

World Maritime University

The Maritime Commons: Digital Repository of the World Maritime University

World Maritime University Dissertations

Dissertations

2003

Implementation of the code for the investigation of marine casualties and incidents : a critical analysis

Kevin Thomas Ghirxi
World Maritime University

Follow this and additional works at: https://commons.wmu.se/all_dissertations

This Dissertation is brought to you courtesy of Maritime Commons. Open Access items may be downloaded for non-commercial, fair use academic purposes. No items may be hosted on another server or web site without express written permission from the World Maritime University. For more information, please contact library@wmu.se.

WORLD MARITIME UNIVERSITY
Malmö, Sweden

**IMPLEMENTATION OF THE CODE FOR THE
INVESTIGATION OF MARINE CASUALTIES
AND INCIDENTS:**

A Critical Analysis

By

KEVIN THOMAS GHIRXI
Malta

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

in

MARITIME AFFAIRS
(Maritime Safety and Environmental Protection)

2003

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

Signature: 

Date: 01.IX.2003

Supervised by: Jens-Uwe Schröder
Lecturer
World Maritime University

Assessor: Jennifer Ketchum
Lecturer
Institution: World Maritime University

Co-assessor: Proshanto K Mukherjee
Professor
Institution: World Maritime University

ACKNOWLEDGEMENTS

I am sincerely grateful to the good Lord for allowing me to feel His presence throughout my life, especially during difficult times when I was not aware of Him.

I express my appreciation to Dr Mark Bonello, Chairman of the Malta Maritime Authority and Mr Lino C Vassallo, Executive Director of the Merchant Shipping Directorate of the Malta Maritime Authority for granting me this unique opportunity to enrol at the World Maritime University.

A great debt is owed to Captain Joseph Zerafa, Technical Manager of the Merchant Shipping Directorate of the Malta Maritime Authority for supporting my nomination and for his belief in my capabilities even before joining his Department in January 1999.

I wish to thank the MA/MSEP Faculty of the World Maritime University for delivering precious knowledge with so much dedication. Special merit to Professor Proshanto K Mukherjee, whose overwhelming experience and knowledge were a constant guide. Associate Professor Jan Å Jönsson was essential in the technical material provided during the third semester and I am greatly thankful for his professional support, kindness and efforts. I am also grateful to Lecturer John Liljedahl for discussing with great interest several issues of this dissertation, especially those related to the Danish Maritime Authority.

I express sincere thanks to my dissertation supervisor, Lecturer Dr Jens-Uwe Schröder, for his erudite guidance during the research and compilation of the material. I am thankful for his affability and enthusiasm in sharing with me his knowledge on casualty investigation whenever circumstances permitted, including his own free time. I am indebted to Lecturer Jennifer Ketchum, whose assistance during my stay in Malmö, Sweden is too broad to record.

I want to express a note of appreciation to Associate Professor Patrick Donner for spending a considerable amount of his precious time discussing the notion of maritime adventure – to a larger depth than I ever anticipated.

Thanks are due to the World Maritime University library staff, David, Susan and Cecilia for assisting me with the research material and for being so meticulous in executing their duties.

I am also grateful to all the accident investigators who very willingly contributed to my research and studies. My gratitude extends to former and present delegate members of MAIIF for their assistance whenever requested. The devotion of these fine people towards maritime casualty and incident investigation was my very first inspiration to ponder with great interest into this field. Special appreciation to Mr Stuart Withington, Principal Inspector of MAIB - United Kingdom, whom I had the privilege to meet at the International Maritime Academy in Trieste, Italy.

Much is owed to Captain Mark A Chapelle, serving master and Mrs Chapelle for their willingness and thorough review of the draft copy of this dissertation.

I am thankful to my parents Mary and Frans and my brother Captain Gordon James Ghirxi, also a serving master, for being a motivation to pursue my studies since my first days at sea as an engineer officer cadet – “The engine room is no room for compromise!”

My very deepest gratitude, however, is reserved to my wife Josanne and son Gary James for keeping up with me...again! Thanks to both of you for the extraordinary encouragement, heartfelt patience and inestimable support, especially on those occasions when I over did it.

Three basic attributes describe all good investigators:

- 1. They are not afraid to be wrong. They will accept facts that are contrary to their present theory*
- 2. They readily admit that they do not know everything. When they need help, they seek help*
- 3. They listen to other investigators. They do not necessarily believe them, but they do listen to them.*

R. H. Wood & R. W. Sweginnis,
(1995)

Title of Dissertation: **Implementation of the Code for the Investigation of Marine Casualties and Incidents: A Critical Analysis**

Degree: **MSc**

ABSTRACT

The purpose of this dissertation is to analyse the implementation of the Code for the Investigation of Marine Casualties and Incidents, focusing on the roles of politicians, casualty investigating bodies and casualty investigation reports.

The implementation of Annex 1 to IMO Resolution A.849(20) as amended, may be weakened by excessive and inadequate political reactions in the aftermath of a casualty, especially if it causes an environmental catastrophe. The logic behind these reactions and the several ways they are expressed, are thoroughly examined.

In contrast with the majority of IMO Member States, several States have established a casualty investigating body, autonomous from the regulator *i.e.* the maritime administration. The diverse and at times conflicting philosophies are researched and their implications on the implementation of the IMO Code analysed.

The maritime industry has always been conservative and history attests that internal cultural changes may take years to transpire, if at all achieved. In discussing this phenomenon, the dissertation examines the contribution of casualty investigation reports towards achieving foresight and overcoming this traditional approach. A casualty investigation report is analysed. Innovative to the industry's practice, 'Conclusions, Analysis, Evidence' diagrams were constructed to determine whether this tool serves the promulgation of information.

The final chapter brings together the entire study into a model, explaining how the industry may achieve active foresight, through the implementation of the IMO Code.

KEYWORDS: A.849(20); CAE; Casualty Investigation; Code; Maritime Accident; Maritime Incident; Safety.

TABLE OF CONTENTS

Declaration	<i>ii</i>
Acknowledgments	<i>iii</i>
Abstract	<i>vi</i>
Table of Contents	<i>vii</i>
List of Tables	<i>x</i>
List of Figures	<i>xi</i>
List of Abbreviations	<i>xii</i>
1 Introduction	1
2 The Role of Politicians in (Frustrating) Safety Investigations	
2.1 The Actions of Politicians in the Aftermath of a Very Serious Casualty	5
2.2 International Co-Operation During Casualty Investigations	6
2.2.1 The status of the IMO Code	6
2.2.1.1 The other standpoint of soft law	9
2.2.2 Spontaneous reactions	10
2.2.3 Political interference	13
2.2.4 Possible rationale to spontaneous reactions and the blame culture	16
2.3 Overcoming the Political Scepticism to Advance the Implementation of the IMO Code	18
2.3.1 Breaking free the blame cycle	18
2.3.2 The machinery provided by IMO	20
2.3.3 The EU and regional agreements	22
2.3.4 Other international fora	23
2.3.5 Enforcing the IMO Code at municipal and international levels	23
2.3.6 The IMO Code as customary international law	26
2.4 The Blame Culture and Safety by Compulsion	26

3	The Relationship between the Investigator and the Regulator	
3.1	Independent <i>versus</i> Non-Independent Investigating Bodies	29
3.1.1	Defining an independent investigating body	29
3.1.2	The lawyers' and industry's perspective towards the investigating body	29
3.1.3	Investigators' expertise	36
3.1.4	Conflicts of interest	37
3.1.4.1	A psychologist's observation on conflicts of interest	43
3.1.5	The impact of safety recommendations	45
3.2	Implications on the Implementation of the IMO Code	45
3.2.1	The STCW Convention and its relevance to casualty investigation	47
3.3	The Emerging Trends in Europe	50
3.3.1	The economic viability of independent investigating bodies	51
3.3.2	The Danish Maritime Authority (DMA) Order of 2003	52
3.3.3	The Casualty Analysis Methodology for Maritime Operations (CASMET) WP2 report (1998)	54
3.4	Casualty Investigation and Co-operation	57
4	Casualty Investigation Reports	
4.1	The Role of Casualty Investigation Reports	61
4.1.1	Learning from others	61
4.2	A New Approach Towards Casualty Investigation and Reports	63
4.2.1	The concept of foresight: its roles and limitations	64
4.2.2	The importance of casualty investigation reports within the context of foresight	66
4.3	The Current Situation in the Industry – Identified Weaknesses in Casualty Investigation Reports	69
4.3.1	The usability of casualty investigation reports	69
4.3.2	The intricacy to link evidence, analysis and conclusions	71
4.3.3	Events and causal factors charts	73
4.4	Conclusion, Analysis, Evidence (CAE) Diagrams	75
4.4.1	A case study	75
4.4.2	Evaluation of CAE diagrams constructed in the case study	76
4.5	Linking Hindsight to Foresight	79

5	Conclusions	
5.1	The Start of a Process...	82
5.2	Active Foresight and the IMO Code	84
	References	86
	Appendices	
Appendix 1	The Adoption of the IMO Code and the Rights and Obligations under Public International Law	102
Appendix 2	Front cover of the <i>Interim</i> French BEA-MER Report on the Loss of the Motor Tanker <i>Erika</i>	111
Appendix 3	Case Study	112
Appendix 4	Electronic Promulgation of Casualty Investigation Reports	131

LIST OF TABLES

Table 4i	Characteristics of HTML Reports	131
Table 4ii	Characteristics of PDF Reports	132

LIST OF FIGURES

Figure 2.4a	The Blame Culture and Safety by Compulsion	27
Figure 3.4a	Casualty Investigation and Co-operation	57
Figure 4.2a	Accident Investigation Process	64
Figure 4.5a	Linking Hindsight to Foresight	80
Figure 5.1a	The Start of a Process	83
Figure 3i	<i>Bunga Teratai Satu</i> 's Passage Plan and Track	113
Figure 3ii	CAE Diagram for Conclusion 1(a)	116
Figure 3iii	CAE Diagram for Conclusion 1(b)	117
Figure 3iv	CAE Diagram for Conclusion 2	120
Figure 3v	CAE Diagram for Conclusion 3	121
Figure 3vi	CAE Diagram for Conclusion 4	124
Figure 3vii	CAE Diagram for Conclusion 5	125
Figure 3viii	CAE Diagram for Conclusion 6	127
Figure 3ix	CAE Diagram for Conclusion 7	128
Figure 3x	<i>Bunga Teratai Satu</i> Events and Causal Factors Chart	130

LIST OF ABBREVIATIONS

AB	Able-Bodied Seaman
ABS	American Bureau of Shipping
ATSB	Australian Transport Safety Bureau
BASIS	British Airways Safety Information System
BEA-MER	Bureau Enquêtes Accidents Mer
BRM	Bridge Resource Management
CAE	Conclusion, Analysis, Evidence
CASMET	Casualty Analysis Methodology for Maritime Operations
CMI	Comité Maritime International
DMA	Danish Maritime Authority
EMSA	European Maritime Safety Agency
ETSC	European Transport Safety Council
EU	European Union
FBI	Federal Bureau of Investigation
FSA	Formal Safety Assessment
FSI	Flag State Implementation
GPS	Global Positioning System
HELCOM	Helsinki Commission
HRA	Human Reliability Analysis
HTML	Hypertext Markup Language
ICAO	International Civil Aviation Organization
ILO	International Labour Organization

IMCO	Inter-Governmental Maritime Consultative Organization
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
INMARSAT	International Maritime Satellite
INTERTANKO	International Association of Independent Tanker Owners
ISM	International Safety Management
ISPS CODE	International Code for the Security of Ships and for Port Facilities
ITSA	International Transportation Safety Association
MAIB	Marine Accident Investigation Branch
MAIIF	Marine Accident Investigators' International Forum
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto
MCA	Maritime and Coastguard Agency
MEPC	Marine Environment Protection Committee
MMA	Malta Maritime Authority
MSC	Maritime Safety Committee
NTSB	National Transportation Safety Board
P&I	Protection & Indemnity
PDF	Portable Document Format
QOC	Questions, Options and Criteria
QUICKTIME VR	QuickTime Virtual Reality
REEFREP	Great Barrier Reef Ship Reporting System
SMoC	Simple Model of Cognition
SMS	Safety Management System

SOLAS	Safety of Life at Sea
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995
TAIC	Transport Accident Investigation Commission
THEMES	Thematic Network for Safety Assessment of Waterborne Transport
TIM	Traffic Information Module
TSB	Transportation Safety Board
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
US	United States of America
USCG	United States Coast Guard
VRML	Virtual Reality Markup Language

CHAPTER 1 INTRODUCTION

Maritime¹ casualties are an unpleasant fact and have been around since mankind first ventured out to sea.

The industrial revolution in the 1800's meant the British Isles relied heavily on the importation of raw materials. This massive activity marked the dawn of the British Merchant Navy era. In those early days of steamships, there were almost no guarantees of a ship's safe return. Land-based society ignored the tragedies that happened out at sea and for seafarers and their families, seaborne trade carried a dear price. Under increasing public pressure, however, the United Kingdom (UK) Parliament appointed a committee in 1836 to investigate the escalation in the number of shipwrecks².

In 1870, Samuel Plimsoll, then a UK Member of Parliament from the industrial Midlands, launched a parliamentary campaign on behalf of the British Merchant Seamen³. Plimsoll relayed the public's serious concern of unscrupulous shipowners who had no interest in the crew's safety and always stood to gain, irrespective of the outcome of the maritime adventure. What really mattered was the carriage of goods, and at worst, the collection of insurance money if their ships were lost. During this campaign, Plimsoll referred to "coffin ships" overloaded with cargo and which

¹ Research revealed that the words "marine" and "maritime" are often used interchangeably. In the English language, the word "marine" relates to the scientific area *e.g.* marine science or marine biology. In comparison, the word "maritime" relates to shipping *e.g.* maritime studies and maritime law. There is only one exception and in one particular discipline – marine insurance, but this is more of a tradition rather than for any particular grammatical reason. Throughout this dissertation, the word "marine" is only used where there is a direct quotation or reference to material, which makes use of this word without any distinction.

² G. Peters, *The Plimsoll Line*, 1975 at p. v.

³ G. Peters, *ibid.*

hardly ever made a safe crossing. It would take 15 years before Plimsoll's pleas resulted in the UK Board of Trade assuming full responsibility of the Plimsoll Line in 1885⁴.

The advent of the "coffin ships" had generated what years later turned out to be a widely accepted international maritime convention.

The tragic loss of the *Titanic* in 1912 was also a major impetus to the development of international regulations governing safety of life at sea. Two years after the disaster, an international conference adopted the Safety of Life at Sea (SOLAS) 1914 Convention. A further milestone in the development of international regulations was the grounding of the *Torrey Canyon* in 1967. It was immediately evident that the Oil Pollution Convention of 1954 was inadequate to mitigate the consequences of environmental catastrophes of such dimensions. As a result, an International Conference on Marine Pollution was convened at the International Maritime Organization (IMO) and in 1973, the International Convention for the Prevention of Pollution from Ships was adopted.

These conventions and subsequent amendments remain a perpetual symbol of public concern. The maritime industry had finally acknowledged that loss of life at sea and marine pollution are unacceptable and had to be prevented. It was also recognised that the gateway to the prevention of a maritime casualty was (and still is) an adequate investigation⁵.

In order to provide IMO Member States with maritime casualty investigation procedures, the twentieth IMO Assembly adopted Resolution 849 on November 27, 1997. The Assembly Resolution included a code for the investigation of marine

⁴ *Ibid.*

⁵ Deschênes views casualty investigation as a "preventive medicine" with the sole purpose of improving safety and prevention of recurrences. See B. M. Deschênes, *Study on Marine Casualty Investigations in Canada (for the Minister of Transport)*, (1984) at p. 158.

casualties and incidents (IMO Code). Annexed to an Assembly Resolution, the IMO Code is legally termed as soft law or *para-droit* and is non-mandatory.

The adoption of the IMO Code meant a huge step forward was made towards improving casualty investigations in many ways. Almost six years later, IMO Member States still consider the IMO Code an adequate framework, although the extent of its implementation differs from one country to another.

Against this background, the dissertation critically analyses three aspects in relation to the implementation of the IMO Code.

Chapter 2 undertakes a critique on blame and spontaneous reactions and discusses how these actions may frustrate the spirit of the IMO Code. Chapter 3 examines the different roles of investigating bodies in relation to the implementation of the IMO Code. Chapter 4 then focuses on casualty investigation reports *vis-à-vis* hindsight and foresight. A case study introduces Conclusions, Analysis and Evidence (CAE) diagrams. Chapter 5 provides a visual link of how, rather than benefiting from the lessons learnt, deficiencies in these three major areas may lead to further casualties.

A short historical background to the adoption of IMO Resolution A.849(20) is described in Appendix 1 to this dissertation. The Appendix also heightens the provisions prescribing flag States' obligations and the rights of port and coastal States to investigate casualties onboard ships.

CHAPTER 2 THE ROLE OF POLITICIANS IN (FRUSTRATING) SAFETY INVESTIGATIONS

This chapter mainly focuses on how the actions of politicians can hinder safety investigations. Conversely, their inactions may equally impede safety investigations, thereby frustrating the IMO Code. One of the ongoing criticisms is that only a few IMO Member States carry out timely casualty investigations⁶.

Two years to the date since the Maltese tanker *Kristal* broke in two in the Bay of Biscay with the loss of 11 lives, it was reported that the Malta Maritime Authority (MMA) had still not issued the final report, even though it had circulated a draft confidential copy to the interested parties for their comments⁷.

The delay was ascribed to the *Kristal* carrying a cargo of molasses and not black oil, implying, that the political pressure on MMA, nationally and internationally, was insignificant compared to the casualties of the *Erika* and the recent *Prestige*. Others fear that such delays result from priorities given to financial assets over safety related issues⁸.

This resistance may be also attributed to politicians, who may not entirely understand the importance of shipping interest and where it falls. This suggests that it is only in

⁶ C86/10, *Work Programme and Budget for the Twenty-Second Financial Period 2002-2003. Proposals by the Secretary-General*, (IMO, 2001b).

⁷ See B. Reyes, *When Oil and Water Count More than the Lost Lives of Seafarers*, (2003a) at p. 5. The MT *Kristal* broke in two on February 27, 2001 and subsequently foundered.

⁸ M. Grey, *Digesting Lessons of Safety*, (2002a) at pp. 24-25.

the wake of a very serious casualty that shipping reaches a high profile – only to subside again by time, with other issues taking over⁹.

Dixon¹⁰ identifies four different environments, external to an organisation, which if considered in the context of the maritime industry, may help to explain what influences (and determines) the level of response to maritime casualties. These are -

- Economic;
- Social and cultural;
- Political and legal; and
- Technological.

Thus, the acid test for a maritime state encountering these problems and criticism is whether or not it can get down to the grass roots and analyse how to discharge its obligations under international maritime conventions.

2.1 The Actions of Politicians in the Aftermath of a Very Serious Casualty¹¹

Very serious casualties like the *Erika*¹² and the *Prestige* have shown to what extent the reaction of the industry may extend. Whilst the leaking cargo has long since either been pumped out of the wreck or brought under control, yet, the political repercussions are still unfolding.

Rather than discussing the political issues *per se*, the concept of political actions and spontaneous reactions is analysed. In so doing, the reasons as to why politicians may resort to these extreme measures, rather than implementing the IMO Code is discussed. The chapter does not only present why such actions are taken, but also

⁹ View expressed by P. K. Mukherjee in a personal interview August 13, 2002.

¹⁰ R. Dixon, *The Management Task*, 1997 at p. 126.

¹¹ The term ‘Very Serious Casualty’ as used in this dissertation, has the same definition as given in IMO Resolution A.849(20), Section 4.2.

¹² This writer was part of the team, which investigated the sinking of the MT *Erika* on December 12, 1999. On several occasions, this dissertation will make references to the MT *Erika* casualty investigation.

how these actions frustrate the spirit of the IMO Code. Regional and global efforts, whose success may result in a better implementation of the IMO Code, are identified and discussed.

2.2 International Co-Operation During Casualty Investigations

Following the *Prestige* casualty, which for the second time in three years resulted in severe polluted beaches on the western coasts of two European Union (EU) Member States, the French President Jacques Chirac was quoted saying: “France and Europe must not leave these gangsters of the sea to profit cynically from the lack of transparency in the current system”. Playing the traditional political song and dance, Loyola de Palacio, Vice-President of the European Commission in charge of transport and energy immediately declared: “...the main problem is that there are tanker ships on the sea that are ecological bombs”. She also confirmed, “{w}e are going to call for an administrative decision...so that the most risky fuel, which is the heavy fuel, is not transported on the most risky ships”¹³.

Rather than an adequate implementation of the IMO Code and a reflection of its true spirit, several very serious casualties (especially those which result in severe pollution), manifest anything but international co-operation. Following these casualties, co-operation between the flag State and the coastal or port State fails even before it is conceived. These issues warrant further discussion.

2.2.1 The status of the IMO Code

Section 3 of the IMO Code is very clear in that the extent of its application depends on the national law of the state involved in a casualty¹⁴. The supremacy given to national law is understandable because the IMO Code is a Resolution, *i.e.* a soft law or *para-droit*.

¹³ See I. Middleton, *Another Fine Mess*, (2003) at pp. 15-17.

¹⁴ See Section 3 of Annex 1 to IMO Resolution A.849(20), *Code for the Investigation of Marine Casualties and Incidents*, (IMO, 1997c).

Soft law is “incorporated within soft instruments” and includes recommendations, resolutions and even final acts of international diplomatic conferences¹⁵. In view of soft law not being prescriptive in nature and therefore not legally binding, these instruments do not impose legal obligations but rather project the objectives which need to be reached in the future. It is interesting to note that the relation between the softness of the instrument and the softness of the contents is in direct proportion¹⁶. Thus, the character of the IMO Code, being not legally binding, implies that it may either be ignored or simply hinged on the will of political masters.

Some believe that the IMO Code does not work in most instances due to legal impediments within the legal systems of other States¹⁷. It is also indicated that the status of the IMO Code, a voluntary guideline, is indeed an inherent weakness¹⁸. Notwithstanding, when referring to soft law, Mukherjee heightens that “in a strict legal sense, {soft law} may not be binding, but possesses a persuasive character”¹⁹. So much so that he even refers to the International Safety Management (ISM) Code, which was an IMO Resolution (*i.e.* soft law) but was eventually incorporated in Chapter IX of the SOLAS 1974 Convention, transforming it into hard law. Hence, what Mukherjee remarks, reflects exactly what D’Amato stated much earlier *i.e.* soft law projects the objectives, which need to be reached in the future. The transformation to hard law therefore depends on the political will and priorities of the IMO Member States²⁰.

¹⁵ See A. D’Amato, *Soft law*, (2001) at p. 56. A. D’Amato is a Professor of Law at Northwestern University, Chicago, United States of America (US).

¹⁶ A. D’Amato, *ibid.*

¹⁷ Personal communication with D. Drummond March 21, 2002. D. Drummond is former Director of the Bahamas Maritime Authority. D. J. Sheetz, Executive Vice President of Vanuatu Maritime Services Limited does not share this pessimistic view at all and declares that the IMO Code “has been a resounding success”. Personal communication with D. J. Sheetz April 16, 2003.

¹⁸ Personal communication with F. L. Wiswall May 05, 2003. Professor Wiswall is the Vice President of the Comité Maritime International (CMI).

¹⁹ P. K. Mukherjee, *Maritime Legislation*, 2002 at pp. 118-119.

²⁰ It is very important to point out that not all the Codes emanating from IMO are soft law. As opposed to the ISM Code, which was initially an IMO Assembly Resolution before being incorporated into the SOLAS 1974 Convention, the International Code for the Security of Ships and

One maritime administration comments that if the IMO Code has an inherent weakness, then it was anticipated even during the drafting stages²¹. Given the accuracy of this view, then this statement carries a very serious implication. Any agreement will impose no responsibility on the parties involved, if the same parties had negotiated with the assumption in mind that there would be no legal obligations but a “{sole intention} to express shared values, interests, or desires and uncertain hopes”²². Moreover, the parties involved “assume that their freedom of action will in no way be restricted”²³. The IMO Code is no exception. For instance, the language used is lenient and the word ‘should’ is used throughout the entire document instead of ‘shall’, the latter being used in law-making treaties. This is also particularly pertinent when a document is intended to impose a legal obligation on the parties involved.

The views mentioned above seem to suggest that although there is an implied persuasive character, however, it is the political will and the priorities of IMO Member States that determine the extent to which they implement the IMO Code; from totally ignoring it to an unconditional implementation. One scholar even remarks that the term soft law has attracted ‘soft responsibility’, as opposed to the responsibilities imposed on parties, signatory to an international convention²⁴.

In this respect, however, academic writers and (very interestingly) even politicians themselves, do not entirely concede that soft law should be ignored simply because it carries no legal weight.

for Port Facilities (ISPS Code) was adopted by a Diplomatic Conference on Maritime Security at IMO in December 2002. By incorporating it into the SOLAS 1974 Convention, this new Code will be immediately transformed into hard law when it enters into force, without ever being a Resolution or soft law.

²¹ D. J. Sheetz, *supra* note 17.

²² See H. Hillgenberg, *A Fresh Look at Soft Law*, (1999) at p. 507. H. Hillgenberg is the Ambassador of the Federal Republic of Germany to the Republic of Ireland.

²³ H. Hillgenberg, *ibid.*

²⁴ A. D’Amato, *supra* note 15 at p. 57.

2.2.1.1 The other standpoint of soft law

When adopting Assembly Resolution 1169(1998), the Council of Europe's Parliamentary Assembly recognised that soft law should not be taken very lightly because "...it has proved its worth as a source of inspiration for national legislation and local initiatives alike, and has paved the way for the negotiation of stricter and more binding agreements"²⁵.

If one had to apply this school of thought to IMO and its Member States, it would mean that although, for instance, resolutions *per se* do not create international law, however, they may be considered to be the first step towards this process. This is because they have the potential of guiding and coordinating cooperation between IMO Member States. Furthermore, the term "more binding agreement" seems to point to the existence of some sort of a lesser binding power, which could well be the moral or ethical obligation derived from the persuasive character of the instrument.

The importance of soft law was also highlighted by Jackson during a debate in the UK Parliament on a draft EU Directive. Jackson explained that although IMO Resolutions are adopted on the basis that they are non-mandatory, however, "...there is an implicit presumption that IMO Members would implement agreed Resolutions. Indeed, a number of Resolutions have subsequently been made mandatory by IMO itself"²⁶.

This is a very valid point and one has to remark that during the discussions of these instruments, delegations still negotiate with extreme caution, as if they had before them the draft text of treaty law²⁷. It is therefore evident that the negotiations still

²⁵ Resolution 1169(1998) was adopted on September 24, 1998 and relates to *The Oceans: State of the Marine Environment and New Trends in International Law of the Sea*. See Council of Europe (1998), Section 17.

²⁶ See UK Parliament, *Roll-on/Roll-off Passenger Ferries*, (1998). G. Jackson is the UK Parliamentary Under-Secretary of State, Department of the Environment, Transport and the Regions.

²⁷ A. D'Amato, *supra* note 15.

take into consideration the persuasive character and that in the future, the instrument may become mandatory under international law²⁸.

Hillgenberg concurs that there is no justification to overlook soft law²⁹. He cites Klabbers, who states that rather than a loophole, soft law serves, *inter alia*, as a -

- Framework for confidence-building between negotiating States;
- Stimulation for further development of the instrument; and as a
- Creation of a flexible regime, which blends well with the fact that the instrument is still in its developing stages.

2.2.2 Spontaneous reactions³⁰

Spontaneous reactions have very serious implications, not least on the implementation of the IMO Code. Since the implementation of the latter is an expression of motivation towards safety and environmental protection, spontaneous reactions serve as a telltale sign that the implementation of the IMO Code, if any, is not adequate. Furthermore, as it is explained in the following sections of this chapter, spontaneous reactions create a vicious circle as they may well lead to further casualties.

Spontaneous reactions are the result of either a direct or a perceived public outcry in the wake of a very serious casualty. It is almost certain that when there is public outcry, the government of the State in question will resort to some action, irrelevant to whether it is adequate or not³¹.

²⁸ A. D'Amato, *ibid*.

²⁹ H. Hillgenberg, *supra* note 22 at p.501.

³⁰ For the purpose of this dissertation, spontaneous reactions are defined as reactions lacking adequate appraisal and analysis of ensuing consequences.

³¹ See F. J. Iarossi, (2003). F. J. Iarossi is the Chairman and Chief Executive Officer of the American Bureau of Shipping (ABS).

It appears that following all cases of severe pollution, the media has never encouraged a safety investigation in accordance with the IMO Code³². To the contrary, it has influenced public outcry, which in turn has instigated spontaneous reactions. In reality, the public is not aware of the situation in the industry³³. This therefore implies that the pressure put on politicians to resort to some action may not be adequate and the spontaneous reactions will be far from addressing the real underlying factors of that casualty³⁴.

Hours after the *Erika* casualty, MMA requested the French Bureau Enquêtes Accidents Mer (BEA-MER) to co-operate, share any evidence available and conduct an investigation, in line with the spirit of the IMO Code. Not only did BEA-MER brush aside co-operation, but the IMO Code was never taken into consideration or mentioned by the French investigators. Furthermore, precisely 32 days following the casualty, BEA-MER issued an *interim* technical report which tackled, amongst others, the flooding sequence following the bulkhead and side shell failure of the tanker, and also the inadequacies of MMA³⁵. The report included several contributing factors to the casualty and also recommendations to prevent future similar accidents.

When taking the opportunity to comment on the *Prestige* casualty, Rear Admiral Lang was reported saying that rather than appreciating the importance of casualty investigation, the industry is agile enough to press what he calls the “panic buttons”³⁶. Lang cannot be more precise. Following the *Prestige* casualty, the French President Jacques Chirac was reported requesting “draconian measures”. The

³² Research carried out by this writer.

³³ J. L. Veiga, *Safety Culture in Shipping*, (2002) at p. 22.

³⁴ The same applies to the press media, which is the main source of general public influence and therefore also acts as a pressure point on politicians. However, many are those who in the recent past have accused the media in general that rather than projecting the true image of the industry, they project the latter as a complex system where anything but thorough safety initiative exists.

³⁵ Appendix 2 to this dissertation contains a scanned image of the *interim* technical report cover sheet issued by BEA-MER on January 13, 2000.

³⁶ See “*Pressing the Wrong Buttons*”, (2003) at p. 7.

