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INSPECTION AND SAFETY MEASURES IN HIGH ALTITUDE CONSTRUCTION ACTIVITIES

Cristina GOGELESCU (MEIȚĂ), Oana Roxana CHIVU, Anamaria Ioana FEIER, Claudia BORDA, Marilena GHEORGHE

Abstract: *The paper includes theoretical and practical information that has accumulated over time, but also proposes several solutions in terms of work equipment, workload and environment, as well as regarding the workers, all with the aim of preventing accidents at work on construction sites. More specifically, the aim is to identify appropriate collective protection in relation to the workload, so that construction sites are safe for workers exposed to the risk of falling from a height (employers, employees, supervisors, self-employed persons, staff involved in the inspection of work equipment or workplaces). The results of the research will help managers to prioritize risks according to the likelihood of accidents and injury characteristics and to pay more attention to balancing significant risk relationships to prevent accidents and achieve safer working environments. This paper aims to evaluate the work on occupational health services analyzing the results of the questionnaire.*
Key words: *temperature, the inspection of work equipment or workplaces, working environment, health.*

1. INTRODUCTION

In the last 10 years, the concept of "buildings with non-typical ventilated facades" combining metal and concrete has developed. At the same time, companies want to build safely to ensure that they respect the three basic components - social, economic and environmental.

The study is based on more than 10 years of experience in health and safety on construction sites of one of the authors, who has been confronted with different situations. The questionnaire in the study is also based on the author's experience on construction sites and events she has experienced in different situations.

The main risk of injury on construction sites is falling from a height, due to a lack of knowledge of how to choose appropriate collective protection, as the number of workers exposed to working at height has increased. The focus of the present research is on identifying the factors that influence the smooth completion of a construction project and developing a safe working model for the construction of ventilated facade buildings based on the hierarchy of controls.

A construction company has a wide range of factors, staff with different professions and training, exposed to pollutants that may or may not lead to health problems.

To ensure the medical supervision of staff, it is important for the doctor to collaborate with the employer. It is proposed to examine the role of the Occupational Health Service in supervising the health of workers so that they can carry out their work under normal conditions.

Occupational medicine control is carried out according to the Law on Occupational Safety and Health No. 319/2006 thus, the measures ensuring proper supervision of workers' health according to the risks related to occupational safety and health are established according to legal regulations [2]. Health surveillance of workers is provided by occupational health physicians [9],[10]. The prophylactic medical

services that provide health surveillance of workers are medical examinations at the time of employment, adaptation, periodically, when returning to work, special surveillance and occupational health promotion [9].

The parameters, the investigation procedure and the scheduling of the medical check-up on hiring, periodically, resumption of work are determined by the occupational physician, who formulates the conclusion of the examinations performed.

The main objective being to supervise the health of workers at work, taking into account that their work is carried out in special conditions, “work at height”.

"Capacity for work" means the worker's medical capacity to carry out work at the workplace in the profession/function for which the medical examination is requested [9].

2. OCCUPATIONAL HEALTH SURVEILLANCE OF WORKERS WITH THE HELP OF OCCUPATIONAL MEDICINE

The OMS has given a definition for occupational health [15]:

"The primary goal of occupational health is the promotion and maintenance of the highest degree of physical, mental and social well-being of all employees, regardless of occupation."

Some goals of occupational health are [15]:

- Placing and maintaining employees in an environment adapted to their physical and mental capacities, adapting work to man and adapting man to his job, protecting workers from workplace risk factors.
- Its main role is to inform the employer on how to achieve and maintain working conditions that do not affect the health of employees.

The employer is obliged to provide its employees with preventive occupational health services [2].

According to the law 418/2004 the occupational physician has the following duties [14]:

1. Establishes annually the activity program for the improvement of the working environment in terms of occupational health for each employer.

2. Identifies risk factors and participates in their assessment actions.

3. Supervises the health of employees based on legal provisions and occupational health risks for employees.

4. Organizes the health surveillance of employees in accordance with the specifics of exposure to risk factors;

5. Organizes first aid and emergency treatment and instructs employees in the application of accessible first aid methods and emergency procedures, if competent.

