Licensing and continuous professional development of geodetic experts
Slobodan Pandžić¹*, Slavoljub Tomić¹

¹University College of Applied Sciences in Civil Engineering and Geodesy, Belgrade, Serbia

Abstract. The same as other engineering and technical fields, performing geodetic activities in the Republic of Serbia is regulated by relevant standards and a system of licensing. Geodetic professionals licensing is conducted in accordance with the Law on Planning and Construction and the Regulations on Granting Licenses prescribed by Serbian Chamber of Engineers. Simultaneously, geodetic activity relating to the affairs of the state survey and the cadastre is regulated by the Law on State Survey and Cadastre and the Law on Amendments to the Law on State Survey and Cadastre, in which a special licensing system is implemented by the Republic Geodetic Authority. In both cases, the requirements to obtain the licenses are: a diploma of the higher education, prescribed work experience and the appropriate professional examination passed. The procedure for periodic renewing or extending the license validity is not stipulated. In most countries, like in other professions where the licensing system is applied, extending license validity with the proof of completed professional development is anticipated. Unfortunately, this is not the case for any type of license for the geodetic experts in Serbia. This paper presents the proposal for establishing the license renewal procedure and its linkage to the continuous professional development.

Keywords: licenses, Serbian Chamber of Engineers, Republic Geodetic Authority

* Slobodan Pandžić > slobodanpandzic@vggs.rs
1 Introduction

After the successful completion of education at universities and colleges in the Republic of Serbia, students acquire relevant diplomas which verify their knowledge and skills. This is a necessary condition for inclusion in workflows. However, in addition to their bachelor degree, it is often necessary for the professionals of a specific educational profile to have the appropriate work license for independent professional engagement in an activity. Licensing requirements vary from profession to profession, but, in principle, the possession of the necessary work experience and taking an appropriate professional examination are required.

Besides private persons, the work licenses are also issued to legal entities (institutions, companies, enterprises, agencies, labour organizations, etc.). The licenses are granted to the private persons by the appropriate vocational chambers or the competent state authorities, while they are issued to the legal entities mainly by the responsible ministries of the Government of the Republic of Serbia or the competent state authorities. Since the licenses to legal entities are most commonly conditioned by the necessary number of full-time employees with the appropriate license, discussions in this paper will be confined only to the relationship of the procedures for obtaining and renewing the personal licenses and the permanent education of the professionals with the higher education.

Since 2003 Serbian Chamber of Engineers (SCE) has been operating successfully in the engineering and the technical fields, where geodetic activity also belongs to. By the Law on Planning and Construction ("Official Gazette of the Republic of Serbia" No. 47/2003), it is authorized to organize and implement a licensing system of specialists with the higher education. This activity is a specific one due to the fact that geodetic experts can also acquire a license for the work in the field of the state survey, cadastre and other geodetic works, which is issued by the Republic Geodetic Authority (RGA) in addition to the licenses for the works in the engineering and the technical fields issued by SCE. This can lead to misunderstanding and confusion, as well as doubt which one is needed in certain cases.

This paper presents an overview of the systems of geodesists’ licensing by SCE and RGA, with the special reference to their impact on encouraging permanent education of geodetic professionals.

2 Licenses for the geodetic professionals issued by SCE

SCE was established in 2003 according to the Law on Planning and Construction ("Official Gazette of the Republic of Serbia" No. 47/2003). Pursuant to this law the licensing system of responsible planners, responsible urbanists, responsible designers and responsible contractors was established. Members of SCE may be all persons who have the adequate higher education from some of the engineering and the technical fields, and who meet other licensing requirements [1]. Their licensing is regulated by the Regulations on the Conditions and Procedures for Granting and Revoking License for Responsible Urbanist, Designer, Contractor and Responsible Planner ("Official Gazette of the Republic of Serbia" no. 116/04 and 69/06), which were prescribed by the SCE. Licensing of the geodetic professionals with the higher education is conducted in this way.