EU joined his bandwagon and initiated the implementation of stricter legislation; well before any casualty investigation report had yet been completed³⁷.

Many influential persons in the industry have expressed their views against spontaneous reactions and additional regulations, either because they are a sign that the role of safety investigations is being made redundant or because of economic expediency. Making an obvious reference to the Vice-President of the European Commission, Woods acknowledges, "...it is difficult to persuade a politician with a crusade...of practical or technical considerations"³⁸. It is also deemed that after all, politicians are not shipping experts and there are occasions where they are badly advised, resulting in additional or tighter regulations³⁹.

The problem with additional or tighter regulations can be viewed from at least two perspectives; namely safety and economics. Whilst leaving the economics aspect to economists, it must be pointed out that a wrong political decision taken in the aftermath of a casualty, can be easily viewed as a latent failure at the decision-making level, meaning another weakness in the barriers, which should prevent casualties. Thus, a spontaneous reaction can backfire, create a compliance culture⁴⁰

³⁷ B. Ryes, *Not Again*, (2002) at p. 1.

³⁸ See "*A Case for Education*", (2003) at p. 5. R. Woods is the President of the UK Chamber of Shipping.

³⁹ See D. Osler, *O'Neil urges IMO Flag Power*, (2003) at p. 1. During this speech, Secretary-General O'Neil implied that the double-hull issue was a political cover-up and that it is only a matter of time until the maritime industry will suffer the first casualty involving a double-hull tanker. It can be immediately perceived that Secretary-General O'Neil's speech has cast aspersions on the regime's hasty decision to phase out single-hull tankers, rather than addressing the root causes of the accident.

⁴⁰ David Wright, Maritime and Coastguard Agency (MCA) Principal Surveyor at the Formal Safety Assessment (FSA) Branch identifies two hazards related to the compliance culture: massive amount of regulations that can lead the operator of a complex system to simply comply with rules, without considering the implications on safety. Furthermore, the operator may assume that if he complies with rules, then the operation is safe, which is, however, not always the case. See D. Wright, *Formal Safety Assessment: Its Role in Marine Safety*, (1999) at p. 2. This is what Jens Rasmussen defines in his taxonomy as Rule-Based errors.

and can become antagonistic to the objective of the IMO Code, which is the prevention of similar future casualties⁴¹.

2.2.3 Political interference

Political interference may be another stumbling block during the implementation process because it stymies the spirit of the IMO Code. The turbulent atmosphere, which may be created by several politicians in the aftermath of very serious casualties, is far from desirable and ideal for the implementation of the IMO Code. No wonder that during the *Prestige* events, “politicians...{were} spitting with rage...”⁴². In addition to spontaneous reactions, politicians’ rage is expressed in finger pointing and a blaming culture.

Finger pointing not only goes against the purpose of safety investigations but it also blocks the co-operation process. In the executive summary of the MMA report into the loss of the *Erika* it was remarked that further to the lack of information made available to the flag Administration, the incarceration of the master by the French authorities for ten consecutive days, might have had a bearing on the findings of the casualty investigation⁴³. The lack of co-operation was also expressed by the Maltese delegation to the Marine Environment Protection Committee’s (MEPC) forty-fifth Session when the *Erika* report was officially presented to IMO⁴⁴.

Almost three years later, the master of the *Prestige* met worse treatment and spent several months in jail. The flag State, in this case the Bahamas, also reported to the seventy-sixth Session of the Maritime Safety Committee (MSC) that its investigators

⁴¹ See IMO, *supra* note 14. This means that the implementation of the IMO Code becomes redundant. Even worse, the European Commission Vice-President was reported describing the quick phasing-out of single-hull tankers from EU waters as “...spectacular steps ahead...and I am very happy to see these crucial initiatives finally approved...!”. See R. Hailey & J. Frank, *European MP’s Vote for Faster Phase-out*, (2003) at p. 1.

⁴² See “*Prestige Sparks Déjà Vu*”, (2002) at p. 7.

⁴³ Malta Maritime Authority, *Report of the Investigation into the Loss of the Motor Tanker ERIKA on Sunday 12 December 1999*, 2000.

⁴⁴ MEPC 45/20, *Report of the Marine Environment Protection Committee on its Forty-Fifth Session*, (IMO, 2000b).

were not permitted to interview the master by the coastal State authorities⁴⁵. This is a right, which is granted by international conventions to which the coastal State is also a Party.

It takes no scholar to realise that the frustration of the spirit of the IMO Code is very clear in at least the following respects -

- Failure to co-operate;
- Failure to share available evidence;
- Prohibiting access to key witnesses; and
- Taking blunt reactive measures, without considering the safety investigation findings.

In opposition to the objective of the IMO Code, it is virtually expected that in some way or another, an investigation will determine blame. So much so that comments on the forthcoming report compiled by the European Parliament's *rapporteur* on the *Prestige*, claiming "neutrality and technicality", have raised many eyebrows, especially after the stand taken by the EU⁴⁶. MacIntosh-Murray and Wei Choo cite

⁴⁵ M. Grey, *Bahamas Government Protests to Spain on Treatment of Mangouras*, (2002b) at p. 1.

⁴⁶ See B. Reyes, *EU Report to Back Industry Line on Action over Prestige*, (2003b) at p. 1. A draft copy of the report prepared by Sterckx, the European Parliament's *rapporteur* on the *Prestige*, was finalised at a time when the writing of this dissertation was in progress. The report was not available to this writer and therefore the genuineness and accuracy of the extensive coverage by Lloyd's List issue of June 10, 2003 cannot be determined.

Also see R. Hailey, *Sterckx Calls for Steeper Owner Pollution Liability*, (2003) at p. 1. Hailey reported that Sterckx's report recommends the European Maritime Safety Agency (EMSA) to, *inter alia*, investigate specific hazards related to double-hull tankers. This recommendation only confirms that wrong decisions constitute a latent failure within the system and suggests that the EU missed the boat altogether when it insisted on a spontaneous reaction to phase out single-hull tankers. Chapter 4 of this dissertation shows that risk assessment should be a proactive exercise and not addressed as a retrospective approach. Scientifically and logically, it makes no sense that the EU jumped the gun, stuck to its decision to phase out single-hull tankers and now is being recommended to assess the risk related to its political judgment. Moreover, the report also expresses concern on the incarceration of the *Prestige* master, which is looked upon as a direct blow to the revival of the seafaring career. Whilst there is no doubt that this concern is genuine, the report should express equal concern on the fact that his incarceration simply compromised the on-going safety investigation by the Bahamas Maritime Authority.

Douglas in their paper who asserts, “blaming is a way of manning the gates through which all information has to pass”⁴⁷.

On the occasion of World Maritime Day 1997, ‘IMO News’⁴⁸ referred to Allinson who expressed his grave concern on blaming and scapegoating as follows -

The problem with the technique of scapegoating is not only that it may be unfair to the scapegoat but that by thinking that one has discovered the cause of the disaster, one is alleviated from the responsibility of searching for the entire constellation of factors.

Although this issue of ‘IMO News’ was published just months before the IMO Assembly adopted Resolution 849, recent casualties have shown that at least when severe pollution occurs, the IMO Code is not being implemented to an extent which would enable the industry to benefit from the safety investigation⁴⁹.

⁴⁷ A. MacIntosh-Murray & C. Wei Choo, *Information Failures and Catastrophes: What Can We Learn by Linking Information Studies and Disaster Research?*, (2002).

⁴⁸ See IMO News, “*Optimum Maritime Safety Demands a Focus on People*”, (IMO, 1997b) at pp. i-iv.

⁴⁹ Leading opponents of the ‘blame culture’ are not suggesting that society transforms itself into anarchy. As compared to a no ‘blame culture’, Professor Reason instead suggests a ‘just culture’, believing that such a society is more realistic and credible. What Reason recommends is a culture, where punishments are only given in circumstances where casualties would have resulted from *Mens Rea* offences. (*Mens Rea* means the mental element). He also emphasises that such cases are only a minority, the rest being unsafe acts and decisions where the determination of blame is only undesired and to the detriment of safety. See J. Reason, *Managing the Risks of Organizational Accidents*, 1997 at p. 205.

Furthermore, it neither means that a safety investigation refrains from reporting criminal offences. Enforcing the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 1973/78) may require the port or coastal State to report a wilful discharge of oil or any polluting substance to the flag State. However, once an alleged criminal offence has been reported to the competent authorities, the casualty investigators should not involve themselves any further.

2.2.4 Possible rationale to spontaneous reactions and the blame culture

Although scholars and academic writers are cautioning the industry that spontaneous reactions and a blame culture are neither ideal nor desirable, however, politicians persist with their hasty decisions.

It is submitted that Reason has indirectly explained the rationale behind this behaviour, which goes against the objective, purpose and spirit of the IMO Code. He suggests that there are instances in the aftermath of an accident where politicians decide to blame or prescribe new regulations even if they are aware that such actions will not prevent future accidents. He indicates that in addition to being seen as doing something, “blaming those at the sharp end deflects blame from the organization as a whole”⁵⁰.

One other major reason why several politicians choose to ignore the IMO Code is because they find it difficult to believe in its potential, as opposed to those countries where it was ensured that the IMO Code is implemented and the safety investigation is given the same priority as any other investigation.

The IMO Code provides the framework for safety investigations and its purpose is achieved when the casualty investigation report is published, identifies the contributing factors and gives recommendations without apportioning blame or determining liability. The report should serve as the bedrock of a safety culture and it is precisely here that the problem lies. It has already been established that for various reasons, following major casualties, politicians who strongly believe in the blame culture, generally demand the unachievable. Reason deems that the positive impact of these measures towards a new safety culture is negligible. In fact he eloquently suggests that safety culture needs to be constructed and “...{is} not something that springs up ready-made from the organizational equivalent of a near-

⁵⁰ J. Reason, *ibid.* at p. 193. The view expressed by Reason was later echoed by Iarossi. See F. J. Iarossi, *supra* note 31. Actually, many regard the extreme position taken by the Spanish Government in arresting and charging the master of the *Prestige* of several offences, as a political manoeuvre, to allay the Spanish people’s fears about their Government’s lack of appropriate action to mitigate the pollution on the Galician beaches.

death experience, rather it emerges gradually from the persistent and successful application of practical and down-to-earth measures”⁵¹.

Schröder considers spontaneous reactions and the outcome of thorough casualty investigation reports as “short-term needs *versus* long-term interest”⁵². He indicates that in view of the long time gap (sometimes even years) from the identification of root cause failures to the agreement on justified measures/solutions to prevent the casualty from happening again, politicians tend to resort to short-term measures. As he rightly points out, this should only be a temporary measure, which then has to be reviewed once the corrective actions are identified.

However, his point seems to be inexact because whilst admitting that this is not often the case, he still defines these measures as “short-term”. For instance, the phasing out of the single-hull tankers from EU waters following the *Erika* casualty and their subsequent accelerated phasing out following the sinking of the *Prestige*, are nothing less than long-term measures. These are measures, which have been called upon by politicians in general, based on no scientific justifications, without even waiting for the publication of the casualty investigation reports and rather than being short-lived, are irrevocable. Far from an ideal implementation of the IMO Code!

As one scholar points out, a reactive approach may be justified, subject to the condition that it addresses the important contributing factors⁵³. This implies, however, that an ideal safety policy can only be adopted after the safety investigation report has been published.

⁵¹ *Ibid.* at p. 192.

⁵² J.-U. Schröder, *The Human Element (HE) in Marine Casualties – Are We Prepared to Address the Real Issues?*, (2003) at p. 2.

⁵³ See H. N. Psaraftis, *Maritime Safety: To Be or Not to Be Proactive*, (2003) at p. 6. H. N. Psaraftis is a Professor at the National Technical University, Athens, Greece.

2.3 Overcoming the Political Scepticism to Advance the Implementation of the IMO Code

So far cases have been referred to, where it is evident that the IMO Code is hardly being implemented. In addition, the possible reasons why this is so have been addressed. The repercussions of wrong political decisions were also highlighted and it has been established that depending on the will of the IMO Member States, the implementation of the IMO Code can be further advanced⁵⁴.

2.3.1 Breaking free the blame cycle

Politicians need to understand that the very fundamental premise on which the IMO Code is to be implemented is that the process absolutely does not foster scapegoating. As Reason puts it: “{t}here is one obvious but psychological significant difference between ourselves, the retrospective judges, and the people whose decisions, actions or inactions led to a disaster; we know how things were going to turn out, they did not”⁵⁵.

Sir Neville Purvis asserted that one should not emphasise “...on the final garnish {instead of} the basic ingredients of a lethal brew which has already been long in the cooking”⁵⁶. This very important remark complements Reason’s belief that, *inter alia*, there is an interaction of factors beyond the control of the scapegoat and it will

⁵⁴ Away from the scrutiny of the eyes of the general public, the attitude of a State is another factor, which together with the political will, regulates the implementation of the IMO Code. On May 02, 2003, a collision in the Black Sea involving the Maltese ship *Junior M* and the Spanish tanker *Nuria Tapias* resulted in the loss of the Maltese ship. Discussing the co-operation process, Captain Zerafa, Technical Manager of the Merchant Shipping Directorate of the MMA stated that the other flag State was very reluctant to co-operate and only after reporting the appalling situation to the EU that correspondence trickled in Spanish, although co-operation is still at the barest minimum. Discussion with J. Zerafa May 29, 2003.

Captain Dietrich of the German Federal Bureau of Maritime Casualty Investigation recalls a similar experience where they requested Egypt (the flag State) to co-operate in accordance with the IMO Code but all they received was a “friendly reply without any information”. Personal communication with D. Dietrich May 14, 2003.

⁵⁵ J. Reason, *Human Error*, 1990 at p. 215.

⁵⁶ See B. Toft & S. Reynolds, *Learning from Disasters: A Management Approach*, 1997 at p. vii. Sir Neville Purvis is the Director General of the British Safety Council.

not be easy for the operator of a complex system to control actions which he did not intend to execute⁵⁷.

The above views lead to the fact that politicians may be constrained to spontaneous reactions, which then will be destined to stay because if otherwise, they may fear that their sovereign people will accuse them of political ‘U-turns’. Reason argues that it is true that operators of complex systems frequently do make mistakes, especially when trying to recover the system to its normal operational status. However, that situation would have materialised in the first place because of latent defects within the general system⁵⁸.

This would therefore mean that the mistakes committed by the operator are a consequence of latent failures and should be viewed as a manifestation that indeed, weaknesses had existed in the system since it was a mere sketch, pinned to the drawing board. Hollnagel echoes Reason’s view and defines the human beings at the sharp end as “people who were caught between the demands of complex technology and the inadequate means they were given to achieve their tasks”⁵⁹.

Neither politicians nor anybody in the maritime industry should have a narrow vision and interpret the “inadequate means” as referring only to an old corroded single-hull tanker transporting black oil. Decisions taken with alacrity in the wake of a casualty can also perfectly fit the “inadequate means”. Reason’s Hybrid model, adopted by IMO as Assembly Resolution 884, clearly shows that spontaneous reactions,

⁵⁷ J. Reason, *supra* note 49 at p. 128.

⁵⁸ J. Reason, *supra* note 55 at p. 173.

⁵⁹ E. Hollnagel, *Cognitive Reliability and Error Analysis Method. CREAM*, 1998 at p. xiii. Crewmembers onboard ships fall within the definition of human beings at the sharp end *i.e.* the operators of a complex system. In other words, the task of seafarers is to, *inter alia*, meet the demands of complex technology. However, the same complex technology is not free from weaknesses and therefore may be susceptible to fail in the hands of those at the sharp end.

especially if taken without even considering the casualty investigation report, may in the long run result in latent defects at the top management level⁶⁰.

2.3.2 The machinery provided by IMO

It is acknowledged that IMO is the only global forum where international co-operation may be promoted⁶¹. Observers have, however, identified at least seven weaknesses of the Flag State Implementation (FSI) Sub-Committee, which hinder the efforts towards the implementation of the IMO Code⁶². They are -

- Failure to establish mandatory procedures related to casualty investigation;
- Limited enforcement of the IMO Code;
- IMO cannot disclose whether a flag State has submitted a report;
- Failure to exert pressure on flag States which have failed to complete a casualty report;
- Unable to disseminate the findings of casualty investigations without the consent of the flag;
- No deadline for completing casualty investigations; and
- Several international maritime conventions only require investigations, if the flag State judges that the investigation may lead to an amendment in the present regulations.

The need to provide IMO with some enforcement powers has long been sensed. In a speech given in October 2000, Secretary-General O'Neil stressed that IMO is ready

⁶⁰ See A.884(21), *Amendments to the Code for the Investigation of Marine Casualties and Incidents*, (IMO, 1999).

⁶¹ Article 1(a) of the Convention establishing IMO defines the purposes of the Organization as “to provide machinery for co-operation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships”. See Focus on IMO, “*Basic facts about IMO*”, (IMO, 2000a) at p. 1.

⁶² See “*IMO Remains Toothless and on the Fringe*”, (2002).

to respond if the necessary resources are provided⁶³. Thus, even if the MSC seventy-sixth Session and the MEPC forty-eighth Session have adopted MSC/Circ.1058 / MEPC/Circ.400, which relates directly to the better implementation of the IMO Code⁶⁴; with little enforcement power, it still comes down to the political will of the IMO Member States.

During the eleventh Session of the FSI Sub-Committee, Canada, Denmark and New Zealand submitted document FSI 11/7, requesting the Sub-Committee to consider transferring the content of IMO Resolution A.847(20) into a 'Flag State Implementation Code' (FSI Code), with the intent of making it mandatory at some later stage⁶⁵. As it would have been expected, the draft FSI Code, annexed to document FSI 11/7, referred to casualty investigations and made specific reference to the IMO Code in a footnote. It has to be pointed out that the reference to the IMO Code in a footnote does not mean that it will become mandatory, should the FSI Code enter into force⁶⁶. This means nothing less than a direct reliance on the political will of the IMO Member States.

⁶³ See W. O'Neil, (2000). In so doing, Secretary-General O'Neil also pointed out that the waiver-clause inserted in several international maritime conventions, only requiring investigations when deemed possible to amend regulations, should be removed.

⁶⁴ MSC/Circ.1058 / MEPC/Circ.400, *Interim Guidelines to Assist flag States and Other Substantially Interested States to Establish and Maintain an Effective Framework for Consultation and Co-Operation in Marine Casualty Investigations*, (IMO, 2002c).

⁶⁵ Enhancing global maritime safety and protection of the marine environment is the sole objective of the proposed FSI Code. See *Responsibilities of Governments and Measures to Encourage Flag State Compliance. Draft revised resolution A.847(20)*, (IMO, 2003a).

⁶⁶ Mukherjee adds that should the FSI Code enter into force, the application of the IMO Code will only become mandatory if the IMO Code itself becomes mandatory through the necessary actions at the international level and then, through corresponding legislative action at the national level. Thus, it is up to the political will of governments to take the opportunity and insert the IMO Code in their national legislation at the same time that they insert the FSI Code. However, putting an enabling clause in the national legislation to enforce the FSI Code will not mean that the IMO Code has also become mandatory. Views expressed by P. K. Mukherjee in a personal interview June 06, 2003. Countries such as Australia, Canada and the UK have either incorporated the IMO Code in their national principal legislation or drafted new subordinate legislation based on the IMO Code.

2.3.3 The EU and regional agreements

Article 12 of EU Council Directive 1999/35/EC refers to accident investigations and in this respect, sets out obligations on EU Member States, even if solely limited to ro-ro ferries and high-speed passenger crafts. The Article makes direct reference to the importance of implementing the IMO Code, although it only presents a blueprint on how co-operation shall be achieved⁶⁷.

Regulation (EC) No. 1406/2002 of the European Parliament and of the Council, established EMSA on June 27, 2002. Article 2e defines that one of the tasks of EMSA is the facilitation of co-operation between EU Member States and the Commission. The facilitation of co-operation will automatically support EU Member States during the investigation process⁶⁸. Although in its infancy, once matured, EMSA may help assist the implementation of the IMO Code, hopefully brushing aside the spontaneous reactions and the blame culture mentioned earlier.

The fact that the maritime industry needs a global solution to promote an even better implementation of the IMO Code does not in anyway mean that there is no room for regional agreements, especially if the IMO Code is used as the core of that agreement. *Per se*, that would signify that parties involved are committed to implement the IMO Code, rather than resorting to spontaneous reactions and scapegoating⁶⁹.

⁶⁷ Council Directive 1999/35/EC, *A System of Mandatory Surveys for the Safe Operation of Regular Ro-Ro Ferry and High-Speed Passenger Craft Services*, (EU, 1999).

⁶⁸ Regulation (EC) No. 1406/2002 of the European Parliament and the Council, (EC, 2002).

⁶⁹ In addition to implementing the IMO Code, regional agreements also serve the purpose of harmonising the legislation of the parties; which will also harmonise different philosophies in casualty investigation. (The consequences of different philosophies are addressed in more detail in chapter 3 of this dissertation). Denmark, France, Germany, the Republic of Korea and Sweden submitted FSI 10/9/1 to the tenth Session of the FSI Sub-Committee and referred to Section X of the HELCOM Copenhagen Declaration, adopted September 10, 2001 and which relates to the IMO Code and establishment of common procedures. See FSI 10/9/1, *Casualty Statistics and Investigations. Guidelines to Assist Flag States and other States with a Substantial Interest in the Investigation of Marine Casualties to Establish and Maintain an Effective Framework for Consultation and Co-operation*, (IMO, 2002a).

2.3.4 Other international fora

Two of the most influential international fora are the Marine Accident International Investigators' Forum (MAIIF) and the International Transportation Safety Association (ITSA)⁷⁰. Both fora share the same principles of co-operation and their respective members have supported the adoption of the IMO Code and its implementation. Such fora should be warmly welcomed as a source of learning from the practices of others, especially those who, by adopting the IMO Code, have overcome political stumbling blocks during casualty investigation.

2.3.5 Enforcing the IMO Code at municipal and international levels

Soft law may be enforced in a “soft manner”⁷¹. This compares well with IMO Assembly Resolution A.912(22), which is the ‘Self-Assessment of Flag State Performance’. The self-assessment form has some weaknesses in its current format, but it may serve as an eye opener for a flag State that drags its feet, not least in the area of casualty investigation, as it might also influence the public opinion *vis-à-vis* the flag State concerned. The IMO Model Audit Scheme discussed by MSC during its seventy-sixth and seventy-seventh Sessions is also being designed to assess how effectively Member States are complying with international conventions⁷² and indirectly may therefore determine the extent of implementation of the IMO Code.

In attempting to avoid circumventing safety investigations, civil servants may also encourage politicians to understand that their actions should not frustrate the implementation of the IMO Code. This can be achieved by giving effect to the IMO Code through national maritime legislation, meaning that IMO Member States can incorporate it into their national maritime legislation and transform it into hard law. The same applied to the International Maritime Dangerous Goods (IMDG) Code,

⁷⁰ Whilst MAIIF membership is open to all states, participation at ITSA is only limited to states, which have established independent casualty investigating bodies.

⁷¹ See H. Hillgenberg, *supra* note 22 at p. 511.

⁷² See IMO News, “*Casualty Investigations – New Guidelines Approved*”, (IMO, 2003b) at p. 16.

which many States incorporated into their national maritime legislation, even before it became mandatory⁷³.

However, although a government will then ensure a more effective implementation of the IMO Code (and its spirit of no blame and spontaneous reactions), its incorporation into national maritime legislation without it being in force internationally, may still not bring harmonisation in its implementation. This is also true, given the fact that the IMO Code has a very serious limitation in that it only applies “as far as national laws allow”⁷⁴.

The solution to the above problem was expressed by Lord McNair who brings to light a fundamental principle of international law – a principle that gives international law supremacy over municipal law⁷⁵. He states that -

When a State enters into obligation of an international character, it is not allowed to adduce any inadequacy or incompatibility in its own legal system, or any of its legislative or executive acts, as an excuse for the non-performance of the international obligation.

Followed to its logical conclusion, Lord McNair’s statement becomes a reality if, for instance, the IMO Code had to be made mandatory through the SOLAS 1974 Convention⁷⁶. Whilst IMO emphasises its global role, Wiswall concludes that the MSC is unwilling to amend SOLAS 1974 Convention, Regulation I/21; meaning that

⁷³ P. K. Mukherjee, *supra* note 19 at p. 118.

⁷⁴ See IMO, *supra* note 14.

⁷⁵ Lord A. D. McNair, *The Law of Treaties*, 1961 at p. 761.

⁷⁶ According to Mukherjee, for a code to be made mandatory, it cannot remain as a stand-alone instrument and is thus made mandatory through an amendment of the parent instrument. SOLAS 1974 Convention is considered to be the appropriate parent instrument *vis-à-vis* the IMO Code since the Convention has two dimensions which are compatible with the spirit of the IMO Code: safety and environmental protection. (With the newly adopted ISPS Code being considered as a component of SOLAS 1974 Convention, security is the third dimension, which has been added to the Convention). Views expressed by P. K. Mukherjee in a personal interview August 22, 2003. Incorporating the IMO Code into the SOLAS 1974 Convention would also mean that non-State Parties to the Convention, even if they are IMO Member States, would technically have no obligation whatsoever to implement the IMO Code. This does not, however, prevent them from taking the initiative to incorporate the IMO Code into their national maritime legislation.

it would be inconsistent for a modified mandatory version of the IMO Code in a new SOLAS chapter⁷⁷.

The rationale behind Wiswall's thoughts might be due to the 'explicit acceptance'; the single procedure that can amend SOLAS Chapter I. It may take years before two thirds of the Contracting Governments accept the amendments to SOLAS Regulation I/21⁷⁸. Observers in the maritime industry acknowledge that this is a serious weakness in IMO's internal operating mechanism⁷⁹.

On the other hand, at least one maritime authority is not very optimistic that the IMO Code will become mandatory in the near future. For this to happen, it envisages every state giving up its sovereignty with regard to maritime matters⁸⁰. This view does not, however, reflect entirely what is already happening at IMO, where Member States on the 'white list', pertaining to the 1978 Standards of Training, Certification and Watchkeeping for Seafarers Convention, as amended in 1995 (STCW) have sacrificed some of their sovereignty.

The IMO Model Audit Scheme is another indication that IMO is tackling sensitive issues head-on and there are already calls for mandatory auditing of flag States, meaning a further step towards the relinquishment of complete sovereignty.

⁷⁷ F. L. Wiswall, *supra* note 18. See also IMO, *SOLAS 1974*, (IMO, 2001c).

⁷⁸ These delays have led to the adoption of the 'tacit acceptance' procedure. However, this procedure cannot be applied to amend the articles of the SOLAS 1974 Convention and SOLAS Chapter I. See IMO, *ibid*.

⁷⁹ K. Hindell, *Strengthening the Ship Regulating Regime*, (1996) at p. 377.

⁸⁰ D. J. Sheetz, *supra* note 17.

2.3.6 The IMO Code as customary international law

The basis of customary international law is state practice. Customary law is often codified through treaty law. One writer subscribes to this option with optimism because as distinguished from treaty law, which is contractual in nature, customary international law is binding on all States⁸¹.

2.4 The Blame Culture and Safety by Compulsion

The chapter endeavoured to demonstrate that whilst soft law may be seen as a weakness or a loophole through which politicians may avoid implementing the IMO Code, scholars and academic writers have adamant standpoints that this should not be the case. The main reason rests on the persuasive character and potential of soft law as a source of inspiration.

Figure 2.4a attempts to portray the frustration of safety investigations (and hence the implementation of the IMO Code), should one resort to impulsive decisions in the wake of a very serious casualty⁸². Spontaneous reactions very often result in fallible decisions, leading to the build-up of latent failures; defined as weaknesses in the system's defences. Spontaneous reactions defy the purpose of the IMO Code (*i.e.* the identification of causal factors) and are antagonistic to its objective of preventing similar casualties from happening in the future.

⁸¹ See M. J. Sobey, *International Cooperation in Maritime Casualty Investigations: An Analysis of IMO Resolution A.637(16)*, (1993) at p. 22. Expanding on the existence of a rule of customary international law, Churchill & Lowe refer to the Orthodox legal theory, which requires the proof of existence of two elements. The first element is the general and consistent practice by States. The second element is the *opinio juris sive necessitates i.e.* the first element has to be followed with a sense of legal obligation, which does not go against the norms of international law. They also remark that customary international law is not binding on States “{which} persistently object to an emerging rule of customary international law”, *i.e.* States which claim “the status of persistent objectors”. R. R. Churchill & A. V. Lowe, *The Law of the Sea*, 1999 at p. 7. For a discussion on how a legal obligation may arise from or transform into customary international law, see J. G. Starke, *Introduction to International Law*, 1989 at pp. 35-41.

⁸² For the purpose and scope of this dissertation, the words ‘disaster’, ‘casualty’ and ‘accident’ carry the same meaning.

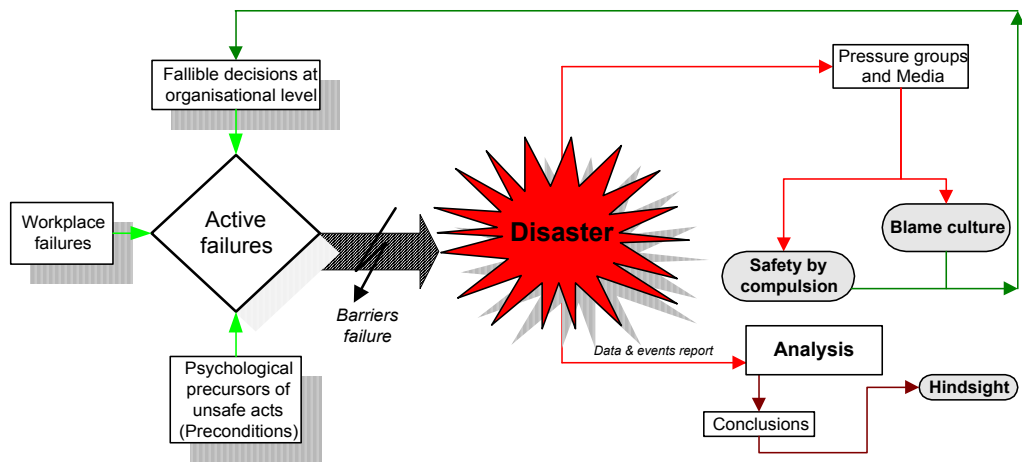


Figure 2.4a The Blame Culture and Safety by Compulsion.
Source: Adapted from J. Reason, 1990 at p. 202 and B. Toft & S. Reynolds, 1997 at p. 56.

