

MITIGATING THE EFFECTS OF EMERGENCIES IN THE BALTIC SEA REGION PORTS 2016–2019



Photo: Mindaugas Kruopys

HAZARD project aims at mitigating the effects of emergencies in major seaports in the Baltic Sea Region. The types of safety and security emergencies include, for example, leakages of hazardous materials, fires on passenger ships at port, oil spills in port areas as well as explosions of gases and chemicals. The project enables better preparedness through joint exercises, improved communication between authorities in emergencies, better compliance of regulatory framework and better use of risk assessment methods as well as faster adoption of state-of-the-art technologies.

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Photo: Mindaugas Kruopys

PROJECT MILESTONES September 2017– May 2018

September 2017	Oil spill exercise, Porvoo FI
September 2017	Chemical accident exercise, Klaipeda LT
October 2017	Oil spill and mass evacuation exercise, Naantali FI
January 2018	Study visit to Fredericia DK
February 2018	KriSu exercise, Turku FI
March 2018	Communication between the authorities seminar, Riga, LV
April 2018	Risk assessment workshop, Klaipeda, LT
April 2018	Incident in a RoRo vessel exercise, Klaipeda, LT
May 2018	Oil recovery exercise, Naantali, FI

THEORY MEETS PRACTICE – THE INPUT FROM HAZARD KNOWLEDGE PARTNERS TO SEAPORTS, RESCUE SERVICES AND PORT OPERATORS

In the HAZARD project, a framework, reference processes and a suitable set of methods to identify, analyze and evaluate risks that could occur in seaport areas aim at supporting rescue services, port operators and other port partners. The linkage between theory and practice is crucial in order to capture and extract applicable methods, tools and procedures that help to increase the efficiency and effectiveness of the overall risk management.

Focusing on risk assessment, the project's Work Package (WP) 4 strives to identify, structure and customize methods and approaches useful within

seaports of all types and sizes. The work considers quantitative, semi-quantitative and qualitative risk management methods.

To communicate the results of this analysis, several publications have been and will be issued. These publications report the outcomes of literature reviews, conceptual approaches and empirical studies.

To ensure their practical applicability, all outcomes are discussed in workshops and focus groups with the other partners of the project consortium. These workshops and focus groups help in the validation and analysis of

the applicability and complexity of the suggested methods in the context of seaports.

Furthermore, such workshops enable WP4 to determine the requirements and specifications for the upcoming online toolbox for risk assessment methods in seaports.

Therefore, the co-operation among work packages and partners of HAZARD is essential to ensure a better understanding, successful support and application of the risk assessment methods in order to improve the current status of risk management process in BSR seaports.

For instance, the HAZARD publication of WP4 "Risk assessment in seaports: a literature review" played an important role in organizing the co-operation meeting held in Klaipeda on 19th of April 2018 by extracting an initial list of risk assessment methods for further evaluation. These methods were discussed and analyzed with the rescue services and port partners to determine their applicability and suitability to seaports.

Another important milestone within the work of WP4 is an exhaustive and cross-border interview study. This study aims at understanding the current status and practices of risk management at Baltic Sea Region (BSR) seaports.

A detailed interview guide was developed by the leader of WP4. This interview guide was distributed to the knowledge partners of WP4 in order to carry out interviews with different categories of stakeholders using the same set of questions. The study will present the current methods used for

risk management as well as the various requirements, status of co-operation and measures implemented for certain types of risks.

Furthermore, co-operation is taking place with the OpenRisk project - An EU funded project on open tools for assessing the risk of maritime accidents and spills. The leader of WP4 is participating in the regional workshops of risk assessment methods for hazardous spills. Several methods were mutually refined and the same framework and process based on ISO 31000 for risk assessment are followed.

Based on the research part and the empirical study, an online toolbox with an associated guide will be developed in Q4 2018. The extracted methods from the literature review and the interview study, which are validated and analyzed with port authorities, terminal operators and rescue service using workshops, will be integrated in the online toolbox.