In the process of preparing SCE for the beginning of the work, in 2003 the Ministry of Urbanism and Construction of the Republic of Serbia granted two hundred "zero" licenses for the responsible planners, the responsible urbanists, the responsible designers, and the responsible contractors. Among the issued "zero" licenses, SCE also granted five licenses for the graduate geodetic engineers. In this way, the requirement that the applicant for a license must have at least two recommendations of the licensed engineers, members of SCE was fulfilled. In addition, according to the Regulations on the Conditions and Procedures for Granting and Revoking Licenses for Responsible Urbanist, Designer, Contractor and Responsible Planner, the candidates for SCE membership and for obtaining the license must have relevant diplomas of the higher education, the professional exam passed before a commission appointed by SCE, the necessary work experience and participation in the activities of designing and implementation of at least two projects [6].

In accordance with the Regulations on Conditions and Procedures for Granting and Revoking Licenses for Responsible Urbanist, Designer, Contractor and Responsible Planner, in the initial period SCE issued the following licenses for geodetic professionals:

- Responsible designer of geodetic projects (the License Key 372), and
- Responsible contractor of geodetic works (the License Key 471).
By adopting the new Law on Higher Education ("Official Gazette of the Republic of Serbia" no. 76/05) and introducing the Bologna process in the higher education, new educational profiles and professional titles have emerged, which could not be treated adequately with the existing Regulations [4]. Therefore, pursuant to the Article 164, paragraph 1, item 2 of the Law on Planning and Construction, Article 8, paragraph 3 of the Regulations on the Conditions and Procedures for Granting and Revoking Licenses for Responsible Urbanist, Designer, Contractor and Responsible planner and Article 21, paragraph 1, item 18 of the Statute of SCE ("Official Gazette of the Republic of Serbia", no. 88/05 and 16/09), the Steering Board of SCE, at the 42nd regular session held on 2nd July 2012, adopted the new Decision on the type of the license issued by SCE [7]. By this decision the list of the licenses issued by SCE in the field of the geodetic engineering was expanded, so the following licenses are being issued now:

- Responsible designer of geodetic projects (the License Key 372),
- Responsible contractor of geodetic works (the License Key 471),
- Responsible contractor with specialized applied studies, geodetic works at the facilities of high-rise and low-rise construction (the License Key 771), and
- Responsible contractor of geodetic works at the facilities of high-rise and low-rise construction (the License Key 871) [7].

3Requirements for the licenses issued to the geodetic professionals by SCE

The basic requirements for obtaining the licenses issued by the SCE in the field of the geodetic engineering are the appropriate diploma of the university degree, passed professional examination, the necessary work experience, records on the professional results, as well as the recommendations of at least two members of the SCE, holders of the license with the same or higher rank. The regulations on Requirements and Procedure for Granting and Revoking Licenses for Responsible Urbanist, Designer, Contractor and Responsible planner define the conditions necessary for obtaining any specific license, the required diploma of the faculty or university, the length of the work experience and the level of the professional examination.

For granting the license of the responsible designer of the geodetic projects (the License Key 372) and the responsible contractor of the geodetic works (the License Key 471) the necessary requirements are: passed professional examination, at least three years of work experience and one of the following diplomas:

- Diploma of the Faculty of Civil Engineering in Belgrade – Department of Geodesy and Geoinformatics,
- Diploma of the Faculty of Technical Sciences in Novi Sad – Department of Geodesy and Geomatics, or
- Diploma obtained at the above mentioned universities in accordance with the Law on Higher Education ("Official Gazette of the Republic of Serbia", no. 76/2005, 100/2007, 97/2008 44/2010), the academic studies of the second degree (graduate academic studies – master, specialist academic studies), and before this Law entered into force – basic studies lasting at least five years (only the Diploma of the Faculty of Civil Engineering in Belgrade – Department of Geodesy).

With the license for the responsible designer of the geodetic projects the authorization to conduct all kinds of the geodetic projects is acquired, and with the license for the responsible contractor of the geodetic works the authorization to perform all kinds of the geodetic works. In the Decision on the Types of Licenses Granted by the SCE the activities that persons with these licenses can perform are listed in detail.

For issuing the licenses for the responsible contractor with the specialized vocational studies of the geodetic works in the high-rise and the low-rise construction (the License Key 771) in addition to the passed professional examination, and at least three years of the work experience, the following degree is required:

- Diploma of specialist vocational studies from the field of geodesy acquired by the Law on Higher Education (“Official Gazette of the Republic of Serbia, no. 76/2005, 100/2007, 97/2008, 44/2010) [7].

