

DOES THE PRESENCE OF HUMAN ELEMENT IN SHIPPING COMPANIES CONTRIBUTE TOWARDS ACCIDENTS ON SHIPS?

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Declaration

I hereby declare that this work has not been previously accepted in substance for any degree and is not being concurrently submitted by another candidate for any degree.

I further declare that this dissertation is being submitted in partial fulfilment of the requirements for the degree of MBA in Maritime Management and it is the result of my own independent work except where otherwise stated. Other sources are acknowledged by explicit references. A bibliography is appended.

Finally, I hereby give consent for my dissertation to be available for photocopying and inter library loan, and for the title and abstract to be made available to outside organisations.

Acknowledgement

I humbly thank the Lord Almighty for His grace and mercy that enabled me in completing this research in good faith.

I would like to express my gratitude to Dr. Minghua Zhao for her support and guidance in this research.

This research became a reality because of the continual support from Maritime and Coast Guard Agency, especially Mr. David Turner and for that I shall be ever grateful.

A special thanks to a dear friend and for all those who helped me in this research.

I would like to thank my wife and my family for their support and encouragement.

I dedicate this research to my beloved parents, 'thanks a lot'.

Abstract

This research studies the current knowledge on human element and applies them to a manager in a shipping company. The aim of this research is to identify human elements in a shipping company and to understand how decision-making and safety culture are affected by human behaviour. It is further hypothesised that the presence of human element in a shipping company can lead to accidents on ships.

The research adopted a positivist paradigm and followed a survey methodology. A total number of forty one questionnaire responses were received and two interviews were undertaken taken. The findings of the research were considered rich and unbiased because the analysis was carried out taking into account the perspective of managers, seafarer's and the wider industry.

The present research indentified decision-making and safety culture as factors which are affected by human behaviour. The results also identified a degree of variance in the industry with respect to safety. There was a group who adhered to the best practices and, is referred as the '*exemplary group*.' Whereas, evidence also identified a group which was in contrast to the earlier and is referred as the '*atypical group*.'

Other significant findings of the present research were,

- A high degree of variance was observed for the training of managers while dealing with safety related issues;
- As compared to managers seafarers were not being involved in developing a safety policy;
- Deliberate violations on part of management when onboard safety procedures were by passed and;
- Wrong decisions made by managers can lead to accidents on ships.

In light of the literature review and the findings the research concludes that presence of human element in a shipping company can lead to accidents on ships.

Furthermore, the research draws attention towards the price of not addressing the human element. For it comes not only in form financial losses but, the introduction of new laws such as MLC – 2006, The Companies Act 2006 and The Corporate Manslaughter and Corporate Homicide Act 2007 are compelling evidence that companies are required to act in a responsible manner or else they will be accountable for their action.

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List of Abbreviations

ABS:	American Bureau of Shipping.
CA:	Companies Act 2006.
Cir:	Circular.
DOC:	Document of Compliance.
DPA:	Designated Person Ashore.
EU:	European Union.
gt:	Gross Tonnage
HEAG:	Human Element Advisory Group.
HEAT:	Human Element Assessment Tools.
HEAT-C:	Human Element Assessment Tool for companies.
HEAT-S:	Human Element Assessment Tool for ships.
ILC:	International Labour Conference.
ILO:	International Labour Organisation.
IMO:	International Maritime Organisation.
ISM:	International Management Code for the Safe Operation of Ships and for Pollution Prevention.
KPI's:	Key Performance Indicators.
MAIB:	Marine Accident Investigation Branch.
MARPOL:	International Convention for the Prevention of Pollution from Ships.
MCA:	Maritime and Coast Guard Agency.
MEPC:	Marine Environment Protection Committee.
MGN:	Marine Guidance Notice.
MLC:	Maritime Labour Convention.
MSC:	Maritime Safety Committee.

P&I:	Protection and Indemnity.
Q:	Question.
SMC:	Safety Management Certificate.
SMS:	Safety Management System.
SOLAS:	Safety of Life at Sea.
STCW:	Standards of Training Certification and Watch keeping.
UN:	United Nation.
USCG:	United States Coast Guard.

