

# INTERNATIONAL CONFERENCE LEARNING FROM MARINE INCIDENTS II

In 1999 the Institution ran the first conference on learning from Marine incidents with the aim of developing better safety awareness among Mariners, Naval Architects and others working in the maritime industry. This conference will look at what developments and progress have been made since the previous conference. The conference will be of interest to all sectors on the maritime industry including deep-sea shipping, offshore, conventional passenger & high-speed craft, working craft & small craft.

## day 1

9.30 - 10.00 Registration and Coffee

### Session 1 - Introduction

10.00 - 10.35

**The Capsize of the Daphne in 1883 - The world's worst lurching tragedy and its consequences**

*Mr. Fred. M. Walker, Fred M. Walker Naval Architects, UK*  
The loss of the Daphne 1883 during launching resulted in the loss of 124 lives. The subsequent inquiry and report into this accident resulted in standardised launching procedures throughout the UK and had a world wide influence. This paper examines the background to the event and considers the far reaching consequences of this the first major shipbuilding enquiry into a shipbuilding incident in this country. The author also argues that though this incident occurred over a century ago the relevance of the report has not diminished and should be required reading for all persons aspiring to positions of authority in the maritime industry.

10.35 - 11.10

**Occupational Hazards On Board Danish Merchant Ships**  
*Dr. Detlef Nielsen, The Hong Kong Polytechnic University, Dept. of Shipping and Transport Logistics, Hong Kong SAR*  
This paper reports on a study carried out investigating the frequency, circumstances and causes of non-fatal and fatal occupational accidents registered on board Danish flag merchant ships in international trade. The aim was to identify risk factors for the occurrence of occupational accidents and to identify dangerous working situations with a view to initiate possible preventative measures

11.45 - 12.15

**Elements of an Integrated Risk-Based Design (RBD) Methodology**  
*Dr. Dimitris Konovessis and Prof. Dracos Vassalos, University of Strathclyde & Glasgow, The Ship Stability Research Centre, UK*  
A Risk-Based Design methodology is currently under development at the Ship Stability Research Centre. The overall aim is to provide rational input to decision making during the design process. In this process, a number of tools ought to be integrated into the RBD methodology for the appropriate handling of data from accidents or near-misses (mainly frequencies) as well as techniques appropriate for evaluating information relevant to improving operational practices on board. The paper describes the overall methodology for the RBD and provides a case study demonstrating the applicability of this approach.

Coffee

### Session 2 - Incident Reporting

12.15 - 12.50

**Things Happen at Sea: Integrating Human Factors into the Incident Reporting Cycle**  
*Ms. Julia Morris and Mr. Chris Peachey, Bomel Engineering Consultants, UK*

By far the safest organisations are those that "never forget to be afraid" and this state of healthy paranoia is only achieved by collecting the right sorts of data. Incident reporting systems are a vital source of information for this purpose, however design and implementation can often prevent them from being the proactive safety management resource they are meant to be. For a reporting system to be effective it must take account of:

- The root causes of incidents so they can be addressed
- The complex interaction of human and hardware factors leading to incidents
- The process of implementation
- The culture into which it is introduced

This paper discusses these factors as well as the mechanisms for socially engineering a reporting culture.

12.50 - 13.25

**International Marine Reporting Scheme (MARS) Results to Date**  
*Capt. Robin Beedel and Mr. Julian Parker, Nautical Institute, UK*  
MARS was introduced to provide information on marine incidents to the whole industry, while companies have their own reporting systems their use is limited as the information remains within the company unless an incident is investigated by an outside body. The authors assess the effects of MARS since its introduction in 1992. The paper looks at what can be learnt from the incidents reported and considers the statistical trends in the data regarding incidents and their causes.