6. Makes recommendations on the organization of work, the ergonomic layout of the workplace, the safe use of substances used in the work process and the allocation of work tasks, considering the ability and skills of employees to perform them.

7. May propose to the employer a change in the workplace or in the type of work of certain employees, determined by their state of health.

8. Participates in the establishment of occupational health programmes within the Occupational Health and Safety Committee.

9. Assesses fitness for work in relation to the state of health and promotes the adaptation of work to the capabilities of employees.

10. Advises the employer on the best adaptation of work to the employee's possibilities in the special circumstances of vulnerable groups: pregnant women, breastfeeding mothers, teenagers, the elderly and the disabled.

11. Reports to the employer, employees and competent authorities as required by law.

12. Can contribute through his/her work to scientific knowledge in the field of occupational health, respecting the ethical principles applied in medical research.

13. ensures the management of occupational health services [14].

For the occupational health doctor assisting a construction company, several question marks arise, the answer to which depends on medical behavior [10]:

1. Has the medical service been formally engaged, or is real collaboration desired with strict compliance with the letter of the law?

2. Is the employer aware of his rights and of his obligations with regard to health and safety at work?

3. How large is the construction company in terms of number of employees and what area does it cover in the territory?

4. What is the scope of activity: civil engineering, road and bridge construction, hydro-engineering, industrial construction, metal construction, interior construction, energy construction, etc.?

5. What tools and machinery do they work with; are they high-performance, or are they "patched up" and old?

6. Do they work with seasonal, underage, "undocumented" workers?

7. Do they work in shifts? What is the duration of a shift?

8. Are there rest, rest, dining and toilet facilities, possibly adequately equipped and maintained accommodation?

9. Is there protective equipment that is used correctly and, particularly, worn when required by workers?

10. Are they carriers of chronic diseases?

11. Do they use alcohol, tobacco, drugs (medicinal or not)?

12. Do they work indoors or outdoors?

13. Do they work on the ground or at height?

14. Do machines and machinery also operate on public roads? Are all traffic safety requirements being met?

15. Is there a controlled water source?

The knowledge of the answer to these questions, together with the visit to the workplace, the study of the safety data records for the substances used, allows the doctor to correctly interpret the clinical health data in the context of occupational exposure [10].

3. THE ROLE OF MEDICAL TESTS IN DISCOVERING/ESTABLISHING ABILITY TO WORK

Construction activity is the occupational activity that causes known and un-(re)known victims through accidents at work, causing various professional and occupational-related diseases.

The occupational health services provided include [13]:

- The filling and registration of individual medical records;
- Issuance of certificates of aptitude and employer advice;
- Spontaneous occupational health consultations;
- Occupational medicine consultation for the human resources and labor protection services;
- Organization of and participation in occupational risk assessment;
- Monitoring the health of employees;
- Reorientation in case of occupational disease or other chronic conditions;
- Advice on adapting work to the psychophysiological characteristics of employees;
- Advice based on a health and safety strategy at work.

The clinical-paraclinical protocol - occupational medicine covers all employees:

- General clinical examination of occupational medicine;
- Assessment of visual acuity and color sense;
- Assessment of hearing acuity (audiogram);
- Psychological testing - for all professional categories driving a motor vehicle or employees in decision-making positions;
- Electrocardiogram, EKG;
- Serum glucose;
- Ventilatory function tests (spirometry).

It is important that these services are carried out by an occupational medicine clinic that can develop in addition to diagnosis and surveillance/recovery of medical conditions.

In the construction company in question, a contract is concluded so that all workers benefit from medical examinations for "working at height" regardless of their occupation/job.

It is also important for workers to be honest, when they have medical conditions to declare them to the occupational health doctor, so he can recommend dispensing their condition through the family doctor or even stopping

work or changing jobs. This brief presentation of the risks to life and health in construction leads to the existence of several factors that are conducive to ill health.

New technologies in construction, new stages in the technological process, the use of the correct means of protection and, above all, the training of workers to protect their lives and medical supervision lead to a healthy working environment. To know the role of occupational medicine and medical services among workers, a questionnaire of 11 questions was conducted, the questionnaire was completed by 10 workers from 6 different construction sites [11].

Table 1

Questionnaire sent to construction sites - medical control.

