

## Safety of Ports, Harbours, Marine Terminals: Application of Quantitative Risk Assessment

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**Abstract :** Quantitative risk assessment (QRA) is a very precise and consistent approach to defining the likelihood, consequence and severity of a major incident/accident. A variety of hazardous cargoes in bulk, such as hydrocarbons and flammable/toxic chemicals, are handled at various ports. It is well known that most of the operations are hazardous, having the potential of damaging property, causing injury/loss of life and, in some cases, the threat of environmental damage. In order to ensure adequate safety towards life, environment and property, the application of scientific methods such as QRA is inevitable. By means of these methods, comprehensive hazard identification, risk assessment and appropriate implementation of Risk Control measures can be carried out. In this paper, the authors, based on their extensive experience in Risk Analysis for ports and harbors, have exhibited how QRA can be used in practice to minimize and contain risk to tolerable levels. A specific case involving the operation for unloading of hydrocarbon at a port is presented. The exercise provides confidence that the method of QRA, as proposed by the authors, can be used appropriately for the identification of hazards and risk assessment of Ports and Terminals.

**Keywords :** quantitative risk assessment, hazard assessment, consequence analysis, individual risk, societal risk

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