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COMPARATIVE ANALYSIS OF THE HIGHER EDUCATION SYSTEM OF OCCUPATIONAL SAFETY ENGINEERS IN SERBIA AND CROATIA

Abstract: The system of security and occupational health/safety and the right to dignified ("decent") work in one country is determined by specific characteristics of that country, that is, characteristics of its economic and socio-economic development. Understanding the evolution of this system assumes the insight of its subjects, creators and implementers, but also legal and organizational and cognitive categories that have defined this system and through which it expresses itself. Based on this, the paper presents research results obtained by comparative analysis of the higher education system, of occupational safety engineers in Serbia and Croatia as key subjects in the implementation and further development of occupational safety systems of these countries.

Key words: occupational safety engineers, system, higher education

INTRODUCTION

In modern conditions, occupational safety system (occupational safety, security and health) promoted by the Council Directive 89/391/EEC includes various measures and activities aimed at continuous improvement of occupational health and safety (by the introduction of workplace and work environment risk assessment as the key principle of prevention). There is a high level of agreement about the importance of preventive measures and activities affecting prevention, elimination or minimization of occupational risks [Nikolić, 2005; Nikolić, V., 2010], appropriate risk management [Markič, M., Nikolić, V., 2010] and achievement of "a condition that enables the normal flow of business processes and functioning of business systems, and thus better economic results" [Kacian, 2000).

The application of preventive measures for safe and healthy work in the workplace and working environment in accordance with the obligations arising from national legislation and international documents, involves exercise of such conditions which largely eliminate risks and hazards in the workplace in order to achieve conditions for both full physical, mental and social well-being of employees and the right to dignified ("decent") work[1] [more about "decent" work: MOR; 3-9/1970, s. 41-42

Occupational health and safety has a special role in the preservation of human resources as the capital and source of strength for any organization. At the same time, management and human resource development is seen as the key factor in improving occupational safety as an important prerequisite to create additional value, increase productivity and competitiveness of the organization (Markič, M., Nikolić, V., 2011; Nikolić, V., 2011). Hence, the organizational environment and climate that promotes occupational safety and health involves the participation of occupational safety engineers in creating business policies and operations of modern organizations in accordance with modern standards of workplace safety. Broadly speaking, we can speak of their involvement in the establishment and development of corporate social responsibility practices of contemporary organizations [2].

In recent years, the Bologna process has tackled a revision of academic programs and defining of new competencies in higher education. Implementation of issues and problems relating to occupational health and safety into higher education curriculum is seen as an important element of quality, an indicator of the degree of commitment to provide future occupational safety engineers and other experts dealing with these issues, current scientific and expert knowledge and managerial competencies in promoting health in the workplace, improving safety and quality of work environment [www.coe.int/T/E/Cultural_Cooperation/education/Higher_education/Activities/Bologna_Process/default.asp]. Of course, continuing to generate risks of different nature and character in the working and living environment, changes in structure, content, work

[1] In societies that tend to the realization of human and democratic relations, the right to safe working conditions is particularly important right of every person and citizen. It is the right to protect the physical, mental and moral integrity in the workplace, which summarizes several rights, some of which belong to a group of citizens' individual rights (the right to life, the right to the inviolability of human dignity and integrity); other belong to a group of economic rights (the right to occupational health and safety) and social rights (the right to health). The exercise of this right is a kind of indicator of civilizational achievements in certain societies.

[2] The effectiveness of occupational safety system in the organization is reflected in a relationship with employees as important elements of the *internal* dimension *of corporate social responsibility.*

technology, practices and learning of organizations *(learning organization, knowledge management)*, represent a challenge to higher education, of occupational health and safety engineers for providing constant innovation in educational work in this area.

Recent "Research on work issues of occupational health and safety professionals in companies throughout Serbia"[Živković, 2011], provides important information on their profile, especially their specialization and level of qualification and professional title. In most companies (47.07 %) a person in charge of occupational health and safety has completed a course of study in occupational safety. They dominantly have high level of expertise (56.09 %), then there are 26.98 % with higher expertise, 8.74%, with medium expertise and other levels of expertise are of marginally low representation. The great majority holds the professional title in the field of occupational health and safety (60.84%). Most of them are engineers (20.65 %) and graduates in occupational safety engineering (25.95 %).