Nr. crt.	Question	YES	No	I don't know
1.	**Have you received information about the following aspects**			
1a	Can you be exposed to risks?			
1b	Do you know what the effects of these risks are?			
1c	Do you know how to reduce the level of risk?			
1d	Occupational health check-ups			
2.	**What do you think about the workplace [11]?**			
2a	Very good			
2b	Good			
2c	Satisfactory			
2d	Unsatisfactory in terms of security			
2e	Functionally unsatisfactory			
2f	Aesthetically unsatisfactory			
3.	What medical examinations have you had:			
3a	Medical check-up on hiring			
3b	Regular medical check-ups			
3c	Exams for returning to work			
3d	Special surveillance examinations			
4.	What investigations necessary to determine the aptitude of employees to carry out the specific functions of each job have you carried out:			
4a	general clinical examinations			
4b	assessments of visual acuity and color perception			
4c	hearing evaluations (audiograms)			
4d	psychological testing			
4e	electrocardiogram			
4f	glycemia			
4g	functional ventilatory testing (spirometry)			
5.	Are you aware of the conclusion of the aptitude sheet issued for you?			
5a	with the "able" opinion,			
5b	with the "conditionally able" opinion,			
5c	with the "temporarily unable to work" opinion,			
5d	with the "unable" opinion,			
6.	Do you know the difference between occupational diseases and profession-related diseases?			
6a				
7.	After your medical check-up, did you find out that you suffer from any disease (diabetes, blood pressure, etc.)?			
7a	.....			
7b	.....			
8.	Do you know what is expected from you in the workplace in terms of Occupational Safety?			
8a	……			
8b	……			
9.	Do you know employees who are concerned about working safely, having adequate eip, being sick?			
9a	……			
9b	……			
10.	Regarding the COVID 19 pandemic, outline what measures have been taken in your workplace			
	……			
11.	What measures do you propose to improve the working conditions?			
	……			

This paper aims to evaluate the work on occupational health services.

The analysis of the questionnaires shows that workers benefit from occupational health services, that they are aware of the risks to which they are exposed and of the preventive measures imposed/recommended by the employer. Some of these workers discovered medical conditions they did not know about - hypertension, diabetes.

4. ORGANIZATION OF MEDICAL EXAMINATION IN A CONSTRUCTION COMPANY

In accordance with the protocol of the periodic annual medical check-up upon employment, all employees were examined annually upon resumption of work to assess their health and fitness for work, according to the established schedule.

The medical check-up on recruitment is carried out in the occupational medicine clinic and the periodic medical check-up is usually carried out on the construction sites in specially equipped premises. A minimum number of examinations were carried out to determine the fitness of employees to perform specific job functions. It should be noted that in 2017-2021 the same investigations of workers were carried out, namely:

- General clinical examinations;
- Assessments of visual acuity and color sense;
- Hearing acuity assessments (audiograms);
- Psychological testing;
- Electrocardiograms;
- Blood glucose tests;
- Ventilatory function tests (spirometry).

Medical examinations often reveal the presence of diseases that contraindicate work under certain conditions [9]. Thus, epilepsy, diabetes, alcoholism, some mental and neurological diseases prohibit working at height, in conditions of isolation and danger. In men, particularly after the age of 45, the risk of myocardial infarction or cerebrovascular accident is increased, especially when other factors such as smoking, medical history, high blood pressure, obesity, with or without metabolic disorders, are associated. For this category of personnel, EKG investigation is required, especially if they carry out heavy physical activity, in conditions of high atmospheric humidity, at low or very high temperatures [9, 13].

Considering that the workers have been employed for about 5 years, it is concluded that a part of the workers received the same medical investigations annually.

The number of hirings is given by the number of foreign workers who have been brought in from Vietnam due to labor lack.

According to the protocol of medical check-ups upon employment, annual periodic medical, etc., all employees were examined for health and ability to work according to the established schedule.

They were instructed not to eat about 2 hours before the tests were taken. The medical check-up is usually organized on the site in a specially equipped cabin. According to the number of medical checks carried out in the last 5 years we have presented in Table 1 with the type of checks carried out.

Table 2.

