

# Prevention of work accidents and occupational risk

DUMITRASCU A.-E.

**Abstract**— In the present paper are detailed the processes for identifying the risk factors, assessing and prioritizing the specific professional risks in order to identify and establish measures meant to protect the health and ensure the safety of the workers. The case study refers to the identification of the professional risk factors specific to the analyzed process, their quantification, monitoring and control in order to prevent occupational accidents and diseases. The results of the assessment indicate that the estimated level of risk for the three components of the analyzed system of work generates risks of occupational and professional health that exceed the acceptable level.

**Keywords**— occupational risks, occupational risk assessment, prevention, work accidents.

## I. INTRODUCTION

THE occupational risk assessment aims at enabling the employer to take appropriate preventive / protective measures related to: prevention of occupational hazards, training of workers, informing workers, implementing a management system that allows effective implementation of the necessary measures. If the basic purpose of risk assessment is to prevent occupational hazards, achieving this goal is not always possible. When it is not possible to eliminate the risks, they should be reduced and the residual risk should be controlled [1], [2], [3].

Occupational risk assessment process should be structured so that they can achieve [2], [4], [5], [6]:

- identifying existing hazards and assessing the risks associated with these hazards, in order to establish measures to protect the health and safety of workers, as required by legislation;
- assessing risks for the optimum selection of equipment, substances used, and the organization of the workplaces;
- verifying the appropriate implementation of the proposed measures;
- establishing both the priorities for action and the opportunity to take further action following the analysis of the conclusions of the occupational risk assessment.

A successful organization is based on healthy employees who work in an exciting environment. By that makes employees feel better and healthier, workplace health

promotion aims:

- Reduce absence from work;
- Stimulate motivation, increase productivity;
- Facilitating the recruitment process;
- Reduce the fluctuation of workers;
- Promoting a positive image.

Management system of safety and health at work is a component of general management.

This system aims to:

- Awareness and knowledge of employees in compliance with norms and standards of safety and health at work;
- Elimination or reduction of risk factors for injury and / or professional disease;
- Getting to the performance of state employees by providing good job;
- Favorable perception by providers, beneficiaries and society in general.

Implementation and certification of a management system of safety and health (occupational) is an effective tool for organizing and focusing an organization to better management of occupational risks (accidents, incidents, occupational diseases) and improve performance considerably professional.

The objective is to help an organization to understand the hazards and risks which can be minimized or removed to assure its employees and other interested parties that they are practicing a hazardless process in meeting the product requirements of their customers.

Assessing the level of security is a systematic examination of all aspects of work undertaken to determine the sources that may cause bodily harm, constituting the basis for substantiation of preventive measures and control risks [5].

## II. EVALUATION OF OCCUPATIONAL RISK FACTORS

The analyzed work is represented by the superfinishing, washing and preservation operations that the piece is subjected to during processing.

The CNC operator of the honing machine carries out its activity in specially equipped spaces with adequate work equipment.

The work process involves compliance with all specific work safety rules and machine and device operating instructions as well as specific internal working rules / instructions.

Besides these basic operations, CNC operator run and supply feedstock to the respective equipment.

A.-E. Dumitrascu is professor at Department of Manufacturing Engineering, Faculty of Technological Engineering and Industrial Management, Transilvania University of Brasov, Romania (corresponding author to provide e-mail: dumitrascu\_a@unitbv.ro).

The components of the assessed work system are:

- production system;
- work task;
- work environment;
- performer.

Work equipment:

- superfinishing machine;
- clamping device;
- verification device;
- operator toolbox;

Used materials:

- raw material;
- superfinishing tools;
- industrial detergents;
- preservative.

The works are executed on the basis of the job attributions and consist of:

- Visual inspection of the technical and functional state of the used work equipment;
- Equipped with protective equipment;
- Preparing the components necessary for the production process;
- handling materials;
- Mounts and installs the clamping and verification devices;
- Feed the machine with industrial detergents and

preservatives;

- Ensure the functioning and maintenance of the sanitary facilities;
- Keep cleanliness at work.

Every worker must work in accordance with his / her training and instruction as well as instructions received from the employer so as not to expose both his or herself and others to the danger of injury or illness of its actions or omissions during the work process.

The risk factors of the analyzed process are highlighted in the "Evaluation Sheet". These risks factors have been identified taking into account all components of the work system.

The level of risk obtained for the job analyzed is 3.28, which is in the high risk category for assessing occupational health and safety for the analyzed processing process. The level of risk allowed by the organization is 2.5 (Figure 1).

