring the efficient functioning of building infrastructure. At the same time, under Bulgarian law, elevators are classified as high-risk equipment, which requires their design, installation, commissioning, and maintenance to be carried out with a high level of technical competence and strict adherence to safety legislation and standards. According to data from the State agency for metrological and technical surveillance (SAMTS), 84,715 elevators are registered for technical supervision in Bulgaria, of which 74,960 are in operation [1]. The safety and reliability of these facilities largely depend on the training and qualifications of specialists responsible for their installation, operation, and repair. With the increase in newly constructed buildings, the demand for lifting equipment also rises, creating a need for a sufficient number of well-trained professionals capable of ensuring compliance with high safety standards. This necessity is further reinforced by dynamic labour market conditions and unfavourable demographic trends.

Elevators intended for the EU internal market must comply with safety and health protection requirements established in relevant EU directives and regulations. Harmonized standards play a key role in meeting elevator safety requirements. In-depth knowledge of both legislation and harmonized standards is essential not only for designers but also for those engaged in the installation, maintenance, and repair of elevators.

The present study addresses the following questions:

What are the specific requirements for obtaining a license to practice as an Elevator installation and maintenance technician?

What qualifications are required for individuals wishing to install, maintain, and repair elevators?

Is school-based education sufficient to practice the profession, or is additional training necessary?

What is the role of standards and legislation in the training of elevator industry specialists?

In cases where formal school education is not related to elevators, is retraining possible, and what documents grant the right to work on elevator?

2. Professional Education and Training of Specialists in Elevator Installation, Maintenance, and Repair in Bulgaria

2.1. Classification of School Education in Bulgaria. General Framework of Professional Education

The school education system in Bulgaria is structured into two main levels – primary and secondary education. Primary education is obtained from grade I to grade VII and consists of two stages: primary (grades I–IV) and lower secondary (grades V–VII). Secondary education covers grades VIII–XII and is likewise divided into two stages: the first upper secondary stage (grades VIII–X) and the second upper secondary stage (grades XI–XII) [2].

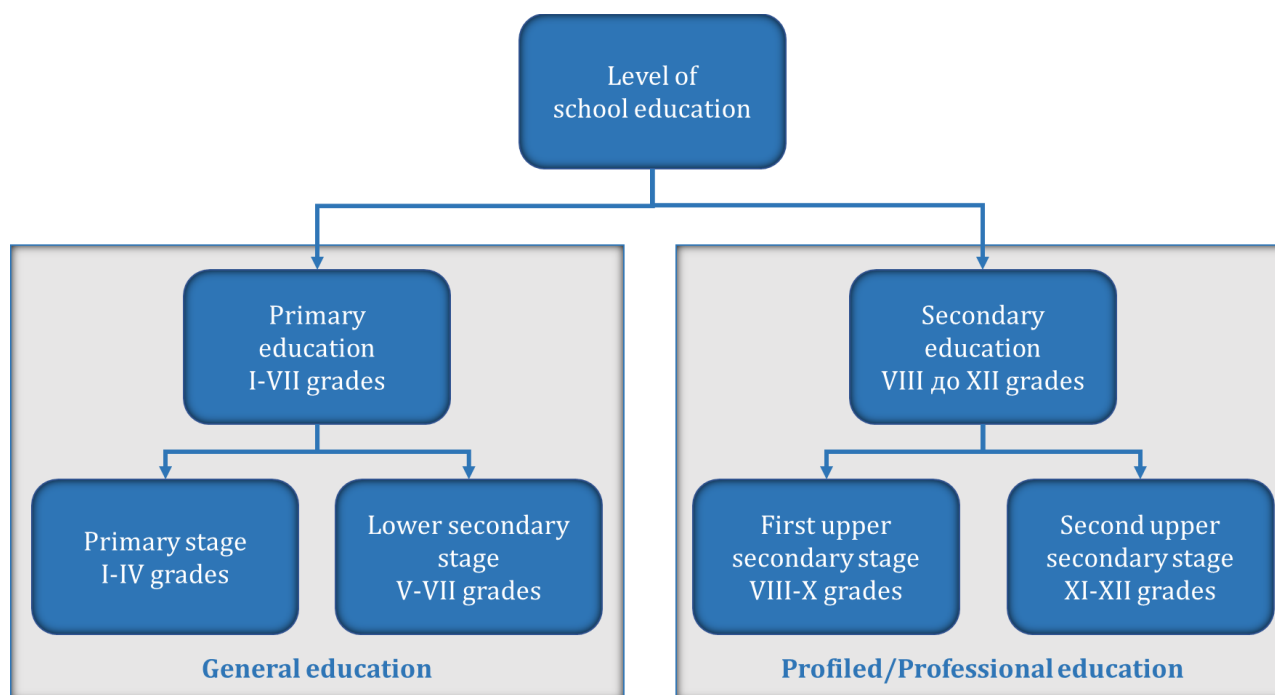


Fig. 1. Classification of school education in Bulgaria

Depending on the type of training, school education is divided into general, profiled, and professional.

