

# LIMITING OF HUMAN ERRORS AND MARITIME ACCIDENTS BY SIMULATOR BASED TRAINING

Prof. Bhoopathy Bhaskaran<sup>1</sup>

<sup>1</sup>faculty, Department of marine engineering,

AMET deemed to be University,

135, East Coast Road, Kanathur, Chennai-603112, India

## ABSTRACT

The history of maritime simulation of teaching future sailors is primarily that simulators filled a vacuum left by the severe reduction in opportunities for on board training as a primary resource. Marine accidents have been occurring ever since as man set sail. An increasing number of accidents were identified and this is due to the lack of quality seafarers. Seafarers training from developed and developing countries is not at balance in terms of quality seafarers. It is true that there is no substitute for the real thing and undoubtedly the best method for seafarers is still the actual sea experience, nevertheless simulators may offer unique advantages. Realistic training using real equipment requires a lot of effort. The chances of risk to an individual and equipment combined with limited access to required marine assets and related serious costs is creating increased demand for a new technology called simulation. The article has tried to provide an overview of human factors and their role in maritime accident and to explore the importance of simulation training and its impact on decreasing the probability of occurrence of human errors and maritime accidents.

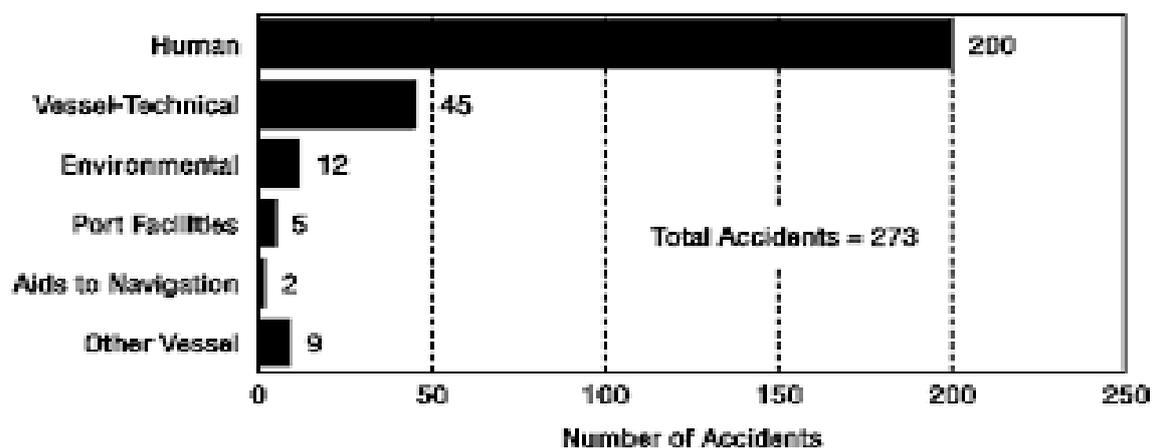
**IndexTerms:** Maritime accidents, human factors, prospects of simulator training

## INTRODUCTION

Nowadays, it is stated that over 90% of the world's cargo is transported by merchant ships. Considering the number of ships which are active in recent years, we conclude that the ocean also becomes quite complicated mode of transport. If we look into the statistics, we can say that humans and their actions on sea are the major causes for the majority of sea accidents.