"Research of the circumstances of the work of an independent occupational safety professional in in medium-sized business organizations in Croatia"[Božajić, 2010] and "Research on issues related to organization and operation of occupational health and safety services in business companies in Croatia" [Crečnjak, 2009] by the same model, also provides insights about the orientation and level of professional qualification and professional title of an occupational safety expert. Thus, in medium-sized business organizations (50-250 employees) one third (33.73 %) of occupational safety experts has occupational safety professional orientation. The vast majority of employees (37.87 %) have high expertise (university degree), and then higher expertise (27.72 %) in compliance with the old (pre-Bologna) system. The first and second level of the Bologna system is currently represented by about 4% of employees. One third of occupational safety experts (33.73%) holds the professional title in the field of safety. Most of them are graduates in safety engineering (17.46 %), and safety engineers (13.31 %).

In large business organizations in Croatia (over 250 employees), the substantial majority of occupational safety experts (37.31 %) in the occupational safety service have high level of expertise (university degree), while 32.84 % has higher expertise in compliance with the old, pre-Bologna system. According to the new, Bologna system of higher education, ca 6% of occupational health and safety experts have the first and second level university degree. 46.77 % of occupational safety experts in the occupational safety service hold the professional title in the field of safety.

This recent studies in Serbia and Croatia, among other things, indicate that occupational safety engineers with higher education in Serbia and Croatia are the main carriers of occupational health and safety profession . Therefore, work and development of higher education system of occupational safety engineers is of particular importance, as well as compatibility and international cooperation of higher education institutions for the education of occupational safety engineers in Serbia and Croatia.

METHODOLOGY

Problem

The lack of current comparative analysis of the higher education system of occupational safety engineers in Serbia and Croatia.

Objective

To develop a comparative analysis of the higher education system of occupational safety engineers in Serbia and Croatia.

Hypothesis

A general positive hypothesis is set:

H1: Higher education systems of occupational safety engineers in Serbia and Croatia are mutually compatible in most aspects.

Methods

The implementation of descriptive methods with studying literature, documentation and regulations, method of comparative analysis of paired data and not standardized interviewing of representatives of higher education institutions involved in education of occupational health and safety engineers.

RESULTS

Higher education system of occupational health and safety engineers in Serbia

Legal requirements of higher education system of occupational health and safety engineers in Serbia

The basic legal regulation that regulates occupational safety in Serbia is the Occupational Health and Safety Act ("Official Gazette"of the Republic of Serbia no. 101/2005.). However, this Act ***does not specify higher education requirements for occupational safety experts.*** Moreover, the Act does not specify higher education programs in the field of occupational health and safety nor proscribes the necessity and way of studying contents related to this field in compliance with the specific needs of study programs of relevant higher education institutions.

Based on Article 54 Paragraph 3 of the Occupational Health and Safety Act ("Official Gazette" of the Republic of Serbia no. 101/2005.), the Regulations on the program, method and costs of taking the professional exam to perform occupational safety and health activities and responsible person tasks ("Official Gazette" of the Republic of Serbia, no.29/06 and 62/07) were issued, and pursuant to Article 13 paragraph 4 of the Act, the Regulations on the method and procedure for risk assessment in the workplace and work environment were issued ("Official Gazette" of the Republic of Serbia no. 72/06.). None of these

subordinate regulations specifies ***who and with which professional qualification may perform occupational health and safety activities.*** It is left to the discretion of the employer to choose a qualified person among the employees who have passed the required practical training examination to perform occupational health and safety activities (professional examination and issuance of licenses are governed by Art. 54-58 of the Act).

The Regulations on the program, method and costs of taking the professional exam to perform occupational safety and health activities and responsible person tasks ("Official Gazette" of the Republic of Serbia, no. 29/06 and 62/07) *do not prescribe the conditions of professional qualifications and work experience for taking the professional examination.* This Regulation proscribes the program, method and costs of taking the professional examination to perform occupational safety and health activities and responsible person tasks, without defining the appropriate qualifications, which means that an employer may appoint any person based on their own assessment and needs. Moreover, the professional examination program is unique for all professions and all activities, so there is a problem of unique criteria of knowledge required by professionals[3].