In order to prioritize the risk factors characteristic of the analyzed workplace, the partial risk levels were determined for each category.

Analyzing the results evaluation, it can be noted that the estimated risk level for the production system is 3, the level of risk to the contractor is 3.5, and the level of work task is 4. These three components of the analyzed work system generate risks of health and safety that exceed the acceptable level of 2.5 (Figure 2 to Figure 5).

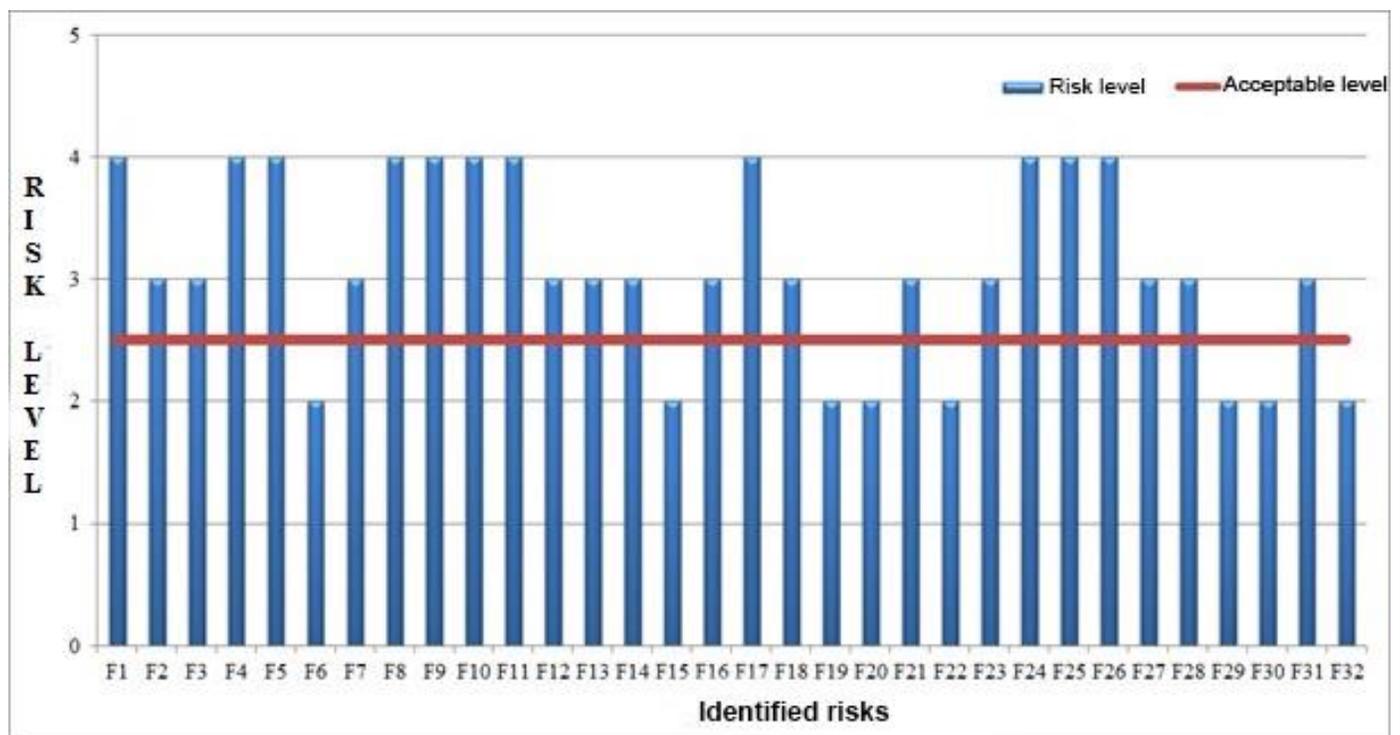


Fig. 1 The distribution of identified risks for the analyzed workplace

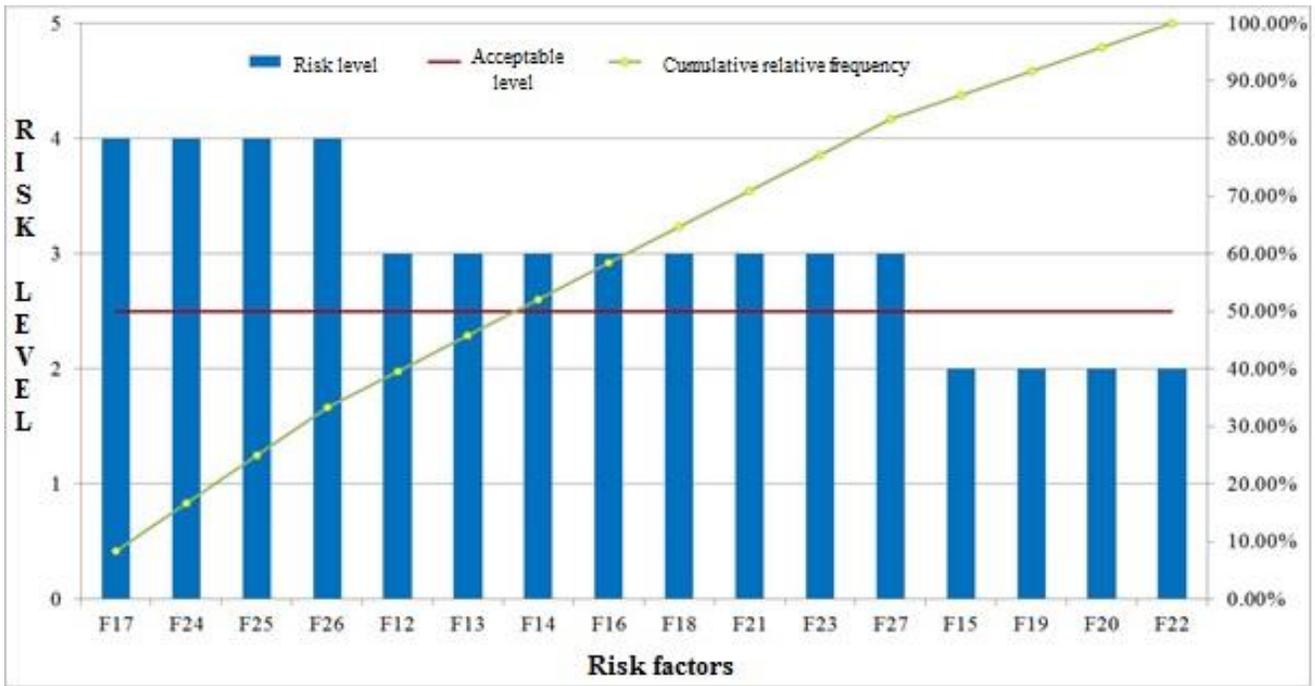


Fig. 2 The prioritization of risks factors

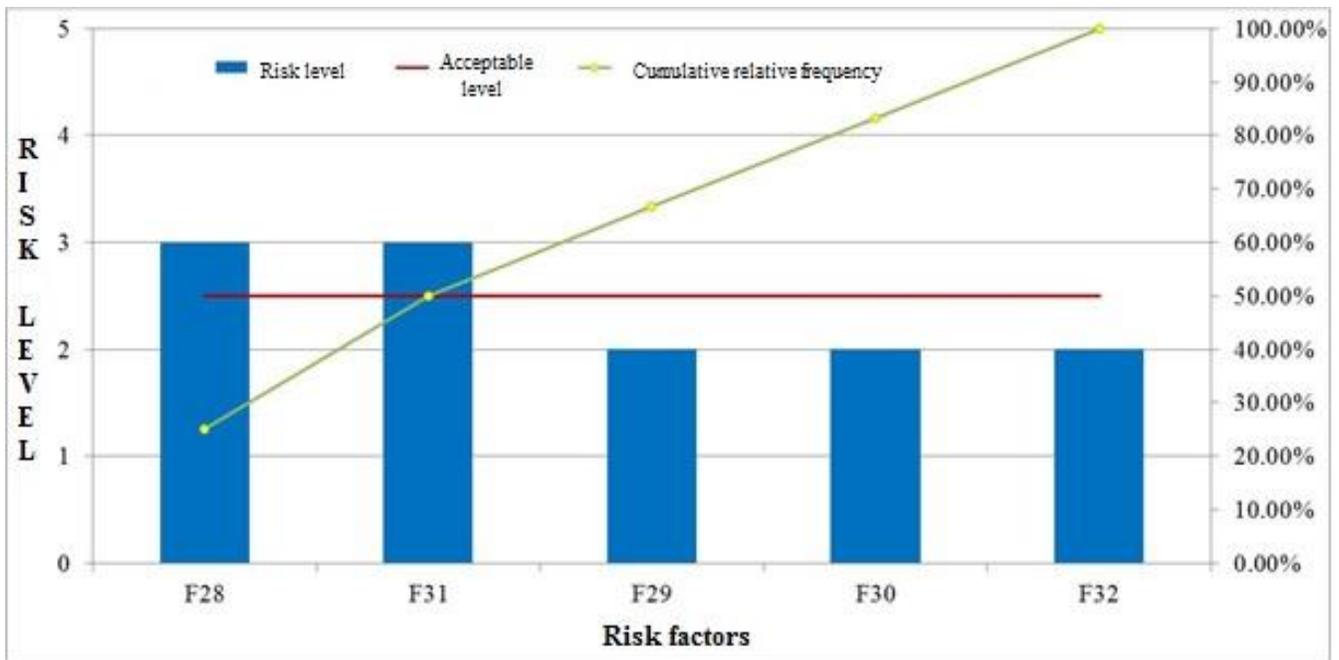


Fig. 3 The prioritization of risks factors for work environment

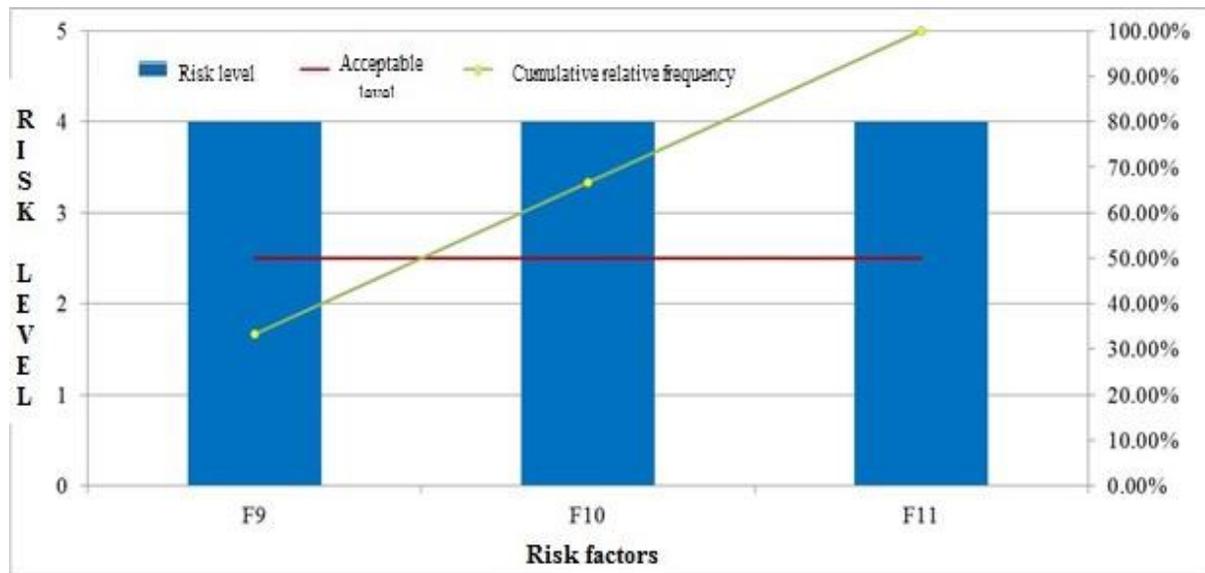


Fig. 4 The prioritization of risks factors for work task

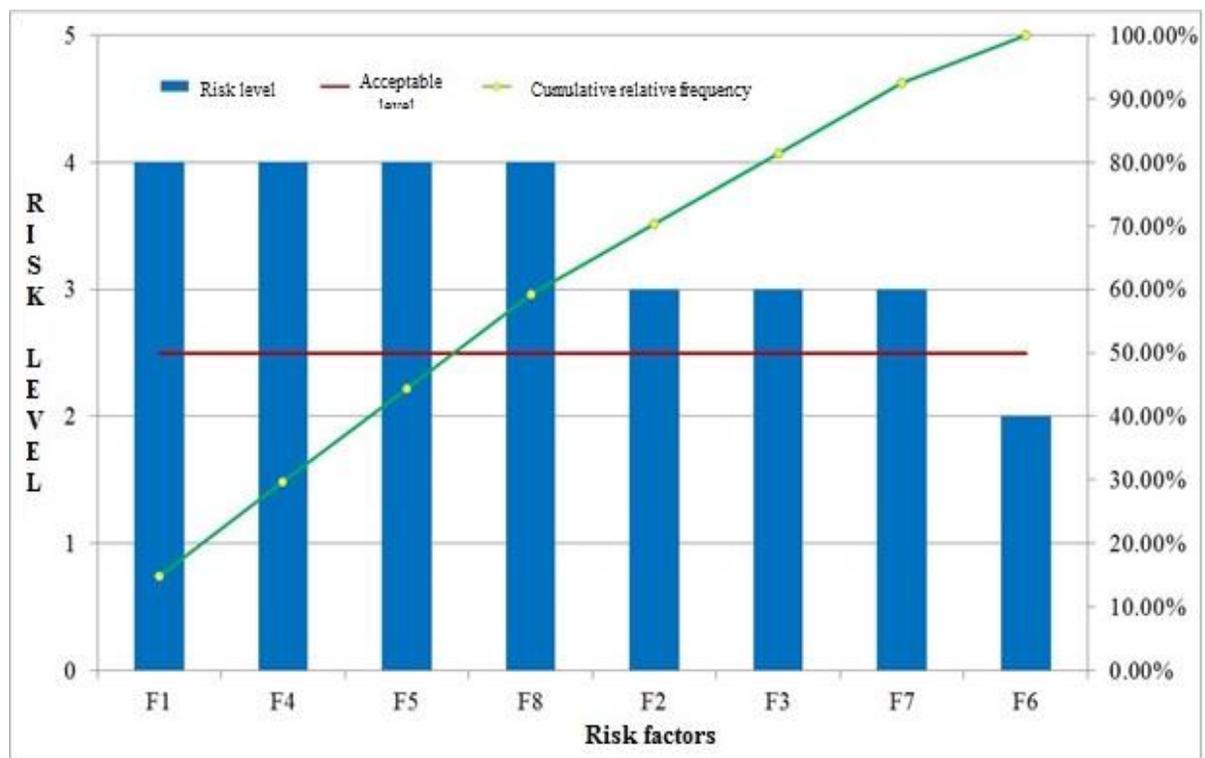


Fig. 5 The prioritization of risks factors for performer