CHAPTER ONE

Introduction

1.1) Back ground to study:

Shipping industry is one of the most highly regulated industries and the reason behind this environment is ship safety (Branch, 2007). Safe ships are of paramount importance as they are responsible for transporting 90% of the world trade (Farthing & Brownrigg, 1997). In order to keep our ships safe and accident free the industry adopted a technological approach hence, reducing the frequency and severity of shipping incidents (Hetherington, Flin and Mearns, 2006). But despite the efforts, 80% of the accidents at sea are due to human error (Ross, 2009).

It is evident from the statement that most accidents are influenced by human failings. Hence, International Maritime Organisation (IMO) and other organisations started to explore the term human element as a critical feature for all aspects of a ship.

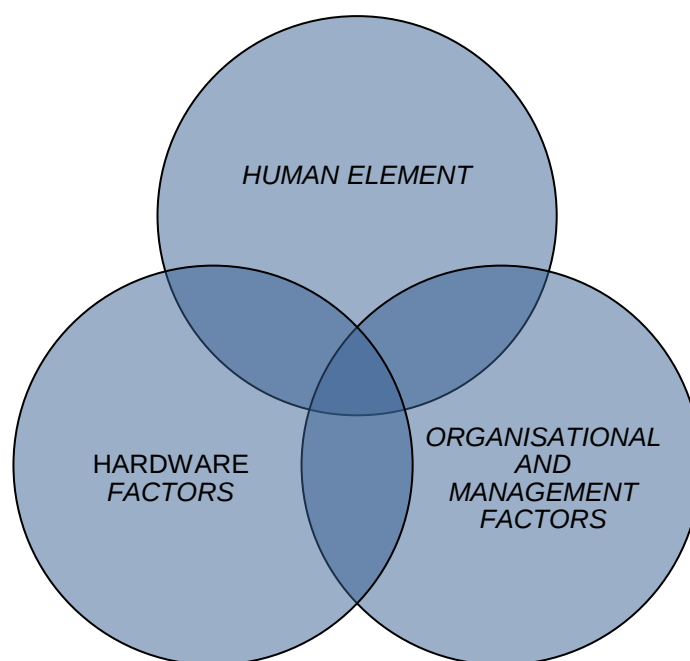
Today there is abundant maritime literature on the topic but, it is argued that traditionally human error has been seen as a responsibility of ships officers and her crew (Earthly and Jones, 2010). According to ClassNK (2010), broadly there are three factors related to the occurrence of human error and each of these factors are influenced by sub-factors,

- *Human element* includes fatigue, experience, stress, etc.;
- *Hardware factors* includes ergonomics and;

- *Organisational and management factors* include safety culture, work procedures, etc.

More interestingly there is a part that mutually affects these factors as suggested by ClassNK (2010), and seen in diagram 1.

Diagram 1: Factors related to human error



Source: ClassNK, 2010

1.2) Aim and objective:

It is evident from the diagram that even though safety culture is a part of organisation and management, it is also affected by the human element. Hence, not only do the individual factors contribute towards human error but the overlapping of these two factors also induces human error.

Hence, this study is aimed at identifying human element in a shipping company. Its objective is to understand how decision-making and safety culture are affected by the human behaviour and their importance for managers.

1.3) Research question:

“Does the presence of human element in shipping companies contribute towards accidents on ships?”

1.4) Hypothesis:

In order to test that existence of human elements in a company contributes towards accidents on ships. The following hypotheses were tested,

Table 1: Hypotheses tested in the research

<i>The study tested the following hypothesis</i>	
No.1	Decision making and safety culture are activities linked to human behaviour and, can be classified as human element.
No.2	With a high priority assigned to safety ship managers are well trained and respond effectively to safety related issues. Sufficient resources are allocated towards safety and, managers understand the importance of cooperation between ship and shore for developing and maintaining a positive culture.
No.3	In developing a safety policy the views of all relevant members should be taken into account.
No.4	Decision making is a process affected not only by human behaviour but, also by the demands of business.
No.5	Due to the awareness and, consequences of neglecting human element (.e.g. Herald of Free Enterprise), management does not ignore the breaches in safety and, rather adopt a proactive attitude towards safety.
No.6	ISM has successfully addressed the human element issues in accidents.
No.7	Wrong decisions made by managers will cause accidents on ships.

