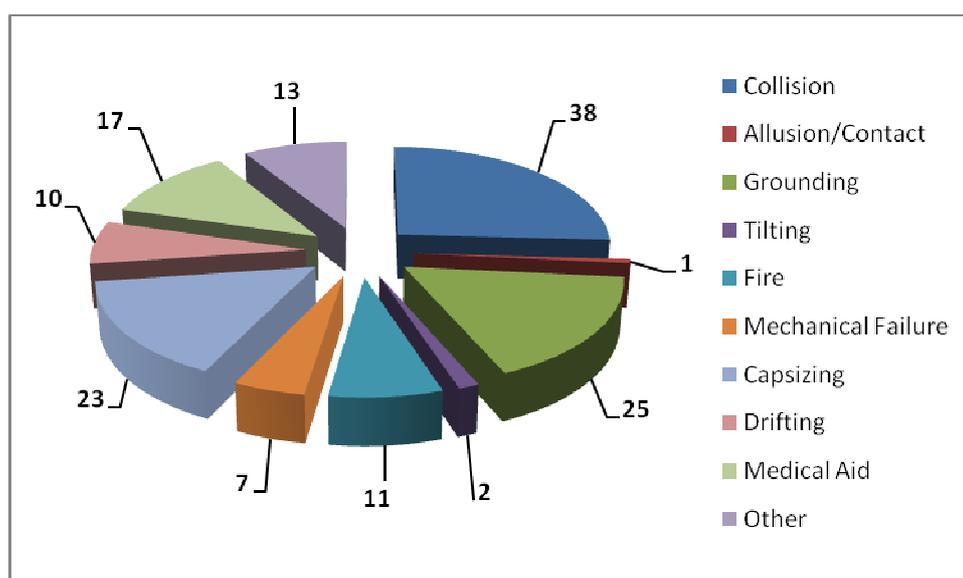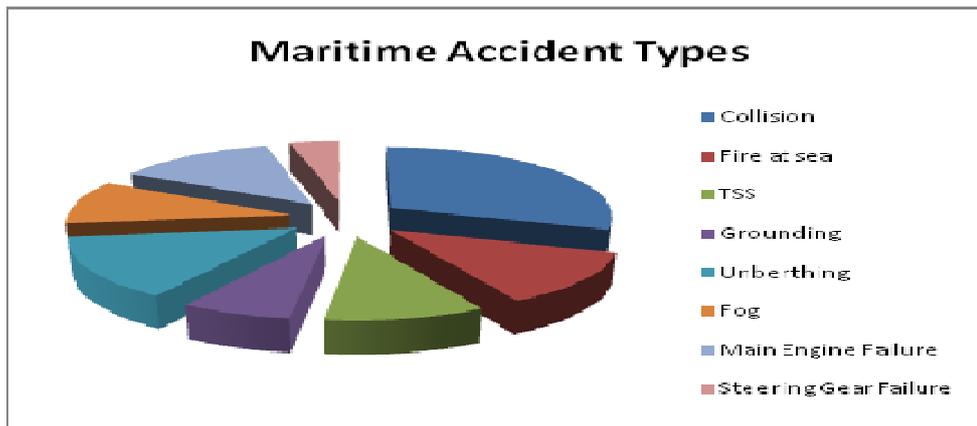# MariFuture

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Learning from Accidents - EU Funded Leonardo M'AIDER and SURPASS Projects

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There have been several research reports which have pointed out that while some countries are applying good practices there are those that need support. A study by (Torkel, 2004) reports that 25% of the world fleet was responsible for more that 50% of shipping accidents around the world. The study notes that the top 25% of the safest ships were involved in just 7% of all accidents. The University of Technology and Science in Norway (Ziarati, 2003), reports that by improving the quality of the world fleet to the same level as those in the safest 25% category, there might be an overall reduction of 72% in shipping accidents. While such reports are crucial in identifying the underlying differences in safest and less safer categories, what often is neglected is that situation in countries such as Turkey (TR) is not that different to countries such as the UK, and contrary to the perception held strongly by many in the maritime sectors, the waters around the UK are not any safer than the waters around TR. The two figures below are extracted from the official bodies in the UK and in TR (UK Protection and Indemnity Club, 2007; Statistical data of MSRCC, 2009). The question is which one belongs to the UK and which one to TR.

Maritime Accident Types

- Collision
- Fire at sea
- TSS
- Grounding
- Unberthing
- Fog
- Main Engine Failure
- Steering Gear Failure

Even if you are certain which one is which, the data presented clearly indicates that all concern should work together to make the seas safer for all and keep damages to minimum. It is no good to blame one another as no one in their right mind would wish to have or cause an accident.

Review of research also shows that there has **not** been a systematic attempt to develop a set of accident and/or incident scenarios for the training of young cadets, or seafarers working at sea, which focuses on emergency situations and/or automation failures, on-board of vessels. These scenarios are considered necessary if the education and training of seafarers are to improve and become more effective. IMO (Ziarati, 2006, 2007) places a great deal of emphasis on the part the human element plays in causes of accidents stating that how human errors have contributed to loss of life and property at sea. This has been supported in a research report (Turan and Ladan, 2008) stating that the accidents are usually due to human error, poor design or equipment failure. It has also been acknowledged that lessons from emergency situations and automation failures and use of simulators involving real accidents have not been taken into consideration in training of merchant navy officers, and that the industry would benefit from a training tool or a programme for its sea-going and port personnel focusing on causes of emergency situations and automation failures.