A blaming culture frustrates the spirit of the IMO Code because it impedes co-operation, sharing of evidence and access to key witnesses. A blame policy will have a detrimental effect on the findings of the safety investigation, and creates the dangerous potential of not addressing the root causes in an adequate manner.

In emphasising the determination of blame, politicians suggest that the most important issue is the public perception rather than the outcome of the safety investigation carried out in line with the IMO Code. In so doing, there is a restrained expression towards a constructive and systematic build-up of safety, based on lessons learnt.

CHAPTER 3 THE RELATIONSHIP BETWEEN THE INVESTIGATOR AND THE REGULATOR

If for the purpose of this chapter, certain reactions by politicians described in chapter two are omitted (because it has already been established that these political actions do not favour safety investigations), then a State may conduct -

- a) A safety investigation with the sole objective of determining the causes, responsibilities, contributing factors and prevention of similar recurrences; and
- b) An investigation with the same objective as in (a) but which may also establish blame, resulting in disciplinary actions against seafarers who are held responsible⁸³.

This chapter attempts to analyse why a minority of IMO Member States have created a separate legal entity from the maritime administrator *i.e.* the regulator, with completely different infrastructure and responsibilities, and with a sole objective of determining the causes and contributing factors, whilst others, for various reasons, have opted not to. As would be expected, IMO Member States embracing these two different practices claim that their respective organisation is well fitted for the purpose, even within the spirit of the IMO Code and achieving well-acceptable results. Their different and at times contradictory views are also studied.

⁸³ As far as this chapter is concerned, it is irrelevant whether the disciplinary actions are initiated within the structure of the same investigating body, a different body or some form of inquiry or formal investigation. Such procedures depend on the legal regime established in each particular country. The issue remains that in the maritime industry, there are two distinct philosophies, which in practice are translated in either option (a) or (b).

3.1 Independent versus Non-Independent Investigating Bodies

3.1.1 Defining an independent investigating body

An independent investigating body is any body which “has the ability to plan and conduct accident investigations without having direct contact with the corresponding government administrative body”⁸⁴.

It can be further said that the establishment of all independent investigating bodies, followed the exercise carried out in the US, when the National Transportation Safety Board (NTSB) was set up in 1966. As early as 1973, the then retired Judge-advocate General, Brigadier-General McLearn had concluded in his report that the “creation of an independent Transportation Accident Investigation and Safety Board {in Canada} would be the only effective means...”⁸⁵.

3.1.2 The lawyers’ and industry’s perspective towards the investigating body

One of the realities, which justifies the separation of safety investigations from the regulator (in implementing the IMO Code), is the lawyers’ and industry’s perspectives at the scene of the accident or the place where the surviving crew of the ship has been landed.

Russo refers in detail to what a lawyer can expect to encounter at an accident scene⁸⁶. In particular, he refers to the United States Coast Guard (USCG) and cautions that the latter has at least a dual role⁸⁷; to determine the cause of the accident (and take corrective actions) and forward any evidence related to criminal liability to the US

⁸⁴ P. Caridis, *State-of-the-Art in Marine Casualty. Reporting, Data Processing and Analysis in EU Member States, the IMO and the US*, (1999a) at p. 1.

⁸⁵ See B. M. Deschênes, *supra* note 5 at p. 145.

⁸⁶ T. Russo, *Criminal Liability in Maritime Accidents*, (1994) at p. 6.

⁸⁷ In the case of a pollution accident, the USCG also has the role to activate the contingency plan and mitigate the pollution. However, this function is not related to the subject of this dissertation and will not be discussed any further.

Attorney General⁸⁸. He continues to caution that a lawyer must be careful with a USCG investigator, who should be dealt with in the same manner as the State Police or even the Federal Bureau of Investigation (FBI). Very explicitly, he comments that -

...once it becomes apparent that the {USCG} investigators will not rule out that a crime has been committed, it then becomes the job of the defence lawyer present to protect his clients' rights and certainly not to actively assist investigators to gather incriminating evidence...no one on board a ship can or should be forced to speak to a law enforcement officer investigating the cause of the mishap if there is a possibility that the person may incriminate himself by doing so.

What Russo advises is a fundamental legal right in every society built on the principle of democracy. Be that as it may, the purpose of a safety investigation is fact-finding. Whether the product of a fact-finding mission supports or opposes a particular position in subsequent proceedings, is no doubt an issue. In many instances, the findings may point towards blame or fault in some way. However, that does not change the purpose of carrying out a safety investigation. It is therefore important that a potential witness does not remain silent by simply invoking a fundamental right. However, it is well known that this is a problem, which is easily identified than resolved⁸⁹.

Similar views were expressed much more recently. One law practitioner in New York was very critical of the situation in the US and lamented that "...the Coast

⁸⁸ Past and recent casualties, which resulted in oil pollution, have shown that criminal liability may also arise following an oil pollution accident.

⁸⁹ The same situation was encountered by this writer in February 2001, at La Coruna, Spain whilst interviewing the survivors of the Maltese tanker MT *Kristal*. The attitude of the P&I lawyers (even if representing the interests of the owner and not of the seafarers) present during all stages of the interviews, fell short of co-operation with the Maltese and Spanish investigators and their main concern was to repatriate the crew as soon as possible. In all probability, a different attitude would have met the investigators if, rather than the regulator, an independent investigating body appeared on the scene.

Guard and the Department of Justice were...contributors to the climate of finger-pointing”⁹⁰.

What independent investigating bodies foster, much in their favour, is an approach positively looked at by witnesses and analysts alike. In its findings, an independent investigating body will never determine blame and this philosophy is reflected throughout the investigation process, including the findings and conclusions. Scholars such as Hollnagel are also of the view that rather than apportioning blame, an investigation should take into consideration the sequence of events and investigate backwards until “a reasonable set of causes” has been identified⁹¹. This approach is compatible with the IMO Code’s objective, prescribed in Section 2.

This philosophy was exemplified in the case of *Tracey Ann Renehan v. Commonwealth of Australia* [2001], where the plaintiff was injured whilst climbing the rigging of a sail-training vessel, a casualty that was investigated by the Australian Transport Safety Bureau (ATSB)⁹². Since the Navigation (Marine Casualty) Amendment Regulations 2001 adopted the IMO Code, the Supreme Court of the Northern Territory of Australia declined the plaintiff’s plea to request ATSB to make the casualty investigation documents available.

The Court held that the Navigation Regulations 2001 now reflect the IMO Code’s aim *i.e.* casualty investigations are not carried out for the purpose of determining liability and apportioning blame and therefore the investigation documents cannot be disclosed to any person other than the witness himself. It was also clarified that the term ‘any person’ included the court⁹³.

⁹⁰ This intervention was made during the ‘Maritime Casualties Conference & Expo’, held in November 2000. See T. Braden, *MarCas. Debate and Energy Drive First Casualties Conference*, (2001) at p. 68.

⁹¹ E. Hollnagel, *supra* note 59 at p. 192.

⁹² See J. D’Andrea & A. Roy, *Marine Casualty Investigations*, (2001).

⁹³ J. D’Andrea & A. Roy, *ibid.*

In view of their philosophy of not apportioning blame, independent investigating bodies try to educate the public in this regard and in so doing, distinct themselves from IMO Member States, which conduct an investigation that may lead to the determination of blame⁹⁴. One proponent of independent investigating bodies, expressed his reservations on the blame culture and commented that this culture is having its toll on safety investigations. According to him, this situation is not ameliorating safety at sea⁹⁵.

This perception contrasts but binds with what Russo, from the other side of the fence, claims to be a fundamental right to remain silent in order not to incriminate oneself⁹⁶. Lang observes that “{t}he fear of self-incrimination, or being held solely responsible for some lapse, is having an adverse effect on people’s willingness to co-operate in an accident investigation to determine the primary and underlying causes”⁹⁷. Lang’s concern is not only related to the fact that adversarial settings might not contribute to safety, but is also apprehensive that such an attitude is undermining the work of his own organisation. Gaining people’s confidence takes years of professional work and yet, it may be jeopardised by even the slightest public perception that the investigating body is not living up to its philosophy.

In spite of the claims made by independent investigating bodies, it does not necessarily mean that a witness will open up spontaneously the moment he is advised that he is releasing a statement to an independent investigating body. The casualty investigation report into the grounding of the *Bunga Teratai Satu* proves precisely the contrary⁹⁸. The report illustrates how claims made by the chief mate were

⁹⁴ See J. Lang, (2000b).

⁹⁵ J. Lang, *Chief Inspector’s Forward*, (2001) at p. 2. Rear Admiral J. Lang is the former Chief Inspector of the Marine Accident Investigation Branch (MAIB), UK.

⁹⁶ See section 3.1.2 above.

⁹⁷ J. Lang, *ibid.* at pp. 2-3.

⁹⁸ See ATSB, *Independent Investigation into the Grounding of the Malaysian Flag Container Ship Bunga Teratai Satu on Sudbury Reef, Great Barrier Reef, 02 November 2000*, (2001) at p. 16. Reference to this report is also made in chapter 4 of this dissertation and is used further in the case study presented in Appendix 3 to this dissertation.

inconsistent with available evidence. It notes that the claims made to the shipping company “...{were} repeated to the {ATSB} accident investigators”.

Ironically, the report then acknowledges that, “{l}ater he gave a more plausible account to the Australian Federal Police and the Queensland Parks and Wildlife Service, before appearing in court...”. Thus, rather than stating the truth to an independent investigating body, with no vested powers to take a case to court, the chief mate selected otherwise. However, one cannot generalise and this does not disqualify the views of those who favour independent investigating bodies. Understandably, the report has no interest in indicating the legal advice, if any, received by the chief mate. Furthermore, the situation may be viewed from a different perspective - gaining public confidence indeed takes years of professional work.

From a scientific point of view, Kirwan opines that it is unacceptable to use an investigation to justify some actions taken at the sharp end, simply because the system is so complex that the sharp end is the mere operator of that system⁹⁹. In so doing, however, he acknowledges that the nature of ‘modern’ accidents does promote an attitude to apportion blame, yet, he cautions that blame has nothing to do with Human Reliability Analysis (HRA) as in this regard, blame serves no purpose.

Wiswall believes that it makes no difference whether or not the investigator forms part of an investigating infrastructure, which is independent from the regulating body. He maintains that if the role of the investigator is to identify the contributing causes to the casualty, then most often he “reveals” both fault and blame, no matter how much he avoids mentioning these two terms in the casualty investigation report¹⁰⁰. Reason views this revelation of fault and blame from a different angle and instead underscores the legitimate search for contributing factors¹⁰¹.

⁹⁹ B. Kirwan, *A Guide to Practical Human Reliability Assessment*, 1994 at p. 3.

¹⁰⁰ F. L. Wiswall, *supra* note 18. Whilst that may be true, nevertheless, there is sufficient merit in the submission that the investigator should be autonomous from the regulator, simply because the

He expressed his point of view most succinctly -

This is not a question of allocating blame, but simply a recognition of the fact that even in the best-run organisations a significant number of influential decisions will subsequently prove to be mistaken. This is a fact of life. Fallible decisions are an inevitable part of the design and management process.

Annex 13 to the Convention on International Civil Aviation requires in Clause 5.4 that the accident investigating authority shall be independent from any judicial or administrative proceedings¹⁰². Furthermore, Clause 5.12 lists down a set of records, which shall be used only for the safety investigation. The list includes, *inter alia*, witness' statements and cockpit voice recordings. It is specifically cautioned that if this information, which also embraces statements given voluntarily by a witness, is used for purposes other than a safety investigation, then flight safety will be seriously affected. It has already been emphasised that it stands to reason that a witness will co-operate more if he is assured that the information given is not admissible in a court of law. Should there be a possibility of self-incrimination, then the witness' lawyer would suggest otherwise.

As it would be expected, the report on the Maritime Casualties Conference & Expo, did not indicate any specific reference to NTSB in the debates raised during the Conference - maybe in view of NTSB's objectives and reputation built throughout the years¹⁰³. This is very interesting because although NTSB does not determine blame or liability, however, any evidence gathered is also made available to the

fault or blame appearing in the investigators' findings may be that of the regulator. This point is expanded further in section 3.1.4 of this chapter.

¹⁰¹ J. Reason, *supra* note 55 at p. 203.

¹⁰² International Civil Aviation Organization (ICAO), *Aircraft Accident and Incident Investigation. Annex 13 to the Convention on International Civil Aviation 1944*, (2001) at p. 5-2.

¹⁰³ See T. Braden, *supra* note 90 at p. 69.

USCG and a witness might still stop short of stating what exactly happened according to him during the course of the accident¹⁰⁴.

The USCG tends to agree that problems may arise from adversarial settings, but quite naturally, it finds the accusatory tone against its system very abstruse¹⁰⁵. During the Maritime Casualties Conference & Expo, it was remarked that rather than pointing a finger towards the USCG, one should instead look at its history and analyse how it conducts casualty investigations. These arguments were justified based on case studies, which show that USCG investigations are impartial and fair, only engaging in a criminal process when there is evidence of criminal intent. It was also remarked that the USCG would never seek criminal actions against anyone during the initial stages of the investigation¹⁰⁶.

In this particular issue, it is being suggested that lawyers are not justified in declaring that the USCG launches a casualty investigation when there already exists a bias that there was criminal intent¹⁰⁷. A thorough investigation (and the USCG investigations have been widely acclaimed for their contribution to safety of life at sea and environmental protection) definitely requires the investigators and anyone engaged in the process neither to be biased, nor to make any assumptions in reaching their conclusions.

¹⁰⁴ D. Rabe, the USCG Chief at the Investigations Division remarks his awareness that there are countries, such as Canada, where witness' interviews are conducted in private and not released to the public or disciplinary authorities. He also acknowledges that if there is no chance that a witness' statement is used against him, there is a better possibility that the witness will tell the truth about his own mistakes. However, he points out that the US society demands to know what people say and in this respect, both the USCG and NTSB investigations allow statements to be released. Personal communication with D. Rabe, January 08, 2003. Furthermore, as remarked earlier in this section, one has to mention that there is at least one recorded instance, where the witness did not take advantage of an independent investigating body's policy.

¹⁰⁵ T. Braden, *ibid*.

¹⁰⁶ *Ibid*.

¹⁰⁷ This remark is also supported by the rules of interviewing and casualty investigation.

3.1.3 Investigators' expertise

One opponent of independent investigating bodies points out that investigators forming part of a maritime administration have extensive knowledge of ships, how shipping companies operate¹⁰⁸ and are aware of international regulations, which are either in force or being drafted at IMO. It is also being maintained that this does not apply to investigators forming part of independent investigating bodies. This is so because they either lack the necessary knowledge, or else they tend to lose their expertise because the infrastructure of their organisation is not flexible enough to allow them to keep in touch with the realities of shipping, be it technological and regulatory¹⁰⁹.

In 1999, the USCG presented several justifications as to why it should retain the primacy in maritime casualty investigation¹¹⁰. For instance, it was maintained that -

- The USCG has substantial technical expertise at hand;
- It had knowledge on the operations of commercial ships, which it has managed to gain from the daily communications and its day-to-day duties; and based on these interactions
- The USCG investigators can focus immediately on latent failures and if there is a need to address the legislative framework (or its inadequacy) then, the exercise will be commenced immediately, even before the investigation has been completed.

However, others rebut these comments and explain that all the countries, which have established an independent investigating body ensure, in their own interest, that their investigators form part of the delegations to various IMO meetings, including the FSI

¹⁰⁸ Since several psychologists have expressed their reservations on this point, this issue will be further discussed in sub-section 3.1.4.1 below.

¹⁰⁹ D. Drummond, *supra* note 17.

¹¹⁰ In this particular occasion, Admiral J. Loy, the former Commandant of the USCG, addressed a Sub-Committee of the US Senate which was discussing legislative amendments, entitled "National Transportation Safety Board Amendments of 1999". These amendments included, *inter alia*, provisions to provide NTSB with the necessary jurisdiction to have the right of primacy in maritime casualty investigation. See J. Loy, (1999).

Sub-Committee, where casualty statistics and analyses are discussed¹¹¹. The same applies in the US, where the Memorandum between the USCG and NTSB obliges the former to invite NTSB at all IMO meetings where maritime casualty investigation issues are expected to be discussed¹¹².

3.1.4 Conflicts of interest

Another justification brought forward by independent investigating bodies is that the IMO Code can only be effectively implemented if there are no conflicts of interest within the investigating body¹¹³. Lang recalls that following the Formal Investigation into the *Herald of Free Enterprise* casualty (and therefore well before the IMO Code was adopted), it became apparent that there existed potential conflicts of interest if the (then) UK Marine Directorate¹¹⁴ established policies and investigated maritime casualties.

It is further suggested that if safety is the aim of the investigation (which also happens to be the objective of the IMO Code), then there are no other credible ways

¹¹¹ Discussion with S. Harwood May 28, 2003. Captain S. Harwood is MAIB's Deputy Chief Inspector.

In addition, this writer is of the opinion that it would be arguable if one had to express scepticism to establish an independent investigating body, based on the theory that expertise may be lost because of an inflexible infrastructure. One must not neglect the fact that an independent casualty investigator is a specialised and dedicated player. As opposed to the regulator/investigator, the former is separated from the additional bureaucracy, which the regulator/investigator has to satisfy in the day-to-day operation of a maritime administration. An independent casualty investigator is therefore much more in touch with the 'casualty world' rather than the 'shipping world' and *per se*, that guarantees the necessary expertise.

¹¹² See *Memorandum of Understanding between the National Transportation Safety Board and the United States Coast Guard Regarding Marine Accident Investigation 2002*, (2002) at p. 5.

¹¹³ The IMO Code states that "ideally, marine accident investigation should be separate from, and independent of, any other form of investigation". In the English language, 'separate' means existing or happening in a different physical space whilst 'independent' means not influenced or controlled in anyway by any other event. See Cambridge University, *Cambridge International Dictionary of English*, (1995).

¹¹⁴ Personal communication with J. Lang December 04, 2001. Since the *Herald of Free Enterprise* casualty, the UK Marine Directorate has amalgamated with Her Majesty Coastguard and formed UK's MCA.

but to function independently from the regulator¹¹⁵. This is so because notwithstanding its objectivity, an investigation carried out by a regulatory body will be “tainted by conflicts of interest”. This section attempts to explain how an investigation carried out by the regulator may be “tainted by conflicts of interest”.

Deschênes referred to the comments given by the Canadian Bar Association, which in 1977 had identified the following conflicts of interest¹¹⁶ -

- Her Majesty as investigator and Her Majesty as potential litigant;
- Her Majesty as investigator and Her Majesty as enforcer of regulations;
and
- Her Majesty as investigator and Her Majesty as supplier of services.

Similarly, the issue of conflicts of interest led the Dutch Government to establish an independent transport safety board in The Netherlands on July 01, 1999¹¹⁷. It is believed that the objectives of the IMO Code can be best met if the investigating body has no relation whatsoever, either direct or indirect, with the policy-makers/governmental (inspection) agencies. In most cases, a thorough investigation into the root causes of any casualty, would reveal that the underlying factors relate to, *inter alia*, lack of inspections, inadequate implementation and enforcement of rules and regulations or inadequate safe manning¹¹⁸.

This line of reasoning means that most of these underlying factors, if not all, stem from decision-makers or individuals whose statures may be jeopardised by the outcome of a thorough casualty investigation. This is the rationale behind these

¹¹⁵ Personal communication with K. Filor February 01, 2002. Captain K. Filor is the Surface Safety Deputy Director at the ATSB.

¹¹⁶ B. M. Deschênes, *supra* note 5 at pp. 147-148.

¹¹⁷ Personal communication with H. J. A. Zieverink March 11, 2003. H. J. A. Zieverink is a casualty investigator at the Dutch Transport Safety Board.

¹¹⁸ H. J. A. Zieverink, *ibid*.

points and in view of the shortcomings of human nature, an investigation cannot be carried out or even masterminded by these very same people¹¹⁹.

The same philosophy is acknowledged by observers in the aviation industry, who consider that a conflict of interest may arise when “...there was a reasonable possibility that an accident was caused or contributed to, by the action or inaction of the Department of Transport’s officials in their role as providers of civil aviation facilities...”¹²⁰.

The above viewpoints support the standpoint of the Canadian Bar Association mentioned earlier. Indeed, they highlighted that conflicts of interest are not problems which commence and terminate at the middle management *i.e.* the investigator/regulator in a department of his maritime administration; they are also a major concern for the higher management level, where policies and strategies are drawn up.

To overcome this problem, countries with a Westminster type of Government and which have established an independent investigating body, do not require the latter to report to the Minister of Transport¹²¹. For instance, in order to remain autonomous and avoid conflicts of interest, the Transportation Safety Board of Canada (TSB-Canada) reports directly to Parliament, through the President of the Queen’s Privy Council for Canada¹²².

¹¹⁹ *Ibid.*

¹²⁰ See D. Fiorita in C. J. Durand, *Aircraft Accident Investigation: The Need for a Stronger International Regime*, 1993 at p. 49.

¹²¹ New Zealand is the only exception. The Transport Accident Investigation Commission (TAIC) reports to the Parliament through the Minister of Transport. Captain Burfoot, former Chief Investigator, acknowledges that it would be ideal not to report to the Minister of Transport, however, the Minister has no vested power to politically interfere in the output of any report or request the Commission not to investigate a casualty. Personal communication with T. Burfoot December 24, 2001.

¹²² Personal communication with F. Perkins January 14, 2003. F. Perkins is the Director of Marine Investigations, TSB-Canada.

In addition, the Canadian Transport Safety Board Act requires, *inter alia*, in Subsections 6(1) that: a Member of the Board shall not retain any direct or indirect interest in transportation (which incorporates all modes since TSB-Canada is a multi-modal investigating board). It also requires in Subsections 6(2) and 6(3) the disposal of any transportation interest and resignation from any other office that might conflict with the Member's duties in the Board¹²³.

The conflicts of interest, which may arise when a regulator investigates a casualty, also apply to all flag State administrations, which have the policy of delegating authority to recognised organisations, on matters, which *e.g.* include regulations for the construction of ships, designs of operational systems and noise and vibration¹²⁴. All these points sound one perfectly harmonised tone. The objective of a safety investigation should be the prevention of accidents and it is recognised that whether or not one is in consensus, the only way to achieve this, is through an independent investigation, which is unbiased and based on facts and honest conclusions.

In coming to a decision on this issue, Deschênes affirmed that from the research which he had carried out, it was very clear that the industry in general considered that a potential for conflicts of interest would immediately emerge should the investigating body form part of the regulatory structure¹²⁵. Expanding on his findings, he recognised that a civil servant might be reluctant to publicly recommend his colleague to improve his performance and declared "no government service organization, however successful, should be above public scrutiny and monitoring"¹²⁶. What Deschênes implied is that it is unacceptable that the same civil servant in a maritime administration acts as the judge and the jury.

¹²³ See *Canadian Transportation Accident and Safety Board Act 1989, c.3*, (1998).

¹²⁴ According to Tangen, Fagerstrom & Ulstrup, recognition implies that the Administration has accepted a classification society's rules. So much so that they also argue that a flag State Administration may delegate the execution of various activities but **NOT** the responsibility. See E. H. Tangen, S. Fagerstrom & A. Ulstrup, *Certification Manual*, (1998).

¹²⁵ B. M. Deschênes, *supra* note 5 at pp. 229-234.

¹²⁶ B. M. Deschênes, *ibid.*

From the perspective of a flag State Administration, this remark by Deschênes suggests also that the loyalty, which a regulator has towards safety onboard ships registered under his own flag, should not give him immunity from public scrutiny. The views expressed so far have one resounding point: the government should never be in a position to enjoy monopoly in issues related to safety¹²⁷.

Making a strong reservation, one maritime administration acknowledges that superficially, the public perception might see benefits in the establishment of independent investigating bodies¹²⁸. However, it pointed out that an investigator who is a member of a maritime administration, has his own integrity as well, and his professional judgement can be relied upon. In addition, if there were a major conflict or a major casualty, the investigation carried out *e.g.* by this particular maritime administration would only be a preliminary one as it will be followed by a Formal Investigation with public hearings before a judge¹²⁹.

If such were the case, then a judicial investigation would overcome the problem raised by the conflicts of interest. In spite of these views, this writer is of the opinion that there are at least three important flaws to consider with this setting. These are -

- The procedure is only followed in cases of major conflicts and major casualties;
- The definition of a ‘major conflict’; and
- The judicial process *per se*.

¹²⁷ See P. v. Vollenhoven, (2001). It may be disputed that conflicts of interest can be investigated by Parliament, especially in countries where an independent investigating body has not been established. Such an exercise may work satisfactory, but one also has to consider the priorities afforded to the maritime sector *versus* other national issues on the Parliament’s agenda. Such a process may therefore lead to a bureaucratic exercise, which may still not promote the benefits that a safety investigation has the potential to offer.

¹²⁸ D. Drummond, *supra* note 17.

¹²⁹ *Ibid.* In cases of a major conflict and/or a major casualty, the public hearings before a judge (judicial process) will replace the investigation carried out by this maritime administration.

Whilst IMO has defined what a very serious casualty is¹³⁰, there is no established international criterion, which determines what is a major conflict of interest and what benchmark has to be used. In addition, a judicial investigation will still result in an adversarial setting, which is neither favoured by scholars nor is it in line with the spirit of the IMO Code because it undermines its basic purpose of fact-finding.

However, the above procedures cannot be looked upon or viewed as a straw in a hurricane of hypes. Referring to the USCG, Loy stated: “the concern over Coast Guard impartiality is unfounded”. He viewed this problem as trivial because the selected investigators would have never formed part of the command chain involved in the particular case, apart from the fact that NTSB has the right of participation during interviews¹³¹. This does not justify, however, this position worldwide. The US has a unique set-up, with two bodies having concurrent jurisdiction to investigate casualties, as regulated by a Memorandum of Understanding signed on September 12, 2002¹³². Furthermore, several IMO Member States carry out interviews behind closed doors, and interested third parties do not have the right either to participate/observe, or to have a copy of the interview transcript, without the consent of the interviewee.

In addition to the judicial process (which has been discussed above), “...an internal system of checks” can be seen as providing a possible solution to the risk of conflicts of interest¹³³. This suggestion runs in parallel with Loy’s view *i.e.* ensuring that a maritime administrator does not investigate casualties onboard ships if his previous

¹³⁰ Section 4 of the IMO Code does not define the term ‘major casualty’ but it distinguishes between a very serious casualty, serious casualty and marine incident. See IMO, *supra* note 14.

¹³¹ J. Loy, *supra* note 110.

¹³² Clause 3 of the Memorandum of Understanding prescribes the conditions when NTSB may lead a marine casualty investigation, with the USCG participating as a party to the investigation. In addition, Clause 4 requires the USCG to apply the ‘bright-line chart’ in order to determine whether a particular major marine casualty “warrants an independent investigation by NTSB”, even if the conditions surrounding the casualty in question do not satisfy the requirements of Clause 3. (It is important to point out, however, that these procedures do not prejudice the right of the USCG to enforce regulations in a clearly separated set-up from that of NTSB). See *supra* note 112 at pp. 2, 4.

¹³³ D. Drummond, *supra* note 17.

decisions may be questioned. Furthermore, one has to assume that the decisions taken (in line with the maritime administration's policies) would be recorded and therefore, it would become readily apparent if the decisions are not raised in the investigation and the final report.

Deschênes referred to his research and pointed out that several people in the maritime industry do not consider conflicts of interest a crucial point¹³⁴. One observer replied cynically to his question -

...there is the potential for conflict of interest in any free society and obviously the risk will always be there. There are bound to be bad apples in every barrel but I am prepared to accept the risk, if a witch hunt is the alternative.

In analysing these views, it results that the query is not whether or not one should acknowledge the existence of conflicts of interest. It seems that everyone is accepting that there is either a risk or a perceived risk. The point is that at one end, some are very explicit and declare that the minute the regulator starts investigating, then that is already a conflict of interest. The remainder, at the other end, opt to have an internal safety mechanism of some sort, which is triggered, should the risk of conflicts of interest become a threat to the investigation or exceeds a pre-determined threshold.

3.1.4.1 A psychologist's observation on conflicts of interest

Examining this problem through a psychological microscope, Reason considers conflicts of interest as a threat to safety and risk management. He refers to Vaughan's view that "...the regulatory process - discovery, monitoring, investigation and sanctioning - is inevitably constrained by the interorganizational relations existing between the regulatory body and the regulated company. These, in turn, lead to relationships based more upon bargaining and compromise than threats and sanctions". Reason also points out that one of the most serious problems which regulators experience, originates from the nature of the business and complexities of

¹³⁴ B. M. Deschênes, *supra* note 5 at p. 231.

the industry (be it maritime, aviation or otherwise). These complexities will prevent them from obtaining a thorough idea on how the regulated entities are in reality operating and conducting their business¹³⁵. He expounded that -

In an effort to work around these obstacles, regulators tend to become dependent upon the regulated organizations to help them acquire and interpret information. Such interdependence can undermine the regulatory process in various ways. The regulator's knowledge of the nature and severity of a safety problem can be manipulated by what the regulated organization chooses to communicate and how this material is presented. Regulators, being human beings, tend to establish personal relationships with the regulated - they get to like the people they oversee and come to sympathize with their problems on a personal level - and this sometimes compromises their ability to identify, report or sanction violations.

The above enforcement problem can be extended to casualty investigations conducted by the regulator. Reason's thoughts may be easily applied to a maritime administration on two different levels -

- The relationship between the administration and its 'clients' - the shipowners; and
- Its relationship with the recognised organisations, which have been delegated the authority to carry out surveys onboard its ships and in certain instances issue Statutory Certificates on its behalf.

The latter point is crucial, especially if the regulator does not have the technical resources to implement the conventions and therefore relies heavily on the expertise of the recognised organisation and then, following a casualty, attempts to investigate the operation of the same recognised organisation.

¹³⁵ See J. Reason, *supra* note 49 at pp. 173-174.

3.1.5 The impact of safety recommendations

It has been argued that NTSB's impartiality meant that over the years, the latter has gained a reputation, which has helped its recommendations "gaining greater authority"¹³⁶. In other words, this meant that since NTSB is not a regulatory body and has no conflicts of interest, its findings and recommendations are more credible and readily acceptable.

