

## Comparison of Risk Analysis Methodologies Through the Consequences Identification in Chemical Accidents Associated with Dangerous Flammable Goods Storage

**Authors :** Daniel Alfonso Reséndiz-García, Luis Antonio García-Villanueva

**Abstract :** As a result of the high industrial activity, which arises from the search to satisfy the needs of products and services for society, several chemical accidents have occurred, causing serious damage to different sectors: human, economic, infrastructure and environmental losses. Historically, with the study of this chemical accidents, it has been determined that the causes are mainly due to human errors (inexperienced personnel, negligence, lack of maintenance and deficient risk analysis). The industries have the aim to increase production and reduce costs. However, it should be kept in mind that the costs involved in risk studies, implementation of barriers and safety systems is much cheaper than paying for the possible damages that could occur in the event of an accident, without forgetting that there are things that cannot be replaced, such as human lives. Therefore, it is of utmost importance to implement risk studies in all industries, which provide information for prevention and planning. The aim of this study is to compare risk methodologies by identifying the consequences of accidents related to the storage of flammable, dangerous goods for decision making and emergency response. The methodologies considered in this study are qualitative and quantitative risk analysis and consequence analysis. The latter, by means of modeling software, which provides radius of affectation and the possible scope and magnitude of damages. By using risk analysis, possible scenarios of occurrence of chemical accidents in the storage of flammable substances are identified. Once the possible risk scenarios have been identified, the characteristics of the substances, their storage and atmospheric conditions are entered into the software. The results provide information that allows the implementation of prevention, detection, control, and combat elements for emergency response, thus having the necessary tools to avoid the occurrence of accidents and, if they do occur, to significantly reduce the magnitude of the damage. This study highlights the importance of risk studies applying tools that best suited to each case study. It also proves the importance of knowing the risk exposure of industrial activities for a better prevention, planning and emergency response.

**Keywords :** chemical accidents, emergency response, flammable substances, risk analysis, modeling

**Conference Title :** ICCPSAI 2024 : International Conference on Chemical Process Safety and Accident Investigation

**Conference Location :** Amsterdam, Netherlands

**Conference Dates :** February 05-06, 2024