The history of the higher education system of occupational health and safety engineers in Serbia

The Republic of Serbia has a rich tradition in education of occupational safety engineers that started almost 50 years ago. The initiative was launched by the experts of the Association of institutes and bureaus of occupational safety in Niš, early in the second half of the 20th century. Working for years in solving many problems in industry, transportation and other industries, these experts realized the need for training of experts to address various issues and problems of occupational safety. This idea was realized in 1965 with the formation of the Department of Occupational Safety at the Technical and Mechanical Engineering College in Niš. A few years later, the authorities of the Community have launched an action for the establishment of special higher education institution for occupational health and safety professionals. This project was supported by the Technical Faculty, University in Niš. Joint request of these institutions was considered by the National Assembly of the Republic of Serbia and in June 1968 they reached a decision to establish the Occupational Safety Department at the Technical University. In the academic year 1972/73, the Department of Occupational Safety became an independent institution of higher education - Faculty of Occupational Safety.

Nowadays in Serbia, the higher education in the field of occupational health and safety can be acquired at higher institutions of professional studies in Zemun, Belgrade and Novi Sad. Faculties that organize teaching and develop scientific activities in this field are: Faculty of Occupational Safety in Niš, Faculty of Technical Sciences in Novi Sad, Faculty of Mining and Geology, University of Belgrade and Faculty of Technical Sciences, University of Priština.

Higher education institutions and accredited study programs in Serbia

- *University of Niš, Faculty of Occupational Safety http://www.znrfak.ni.ac.rs*

Education for occupational safety at the Faculty of Occupational Safety in Niš, is achieved through basic, specialist, master and doctoral studies in compliance with the old programs of pre-Bologna education system and through new accredited study programs of basic undergraduate and graduate studies.

Implementation of the curriculum of basic academic studies at the Department of Occupational safety for acquiring higher education under Bologna system lasted 4 academic years (8 semesters) (34 courses, semester practice, thesis). The first student graduated in 1977, and 1567 students have acquired a degree in occupational safety engineering (under the old curriculum), the first level degree in occupational safety was obtained by 28 students (by June 1, 2011), while the degree - occupational safety engineer graduate (pre-Bologna education system) was acquired by 1436 students (by June 1, 2011).

Postgraduate studies in the field of occupational safety at the Faculty last for a year and include general and specialized course exams, specialist practice and preparation and defence of the specialist thesis. Upon specialist thesis defence, 6 students have acquired the professional title - *Occupational Safety Specialist.*

In 1973/74, the Faculty of Occupational Safety formed master's studies (2 years, general and specialized courses, two seminar papers, preparation and defence of master's thesis) for acquiring the academic title of Master of Science in Occupational Safety. Upon master's thesis defence, a student acquires the title - *Master of Technical Science in Occupational Safety* and *Master of Science in Occupational Safety.* The first master's thesis defence at the Faculty took place in 1977. To date, a total of 150 master's thesis in this field was defended. The Faculty offers the degree of Doctor of Science in Occupational Safety scientific field. Upon doctoral dissertation defence, a candidate acquires the title - *Doctor of Technical Science in Occupational Safety or Doctor of Science in Occupational Safety.* To date, (July 1, 2011) 41 doctoral dissertations were defended in this field.

[3] The professional exam shall be taken by persons who are trained to effectively perform occupational safety and health activities (expert), and persons who are trained to effectively perform work equipment inspection and testing activities and activities of testing working environment conditions (responsible person).

Aside from Niš, for many years the Faculty of Occupational Safety has organized lectures for separate study groups in Belgrade, Novi Sad, Pančevo, Priština and other cities in former Yugoslavia, in compliance with the old University Act.

Since 2007/08, the Faculty has organized basic academic studies of the accredited study programme in Working and Living Environmental Protection (3 years, 180 ECTS points, 32 courses). Upon final thesis defense a student acquires the title - *Bachelor of Science in Environmental Protection.* As part of graduate academic studies, since the academic year 2010/11 the Faculty of Occupational Safety in Niš has organized the accredited study programme in Occupational Safety (2 years, 120 ECTS points, 21 courses). Upon diploma thesis defense, a student acquires the title - Master of Science in Occupational Safety Engineering. The process of doctoral studies study programme accreditation in this field at the Faculty is underway.