Record of medical check-ups according to categories in 2017-2021.

Year	Periodic medical check-ups	Medical examinations on employment	Adaptation examinations	Exams to restart the work	Special surveillance examinations	Clinical check-up examinations at the end of employment	Others	Spontaneous consultations	Number of employees
2017	322	368	0	1	1	1	2	0	694
2018	454	317	0	8	0	0	1	0	780
2019	387	266	0	2	2	0	8	0	665
2020	352	96	0	3	3	0	0	0	454
2021	373	47	0	2	2	0	0	0	424

5. HEALTH ANALYSIS OF THE WORKERS - OCCUPATIONAL MEDICINE REPORTS AT A CONSTRUCTION COMPANY FOR 5 YEARS

Medical investigations for a construction company are complex.

Most of the workers are workers at altitude, exposed during the working day to noise, vibration, bad weather, solar radiation, dust (cement, sand, lime, gypsum, plaster, asbestos - from asbestos cement boards, wood, etc.), chromium, risk of accidents (falling from height, crushing, slipping, burns, electrocution, etc.). The physical effort is high or very high, and the work requires lifting - carrying - handling weights, forced postures in non-physiological posture [4, 6-9].

Occupational exposure under certain working conditions requires multiple job-specific investigations. These investigations are based on the occupational exposure form, which is filled in correctly and completely by the employer and is part of the medical file [9].

After a full analysis of the results of the medical checks, aptitude forms were issued (one for each employee and employer), including general medical recommendations, including fit/conditional fit/temporary unfit/unfit, presented below in Table 3.

The medical reasons for issuing aptitude sheets with the specification "conditionally able-bodied" were mostly cardiovascular diseases and nutritional and metabolic diseases, which contraindicate intense physical effort, neuro-psychological overstrain.

In the years 2017-2021 at the time of the medical examination no occupational diseases, diseases related to the profession were diagnosed. In the analysis of general morbidity, the peak of morbidity is found in nutrition and metabolism diseases, followed by cardiovascular diseases and ophthalmological diseases as shown in Table 4. The analysis of the data presented above allows some suggestions to be made:

- Nutritional and metabolic diseases and cardiovascular diseases;
- The increased prevalence of nutritional and metabolic diseases and cardiovascular diseases is due to sedentary lifestyles and mental stress, which can be countered by a healthy lifestyle and mental comfort;
- The increased frequency is also due to unhealthy eating habits, excessive consumption of animal fats at the expense of vegetable fats, insufficient intake of vegetables and fruit and constant or excessive consumption of alcohol, coffee, etc.

Table 3

Records of occupational medicine reports covering the years 2017-2021.

Year	Category Professional	No employees	Occupational medical certificates			
			Able	Able conditioned	Unable temporarily	Unable
2017	White worker, blue worker	694	650	44	0	0
2018	White worker, blue worker	780	758	22	0	0
2019	White worker, blue worker	665	651	14	0	0
2020	White worker, blue worker	454	423	31	0	0
2021	White worker, blue worker	424	383	41	0	0

Table 4

Structure of general morbidity in 2017-2021.

Category of diseases	**2017**	**2018**	**2019**	**2020**	**2021**
Diseases of nutrition and metabolism	14,41 %	12,82%	13,38 %	10,79%	10,61%
Cardiovascular diseases	12,25 %	10,90 %	10,38 %	12,11%	13,92%
Ophthalmological diseases	10, 81%	9,62 %	10,68 %	21,59%	21,93%
Respiratory diseases	2, 61 %	1,92 %	1,35 %	8,59%	8,02%
Osteo-articular diseases	5,04 %	4,49 %	4,51 %	9,69%	11,56%
ORL diseases	0%	0%	0%	5,07%	4,48%

These types of illnesses require proper treatment and very close follow-up to minimize the risk of accidents at work.

Particular attention should be paid to all cases of illnesses found. For example, the association of a cardiovascular disease with a potential nutritional and metabolic disorder in a mentally or physically overworked employee is a synergistic combination of risk factors that can lead to serious events with repercussions for both the person concerned and others. In these cases, close, continuous medical follow-up by the family doctor and specialist doctors is required to monitor the evolution of these cases under treatment and diet [12, 13].

