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Port Risk Management in Container Terminals

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Abstract

World trade increasingly relies on longer, larger and more complex port systems, where maritime transportation is a vital backbone of such operations. Port systems are more prone to being risk oriented. Many specific methods have been found to assess risk and safety in a port area or operation. A review is presented of different approaches to quantify the risk in port area. On the other hand, there is no specific risk management method or framework to cope with threats and hazards as a whole.

This conceptual paper presents a Port Risk Management (PRM) methodology, seeking to transfer the safety-oriented Formal Safety Assessment (FSA) framework into the domain of port container terminal. The PRM methodology, has been developed to model all the probable port risks, by taking into account its different factors and their mutual influences.

This paper presents a risk management methodology into the domain of port container terminals. This methodology constitutes a decision support framework that will be used to conduct port to port risk evaluations or to assess a whole port's and terminal's overall risk level in order to facilitate continues improvement strategies.

An empirical study is contacted in order to provide evidence for risk management at the port container terminals in Greece.

There is a need for methodologies and tools for assessing and managing the overall risk in maritime and port operations, which are increasingly complex and are dependable by systematic and nonsystematic risks. The critical impact on a number of port stakeholders has established a new methodology and a port risk index a considerable task.

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1. Introduction

Public interest in the field of risk analysis has expanded in leaps and bounds during the last three decades, while risk management has emerged as an effective and comprehensive procedure that supplements and complements the overall management of almost all aspects of our life. Managers of health care, the environment, and physical infrastructure systems all incorporate risk management in their decision-making process. Moreover the omnipresent adaptations of risk management by many disciplines, along with its deployment by industry and government agencies in decision-making, have led to an unprecedented development of theory, methodology, and practical tools (Haimes, 2009).

Moreover, in recent years, we have seen a substantial increase in cooperation between public and private sector for the development and operation of infrastructure for a wide range of economic activities (Chlomoudis and Pallis, 1998), driven by limitations in public funds to cover investments needs, by efforts to increase the quality and efficiency of public services, and by efforts to mitigate the potential risk (Chlomoudis, 2006). There is a comprehensive literature regarding the risk that is associated with investments in seaport projects under public private partnerships (Chlomoudis and Pallis, 2008).

Risk has been considered as the chance that someone or something that is valued will be adversely affected by the hazard (Woodruff, 2005), while “hazard” is any unsafe condition or potential source of an undesirable event with potential for harm or damage (Reniers et al., 2005). Moreover, risk has been defined as a measure under uncertainty of the severity of a hazard (Høj and Kröger, 2002), or a measure of the probability and severity of adverse effects (Haimes, 2009). In general, “danger” should be defined as an attribute of substances or processes, which may potentially cause harm (Høj and Kröger, 2002).

Risk assessment is an essential and systematic process for assessing the impact, occurrence and the consequences of human activities on systems with hazardous characteristics (van Duijne et al., 2008) and constitutes a needful tool for a safety policy. The diversity in risk management procedures is such that there are many appropriate techniques for any circumstance and the choice has become more a matter of taste (Reniers et al., 2005; Rouvroye and van den Blik, 2002).

The main objective of this work is to develop a risk management based methodology suitable for ports through an adaptation of the FSA approach, whilst utilising the knowledge and experience gained through existing risk analysis and assessment (RAA) methods and techniques (Marhavilas et al., 2011).

On the other hand, as there is no specific risk management method or framework to cope with safety risks in general and ports in particular, this paper proposes an approach for risk assessment in container terminals which constitutes an adaptation of the IMO Formal Safety Assessment (FSA) (Trucco et al., 2007).

Similar to the structure of the FSA as applied to the safety risks of ships, the proposed Port Risk Assessment (PRA) methodology is based on the evaluation of risks relevant to ports and the analysis of their effective control through combining the economic and risk reducing influence of alternative Risk Control Options (RCO). By virtue of its significance, the two main container terminals of Greece (Piraeus & Thessalonica) present suitable references for demonstrating the applicability of the proposed risk management methodology, through contacting an empirical study on encountered accidents during 2008-2011. The results indicate that the PRA offers a workable methodology for the application of safety risk assessment and management in ports, whilst the conclusions drawn provide a firm basis for further research on this issue.

2. Port Risk Management

2.1. General

While it is generally accepted that the overall level of maritime safety has improved in recent years, further and ongoing improvements are still desirable. The safety culture of anticipating hazards rather than waiting for accidents to reveal them has been widely used in many industries. The international shipping industry has begun to move from a reactive to a proactive approach to safety through what is known as Formal Safety Assessment (FSA). Formal Safety Assessment was introduced by the IMO as “a rational and systematic process for assessing the risk related to maritime

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