13.25 - 14.25

Lunch

### Session 3 - Evacuation of Passenger Vessels

14.25 - 15.00

**The Case for Damage Control Training on Large Passenger Vessels**

*Mr. Larrie Ferreira, US Navy Office of Naval Research, UK*  
The IMO Secretary-General has identified the evacuation of large numbers of people from large passenger ships as one of his chief worries. One of the key elements is the ability to extend the length of time available for people to get off the ship, or to obviate that need altogether - in this case, to slow down or stop flooding after it has begun. No current or anticipated effort is being directed at this vital piece of the overall evacuation "puzzle". This paper outlines the case for mandatory damage control training for the licensed crews of large passenger vessels. The case is made through the results of top-level safety assessment, which shows that serious flooding casualties happen on large passenger vessels, on average, once every two years, although the casualty figures are generally low. It presents a cost-benefit analysis to support the proposal, and provides an outline of a more formal safety assessment that could be carried out to validate its conclusions.

15.00 - 15.35

**The Use of Simulation to Assess the Evacuation from Ships**  
*Mr. Michael Starling, BMT Reliability Consultants Limited, UK*  
This paper describes the ongoing work in the UK and Canada to model and trial ship evacuation and to integrate with subsequent search and rescue. A number of initiatives are underway to develop more sophisticated evacuation simulation models. Current models vary in sophistication from simple risk models to complex, time-domain simulations that account for a wide range of human responses and environmental effects. The paper reviews models, trials and software to produce a guide to the state of the art in Evacuation, Search and Risk Assessment.

15.35 - 16.10

Coffee

### Session 4 - Learning From Offshore Incidents

16.10 - 16.45

**Structural Design Basis Determination of TEMPSC**  
*Mr. Philip Smedley, PAFA Consulting Engineers, UK*  
*Mr. W.R Ralph, Health and Safety Executive, UK*  
The authors review a HSE study into the structural design basis for Totally Enclosed Motor Propelled Survival Craft (TEMPSC). The objective of the study was to estimate the likelihood of a 50 man TEMPSC, typical of those built in accordance with the pre 1986 amendments to the 1974 SOLAS regulations, suffering structural failure during escape from a fixed steel offshore platform. The study looked at six specified design events:

- Failure of davits
- Impacting the platform

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- Falling into the sea
- Complete submergence
- Being driven into the platform by waves
- Damage during towing to safety

The paper describes the findings of the study and compares them to some incidents which have occurred during evacuation by davit lifeboat.

**16.45 - 17.20 Dynamic Behaviour and Strength of Minimum Structure Platforms Subject to Ship Impact**

*Mr. Gage Grewal, PAFA Consulting Engineers, UK*

This paper presents the findings of a numerical investigation into the dynamic behaviour and strength of minimum structure platforms subject to a ship impact. The aim of the work was to assess existing design guidelines for four-pile jackets with regard to energy absorption and vibration levels, and determine how

17.20

they could be developed for minimum structure platforms. It was found that design guidelines governing minimum structure platforms subjected to a ship impact are much less well researched and, as a consequence, are lacking in comparison with 4-pile jacket platforms. In particular, requirements governing the minimum amount of plastic energy absorption in minimum structures are not clearly defined. Ship impact analyses were therefore carried out in order to compare their structural integrity with that for a jacket under ship collision conditions and to evaluate the effects on their ultimate strength. The study not only has established any degradation of system strength, but has also determined the amount of plastic energy that could be safely absorbed by the platforms without resulting in overall collapse.

**General Discussion Followed by Evening Reception**

**day 2**

9.00 - 9.30 Coffee

**Session 5 - Marine Incident Investigation**

**9.30 - 10.05 Learning - What? The Truth the Whole Truth and Nothing but the Truth**

*Eur. Ing. David Brown RCNC, UK*

The author looks at the difficulties:

- In establishing the truth when a ship is lost without survivors
- In establishing full facts in an accident investigation
- Caused by legislation in ascertaining the truth
- In ensuring all relevant factors in an incident are considered
- Caused by confusing facts with their interpretation

**10.05 - 10.40 Marine Accident Investigations**

*Captain Nick Beer, Marine Accident Investigation Branch, UK*

Providing a marine accident is fully and impartially investigated and the findings published, it can provide a unique opportunity for learning lessons. Some of the most far-reaching and effective measures for improving safety at sea have stemmed from accident investigation. It therefore follows that this undervalued function has an extremely important part to play in ensuring the future safety of ships and all who sail in them. Nearly all accidents have an underlying human factor component and this has been confirmed by the findings of the MAIB. This paper presents an update on MAIB findings so that delegates can see what needs to be done to improve safety at sea.