Ophthalmological diseases require correct and active monitoring for staff working at the computer, correction of both refractive errors (myopia, hyperopia, presbyopia) as well as specialist treatment of any ophthalmic pathology regardless of the severity of the condition. Ophthalmological disorders were mainly refractive errors (myopia, hyperopia, presbyopia). Instructions for the use of viewing screen equipment should also be followed [9].

6. DETERMINATION OF RISK FACTORS AFFECTING CONSTRUCTION WORKERS ON CONSTRUCTION SITES

The personnel working at altitude are medically competent. Epilepsy, chronic diseases of the nervous system (including alcoholism), mental illness, balance disorders of any kind, deafness, untreated high blood pressure, some heart diseases, some lung diseases, some chronic eye diseases, and acute eye diseases until cured are contraindications for working at height, even for one day.

Persons working at a height are carefully selected by the employer based on a thorough and rigorous medical check-up and psychological examination.

Any change in the health condition (whether physical or mental) of persons working at height should be reported to the direct supervisor/team leader and/or other responsible persons so that the employee can be referred to a doctor for prompt remedial action. Until the employee's health condition is resolved, the employee will be suspended from working at altitude.

Personnel working at altitude (according to the legislation in vigor) must be aware of, trained on [1, 2]:

- Handling of technical equipment, its condition (reliability and accessibility);
- Risks of injury;
- Behavior in the event of damage or a critical situation;
- Use of personal protective equipment (with particular emphasis on safety helmets and safety belts);
- First aid.

Particularly importance should be attached to the technical equipment needed for work at altitude. To this end, ergonomic conditions and safety measures must be provided on a suitable surface, as well as suitable equipment so that working conditions are safe. Priority must be given to collective protection measures over individual protection measures [2].

The type, size of equipment (ladders, scaffolding, walkways, planking, work/safety ropes, safety belts) and access routes must be appropriate to the nature of the work to be carried out, the tasks for which they are used, the foreseeable difficulties, be capable of being evacuated and not give rise to additional risks of falls/accidents.

The specific nature of the work means that musculoskeletal disorders, and particularly to those of the lower back, are particularly frequent. The presence in a unit of many medical certificates for such disorders is an additional argument, together with the ergonomic analysis of the work, for the need to make changes in the technological process or in the organization of the work. Modernization of the work with the introduction of aids (levers, pulleys, conveyor belts, etc.) and staff health education are necessary. Workers must be educated to work together, to help each other, how to lift while maintaining a straight back and a solid support base, which is the legal limit of the weight they can lift [16].

Smoking and alcohol consumption decreases work quality and productivity. Smoking is a recognized risk factor for respiratory cancer and cardiovascular disease [13].

Table 5

Evidence of individual/particular factors.

Intrinsic -individual factors	Extrinsic -particulate factors
- Weight - Hypotonia - Hyperlaxity - Hydroelectrolytic disorders - Endocrine-metabolic pathology - Cardiovascular adaptation - Age, sex, constitutional type, lifestyle	- Physical demand - Stress - Humidity and air currents - Psycho-behavioral factors

7. COLLABORATION BETWEEN REMEDIAL MEDICAL PRACTITIONERS AND THE OCCUPATIONAL HEALTH SERVICE

Good collaboration between the remedial practitioner and the occupational health service can be reflected in the health status of workers depending on the factors highlighted in Table 5 below.

Most of the workers who were found to have a medical condition attended the occupational health service. This reduced the "conditionally able-bodied" status.

8. CONCLUSIONS

Recommendations on medical measures [12]:

- Prompt treatment of chronic conditions to prevent them from worsening and reduce the number of days of temporary incapacity for work.
- Monitoring of those with chronic conditions, with regular check-ups, to raise awareness of the need to follow prescribed treatments, and to note in good time any changes that may affect both health and work capacity.
- Limiting smoking and observing individual and collective hygiene measures.
- Recognizing the risks arising from occupational exposure.
- Carrying out a medical examination when taking up employment, returning to work, periodic medical check-ups in accordance with current legislation [9].

Compliance with these recommendations maintains the work capacity at appropriate parameters and obviously contributes to improving the health of employees [12].

