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UNIVERSITY OF NIS, FACULTY OF OCCUPATIONAL SAFETY

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THE BASIS FOR IMPROVING OCCUPATIONALSAFETY

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CONTENT

Keynote paper

INDICATORS OF OCCUPATIONAL INJURIES IN CONSTRUCTION INDUSTRY OF SERBIA
Vladimir Mučenski, MSc Dušica Savić, Miodrag Hadzistevic, Stevan Djurovic, Maja Ilic.....7

NATIONAL LEGISLATION ABOUT OCCUPATIONAL SAFETY AND HEALTH IN MINING INDUSTRY
Laze Atanasov.....18

CONTINUOUS EDUCATION OF PROFESSIONALS ON SAFETY OF WORK PREFACE FOR SAFE WORKING PLANS
Blagoja Bogoevski, Goran Sekovski, Mladenovski Goce, Žika Goric, Umer Nevzat 25

THE INFLUENCE OF NOISE ON EMPLOYEES IN OFFICE CONDITIONS
Žarko Bojić, Tijana Lazendić 33

TYPES OF OHS RISKS IN CONSTRUCTION PROJECTS
Dragana Bibić, Vladimir Mučenski, Igor Peško, Aleksandra Vujkov 40

HOW TO MAKE FUNCTIONAL OSH SYSTEM?
Prof. Dr Jasmina Chaloska, Mr Scs Milan Petkovski, Ass. Mr Trajche Velkovski, Mr Snezhana Jankova Petkovska
.....45

OSH – PREVENTIVE FACTOR IN REALIZATION OF THE PRACTICAL TEACHING IN SECONDARY VOCATIONAL SCHOOLS
Jasna Domazetovska, Cvetanka Ristic, Dejan Krstevski, Blagoja Bogoevski..... .55

EDUCATION FOR OSH - KEY SEGMENT OF EDUCATION OF ADULTS IN THE REPUBLIC OF MACEDONIA
Lidija B. Duvcevska, m.r. Liljana Lazova, Azra Tutic, m.r. Blagoja Bogoevski 62

MASTER'S DEGREE STUDIES ABOUT WORKPLACE SAFETY ENGINEERING AS NECESSITY FOR IMPROVING SAFETY CULTURE
Marija Hadzi – Nikolova, Dejan Mirakovski, Nikolinka Doneva.....69

DIGITAL OSH (Occupational Safety and Health)
Emili Jovanovik Lokvenec.....77

WORK AT HEIGHT IN ROAD CONSTRUCTION – BUILDING AN INFRASTRUCTURE OBJECT
Krste Micevski, S.Anastasov, S.Micevski 84

BASICS OF LEAN CONSTRUCTION AND HEALTH AND SAFETY
Igor Peško, Vladimir Mučenski, Aleksandra Vujkov, Milan Trivunić, Dragana Bibić.....91

EDUCATION OF STUDENTS FOR FIRE PROTECTION, FLOODS AND EARTHQUAKES
Cvetanka Ristic, Jasna Domazetovska, Biljana Ristova, Lidija B. Duvčevska 97

ANALYSIS HEALTH AND SAFETY IN THE MICRO AND SMALL TO MEDIUM SIZED CONSTRUCTION ENTERPRISES
MSc Dušica Savić, phD Miodrag Hadžistević, phD Vladimir Mučenski 104

CONSTRUCTION AND DEMOLITION WASTE IN SERBIA AND EU
Aleksandra Vujkov, Igor Peško, Dragana Bibić, Vladimir Mučenski.....109

CASE STUDY: SAFETY MEASURES FOR THE BELT FEEDER WORK
Dragan Živanić, Atila Zelić, Nikola Ilanković, Anto Gajić 117

МАГИСТЕРСКИ СТУДИИ ПО ИНЖЕНЕРСТВО ЗА ЗАШТИТА НА РАБОТНА СРЕДИНА - НЕОПХОДНОСТ ЗА УНАПРЕДУВАЊЕ НА БЕЗБЕДНОСНАТА КУЛТУРА

MASTER'S DEGREE STUDIES ABOUT WORKPLACE SAFETY ENGINEERING AS NECESSITY FOR IMPROVING SAFETY CULTURE

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Резиме

Прашањата поврзани со здравјето и безбедноста се важни во областа на инженерството, управувањето и другите области. Повеќе професионални инженерски здруженија укажуваат дека здравјето и безбедноста се прашања од најголемо значење во инженерската практика. Потребата за соодветно образование и обука од областа на безбедноста и здравје при работа е широко прифатена и претставува дел од студиските програми на сите технички факултети во рамки на Универзитетот Гоце Делчев. Факултетот за природни и технички науки во рамки на Универзитетот „Гоце Делчев“ во Штип, согледувајќи ја потребата од континуирано усовршување на наставните програми на магистерските студии по безбедносно инженерството во Република Македонија согласно актуелните и современи светски стандарди за БЗР, изврши реакредитација на Магистерските студии по Инженерство за заштита на работна средина. Во трудот е прикажана структурата и целите на Магистерските студии, како и очекуваните резултати од курсот.