- General education is mainly delivered at the primary level, providing basic knowledge and skills.
- Profiled education is characteristic of the secondary level, offering extended training in the first stage and specialized training in the second.
- Professional education – the focus of the present analysis – is also implemented at the secondary level, spanning both stages. It combines general and professional training and, where necessary, may be supplemented with extended training.

In terms of content, the curriculum can include general education, extended, profiled, professional, and supplementary training. General education is common to all schools and consists of the same subjects taught with an equal number of class hours. Extended training provides additional competencies that develop or deepen aspects of the general education curriculum, often in the form of elective subjects aligned with students' interests and the school's capacity. Profiled education offers advanced competencies within a specific profile, as determined by the state educational standard (SES) for profiled training. Profiles represent a set of specialized subjects, two of which are defined by the SES and the rest by the school. Profiles include foreign languages, humanities, mathematics, natural sciences, software and hardware sciences, fine arts, and others [2].

In the context of preparing personnel for the elevator industry, professional education occupies a central role, as the training related to elevator installation, maintenance, and repair is embedded within this educational pathway.

Professional education includes both general education subjects and professionally oriented disciplines aimed at the acquisition of specific competencies. The training is designed to provide

knowledge and skills leading to the attainment of professional qualification. It is multi-layered, comprising general, sectoral, specific, and extended professional foundations, and always combines theoretical instruction with practical training in the profession. A dual system of education (work-based learning) is also possible, under the conditions and procedures established by the Professional Education and Training Act.

2.2. Professional Education Related to the Elevator Industry

Secondary professional education in Bulgaria offers a wide range of specialties in the fields of Electrical engineering and energy and Mechanical engineering, metalworking, and metallurgy. However, only one specialty is directly oriented towards preparing personnel for the elevator industry – “Electrical equipment of lifting and elevator systems” (II level of professional qualification (LPQ) and III LPQ) [3]. This specialty is part of the following professions:

- Electrician-Fitter (second level of professional qualification – LPQ II)
- Electrical Technician (third level of professional qualification – LPQ III)

Ordinance № 15 of 8 July 2021 on acquiring a qualification in the profession “Electrician-fitter” [4] and Ordinance № 9 of 14 February 2023 on acquiring a qualification in the profession “Electrical technician” [5] define the state educational standard (SES) for the specialty “Electrical equipment of lifting and elevator systems”. Graduates of this specialty may be employed as Elevator technicians, but only under certain additional conditions:

- acquisition of a license pursuant to Ordinance № 3 of 2001 on the practice of the profession Elevator technician.
- acquisition of a qualification group in safety techniques, awarded in accordance with the Safety and health regulations for work on electrical installations up to 1000 V and the Safety and health regulations for work in electrical installations of power and district heating plants and electrical networks.

This demonstrates that a school diploma alone is not sufficient for employment in elevator installation, maintenance, and repair. It provides the foundation for subsequent training through licensing courses.

In addition to professional secondary schools, training in this specialty is also offered in Professional training centres (PTCs), which organize courses for individuals over 16 years of age, including adults with already completed secondary education. This form of training is particularly valuable, as it enables retraining, upskilling of the workforce, and the preparation of new specialists for the sector. Training in PTCs also combines theory and practice in compliance with state educational standards but offers more flexible pathways to labour market entry.

The importance of the specialty “Electrical equipment of lifting and elevator systems” has also been emphasized at the national level. In annual decrees of the Council of Ministers [6-13] from 2018 to the present, it has consistently been included both in the list of specialties with projected shortage of specialists and in the list of protected specialties receiving priority state support. This indicates the growing demand for trained professionals in this field and highlights the reasons behind the persistent shortage of qualified personnel. Contributing factors include emigration of skilled workers, aging of the workforce, low interest among students in the profession, the need for advanced technical knowledge and skills, the requirement for a high level of personal responsibility, and the significant risks inherent to the working environment.

Possible measures to address these factors include broader promotion of the profession among students; financial incentives such as scholarships; stronger partnerships between educational institutions and industry; expansion of dual training; and the provision of opportunities for further qualification and career development. The experience of several EU countries demonstrates that dual training, based on close cooperation between schools and employers, creates a sustainable environment for preparing specialists and facilitates the transition to the real work setting.

