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# PEOPLE WHO ARE RESPONSIBLE FOR HEALTH AND SAFETY ON THE CONSTRUCTION SITES

BY

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**Abstract.** This work presents the responsibilities that must have be fulfilled by employers, project manager, and the employee, to reduce the level of work-related risk that may arise on construction sites. Usually the economic, psychological, technical, environmental, organizational and procedural aspects lie at the base of unwanted events. The nature of risks and their prediction in this area is much more difficult and complex than other areas of economic activity. For example, industrial construction due to the specific features of the mobility of the construction process and the workplace, the specific technology to each process, the action of climatic agents, different materials and types of semi-finished or precast elements.

The identification of risks, the establishment of occupational safety standards and the training of the persons whois working on the site, as well as the persons visiting the site, all these must be done for each stage of execution, since they differ from one stage to another.

**Keywords:** safety; security; working environment; risk factors; risk management.

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## 1. Introduction

Over time, the level of awareness has been raised about occupational health risks that may arise on construction sites. However, despite the substantial improvements achieved, the level of risk associated with the labour protection, namely the rate of accidents produced, is much higher than in most another economic activities, the construction activity being one of the most dangerous areas in the world. Although occupational safety and health concerns are present at all stages of the life cycle of construction projects, the risk of accidents with serious consequences is manifested by a significant weight in the execution stage.

In construction, domain the risk of death as a result of an accident is 5 times higher than in the manufacturing industry, and the risk of a major injury is 2.5 times higher. Regarding strictly the construction field, the particularities favoring the high rate of accidents as opposed to the rest of the manufacturing industry are:

– the high percentage of small businesses and self-employed workers;
– the variety and relatively short life of construction sites;
– the repeated change of workers;
– a large number of seasonal or migrant workers, many of them are unfamiliar with construction processes;
– the influence of climatic conditions;
– the great number of different professions and occupations;
– construction projects as unique products;
– dispersion and variability of conditions and jobs;
– structure of diversified and multicultural work;
– the type of contract with the workers;
– variability/instability of workplaces and work teams;
– lack of professional training and information.

The results of the activity of any construction company are influenced by threats from the environment, but at the same time, it is important for managers to be able to harness the opportunities of the environment in which they operate and to avoid external threats.

Responsibilities in the field of labour safety and health at work of employers and employees in all sectors of activity, both public and private, are set by the following legislative regulations: Legea nr. *319*/2006 a Securităţii şi Sanătăţii în muncă; Normele metodologice de aplicare a Legii nr. *319*/2006 a Securităţii şi Sanătăţii în muncă; Hotararile de Guvern care transpun Directivele specifice aplicabile.

## 2. Obligations of the Employer

Employers must have elaborated an employment protection of health measures whether grounded primarily in legislation and court rulings. It is not by accident that the laws in force impose that every firm doing business in the field of construction should develop a Risk Assessment in the field of occupational safety and health - unfortunately this is not very much respected.

The document should specify which of the members of the management is responsible for controlling the achievement of these standards and who has the authority to assign responsibilities to the members of the management and the heads of the working group at all levels, as well as to verify their fulfillment.

## 3. Occupational Safety Management Obligations

Occupational safety management involves planning, identifying problem areas, coordinating, managing and controlling activities to ensure safety and security on a construction site, all aimed at preventing accidents and illnesses. Construction managers have to identify the hazardous conditions that led to the accident, in particular, they must first deal with the incident and after the accident themselves. On a construction site, there are more incidents than accidents. A dangerous action can be carried out hundreds of times before it causes an accident, and managers' efforts should be directed towards eliminating these potential dangers. Therefore, safety management means checking security measures before the injury occurs.

The most common situation on a construction site is the inadequacy of labor protection equipment, whether it is incomplete, or the workers are not checked protective equipment (Fig. 1).