### III. CONCLUSIONS

Regarding the percent of assessed risk factors and according to the generating source within the analyzed work system, the situation is as follows:

- 53% - factors of the production system;
- 22% - factors of the performer;
- 14% - factors related to the working environment;
- 11% - factors related to the work tasks.

In order to prevent the occupational accidents and illness,

the performer has the following obligations:

- Proper use of systems, equipment, tools, hazardous substances, transport equipment and other production systems;
- Use properly the individual protective equipment provided and, after use, to return it or put it in the place for storage;
- Not to disable, modify, change or arbitrarily remove its own security devices.

## REFERENCES

- [1] *A Practical Guide to Risk Management*. The NASA ASIC Guide: Assuring ASICS for Space, Jet Propulsion Laboratory, California Institute of Technology and National Aeronautics and Space Administration, 1993.
- [2] *SR OHSAS 18001:2008, Occupational health and safety management systems. Requirements*, ASRO & Bleu Project Software, Bucharest, 2008.
- [3] C. Alexander, E. Sheedy, *The Professional Risk Managers' Handbook: A Comprehensive Guide to Current Theory and Best Practices*. PRMIA Publications. ISBN 0-9766097-0-3, 2005.
- [4] N. Crockford, *An Introduction to Risk Management*, 2nd Edition, Woodhead-Faulkner. ISBN 0-85941-332-2, 1986.
- [5] A. Nedelcu, A.-E. Dumitrașcu, L. Cristea, "The Importance to Evaluate Risks of Occupational Health and Safety." *Proceedings of the 8th WSEAS International Conference on INSTRUMENTATION, MEASUREMENT, CIRCUITS and SYSTEMS*, pp. 79-82, May 20-22, Hangzhou, China, 2009, ISSN 1790-5117, ISBN 978-960-474-076-5.
- [6] A.-E. Dumitrascu, *Environmental quality management* (in Romanian: Managementul calitatii mediului), MATRIXROM Publishing House, Bucharest, 2016.

**A.-E. Dumitrascu** is currently professor at Manufacturing Engineering Department, Faculty of Technological Engineering and Industrial Management. She received a Ph.D. degree in Industrial Engineering from Transilvania University of Brasov in 2005 and a M.Sc. in Quality Engineering, with competences in the fields of renewable resources valorization, reliability engineering, industrial probability and statistics, industrial project management, manufacturing, quality and environment management system implementation. Member of the Center for Scientific Research of "Technological Development System" (CCSDeTInfo) of the Transilvania University of Brasov, NURC recognized center, member of Scientific Research Center "Advanced Technologies and Manufacturing Systems". The scientific activity consists of publication as author and coauthor of scientific articles, member and project responsible of research grants and co-organizer of several international conferences.