Abstract

Dangerous goods that have not been correctly declared when offered for transport have contributed to some serious accidents at sea. Safe handling, stowage, and segregation of packaged dangerous goods cannot be carried out if there is no knowledge of the presence of dangerous goods inside the cargo transport unit (container and/or trailer), or if the goods have been incorrectly declared. Although undeclared dangerous goods are recognized as a safety issue in the shipping industry, there is little information available on the extent of the risk involved. The study described in this paper was carried out to investigate the extent and potential consequences of the maritime transport of undeclared dangerous goods. Dangerous goods incident and inspection reports and ship casualty data were reviewed and analysed. A generic qualitative model was constructed to illustrate contributing factors and potential consequences in incidents involving undeclared dangerous goods.

Key words: Dangerous Goods, Risk, Maritime Transport, Marine Safety, Incident Analysis

1 Introduction

Dangerous goods are transported on a regular basis by sea and include many widely used commodities such as fuels, paints, adhesives, pesticides, aerosols, and refrigerated gases. The hazards associated with each class of dangerous goods are varied and relate to the inherent characteristics of the dangerous goods themselves. Hazards are the result of properties such as corrosiveness, explosiveness, toxicity, radioactivity, and flammability.

Dangerous goods transport must be carried out according to regulations that are in place to reduce the potential for harm to people, property, and environment that may result from a dangerous goods release. The International Maritime Dangerous Goods Code (IMDG) (International Maritime Organization (IMO) 2008a), which was made mandatory under the International Convention for the Safety of Life at Sea (SOLAS) Chapter VII (Carriage of Dangerous Goods) amendments adopted in 2002, describes the provisions that govern the carriage of dangerous goods in packaged form by sea. Goods that are listed within the code must be transported according to the provisions which specify requirements for packing, consignment, and transport operations, including packaging to be used, marking, labelling, placarding, stowing, segregation, and transport documentation.

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Information on the amount and type of dangerous goods that are typically carried as packaged dangerous goods in cargo transport units (CTUs) on container ships and ro-ro vessels is limited and quantities can vary considerably for individual ships and routes (Forsman et al. 2006). A report by the Munich Re Group (2002) states that container vessels can sometimes carry as much as 10–40% hazardous cargo. Burgess (2006) reports that on many shipping routes, dangerous goods are carried in about 10% of containers. Specific examples can also be obtained from container ship accident reports: declared and undeclared dangerous goods together accounted for 5.4% of the Sea-Land Mariner container ship’s cargo at the time of the fire and explosion incident in 1998 (Maritime Administrator, Republic of the Marshall Islands 1999); dangerous goods were carried in approximately 7% of the 2318 containers onboard the MSC Napoli when it suffered a catastrophic hull failure and was beached in the UK in 2007 (Maritime and Coastguard Agency (MCA) 2008).

Dangerous goods are sometimes not declared for transport as required by the regulations and this is a safety hazard for all involved in the transport operations. Undeclared dangerous goods may not be stowed or handled correctly by crew or port staff if they are unaware of the hazards, potentially resulting in release, fire, or explosion. It also is a safety issue for emergency response personnel who will not be aware of the additional dangers associated with the unknown dangerous goods. Güner-Özbek (2008) states that information is the most important factor in the carriage of dangerous goods, and that the master and crew need to be fully aware of the nature and properties of cargo for both cargo protection and safety of human lives and property.

Undeclared dangerous goods have been identified as a cause or contributing factor in some serious accidents, such as the Sea-Land Mariner fire and explosion, the fire that resulted in the loss of the Sea Elegance container ship in 2003, and the explosion and fire on the Zim Haifa in 2007. Marine insurers have expressed concern over the threat posed by undeclared dangerous goods and the potential for extremely large losses given the increasing size of container ships (TT Club 2007). Despite the identification of the problem of undeclared dangerous goods in marine transport, there is little information available on the frequency of the occurrence and the extent of the problem.

2 Background and Literature Review

Although some research has been carried out on the risk of transporting dangerous goods by sea, a literature review found very little on the topic of risk of sea transport of undeclared dangerous goods. Kristiansen (2005), in his book on safety management and risk analysis in maritime transportation, lists dangerous cargo as a hazard in shipping, and identifies the threats of fire, explosion, poisoning, and environmental damage.

The Formal Safety Assessment (FSA) of container vessels carried out within the SAFE-DOR project only dealt with dangerous cargo on a general level and noted that a