

Systematic Method of Risk Assessment in Industrial Processes

Katarína Zánická Hollá
 University of Žilina
 Jozef.Ristvej@fsi.uniza.sk

Ladislav Šimák
 University of Žilina
 Ladislav.Simak@fsi.uniza.sk

Jozef Ristvej
 University of Žilina
 Jozef.Ristvej@fsi.uniza.sk

Abstract

The mankind has passed through a significant historical frontier, including technological processes where hazardous substances are the potential threats for the employees, the public, environment and property and therefore it is inevitable to pay increased attention to the occurrence of the industrial accidents and mainly to their prevention. The area of safety of technical and technological systems is very closely connected not only with the reliability of the processes but also with the technical as well as social, legal and other aspects. There exist several systematic approaches, methods and techniques to assess industrial processes and risks linked to these processes on the European Union level and also on the national level of each member state. We can mention some basic systematic approaches - MOSAR, CPQRA, ARAMIS, PRA (PSA) widely used in this area. But according to the analyst's needs they usually miss structured and systematic approach, how to complete the risk assessment in steps and what the content of each of these steps is. The main focus of this paper is to discuss the theoretical aspects of the risk assessment in industrial processes and to show the possible approach of structured and systematic methods with support of logical diagrams to fulfill all tasks concerning the industrial accident assessment. Last but not least it is to present the research activities of the Department of Crisis Management, University of Žilina in Žilina, Slovakia.

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Implementing the currently utilized procedures ARAMIS (Accidental Risk Assessment Methodology for Industries) and PRA (PSA) (Probabilistic Risk/Safety Assessment) requires good knowledge and experience. They are relatively demanding and are utilized especially for the SEVESO companies working with selected hazardous substances. The need to create a transparent procedure with mutually complexly linked steps is inevitable. The systematic procedures serve the processors of the risk assessments of the technological processes with the presence of a hazardous substance for better orientation in the given area as well as for approximation of the fulfillment of the individual phases and will make the selection of the methods and techniques for their implementation in the individual steps easier. Creating the logical sequence of the phases and steps, according to which the analyst should advance, is also emphasized. The phases of the risk assessment can be depicted by a simplified model which shows the involvement of the analyst, the manager (decision-maker) and the working team into the whole process.

Model of Systematic Method for Risk Assessment in Industrial Processes

The model of systematic method of the risk assessment in industrial processes in the Figure 1 contains the sequence of steps of the preparation phase of the risk assessment, the realization phase of the risk assessment, the phase of risk acceptability and reducing the risks out of which the first two have been described in the previous text. Individual steps necessary for correct realizing and securing the complexity of the assessment in the whole process were explained and characterized in each phase. Mutual link, especially from the point of view of the input of the necessary data to further steps is depicted in the individual steps. The model was set up based on analyzing the already existing procedures (e.g. MOSAR (Method Organized Systematic Analysis of Risk), ARAMIS).

- This model can be utilized for assessing the risks with the goal:
- to fulfill the legal requirements (e.g. law of the National Assembly of the Slovak Republic No. 261/2002 about Prevention of Serious Industrial Accidents, as Amended),
 - of control of operating process continuity (identifying and analyzing the risks in the microeconomic environment),
 - of the risk assessment in the area of safety and health at work.

The characteristic of the last phase of the risk assessment model – reducing unacceptable risks (this is not included within this poster due to the extensiveness of this area).

Conclusion

The risk assessment of the technological processes in the industrial environment is an area which is actual both from the point of view of the scientific knowledge and the social practice. Technological processes where hazardous substances are the potential threats for the employees, the public, environment and property should be paid increased attention. In the time of increased demands on the safety of the technological processes (whose part also the risk assessment is), the idea of prevention becomes dominant. Currently most EU countries incline to the ARAMIS approach. The systematic approach presented provides a sequence of phases for the risk assessment of the technological processes in the industrial environment and explains the content of fulfilling the individual steps. It is unambiguously beneficial for the processors of the risk assessments. This step should unite the EU countries in the area of the risk assessment of prevention of serious industrial accidents. The objective of this poster is to explain in an understandable way and stepwise the process of the risk assessment and the possibility to utilize the methods and techniques in its individual phases and steps. The model created complies with the currently valid legal regulations in the area of prevention against industrial accidents and is in balance with the used procedures for practical risk assessment in Slovakia as well as the European Union.

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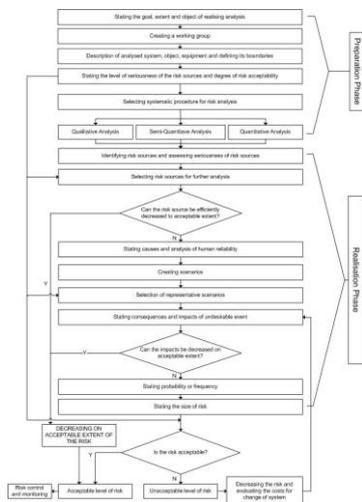


Figure 1 Model of systematic methods of risk assessment in industrial processes