This statement is, however, denied in quite a harsh and acute style and based on personal experiences, some do not concede this view. Instead, it is maintained that any sensible and responsible shipowner will take onboard sensible and practical recommendations and the value of these recommendations is not necessarily enhanced simply because they originate from an independent investigating body¹³⁷. Furthermore, others recall casualty investigation reports prepared by independent investigating bodies, which reflected a "going-in agenda", because it was evident that the investigating body was already biased (confirmation bias) in its findings. Similarly, there were reports prepared by non-independent investigating bodies, which "were extremely revealing and self-critical"¹³⁸.

3.2 Implications on the Implementation of the IMO Code

The two set-ups in the maritime industry, which claim that they are sufficiently geared to implement the IMO Code have been identified. Moreover, the most important incentives to justify the respective set-ups have been analysed. If the effects of the selected set-up were contained within a particular IMO Member State, then the situation would be a national issue. However, because shipping is so international in character and the rise of aspiring maritime States has had such an

¹³⁶ P. v. Vollenhoven, *supra* note 127. This speech was delivered by Vollenhoven at the third annual lecture delivered to the European Transport Safety Council (ETSC) in 2001. Vollenhoven currently holds the Chairman Office of the Dutch Transport Safety Board. He is also the chairman of ITSA, which was established in 1993.

¹³⁷ D. Drummond, *supra* note 17.

¹³⁸ D. J. Sheetz, *supra* note 17. Reason defines confirmation bias as a tendency to only look for information (or evidence), which supports one's theory and in so doing, ignoring other evidence that might prove otherwise. See J. Reason, *supra* note 55 at p. 89.

important impact, not least on ships and seaborne trade, then it is only expected that ultimately, these two set-ups have to interact as a result of a casualty. It is here that one has to analyse whether or not, these two different set-ups, which claim that their infrastructure is well designed to vigilantly implement the IMO Code, are in fact hindering the industry from fully benefiting from a safety investigation (with the concepts of both hindsight and foresight in mind)¹³⁹.

One member of the maritime industry is of the view that the issue of hindrance is intrinsically related to whether or not an investigating body is independent from the regulatory framework. After all, even before attempting to analyse, one has to define the term 'independent'. Rather, he concedes that the real issue is the scope of the investigation, held by the other substantially interested State, be it a flag, port or coastal State¹⁴⁰.

Very recently, MAIIF published the results of an internal survey¹⁴¹. An analysis of this survey and further clarifications sought by this writer revealed that the extent of international co-operation concerning Australia, Canada, Netherlands, New Zealand and UK¹⁴², depends on the following criteria -

- The objective of the other State (safety investigation or punitive basis);
- Thoroughness, independence and openness of reporting; and
- Independent investigation with no links to criminal/civil investigation.

¹³⁹ Chapter 4 addresses the importance of foresight and explains its relation to a safety casualty investigation, hindsight and the implementation of the IMO Code.

¹⁴⁰ Personal communication with K. Filor April 29, 2003. Critics of independent investigating bodies pronounce that in reality, pure independence can never be achieved as it is the government of the State in question, which nominates the chairman/director of the board or branch. Furthermore, the government is also responsible to allocate (and in so doing controlling) the funds to the investigating body.

¹⁴¹ MAIIF, *Survey on the Implementation of the IMO Code for the Investigation of Marine Casualties and Incidents*, (2002b). Unfortunately, at the time of writing this dissertation, only 17 countries had responded to the survey. The results are accessible to MAIIF members through secure Internet.

¹⁴² All these countries have an independent investigating body.

The findings of the MAIIF survey therefore explain the view expressed above. Based on these countries' common philosophy concerning casualty investigation, it is only expected that international co-operation (for instance sharing of witness' interviews) is approached with maximum care. The national legislation of some of these countries requires the investigating body to compel the witness to provide information. Thus, a witness is not given the right to remain silent but in return, it is ensured that the information given is protected and not used for third purposes¹⁴³.

It therefore does seem that there is no direct link between international co-operation and the framework of the investigating body¹⁴⁴. However, there is one issue, which in reality provides an indirect link: the requirements pertaining to incompetency, acts or omissions, as prescribed in the STCW Convention, as amended.

3.2.1 The STCW Convention and its relevance to casualty investigation

STCW Regulation I/5 obliges contracting Parties to establish and enforce within their national legal framework, processes and procedures to investigate, *inter alia*, any alleged incompetency, acts or omission by seafarers, holding certificate of competencies issued by their administration or else endorsed to attest the issuing of that certificate. Morrison points out that these legal procedures may declare a seafarer "unfit" to serve onboard a ship, and in line with this, the issuing Party is obliged to determine whether or not the certificate or the endorsement (attesting issuance) should be withdrawn, suspended or even cancelled¹⁴⁵. It remains with the

¹⁴³ This approach may also be endorsed by regulators. This writer recalls a casualty in 1999, which happened on board a Maltese ship in Dutch internal waters. In order to start legal proceedings against the master of the ship, the Dutch Police sent a formal letter to the Merchant Shipping Directorate of the MMA, requesting a copy of the statements released to MMA by the master. MMA declined the request in order to protect the statements from being used against the master during legal proceedings.

¹⁴⁴ Chapter 2 has already discussed that achieving international co-operation can also be translated into a success towards the implementation of the IMO Code.

¹⁴⁵ W. S. G. Morrison, *Competent Crews = Safer Ships. An Aid to Understanding STCW 95*, 1997 at p. 45. Also see IMO, *STCW 95*, (1996) in "Annex – Amendments to the annex to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers" (Chapter I) at pp. 26-27.

contracting Party and its national legislation to determine how to operate the regime. However, this procedure could also be initiated during a casualty investigation.

It would therefore be relevant to consider a fictitious investigation in a State 'A' where an independent investigating body does not exist. One may also assume that the investigator in State 'A' has launched a safety investigation, with the purpose of identifying active and latent failures, as required by the IMO Code. The problem immediately crops up when during the course of the investigation, the investigator has strong evidence suggesting that, for instance, the master onboard the ship registered in State 'A' was incompetent or could have carried out a more diligent manoeuvre.

Based on this scenario and on the fact that his country is a contracting Party to the STCW Convention, the investigator has no solution to this dilemma but to report his analysis to his Director - because STCW Regulation I/5 requires a legal process to investigate the master's manoeuvre and actions. Thus, the investigator has found himself in a position where he has to remove the hat of a safety investigator and wear that of a regulator in order to enforce the STCW Convention.

It is important to note that the above applies even if it were not flag State 'A' that issued the master's certificate of competency (or endorsed the attestation of its issuance) as required by STCW Regulation I/2. Although this flag State would not be able to withdraw, suspend or cancel the master's certificate of competency or the endorsement attesting its *issuance*, however, in accordance with the same regulation, State 'A' may still withdraw, suspend or cancel the endorsement, which attests the *recognition* of the certificate of competency. If this action were taken, then the master would not be able to sail on ships flying the flag of State 'A', an action that falls within the parameters of apportioning blame¹⁴⁶.

¹⁴⁶ Without initiating court proceedings, a flag State may withdraw, suspend or cancel the endorsement, which attests the *recognition* of a certificate of competency. This is so because the recognition withdrawal is simply an administrative action where only the 'recognition regime' is operative. View expressed by P. K. Mukherjee in a personal interview August 27, 2003.

Expanding further on this presumption, the scenario may now involve another substantially interested State; say, the casualty happened in the waters of a State, which has an independent investigating body *e.g.* New Zealand. Considering the fact that the casualty occurred in its territorial waters, New Zealand will lead the investigation, as described in IMO Code, Section 7. Based on its fundamental policy of not determining blame and protecting evidence for the sake of safety, New Zealand will not be in a position to unconditionally extend its co-operation to State 'A', simply because the latter is obliged to start legal proceedings, as soon as evidence indicates possibilities of incompetency¹⁴⁷.

On the same grounds, ATSB will provide investigation documents to another substantially interested State, if and only if, that substantially interested State undertook that the documents were necessary for a safety investigation¹⁴⁸. Based on the requirements of STCW Regulation I/5, a regulator/investigator may be reluctant to give such guarantee as at that stage of the investigation, he would be in no position to recognise where the evidence would lead him, unless of course he is already biased.

¹⁴⁷ In this case, there is an interaction between State A and another State, which is leading the casualty investigation. Therefore, the national maritime legislation of the former must prescribe what is the value of the factual findings of the State leading the investigation *vis-à-vis* the judicial process in the country. View expressed by P. K. Mukherjee in a personal interview August 04, 2003.

¹⁴⁸ K. Filor, *supra* note 140.

3.3 The Emerging Trends in Europe

Those supporting the establishment of an independent investigating body maintain that if this set-up has proved beneficial in the aviation industry, then there is no reason why the same philosophy should not produce the same welcoming results in the maritime industry. One proponent of independent investigating bodies believes that such a system is “...every citizen’s right and society’s duty”¹⁴⁹. The structures of independent investigating bodies differ; the extent of independence varying, even if one compares *e.g.* Canada and Denmark¹⁵⁰ (or with what one may describe as a hybrid system in the US) - but the objective remains the same.

The Thematic Network for Safety Assessment of Waterborne Transport (THEMES) report refers to the British Airways Safety Information System (BASIS) programme, which recommended, *inter alia*, “{t}he separation of the agency/department collecting and analysing the reports from those bodies with authority to institute disciplinary proceedings and impose sanctions”¹⁵¹.

Vollenhoven, recalled that on March 06, 2002 in a response to his letter, the EU Commission Vice-President¹⁵² wrote that -

...with respect to the need for independent investigation into the causes of accidents and incidents, I can only confirm that the Commission shares your views. This is clearly expressed in the "White Paper/European Transport Policy for 2010: Time to Decide", of 12 September 2001...

One still has to see whether or not this would become a reality and if so, to what extent. What is definite is that the problems related to independent investigating bodies need deep consideration, both legally and financially. However, the issue of

¹⁴⁹ See P. v. Vollenhoven, (2002).

¹⁵⁰ The set-up in Denmark is addressed in more detail in section 3.3.2 below.

¹⁵¹ THEMES, *THEMES Deliverable D1.1*, (2001) at p. 5.6.

¹⁵² P. v. Vollenhoven, *supra* note 149 at p. 3.

independent investigating bodies is not a novel concept to the EU, at least not in another mode of transport.

On November 21, 1994, the EU Council adopted Council Directive 94/56/EC on casualty investigations in civil aviation¹⁵³. In line with the Chicago 1944 Convention, the Directive requires in Article 6.1 that the body responsible for the investigation is “functionally independent” of regulatory and other bodies, which might have an interest, in conflict with the investigation.

So far, in the maritime sector, an independent investigation is still limited to a national approach rather than a globally accepted practice. For most European States, it is still in its infancy. Once determined, one has to see how the EU will put forward its ‘independent’ notion on a global domain, *i.e.* at IMO. Past casualties have confirmed that in other delicate issues, the EU recognised very well when, how, and where to exert pressure in order to foster its policies and objectives.

3.3.1 The economic viability of independent investigating bodies

It is much debated, especially by most aspiring maritime States that an independent investigating body is extremely expensive and the financial burden is large enough to be classified as unsustainable¹⁵⁴. As one scholar opines, whilst the trend is in favour of independent investigating bodies, “...this is simply impractical and uneconomic for most maritime States”¹⁵⁵.

¹⁵³ Council Directive 94/56/EC, *The Fundamental Principles Governing the Investigation of Civil Aviation Accidents and Incidents*, (EU, 1994).

¹⁵⁴ As an indicative example, MAIB, which is a very small independent investigation branch, has a compliment of 15 investigators and 12 administrative staff. The 2001 Annual Report considers this number as the minimum required so that the Branch reaches its own objectives. For the financial year 2001/2002, the UK Department of Transport allocated £1.354 million but the overrun of the Branch was £1.399 million. A breakdown of the expenditure for the financial year suggested, 74% of the costs related to the staff, 21% were running costs, 2% of the incurred costs related to publications and the remaining 3% were allocated for investigation contracts. See MAIB, *MAIB Annual Report 2001*, (2002).

¹⁵⁵ F. L. Wiswall, *supra* note 18.

Of course, a politician will definitely look at the expenses which the taxpayer will have to bear in order to run an independent investigating body. Naturally, in trying to justify an independent investigating body, a government will analyse the maritime activity and whether or not it is vital for the national economic motor. However, even then, considering the expenses of an independent investigating body may not be the best way to reach a decision on whether or not the body should be established. The exercise may be very subjective even in its initial process of establishing a benchmark to measure the level of success and deciding on the appropriateness of the investment. It is difficult to measure the level of success and determine how expensive is expensive.

An argument derived from monetary considerations is *per se* a sharp double-edged sword. It is very difficult to quantify the costs or benefits of accident investigations, immaterial of whether they are carried out by an independent investigating body or the regulator. It is therefore inappropriate for both set-ups to justify their respective position based on costs incurred or saved.

Financial concerns do take, however, precedence over other issues. As Robin puts it: “Economic constraints facing aspiring maritime States dictate that health, education, physical infrastructure and other pressing needs must take priority over maritime affairs”¹⁵⁶. This comment explains why so far, independent investigating bodies have only been established in developed western countries.

3.3.2 The Danish Maritime Authority (DMA) Order of 2003

From the foregoing, it is clear that the two identified set-ups constitute two extremes. Both set-ups declare that their respective philosophy is more than justified in implementing the IMO Code. Experience has in fact shown that when there was a genuine will to honour safety, both the regulator (wearing the hat of an investigator) and the independent investigating body have contributed immensely towards

¹⁵⁶ D. V. Robin, *The Impact of Competing Interest and Pressures on Maritime Administrations in Aspiring Maritime States: A Critical Analysis*, 2002 at p. 51.

achieving safer ships and cleaner oceans. Denmark, an EU Member State, has aimed to find a balance of both approaches by establishing a policy somewhere in between.

On February 01, 2003, DMA Order No. 31 of January 14, 2003, came into force, bringing changes to the Danish maritime investigations. The responsibility of casualty investigations, however, rests with the DMA. Aware of the problem (or the perceived problem) of conflicts of interest, Section 1(3) requires investigations to be carried out separately from any other function or activity of the DMA. Section 2 of the Order also prescribes that the aim of an investigation *shall* reflect the aim and principle of the IMO Code and does not therefore determine liability or apportion blame¹⁵⁷; the term ‘shall’ being imperative when used in a strict legal sense.

Nonetheless the above, the Order has some shortcomings in addressing in real depth the two major problems mentioned in this chapter *i.e.* the perspective of lawyers and the industry and the conflicts of interest. It has to be acknowledged that a separate, almost isolated Division has been created. However, it remains part of the DMA structure. Section 3.1.4 of this chapter attempted to explain that conflicts of interest are not solely limited to the middle management but are also a matter of concern for higher levels. Thus, critics in favour of independent investigating bodies would insist that the Division is not autonomous at all, since it still reports to the DMA Director General (and the same Minister).

The Order does provide, however, a tool for managing conflicts of interest. Section 11(4) gives the Division the prerogative to decide the appropriateness of publishing a casualty investigation report or even drawing one up in the first place. Therefore, if there is a conflict of interest, the Division may opt to refrain from carrying out a casualty investigation and leave the matter to another competent body, such as a public inquiry¹⁵⁸. This option will again raise the issue of costs. Taking into

¹⁵⁷ DMA, *Order on the Investigation of Accidents at Sea 2003, No. 31*, (2003).

¹⁵⁸ Discussion with J. Liljedahl June 30, 2003.

consideration the quantity, time frames and the expertise required, public inquiries tend to be very costly indeed.

Furthermore, the industry may still view the Division's objective as determination of blame, especially because it lies within the regulator and his compliance culture. Whilst the Order specifies that the aim of the investigations is not to determine blame or liability, however, it does not prevent the report or investigation documents from being used in a court of law¹⁵⁹. In addition, Section 6(3) requires the DMA Division to make the witness aware that he/she has the right to remain silent if it is assessed that the witness in question may face criminal proceedings. That further emphasises that the report and/or the investigation documents may be used in a Court of Law.

Whilst remaining silent does not serve the objective of safety investigations, the fact-finding process is ultimately not separate from the determination of guilt since the safety investigation may transform itself into an adversarial setting. The findings of a public inquiry are also admissible in a Danish Court of Law, meaning that whilst conflicts of interest may have been mitigated to a certain extent, there remains the problem of guilt *versus* a safety investigation.

3.3.3 The Casualty Analysis Methodology for Maritime Operations (CASMET) WP2 report (1998)

The issue is that in order to gain the maximum benefit that is possible from a casualty investigation, the key persons involved have to be given some degree of immunity, even if they may have committed an offence. However, in so doing, safety may be equally compromised, as if no investigation had been carried out in the first place¹⁶⁰.

¹⁵⁹ The implication discussed in section 3.1.4 of this chapter explains precisely this point. Denmark is a contracting Party to the STCW Convention and therefore as long as the Division remains within the structure of DMA, the Danish Order can never prohibit the report or the investigation documents from being presented in a court of law; otherwise Denmark will not meet the obligations, prescribed in Regulation I/5 of the STCW Convention.

¹⁶⁰ Chapter 2, section 2.2.3 of this dissertation has explained the notion of a 'just culture' as opposed to a 'no blame culture'.

The CASMET WP2 report explains this dilemma very lucidly: “{b}oth functions are necessary in order to maintain safety, but it seems that each function is blocking the other function”. To justify the separation of these two functions, the report refers to the aviation industry (*i.e.* Annex 13 to the Convention on International Civil Aviation)¹⁶¹ and to the establishment of the non-regulatory Chemical Safety and Hazard Investigation Board in the US in 1994 - both of which are signs that independence “is a necessity for true accident investigation”¹⁶².

The report therefore presents two options to States like Denmark and other countries, where the regulator has a dual role. These are -

- i) Rule enforcement *versus* responsibility demonstrated; and
- ii) Rule enforcement *versus* new lessons.

In adopting option (i), the CASMET WP2 report requires a balance between the strict act of sanction (because of the committed offence) and the responsibility demonstrated by the offenders. The criteria for quantifying responsibility will be based on the extent of voluntary reporting, co-operation with the authorities and the action taken to prevent the casualty. Since such responsibilities are documented in the Safety Management System (SMS), the report suggests the latter to be taken as a benchmark.

On the other hand, option (ii) is based on the fact that some hazards are well known - to the extent that authorities have sought to mitigate them by erecting safety barriers. If that would be the case, then the investigation would follow a legal track and sanctions may be initiated against those held responsible. Otherwise, if this were a newly identified hazard, those involved would receive immunity. This option

¹⁶¹ This Annex has been referred to in section 3.1.2 of this chapter.

¹⁶² CASMET WP 2, *Framework for a Common Accident Investigation Procedure*, (1998).

necessitates a preliminary investigation to determine if the case is ‘legal’ or ‘fact-finding’¹⁶³.

Nevertheless, the CASMET WP2 report identifies limitations in these two options, suggesting that there is nothing akin to independent investigating bodies. In citing Bird and Germain, the report cautions that casualty investigation involves interacting with people who may be, *inter alia*, concerned about punishment, their reputation and the attitudes of the industry towards them¹⁶⁴.

The first option may also be difficult to adopt. Unless specified otherwise, the SOLAS 1974 Convention, Regulation I/1, prescribes that the Convention does not apply to ships, which are not engaged on international voyages as defined in Regulation I/2 of the Convention. Furthermore, SOLAS 1974, Regulation IX/2 does not apply to, *inter alia*, oil and chemical tankers, gas carriers, bulk carriers, cargo high-speed crafts, other cargo ships and mobile offshore drilling units below 500 gross tonnage¹⁶⁵. Moreover, if the SMS is used as a benchmark for this purpose, the investigator may run into the danger of excessively concentrating on the sharp end and in so doing, neglecting higher levels of the complex system.

The second option provides a formidable challenge to overcome conflicts of interest at the higher management level. Even if the authorities (high level management) had created safety barriers, unless *Mens Rea*¹⁶⁶ offences were committed, the occurrence of the casualty simply means that the barriers had either failed, or were inadequate. A thorough investigation will have to be carried out to determine which barriers failed, how and why. This may prove too sensitive for the investigator/regulator to criticise his superiors. Even if all these obstacles are overcome and the case takes a

¹⁶³ In this context, the meaning of ‘legal’ has to be distinguished from that of ‘fact-finding’. Here, ‘legal’ means proceedings taken to determine civil or penal liability.

¹⁶⁴ CASMET WP 2, *ibid*.

¹⁶⁵ IMO, *supra* note 77.

¹⁶⁶ *Mens Rea* offences carry different thresholds *e.g.* carelessness, recklessness, knowledge or intent. See also remark on *Mens Rea* in note 49.

legal track, there remains the problem of whether or not there is room for a safety investigation. Provided that the latter has not been jeopardised, the question of who will carry out the safety investigation, (now that the investigating authorities have opted to wear the prosecutor's hat) needs to be answered.

3.4 Casualty Investigation and Co-operation

This chapter analyses the different set-ups, which are in place for the purpose of casualty investigation. It also examines the perception of the industry and scholars on determination of blame. Figure 3.4a illustrates that data and events are a vital input to the analysis and a witness remaining silent will adversely affect this process. This rationalises the concern of those who oppose adversarial settings.

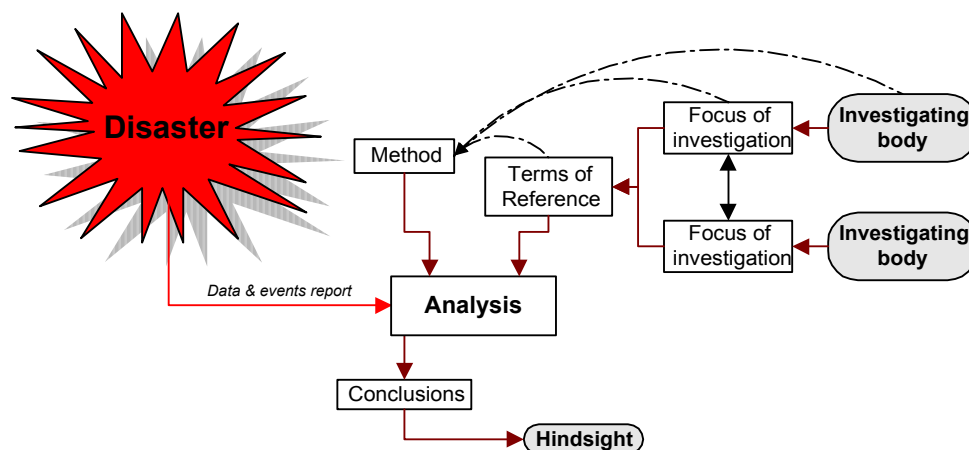


Figure 3.4a Casualty Investigation and Co-operation.

Source: Adapted from J.-U. Schröder (2003) at p. 4 and B. Toft & S. Reynolds, 1997 at p. 56.

Another major problem - conflicts of interest, is also examined. In studying the various views, it appears that all concerned agree that potential conflicts of interest do exist - the dissenting views pertain to how the problem shall be addressed. As the figure demonstrates, should this situation arise (irrespective of the severity, which one would like to attribute to the problem of conflicts of interest), then the entire system will be jeopardised because it will result in an internal problem within the investigating body. In fact, either through an independent investigating body or

through a series of internal ‘safety mechanisms’, each set-up acknowledges that it has to address the setback¹⁶⁷.

It has transpired that an attempt to adopt a policy lying somewhere in between will not entirely solve either problem. Even an internal monitoring system might not be as effective as it sounds, considering that in being internal, it is not impartial and therefore the regulator is still beyond public scrutiny.

The figure also explains that each investigating body has its own focus, which reflects the intents and purposes of each substantially interested State. Should two investigating bodies¹⁶⁸ have the same objectives of safety, then in accordance with IMO Code, Section 7.1, the lead investigating State can ‘develop a common strategy’ (terms of reference) with the substantially interested State/s. Based on a pre-determined method, the analysis of the data and events can then be carried out.

If, however, the foci of the investigation are not synchronised and the investigating bodies have different objectives (for instance due to STCW Convention, Regulation I/5), then the figure implies that a problem at the analysis stage will materialise. In fact, the chapter also refers to various IMO Member States who are very cautious when it comes to sharing of evidence. In this case, there remains no other plausible options but for each substantially interested State to carry out its own investigation - a situation which does not foster international co-operation or reflect the spirit of the IMO Code.

Due to the potential of conflicts of interest and the awkward situation, which an investigator/regulator might encounter in view of the requirements of the STCW Convention, the spirit of the IMO Code may be frustrated unless the investigator is

¹⁶⁷ Although the chapter focuses mostly on conflicts of interest on a regulator/investigator basis, however, it does not mean that an investigator within an independent body is immune from the problem of conflicts of interest, for instance on a personal basis. This issue is referred to in section 3.1.4 of this chapter.

¹⁶⁸ For the sake of simplicity, figure 3.4a only shows two investigating bodies. In reality, this may not be the case and additional substantially interested States may be involved in the investigation.

forming part of a framework, which is entirely independent from the regulator. Within the same context, it is acknowledged that the definition of a substantially interested State in Section 4.11 of the IMO Code is very broad, to the extent that it almost guarantees an absolute and unrestricted participation in the investigation. Even so, there can still be mismatches between the substantially interested States because of their divergent foci.

Interfering with the acquisition of information may either result from fear of incrimination or is deliberate due to conflicts of interest. Casualty investigations cannot afford hindrances in the gathering of information; otherwise, root cause analysis will be incomplete and futile. Conversely, safety is equally not effectuated if conventions are not enforced. Besides, a sanction is essential as a deterrent measure or for preventing such conduct from being repeated.

It is therefore submitted that a complete segregation between the determination of guilt and safety investigations is essential.

A partially autonomous body does not alleviate these difficulties because investigation documents can still be used in court proceedings. A partially autonomous body is a misnomer, even paradoxical in character. Its creation is an acknowledgement that both elements need to be separated, yet, they are re-linked at some other point in the organisational structure. As such, that does not eliminate the problem of conflicts of interest at the higher managerial level.

CHAPTER 4 CASUALTY INVESTIGATION REPORTS

When the IMO Code was being drafted, it was expected that it would address the issue of report writing in order to maintain consistency with the requirements of international maritime conventions¹⁶⁹. Section 1.4 of the IMO Code lays down the purpose, which is “to create a marine casualty investigation process the aim of which is to...publicise the causes of the casualty and to make safety recommendations”¹⁷⁰.

This is pivotal for the investigation and means that a casualty investigation report must serve as a vehicle for the conveying of safety recommendations to the interested parties, including IMO. It is therefore suggested that unless casualty investigation reports received at IMO are adequately detailed and well presented to serve their intended purpose, then international co-operation cannot be expected to be forthcoming. It has to be borne in mind that international co-operation is not limited to the securing and preservation of human, physical and documentary evidence. Discussions on safety recommendations at IMO are in fact based on international co-operation.

This chapter addresses the shortcomings of the system, focusing on the casualty investigation report, how the findings of the investigation can be presented, and how omissions of information and data can be minimised.

¹⁶⁹ Appendix 1 to this dissertation identifies international convention law, which requires reports into casualties to be forwarded to the Organization.

¹⁷⁰ IMO, *supra* note 14.

4.1 The Role of Casualty Investigation Reports

On February 2002, the FSI Sub-Committee forwarded document FSI 10/9/1 to all IMO Member States. The FSI document suggested that “transparent, documented and publicly available” casualty investigation reports should be the basis of any legislative action towards achieving maritime safety and environmental protection¹⁷¹. The document infers that in analysing the findings presented in a casualty investigation report, international co-operation is an important need for the coastal/port States, entities and individuals who have suffered from the effects of a casualty¹⁷².

4.1.1 Learning from others

Similar views were expressed by Parker in 1998 in reference to the *Estonia* casualty. He expressed concern that the owners of the vessel were oblivious to previous accidents which involved structural damage to the bow visor during heavy weather¹⁷³. He also stated that a seafarer is only exposed to the environment onboard his own ship, which makes it even more difficult for him to assess and appreciate the dangers of life at sea¹⁷⁴.

What Parker has raised is very relevant and has two components -

- The importance to disseminate findings of casualty investigations; and
- The quality of casualty investigation reports.

¹⁷¹ It has already been discussed in chapter 2 of this dissertation that this is not always the case, especially when environmental protection is the main issue.

¹⁷² IMO, *supra* note 69 at p. 1.

¹⁷³ In accordance with MSC/Circ.953 / MEPC/Circ.372, if the loss of a bow visor is **not** followed by the total loss of the ship, loss of life or severe pollution, then the casualty is classified as ‘serious’ and a full investigation report is only required if there are important lessons to be learnt. See MSC/Circ.953 / MEPC/Circ.372, *Reports on Marine Casualties and Incidents. Revised harmonized reporting procedures – Reports required under SOLAS regulation I/21 and MARPOL 73/78 articles 8 and 12*, (IMO, 2000c).

¹⁷⁴ C. J. Parker, *Accident Investigation*, (1998) at p.14. C. J. Parker is the Secretary of the Nautical Institute.

Schröder goes some steps further. He discusses the importance of investigating casualties and complimenting the investigation with a thorough report¹⁷⁵. He remarks that shipping is a complex system (like aviation), which involves an intimate interaction of its elements with the human being. This creates a high-risk situation for the operator of the system, his tool - the ship, and the environment in which he operates. He also identifies several contributing factors, which make this system and the human interaction even more complex. These are -

- Seaborne trade remains on the incline;
- Increase in ship size due to economies of scale; and
- Increase in automation, which has led to minimising manning scales.

Schröder's opinion supports what Bainbridge has identified as "The Ironies of Automation"¹⁷⁶. According to Bainbridge -

- Automation has evolved to overcome human limitations although limitations of automated systems are left to human beings;
- Since automated systems require the operator to monitor rather than operate, such functions increase the possibility of errors even by the most motivated operators; and
- Automation denies the operator the opportunity to practice the skill, which may therefore create problems during emergencies.

It is claimed that although humans interact with the elements of a complex system, this does not mean that accidents are more likely to happen. In fact, it is usually the contrary; human beings will respond to situations that would have otherwise caused the system to malfunction. However, when accidents happen in complex systems, *e.g.* a maritime scenario, it is even more important to investigate and prepare a good quality report to promulgate the findings. It must be borne in mind, that in all

¹⁷⁵ J.-U. Schröder, *supra* note 52 at p. 1.

¹⁷⁶ L. Bainbridge, *The Ironies of Automation*, (1987) at p. 272.

probability, the ironies and complexity of the system would have been the main contributing factors to the casualty¹⁷⁷.