Based on the research publications, interview study, risk assessment framework, online toolbox and the associated guideline, the current status of risk management in BSR core seaports will notice a significant improvement.

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Photos: Mindaugas Kruopys

HAZARD Publication series: GENERAL SEAPORT SAFETY AND SECURITY REPORTS

Publication 1/2016: **Seaport safety and security issues in the Baltic Sea Region**

Editors: Lauri Ojala, Mariikka Whiteman, Jarmo Malmsten

An overview of the seaports and maritime transportation in the Baltic Sea Region and the introductions of the relevant topics related to the project. The publication gives an idea of some of the key inputs by knowledge partners in the HAZARD project dealing with seaport safety and security in the Baltic Sea Region.

Publication 2/2016: **Simpler safety and security planning for ports**

Ilkka Laitinen, Kirsti Tarnanen-Sariola, Jussi Kurikka-Oja

The aim of the authors was to find ways to simplify safety and security planning and thus lighten the administrative burden of port authorities and officials, decrease the costs incurred from maintaining the plans, and release personnel resources from planning to other duties.

Publication 3/2017: **Cybersecurity in ports**

Jenna Ahokas, Tuomas Kiiski

The report aims to clarify the main points and definitions of the cyberspace and cybersecurity for ports and port operators. It is important to point out possible threats that ports need to identify for the future. The objective of the report is to describe cybersecurity in ports.

Publication 10/2017: **Review of methods for identifying threats including the critical infrastructure systems within the Baltic Sea**
Barbara Tchórzewska-Cieślak, Katarzyna Pietrucha-Urbanik, Dawid Szpak

In the analysis of the operation of critical infrastructure systems it is important to perform the analysis of the safety of the operation. The daily operation of such systems is inherently associated with the occurrence of various types of random undesirable events. Therefore, in the paper the methods used in the analysis of the risk of threats in critical infrastructure systems within the Baltic Sea, were presented.

Publication 15/2017: **Communication and regulatory challenges in Baltic Sea Region ports**

Ira Ahokas, Kimmo Laakso

The objective of this Delphi study was to create an overall picture of the communicational and regulatory challenges related to safety and security issues for major seaports in the Baltic Sea Region.

Publication 17/2017: **Voluntary oil spill response in the Baltic Sea Region**

Ukri-Pekka Puruskainen

The countries of the Baltic Sea Region (BSR) share a common concern over the state of our unique and vulnerable sea. The urge to develop oil spill disaster preparedness is strong across the region. The publication briefly assess the current state of volunteering in the BSR countries.

Publication 18/2018: **Theft of goods in ports**

Daniel Ekwall, Björn Lantz

This report examines patterns of reported cargo thefts at maritime transport facilities in Europe, the Middle East, and Africa (EMEA) with respect to frequency, incident category, modus operandi, and targeted product category.

HAZARD Publication series: REPORTS ABOUT RISK MANAGEMENT AND SUPPLY CHAINS IN PORTS

Publication 20/2018: **Overview of risk assessments in the western part of Muuga harbour**

Compiled by Anna-Helena Purre

An overview of risk analysis in Estonia and risk analysis in ports.

Publication 21/2018: **The risk management process and the supply chain security**

Ulf Paulsson

In this report the risk management process is presented as consisting of 14 different steps and each step is described and discussed. Also widened aspects on the risk management process are treated, as well as the economic significance.

Publication 22/2018: **Supply chain risk management: An idea generator for managing disruption risks in supply chains**

Ulf Paulsson

This report presents an idea generator which is intended to be used when searching for new options for handling the disruption risks of the company.

Publication 23/2018: **The flow-based society and its vulnerability**

Ulf Paulsson

This report presents a meticulous review of the background of today's flow-based society and its vulnerability. Furthermore, there is a discussion about how to define flow-based disruption risks, and how their consequences, including the domino effects, can be described. Also the theory areas, addressing this kind of risks, are treated in this report.