It is stated that the professionals who possess licenses for the responsible contractor with the specialist vocational studies of the geodetic works in the high and the low-rise construction the Decision on
the Types of Licenses Granted by the SCE can carry out the following activities:

− performing the geodetic works on the high-rise buildings for which building permits are issued by the unit of the local authorities (with a detailed work description);
− performing the geodetic works on the land expropriation during the construction of the local and the unclassified roads and streets for which the building permit is issued by the unit of the local authorities;
− performing the geodetic works on the construction of the local and the unclassified roads and streets for which the building permit is issued by the unit of the local authorities;
− performing the geodetic works in the engineering and the technical fields (with the detailed work description) [7].

The requirements for issuing the licenses for the responsible contractor of the geodetic works in the high- and the low-rise construction (the License Key 871) are: passed professional examination, at least three years of the work experience (or five years for the higher professional qualifications) and one of the following degrees:

− Diploma of the first degree of the Faculty of Civil Engineering in Belgrade – Department of Geodesy and Geoinformatics, or
− Diploma of the first degree of the Faculty of Technical Sciences in Novi Sad – Department of Geodesy and Geomatics. or
− Diploma of the University of Applied Sciences in Civil Engineering and Geodesy in Belgrade – Department of Geodesy and Geomatics (since 2003), or
− Diploma of the College of Civil Engineering and Geodesy in Belgrade – Department of Geodesy before the Law on Planning and Construction entered into force (Official Gazette of the Republic of Serbia no. 47 / 03), or
− Diploma acquired at these faculties and schools in accordance with the Law on Higher Education ( "Official Gazette of the Republic of Serbia", no. 76/2005 , 100/2007 , 97/2008 , 44/ 2010), at the studies of the first degree (basic academic studies, basic vocational studies), and prior to the mentioned Law entry into force, the studies lasting up to three years (advanced school education – 6th degree – exclusively Diploma of the College of Civil Engineering and Geodesy in Belgrade – Department of Geodesy ) [7].

According to the Decision on the Types of Licenses Issued by the ICS, a responsible contractor of geodetic works on high- and low-rise construction can:

− perform the geodetic works on the high-rise buildings for which the building permits are issued by the unit of the local authority, maximum gross floor area up to 2000 m$^2$, maximum number of floors up to P0 + P + 4 + PK, (with detailed work description);
− perform the geodetic works for the land expropriation during the construction of the local and the unclassified roads and streets for which the building permit is issued by the unit of the local authorities;
− perform the geodetic works on the construction of the local and the unclassified roads and streets for which the building permit is issued by the unit of the local authority [7].

4 Licenses for the geodetic experts issued by the RGA

The Law on State Survey and Cadastre ("Official Gazette of the Republic of Serbia", no. 79/09 and 18/10) and the Law on Amendments to the Law on State Survey and Cadastre ("Official Gazette of the Republic of Serbia", no. 65/2013) prescribed licensing of the geodetic professionals with the higher education from the jurisdiction of RGA completely respecting all educational profiles that are provided by the Law on Higher Education [3]. Two levels of the licenses for the persons of the geodetic profession with the higher education are anticipated:

− geodetic license of the first category, and
− geodetic license of the second category.

The geodetic license of the first category can be obtained by the geodetic expert with the master the academic studies, the specialized academic studies, or the basic studies lasting at least four years in accordance with the regulations that were valid before the Law on Higher Education entered into force, specialized professional studies in a total duration of at least four years (minimum 240 ECTS credits), passed the state professional examination, prescribed for that educational degree and the work experience of
at least five years in the geodetic profession, of which at least two years with some of the mentioned levels of education [3].

The geodetic license of the second category can be acquired by the geodetic professional with the basic academic studies, the basic vocational studies or with the studies lasting up to three years, in accordance with the regulations that were in force before the Law on Higher Education entered into force, passed the state professional examination prescribed for this degree of education and the work experience of at least three years in the geodetic profession of which at least one year with this educational degree [2].

Prior to meeting the requirements for obtaining the first category license, the geodetic experts with the master academic studies, the specialized academic studies, or with the basic studies lasting at least four years in accordance with the regulations that were in force before the Law on Higher Education entered into force, the specialist professional studies lasting at least four years (minimum 240 ECTS credits), passed the state professional exam prescribed for that education degree and the work experience of at least one year with this education, can get the geodetic license of the second category [3].