The importance of casualty investigation reports is also related to risk management and the fact that casualties occur everywhere around the world¹⁷⁸. If the findings of these accidents are not promulgated by means of casualty investigation reports, then any particular shipping company might not appreciate the severity of the accident, hence delaying or preventing corrective actions altogether; believing that it was only a one-off situation, which never happened (and will never happen) to anyone else¹⁷⁹.

It is therefore evident that both scholars and members of the maritime industry share a common view that there is a very good possibility that the promulgation of information through casualty investigation reports will reduce the occurrence of accidents. Initially, it might appear that there is not one accident similar to another and that may very well be the case. However, even with the limitations of past investigations, it has been shown that whilst one outcome differs from another, underlying factors might share a trend.

4.2 A New Approach towards Casualty Investigation and Reports

Figure 4.2a illustrates how the perspective of the industry towards casualty investigation and report writing has changed in the past 15 years.

The figure evokes the theory that in the maritime industry, in the past, the process ended as soon as the casualty investigation report was finalised. The figure purports to suggest that there is no other option for improving standards except *post hoc* a casualty. This is almost true because an investigation is a reaction to a casualty, but

¹⁷⁷ Reason identifies these contributing factors as latent failures; weaknesses in the defences of a complex system. See J. Reason, *supra* note 55 at p. 202.

¹⁷⁸ B. Toft & S. Reynolds, *supra* note 56 at p.4.

¹⁷⁹ B. Toft & S. Reynolds, *ibid*.

during the years, another component has emerged: the proactive approach or foresight.

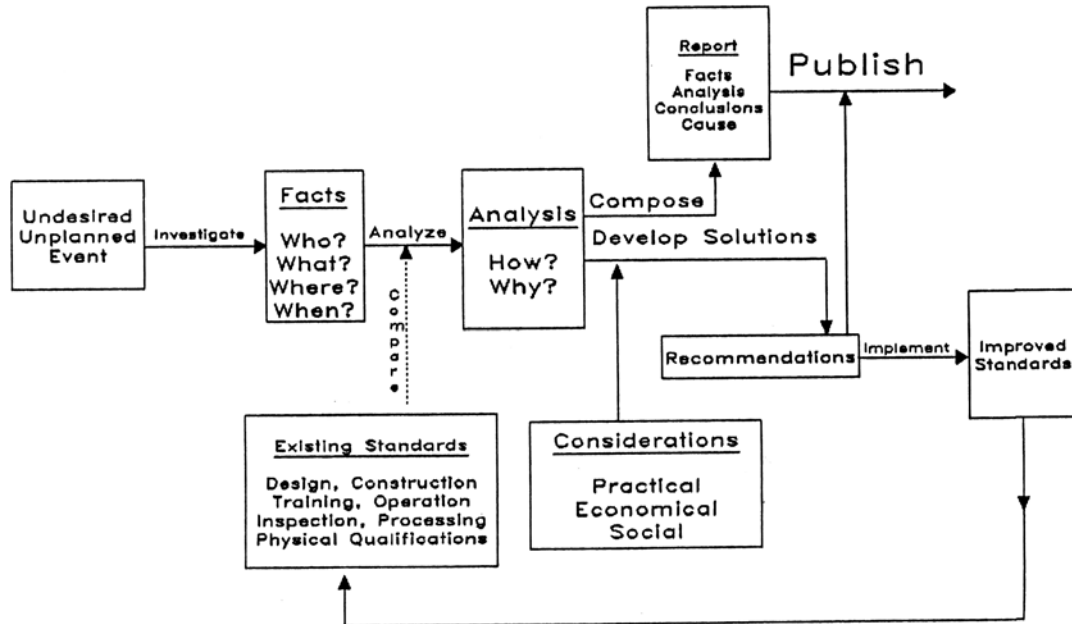


Figure 4.2a Accident Investigation Process.

Source: N. Wayne, *Marine Accident Investigation: time for change?*, (1988).

4.2.1 The concept of foresight: its roles and limitations

Secretary-General O'Neil refers to foresight in the following terms¹⁸⁰ -

It is irresponsible to wait for an accident to happen with an ensuing loss of life or degradation of the environment before taking some corrective action. IMO has recognised this and in recent years has brought about a switch to the so-called proactive approach with which it has reached some success. By introducing a more structured risk analysis process through Formal Safety Assessment Procedures, regulators are compelled to examine potential problem areas and to introduce appropriate measures or standards before a tragedy occurs¹⁸¹.

¹⁸⁰ See W. O'Neil, (1999).

¹⁸¹ See MSC/Circ.1023 / MEPC/Circ.392, *Guidelines for Formal Safety Assessment for Use in the IMO Rule-Making Process*, (IMO, 2002b). MSC/Circ.1023 / MEPC/Circ.392 was approved by MSC 74 and MEPC 47.

Hence, the new approach towards casualties is the anticipation of an accident and in so doing, the barriers within the complex system are strengthened *i.e.* an effective attempt towards minimising the latent failures mentioned in section 4.1.1¹⁸².

Scholars do consider foresight as a tool to minimise latent failures. Reason reiterated that in view of the unique trajectory of events that would have led to an accident, one has to engage in this painful detail in order to minimise the possibility of accidents from happening in the future. In this respect, he cautions that it would be futile to address only the particular active failures. Since the trajectory of events is specific to any one accident, even exclusive in their combination, then it would be wiser and more effective to analyse the latent failures inherent in the system¹⁸³.

Human error can only be studied by observing human behaviour and it may be done using two methods; experimental and quasi-experimental. What the experimental method entails is a simulator, which for instance represents a ship's bridge or an engine room. The quasi-experimental method involves studies of casualty investigation reports, interviews and observation of the crew during the course of their duties¹⁸⁴.

In the same context, Hollnagel wrote that when designing a new system, there are two main points, which need to be addressed¹⁸⁵. These are -

- Foreseeing and evaluating possible initiating events (active failures); and
- Analysing the possibility that the system recovers from the deviation.

The evaluation and analysis must include the study of the material/equipment failure, envisage the behaviour of the operator *and* the conditions, which may influence this behaviour¹⁸⁶.

¹⁸² The importance of casualty investigation reports and their relation to foresight are addressed in the following sections of this chapter.

¹⁸³ J. Reason, *supra* note 55 at p. 174.

¹⁸⁴ T. Koester, *Human Error in the Maritime Work Domain*, (2002) at p. 3.

¹⁸⁵ E. Hollnagel, *supra* note 59 at p. 84.

The concept of foresight carries favourable characteristics. For instance, during simulation exercises, the conditions that influence the human behaviour can be manipulated through one's choice. Furthermore, there is the possibility of observing human behaviour, gathering and storing all the data and information, which can then be referred to and studied at a later stage.

Whilst foresight and proactive actions are therefore synonymous, there are several limitations to foresight. For instance, an exercise only simulates real scenarios. Human behaviour may be influenced by this lack of reality and a true reflection of an individual's behaviour, *e.g.* under stress, will not be achieved because simulation carries no real threat to life¹⁸⁷. In addition, it is simply impossible for the designer of the simulator to predict or anticipate all the variables and conditions, which influence the operator of the complex system in reaching his decision¹⁸⁸.

4.2.2 The importance of casualty investigation reports within the context of foresight

It is established that the maritime industry is looking at a new proactive approach, attempting to foresee failures and their consequences, and striving to design stronger barriers to keep the hazard and the receiver as distant as possible. It is also understood that foresight, as a stand-alone concept, is not error-free and it does contain limitations. This is in fact where the importance of casualty investigation reports comes in. Casualty investigations and the reports that follow can help overcome some of these limitations by being an integral part of the foresight process. Various academics and observers have voiced this important and interesting view.

¹⁸⁶ Having said so, one can easily conclude that Hollnagel's theory is also perfectly valid if the system is already in existence and it is either being extended or altered in some way or another.

¹⁸⁷ G. Nagy, *Human Reliability Analysis: From Action to Context*, (2002) at p. 3.

¹⁸⁸ B. Toft & S. Reynolds, *supra* note 56 at p. 68.

In trying to make his readers visualise the importance of this concept, Reason refers to American social scientist Weick who is quoted to have said¹⁸⁹ -

We know that single causes are rare, but we don't know how small events can become chained together so that they result in a disastrous outcome. In the absence of this understanding, people must wait until some crises actually occurs before they can diagnose a problem, rather than be in a position to detect a potential problem before it emerges. To anticipate and forestall disasters is to understand regularities in the ways small events can combine to have disproportionately large effects.

There is no need to overstress that to understand and foresee what Weick, in his words, calls latent failures and how they can agglomerate, is through the study of detailed and thorough casualty investigation reports, including the reported findings. It is asserted that if a well thought and organised casualty database is created, and all the findings are refined and classified in accordance with a pre-determined classification scheme or taxonomy, then the analysis and the data will be more reliable and therefore will serve the purpose of foresight perfectly¹⁹⁰. What is being emphasised is that the casualty investigation report, which is the reaction of the industry to a casualty, serves as a basic tool for the proactive approach.

Schröder maintains and states "...a solid combination of an assessment of documented accidents and the expert forecast about the future performance will certainly improve the results of a risk assessment of any new system"¹⁹¹. What he depicts is approved by other members of the industry. The MCA was the pioneer of the FSA as adopted by IMO¹⁹². Despite its new perspective, MCA still deems that casualty investigation and reports have a major role to play in the proactive

¹⁸⁹ J. Reason, *supra* note 49, p. 22.

¹⁹⁰ J.-U. Schröder & G. Zade, *The Impact of Marine Casualty Investigation on Maritime Administration and Maritime Education Training*, (2002) at p. 289.

¹⁹¹ J.-U. Schröder, *supra* note 52 at pp. 2-3.

¹⁹² FSA came about following Lord Carver's report in 1992, based on a principle that "the regulator's role is to reflect society's expectations of an industry, in terms of an acceptable level of safety at an acceptable cost. See J. H. Peachey, *A New Safety Culture – for the Regulator Too*, (1999) at pp. 9-17.

approach. MCA recognises that since the reports portray the real scenario, they guide the analysts to determine a limit to the human behaviour study¹⁹³.

Again, as Reason affirms, thorough reports also identify the latent failures in the system, which may serve as an input to the foresight exercise or programmed into a simulator to study the behaviour of the operator in these conditions. Thus, by taking into consideration latent failures (both at the line management and higher organisational levels) during the simulation process, one would expect a realistic scenario, enabling the assessment of behavioural reactions¹⁹⁴.

There are at least two advantages of systematically combining casualty investigation reports and foresight¹⁹⁵ -

- Casualty reports are the best sources to reveal the link between human error and the casualty; and
- In comparison to experimental methods, quasi-experimental methods, provide the material, data and evidence following a casualty, which is already collected, compiled and analysed in the report.

¹⁹³ See E. Hughes & P. White, *Formal Safety Assessment – Targeting Needs*, (2002) at p. 26. This is a very legitimate point. By examining Hollnagel's Simple Model of Cognition (SMoC), it will be affirmed that of all the elements that constitute a complex system, the human being, *i.e.* the liveware, is the most flexible of all these elements. Not only does he have the capabilities to operate the system but also observe, even anticipate a situation, analyse and react to it and then observe again the outcome of his own reaction. Such properties and capabilities are surely a challenge to the designer of the simulator's software and for those trying to predict the future performance of the entire system. See E. Hollnagel, *supra* note 59 at p. 100.

¹⁹⁴ J.-U. Schröder & J. Hahne, *Maritime Casualty Analysis – An Adequate Basis for Simulation during Maritime Education and Training?*, (2003) at p. 2.

¹⁹⁵ T. Koester, *supra* note 184 at p. 1.

4.3 The Current Situation in the Industry - Identified Weaknesses in Casualty Investigation Reports

The above sections project the impression that after so many casualties, investigations and supposed improvements in the analysis of these mishaps, mankind has finally discovered the way to address these unwanted (but not unanticipated) events and their consequences, which sometimes reach a disastrous scale. That not being the case, it is only expected that questions are raised and a straightforward reply is indispensable. This is so because, given that all this is known, the maritime industry still suffers major recurrences of casualties, which seem to originate from similar underlying factors.

Most importantly, international co-operation seems to reach a deadlock at this stage after so much effort is expended to reach an agreement in building its own framework or blueprint.

4.3.1 The usability of casualty investigation reports

Some scholars are of the view that the information or data, which one can extract from a casualty investigation report is somewhat limited, especially when it comes to developing the ‘causes tree’.

Hollnagel refers to Swain, who, as early as 1990, had already declared that the data available for first-generation Human Reliability Analysis (HRA)¹⁹⁶ was “less-than-adequate” if an analyst had to predict human performance in complex systems¹⁹⁷. Thus, the problem of inadequate information manifests itself when based on the findings of reports, one attempts to apply or implement corrective actions, which would have even been recommended in the available reports¹⁹⁸.

¹⁹⁶ First-generation HRA is the classical approach, as compared to the second-generation HRA, which is the modern approach.

¹⁹⁷ See E. Hollnagel, *supra* note 59 at pp. 8-9.

¹⁹⁸ R. Mari, *Harmonization of Safety Criteria: Approach Proposal for New Accident Reports*, (1997) at p. 473.

The overview of IMO's Work Programme and Budget for the Twenty-Second Financial Period, reported that the Secretary-General "considers that the average quality and timeliness of accident reports submitted to the Organization is less than satisfactory"¹⁹⁹.

The emphasis made in previous sections on the building of a database, carries considerable weight. To start with, there is no adequate database running which could help in the analysis of human error²⁰⁰. This shortcoming had already been brought to the attention of the Directorate General VII – Transport, Commission of the European Communities, when the CASMET report was published. The report highlighted that based on casualty investigation reports²⁰¹ -

- The findings are classified by different taxonomies;
- Recording of information is not uniform since each country makes use of its own national system; and
- The presentation of findings to IMO is inadequate.

A study on 42 casualty investigation reports, completed by Schröder in 2002, revealed the same deficiencies. In fact, the findings did not satisfy his objectives of reconstructing the accident process or trajectory of events, suggesting that these reports are not adequate for the study of foresight²⁰².

¹⁹⁹ IMO, *supra* note 6. The first part of this statement is in contradiction with what the Working Group on Casualty Analysis reported to the FSI Sub-Committee during its tenth session, where it was stated that in comparison with previous years, the 69 casualty reports analysed were of good quality, showing thorough investigation and presenting well described events and their consequence. See IMO, *Sub-Committee on Flag State Implementation (FSI), 10th session: 8-12 April 2002*, (IMO, 2002d).

²⁰⁰ J.-U. Schröder, *supra* note 52 at p. 1.

²⁰¹ P. Caridis, *Casualty Analysis Methodology for Maritime Operations (CASMET)*, (1999b) at p. 17. The CASMET report was published on June 30, 1999.

²⁰² J.-U. Schröder & G. Zade, *supra* note 190 at p. 290. The reports selected by Schröder range from 1979 to 1999 and this might therefore be a 'partial' explanation for not achieving his objectives. As it has been stated in the initial pages of this chapter, it is only very recently that IMO Member States realised the potential of casualty investigation reports as an input to foresight. Before that, most reports only served as documentary evidence that the flag State had satisfied its obligations prescribed in international maritime conventions. Further to the problem identified in this section, at least one scholar questions the adequacy of Reason's Hybrid model, which has been

4.3.2 The intricacy to link evidence, analysis and conclusions

Casualty reports have become more intricate because of two main reasons. These are²⁰³ -

- Technological advances have created more complex systems; and
- The emerging trend in the industry to address both latent and active failures.

As one would expect, the concept of a ship being an integral part of a complex system, has been renovated throughout the years. Nowadays, automation is a standard feature in any department onboard, despite the ironies referred to above. The constant increase in maritime legislation adds to the complexity of the system. In addition, manning scales have been scraped to the barest minimum, just enough to guarantee the safest minimal complement, creating further concepts such as one-man bridge. These conditions, which shape up the industry, have to be addressed in casualty investigation reports.

Moreover, both the complexity of the system and the financial investment involved, necessitate that reports address also latent failures, even at the design stage (ergonomics included) if crucial. This is more than justified; but when expressed in physical terms, this could mean reports that, for instance, run into volumes containing hundreds of pages, most particularly if the casualty involves a large loss of life or severe pollution²⁰⁴.

adopted by IMO in Resolution A.884(21). Braithwaite cautions that whilst the Hybrid model is very valuable, however, its misapplication might jeopardise the entire scope of the investigation. G. Braithwaite, *The simpler it seems, the more you have forgotten...*, (2002) at pp. 215-217. According to Braithwaite, investigators have to be cautious because Reason's model is a tool and not an investigation methodology. He recalled that the Australian Bureau of Air Safety Investigation (now ATSB) had encountered real difficulties when they attempted to use the Hybrid model in the investigation of several major accidents. Personal communication with G. Braithwaite March 24, 2003. (It is not the intention of this dissertation to study the implications of the Hybrid model. An analysis of this matter requires a study of its own and certainly falls beyond the scope of this dissertation).

²⁰³ See C. Johnson, *Improving Accident Reports*, (1998) at p. 1.

²⁰⁴ C. Johnson, *ibid.* at pp.14-15.

Logically, every casualty investigation report is presented in such a way that the findings of the investigators follow the narrative and the analysis²⁰⁵. This approach is acceptable and even recommended because the reader may reach his own deductions without being biased by the investigators' own conclusions. However, this carries one major disadvantage; the reader has to go back and forth, scrolling through the pages in an attempt to link the logic and conclusions with the evidence supporting this analysis, and which should have been presented in the report²⁰⁶.

What applies to the reader of the report, be it a maritime administrator or a layman, equally applies to the analysts of the IMO Casualty Analysis Correspondence Group for Casualties. This would translate in a major problem since the responsibility of the Correspondence Group is to identify acute accident circumstances/causes and report them to other IMO Sub-Committees for information or appropriate action²⁰⁷.

Toft & Reynolds share the same view expressed above²⁰⁸. They identify at least the following four typical drawbacks in large casualty investigation reports -

- Difficulty to fully identify lessons learnt and their promulgation throughout the industry;
- Inconvenience to link events and analysis;
- Investigators may not fully appreciate the implications of the evidence available, especially if it weakens their own analysis; and the
- Creation of blind spots, which may result in limiting the exploitation of the analysis' potential.

Since the importance of a link between hindsight and foresight has already been established, then one would appreciate that inadequate reports will not serve the

²⁰⁵ *Ibid.* at p. 13.

²⁰⁶ *Ibid.*

²⁰⁷ See D. Rabe, (2001) at p. 3.

²⁰⁸ B. Toft & S. Reynolds, *supra* note 56 at p. 41.

purpose of an input to the creation of simulator's software, as shown above by the different opinions brought together.

4.3.3 Events and causal factors charts

The Investigator's Manual prepared by MAIIF, explains that one of the core analytical techniques used during casualty investigation is the events and causal factors chart²⁰⁹.

As the manual rightly affirms, the chart, which is constructed during the course of the investigation, provides a chronological sequence or timeline of events, leading to the accident. It is also being claimed that its benefits include -

- Illustrating the sequence of events leading to the accident and the conditions shaping these events;
- Demonstrating the interaction between events and conditions and relation of organisations and individuals;
- Validating the results of other analytical techniques;
- Presenting the information in such a way that it can be used to guide report writing; and
- Serving as an aid to summarise the key information regarding the casualty and its causes in the investigation report.

Practice has shown that there is no setback in the use of the chart as an investigative tool. The main problem lies, however, if the chart is utilised to summarise key information at the end of a report²¹⁰.

²⁰⁹ MAIIF, *Investigators Manual*, (2002a) at pp. 56-57.

²¹⁰ Established investigating bodies such as NTSB have worked for years with this tool and it has therefore stood the test of time and tens of investigations. However, whilst NTSB uses the chart to investigate, it does not publish a simplified version, in all probability because it fears it may give the impression of oversimplification.

This does not mean that other investigating bodies follow suit. ATSB are now well known to publish events and causal factors charts at the end of its casualty investigation reports although it is acknowledged that the chart only represents a simplified version of the actual chart built during the investigation process. Discussion with K. Filor October 18, 2001.

Therefore, *the events and causal factors chart is adequate as an investigation tool* but this writer opines that *there is a pitfall if the chart is used to summarise key information*. For instance, it fails to present contradictory evidence and analysis, which are very frequently encountered during an investigation, especially where interviews are concerned. Such contradictions might weaken the analysis of the investigator and in order to create an impartial report for the readers, counter analysis should be included in the report. If this is not done, then the reader will have to rely solely on the analysis, conclusions and perspective of the investigator. Such reliance will not assist *e.g.* in the study of human behaviour for the purpose of foresight because the analyst might be influenced by what he has read²¹¹.

Several investigating bodies are obliged by their own national requirements to send a report to the interested parties. Other States do not have such requirements, however, they abide by the IMO Code, Section 12, and send a draft copy to the substantially interested States (and parties) for their “substantiated comments”.

Since modern reports address latent failures both at the line management and organisational levels, it is expected that, for instance, the shipping company or the flag/port State will send in their comments, which might not necessarily concur with the findings of the report. Such submissions can also strengthen or weaken the analysis of the investigator or question his interpretation. No matter what, to ensure credibility, these submissions should be included in the report; an exercise that cannot be facilitated *e.g.* by the application of the events and causal factors charts.

In addition, the chart fails to bring together the analysis and the supporting evidence. This will leave no other option for the reader but to go back and forth in the report, trying to establish the link himself²¹².

²¹¹ T. Koester, *supra* note 184 at p. 6.

²¹² See C. Johnson, *supra* note 203.

4.4 Conclusion, Analysis, Evidence (CAE) Diagrams

Concerned and critical to these weaknesses, and to the possibility that reports may not assist analysts as one would hope, Johnson discussed the CAE diagram concept and its application to provide a “graphical overview of the arguments that are presented in accident reports”²¹³ but as yet, in a more detailed way than presented by an events and causal factors chart. According to Johnson, CAE diagrams -

- Link directly the analysis and the evidence presented in the report;
- Enable the readers to remember interactions of the different elements identified during the investigation;
- Provide a “road-map” of the conclusions, supporting/complex analysis and the related evidence;
- Identify weakening evidence or analysis in reports and help discussions concerning the consistency of the report;
- Help the analyst to keep an open vision without being influenced by the investigator; and
- Serve as a means to promote corrective actions and recommendations²¹⁴.

4.4.1 A Case Study

The above claims are the beneficial properties of CAE diagrams. In order to perceive how CAE diagrams operate, this writer selected a casualty investigation report prepared by ATSB and constructed CAE diagrams based on the evidence and analysis presented in the report²¹⁵. The case study is presented in detail in Appendix 3 to this dissertation.

²¹³ *Ibid.* at pp. 12-19.

²¹⁴ This exercise requires the use of another tool - Questions, Options and Criteria (QOC) diagrams.

²¹⁵ The selection of the report was based on the following criteria: to avoid hindsight bias, this writer was not familiar with the events, investigation and analysis; it included submissions by interested parties; it is a short report in view of the time constraints; it included an events and causal factors chart and involved interactions of different operators at the sharp end. In addition to the CAE diagrams, the events and causal factors chart is reproduced in Appendix 3 to help the reader compare the chart and the diagrams.

4.4.2 Evaluation of CAE diagrams constructed in the case study

The points that Johnson raised on CAE diagrams were identified when the case study exercise was completed. In addition, this writer linked submissions made by interested parties and indeed, certain weaknesses in the report were then visible and it was clear that either they had not been adequately addressed by the investigating body or if otherwise, then justifications/analysis for omitting these comments had not been provided, as explained in Appendix 3.

The above properties of CAE diagrams, which were also identified in this case study, showed how -

1. Divergent views of witnesses can be brought together;
2. A numbering system enables better management of analysis and/or evidence and allows cross-referencing;
3. Unsupported analysis can be identified;
4. Analysis by those involved in the casualty may be included in the diagram, even if not supporting the interpretation by the investigators;
5. Areas of analysis contradicting other areas in the report become visible, suggesting deeper or revised analysis to clarify these contradictions;
6. Inconsistencies are identified *e.g.* lack of segregation between analysis and conclusions; and how
7. A single piece of evidence supports more than one analysis, indicating the importance of a particular piece of evidence and suggests where counter submissions may be expected, which if successful, will undermine large parts of the report.

Depending on the contents of the report, Johnson²¹⁶ adds that -

8. CAE diagrams have the potential to indicate where the investigator fails to segregate his own inferences and “facts for which there are substantiated evidence”; and
9. Analysis may be supported by evidence of different media, such as photographs or Virtual Reality Markup Language (VRML) models, which may also be included in the CAE diagrams²¹⁷.

The use of CAE diagrams does carry disadvantages. The language used in casualty investigation reports does not always make it possible to categorise a report into conclusions, analysis and evidence²¹⁸. This same difficulty was again encountered in this case study, most particularly when constructing the CAE diagrams for conclusions 1(b) and 3.

The use of the QOC tool referred to in footnote 214, implies that CAE diagrams fall short of achieving the former tool’s function. Furthermore, there are no internationally agreed codified guidelines to help link CAE and QOC diagrams. This may again prove to be a difficulty for the experts involved in foresight and who are not acquainted with the use of this tool.

This writer encountered other difficulties when the diagrams were being constructed. Although the report runs for 36 pages, it was impossible to fit the diagrams into a single page because each conclusion requires a CAE diagram. This problem

²¹⁶ C. Johnson, *Using CAE Diagrams to Visualise the Arguments in Accident Reports*, (2001) at pp. 7, 12.

²¹⁷ In this respect, Appendix 4 to this dissertation touches briefly on the electronic promulgation of casualty investigation reports. This particular casualty investigation report, however, did not include any photographs, which could have been utilised in Appendix 3, to illustrate this last point.

²¹⁸ C. Johnson, *ibid.* at pp. 18-19.

becomes considerable if CAE diagrams had to be constructed for reports such as the grounding of the *Exxon Valdez*, which runs into volumes²¹⁹.

This does not mean that it would prove impossible to construct CAE diagrams for voluminous reports but it does certainly mean that the diagrams will be numerous, complex and would have to be presented in a dedicated section of the report. Notwithstanding, the advantages of bringing together evidence, analysis and conclusions may still be appreciated.

Intentionally, the events and causal factors chart is presented adjacent to the CAE diagrams in Appendix 3 to this dissertation. One major disadvantage of CAE diagrams stands out. The former indicates a sequence of events in chronological order, a characteristic that is lost altogether in CAE diagrams.

Therefore, it would be appropriate that a report should present a chart, which is complimentary to the diagrams, and thus minimising on each of their limitations. In his research, however, this writer has not come across any casualty investigation reports with annexed CAE diagrams, suggesting that the use of this tool is not widespread²²⁰.

²¹⁹ Johnson acknowledges this point but views it from the perspective that the longer the report, the more justified it is to adopt CAE diagrams in order to overcome the problems present in conventional reports. See *ibid.* at p. 19.

²²⁰ This is one scope of this writer. It is aspired that this dissertation makes casualty investigators aware of another tool, which although has its limitations and may require improvements, however, it has the potential of enhancing casualty investigation reports and assist in the achievement of foresight, thereby satisfying the purpose of the IMO Code.

4.5 Linking Hindsight to Foresight

The maritime industry at large has realised that casualty investigation reports serve to convey safety recommendations. It is claimed that the impetus is the strong moral demand, considering the cost of hindsight, be it in human life or mitigation of environmental pollution²²¹.

Efforts should not be therefore directed towards achieving this concept. The real issue is how to communicate the information, which is gathered during the course of the investigation. It has been stated that scholars believe that in all probability, most of the data available is inadequate to serve the purpose of foresight. Several research books have been published in an attempt to visualise this problem and to present a solution. This chapter, on the other, hand emphasises the presentation of the findings in reports and brought together research by various academic writers in this respect.

International co-operation between IMO Member States does not end when the report has been sent to IMO. That stage would only mean that the flag State has diligently executed its duties as required by international conventions. International co-operation now goes beyond *i.e.* reaching an agreement (or a compromise) on the corrective actions, recommended in adequate and high quality reports.

Linking hindsight to foresight, one scholar asserts that “without naturalistic facts, experimental work may become narrow and blind; but without experimental research, the naturalistic approach runs the danger of being shallow and uncertain”²²².

Figure 4.5a plots the focus of this chapter *i.e.* how hindsight should operate with foresight in a bid to enhance international co-operation and improve the implementation of the IMO Code. It also illustrates how the conclusions reached from the analysis of data and events contribute to hindsight.

²²¹ B. Toft & S. Reynolds, *supra* note 56 at p. 24.

²²² B. J. Baars, *Eliciting Predictable Speech Errors in the Laboratory*, (1980) at pp. 307-318.

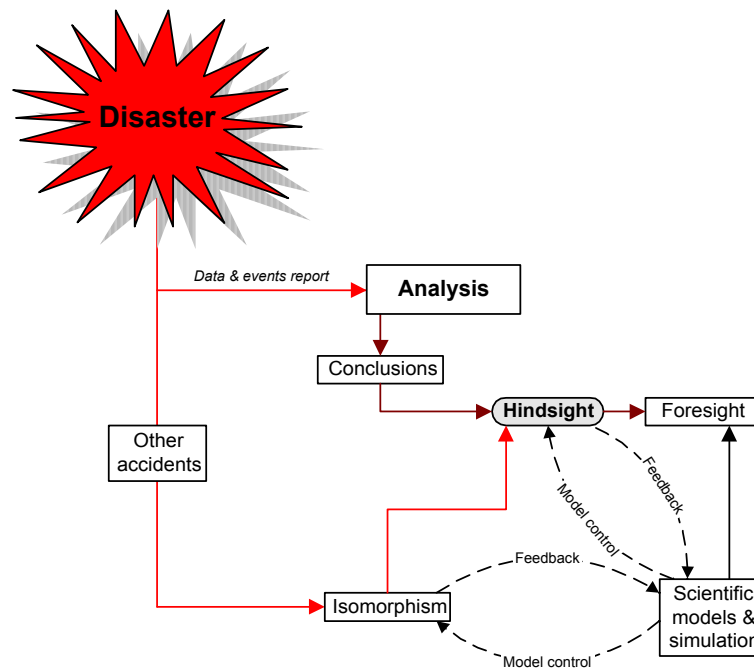


Figure 4.5a Linking Hindsight to Foresight.
Source: Adapted from B. Toft & S. Reynolds, 1997 at p. 56.

Another input to hindsight is isomorphism; accidents, happening in what appears to be different complex systems but share the same basic components that make them susceptible to similar failures²²³. Foresight has three inputs; hindsight, scientific models and simulation (which have also been referred to in this chapter as experimental and quasi-experimental methods). The other important function of hindsight (and isomorphism) is shown using dotted lines; they act as a feedback and a control for the model and simulation so as to ensure a realistic approach.

