Science

Designing an Integrated Quality and Safety Management System (IQSMS) for Shipping Operations *Celik, M. (2009).*

Safety Science 47(5): pp. 569-577.

As merchant shipping is defined by the International Maritime Organization (IMO) as one of the most dangerous sectors among the world's greatest industries, the relevant shareholders in the maritime transportation industry need to enhance the safety culture and climate within their organisations

Maritime catastrophes at the operational level, environmental disasters and economic losses have been subsequently monitored. This paper proposes a systematic approach for exploring the compliance level of the international safety management (ISM) code with the ISO 9001:2000 in order to structure an integrated quality and safety management system (IQSMS) for shipping operations. Multi-attribute fuzzy axiomatic design (MA-FAD) is determined as being a suitable research methodology for the problem in focus. To illustrate the proposed approach, an accident onboard an oil tanker is analysed; moreover, the potential advantages of the IQSMS at an operational level are highlighted. The outcome of this research will aid decision making by the relevant executives in ship management companies who eagerly insist on implementing quality integrated ISM code.

Software-driven Sensor Networks for Short-range Shallow-water Applications *Jurdak, R., Baldi, P. and Lopes, C. V. (2009).*

Ad Hoc Networks 7(5): pp. 837-848.

Most existing underwater networks target deep and long-range oceanic environments, which has led to the design of power-hungry and expensive underwater communication hardware. Because of prohibitive monetary and energy costs of currently over-engineered communication hardware, dense deployments of shallow-water sensor networks remain an elusive goal. However, dense shallow-water monitoring networks can find interesting applications in water quality monitoring and monitoring the accessibility of harbours.

In summary, this paper proposes software-driven acoustic underwater sensor networks for short-range shallow-water monitoring. The network architecture provides both high spatial scale and high temporal scale at relatively low cost through the use of generic acoustic hardware onboard off-the-shelf sensor motes. Because the cost of the system is limited to the relatively cheap sensor module, the proposed system can promote wider and denser deployments of underwater sensor networks.

Floating Marine Debris in Fjords, Gulfs and Channels of Southern Chile *Hinojosa, I. A. and Thiel, M. (2009).*
Marine Pollution Bulletin 58(3): pp. 341-350.

Floating marine debris (FMD) is reported in all oceans. The bulk of FMD are plastics, which due to their longevity cause multiple negative impacts on wildlife and the environment. The impact of FMD on marine wildlife and invertebrate fauna has been well documented. FMD can also have negative effects on human activities (e.g. entanglement of lines or fishing nets in ship propellers, thereby hampering safe navigation).

Identifying the origins of FMD is important to take the necessary steps to diminish their abundance. Using ship surveys, the authors examined the abundance, composition and distribution of FMD during the years 2002-2005 in the fjords, gulfs and channels of southern Chile. Abundances of FMD were relatively high compared with other studies, ranging from 1 to 250 items per square kilometre. The majority (~80%) of FMD was composed of styrofoam (expanded polystyrene), plastic bags and plastic fragments. The results of the paper indicate that sea-based activities (mussel farming and salmon aquaculture) are responsible for most FMD in the study area. In order to reduce FMD in the environment, in addition to stronger legislation and identification of potential sources, the authors suggest environmental education programmes and encourage public participation (e.g. in beach surveys and clean-ups).

Concept for a Risk-based Navigation Decision Assistant *Bitner-Gregersen, E.M. and Skjong, R. (2009).*

Marine Structures 22(2): pp. 275-286.

Enhancing maritime safety is one of the main concerns of the shipping industry in general and of the Classification Societies in particular. With the increasing availability of real-time or near real-time information about the weather situation, the actual loading condition and the ship behaviour in a seaway, can be monitored. One contribution to improving safety at sea is the development of a decision support system that senses the environment from actual situation data and predicts the ship motions accordingly, thereby ensuring optimal ship operational performance.

This paper describes a concept for a risk-based decision support system for navigation of ships that face degrading weather conditions and dangers of damage to a ship and its cargo. Similar systems exist in various forms, mostly as prototypes, and are based on different ideas of how decision parameters should be communicated to a master as an improved basis for decision making. This paper advocates that it is possible to develop a system that is systematically built on risk assessment approaches with the intention of being applicable for a specific ship with a specific loading situation in a real-time environment. The concept is based on modern reliability methodology and it relies on state-of-the-art hydrodynamics software and information sources relating to the environment. Based on the various consequences that may occur, the study suggests a selection of limit states and shows how they can be integrated in the decision support system described. This paper presents the risk-based concept only; testing of the concept is still in progress.