- *University of Novi Sad, Faculty of Technical Sciences http://www.ftn.uns.ac.rs.*

Since the academic year 2009/10, basic academic studies Safety at Work Engineering (4 years, 41 courses) and graduate academic studies of the study programme in Safety at Work Engineering (1 year, 60 ETCS points, 7 courses, professional practice, research study, diploma/master thesis) have been organized at the Department for Environmental Engineering and Safety at Work of the Faculty of Technical Sciences in Novi Sad. Upon diploma thesis defense, a student acquires the title - Master of Science in Safety at Work. In 2010, specialist academic studies of the study programme in Environmental Engineering and Safety at Work were accredited - for students who have completed relevant academic studies (1 year, 60 ETCS). Students acquire the professional title - Environmental Engineering and Safety at Work Engineering Specialist. These are new study programmes, so there are no students at this Faculty with an occupational safety degree.

- *University of Belgrade, Faculty of Mining And Geology http://www.rgf.bg.ac.rs*

The higher education in the field of occupational health and safety at the Faculty of Mining and Geology in Belgrade is achieved through basic academic (undergraduate) studies - through the study programme in Environmental engineering and safety engineering - module Safety Engineering (lasts 4 years, 47 courses, field work, summer practice, final thesis). Within the graduate studies, study programme in Environmental engineering and safety engineering - module Safety Engineering, students have the opportunity to obtain a masters degree and acquire the title - Master of Science in Safety Engineering. These are new study programmes, so there are no students at this Faculty with occupational safety degree.

- *University of Priština, Faculty of Technical Sciences in Kosovska Mitrovica http://www.ftn.pr.ac.rs*

The higher education in the field of occupational health and safety at the Faculty of Technical Sciences in Kosovska Mitrovica is achieved through basic academic studies of the study programme in Environmental engineering and safety engineering (3 years, 180 ETCS points, 36 courses, professional practice, final thesis). Within the graduate studies in Environmental engineering and safety engineering, education in the field of occupational safety is achieved through the Occupational Safety Module (2 years, 120 ETCS, 21 courses, professional practice, diploma thesis). Upon diploma thesis defence, a student acquires the title - Master of Science in Safety Engineering. These are new study programmes, so there are no students at this Faculty with an occupational safety degree.

- *Engineering University College of Professional Studies*

''Tehnikum Taurunum'' http://www.technikum.edu.rs

The Engineering University College of Professional Studies - Tehnikum Taurunum(VIŠSS) was established by transformation of the Technical and Mechanical Engineering College in Beograd-Zemun into the University College of Professional Studies. In 2007, it was founded as a state higher education institution of vocational studies with the legal right to organize and conduct basic and specialized vocational studies. Education for occupational safety and health at this institution is acquired through the study programme in *Occupational Safety and Health* (3 years, 180 ETCS points, 23 courses, professional practice, final thesis). Since this study programme was accredited in 2007, first students acquired a diploma and the professional title *Professional Safety Engineer* in 2009 and 2010 (the total number of professional engineers who completed their studies by June 1, 2011 is 3).

- *College of Professional Studies ''Belgrade Polytechnic' http://www.test.politehnika.edu.rs*

A this school of professional higher education occupational safety, education is acquired through the study programme of basic professional studies in Occupational Health and Safety (3 years, 180 ECTS points, 25 courses, professional practice, final thesis). Students acquire a diploma and the professional title Professional Safety Engineer. Since the school started with the implementation of this program in 2007, 8 students acquired a diploma of Professional Safety Engineer by June 1, 2011.

- *Technical College of Professional Studies in Novi Sad http://www.vtsns.edu.rs*

The higher education of engineers at the Technical school of professional higher education in Novi Sad is achieved through the study programme of basic professional studies in Occupational Health and Safety (3 years, 180 ECTS points). Students acquire a diploma

and the professional title *Professional Safety Engineer*. The college provides specialist vocational studies through study programme in Occupational Health and Safety (1 year, 60 ECTS points), and the professional title acquired is *Professional Safety Engineer Specialist.* Data on the number of graduates were not available.

