An Analysis of Maritime Transportation Risk Factors

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ABSTRACT

This paper presents an analysis on the factors that are important determinants of maritime transportation risk. The analysis has been part of an international, multi-partner project. The purpose of the project has been to identify technologies and other measures to improve maritime safety, mainly in the context of European waters.

KEY WORDS: Risk analysis, maritime safety.

1. INTRODUCTION

The purpose of this paper is to present an analysis on the factors that are important determinants of maritime transportation risk. The analysis has been part of project SAFECO (for “Safety of Shipping in Coastal Waters”), an international, multi-partner project funded by the Commission of the European Communities. The purpose of the project has been to identify technologies and other measures to improve maritime safety, by analyzing the impact of maritime simulators, collision avoidance systems, improved maneuverability, and related technologies.

Several organizations conduct analyses, publish regular statistical updates, and maintain databases of maritime casualties. For instance, the Lloyds Maritime Information Services (LMIS) compiles a database and publishes “World Maritime Casualty Statistics”, a statistical update of all major maritime casualties in the world. Agencies such as the UK Department of Transport’s Maritime Accident Investigation Branch (MAIB) and the Institute of London Underwriters (IIU) issue such updates based on data collected by them. Other than Lloyds Register, classification societies such as Det Norske Veritas conduct their own statistical updates of maritime casualties, which they use mostly for their own internal purposes.

Within the SAFECO project, the objective of the so-called “Historic risks and validation model” has been to assess the overall level of risk, identify statistics for verification of the risk, identify important risk reduction factors, and identify cases for assessment of the merits (or lack thereof) of specific risk reduction schemes for marine safety in European coastal waters. To that effect, the National Technical University of Athens (NTUA) spent considerable effort searching for and looking at shipping casualty data worldwide. Two such sources were tapped:

- The first has been the Lloyds List Casualty Reports (a weekly publication). A worldwide database was developed from raw data from this source. This database closely emulates the LMIS database.

- The second source has been the casualty files from the Greek Ministry of Merchant Marine. Limited to Greek flag ships (on a worldwide basis). The files go into considerable detail on responsibilities, causes, and other details on each event. Another database on this data was developed.

The analysis reported in this paper is based on data from the first database listed above. The second database was used for an analysis of main causes of accidents, an analysis which will not be reported here (this analysis is reported in a SAFECO internal technical report, ref. [2]). One of the key questions that are addressed in the analysis of the present paper is whether one can identify factors such as ship size, type, age, weather, casualty, geographical location, or others that make a statistically significant difference on maritime transportation risk. An