Клучни зборови: безбедносно инженерство, безбедносна култура, студии, образование

Abstract

Health and Safety issues are important in engineering, management and other fields. Most professional engineering associations point out that health and safety are issues of utmost importance in engineering practice. The need for appropriate education and training in Safety engineering is widely recognized by Goce Delcev University, therefore it is part of curricula at all technical faculties within University. Faculty of Natural and Technical Sciences within the Goce Delcev University in Stip, recognizing the necessity for continuous improvement of the curricula of Master`s Studies about Safety Engineering in Republic of Macedonia in accordance with the actual and modern International OSH standards, last year have been re-accredited Master's Studies about Workplace Safety Engineering. The paper presents the structure and aims of Master`s Studies as well as Course Learning Outcomes.

Keywords: safety engineering, safety culture, studies, education

1. Introduction

In a few last decade, a profound transformation has occurred in the way the world conducts business [1]. Reasons for this transformation include the rapidly changing and unpredictable economic markets, increasing global competition, new forms of work organization, and a shortage of workers with high-level skills, education, and training [2,3,4]. This transformation has

created new demands for Macedonian employers and workers to be globally competitive. As these demands are addressed, new opportunities will occur for enhancing the Occupational Safety and Health. The need that Occupational Safety and Health training be included as an integral part of worker development has been recognized as an important strategy for enhancing the prevention of occupationally related injuries and illnesses. Workplace injuries and illness still take a great toll on workers and are costly to businesses and consumers [5,6].

Safety plays an important role in schools and colleges. Ensuring pupil and student safety has been part of the ethical framework for decades. Schools are changing. Responsibilities for safety and health management are being refocused. Safety is important and needs to be approached creatively and should not be seen as simply another legal burden or bureaucratic chore [7]. A planned approach to managing risk should be seen as an enabler, not just to prevent accidents and work related health problems to both staff and pupils but to build a culture of sensible risk management, linked to a curriculum where teaching young people can develop their capability to assess and manage risk.

Like other public services, schools and colleges are adapting to a period of considerable change as well as continuing to meet existing challenges. There are new structures and accountabilities, additional parental/public/political concern, alongside worries about excessive risk aversion. There is a new understanding of the benefits of risk-taking as part of young people's development. Safety education and integrating 'risk' within the curriculum is key to this.

Some of the main reasons for being concerned about occupational health and safety include the following:

- Economics. The economic costs, both direct and indirect, of workplace accidents, injuries and illnesses are significant. Costs can be associated with the time lost from work, human pain and suffering, and the subsequent loss of moral and decline in worker efficiency and productivity.
- Legality. Occupational Health and Safety Acts provide workers with the right to a safe work environment. In protecting workers, employers must exercise due diligence, i.e., take reasonable precautions appropriate for the circumstances. The legal penalties that are possible for violations of health and safety legislation are significant and can include civil lawsuits and criminal prosecutions.
- Morality. It is generally accepted that employers have a moral responsibility to provide a safe working environment for their employees.

Faculty of Natural and Technical Sciences within the Goce Delcev University in Stip, recognizing the necessity for appropriate education and training in Safety engineering, 2010 lunched the Workplace Safety Engineering Module within Environmental Engineering Master`s Studies in duaration of one-year (Two semesters) course. In August, 2012 Workplace Safety Engineering Module within Goce Delcev University in Stip was accredited by Institution of Occupational Safety and Health (IOSH) as meeting the academic requirements for Graduate Membership. https://www.iosh.co.uk/Membership/About-membership/Qualifications.aspx?currentPage=3.
Because period for accreditation review is 5 years, Goce Delcev University, in 2017 started procedure for re-accreditation of new Workplace Safety Engineering Master`s Studies by IOSH.