To remedy these problems, IMO in its recent Maritime Safety Committee (2006) proceedings has repeatedly promoted the idea of 'safety first time' and novel use of simulators in training of seafarers of various types and ranks. It is believed that the majority of human errors could have been prevented by adopting a more human oriented approach. Appropriate training is crucial in this respect. The same Report (Turan and Landan, 2008) also noted that training is the most efficient way of preventing/reducing accidents at sea.

SURPASS, initiated by TUDEV and M'AIDER, initiated by C4FF (UK) and MIWB (NL) and supported by TUDEV, are two EU Funded projects which specifically aim to remedy the issues relating to human errors by focussing on what can be learnt from the previous accidents and incidents at sea. The projects have created opportunities to study accident, incident and near-miss reports/databases and develop scenarios on various emergency situations and automation failures based on real cases. The investigations included a set of scenarios involving a whole range of near-misses which have not been taken into consideration before. This is expected to improve safety at sea and in ports by developing a series of realistic scenarios based on real life

situations viz., inclusion of scenarios on actual accidents in the Maritime Education and Training of seafarers by provision of a training course enabling them (particularly those at sea) to have a full understanding of emergency situations and why automation failures occur.

A review of previous research and reports shows that the most troublesome of all accidents is collision of two vessels. As shown in figures below, collisions are not just a cause of concern of some countries or certain geographical locations. The statistics for both Turkey and the UK clearly, as shown, indicate that the % of accidents due to collision is the highest and interestingly very similar in both countries. The conclusion reached is that we must, if we believe in, Pareto Analysis, or shear commonsense, concentrate on finding out why collisions happen and then try to ensure the results are used in the actual education and training of cadets and seafarers working at sea and ports. The figures below clearly illustrate that situations in Turkey is not that different to that in the UK and contrary to perceptions the waters around the UK are not any safer than waters around Turkey.

M'AIDER and SURPASS are creating a training platform based on realistic events and cases. Training scenarios are being created which will be available for training by means of full-mission simulators supplemented by e-learning exercises. In this way, both junior and higher level navigation officers will learn further how to anticipate unexpected situations and how to deal with emergencies or automation failures when they occur.

Development of Scenarios

M'AIDER and SURPASS projects included a thorough investigation of hundreds of accidents and incidents. In the scope of both projects causes of accidents were carefully studied. The methodology developed to identify the causes of the accidents was a fault tree (FTA) approach which was used to identify the most critical and relevant accidents cases/ situations (Ziarati, 2006 and 2007).

The review of accident cases in the M'AIDER project is limited to accidents involving UK flagged vessels between 1991 and 2009 but use has been made of accidents investigated during recent EU funded projects such as SOS (www.maredu.co.uk) and MarTEL (www.martel.pro). This included the revision of several accident reports investigating collisions, near misses, groundings, etc. that were reported by the Maritime Accident Investigation Breach (MAIB). In the case of SURPASS some 500 accidents were investigated from several accident investigation agencies and recent research papers (Ziarati, 2009).

The M'AIDER project furthermore takes into consideration scenarios relating to near-misses which are unfortunately ignored or under-estimated and often not reported. It has been reported that there are generally about 100 plus incidents and 10 to 100 near misses to every accident (Bea, 1999). It is inevitable that a cause of a near–miss at sea or port could be the cause of a huge disaster in the future. The method used to identify, collect, analyse and collate the knowledge of accidents in the development of training material for seafarers was as novel as how it was used to develop the scenarios.

In addition to the accidents which were reviewed, a questionnaire for each project was developed and distributed to seafarers in the maritime sector to identify additional accidents to ensure a representative range of accidents are available for this project (www.maider.pro; www.surpass.pro). The outcome of the review of these reports and papers coupled with results of the questionnaire were analysed. This assisted in creating the scenarios for application in bridge and engine-room full-mission simulators and for the development of the online e-learning platform. The development for each project was carried out with different project teams but the implementation was in parallel.

The intention of these projects are to gather the existing knowledge regarding accidents and incidents (Ziarati, 2008; Turan, 2006) and break them into several categories preparing a knowledge-base of the selected scenarios, and train two pilot groups composed of those working on board vessels (including trainee cadets) using advanced bridge as well as integrated and full-mission simulators.

These projects are primarily a preventive approach to understand the causes of accidents and incidents as well as near-misses and use them in the development of learning materials primarily in the form of scenarios which would make learning and teaching more effective and at the same time more interesting.

In these projects it was also intended to prepare a whole range of scenarios simulating actual accidents, incidents and near-misses focusing on emergency situations, in the case of M'AIDER, and automation failures, in the case of SURPASS, and incorporate these into the existing Maritime Education and Training programmes in the partner countries and later European-wide. A training programme on the scenarios, for each project, is being prepared for seafarers working at sea and in ports. The intention is that the scenarios would explain the causes for accidents and incidents as well as near-misses including grounding. The identified causes could lead to avoidance of similar accidents in the future. This type of training is expected to enhance the awareness of dangerous situations significantly and help in identifying what actions should be taken to avoid them.

Group Meetings for both projects were arranged in June 2011. The SURPASS meeting will take place at the same time as the Bridge 2011 Conference in Rauma, Finland and the M'AIDER meeting in Palanga, Lithuania.