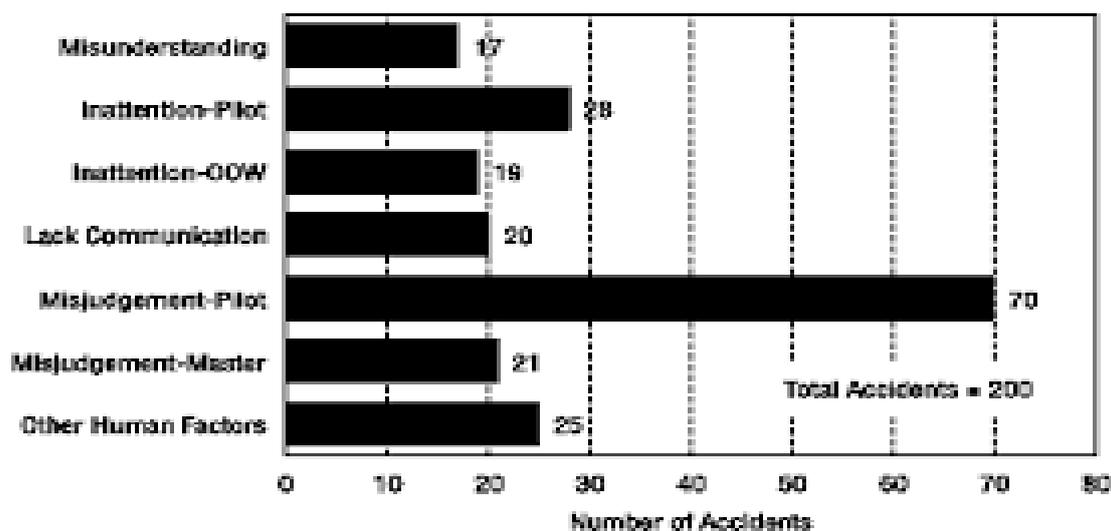
- A Dutch study of 100 maritime casualties found that human error contributed to 96 of the accidents.
- Human error costs the maritime industry \$541 million per year, according to the United Kingdom Protection and Indemnity (UK P&I) club.
- Human error contributes to 84 to 88 percent of tanker accidents.
- Human error contributes to 79 percent of towing vessel grounding.
- Over 80 percent of the marine accidents are caused or influenced by human and organization factors.
- Human error contributes to 89 to 96 percent of ship collisions.

## HUMAN FACTOR-THE WEAKEST LINK



### Contributing factors for number of accidents in marine industry

From the above figure it can be understood that a preliminary investigation was conducted in transportation of safety board comprising of a 273 accidents for which the most essential factor contributing to the accidents was recognized in the above figure. Another figure highlights human factor reasons for accidents in maritime industry.



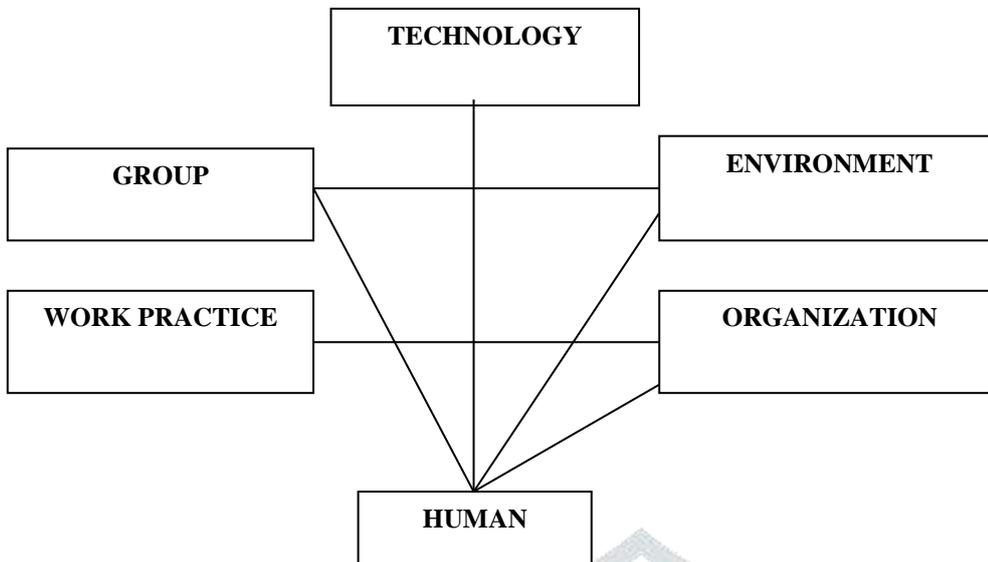
### Human factor reasons for accidents in marine industry

According to TSB statistics from the above figure it may be understood that 200 accidents were recognized as human error related, 42 percent accidents involved misunderstanding between master and pilot, lack of communication between officer of the watch and pilot or inattention by OOW or pilot. In addition to that 46 percent involved misjudgment by master or pilot and breakdowns in teamwork or communication on bridge happens to be involved in several occurrences in maritime industry. The greater number of human factors recognized as being related with pilots may not be surprising as in entire 200 accidents the vessels were under the pilot supervision at the time. As an outcome of its preliminary investigation the transportation of safety board determined to learn practices or conditions which leads to such accidents with a view to recognize deficiencies in safety in marine industry.