The study includes theoretical and practical information that has accumulated over time, but also proposes several solutions in terms of work equipment, workload and environment, as well as regards to the workers, all with the aim of preventing accidents at work on construction sites. The aim of the study is to identify appropriate collective protection in relation to the workload, so that construction sites are safe for workers exposed to the risk of falling from a height (employers, employees, supervisors, self-employed persons, and staff involved in the inspection of work equipment or workplaces).

The results of the study will help managers to prioritize risks according to the likelihood of accidents and injury characteristics and to pay more attention to balancing significant risk relationships to prevent accidents and achieve safer working environments.

In the future, researches will be focused on the investigation of the working conditions and occupational health and safety characterizations in industrial systems based on past experiences of universities - industry collaborations and technical consulting contracts [17]. The aim will be to transfer the innovative approach and the knowledge achieved by the research team in industrial practice. Thus, companies could increase the workplace wellbeing, labor productivity [18] and competitiveness [19, 20]. Also, special attention will be given to the employees training in the field of indoor air quality and the monitoring process of the main characterization parameters (e.g., using modern and actual training systems as presented in [21, 22]). The improvement of the working condition and the safety climate will be better supported by systematic training programs and

occupational health and safety awareness campaigns [23, 24].

9. REFERENCES

[1] Government Decision no. 300/2006 regarding minimum occupational health and safety requirements for temporary or mobile construction sites.

[2] Law no.319/2006 of occupational health and safety.

[3] Chivu, O. R., *Research and contributions on occupational health and safety in the field of industrial engineering,* Assoc. UPB, 2020.

[4] Feier, A., Banciu, F., *Ergonomic aspects of real and virtual welding tools*, Acta Tehnica Napocensis/Series Applied mathematics, mechanics and Engineering, 64(1-S1), 2021.

[5] Dimitrescu, A., Babis, C., Alecusan, A. M., Chivu, O. R., Feier, A., *Analysis of Quality Problems in Production System Using the PDCA Instrument*, Fiability & Durability / Fiabilitate si Durabilitate, 1, pp. 286-292, 2018.

[6] Firu, A., Ţăpîrdea, A., Chivu, O. R., Feier, A., Drăghici,G., *The competences required by the new technologies in Industry 4.0 and the development of employees' skills*, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, 64(1-S1), 2021.

[7] Butisca, A., *Rehabilitation of historical steel cantilever bridges*, UPT, ISSN: 1842-581X, Timisoara, 2013

[8] Antonov, A. E., *Ghid de securitate şi sănătate în muncă în sectorul construcţii*, OEDI INCDPM Publishing House, Bucureşti, 2012.

[9] Government Decision no. 355/2007, regarding surveillance of workers' health.

[10] Păuncu, E. A., *Gherman, F., Riscuri Profesionale- Aspecte de Medicina Muncii in Construcţii*, 2002, https://pdfslide.net/documents/aspecte-de-medicina-muncii-in-constructii.html.

[11] *Checklist for Hazards Identification on a Construction Site*, https://legislatiamuncii.manager.ro/a/7472/lista-de-verificare-pentru-identificarea-pericolelor-pe-un-santier-de-constructii.html.

[12] Romanian Occupational Medicine Reports for the period 2017–2021.

[13] Nica, A.S., Ojoga, F., Murgu, A., *Premize si perspective in colaborarea medicina muncii - medicina de recuperare*, https://www.slideserve.com/fraley/premize-si-perspective-in-colaborarea-medicina-muncii-medicina-de-recuperare-2.

[14] Law no. 418 of 2004 on the professional status of the Occupational Medicine doctor.

[15] Government Decision no. 1048 of 2006 - regarding the minimum safety and health requirements for the use by workers of personal protective equipment at work.

[16] Government Decision no. 1051 of 2006 - on the minimum safety and health requirements for the manual handling of masses that present risks for workers, especially dorsolumbar diseases.

[17] Draghici, A., Baban, C. F., Ivascu, L. V., Sarca, I. (2015). *Key success factors for university–industry collaboration in open innovation*, Proceedings of the ICERI2015, ISBN: 978-84-608-2657-6, 7357-7365, IATED, 2015.