A proactive exercise will transform into a better safety policy, only if foresight has been built up on a detailed study of hindsight²²⁴. What is being emphasised is the quality of hindsight, which will have a direct bearing on the quality of foresight.

A specific reference is made to the tendency of resisting a cultural change because it is believed that an accident can happen once and only to specific organisations. A

²²³ B. Toft & S. Reynolds, *supra* note 56 at p. 16.

²²⁴ R. Mari, *supra* note 198.

thorough safety investigation report, with clear, supported conclusions not only serves the promulgation of information but also facilitates overcoming this misconception.

CHAPTER 5 CONCLUSIONS

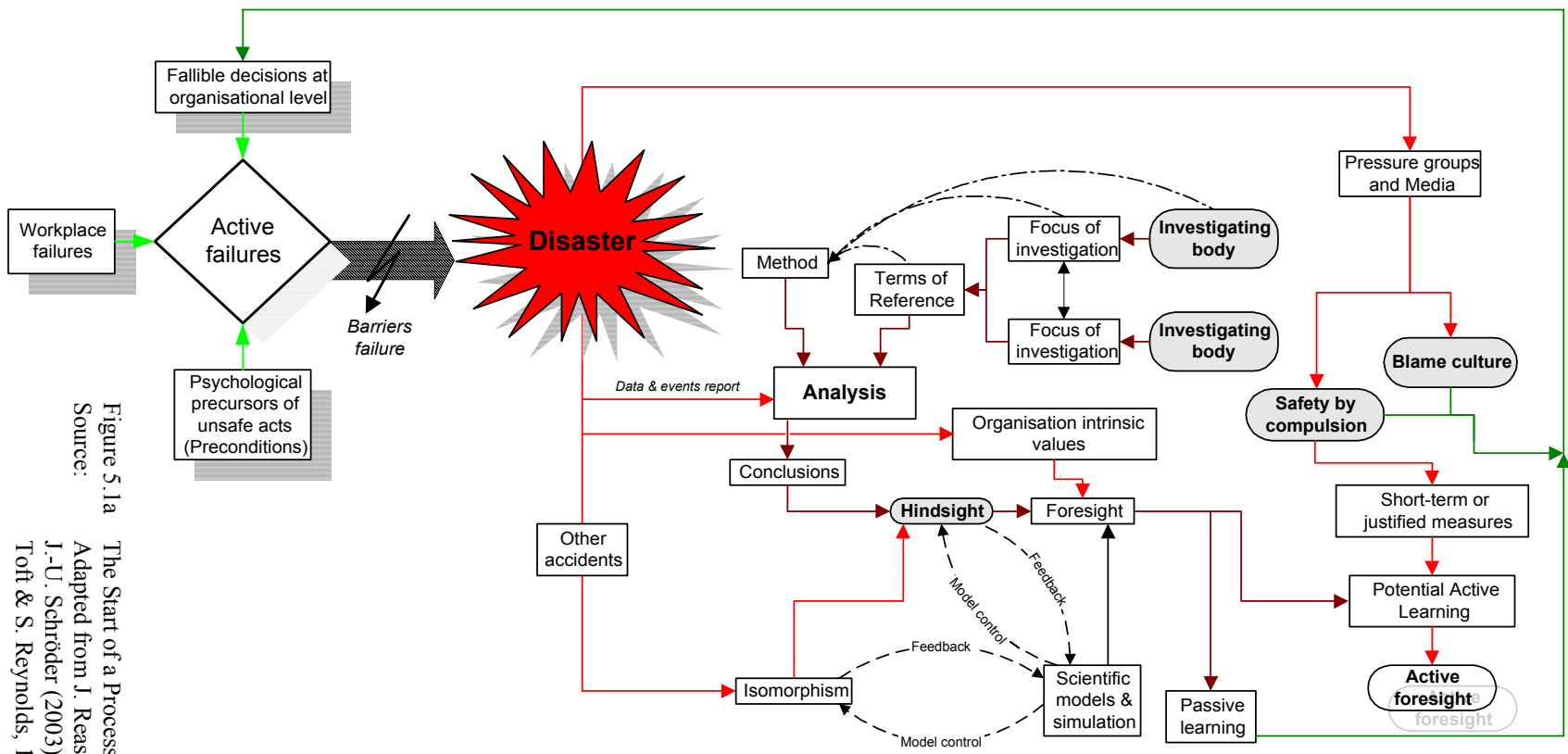
5.1 The Start of a Process...

The dissertation has attempted to steer the reader through a study of three fundamental aspects of maritime casualty investigation. It has sought to demonstrate that if an investigation is not managed properly, it will fail to reflect the aim, share the purpose and reach the objective of the IMO Code. The study has revealed that the fulcrum is *hindsight*, which *per se* is a major input to foresight. It has shown how hindsight cannot be achieved through excessive political reactions, be it in the form of finger pointing, blaming or hindsight bias. This dissertation has also explained that the investigating bodies are the major players and that their policies will definitely administer the analysis process.

Figure 5.1a brings together these three aspects and assembles all three figures previously discussed in the foregoing chapters. As it can be observed, in addition to providing a link of how any one of these three domains may influence a safety investigation, the figure implies that foresight is only the start of another process, which if diligently applied, will lead to *active foresight*²²⁵. Toft & Reynolds accentuate that the reaction of an organisation, influenced by a disaster, may also act as a lever to promote foresight²²⁶.

²²⁵ B. Toft & S. Reynolds, *supra* note 56 at p. 58.

²²⁶ This writer of the opinion, however, that the reaction of an organisation involved in a disaster is only a secondary issue. In reality, the lever is what this writer calls 'organisational intrinsic values' *i.e.* how safety conscious an organisation is and how high are maritime safety and environmental protection on its priority list. These two criteria THEN determine the reaction of an organisation. Only intrinsic values (and financial considerations) will establish how sensitive an organisation is to the effects of a disaster. Again, that emphasises the importance of casualty investigation reports and the promulgation of well-supported findings and conclusions.



The figure suggests that if the recommendations made by the investigation (which must be reasonable and in proportion to the magnitude of the disaster and its effects) are neither adopted nor implemented, then the learning will remain passive, the barriers against mishap will not be enforced and latent failures will not be mitigated. The decision to remain passive is like all other fallible decisions at the organisational level. Thus, not only latent failures were not mitigated, but the industry's passiveness is also transformed into a latent failure. The other possibility is based on the recommendations drawn up by the investigating body and the generated foresight. This is *potential active learning*²²⁷ and is when corrective actions are taken.

5.2 Active Foresight and the IMO Code

In line with Toft & Reynolds' definition, *active foresight* is the stage where based on potential active learning, the industry applies in practice the recommendations, with an objective of preventing similar casualties in the future. This is also the objective of the IMO Code and it heralds the stage where a cultural change has taken place.

The maritime industry may be sceptic of ever achieving this stage. Perhaps this is because of the time frame required by such a process. Furthermore, latent failures are inexorable in complex systems. Human error is both a cause and a consequence. At the sharp end, human error is a consequence of other human errors committed higher up in the organisational hierarchy. That, however, should not mean that the aim and purpose of the IMO Code are discarded, even if from time to time it may require amendments in order to address the changes in the perspective of the maritime industry towards casualty investigation.

²²⁷ B. Toft & S. Reynolds, *ibid.* at p. 55. Toft & Reynolds identify potential active learning as a process, the result of which determines the response of an organisation to recommendations made by an investigating body. Safety by compulsion is also an indirect input to potential active learning. However, as discussed in chapter 2, unless the compulsion factor is short-termed or *interim* – at least until justified by the findings of the casualty investigation report, then a decision will qualify as a spontaneous reaction and may be fallible. Also see *ibid.* at p. 79.

The aim of this dissertation is to capture and discuss similar and divergent views/beliefs and it has exposed inadequacies in the way the maritime industry operates *vis-à-vis* casualty investigations. As it has always been, the implementation of the IMO Code to promote thorough safety investigations will depend entirely on the willpower, determination and beliefs of the IMO Member States.

It is aspired that by achieving the objective of the IMO Code, the burden on the maritime industry is alleviated. It would be an unfortunate setback if the very same industry were to pose a threat to its implementation.

REFERENCES

Official Documents

- Aircraft Accident and Incident Investigation. Annex 13 to the Convention on International Civil Aviation 1944, International Civil Aviation Organization, 9th ed., (2001).
- C147 Merchant Shipping (Minimum Standards) Convention 1976, ILO, (1976).
- Canadian Transportation Accident and Safety Board Act 1989, c.3, Canada (1998).
- Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents, EU, (1994).
- Council Directive 1999/35/EC of 29 April 1999 on a system of mandatory surveys for the safe operation of regular ro-ro ferry and high-speed passenger craft services, EU, (1999).
- Council of Europe Parliamentary Assembly. Resolution 1169(1998): The oceans; state of the marine environment and new trends in international law of the sea, (1998). Retrieved March 09, 2003 from the World Wide Web: <http://assembly.coe.int/Documents/AdoptedText/ta98/eres1169.htm#1>
- International Convention on Load Lines 1966, International Maritime Organization [IMO], (1966).

- IMO. Participation in Official Inquiries into Maritime Casualties (A ES.IV/Res.173). *Resolutions and other decisions of the fourth Assembly, 26-28 November 1968: Resolutions 146-201* (pp. 97-98). London: Author, (1969).
- IMO. “Work of the International Maritime Organization in relation to the investigation of maritime casualties” in *Transactions (C) IMarE Seminar: Vol. 95 (C122). Marine Inquiries and Casualty Investigations* (pp 39-40). London: Institute of Marine Engineers, (1982).
- IMO. Co-operation in Maritime Casualty Investigations (A16/Res.637). *Resolutions and other decisions of the 16th Assembly, 09-20 October 1989: Resolutions 636-679* (pp. 6-9). London: Author, (1990).
- IMO. *Report to the Maritime Safety Committee and the Marine Environment Protection Committee*. (FSI 1/21). London: Author, (1993).
- IMO. *Report of the Maritime Safety Committee on its Sixty-Third Session*. (MSC 63/23). London: Author, (1994a).
- IMO. *Casualty Statistics and Investigations. Common principles in official marine accident investigations: submitted by Australia* (FSI 3/5/4). London: Author, (1994b).
- IMO. *Casualty Statistics and Investigations. Improved International Standards. Draft code of international standards and recommended practices in marine accident investigation. Report of the Correspondence Group: submitted by Australia* (FSI 4/5/1). London: Author, (1995).
- International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995 and 1997, IMO, (1996).

- IMO. *Flag State Implementation. Draft code for the investigation of marine casualties and incidents: submitted by Australia on behalf of the Working Group on Casualty Statistics and Investigations* (MSC 68/7/1). London: Author, (1997a).
- IMO. Code for the Investigation of Marine Casualties and Incidents (A20/Res.849). *Resolutions and other decisions of the 20th Assembly, 17-27 November 1997: Resolutions 839-873* (pp. 48-62). London: Author, (1997c).
- IMO. Amendments to the Code for the Investigation of Marine Casualties and Incidents (A21/Res. 884). London: Author, (1999).
- IMO. *Report of the Marine Environment Protection Committee on its Forty-Fifth Session.* (MEPC 45/20). London: Author, (2000b).
- IMO. *Reports on Marine Casualties and Incidents. Revised harmonized reporting procedures – Reports required under SOLAS regulation I/21 and MARPOL 73/78 articles 8 and 12* (MSC/Circ.953 / MEPC/Circ.372). London: Author, (2000c).
- IMO. *Report to the Maritime Safety Committee and the Marine Environment Protection Committee.* (FSI 9/19). London: Author, (2001a).
- IMO. *Work Programme and Budget for the Twenty-Second Financial Period 2002-2003. Proposals by the Secretary-General.* (C86/10). London: Author, (2001b).
- International Convention for the Safety of Life at Sea [SOLAS] 1974, IMO, (2001c).

- IMO. *Casualty Statistics and Investigations. Guidelines to assist flag States and other States with a substantial interest in the investigation of marine casualties to establish and maintain an effective framework for consultation and co-operation: submitted by Denmark, France, Germany, the Republic of Korea and Sweden* (FSI 10/9/1). London: Author, (2002a).
- IMO. *Guidelines for Formal Safety Assessment (FSA) for Use in the Rule-Making Process* (MSC/Circ.1023 / MEPC/Circ.392). London: Author, (2002b).
- IMO. *Interim Guidelines to Assist flag States and Other Substantially Interested States to Establish and Maintain an Effective Framework for Consultation and Co-Operation in Marine casualty Investigations* (MSC/Circ.1058 / MEPC/Circ.400). London: Author, (2002c).
- International Convention for the Prevention of Pollution from Ships, 1973, as amended by the Protocol of 1978 relating thereto, IMO, (2002e).
- IMO. *Responsibilities of Governments and Measures to Encourage Flag State Compliance. Draft revised resolution A.847(20): submitted by Canada, Denmark and New Zealand* (FSI 11/7). London: Author, (2003a).
- Memorandum of Understanding between the National Transportation Safety Board and the United States Coast Guard Regarding Marine Accident Investigation 2002, USCG, (2002).
- Order on the Investigation of Accidents at Sea 2003, No. 31, Denmark (2003).
- Regulation (EC) No 1406/2002 of the European Parliament and the Council of 27 June 2002 establishing a European Maritime Safety Agency, EC, (2002).

- United Nations Convention on the Law of the Sea 1982, UN, (1982).

Text Books

- R. R. Churchill & A. V. Lowe, *The Law of the Sea*, (Manchester: Manchester University Press, 1999).
- R. Dixon, *The Management Task*, (Oxford/Woburn: Butterworth-Heinemann, 1997).
- E. Hollnagel, *Cognitive Reliability and Error Analysis Method. CREAM*, (Oxford: Elsevier Science Ltd., 1998).
- G. C. Kasoulides, *Port State Control: Evolution of the Port State Regime*, (Dordrecht/Boston/London: Martinus Nijhoff Publishers, 1998).
- B. Kirwan, *A Guide to Practical Human Reliability Assessment*, (London: Taylor & Francis, 1994).
- Lord A. D. McNair, *The Law of Treaties*, (Oxford: Oxford University Press, 1961).
- W. S. G. Morrison, *Competent Crews = Safer Ships. An Aid to Understanding STCW 95*, (Malmö: World Maritime University, 1997).
- P. K. Mukherjee, *Maritime Legislation*, (Malmö: WMU Publications, 2002).
- G. Peters, *The Plimsoll Line*, (London: Barry Rose [Publishers] Ltd, 1975).
- J. Reason, *Human Error*, (Cambridge: Press Syndicate of the University of Cambridge, 1990).

- J. Reason, *Managing the Risks of Organizational Accidents*, (Aldershot: Ashgate Publishing Limited, 1997).
- J. G. Starke, *Introduction to International Law*, (London: Butterworths, 1989).
- B. Toft & S. Reynolds, *Learning from Disasters. A Management Approach*, (Leicester: Perpetuity Press Limited, 1997).

Papers

- B. J. Baars, "Eliciting Predictable Speech Errors in the Laboratory". In V. Fromkin (Ed.), *Errors in Linguistic Performance: Slips of the Tongue, Ear, Pen, and Hand*, (New York: Academic Press, 1980) at pp. 307-318.
- L. Bainbridge, "The Ironies of Automation". In J. Rasmussen, K. Duncan & J. Leplat (Eds.), *New Technology and Human Error*, (London: Wiley, 1987) at p. 272.
- G. Braithwaite, "'The Simpler it Seems, the More You Have Forgotten...'. New Challenges in Investigation and Safety Management". In C. W. Johnson (Ed.), *Workshop on the Investigation and Reporting of Incidents and Accidents*, (Glasgow: University of Glasgow, 2000) at pp. 215-217.
- A. D'Amato, "Soft Law". In A. D'Amato & K. Engel (Eds.), *International Environmental Law Anthology*, (Ohio: Anderson Publishing Company, 2001) at pp. 55-59.
- C. J. Durand, "Aircraft Accident Investigation: The Need for a Stronger International Regime", Canada: UMI ProQuest Digital Dissertations, (1993).

- H. Hillgenberg, “A Fresh Look at Soft Law”. *European Journal of International Law*, 10 (3), 1999, at pp. 499-515.
- K. Hindell, “Strengthening the Ship Regulating Regime”. *Maritime Policy and Management: An International Journal of Shipping and Port Research*, 23 (4), 1996, at pp. 371-380.
- E. Hughes & P. White, “Formal Safety Assessment – Targeting Needs”. In *Learning From Marine Incidents II, London, 13-14 March 2002*, (London: The Royal Institution of Naval Architects, 2002) at p. 26.
- C. Johnson, “Improving Accident Report”, (1998). Retrieved 28 December, 1999 from the World Wide Web: <http://www.dcs.gla.ac.uk/~johnson.html>
- C. Johnson, “Using CAE Diagrams to Visualise the Arguments in Accident Reports”, (2001). Retrieved 31 December, 2002 from the World Wide Web: http://www.dcs.gla.ac.uk/~johnson/papers/dsvis_2001/johnson/
- C. Johnson, “Improving the Presentation of Accident Reports over the World Wide Web”, (2002). Retrieved 23 March, 2003 from the World Wide Web: <http://www.dcs.gla.ac.uk/~johnson/papers/>
- T. Koester, “Human Error in the Maritime Work Domain”, (2002). Retrieved December 23, 2002 from the World Wide Web: http://www.dmi-online.dk/koester_pdf
- J. Lang, “The Marine Accident Investigator’s Perspective”, (2000a). Paper presented at the International Union of Marine Insurance Conference. Ocean hull workshop on the changing scene of passenger travel by sea 2000. The Changing Scene of Passenger Travel by Sea – New Risks, New Challenges, New Solutions, London, UK. Retrieved 27 April, 2003 from the World Wide Web: <http://www.cbmu.com/IUMI2000/JohnLang.doc>

- A. MacIntosh-Murray & C. Wei Choo, “Information Failures and Catastrophes: What Can We learn by Linking Information Studies and Disaster Research?”, (2002). Paper presented at the 65th Annual Meeting of the American Society for Information Science & Technology, Philadelphia, USA.
- R. Mari, “Harmonization of Safety Criteria: Approach Proposal for New Accident Reports”. In *Marine Technology and Transportation*, (Barcelona: University of Catalonia, 1997) at p. 474.
- G. Nagy, “Human Reliability Analysis: From Action to Context”, (2002). Retrieved February 12, 2003 from the World Wide Web:
http://www.carleton.ca/hotlab/hottopics/Articles/error_methodologies
- J. H. Peachey, “A New Safety Culture – For the Regulator Too”. In *Proceedings Part II of New Safety Culture*, (London: Institute of Marine Engineers, 1999) at pp. 9-17.
- H. N. Psaraftis, “Maritime Safety: To Be or Not to Be Proactive”. *WMU Journal of Maritime Affairs*, 1 (1), 2002, at pp. 3-16.
- D. V. Robin, “The Impact of Competing Interests and Pressures on Maritime Administrations in Aspiring Maritime States: A Critical Analysis”, Unpublished master’s thesis, (World Maritime University, Malmö, Sweden, 2002).
- T. Russo, “Criminal Liability in Maritime Accidents”, (1994). Retrieved October 29, 2002 from the World Wide Web:
<http://www.freehill.com/news.cfm>

- J.-U. Schröder, “The Human Element (HE) in Marine Casualties – Are We Prepared to Address the Real Issues?” In: *Risk and Safety Management in Industry, Logistics, Transport and Military Service: New Solutions for the 21st Century*, [Tallinn: Technical University 2003 (in press)].
- J.-U. Schröder & J. Hahne, “Maritime Casualty Analysis – An Adequate Basis for Simulation during Maritime Education and Training?”, [Malmö: World Maritime University (in press), 2003].
- J.-U. Schröder & G. Zade, “The Impact of Marine Casualty Investigation on Maritime Administration and Maritime Education Training”. In *3rd International Congress on Maritime Technological Innovations and Research, Bilbao, 6-8 November 2002*, (Bilbao: University of the Basque Country, 2002) at pp. 287-293.
- M. J. Sobey, “International Cooperation in Maritime Casualty Investigations: An Analysis of IMO Resolution A.637(16)”. *Maritime Policy and Management*, 20, 1993, at pp. 3-29.
- J. L. Veiga, “Safety Culture in Shipping”. *WMU Journal of Maritime Affairs*, 1 (1), 2002, at pp. 17-31.
- P. v. Vollenhoven, “Independent Accident Investigation: Every Citizen's Right, Society's Duty”, (2002). Retrieved March 01, 2003 from the World Wide Web: http://www.itsasafety.org/data/2002/10-22_IAI_Eng.doc
- N. Wayne, “Marine Accident Investigation: time for change?”, Unpublished master's thesis, (World Maritime University, Malmö, Sweden, 1998).
- D. Wright, “Formal Safety Assessment: Its Role in Marine Safety”. In *Learning From Marine Incidents, London, 20-21 October 1999*, (London: The Royal Institution of Naval Architects, 1999) at p. 2.

Press

- “A Case for Education”, *Lloyd’s List* (2003, May 05) at p. 5.
- M. Grey, “Bahamas Government Protests to Spain on Treatment of Mangouras”, *Lloyd’s List* (2002b, December 05) at p. 1.
- R. Hailey, “Sterckx Calls for Steeper Owner Pollution Liability”, *Lloyd’s List* (2003, June 10) at p. 1.
- R. Hailey & J. Frank, “European MP’s Vote for Faster Phase-out”, *Lloyd’s List* (2003, June 06) at p. 1.
- D. Osler, “O’Neil Urges IMO Flag Power”, *Lloyd’s List* (2003, May 15) at p. 1.
- “Pressing the Wrong Buttons”, *Lloyd’s List* (2003, February 11) at p. 7.
- “Prestige Sparks Déjà Vu”, *Lloyd’s List* (2002, November 19) at p. 7.
- B. Reyes, “Not Again”, *Lloyd’s List* (2002, November 20) at p. 1.
- B. Reyes, “When Oil and Water Count More Than the Lost Lives of Seafarers”, *Lloyd’s List* (2003a, February 27) at p. 5.
- B. Reyes, “EU Report to Back Industry Line on Action Over *Prestige*”, *Lloyd’s List* (2003b, May 23) at p. 1.

Legal Cases

- *Tracey Ann Renehan v. Commonwealth of Australia*. (Australian) Supreme Court of the Northern Territory (Coulehan) – June 19, 2001. Retrieved January 26, 2003 from the World Wide Web:
<http://www.middletons.com.au>

Casualty Investigation Reports

- Australian Transport Safety Bureau [ATSB], “Independent investigation into the grounding of the Malaysian flag container ship Bunga Teratai Satu on Sudbury Reef, Great Barrier Reef, 02 November 2000 (Report 162)”, (Canberra: Author, 2001).
- Bureau Enquêtes Accidents Mer [BEA-MER], “Naufrage du Pétrolier Erika: Contribution Provisoire au Rapport d’enquête Technique”, (Paris: Author, 2000).
- Malta Maritime Authority [MMA], “Report of the Investigation into the Loss of the Motor Tanker ERIKA on Sunday 12 December 1999”, (Valletta: Author, 2000).

Articles

- T. Braden, “MarCas. Debate and Energy Drive First Casualties Conference” (2001), *Professional Mariner*, (54), at pp. 68-69.
- J. D’Andrea & A. Roy, “Marine Casualty Investigations” (2001), *Transport & Trade News*. Retrieved January 26, 2003 from the World Wide Web: http://www.middletons.com.au/_site/main.html
- M. Grey, “Digesting Lessons of Safety”, (2002a), *BIMCO Bulletin*, 91 (1), at pp. 24-25.
- IMO, “Optimum Maritime Safety Demands a Focus on People”, *IMO News* (2/3), 1997b, at pp. i-vi.
- IMO “Basic Facts About IMO”. *Focus on IMO*, 2000a March, at pp. 1-7.

- IMO. Casualty Investigations – New Guidelines Approved. *IMO News*, (1), 2003b, at pp. 13-17.
- “IMO Remains Toothless and on the Fringe”, *Tradewinds*, (2002, April 26). Retrieved January 07, 2003 from the World Wide Web: <http://archive.tradewinds.no/archive/view.asp>
- I. Middleton, “Another Fine Mess”, *Seatrade*, (2003, January/February) at pp. 15-17.
- C. J. Parker, “Accident Investigation”, *Seaways*, (1998, August) at pp. 11-14.

Speeches

- F. J. Iarossi, *Speech given at the 17th Annual Chua Chor Teck Memorial Lecture, Singapore, January 2003*, (2003). Retrieved 02 March, 2003 from the World Wide Web: <http://www.eagle.org/news/speeches/fji.html>
- J. Lang, *Speech given at the Mare Forum 2000: Quality Management versus Risk Finance in Shipping, Athens, 25-26 September 2000*, (2000b). Retrieved 01 March 2003, from the World Wide Web: <http://www.mareforum.com/LANG%20John,%20UK%20MAIB.htm>
- J. Loy, *Speech given at the Committee of Commerce, Science and Transportation, United States Senate, Washington, 15 July 1999*, (1999). Retrieved 29 December, 2002 from the World Wide Web: <http://www.senate.gov/~commerce/hearings/0715loy.pdf>
- W. O’Neil, *Speech given at the Lloyd’s List 1st International Shipping Convention, London, 18 October 2000*, (2000). Retrieved 11 March, 2003 from the World Wide Web: <http://www.imo.org/home.asp>

- D. Rabe, *Speech given at the 10th MAIIF, Busan, Republic of Korea, 15-19 October 2001*, (2001). Retrieved 08 December, 2002 from the World Wide Web: <http://www.maiif.net/meetings/maiif10.htm>
- P. v. Vollenhoven, *Speech given at the European Transport Safety Council, Brussels, 23 January 2001*, (2001). Retrieved from the World Wide Web: http://www.nts.gov/ITSA/independent_investigations.htm

Personal Communications

- G. Braithwaite (2003). E-mail to the author. University of New South Wales, Australia.
- T. Burfoot (2001). E-mail to the author. TAIC, New Zealand.
- D. Dietrich (2003). E-mail to the author. Federal Bureau of Maritime Casualty Investigation, Germany.
- D. Drummond (2002). E-mail to the author. Bahamas Maritime Authority, UK.
- K. Filor (2001). Discussion with the author. ATSB, Australia.
- K. Filor (2002). E-mail to the author. ATSB, Australia.
- K. Filor (2003). E-mail to the author. ATSB, Australia.
- S. Harwood (2003). Discussion with the author. MAIB, UK.
- J. Lang (2001). E-mail to the author. MAIB, UK.
- J. Liljedahl (2003). Discussion with the author. World Maritime University, Sweden.

- P. K. Mukherjee (2002). Discussion with the author. World Maritime University, Sweden.
- P. K. Mukherjee (2003). Discussion with the author. World Maritime University, Sweden.
- F. Perkins (2003). E-mail to the author. TSB, Canada.
- D. Rabe (2003). E-mail to the author. USCG, US.
- D. Sheetz (2003). E-mail to the author. Vanuatu Maritime Services Limited, US.
- F. L. Wiswall (2003). E-mail to the author. CMI, US.
- J. Zerafa (2003). Discussion with the author. Malta Maritime Authority, Malta.
- H. J. A. Zieverink (2003). E-mail to the author. Dutch Transport Safety Board, The Netherlands.

Additional Sources

- “Cambridge International Dictionary of English”. (Cambridge: Cambridge University, 1995).
- CASMET WP 2, “Framework for a Common Accident Investigation Procedure”, (Oslo: Det Norske Veritas, 1998).
- P. Caridis, “State-of-the-Art in Marine Casualty. Reporting, Data Processing and Analysis in EU Member States, the IMO and the US”, (Athens: National Technical University, 1999a).

- P. Caridis, “Casualty Analysis Methodology for Maritime Operations [CASMET]”, (Athens: National Technical University, 1999b).
- B. M. Deschênes, “Study on Marine Casualty Investigation in Canada (for the Minister of Transport)”, (Toronto: Ministry of Transport, 1984).
- J. Lang, “Chief Inspector’s Foreword”, *Marine Accident Investigation Branch [MAIB] Annual Report 2001*, (2001) at pp. 2-3.
- IMO. Sub-Committee on Flag State Implementation (FSI), 10th Session: 8-12 April 2002, (2002d). Retrieved 11 February, 2003 from the World Wide Web: <http://www.imo.org>
- Marine Accident Investigation Branch [MAIB]. (2002). *MAIB Annual Report 2001*. (Southampton: Author, 2002).
- Marine Accident Investigators’ International Forum [MAIIF], “Investigators Manual”, (2002a). Retrieved 24 December, 2002 from the World Wide Web: <http://www.maiif.net/manual.htm>
- MAIIF, “Survey on the Implementation of the IMO Code for the Investigation of Marine Casualties and Incidents”, (2002b). Retrieved 12 January, 2003 from the World Wide Web: <http://maiif.tsb.gc.ca>
- W. O’Neil, “Formal Safety Assessment (FSA)”, Unpublished lecture handout, (World Maritime University, Malmö, Sweden, 1999).
- E. H. Tangen, S. Fagerstrom & A. Ulstrup, “Certification Manual”, Unpublished lecture handout, (World Maritime University, Malmö, Sweden, 1998).

- Thematic Network for Safety Assessment of Waterborne Transport [THEMES], “THEMES Deliverable D1.1”, Brussels: BOMEL Limited, (2001) at p. 5.6.
- United Kingdom Parliament, “Roll-on/Roll-off Passenger Ferries”, (1998). Retrieved March 03 2003 from the World Wide Web:
<http://www.parliament.the-stationery-office.co.uk/pa/cm199798/cmselect/>
- F. L. Wiswall, “Legal Aspects of Maritime Casualty Investigation”, Unpublished lecture handout, (World Maritime University, Malmö, Sweden, 2003a).
- F. L. Wiswall, “Relevant Provisions of Conventional International Law”, Unpublished lecture handout, (World Maritime University, Malmö, Sweden, 2003b).

APPENDIX 1 THE ADOPTION OF THE IMO CODE AND THE RIGHTS AND OBLIGATIONS UNDER PUBLIC INTERNATIONAL LAW

i. IMO Resolutions Prior to A.849(20)

The adoption of IMO Resolution A.849(20) meant the revocation of three Assembly Resolutions, all related to casualty investigation²²⁸.