Number of Occupational Safety Engineers in Serbia

At the Faculty of Occupational Safety, University of Niš over 50 years students have been acquiring occupational safety engineering degree through various programmes (old and new - pre-Bologna system, accredited study programmes - Bologna system) and for different study levels. 1567 students have acquired a degree in occupational safety engineering under the old curriculum and 28 students have acquired a bachelor's degree (the first-level higher education award) (under the new curriculum of pre-Bologna system) by June 1, 2011, while by that same time 1436 students acquired a safety engineering master's degree (pre-Bologna education system) . By June 1, 2011, 36 students acquired a diploma of basic academic (undergraduate) study programmes in Working and Living Environmental Protection, and the professional title Environmental Protection Engineer.(accredited programme, Bologna education system)

Six students have completed specialist studies and acquired the professional title - *Occupational Safety Specialist.* In 1977, the first master's thesis was defended at the Faculty, and to date, the number has climbed up to 150 master's thesis in the field of Occupational Safety.The first doctoral thesis was defended in 1976, and to date, 41 doctoral theses have been defended in the field of Occupational Safety. A large number of students completed higher education from all republics of former Yugoslavia, but also from other countries (especially non-aligned countries, who were granted scholarships by their governments) worldwide.

Since these are the new accredited study programmes in this field, it is understandable that there are only few students who graduated from certain schools of professional higher education[4] that is, that are still no students who have acquired a degree in occupational safety engineering at other higher education institutions which have accredited study programmes in this field.

Higher education system of occupational health and safety engineers in Croatia

Legal requirements for the higher education of occupational safety engineers in Croatia

The basic regulation that governs the field of occupational safety is the Occupational Health and Safety Act ("Official Gazette" no. 59/96., 94/96., 114/03., 100/04., 86/08., 116/08., 75/09.). Article 80, Paragraph 3 stipulates that programs of higher education include specific contents from the field of occupational safety to the extent appropriate to the needs of certain studies, orientation, or subject field. Paragraph 4 prescribes that the contents of the program shall be prescribed by the Minister of Science, Education and Sports in cooperation and at the proposal of the Minister of Labour.

Subordinate regulations are adopted based on Occupational Health and Safety Act, some of which prescribe the specific qualification requirements of an occupational safety engineer.

The Regulation on occupational safety expert professional exam ("Official Gazette" no. 114/02., 126/03.) prescribes qualification and work experience requirements for taking the professional examination and programmes, contents and method of taking occupational safety expert exam. Appropriate qualifications include the level of specialization in occupational safety, technical, medical or other specializations, which corresponds to the activities of the employer. This regulation has not been harmonized with the Bologna system of higher education so it lists requirements for university and college graduates.

History of the higher education system of occupational health and safety engineers in Croatia

The Republic of Croatia has a rich tradition in education of occupational safety engineers that started almost 50 years ago. The Technical College of Occupational Health and Safety became operational in the academic year 1963-1964. In 1972, it began expanding its programme activities and was renamed Technical College of Occupational Safety and Fire Protection. The college operated as a separate organizational unit within "Moša Pijade" Workers' University in Zagreb. In 1976, by separation from "Moša Pijade" Workers' University as a teaching institution of the joint work of higher education it became part of the University of Zagreb. At the Technical College of Occupational Safety and Fire Protection study programmes lasted two years or four semesters, and students acquired a higher degree and the professional title of occupational safety engineer or fire protection engineer.

At the proposal of the Republic Committee for Education, Culture and Physical Education, Technical College of Occupational Safety and Fire Protection ceased its operations in 1984, after the expected integration with the Faculty of Technology in Zagreb had failed.

University College of Applied Sciences in Occupational Safety (later the University College of Applied Sciences in Safety) in Zagreb became operational in the 1997-1998 academic year as unique

[4] Students who, during their study, have passed more than half of the exams under the new study program at the Faculty, were approved to acquire the first level degree of higher education by the year 2013/14.

four-year study whose completion gained a university degree and the professional title of occupational safety engineering graduate (indicating the specialization). In the academic year 2001-2002 the College established and performed, in three generations, postgraduate professional safety study programme that lasted one year and a half, or 3 semesters, and students acquired the professional title of Master of Safety and abbreviation mr. sig.

Since the academic year 2005-2006, the University College of Applied Sciences in Safety (accredited), has performed the new Bologna higher education system programmes as an undergraduate professional study programme, with specialization in occupational health and safety and fire protection and specialist graduate professional safety study programme with specialization in: occupational safety, fire protection and environmental protection.