In its regulations RGA prescribes the procedure for issuing the geodetic licenses of the first and second category, the level and the method for taking the state professional examination, as well as the scope of the activities that can be performed by the person with the specific geodetic license.

5 Renewal of the licenses for the geodetic experts

The previous part of the paper presents the requirements and procedures for obtaining the licenses for the geodetic professionals issued by SCE and RGA. However, neither the Regulations on Conditions and Procedure for Granting and Revoking Licenses for Responsible Urbanist, Designer, Contractor and Responsible Planner, nor the Law on State Survey and Cadastre define the process of renewal or validity extension of the issued licenses. Only the reasons and method for the license revocation have been worked out in detail. Consequently, the duration of the license is unrestricted, except when some of the anticipated reasons for the license revocation are accomplished. For the validity period extension of the licenses issued by the SCE there are no other requirements except timely payment of annual membership fee. [5] The licenses issued by RGA are not intended to be renewed; they can only be revoked when the conditions for that are met [2].

In most countries the practice in the geodetic activity anticipates that the acquired license has to be periodically renewed, i.e. that its validity should be extended. In addition to the usual general conditions for the validity extension of the license the proof of completed a professional training in the specific time period is required. Also, in the countries in our surrounding, where the geodetic activities are performed under the similar conditions due to the joint legislative and technological heritage from the period of the common state, the licenses or the titles of the authorized geodetic engineer are periodically renewed (the period of their validity is prolonged), with the evidence of the professional development completed in this period.

In Germany, one of the technologically most developed countries in the world and the leading country of the European Union, it is necessary to collect a number of points acquired by mastering the appropriate professional training programs during a year in order to prolong the validity of the licenses for the authorized geodetic engineers. This would especially be taken into account, starting from the fact that many areas of the geodetic activity in Serbia have been established with a heavy influence of German example.

Pursuant to the Law on Performing Geodetic Activities (Article 47) in the Republic of Croatia, for example, it is prescribed that the authorized geodetic engineer’s right to perform the professional geodetic duties ceases if he does not collect the minimal number of points specified in the Statute of the Chamber of Geodesy Engineers [12] through the program of complementing and improving his knowledge. Also, in the Republic of Macedonia the Chamber extends the validity of licenses for the authorized geodesists every ten years, if the license holder attended at least twenty hours of the organized continuous training per year and received the appropriate certificate from the Chamber [13] for that.

Prolonging the license validity for the work in other professions is also performed periodically, with an evidence of completed professional development in that period. So, for example, in order to prolong the validity of their licenses, teachers, professors and professional associates in primary and secondary schools in the Republic of Serbia must submit the evidence (certificates) that they attended at least 100 hours of accredited seminars and 20 hours of other
forms of the professional development in the last five years. The license is renewed by Serbian Ministry of Education and programs for the professional development seminars are accredited by Institute for the Advancement of Education, which at the same time also keeps records on the teachers’ participation in them. The licenses for physicians and other medical professionals are renewed in a similar way.

The system of the periodic renewal or prolongation of the license validity can provide continuous professional development even after passing the professional examination and obtaining the license. In the geodetic activity this is very important because of intensive changes that are a consequence of the overall technological development and the development of the geodetic measurement techniques and software, for which the continuous professional development is necessary throughout the entire working life.

6 Permanent education and licensing of the geodetic experts

If the completion of the higher education is considered the final act of formal (regular) education, then any form of the professional development after it is a part of the desirable permanent education of the professionals with the higher education. Therefore, in all areas mechanisms are being developed with which the permanent education will be institutionalized and made available to all interested professionals during their entire professional career.

In addition to the faculty or the high school diploma, it is necessary to possess the appropriate licenses for the independent professional performance of the professional activities in the field of the geodetic engineering. As noted above, the necessary condition for obtaining some of the available geodetic licenses is taking the professional exam or the state professional examination. This equally applies to obtaining the licenses issued by both the SCE and RGA. Thus, preparing and taking the professional exams for the license can be considered as the initial stage of the permanent education for the geodetic experts. Unfortunately, this is the only mandatory form of the professional development for the geodetic experts.