2. Knowledge Needed to Address Occupational Health and Safety

In order to address Occupational Health and Safety (OHS) appropriately, a wide range of knowledge and skills are needed, including the following [8]:

- A technical understanding of, and ability to assess, recognize and prevent, all types of workplace hazards and risk factors.
- Knowledge of relevant acts, standards, regulations, codes, laws and liability. These include OSH legislation, and Workplace Hazardous Materials Information System (WHMIS) legislation.
- Knowledge of workers compensation schemes and programs.
- Medical knowledge, including physiotherapy, psychology and health care.
- An ability to deal with and motivate people, communicate clearly, and develop and manage plans.

These information are used in creating studies and teaching programs for Occupational Health and Safety. Such programs should provide the acquisition of knowledge and skills of students as well as experience for their further working activities in field of OHS as following:

- A leadership commitment to occupational health and safety.
- Consistent support of senior management in establishing and maintaining a health and safety culture in the company.
- Appropriate plans to deal with problems and emergencies.
- Promotion of health and safety throughout a company.
- Appropriate and relevant education and training in health and safety throughout a company.
- Clearly defined responsibilities relating to health and safety.
- Clearly defined authority to take action relating to health and safety.
- Appropriate procedures for reporting safety incidents.
- Procedures for investigating health and safety incidents and taking follow-up actions.
- Appropriate procedures for record keeping for all facets of health and safety.

3. Overview and Aims of Master's studies in Workplace Safety Engineering

In 2017 Faculty of Natural and Technical Sciences within Goce Delcev University lunched the new re-accredited Workplace Safety Engineering Master`s Studies in duaration of two years (Four Semesters) course. Syllabus for Master's Degree studies in Safety Engineering is given in Table below:

No.	Courses	ECTS
	First Semester	
1	Methodology and organization of scientific research working	8
2	Introduction to Occupational Safety and Health	6
3	Elective course for List No.1	8
4	Elective course for List No.1	8
	Second Semester	
5	National and European legislation in field of OHS	8
6	Elective course for List No.2	8
7	Elective course for List No.2	8
8	Elective course for List No.2	6
	Third Semester	
9	Methods for risk assessment	6
10	Industrial accidents	8
11	Elective course for List No.3	8
12	Elective course for List No.3	8
	Fourth Semester	
13	Masters' thesis/ Consultations	30
	Total ECTS	**120**

List No.1 of Elective Courses

No	Courses	ECTS
1.	Technical measures for OHS	8
2.	Noise and vibration control measures	8
3.	Safety and Health in technological processes	8
4.	Dangerous Substances Management	8

List No.2 of Elective Courses

No.	Courses	ECTS
1.	Hygiene and Epidemiology	8
2.	Industrial ventilation	8
3.	Ergonomics and ergonomic design	8

4.	OSH Management Systems	8

List No.3 of Elective Courses

No.	Courses	ECTS
1.	Toxicology and occupational medicine	8
2.	Safety measures for electromagnetic radiation	8
3.	Project Management	8
4.	Human resource Management	8

The aim of Master`s studies is to provide a Safety specialist with an enhanced level of knowledge which supports a career not only as a Health and Safety specialist, but as a specialist and manager of the Health and Safety process in both the private and public sectors, and with the ability to engage in research and practice development. It is anticipated that such a specialist will have the ability to make a significant contribution to their organisation, the community, the advancement of the Health and Safety profession and wider society. Students during their study will have acquired key knowledge, and developed the advanced skills that are associated with, pragmatic competent risk management strategies and techniques. Students successfully completing the programme will also have fulfilled the required professional body learning outcomes, as required by the accrediting professional body, IOSH, and will be eligible for Graduate Membership and the opportunity to progress to Chartered Safety Practitioner status [9].

Safety specialist will have developed the ability and attitudes to critically identify, evaluate, develop, and deliver occupational health and safety issues in a range of settings, contributing to and securing enhanced personal and team practice through research, the continuation of personal professional development and lifelong learning.

Students completing the Post Graduate Programme in health and safety will be able to:

- Critically analyse, examine and deal with complex occupational safety and health issues,formulating sound judgments using the evidence available and then communicate theirdecisions to specialist and non-specialist audiences;
- Act autonomously to plan and implement tasks in an organised and professional manner;
- Advance their knowledge and understanding of risk, and risk management in a holistic context;
- Demonstrate a critical awareness of current practice and use original thought to reach appropriate conclusions;
- Apply self-development techniques to enhance and apply their knowledge.

Throughout the course students will be encouraged to develop their level of knowledge and expertise by undertaking individual and group exercises, and will thereby develop not only their group belonging but advance the skills that are required to be a successful safety specialist, e.g. by using all available tools and techniques to communicate with other students. This activity

should also engender mutual respect for others, develop team building skills, and encourage a cohort and course identity which may be relied upon to help them through the challenges they are to overcome during their studies.