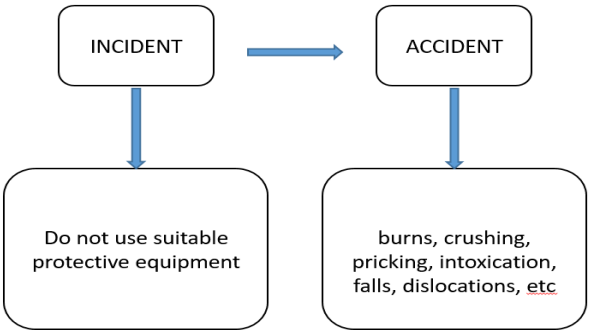


Fig. 1 – An example of an incident on construction sites that cause accidents.

Effective occupational safety management has three major objectives:
– to make the work environment a safe environment;
– to do the job without danger;
– to make workers aware of safety and security issues.

Another classification of accidents that can occur at a construction site, taken from the literature, is presented in Fig. 2.

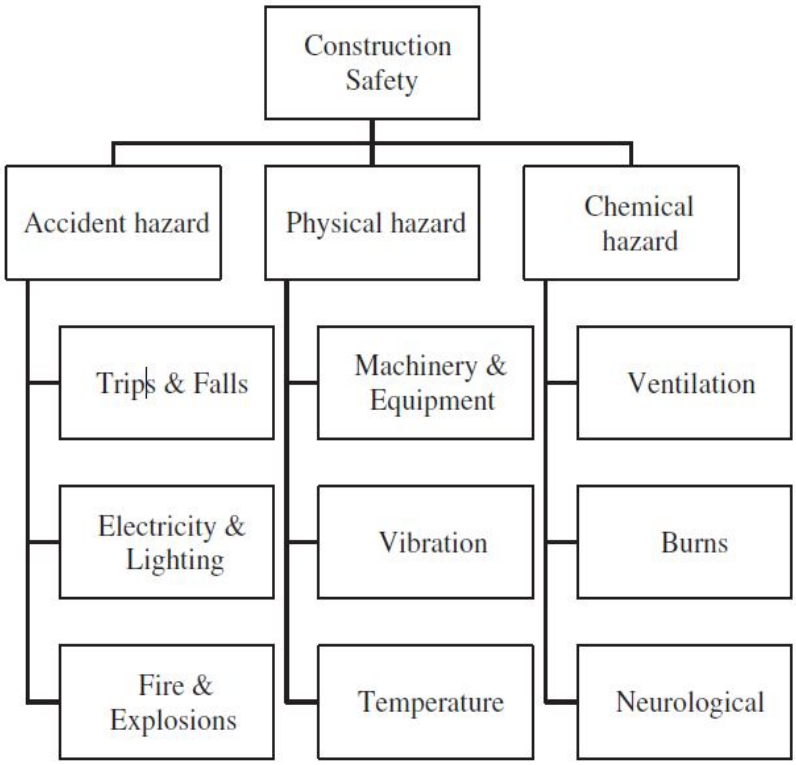


Fig. 2 – Hierarchy of risks affecting construction safety (Saman *et al*., 2013).

In the case where subcontractors are used for construction works, the contract with them must specify the responsibilities, tasks and safety measures that their employees have. These measures may include the existence and use of specific work safety equipment, methods for the safe carrying out of certain work tasks, and the proper checking and use of tools. The person responsible for the site must also ensure that materials, equipment, and tools on-site meet the safety standards of work. Training sessions should be conducted at state levels, including for managers, workplace heads and workers.

Sub-contractors and their workers may also need to be trained in the field of workplace safety procedures on-site, as different teams of skilled workers could mutually influence their occupational safety.

There must be a system whereby site management is briefly informed of unsafe practices and defective equipment.

Duties concerning the health and safety of workers must be allocated to well-trained people. Some examples of duties that should be specified:

– the purchase, construction and maintenance of access ways, pedestrian walkways, barricades and protective awnings;construction and installation of security signs;

– protective measures specific to each occupation;

– testing lifting machines such as cranes and lifts, as well as lifting gear such as cables and connecting rings;

– inspecting and repairing access facilities like sunscreens and stairs;

– inspection and cleaning of toilets, dressing rooms, and canteens;

– transmission of relevant parts of the occupational safety plan to each team;

– emergency and evacuation plans.