Apart from Zagreb, the University College of Applied Sciences in Safety has performed courses for separate study groups in Čakovec, Pazin, Osijek and Split where is still performed today with the permanent license from the ministry as dislocated study programme.

Professional study of safety and protection has been performed at Karlovac University of Applied Sciences since the academic year 2000-2001.

At the Polytechnic of Rijeka, Occupational Safety Department was established in 2002 [Kacian, 2010].

Accredited higher education institutions and study programs in Croatia

In the academic year 2011/2012 in Croatia, the Ministry of Science, Education and Sports accredited (by issuing a license) three higher education institutions that provide the following study programmes in the field of occupational safety:

- *University College of Applied Sciences in Safety (accredited), Zagreb, Split http://www.vss.hr*

Study programmes:

- Professional study of Safety, specialization: occupational safety (among others in the field of safety), 3 years, 180 ECTS points, professional title: bacc.ing.sec.

- Specialist professional graduate study of Safety, specialization: occupational safety, 1 year, 60 ECTS points, professional title: struč.spec.ing.sec.

- *Karlovac University of Applied Sciences http://www.vuka.hr*

Study programmes:

- Professional study of Safety and Protection, specialization: occupational safety, 3 years, 180 ECTS points, professional title: bacc.ing.sec.

- Specialist professional graduate study of Safety and Protection, specialization: occupational safety, 2 years, 120 ECTS points, professional title: struč.spec.ing.sec.

- *Polytechnic of Rijeka http://www.veleri.hr*

Study programmes:

- Professional study of Occupational Safety, areas of specialization: occupational safety in industry, safety in civil engineering and forestry, general safety, 3 years, 180 ECTS points, professional title: bacc.ing.sec.

- Specialist professional graduate study of Occupational Safety, areas of specialization: occupational safety in industry, safety in civil engineering and forestry, general safety, 2 years, 120 ECTS points, professional title: struč.spec.ing.sec.

Number of occupational safety engineers in Croatia

About 2,500 students have graduated from Technical college for safety and fire protection in Zagreb and all external centres during 22 years of its operation, whereas it is important to take into account the fact that a large number of students from other former Yugoslav republics, primarily Slovenia and Bosnia, somewhat less from Serbia, studied there as well as foreign students from non-aligned countries, who were granted scholarships by their governments [Kacian, 2010].

The total of 2051 students completed the University College of Applied Sciences in Safety by the beginning of September 2010, whereas a number of students completed their studies in several specializations, and other graduates later acquired master's degree. About 1300 students specialized in the field of occupational safety [Sever, Dolšak, 2010].

From 2003/04 to 2009/10, the total of 305 students graduated from all safety studies at Karlovac University of Applied Sciences [Waserbauer, Vučinić, Jurac, 2010].

DISCUSSION

For the discussion of the results of the comparative analysis of the higher education system of occupational safety engineers in Serbia and Croatia a review table has been made (Table 1):

Table 1 *Comparison of the aspects* of the higher education system of occupational safety engineers in Serbia and Croatia

Aspects	Serbia	Croatia
The historical beginning of the higher education of occupational safety engineers	1965	1963/64
Compliance of current studies with the new Bologna system	fully	fully
Legal requirements of the higher education of occupational safety engineers under governing legislation for the area of occupational safety	no	yes

Legal requirements of the higher education of occupational safety engineers under subordinate legislation for the area of occupational safety	no	yes
The total number of accredited higher education institutions for higher education of occupational safety engineers	7	3
The total number of accredited faculties within universities for university education of occupational safety engineers	4	0
The total number of accredited colleges and polytechnics for higher professional education of occupational engineers	3	3
Number of occupational safety engineers (engineers, graduate engineers (B.Sc.), specialists, etc.)	over 3000	about 2500
Number of masters of science in the field of occupational safety	150	0
Number of PhDs in the field of occupational safety	41	0

The best confirmation of the viability and success of five decades of continuity of higher education of occupational safety engineers in Serbia and Croatia can be found today in full compliance with the new Bologna higher education system. The fact is that Croatian legislation establishes the requirements of higher education of occupational safety engineers more clearly than Serbian legislation.