### TYPES OF BREAKDOWNS LEADING TO ACCIDENTS

The romans had a saying: 'errare humanum est'. Why are we making mistakes?' is a difficult question to be answered by psychologists; the other should focus on what are the factors leading us to make mistakes and how to prevent them from happening. Mistakes are not that important if it does not strengthen it with another mistake made by some another person from the crew or with a lack of reaction of the others from the crew involved. When mistakes come one after another, and they find favorable conditions, they usually develop into accidents. This error chain could be blindly defined as 'a cumulative of errors'. Even under the international regulations regarding the use of maritime English in all communication regarding the ship, accidents happen when a breakdown occurs in the socio-technical network. The breakdowns can be due to:

- Poor design of equipment ( human-technology),
- Dissonance between work practice and written procedures (work practice- organization)
- Crew stress caused by company pressure (human-organization)
- Poor communication between crew members (human—group)
- Fatigue caused by vibrations and noise (human-group-work environment)



The classification of accidents based on the type of breakdown causing it into

- Problems related to multicultural crews: e.g. bunga teratai satu accident, the sally Maersk death, the Scandinavian star accidents.
- Problems regarding communication failure due to various cultural background between pilot and crew: e.g. the bright field accidents.
- Problems related to miss-communication among crew members and passengers on passengers vessels: e.g. the Skagerak accident, the Scandinavian star accident.
- Problems related to the usage of different languages with respect on external communication, VHF communication with other vessels : e.g. the ROYAL MAJESTY accident.

#### IDEA BEHIND SIMULATION TECHNIQUE

- What I hear, I forget. What I see, I remember. What I do, I understand.
- Tell me and I forget. Teach me and I remember. Involve me and I learn

#### NEED FOR SIMULATORS IN MARITIME INDUSTRY

##### 1) DIFFERENT TASKS – DIFFERENT NEEDS

Maritime simulator investments have reached to all training institutions irrespective of the standards. Today's simulator customers represent a broad mix of different organizations, from public training academies and universities , training centers and vacation schools, to shipping and oil& gas companies; as well as military training organizations. Accordingly ships bridge simulators must be flexible to meet the users various needs. Simulators today can be delivered tailor- made ensuring that both functionality and cost meet the exact requirements of the users.

##### 2) THE IMPORTANCE OF REALISM

Safe handling of vessels in confirmed waters and harbours requires extremely high attention by ship's bridge personnel. It is a known fact that more than 60 percent of the information of available at any time for bridge personnel is gathered through their visual observation of what goes on outside the bridge. Thus it's a necessity that the simulation training is highly realistic and adaptable to real life situations. The latest maritime simulation technology provides impressive 3D-graphics to depict true-to-life vessels models and exercise areas, ensuring quality simulation training in realistic environments, which is adaptable to real life ship handling situations.

##### 3) EDUCATING THE BEST PERSONNEL

Simulators offer a more algorithmic method of building high levels of competence. During simulation training, one can take time and look into each sub-system to understand and gain knowledge, perform operations, and test and develop his skill by training in circumstances that strongly require complex decision making. Through use of advanced assessment and student

profiling system, simulator training can help isolates areas requiring improvement, and allow the instructor to target corrective training. In this way, students can get awareness in advance and this training will be helpful in grooming themselves to a professional.

### SUMMARY

The article summarizes that the maritime industry have been through lot of disasters whose contribution factors are mainly humans. It briefs about the weakest link of maritime industry and the reason factors, the type of accidents and the causes for the occurrence of accidents. The latter part shows the idea behind the technique of simulation and the importance of simulation technique for the cadets in their training part.

### REFERENCES

- 1) <http://www.marineinsight.com/marine-safety/the-relation-between-human-error-and-marine-industry/>
- 2) Chaturvedi P (2006), challenges of occupational safety and health: Thrust: safety in transportation, concept publishing company, New Delhi, pp44.
- 3) World Maritime University (Malmo, Sweden), THE TRAINING OF MARINE ENGINEERS present methods and future directions in developing countries by YASSIN MAGONGO SONGORO.
- 4) [www.km.kongsberg.com](http://www.km.kongsberg.com) , need for simulation technique and idea behind Simulation.