At the same time, the systematic updating of curricula to reflect contemporary technological advancements in the field would also contribute to enhancing the attractiveness of the profession and improving training quality. Within this process, safety training holds a particularly important place. Safety requirements should be presented not merely as abstract rules, but in their entirety – with

explicit reference to their origins in applicable legislation (e.g., Directive 2014/33/EU, the Law on technical requirements for products, the Law on healthy and safe working conditions) and in national and European standards (e.g., the BDS EN 81 series on elevator safety). In this way, trainees acquire not only practical skills but also an understanding of the legal and regulatory framework governing their work – knowledge that is vital both for personal development and for the elevator industry.

3. Acquisition of License for Practicing the Profession of "Elevator Installation, Maintenance, and Repair Technician" (Hereafter Referred to as "Elevator technician") and Training Content

3.1. Levels of License According to Ordinance №3 of 17 January 2001 and Requirements for Candidates' Admission to Training

Ordinance № 3 of 17 January 2001 on the conditions and procedures for acquiring a license to practice the profession of "Elevator installation, maintenance, and repair technician" [14] regulates the conditions, procedures, and requirements for training and licensing. The ordinance specifies three levels of license, where the third level is the entry level, followed by the second, and the first as the highest. These levels differentiate the degree of professional competence – ranging from work on elevators with simpler construction to servicing complex and high-speed systems. Each successive level entails broader responsibilities related to supervision, safety, and the management of other technicians. Successful completion of theoretical and practical examinations at the respective levels culminates in the issuance of a professional license. The criteria for admission to training at each level are summarized in Figure 2. This report focuses on the requirements for the third level of license, as it represents the initial step toward entering the elevator technician profession.

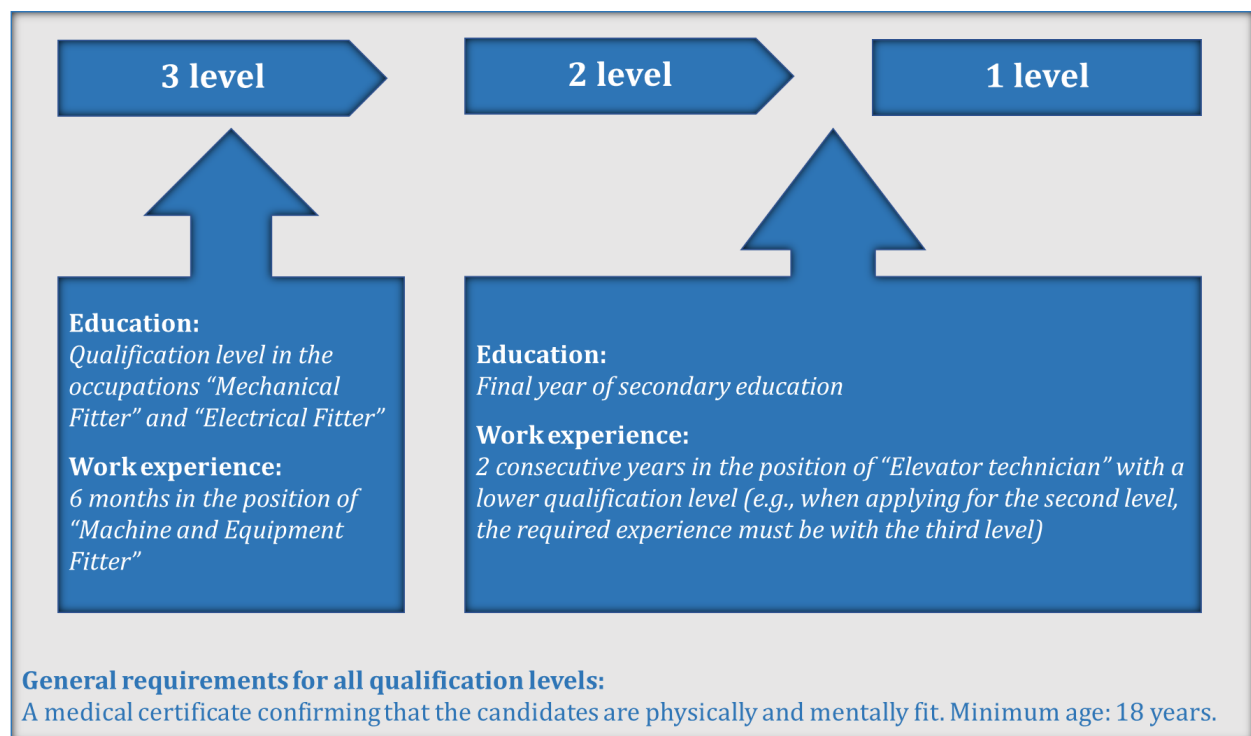


Fig. 2. Levels of license according to Ordinance № 3 of 17 January 2001 and requirements for candidates' admission to training

According to Ordinance № 3, candidates for training at this level must hold professional qualifications in both the occupations "Mechanical fitter" and "Electrical fitter," which are obtained within the system of secondary professional education or through Professional training centres (PTCs). This requirement creates significant difficulties in terms of access to training, as it excludes individuals with secondary education in other fields, as well as those with higher engineering qualifications (e.g.,

"Mechanical engineer"), who, despite their relevant preparation, are not admitted to training programs leading to professional licensing. Furthermore, candidates holding only one of the two professional qualifications (e.g., solely "Mechanical fitter") are also denied admission.