Unlike Croatia, the requirements of higher education of occupational safety engineers in Serbia are not legally defined. The daunting fact is that, according to the current legislation and subordinate legislation in this area, any person (appointed by the employer) who has passed the professional exam, regardless of the type and level of qualification, can perform safety and health activities.

This legislation is in constant change and awareness and the need for higher education of occupational safety engineers should originate primarily from the demands of modern business practice of occupational safety and safety knowledge management. Nowadays, in Croatia there are only vocational and specialist graduate professional study programmes of occupational safety and no university scientific graduate and postgraduate study programmes of occupational safety. This can partly help profiling occupational safety profession, but definitely inhibits the development of occupational safety science in Croatia. It is especially interesting that universities and faculties in Croatia do not show any interest in the development of occupational safety as a scientific field.

Serbia has developed basic and master studies and opportunities for obtaining a doctoral degree in this field under the pre-Bologna education system, as well as accredited study programs of academic and vocational (professional) studies under the Bologna education system at 7 higher education institutions in the country, making it certainly a leader in the region. However, there is an apparent discrepancy between the developed network of programs and higher education institutions dealing with these issues on the one hand, and on the other hand, the lack of explicit legal requirements in terms of hiring higher educated manpower - occupational safety engineers in addressing various issues and problems of occupational safety and health in economic and social system of Serbia. Certainly, these data may help in understanding those research findings that show that there is a significant difference, the discrepancy between the theoretical level of occupational safety and the level of practical realization of those ideas in the work process in Serbia (Nikolić, 2005; Nikolić, V., Maksimović, N., 2010).

When it comes to occupational safety engineers in Croatia, the situation is much better when it comes to legal requirements for higher educated manpower in this field. But, on the other hand, these people do not have an opportunity for postgraduate and doctoral training in their country. What can occupational safety engineers from Croatia who are looking for personal scientific development do? Well, they can continue their scientific doctoral studies at universities in Serbia. Since there is a significant interest, perhaps this is an opportunity for universities in Serbia to open a separate postgraduate studies in Croatia, what the legislation allows, and the Bologna system even emphasizes. That would be the best way to create foundations of scientific cooperation in the field of occupational safety between Serbia and Croatia and the wider region.

CONCLUSION

Based on the identified research problem, using scientific methods of descriptive and comparative analysis and non standardized interviewing procedures with the representatives of the observed higher education institutions, the set objective of the research has been accomplished. Comparative analysis of the higher education system of occupational engineers in Serbia and Croatia is performed. The research sample consisted of all higher education institutions in Serbia and Croatia which accredited their study programs in the field of occupational safety (a total of 10 higher education institutions). The goal achieved by this

research is reflected in the acceptance or rejection of research hypotheses set:

H1: Higher education systems of occupational safety engineers in Serbia and Croatia are mutually compatible in most aspects.

The hypothesis is partially accepted.

The research results and their comparison shows that there is conformity between the education system of occupational safety engineers in Serbia and Croatia in basic aspects related to the historical continuity of higher education of occupational safety engineers and, which is especially important, the current, full compliance with the new Bologna system of higher education. This is the key system basis for cooperation between higher education institutions from Serbia and Croatia through the cooperation of teachers and students in all forms of cooperation. Such a coordinated system of education provides a foundation for professional mobility in a globalized market of labour and knowledge to occupational safety engineers of both countries.

Higher education institutions in Serbia and Croatia are strategically oriented towards the introduction or, further development of E-learning in occupational security/safety and health study programmes. For this purpose, the faculty of some institutions attended and certified programs of certain e-learning academies (e.g. CARNet e-learning Academy), e-learning centres have been founded or the faculty of these institutions have been engaged in local projects[5] or projects supported by the competent Ministry, when it comes to implementing e-learning in education.[6]

Good tradition, the development and success of academic studies for occupational safety and health in Serbia (as opposed to Croatia, where there are only professional studies) and especially postgraduate research and doctoral studies for occupational safety in Serbia, presents an opportunity and necessity that higher education institutions in Serbia organize such separate studies in Croatia, but also in the wider region. That way they can make a crucial contribution to the development of science in the field of occupational health and safety and improvement of the overall occupational safety system in the region, which can and should be the subject-matter of continuing research and joint cooperation.

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