The first step towards consultation between States materialised in 1968, in the wake of the *Torrey Canyon* casualty. A draft resolution, approved by MSC, was adopted by IMCO Assembly as A.173(ES.IV) in November 1968²²⁹. Following further very serious casualties, IMCO Assembly adopted one more Resolution, which was related to casualty investigation and international co-operation - A.440(XI), following the *Amoco Cadiz* grounding and subsequent severe pollution. Later, IMO Assembly adopted Resolution A.637(16), in the aftermath of the *Exxon Valdez* grounding²³⁰.

Further to being somewhat limited in scope, these Assembly Resolutions had several shortcomings. Deschênes²³¹ refers to Resolution A.173(ES.IV) and whilst acknowledging that it recommended the participation of a coastal State in casualty investigations, especially if oil pollution occurs, he specified that the Resolution applied only when a public inquiry was held, but did not apply in the following situations -

- Preliminary or formal inquiries;
- Collisions; and

²²⁸ The Inter-Governmental Maritime Consultative Organization (IMCO) Assembly had also adopted two more Resolutions, which, however, have not been revoked by Resolution A.849(20), as amended. The Assembly adopted Resolution A.322 at its ninth Session: “The Supply of Information and Findings Concerning Serious Casualties”. Resolution A.442 on “The Provision of Personnel and Material Resources for the Investigation of Casualties and the Contravention of Conventions” was adopted by the Assembly’s eleventh Session.

²²⁹ See IMO, 1982. Until May 22, 1982, the Organization was known as IMCO.

²³⁰ F. L. Wiswall, *Legal Aspects of Maritime Casualty Investigation*, (2003a).

²³¹ B. M. Deschênes, *supra* note 5 at pp. 140-141. See also A.173(ES.IV), *Participation in Official Inquiries into Maritime Casualties*, (IMO, 1969).

- If a national of the coastal State was commercially interested in either the ship and/or its cargo.

Analysing IMO Resolution A.637(16), one writer described it as an “international determination to achieve cooperation between different states in investigative matters”²³². Nevertheless, he emphasised that the Resolution left “many questions unanswered”. For instance -

- Like all other resolutions, rather than imposing obligations, Resolution A.637(16) only made recommendations²³³;
- Only the State conducting the investigation had the right to decide if or when to publicise a casualty investigation report (especially if the findings would have had adverse conditions on the government of that State);
- It did not determine which were the substantially interested States and left such important decision at the discretion of the State carrying out the investigation; and
- The Resolution emphasised the role of the flag State, without giving equal importance to the role of substantially interested States.

In a paper submitted to the FSI Sub-Committee, Australia highlighted three serious weaknesses of the same Assembly Resolution²³⁴. The identified weaknesses were -

1. The disregarding of the importance of consistency in investigations;
2. The lack of identification of the purpose and principles of a safety investigation especially when two or more states were involved; and

²³² M. J. Sobey, *supra* note 81 at pp. 3-29. See also A.637(16), *Co-operation in Maritime Casualty Investigations*, (IMO, 1990). IMO Resolution A.637(16) was adopted on October 19, 1989.

²³³ This notion of soft law and its implications on the implementation of the IMO Code is addressed in chapter 2 of this dissertation.

²³⁴ FSI 3/5/4, *Casualty Statistics and Investigations. Common Principles in Official Marine Accident Investigations*, submitted by Australia, (IMO, 1994b).

3. Serious inconsistencies in the same Resolution (such as the terms “official inquiry”, “official investigation” or “casualty investigation”), all of which would have different legal interpretations under different legal systems.

It was more than clear that Resolution A.637(17) had not succeeded to promote international cooperation; at least not to the extent which one would have preferred and it was only a matter of time until another Resolution would have to be drafted and adopted.

ii. The FSI Sub-Committee and the Adoption of the IMO Code

Casualty investigation remained high on the priority list of the IMO agenda. The MSC, at its sixty-first Session, agreed to establish the FSI Sub-Committee, which with the concurrence of MEPC at its thirty-third Session, had to report to both Committees.

Since its first Session, the FSI Sub-Committee considered, *inter alia*, establishing a permanent Casualty Analyses Correspondence Group²³⁵. To date, this Group still carries out invaluable work in analysing casualty investigation reports submitted to IMO and provides technical co-operation needs by identifying trends and the need to amend regulations²³⁶.

Retrieved IMO papers show that the first strong comments, which led to the adoption of the IMO Code in 1997, were made at the MSC sixty-third Session, when the Committee requested IMO Member States to make submissions in respect of

²³⁵ FSI 1/21, *Report to the Maritime Safety Committee and the Marine Environment Protection Committee*, (IMO, 1993).

²³⁶ FSI 9/19, *Report to the Maritime Safety Committee and the Marine Environment Protection Committee*, (IMO, 2001a). With respect to this point, chapter 4 addresses the importance of casualty investigation reports.

improving international procedures and practices in official marine incidents and accident investigations²³⁷.

As a result, Australia submitted document FSI 3/5/4 to the Sub-Committee, acknowledging, *inter alia*, that the “incompatible nature of different legal principles and procedures by sovereign States” may impede a safety investigation²³⁸. In this respect, Australia suggested a code, which would be enforced through the provisions of the SOLAS 1974 Convention. The first ever draft of the IMO Code was annexed to the document for the debates of the Sub-Committee.

Following an interesting discussion at the third FSI Session, the Sub-Committee established a Correspondence Group under the chairmanship of Australia, which was instructed to prepare the necessary drafting. The Correspondence Group worked on these terms of reference and at the fourth FSI Session, Australia submitted the report of the Group²³⁹. A draft code and a draft Assembly resolution were annexed to the document for consideration and approval before being sent to MSC and MEPC.

Following further debates at the FSI fourth Session and more re-drafting between the FSI fourth and fifth Sessions, the FSI Sub-Committee agreed at its fifth Session to recommend MSC and MEPC to endorse the draft Assembly resolution and the code so that the resolution will be adopted by the IMO Assembly²⁴⁰.

Subsequently, on November 27, 1997, the twentieth IMO Assembly adopted the Code as an annex to IMO Resolution A.849²⁴¹.

²³⁷ MSC 63/23, *Report of the Maritime Safety Committee on its Sixty-Third Session*, (IMO, 1994a).

²³⁸ IMO, *supra* note 234.

²³⁹ FSI 4/5/1, *Casualty Statistics and Investigations. Improved International Standards. Draft Code of International Standards and Recommended Practices in Marine Accident Investigation. Report of the Correspondence Group*, submitted by Australia, (IMO, 1995).

²⁴⁰ MSC 68/7/1, *Flag State Implementation. Draft Code for the Investigation of Marine Casualties and Incidents: submitted by Australia on behalf of the Working Group on Casualty Statistics and Investigations*, (IMO, 1997a).

²⁴¹ Since its adoption, IMO Resolution A.849(20) was amended once in 1999 by IMO Resolution A.884(21). The IMO Code became Annex 1 to the Resolution and Annex 2 was incorporated.

iii. The Aims and Objective of the IMO Code

Section 1.2 of the IMO Code determines the aims, which are -

- A common approach towards safety casualty investigation; and
- The promotion of co-operation between States.

On the other hand, the objective of the IMO Code is established in Section 2, which is the prevention of similar casualties in the future.

These three points are now synonymous with the IMO Code and although scholars believe that it is a single step, they concur, however, that it is in the right direction²⁴². The role of the investigator is precisely defined in these words and his objective has to reflect the objective of the IMO Code. Lang opines that "...it falls to the marine accident investigator to identify the component parts of {this} causal chain and to explain what happened with a view to prevent it happening again..."²⁴³. By adopting the IMO Code, the United Nations (UN) Specialised Agency had expressed its concern that casualty investigation deserved top priority on the Member States' agenda²⁴⁴. This is so because it was acknowledged that casualty investigations had four very important functions *i.e.* "scientific, legal, educational and practical" functions²⁴⁵.

²⁴² J.-U. Schröder & G. Zade, *supra* note 190 at p. 288.

²⁴³ J. Lang, *The Marine Accident Investigator's Perspective*, (2000a).

²⁴⁴ J.-U. Schröder & G. Zade, *ibid.* at p. 287.

²⁴⁵ *Ibid.*

iv. The IMO Code and International Convention Law

Whilst the IMO Code is not mandatory, however, rather than being read as a freestanding document, it has to be read in conjunction with international Conventions, which are in force²⁴⁶. The remaining sections of this Appendix indicate the international maritime conventions, which prescribe the obligations of flag States to investigate casualties onboard ships entitled to fly their flags. These conventions also determine the right of port and coastal States to investigate casualties onboard ships sailing in waters where these States either have sovereignty or else can exercise jurisdictional powers.

v. Casualty Investigation: The Obligations of Flag States and the Rights of Port and Coastal States

The *implementation* of international maritime conventions is achieved by -

- *Compliance*; the primary responsibility of which rests with the shipowner and his servants; and
- *Enforcement*, which falls within the responsibility of the flag State.

Enforcement has two components - preventive and remedial. Undeniably, casualty investigation falls within the remedial component²⁴⁷.

vi. Investigations under the United Nations Convention on the Law of the Seas (UNCLOS)

The duties of a flag State are primarily prescribed in UNCLOS, Article 94, which lays down the extent of flag State jurisdiction over ships entitled to fly its flag. Under the prescribed conditions, Paragraph 7 imposes an obligation on flag States to investigate casualties and incidents of navigation on the high seas. Of striking

²⁴⁶ F. L. Wiswall, *supra* note 230.

²⁴⁷ Discussion with P. K. Mukherjee October 03, 2002. Chapter 4 of this dissertation analyses how the remedial component does not necessarily mean that there is no room for a proactive approach.

importance is the accentuation on co-operation between the flag State and other interested State/s in the conduct of the “inquiry”²⁴⁸.

In addition to Article 94, UNCLOS, Articles 97, 217, 218, 220, 221 and 226, relate to ‘investigations’²⁴⁹. The term ‘investigations’ incorporates -

- Processes initiated to determine the seaworthiness of a ship (irrelevant of whether or not that ship has committed a violation of international rules and standards); and
- Maritime casualties (referred to in UNCLOS, Article 221).

Kasoulides notes that UNCLOS, Article 94 imposes no requirements on the flag State to publish the inquiry reports but is of the opinion that the requirement for co-operation includes the access to evidence/records and the location of the casualty²⁵⁰. UNCLOS imposes no obligations on the coastal and port States to investigate casualties onboard foreign ships. On the other hand, out of self-interest, they have an inherent right to investigate and therefore enjoy concurrent jurisdiction with the flag State, within the parameters prescribed in international law.

vii. The Provisions of International Convention Law

The SOLAS 1974 Convention²⁵¹, Regulation I/21; MARPOL 1973/1978 Convention²⁵², Article 12; the Loadline Convention of 1966²⁵³, Article 23 and the STCW Convention²⁵⁴, Regulation I/5, relate to casualty investigation. The SOLAS 1974 Convention and the Loadline Convention of 1966 require investigations into those cases, which indicate that the regulations prescribed in the respective

²⁴⁸ UN, *United Nations Convention on the Law of the Sea*, (1982).

²⁴⁹ F. L. Wiswall, *Relevant Provisions of Conventional International Law*, (2003b).

²⁵⁰ G. C. Kasoulides, *Port State Control: Evolution of the Port State Regime*, 1998 at p. 64.

²⁵¹ IMO, *supra* note 77.

²⁵² IMO, *MARPOL 1973/78*, (IMO, 2002e).

²⁵³ IMO, *Load Lines 1966*, (IMO, 1966).

²⁵⁴ IMO, *supra* note 145.

convention may be amended. The MARPOL 1973/1978 Convention requires an investigation into those casualties, which have “produced a major deleterious effect upon the marine environment”²⁵⁵. Moreover, the STCW Convention, Regulation I/5 refers to investigations related to incompetency, acts or omissions²⁵⁶.

It is only the SOLAS 1974 Convention, which refers to various Assembly Resolutions related to casualty investigation, including Resolution A.849(20). This footnote reference does not, however, make the IMO Code mandatory in anyway, unless it has been incorporated in the national maritime legislation of a contracting Party to the SOLAS 1974 Convention.

The Conventions emanating from the International Labour Organization (ILO) also refer to investigations and inquiries into occupational accidents, serious casualties²⁵⁷ and near-casualties. Nonetheless, it is appropriate to refer to ILO C147, ‘Merchant Shipping (Minimum Standards) Convention, 1976, since this Convention is unique; incorporating 15 other ILO Conventions in its Appendix. In Article 2, the Convention also calls for official inquiries into serious marine casualties.

²⁵⁵ See IMO, *supra* note 252.

²⁵⁶ In addition to these IMO Conventions, Article 7 of the 1977 Torremolinos International Convention on the Safety of Fishing Vessels also requires, *inter alia*, investigations on fishing vessels to which the Convention applies. However, to date, this Convention has not yet entered into force.

²⁵⁷ The definition of ‘serious casualties’ as given in ILO instruments does not relate to the definition of ‘serious casualties’ in the IMO Code.

viii. The Interaction between the Flag State and the Port and Coastal States

Casualty investigation is conducted by States, either because they have the right to investigate or else because there is a prescribed obligation. The rights or duties afforded by international convention law (which then have to be reflected in the municipal law of a contracting Party) give effect to the interaction of States, even if they do not share a common agenda²⁵⁸.

²⁵⁸ Thus, international conventions express the duty of the flag State to initiate an investigation, be it criminal, administrative, safety related or a simple ‘fact-finding’ task. Within the boundaries determined by international law, the port and coastal States have the inherent right to investigate casualties onboard foreign ships, which therefore leads to an interaction between States. The problem, which may arise from States having different objectives to reach, is analysed in chapter 3 of this dissertation.

APPENDIX 2

FRONT COVER OF THE *INTERIM* FRENCH BEA-
MER REPORT ON THE LOSS OF THE MOTOR
TANKER *ERIKA*



APPENDIX 3 CASE STUDY²⁵⁹

Grounding of the Malaysian flag container ship *Bunga Teratai Satu* on Sudbury Reef, Great Barrier Reef, November 02, 2000.

Background to the Casualty

Following is an extract of the summary presented in the ATSB report²⁶⁰ -

...At 0600, 'full away' was rung and the vessel resumed its passage to Sydney on a course of 120⁰ (true). A programmed way-point, at position 16⁰ 52.8'S, 146⁰ 02.3'E, was reached at 0700. At this way-point, the course was supposed to be altered to 164⁰ (true) to round Fitzroy Island and take the vessel to the west of Sudbury Reef. However, no course alteration was made.

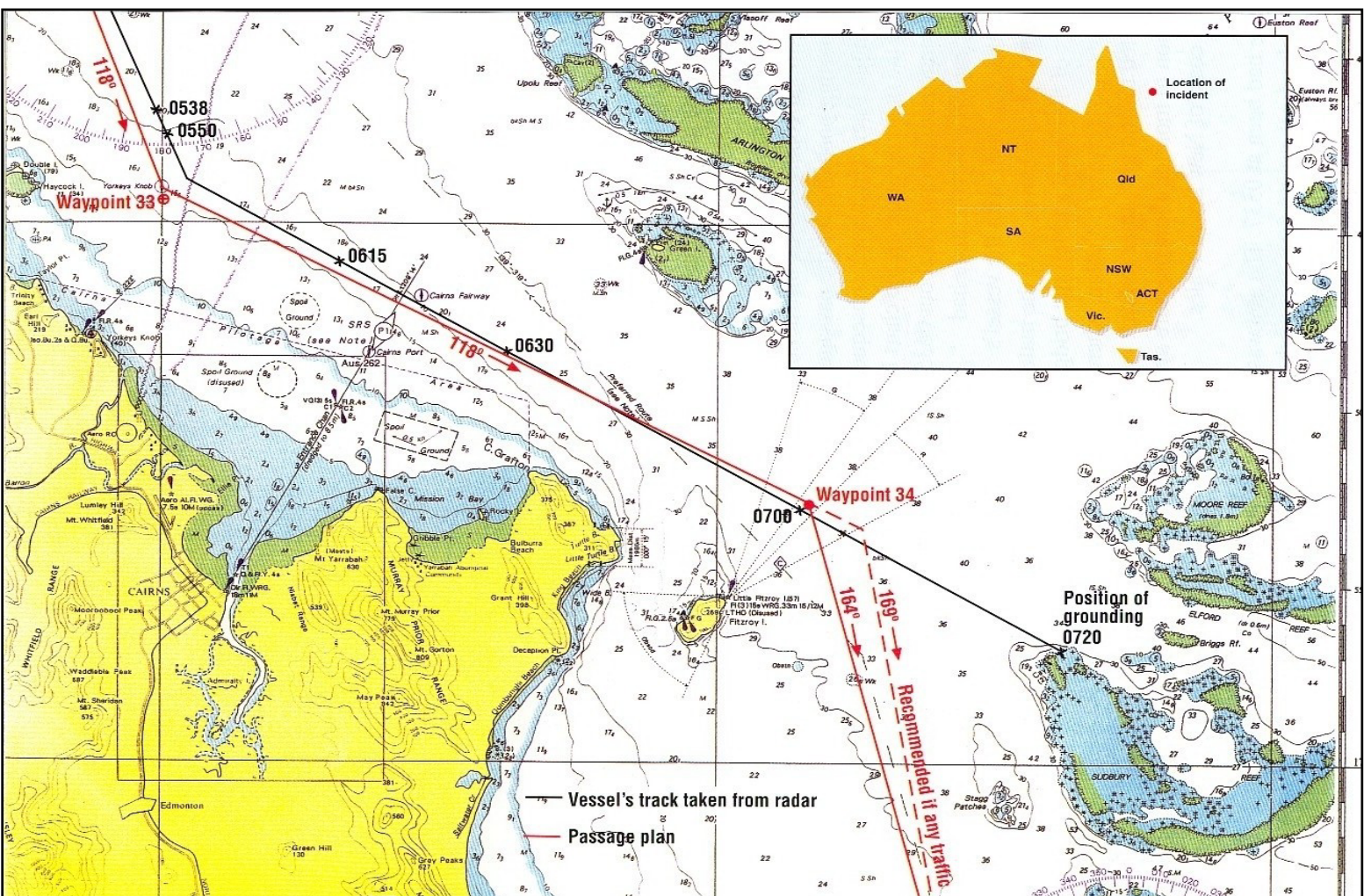
The ship was reporting under REEFREP, administered from Reefcentre, Hay Point. This system requires ships transiting the inner route to report at certain positions within the inner route. To help enforce compliance with pilotage and reporting requirements the normal entry points to the inner route are monitored by radar. In the limited areas covered by radar, the system fulfils a secondary, monitoring role, to improve safe navigation.

At about 0723, the ship struck the north end of Sudbury Reef at a speed of over 20 knots on a heading of 120⁰...

The investigation found that the significant unsafe act that resulted in the grounding was the inattention of the mate on watch aboard *Bunga Teratai Satu*...however, a number of other contributing factors led to a breakdown in the defences and protections that may have prevented the ship from grounding.

²⁵⁹ ATSB Report 162 was selected because it met the criteria identified in chapter 4, section 4.4.1 of this dissertation. It is not the intention of this writer to question the extent and integrity of the investigation. The analysis of this report is carried out within the context of ATSB's Policy. Hence, its selection suggests that indeed, the report perfectly serves the purpose of an educational tool.

²⁶⁰ ATSB, *supra* note 98 at p. 1.



The ATSB report is divided into nine sections, the main ones including the **narrative** from pp. 3 to 12; **comment and analysis** from pp. 15 to 29; **conclusions** on p. 31; **recommendations** on p. 32 and **submissions** from pp. 33 to 35. A simplified events and causal factors chart was reproduced on p. 30.

Constructing the CAE Diagrams

The following procedure, adopted from Johnson²⁶¹ was used to construct the CAE diagrams -

1. All the conclusions of the report were listed down;
2. The analysis from which the conclusions developed were identified;
3. The evidence supporting or contradicting the analysis was noted; and
4. All three main elements of the CAE diagrams were linked together.

Links are drawn in solid lines. Dotted lines represent links, which weaken/contradict the analysis of the investigator. Each text box is numbered and the page numbers are also inserted at the bottom of the text box so that reader can refer directly to the report. Furthermore, there were cases where one set of evidence supported multiple analyses and as can be seen, the identification number will prove indispensable. Dotted text boxes indicate missing evidence detected by CAE diagrams.

Since there are seven identified contributing factors in the report, then there have to be at least seven CAE diagrams, one for each conclusion²⁶². There are two sets of

²⁶¹ C. Johnson, *supra* note 216 at p. 3.

²⁶² In reality, the report identifies nine conclusions on p. 31. The conclusions' section is introduced as, “these conclusions identify different factors contributing to the grounding...”. However, ATSB refer to a possible advice from Reefcentre operator and the radar units, in conclusions 8 and 9 respectively and determine that: “It is unlikely that any advice would have altered the course of events and the radar units were operating within the designed parameters”. See ATSB, *supra* note 98 at p. 31.

Thus, although these two conclusions imply that neither the lack of advice from the operator nor the consistent running of the radars contributed to the casualty, they are still listed under the conclusions' section. In this respect and for the purpose of the case study, the last two conclusions were omitted.

CAE diagrams for conclusion 1, in view of the detailed analyses and several evidence related to this conclusion.

The text in the boxes is reproduced *verbatim*, ensuring that both the meaning and the interpretation conveyed by the investigators to the reader remain unaltered. The numbering sequence is irrelevant and it will vary from one analyst to another. The most important feature is that cross-references are accurate and relate to their respective analysis and evidence²⁶³.

It is imperative to note that CAE diagrams are not intended to replace casualty investigation reports. As it is commented in chapter 4, CAE diagrams should compliment the report, rather than make it redundant.

²⁶³ The term ‘MISC’, which may be encountered in the CAE text boxes is an acronym used by ATSB for the shipping company owning the *Bunga Teratai Satu*. At the time of the casualty, the same company was responsible for the operation of the vessel. This writer refers to ‘MISC’ as the ‘Shipping Company’.

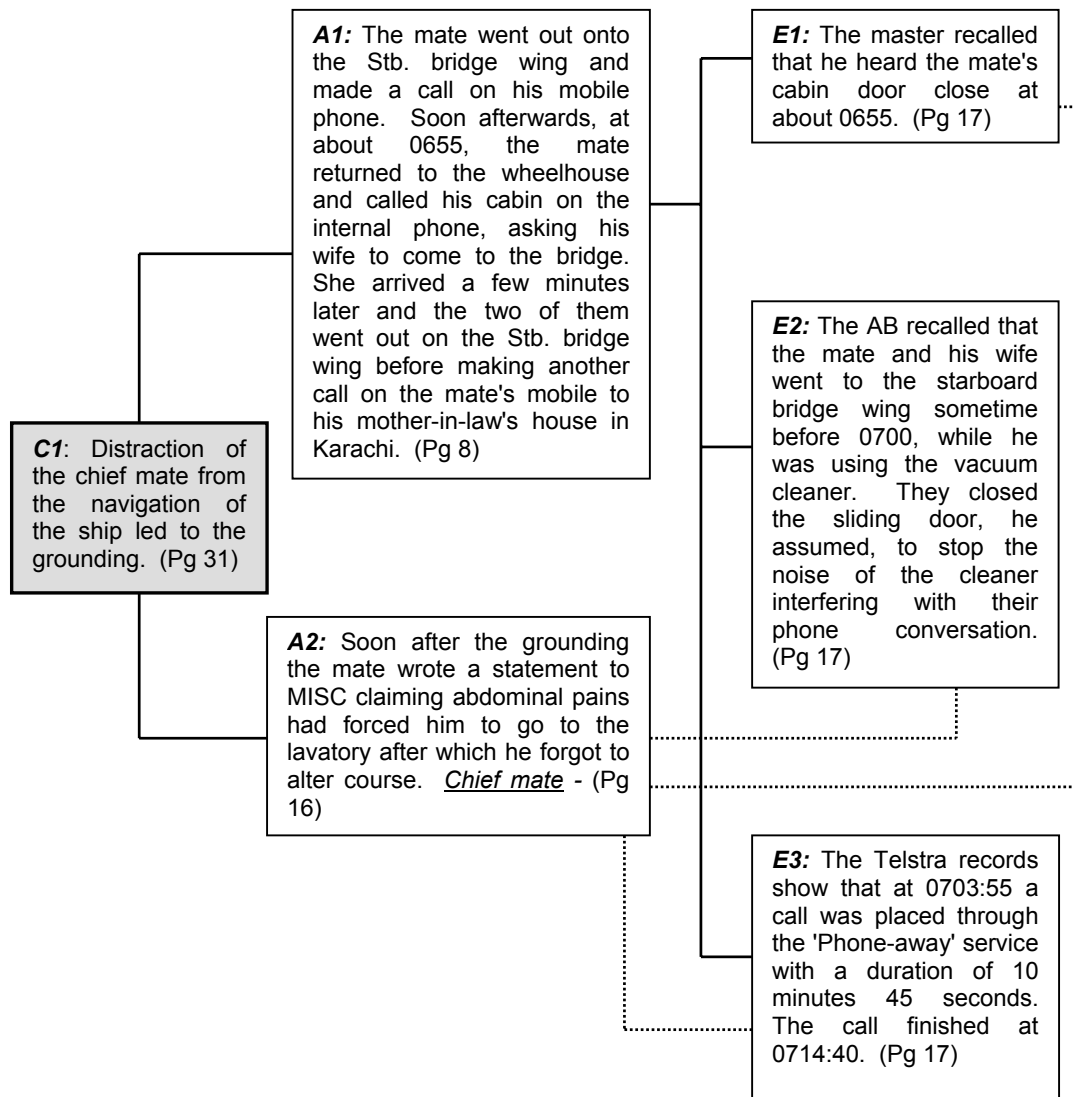


Figure 3ii CAE Diagram for Conclusion 1(a).

Figure 3ii shows that the report presents two possible analysis; *A1* and *A2*, both of which may explain the distraction of the chief mate. The evidence collected during the course of the investigation (*E1*, *E2*, *E3*), however, determined that analysis *A2* is not plausible. Therefore, all the evidence that is weakening analysis *A2* is linked to the latter in dotted lines. It can also be noted that the same evidence, (*E1*, *E2*, *E3*) substantiate analysis *A1*. This supports the investigators' findings that the chief mate was distracted because of telephone calls made to his home country from the ship's starboard bridge wing. Since *A2* is intended to weaken the analysis made by the investigating team, then the source is identified for the benefit of the reader.

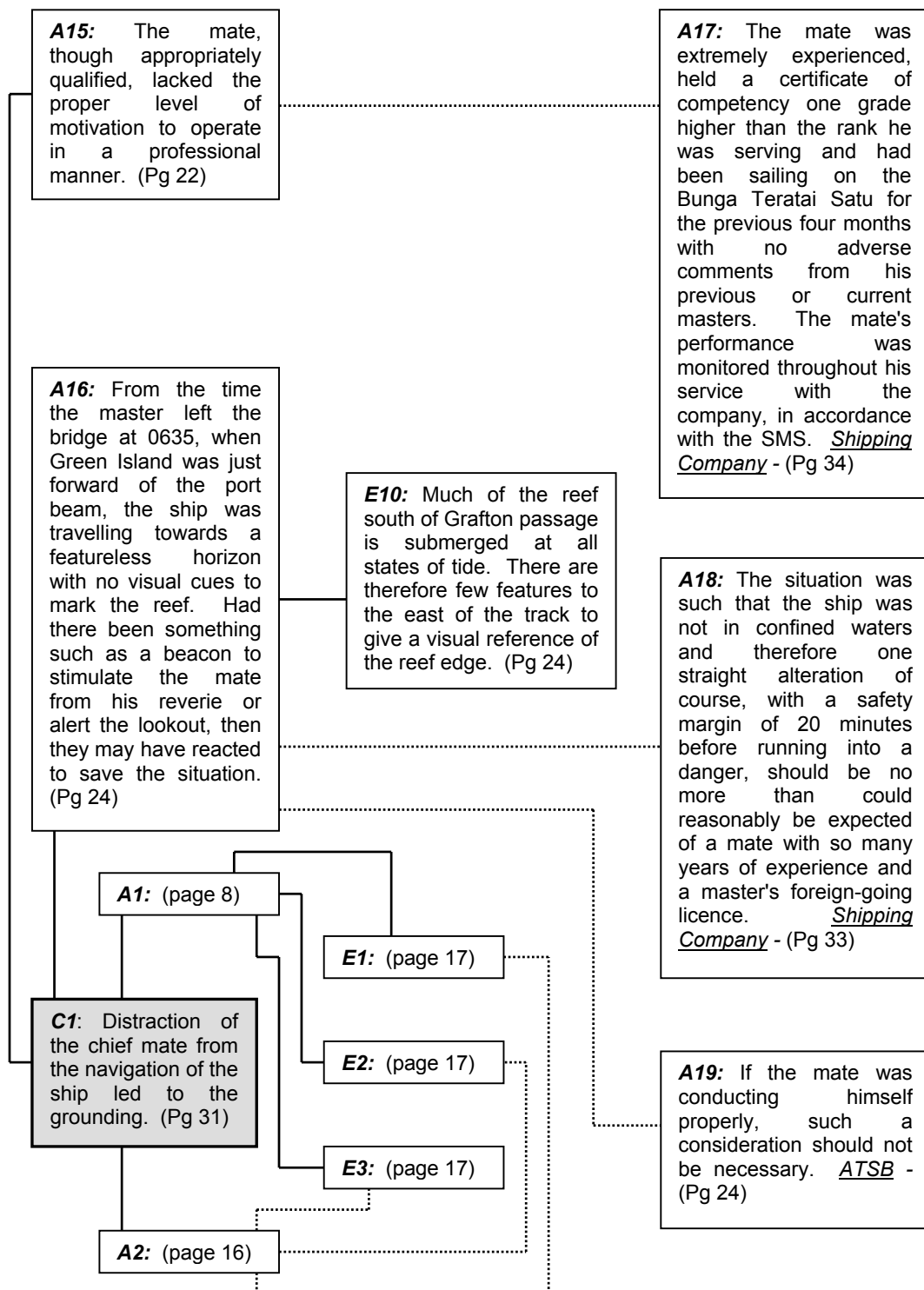


Figure 3iii CAE Diagram for Conclusion 1(b).

Figure 3iii plots an excellent example to illustrate the multiple functions of CAE diagrams.