Any construction company, must employ one or more appropriately trained people whose main task is to promote health and safety. The officers must have direct access to one of the company's executives. The responsibilities of the officers should be as follows:

– organizing the information to be sent from the company management to the munitions, including the sub-contractors' employees;

– organizing and conducting training programs on occupational safety, including the training of all workers on the job site;

– investigating and analyzing the circumstances and causes of work accidents and occupational diseases, to foster prevention recommendations;

– technical advice to the Labor Safety Committee;

– participation in site planning activities.

To perform these duties, the occupational safety officer must have experience in construction work as well as appropriate professional training and, where this is the case, must be a member of a body recognized by health and safety experts.

Good planning and organization on each site, as well as the assignment of clear responsibilities to the heads of the work points, are fundamental elements of the safety of construction work.

Each foreman needs the direct support of the site's management and must ensure within its area of competence the following:

– working conditions and equipment are safe;

– job security to be inspected periodically;

– workers should be properly trained for the coin they have to do;
– labor safety measures to be applied;
– to adopt the best solutions about the resources and skills available;
– all personal protective equipment that is needed, available and used.

Ensuring workplace security will require regular inspections as well as provision for means to address the situation. Forming workers will help them recognize the risks they face and the ways to overcome them. Workers need to be shown what is the safe way of doing a certain task.

## 4. Obligations of the Working Staff

Every worker has the moral duty, and in many cases legal, to take the utmost care of his safety as well as that of his colleagues.

There are several ways to directly involve workers in improving site conditions, for example:

– a short 5,...,10 minute meeting with the head of the workstation, just before starting a work assignment, allows discussing the work security issues that may arise, as well as the potential solutions to solve. This activity is simple to organize and can prevent serious accidents (Fig. 3).

– safety check, worker verification of work environment safety before commencing an operation can allow any dangerous situation to be remedied for their safety or other workers.

Fig. 3 – Meeting with the head of the point.

## 5. Briefly Analyzes Factors that Affect Safety at Work on Construction Sites

The impact of historical, economic, psychological, technical, procedural, organizational and environmental aspects is taken into account as to how these factors are related to the safety level at work in a construction site, Fig. 4.

The historical factor is assessed by the character and characteristics of the individual, such as age and experience;

The economic factor is determined by the monetary values that are associated with security, such as salary;

The psychological factor is assessed by the safety behavior of colleagues at work, including supervisors;

Technical and procedural factors are assessed by providing training and handling of on-site safety equipment;

Organizational and environmental factors are assessed by the type of policy that management takes to ensure site security.

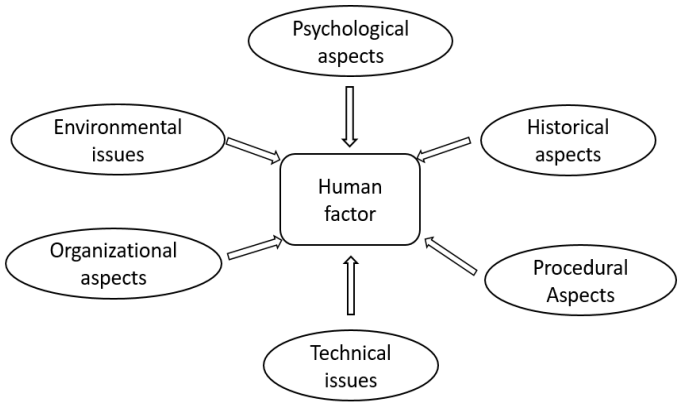


Fig. 4 – Factors that affect worker safety on site.

## 6. Conclusions

The level of risk and implicitly of acidity on construction sites would be considerably reduced if the employer fulfilled the obligation to employ qualified personnel in the field of construction safety and protection in the construction sector to check that the yard is equipped with all the necessary safety, training and permanent checking of workers' teams.

Due to the high workload and variety of construction processes, unskilled workers are also employed, this category of workers is the most vulnerable and accidents-prone. This branch of construction, security, and health at work is not negligible, because many accidents end in the loss of human lives.

## REFERENCES

Aminbakhsh S., Gunduz M., Sonmez R., *Safety Risk Assessment Using Analytic Hierarchy Process (AHP) During Planning and Budgeting of Construction Projects*, Journal of Safety Research, Turkey, **46**, 99-105 (2013).