[18] Albulescu, C. T., Draghici, A., Fistiş, G. M., Trusculescu, A., *Does ISO 9001 quality certification influence labor productivity in EU-27?* Procedia of Social and Behavioral Sciences, 221, 278-286, 2016.

[19] Paschek, D., Rennung, F., Trusculescu, A., Draghici, A., *Corporate development with agile business process modeling as a key success factor*, Procedia Computer Science, 100, 1168-1175, 2016.

[20] Baesu, V., Albulescu, C.T., Farkas, Z.B., Draghici, A., *Determinants of the high-tech sector innovation performance in the European Union: a review,* Procedia Technology, 19, 371-378, 2015.

[21] Gogan, M. L., Sirbu, R., Draghici, A., *Aspects concerning the use of the Moodle platform – case study*, Procedia Technology, 19, 1142-1148, 2015.

[22] Draghici, A., Mocan, M., Draghici, G., *On-line training and certification solution for business process managers*. Proceedings

of International conference on enterprise information systems (380-389). Springer, Berlin, Heidelberg, 2011.

[23] Dragoi, G., Draghici, A., Rosu, S. M., Radovici, A., Cotet, C. E., *Professional risk assessment using virtual enterprise network support for knowledge bases development*. In International conference on enterprise information systems, 168-177, Springer, Berlin, Heidelberg, ISBN978-3-642-16418-7, 2010.

[24] Dufour, C., Draghci, A., Ivascu, L., Sarfraz, M., *Occupational health and safety division of responsibility: A conceptual model for the implementation of the OHSAS 18001: 2007 standard*, Human Systems Management, 39(4), 549-563, 2020.

Măsuri de inspecție și securitate în activitățile de construcție la mare înălțime

Rezumat : Lucrarea include informații teoretice și practice acumulate de-a lungul timpului, dar propune, de asemenea, mai multe soluții în ceea ce privește echipamentele de lucru, volumul de muncă și mediul înconjurător, precum și în ceea ce privește lucrătorii, toate acestea cu scopul de a preveni accidentele de muncă pe șantierele de construcții. Mai precis, scopul este de a identifica o protecție colectivă adecvată în raport cu volumul de muncă, astfel încât șantierele de construcții să fie sigure pentru lucrătorii expuși la riscul de cădere de la înălțime (angajatori, angajați, supraveghetori, lucrători independenți, personal implicat în inspecția echipamentelor de lucru sau a locurilor de muncă).
Rezultatele cercetării îi vor ajuta pe manageri să prioritizeze riscurile în funcție de probabilitatea accidentelor și de caracteristicile leziunilor și să acorde mai multă atenție echilibrării relațiilor de risc semnificative pentru a preveni accidentele și pentru a obține medii de lucru mai sigure. Această lucrare își propune să evalueze activitatea de medicina muncii analizând rezultatele chestionarului.

Cristina GOGELESCU (MEIȚĂ), PhD Student, Industrial Engineering and Robotics Doctoral School, Politehnica University of Bucharest, cristinameita1971@gmail.com, +40727738453, 313 Splaiul Independenței, București, Romania.

Roxana Oana CHIVU, PhD., Professor, Politehnica University of Bucharest, Faculty of Industrial Engineering and Robotics, virlan_oana@yahoo.co.uk, +40722219498, 313 Splaiul Independenței, Sector 6, RO-060042 Bucharest, Romania.

Anamaria Ioana FEIER, PhD., Assoc. Prof., Politehnica University Timișoara, Materials and Manufacturing Engineering Department, ana-maria.feier@upt.ro, +40 741111858, 1 Mihai Viteazu Bd., 300222, Timișoara, Romania.

Claudia BORDA, PhD., Assoc. Prof., Politehnica University of Bucharest, Faculty of Industrial Engineering and Robotics, ctistere@yahoo.com, +40747970458, 313 Splaiul Independenței, Sector 6, RO-060042 Bucharest, Romania.

Marilena GHEORGHE, PhD. Lecturer, Politehnica University of Bucharest, Faculty of Industrial Engineering and Robotics, ghe_marilena@gmail.com, +40722323451, 313 Splaiul Independenței, Sector 6, RO-060042 Bucharest, Romania.