Another considerable obstacle is the mandatory professional experience requirement, which is recognized only if acquired in the position of "Machine and equipment fitter." This condition negatively affects motivation to pursue licensing and, consequently, limits the inflow of new specialists into the elevator industry. The List of professions for professional education and training, approved in 2021 [15], specifies recommended job titles for each specialty. Suitable positions under the professions "Electrical fitter" and "Mechanical fitter," which could be incorporated into Ordinance № 3 to facilitate access to training leading to professional licensing, include: Industrial equipment mechanic (7233 2009), Mechanical locksmith (7233 2010), Installer of industrial equipment (7233 2011), Industrial equipment fitter (7233 2026), Electrical fitter (7412 2009), Electromechanic (7412 2007), Electrolocksmith (7412 2010), Electrical equipment fitter (7412 2012), among others.

3.2. Training Content for Acquiring A License to Practice as an Elevator Technician

Ordinance № 3 of 17 January 2001 requires every organization conducting training courses for licensing to develop curricula for the respective license levels. These curricula enter into force upon approval by the State agency for metrological and technical surveillance (SAMTS). The training content comprises both theoretical and practical components of the profession, covering topics such as [14]:

- Elevator construction and operation.
- Economics and organization of technological processes for installation, maintenance, and repair.
- Organization of technical supervision.
- Ensuring the safety and health of workers and elevator users.

In developing these curricula, and to better distinguish the expected knowledge and skills for each license level, the following requirements synthesized from the ordinance may be considered:

Third Level – acquisition of knowledge and skills for installation, maintenance, and repair of elevators of relatively lower structural complexity, such as standalone elevators with single-speed or dual-speed asynchronous electric drives, or electro-hydraulic drives, with manual or semi-automatic doors, relay or electronic control systems, and a lifting height of up to 25 meters.

Second Level – building on the knowledge and skills from the third level, with competence in servicing more complex constructions such as elevators with dual-speed or adjustable electric drives, or electro-hydraulic drives, with speeds up to 1.0 m/s, automatic doors, group control of two elevators, and unlimited lifting height. Includes responsibility for supervising another technician.

First Level – building on the knowledge and skills from the second level, encompassing competence in high-complexity elevators, including those with speeds exceeding 1.0 m/s, group control of three or more elevators, and speed regulation systems. Includes responsibility for supervising a team of technicians.

The fact that each training organization is authorized to design and deliver its own curricula, even though these curricula are approved by the same regulatory authority, creates the risk of significant variation in the knowledge and skills acquired by trainees across different training providers and license levels.

4. Conclusion and Recommendations

The analysis of the regulatory framework and the requirements for acquiring a license to practice as an elevator technician indicates that the existing system, although designed to ensure high standards of safety and quality, imposes significant barriers to accessing training for licensing and subsequent professional realization. The criteria for prior qualification and work experience narrow the pool of eligible candidates and hinder the entry of new specialists into the sector. In the context of growing demand for qualified professionals, this situation contributes to a deepening workforce shortage. Therefore, a reconsideration and adaptation of the current regulatory requirements is necessary.

Based on the analysis, the following recommendations can be proposed:

- Revision of educational requirements for candidates applying for training to acquire a license under Ordinance № 3, third level. The revision should expand the list of eligible professions. In

addition to "Mechanical fitter" and "Electrical fitter," it could include "Mechanical technician," "Electrical technician," "Lifting and transport equipment technician," and "Automation technician." Importantly, possession of a qualification in only one of the listed professions should be sufficient, unlike the current requirement for two.

- Revision of work experience requirements for candidates applying for training under Ordinance № 3, third level. More flexible mechanisms for recognizing professional experience should be established. For example, beyond the current requirement for experience as a "Machine and equipment fitter," employment in other relevant positions could also be accepted, such as Industrial equipment mechanic (7233 2009), Mechanical locksmith (7233 2010), Installer of industrial equipment (7233 2011), Industrial equipment fitter (7233 2026), Electrical fitter (7412 2009), Electromechanic (7412 2007), Electrolocksmith (7412 2010), and Electrical equipment fitter (7412 2012).
- Implementation of incentives to attract trainees for secondary education, including scholarships, financial support measures, and public campaigns aimed at raising the prestige of the profession.
- Strengthening cooperation between educational institutions and employers in order to achieve better alignment between training curricula and the actual needs of the industry.

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