With regard to employability and other skills the course seeks to ensure that all students will have developed the following generic, intellectual and personal transferable skills to their immediate benefit in the pursuit of their studies and the longer-term benefit in the conduct of their future careers:

- Organisation and planning;
- Communication skills, written and oral;
- Group and interpersonal skills;
- Information and Data collection;
- Theory and principles;
- Analysis;
- Application and reflection;
- Synthesis and evaluation;
- Technical skills;
- Creativity;
- Inter-disciplinary and Professional Skills.

These key skills are further developed with the expectation that each student will have achieved:

- A critical understanding of the current context of safety and risk management;
- Ability to apply technical and professional skills to address and resolve a comprehensiverange of contemporary and emerging issues to meet the needs ofindividuals/families/communities/the environment;
- Ability to critically identify, investigate, analyse, formulate, and advocate solutions toproblems together with an ability to create, identify, synthesise and evaluate optionsto help achieve or implement practical outcomes;
- Ability to reflect critically, review and evaluate theoretical perspectives, methods,strategies and outcomes;
- Ability to critically reflect on their own learning; seeking and making use of constructivefeedback;
- Ability to manage their own learning to achieve structured progress;
- Ability to work independently, demonstrating initiative, self-organisation, planning andtime-management;
- Ability to collaborate with others in a professional environment to achieve commongoals;
- Ability to make informed judgments on complex issues and communicate their ideasand conclusions clearly and effectively.

4. Course Learning Outcomes

On successful completion of the course, the student will be able to:

1. Synthesise and respond to the complexity of legal/ethical issues within their risk management practice;
2. Demonstrate the ability to operate effectively in complex and unpredictable situations within professional contexts;
3. Demonstrate critical understanding of the dynamic nature of safety management;
4. Critically evaluate and synthesise theory and good practice;
5. Apply a critical awareness of the impact of and approaches taken by other professionals to engaging effectively in working with them;
6. Demonstrate critical awarèness of topical and current issues surrounding the Health and Safety Specialist.

5. Conclusion

The field of occupational health and safety has been increasing in importance due to the consequences of occupational injuries and illnesses, and public expectations have increased for better occupational health and safety.

The overall aim of the Workplace Safety Engineering Master`s Studies is to provide an enhanced programme of study, at postgraduate level, for those currently engaged in and those who wish to make a future career in Health and Safety. Implicit within this aim is that our graduates will have qualities of confidence, independent critical judgement, leadership and the ability to work as part of a the team delivering a safe and healthy workplace.

At the end of the course graduates who are new to the profession will be well placed to enter into the world of work as Safety Practitioners within in the public or private sector. Those already working as Safety Practitioners should have enhanced career prospects including the potential to move to a managerial level from a technical operational level.

References

[1] Palassis, J., Schulte, A.P., Haring Sweeney, M., Okun,H.A., Enhancing Occupational Safety and Health through Use of the National Skill Standards, Int J Occup Environ Health 2004;10:90–98.

[2] Landesbergis PA, Cahill J, Schnall P. The impact of lean production and related new systems of work organization on worker health. J Occup Health Psychol. 1999; 4:108–30.

[3] European Agency for Safety and Health at Work. The changing world of work. Magazine of the European Agency for Safety and Health at Work. ISBN 92-828-8870-3. Luxembourg, Belgium: Office for Official Publications of the European Communities, 2000.

[4] National Skill Standards Board: Annual Report (1997–1998). Washington, DC: National Skill Standards Board, 1998.

[5] Takala J. International agency efforts to protect workers and the environment. Int J Occup Environ Health. 1999; 5:30–7.

[6] Leigh JP, Markowitz S, Fahs M, Landrigan P. Cost of Occupational Injuries and Illnesses. Ann Arbor, MI: University of Michigan Press, 2000.

[7] Managing Safety In Schools & Colleges, The Royall Society for the Prevention of Accidents (ROSPA), 2012

[8] Rosen, A.M., Engineering Health and Safety Module and Case Studies, , Faculty of Engineering and Applied Science University of Ontario Institute of Technology, 2000

[9] School of Clinical & Applied Sciences, Course Specification, Postgraduate Diploma, Health & Safety 2018-19 (PGDHS), Leeds Beckett University

[10] Michaylov, M., Kertikov, V., Vlaseva, E., Necessity for Master's Degree in Safety Engineering, 50 years University of Mining and Geology "St. Ivan Rilski" Annual, vol. 46, part IV, Humanitarian and Economic Sciences, Sofia, 2003, pp.109-111