The procedure for obtaining the license itself can be considered as an introduction to lifelong learning, which should be constantly continued throughout the entire professional career. For this purpose SCE has established the programs of the permanent professional development of its members and the licensed engineers. Unfortunately, attending lectures in the framework of the program of permanent development is voluntary and left to the personal initiative of individuals, because as noted there is no requirement for the proof of the continuing professional development to prolong the validity period of the licenses.

For the purpose of improving the activity from its jurisdiction, the RGA organizes a number of trainings, courses, workshops, seminars and professional meetings as the forms of the professional development of the geodetic experts. Besides the employees in the RGA, experts outside the RGA may also take part in these forms of the professional development. Unfortunately, even this professional development is not related to the renewal of the licenses issued by the RGA. Some of these forms of the professional development are mandatory for a number of employees in the RGA, primarily because of the nature of the professional activities they perform and their need to improve the execution of the planned regular tasks. For other geodetic experts the attendance at such forms of the professional development is voluntary.

It can be concluded that, after obtaining the appropriate license, the permanent education of the geodetic experts is left to the personal initiative of the individuals. Having no doubts into the desire of the geodetic experts to develop their skills through various forms of the informal education and learning, it is still necessary to institutionalize the permanent education and apply the appropriate level of the obligation. There is no need to introduce the new formal forms of knowledge and skills verification through the examination, but the geodetic experts should be obliged to take part in the available professional development programs as the basic form of their personal permanent education. This could be solved, as in other professions and in most of the countries, through the periodic renewal or the validity prolongation of the issued licenses, where one of the conditions would be the proof of attending the programs of the permanent professional development.

In addition to the program of its members’ permanent development, SCE could perform the accreditation of other professional development programs for the geodetic professionals that could be proposed by the educational institutions, the distributors of the geodetic measuring equipment and software, as well as the eminent experts who have successfully mastered the new technological procedures and who want to share their knowledge.
and experience with interested colleagues. SCE would keep records on the attendance of these programs issuing the appropriate certificates. Through the Regulations on the Conditions and Procedures for Granting and Revoking Licenses for Responsible Urbanist, Designer, Contractor and Responsible Planner, the procedure of renewing issued licenses after a certain period of time would be further specified, with the condition which would also include the required minimum of the attendance to the accredited professional development programs in the previous period. In the same or similar way the validity of the licenses issued by the RGA could be prolonged.

In the described manner licensing of the geodetic experts would be used as a stimulus for the permanent education, thus ensuring the continuous professional development throughout the entire professional career, regardless of the personal interests and the ambitions. This is particularly important in the field of the geodetic engineering, which is highly dependent on the technological development, both in the field of geodesy and geoinformatics, as well as in other engineering and technical fields.

7 Conclusion

In modern society rapid technological development in all fields creates the need for the continuous education and the professional development, all aimed to adopt and implement the latest scientific and technological achievements in daily practice. The geodetic activity is dependent very much on these accelerated technological changes. In order to be able to use the most modern geodetic measuring equipment and the information technology in performing their professional tasks geodetic experts are forced to be continually further educated and to improve their knowledge and skills. In order not to leave this training to chance and initiative of the individuals, it is necessary to establish the institutional system that will organize, monitor and evaluate the permanent education of each individual geodetic expert. To establish such a system special responsibility lies on SCE and RGA, but also the Federation of Geodesists of Serbia and especially the educational institutions where the study programs in the field of the geodetic engineering and the geoinformatics are performed.

To establish a purposive and efficient system of the permanent education of the geodetic experts the current system of licensing can be utilized which should be upgraded and adapted to the new requirements. This means that the obligation of the periodic renewal/prolongation of the validity period of the geodetic experts’ licenses should be additionally introduced, regardless of whether they are issued by SCE or RGA, setting up the condition that a valid proof of attending the accredited programs of the permanent education in a given time period must be possessed. Thus, the chaotic action in this field would be avoided, the continuous professional development would be provided throughout the entire professional career and every single activity would be valorised properly, and this would certainly have a positive effect on the quality performance of the professional geodetic works in everyday practice.

References

[7] Serbian Chamber of Engineers: „The Decision on the Type of License Granted by the Serbian Chamber of Engineers“. Belgrade, 2012.