Publication 24/2018: **Risk assessment methods in seaports: A literature review**

Nelly Moreno Parra, Ayman Nagi, Wolfgang Kersten

This research work aims to identify suitable risk assessment methods that can be applied in seaports. This study helps to summarize the hazard sources which are classified into: natural and man-made; factors of risk which are enlisted in different categories: climate, operational, safety, technical, organizational, environmental, socio-economic and political.

All publications are available: blogit.utu.fi/hazard/publications

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HAZARD Publication series:
REPORTS ABOUT RISK ASSESSMENT METHODOLOGIES AND ANALYSIS

Publication 4/2017: **Development of cause-effect dependence model of undesirable events using Bayes network**

Barbara Tchórzewska-Cieślak, Katarzyna Pietrucha-Urbanik, Dawid Szpak

In the paper, the methodology, which can be extended in order to improve the detection and monitoring of undesirable events in infrastructure, was presented.

Publication 5/2017: **Procedure based functional safety and information security management of industrial automation and control systems on example of the oil port installations**

Marcin Śliwiński, Emilian Piesik

The approach addresses selected technical and organization aspects of risk mitigation in the oil port installations with regard to functional safety and security requirements specified in standards IEC 61508, IEC 61511 and IEC 62443.

Publication 6/2017: **Towards a process based management system for oilport infrastucture in context of insurance**

Dariusz Gołębiowski, Kazimierz T. Kosmowski

This article addresses selected methodological aspects of a process based management system based on analysis of hazards and threats and risk evaluation for an oil port infrastructure in context of insurance.

Publication 7/2017: **Cognitive engineering and functional safety technology for reducing risks in technical systems**

Kazimierz T. Kosmowski

Cognitive engineering is considered nowadays as interesting multidisciplinary domain that focuses on improving the relations between humans and the systems that are supervised and operated. The industrial automation and control systems (IACS) in hazardous plants are increasingly computerized and perform various safety functions.

Publication 8/2017: **Navigational decision support system during approach maneuver in emergency STS transfer operation**

Anna Witkowska, Roman Śmierzchalski, Przemysław Wilczyński

The paper is concerned with the problem of safe trajectory planning for approaching during emergency STS (Ship to Ship) transfer operation with oil spill.

Publication 9/2017: **Modelling hazard related interactions between processes realized in and around the Baltic Sea Region ports**

Jacek Malinowski

This paper presents a probabilistic model of hazard-related interdependence between the operations carried out in the ports of the Baltic Sea region and in their neighborhoods.

Publication 11/2017: **Nonhomogenous poisson process application to modelling accidents number at Baltic Sea waters and ports**

Franciszek Grabski

The stochastic processes theory provides concepts and theorems that allow to build probabilistic models concerning incidents or (and) accidents.

Publication 12/2017: **Analysis of the crude oil transfer process and its safety**

Agnieszka Blokus-Roszkowska, Bożena Kwiatkowska-Sarnecka, Paweł Wolny

Considering the operation process of oil port terminal the paper focuses on processes related to the cargo movement inside the pipeline system. Technical parameters during all stages of crude oil transfer process are described.

Publication 13/2017: **Modelling spread limitations of oil spills at sea**

Sambor Guze, Krzysztof Kołowrocki, Jolanta Mazurek

To describe the oil spill central point position a two-dimensional stochastic process is used and its drift trend curve is determined.

Publication 14/2017: **Õiguslik analüüs Muuga riskid**

Kristo Kallas

The purpose of the legal analysis „Legal Analysis about possible major accident from transport and handling of dangerous goods in Port of Muuga” is to give an overview of legal background concerning the mitigation and consequences of possible risks in relation with dangerous goods handling and transport in Port of Muuga; to analyse the rights and responsibilities; and to give recommendations for Viimsi Municipality’s government for supplementation and improvement of its general act’s and other documents.

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