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"Gh. Asachi" Technical University of Iasi, Romania

METHODS AND PROCEDURES FOR ENVIRONMENTAL RISK ASSESSMENT

Brînduşa Mihaela Robu*, Florentina Anca Căliman, Camelia Bețianu, Maria Gavrilescu

"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Department of Environmental Engineering and Management, 71Mangeron Blvd., 700050 - Iasi, Romania,

Abstract

This work presents the state of the art of qualitative and quantitative risk assessment methodologies in a variety of fields. Because risk exists in all ranges of human activity, both private and professional, risk assessment is an attempt to analyze precipitating causes of risk in order to more efficiently reduce its probability and effects. Numerous methodological guidelines within the field of environmental science exist to provide guidance for a risk assessment program, although the level of verifiable quantitative data, such as specific chemical effects and scientifically proven hazards, make a direct transfer of methodologies impossible. The risk-assessments and their key principles detailed within can be also used to assist in the development of decision making process. The common notion of risk is associated with actions or decisions that may have undesired to outcome. This implies that the risk-based approaches focus on the negative impacts and their prevention. Risk assessment places the emphasis on the potential negative environmental impacts of an organization's activities and allows the identification of indicators that directly reflect its efforts, efficiency and effectiveness in reducing or even preventing them. Risk assessment is one of the steps of the general risk management procedure. Risk management is a technique used to identify, characterize, quantify, evaluate and reduce losses from actions or decisions that may have undesired outcomes. The first step of the generic procedure involves the risk identification that is the systematic identification of all potential actions or decisions with undesired consequences that may result from the operation of an organization. The next step involves the risk assessment, while further steps address issues like the evaluation of risks in order to determine the organizations ability or willingness to tolerate their consequences in view of the associated benefits, and the selection and implementation of the most preferable approach for the reduction of unacceptable risks. Lately, the trend is to integrate the risk principle into impact assessment procedure, and reasons for that are: risk assessment (*RA)* provides a structured framework for dealing with uncertainty in the assessment of impacts being the subject of debates and concerns, especially, concerning impacts on public health; environmental risk assessment (*ERA)* is specifically developed to address health issues and contains elaborate techniques for enhancing health impacts assessment comprehension in environmental impact assessment (EIA); *ERA* emphasizes scientific quantitative approaches and techniques in impact identification and evaluation and for improving the technical background for decision-making; closer cooperation between the environmental impact assessors and risk assessors and creation the mixed expert team would allow for more effective information collecting into environmental assessment process; *ERA* can be applied not only at the stage of impact prediction and evaluation, but also during project implementation and post-closure stages (over the whole project life cycle).

Keywords: environmental risk assessment, models for risk assessment, event-tree risk analysis, HAZAN, HAZOP, integrated environmental impact and risk assessment

* Author to whom all correspondence should be addressed: e-mail brobu@ch.tuiasi.ro