Cigularova K.P., Chenb P.Y., Rosecranceb J., *The Effects of Error Management Climate and Safety Communication on Safety: A Multi-Level Study*, Accident Analysis and Prevention, USA, **42**, 1498-1506 (2010).

Cunninghama T.R., Guerina R.J., Kellera B.M., Flynna M.A., Salgadob C., Hudsonb D., *Differences in Safety Training Among Smaller and Larger Construction Firms with Non-Native Workers: Evidence of Overlapping Vulnerabilities*, Safety Science, United States, **103**, 62-69 (2018).

Forteza F.J., Carretero-Gómez J.M., Sesé A., *Effects of Organizational Complexity and Resources on Construction Site Risk*, Journal of Safety Research, Spain, **62**, 185-198 (2017).

Forteza F.J., Carretero-Gómez J.M., Sesé A., *Occupational Risks, Accidents on Sites and Economic Performance of Construction Firms*, Safety Science, Spain, **94**, 61-76 (2017).

Golizadeha H., Hona C.K.H., Drogemullera R., Reza Hosseinib M., *Digital Engineering Potential in Addressing Causes of Construction Accidents*, Automation in Construction, Australia, **95**, 284-295 (2018).

Ibarrondo-Dávila M.P., López-Alonso M., Rubio-Gámez M.C., *Managerial Accounting for Safety Management. The Case of a Spanish Construction Company*, Safety Science, Spain, **79**, 116-125 (2015).

Mariscala M.A., López-Pereaa E.M., López-Garcíaa J.R., Herrerab S., García-Herreroa S., *The Influence of Employee Training and Information on the Probability of Accident Rates*, International Journal of Industrial Ergonomics, Spain, **72**, 311-319 (2019).

Newaza M.T., Davisa P., Jefferiesa M., Pillayb M., *The Psychological Contract: A Missing Link Between Safety Climate and Safety Behaviour on Construction Sites*, Safety Science, Australia, **112**, 9-17 (2019).

Şerbănoiu I., Antohi A., *Studiul şi proiectarea procesului de construcţie*, Ed. Rotaprint, Universitatea Tehnica "Gh.Asachi" Iasi, (1993).

Vasconcelos B., Barkokébas B. Junior, *The Causes of Work Place Accidents and Their Relation to Construction Equipment Design*, Procedia Manufacturing, Brasil, **3**, 4392-4399 (2015).

Wing Hang Lee, Kam Hung Danny Tse, Wai Kit Percy Ma, *Applied Technologies in Minimizing Accidents in Construction Industry*, Procedia Environmental Sciences, China, **36,** 54-56 (2016).

* * * *Securitatea şi sănătatea muncii pe şantierele de construcţii*, Organizaţia Internaţională a Muncii, Bucureşti, Editura Casei de Meserii a Constructorilor, 2007.

## PERSOANELE RESPONSABILE CU SECURITATEA ŞI SĂNĂTATEA MUNCII PE ŞANTIERELE DE CONSTRUCŢII

(Rezumat)

În lucrare sunt prezentate responsabilităţile pe care trebuie să le aibă angajatorul, managerul de proiect şi angajatul astefel încât să se reducă nivelul riscului legat de protecţia muncii, care poate să apară pe şantierele de construcţii. Aspectele economice, psihologice, tehnice, de mediu, organizaţionale şi procedurale stau la baza evenimentelor nedorite. Natura riscurilor şi previziunea lor în acest domeniu este mult mai dificilă şi mai complexă decât în alte domenii economice. De exemplu, construcţiile industriale, datorită particularităţilor specifice ce ţin de mobilitatea procesului de construcţie şi a locului de muncă, tehnologia specifică fiecărui proces, acţiunea agenţilor climatici, a diferitelor tipuri de materiale şi a tipurilor de elemente semiprefabricate sau prefabricate.

Identificarea riscurilor, stabilirea standardelor de siguranţă la locul de muncă şi instruirea persoanelor care lucrează pe amplasament, precum şi persoanele care vizitează site-ul, toate acestea trebuie să fie făcute pentru fiecare etapă de execuţie, deoarece diferă de la o etapă la alta.