**10.40 - 11.15 The Investigation of Structural Failures in Ships**

*Mr. J.C. Colman, Burness Corlett & Partners, IOM*

Structural failures in ships can be massively damaging to life, property and the environment. There is a duty on Naval Architects, regulators and operators to do their best to prevent them. This duty involves carrying out investigations into such failures and ensuring that the lessons learnt are reliable. This paper discusses methodologies for investigation into structural failure, the tools available to the investigator and the skills required illustrated by examples from major investigations involving the author including Derbyshire, Estonia, Kurdistan and others.

11.15 - 11.45 Coffee

**Session 6 - Lessons Learned from Investigating Marine Incidents**

**11.45 - 12.20 Some Lessons Learnt from Marine Failure Investigation**

*Mr. J.S. Carlton, Lloyd's Register, UK*

Lloyd's Register's Technical Investigation Department undertakes over 150 investigations into marine incidents every year. The lessons from these investigations provides the basis of this paper. The papers main theme is to draw together some of the important causes of such incidents from which naval architects, seafarers and marine engineers can draw lessons to help prevent their reoccurrence. Looking at the lessons to be learnt from all sectors of the marine industry, naval and merchant and looking at all types and sizes of ship.

**12.20 - 12.55 Lessons Learned from Incidents in UK Search and Rescue Region and UK Pollution Zone**

*Mr. Dave Smith, MCA, UK*

The author looks primarily at the lessons learned from the Sea Empress incident and its consequences. This incident gave rise to the Review of Salvage and Intervention and their Command and Control, undertaken by Lord Donaldson and the subsequent revision of the UK's National Contingency Plan for Marine pollution from Shipping and

12.55 - 13.55

Lunch

**Session 7 - Investigating the Loss of the M.V. Estonia**

13.55 - 14.30

**Some Clues on the Loss of the M.V. Estonia**

*Mr. Andrzej Jasionowski and Prof. Dracos Vassalos, University of Strathclyde & Glasgow, Ship Stability Research Centre, UK*

The loss of the Estonia in 1994 brought safety to the forefront of research, design and policy making agendas. Notwithstanding the indisputable safety improvements that have been achieved in the wake of the accident and studies that followed, it is claimed in this paper that the loss scenario provided by the assessors is incomplete and perhaps deficient in correctly describing the cause of the sinking. Advances in simulation tools for ship behaviour during progressive flooding in a seaway coupled with virtual reality modelling and animation techniques enable improved understanding of the incident and support a version of events more closely matching the available evidence and witness testimonials.

14.30 - 15.05

**Not Learning from Marine Incidents - Some lessons which have not been learnt**

*Mr. Anders Bjorkman, Heiwa Co., France*

Marine accidents occur every day. Most are minor and are investigated by professional hull or P&I underwriters surveyors to everyone's satisfaction. However, some accidents are bigger and may be investigated by persons from the flag states accident investigation board. The results of such investigations and subsequent reports may contribute to safety at sea. Unfortunately where extremely serious incidents occur, such as large oil spills or ferry sinkings with a large death toll, there is a danger that the subsequent investigation becomes entangled with vested interests and the cause of the incident attributed may vary from the actual cause. Regrettably this can mean a deterioration in safety at sea. The author looks at some recent marine accidents and the resulting investigations.

15.05 - 15.35

Coffee

**Session 8 - Grounding Incidents**

**11.45 - 12.20 Some Lessons Learnt from Marine Failure Investigation**

15.35 - 16.10

**The Relative Importance of Human and Technical Factors in Ship Grounding**

*Mr. John Spouge, Det Norske Veritas, UK*

This paper considers the relative importance of two main types of grounding accident. In powered grounding, typified by the Exxon Valdez accident, a ship runs aground at full speed, usually due to some form of human error on the bridge. In drift grounding, such as the Braer accident the ship is disabled by a technical failure and drifts onto the shore. This paper describes some actual grounding accidents, illustrating the difficulty in assigning causes. It provides a review of the existing statistical information that might show the relative importance of powered and drift grounding and considers the biases that might be present in the data. Categorising grounding causal models and discussing how they might be used to reduce grounding risks.

16.10

**General Discussion**