



Book Review

UNCONVENTIONAL METHODS TO ANALYSE AND EVALUATE OCCUPATIONAL RISK

Gabriel-Dragoş Vasilescu

INSEMEX Editors, Petroşani 2008, Romania
ISBN 978-973-88590-0-5, 2008, 196 pages

The book entitled "*Unconventional Methods to Analyze and Evaluate Occupational Risk*" develops mathematical models that can be used in the foundation of modern methods to analyze and evaluate occupational risks with the view to prevent and fight against the causes that can generate occupational diseases and accidents. The book is divided into two distinct parts: the first part covers the present knowledge on the evaluation of professional risk and the second part covers the personal contributions for the design and implementation of specific methods for approaching occupational accidents and diseases that involves an analysis and evaluation of occupational risk as a result of its quantizing.

The first part of the book includes an introductory part with the general issues of professional safety together with the main notions with widely recognized terms in this field of activity. Starting with a detailed presentation of hazards related to the existing risk factors inside the labor systems, the paper gets to a particular presentation of general and specific risks that should be considered for the drawing up of a risk study (Chapter I).

By presenting the means used to evaluate occupational risk by occupational safety diagnosis, as a working method addressing the experts, who takes in consideration both the occupational accidents and diseases recorded and their possible occurrences, there is being underlined the origin of objective uncertainty and of inaccuracy that provides the subjective character of these evaluations.

The purpose for presentation of the concept and of the working methods used in preventing the occurrence of occupational accidents and diseases its o turn aware the experts in the occupational health

and safety and to orientate them towards a modern engineering discipline "occupational safety" that comprises specific methods and techniques for approaching the issues related to design and development of protective systems and technical equipment, as well the management of occupational risk (Chapter II).

The methods and the models used to evaluate and/or estimate occupational risk inside working systems are presented under the form of critical comparisons of performances, characteristics and final results, with no technical detail or information on algorithm that are dully covered in the literature. The critical observations over the methods used to analyse and evaluate occupational risks underline the methods used to highlight the subjective character of the results of evaluation. (Chapter III).

The results presented in the second part of the paper present the efforts made by the author, materialized into a series of accomplishments regarding the design and development of analytical models used for the materialization of occupational risks and the corresponding expert software. There are also shown the theoretical aspects related to the mathematical notions used as working tool for the foundation of certain decisions in inaccurate conditions (with the underline of certain notions of fuzzy mathematics, fuzzy systems and decisions), as well of certain basic elements of probability specific to the safety of systems, used for the sampling of values resulted from evaluations.

The expert mathematical models used for occupational health and safety proposed by the author for further implementation in risk studies are the following ones:

- mathematical model for the analysis and evaluation of professional risk (MRISC);
- evaluation model related to human error (RISCOM);
- model of ergonomic analysis (MERG);
- model for an optimal allocation of resources during the assignation of levels of occupational safety (MRES).

The grapho-analytical method to determine the probable influence over the working systems provides the possibility to determine by calculation means the probable occurrence of risk and it is the basis for drawing up the risk-safety type specific features by which the probability of influence is explained in relation to the safety ratio and variation pseudo-ratio that quantize uncertainty of this safety ratio assigned to the working system under evaluation (Chapter IV).

The related mathematical methods and models drawn up for performing evaluation of occupational risks with the view to preventing and fighting against the causes that trigger occupational accidents and diseases, use specific methods and concepts to get input data, and their processing is with the help of fuzzy algorithms and of probabilistic procedures specific to the safety of systems. These are accomplished by using the order statistics and the statistics treatment of sampling for a concrete evaluation of the parameters that interfere in the formal relation of occupational risk (determining the

value of the probability of influencing the working system related the maximum predicted consequences), the results being expressed under the form of values and adjusted under fuzzy form (Chapter V).

The practical implementation of methods for analysis and evaluation of occupational risks proposed by the author is ensured by the possibility to use expert software on PC with the view to increasing the operation rate and to improving the level of occupational safety level in the working systems under analysis.

This expert software is called CINDY.EXE 1.0 and is intended for the implementation of the mathematical model for complex analysis MRISC, with the view to evaluating occupational risk. The concerns for the development and implementation of software on calculating machines are described in the content of the paper (mathematical algorithm, programming algorithm, menus to start software). The format of the software operating in .exe, the tables comprising database, as well the practical applications are shown in the annex of the book (Chapter VI).

Constantin Baci

Department of Occupational Health and Safety, "Gheorghe Asachi" Technical University of Iasi, Romania