The distraction of the chief mate was a major contributing factor to the casualty and this explains why the report dedicates so much energy analysing the chief mate's behaviour. The CAE diagram in figure 3ii (which also refers to the first conclusion reached by ATSB) has been linked to this diagram on the lower left hand side of figure 3iii, suggesting the importance of accurate labelling of the text boxes.

According to the report, other analysis (*A15* and *A16*) support *C1*, based on the evidence available to the investigation (*E10*). However, the CAE diagram highlights that *A15* is not supported by any evidence and this shortcoming could suggest that the analysis is subjective. In fact, the shipping company contested the analysis. *A17* and *A18* represent the submissions made by the shipping company in relation to analysis *A15* and *A16*. Since the company questioned the analysis made by ATSB, the links are represented in dotted lines.

The CAE diagram also shows what seems to be a contradiction in the analysis. The analysis points out that there is no visual reference of the reef edge, which could have spared those involved from the ordeal by attracting the attention of the chief mate and/or the look out; referring to the horizon as “featureless”, even because the reef is submerged at all states of the tide²⁶⁴.

However, the investigators then cast doubt on their own analysis by remarking -

{t}here should be no need for marks on the east side of the channel as there are lights and prominent radar targets with which the ship's position can be fixed. Also, as in the case of *Bunga Teratai Satu* most ships now have the capability of fixing their position with utmost accuracy by GPS.

²⁶⁴ ATSB, *supra* note 98 at p. 24

The report adds, "...if the mate was conducting himself properly, such a consideration should not be necessary"²⁶⁵.

This unclear analysis is more outstanding when the CAE diagram is constructed and the latter therefore suggests further studies into the behaviour of the chief mate even because although the point was raised, the 'featureless horizon' was not considered a contributing factor to the grounding. Thus, unless explaining where an analysis is intended to lead, the report might not serve the analyst who is trying to build foresight.

Figures 3ii and 3iii have shown that the dotted lines serve three purposes -

- In figure 3ii, 'weakening' arguments were reported on purpose by ATSB to give more weight to its own analysis;
- Figure 3iii shows other analysis made by the shipping company, which question the analysis reached in the report; and
- The diagram in figure 3iii has highlighted an unclear analysis that leads the reader to no conclusion.

²⁶⁵ ATSB, *ibid*.

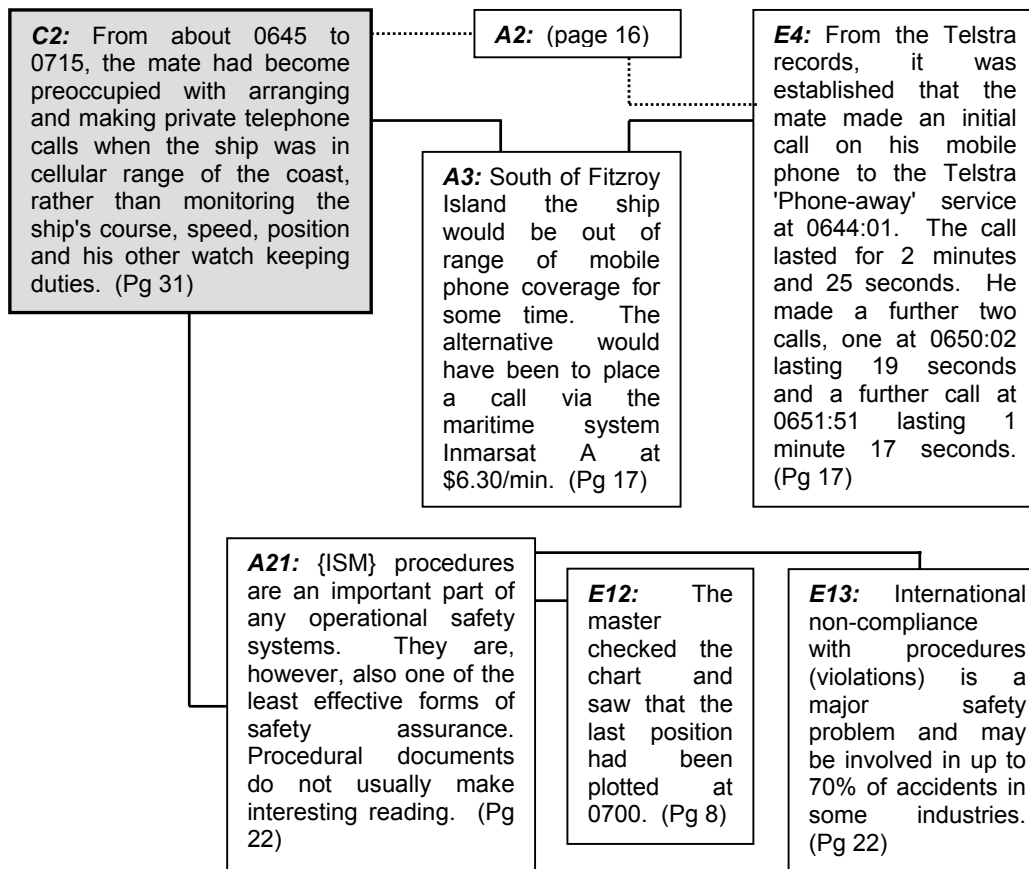


Figure 3iv CAE Diagram for Conclusion 2.

Figure 3iv confirms that the evidence gathered from 'Telstra' supports the conclusion that the chief mate was in fact pre-occupied with the telephone calls rather than his watch keeping duties. In so doing, it validates analysis *A3* and intentionally disqualifies analysis *A2* and gives more credibility to the casualty investigation report. In view of the different time frame, evidence *E4* is not included in the CAE diagram in figure 3ii.

Text box *A21* presents the analysis made in the report, concerning the ISM procedures *vis-à-vis* the officer of the watch. This analysis was made by the investigators to point out that the chief mate did not check the ship's course, position and speed as required by the Company's SMS.

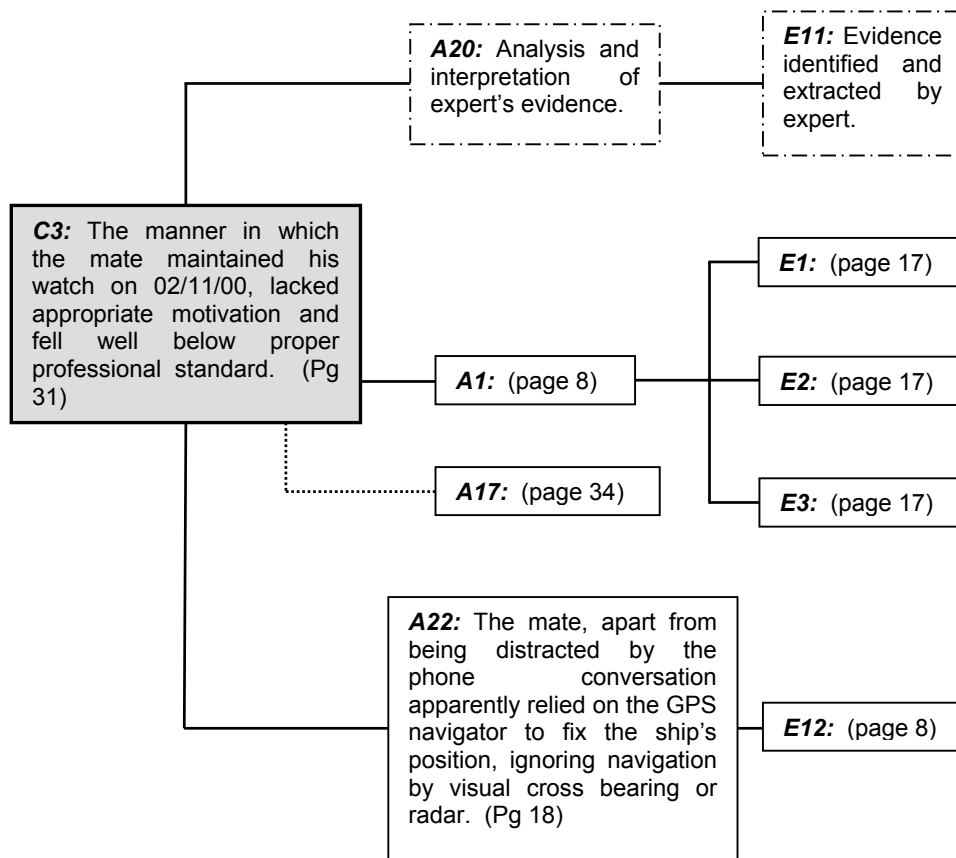


Figure 3v CAE Diagram for Conclusion 3.

The CAE diagram in figure 3v identifies a very serious inconsistency in the casualty investigation report. The alleged lack of motivation and proper professional standard were included as a conclusion (and contributing factor) at the end of the report (C3). However, it may be recalled that this alleged lack of motivation by the chief mate was also considered part of the analysis (A15) on page 22 of the report and was therefore classified as such in figure 3iii. Such an approach is questionable because the CAE diagrams indicate that the report now suggests that conclusion C3 supports another conclusion (C1). Conclusions are not supported by other conclusions but by analysis, which on the other hand are constructed on gathered evidence.

This is one of the difficulties encountered by this writer whilst constructing the CAE diagrams. It is one instant, which shows that there is no complete segregation

between the conclusions and analysis in the report, which in turn may confuse the reader. CAE diagrams have the property of bringing out these shortcomings before the report is published.

The CAE diagrams in this appendix bring together nothing more than the conclusions, analysis and evidence published in the report. For instance, the investigation has reached its conclusion (*C3*) after doing analysis *A1*, based on evidence *E1*, *E2* and *E3*. Experts who studied theories of management (which also encompasses motivation techniques) might debate the analysis and consider it as superficial or even subjective and again, this point is very clear in the CAE diagram in figure 3v. Dixon advanced an important point on motivation; an individual who has failed to perform as expected does not necessarily mean that he suddenly lacks motivation²⁶⁶; not to mention Bainbridge's observation on the ironies of automation²⁶⁷.

The theories of motivation have been developed as far back as Maslow (1954). The evidence required by the investigating team would extend from the company's policy to the working conditions and even beyond. It is only then, that the expert in management theories is able to analyse the evidence, apply these theories and come up with his conclusions.

Unfortunately, although the shipping company disputed this conclusion (*A17*), the report falls short of explaining why its submission was overruled by ATSB. Whilst noting that there is no obligation whatsoever, yet, it is believed that including expanded explanation will minimise uncertainty and give more weight to the investigators' analysis.

The text boxes representing evidence *E11* and analysis *A20* are dashed, to show the investigators that there is missing evidence, especially for the analyses of motivation. If the 'SHEL' model in Annex 2 to the IMO Code is applied, then the investigators

²⁶⁶ R. Dixon, *supra* note 10 at p. 72.

²⁶⁷ See chapter 4, section 4.1.1 of this dissertation.

will have to refer back to the components of the model and determine where the liveware mismatched with the remaining components of the model to justify the analysis represented in text box *A20*.

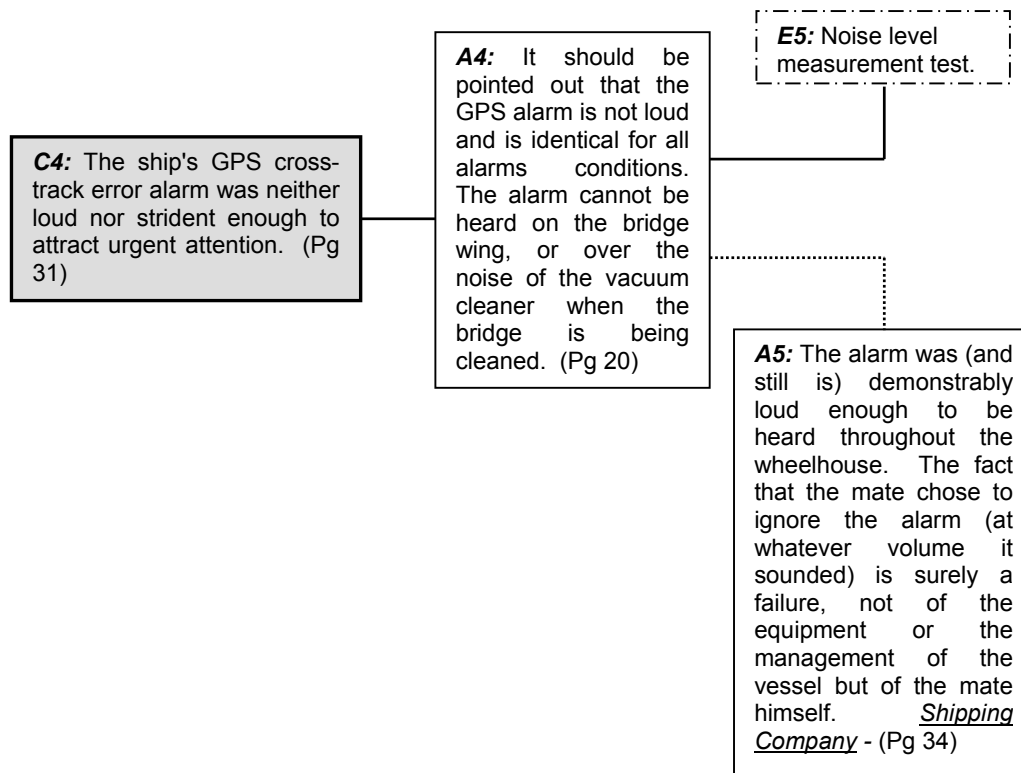


Figure 3vi CAE Diagram for Conclusion 4.

Figure 3vi shows another area where the language used in the report is not clear enough to distinguish between a conclusion and an analysis. For instance, conclusion *C4* refers to the alarm, which “was neither loud...”. The same wording is used earlier in the analysis section as shown in textbox *A4*. Furthermore, there is no mention of identified supporting evidence and the analysis may therefore be interpreted as being biased and unjustified.

Had the investigators carried out a noise level measurement test on the bridge, then the results of the test could have been analysed (such as by plotting an octave band frequency analysis). Only then may a conclusion be drawn up on the noise level of the alarm. That shortcoming from the side of the investigators led to the shipping company disputing the analysis and leaving the reader without a definite answer on how loud the GPS alarm is.

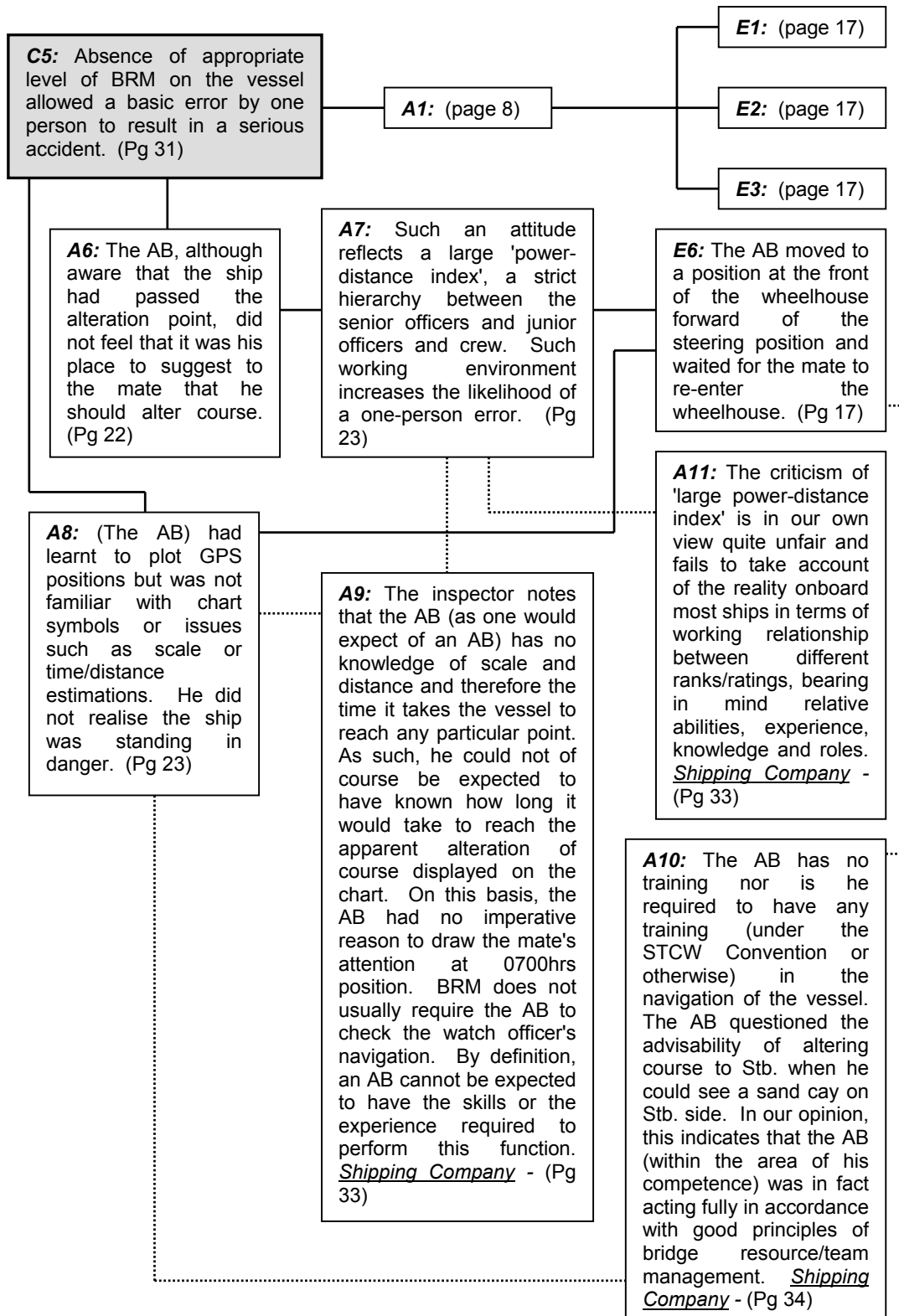


Figure 3vii CAE Diagram for Conclusion 5.

Figure 3vii shows how a single piece of evidence supports multiple analysis made by investigators. CAE diagrams may enable the investigators to predict where statements rebutting the analysis of the evidence may be possibly directed²⁶⁸.

In this case, evidence *E6* is a very important piece of evidence as it supports analysis *A7* and *A8*. As the diagram shows, the shipping company addressed the issue of the able-bodied seaman (AB), who was waiting for the chief mate to take the necessary action. A considerable part of the analysis relates to the lack of Bridge Resource Management (BRM) and revolves around the fact that the AB plotted the ship's position, was aware that it had passed the waypoint but did not report back to the chief mate.

This CAE diagram therefore plots and clarifies to the reader the -

- Analyses made by the investigators to support conclusion *C5*;
- Evidence presented by the investigators to support their analyses;
- Different analyses made by the shipping company; and
- Different interpretation of the same piece of evidence, made by the shipping company.

The remaining two CAE diagrams in figures 3viii and 3ix share the same characteristics of bringing together the conclusions, analysis and evidence, in addition to comments submitted by interested parties. The page numbers at the bottom end of the text boxes show how in certain instances, the necessary information is widely spread across the entire report, making it more difficult for the reader to bring together conclusions, analysis and evidence.

²⁶⁸ C. Johnson, *supra* note 216.

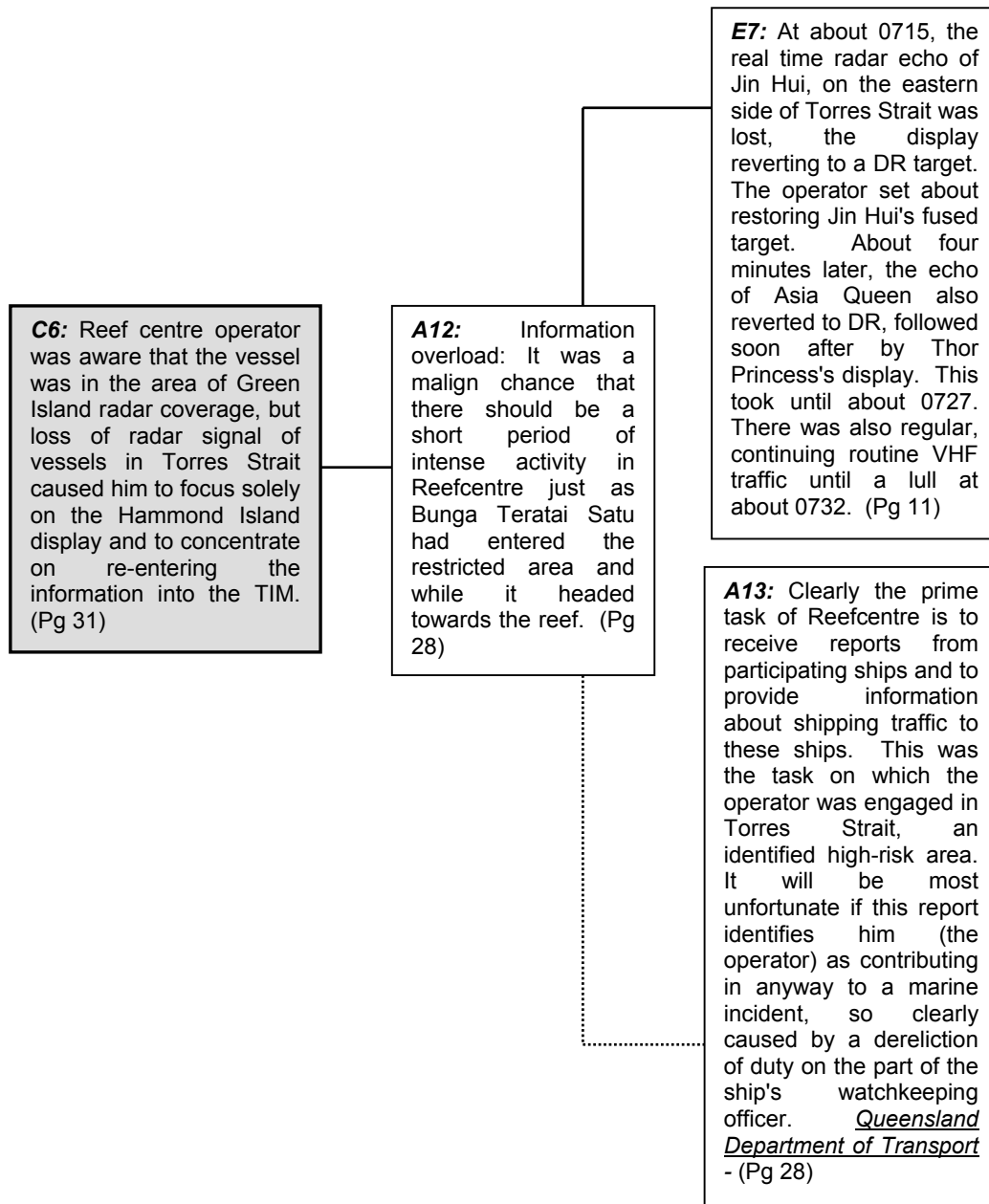


Figure 3viii CAE Diagram for Conclusion 6.

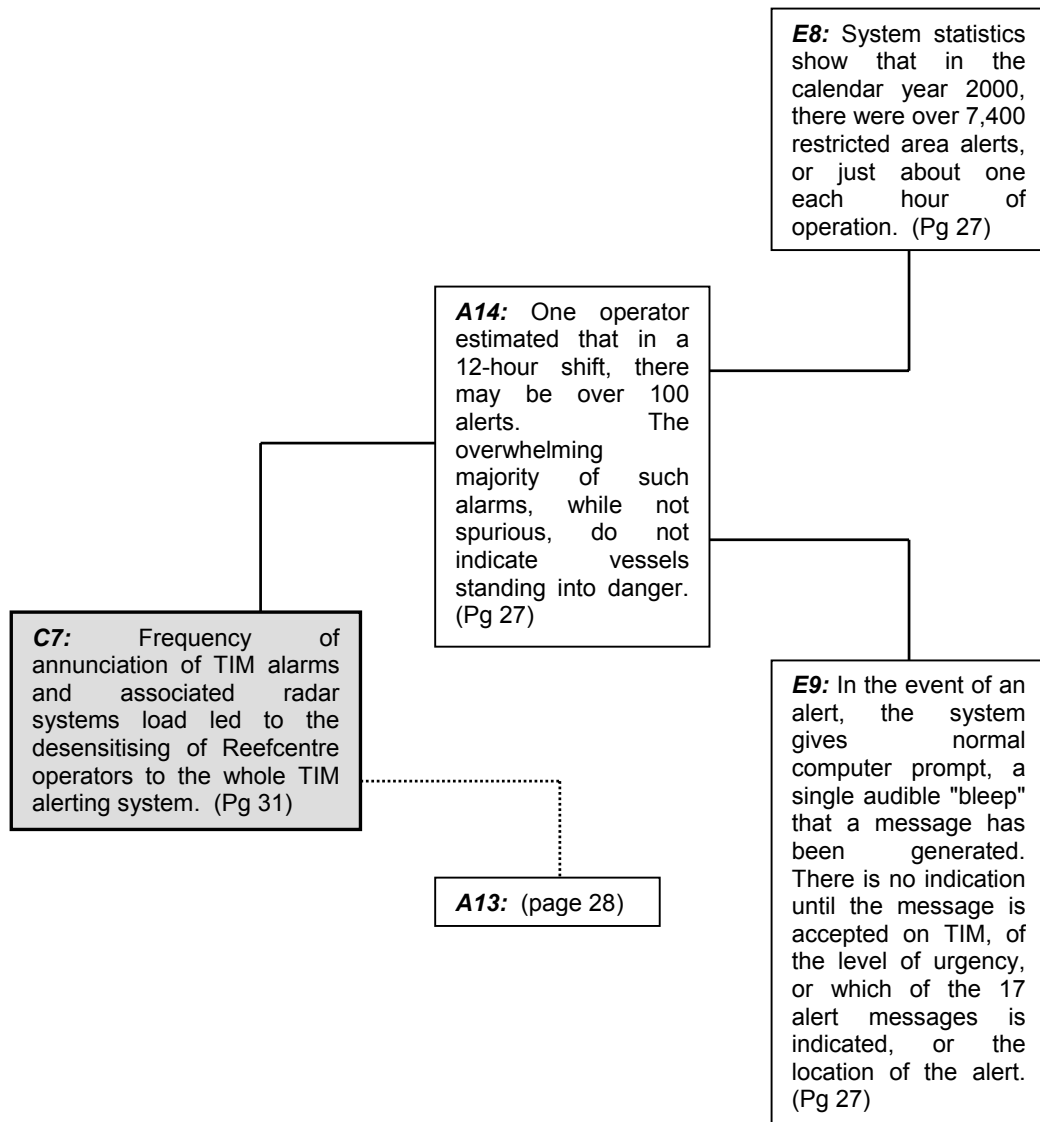


Figure 3ix CAE Diagram for Conclusion 7.

Events and causal factors analysis chart²⁶⁹

The chart shows four event sequences running in parallel (one of which is the primary event sequence). It is interesting to note that the report identifies the loss of the radar signals at Reefcentre as a contributing factor to the grounding. This event and subsequent actions taken by the Reefcentre operator are represented in the chart as a secondary event sequence, yet, they lead to some event, subsequent to the grounding.

The chart and the CAE diagrams in the same appendix make it easier for the reader of this dissertation to compare and analyse the two tools. Whilst CAE diagrams illustrate, *inter alia*, how conclusions may be linked, an events and causal factors chart assist the reader to understand the chronological sequence of events.

²⁶⁹ As stated in chapter 4 of the dissertation, this particular casualty investigation report was purposely selected because, *inter alia*, it included an events and causal factors chart. On the other hand, to date, CAE diagrams are not annexed to casualty investigation reports sent to IMO and in this respect, there were no other options but to construct the diagrams, based on the information and data published in the report. However, this task served this writer to perceive how CAE diagrams operate.

APPENDIX 4 ELECTRONIC PROMULGATION OF CASUALTY INVESTIGATION REPORTS

Chapter four addresses the casualty investigation report *per se* and its present (new) role in the maritime industry. Several investigating bodies publish their reports on the World Wide Web, in an attempt to promote the promulgation of information. The importance of this exercise cannot be overemphasised. It is discussed in chapter four, section 4.1.1 that those who have suffered a casualty tend to believe that this is only a one-off situation, which has not happened to anyone else before. This behaviour will inhibit the cultural changes required to prevent accidents from recurring. This appendix attempts to briefly demonstrate how this exercise can be improved, by the use of electronic media.

An investigating body has two options available when publishing reports electronically; converting the text to Hypertext Markup Language (HTML) or Portable Document Format (PDF). Johnson highlights various advantages and disadvantages of each option, which are summarised in tables 4i and 4ii.

Table 4i Characteristics of HTML Reports.

<i>HTML Format</i>	
<i>Advantages</i>	<i>Disadvantages</i>
Special computer applications are not required to view the document	Perception problems when reading the text from the screen
Short time to download the report	Printing HTML documents might present several problems
Hyperlinks incorporated in the report ease the navigation problems (as opposed to conventional reports).	When printed, pictures will not be included in the hard copy.

Source: C. Johnson, *Improving the Presentation of Accident Reports over the World Wide Web*, (2002).

Table 4ii Characteristics of PDF Reports.

PDF Format	
<i>Advantages</i>	<i>Disadvantages</i>
Adobe Reader software can be freely downloaded	Downloading PDF documents takes a longer time than HTML documents
Text and photographs will be included in the printed version.	Extraction of information is very difficult with an encoded PDF document.

Source: C. Johnson, *Improving the Presentation of Accident Reports over the World Wide Web*, (2002).

An electronic version of the casualty investigation report should be used as a tool to enhance the casualty investigation report rather than duplicate and publish it on the web²⁷⁰. In this respect, he advises image maps to enhance reports, which carry the following advantages²⁷¹ -

- Serve as media to explain contributing factors and justify recommended engineering barriers;
- Link the text of the report with graphics;
- Provide images of the location of the accident²⁷² by complimenting image maps with VRML models and QuickTimeVR techniques to enable the reader to view the location of the accident;
- Includes hyperlinks on the figure to return to the text of the report; and
- Image maps can be used to link CAE diagrams to the actual page of the report.

²⁷⁰ See C. Johnson, *Improving the Presentation of Accident Reports over the World Wide Web*, (2002) at pp. 1-13. This paper explains in detail how virtual reality assists the presentation of reports.

²⁷¹ One main disadvantage of electronic image tools is the cost and resources it involves.

²⁷² Referring to the latent failures identified in the case study presented in Appendix 3, the suggested images and VRML models could include a virtual image of Sudbury Reef passage from the bridge and an image of the vessel's wheelhouse.