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**APPLICATION OF COMPUTER AIDED RISK VALUATION USING
SCORING METHOD**

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***Abstract:** Paper describes possibilities of using computer calculations in human and technical risk valuation process using combine technique of Catalogue sheets method and Scoring method. Article presents behavior of proposed software application by risk matrix generating, which represent support in decision making process of risk valuation analyzes.*

***Key words:** Risk, Probability, Inference, Danger, Menace*

1. INTRODUCTION

Problem of work safety and health care in companies, geneses of work condition a work environment nowadays takes non-detachable part of management and production process controlling. Generally in advanced countries is accident, crash, fire or other damage of health, technical system or work environment considered as managing failure. One of important criteria by new system and technology establishing into production is safety level in human-machine- system. Ability to review safeness of concerned parts of production process can not rise from premises, but it must be based on systematic strategic approach. Main assumption of effective prevention of work safety and safety of technical systems is identification of dangers and threat, definition of their qualitative and quantitative characteristics followed by specification and risk valuation. Risk reviewing, which leads to specifications, proposition and execution of safety stroke, which tend to elimination of risk to lowest possible value – this process is considered as risk controlling or risk management.

Basic duty of machine and technical system producers according to lawful can be summarized in following parts:

- Obligation to perform risk analyses with consideration of human acting.
- Consideration of all risk , during technical lifetime of technical device or risk control
- Risk documentation during technical lifetime of machine and apprise this to user and other considered persons.

Necessary of safety increasing integration in stage of technical devices proposing demands producers to take to considerations these proceeding:

- Ensure minimization of treats or risks during lifetime of machine
- Consider expected auxiliary situations at machine running
- To evaluate necessary and suitable safety instructions for dangers, which cannot be removed
- Inform user of machines trough suitable documentation about remains risk of devices.

Risk valuation, from the view of probability of health damage and possible consequence to human health is determined from each part of work, work environment related with their effect on human factor on place of work. Selection of concrete method of risk and danger identification is for employer not specified by law. It is his responsibility to choose which method of risk identification use, considering of production activity and local specifications.

Outcome of such risk valuation is proposal and realization of safety strokes for example danger elements replacement, choice of using less danger working methods, better work organization, realization of training for interested person etc.

Scoring method, is used for risk valuation as a part of combine approaches of risk valuation and in ordinary operation demand minimal theoretical knowledge and perfect knowledge of appraisal technology and technical system, because of exact dividing of probability and effect into categories. [6].

Risk is in generally function at least of two parameters, parameter of multitude or probability and fallout.

Probability can be defined:

- By statistic data about accident rate, or failure rate from qualified guesses.

The fallout is dependent on:

- Measure of damage
- Injury severity
- Financial loss

Scoring method for each categories come out from theory of risk matrix construction. If the score is low, the risk level is high.

2. PROPOSAL OF SOFTWARE APPLICATION WHICH REPRESENT PRINCIPLES OF SCORING METHOD

On our workstation was for need of risk management process automatization created application which representing abilities of combine techniques by risk valuation and technical and human risk handling. Bookmark *Typ zariadenia* of presented application form concerning of identification data of observed technical device in shape of numerical entry for workplace – type of device and definition of design part which can be considered as possible source of risk in interaction with human aspect. This part also contains basic information about risk, its typing according to type and description of possible risk. In case of new entry for next mechanical part, which is acting as possible risk source, system search computing modules with defined variables, which define probability and effect of unwanted event and make comparison with entries in primary table of work database of application. In case system find out that for some segment of technical system was not executed process of risk valuation send information about this fact to safety engineer and propose possibility to access calculation part on bookmark *Výpočet rizika*. Realization of basic risk calculation is applied via bookmark *Výpočet rizika* of active form. Computing module comes out from scoring method theory. Safety engineer has to choose category of risk probability (A- often, B- probable, C- casual, D- rare, E- improbable) and category of risk effect (I-catastrophic, II-critical, III-boundary, IV- nominal). After clicking on *Prepočítaj riziko* button system according to numerical matrix of risk valuation type risk via philological variables in category ranks (Fig.1). Bookmark *Analyza rizika* (Fig.2) describes result of risk valuation in form of its score

value, risk state and appropriate level. As basic and extended data is used date of realized risk analyze, according to which blocking or unblocking of computing module of application is controlled



Obr.1 Risk calculation using Scoring method

By using *Hľadaj* button it is possible to add selection criteria of technical segment and obtains risk valuation for this construction part. Even after risk calculation the result of analyses can be modified by changing of context slide menu *Povolit' výpočet – Nepovolit' výpočet* and by confirming of this choice using *OK* text button. By clicking on *Tlač* button environment of output summary show up (Fig. 3) for selected type of workplace, characterized by its numerical identifier.

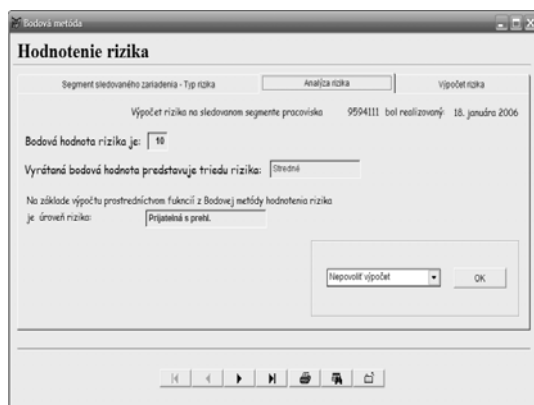


Fig. 2 Risk analyses

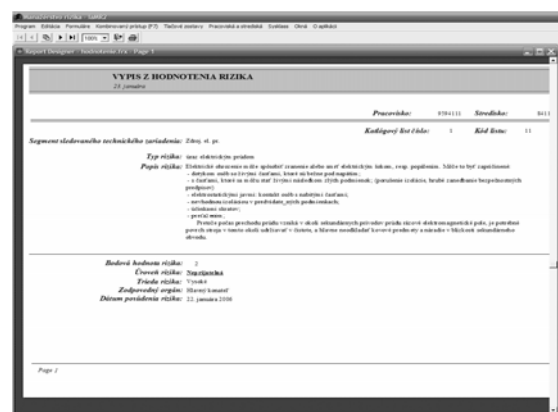


Fig. 3 Output summary generation

3. CONCLUSIONS

Necessary in risk control process is providing actual information about reviewed system, about work organization, used technologies and devices, possible risk sources, number of jeopardized people and law rules in field of safety. Keeping this information up to date and their passing put large demands on data management in organization system of company. It is necessary to safe technical and operational documentation on machines and technologies, statistical data about accident and failure rate, auditions results from internal and external sources, law rules and standard. It is required for risk valuation results implementation into organization of work and employees education, as well as ensuring systematic and repeated risk valuation, where worker from technical development – technologist, technician, team leaders and workers, that work directly in operations. Even using standard information systems the process of data exchange between members of risk consideration is difficult process that claims processing of different information. It is frequent event in this problem, that available information about jams and accidents, which represents forma of negative event are encumbered with subjective mistakes of involved persons.

Proposed application model should help involved persons from view of risk management to handle necessary data by its valuation and in combination with risk register create product, which has ability to minimize technical and human risk in concrete company, as well as it should be useful teaching tool by problem of risk management handling for students in education process.

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