Here human element is considered as an independent variable and accidents as a dependent variable (Hussey and Hussey, 1997). The individual hypotheses are tested and commented in chapter 4.

CHAPTER TWO

Literature review

2.1) By the people for the people

Shipping is one of the most globalised industry (Paul Rodrigue, 2010; International Labour Office, 2006). The ships that ply the world's oceans are manned by more than 1.5 million seafarers (ILO, 2003; Mitropoulos, 2010) and the industry is responsible for transporting 90% of world trade – by weight (IMO, 2006; Maynard, 2003). In words of Lun, et al. (2010, p.208) “...maritime transport remains the back bone of international trade and economic growth.” This is evident from the following table which represents the increase in world seaborne trade over a period of eight years.

Table 2: Goods loaded and unloaded

<i>Year</i>	<i>Goods loaded</i>	<i>Goods unloaded</i>
2000	5938.0	6273.0
2001	6020.0	6201.0
2002	6119.6	6325.0
2003	6500.0	6597.7
2004	6845.5	6893.4
2005	7108.7	7122.0
2006	7545.0	7720.1
2007	7882.0	8061.3
2008	8168.0	8180.7

Millions of tons

Source: United Nation Conference on Trade and Development secretariat (UNCTAD), 2000-2009; Table author generated

Shipping is important not only for economic growth but by transporting large amount of cargo in cost-effective manner shipping has played a pivotal role in integrating the global community (Lun, et al., 2010). In view of Guan and Skogan (2007), if there was no shipping then societies would have remained separated and there would

have been no interchange of cultures. Based on the brief yet concrete evidence it is justified to say that shipping is a service for people.

According to Steenbrink (1974), for the movement of goods a transport system involves three key components,

1. Fixed infrastructure .e.g. ports etc.;
2. Ships, barges etc. and;
3. Organisational systems necessary to make sure that the whole operation runs efficiently and effectively.

However, the above list lacks a key component and in view of the author that component is, people. After all, people are the focal point for the success of any organisation (Pfeffer, 1998). Hence, it is because of the people associated with the maritime industry that we have created the world's most internationalised industry (Lorange, 2009). Finally, authors adopts the view of MCA, et al. (2010, p.1) that, "the shipping industry is run by people, for people."

Shipping is the backbone of world trade and the backbone of this global industry is its people, a view shared by Willingale (1998). However, the same people are responsible for its failures and the issues surrounding human element will be discussed in the following chapters.

2.2) Journey of human element

Shipping is one of the most dangerous industries in the world (IMO, 2002; Guner-Ozbek, 2007) and historically the industry has addressed safety from a technical perspective (IMO, 2000; Ehlers and Lagoni, 2007). Hence, today we have ships those are technologically advanced and reliable (UK P&I Club 2010).



Source: Photo courtesy by Product photography website (2009)

However, an alternative view is that of Bielic and Zec (2003) in their opinion, technology has not only increased the work load for mariners but has also increased the level of stress.

In view of Bielic and Zec (2003), amongst various other factors the two factors mentioned above lead to mental fatigue which in turn increases the probability of errors which eventually leads to an accident.

In view of Celik and Cebi (2009), despite the technological innovations and implementation of safety related regulations marine accidents are of grave concern to the maritime world. Furthermore Celik, et al. (2010, p.18), ask why is that despite these efforts shipping accidents have not been “reduced to desired levels?”

Though Celik, et al. (2010) do not clarify what this ‘desired levels’ is but the general consensus within the industry is that, 80% of accidents are attributed to human error (Aspden & European Institute of Maritime and Transport Law, 1995; Dhillon, 2007; IMO, 2002; Rowely, 2006; Soyer 2006).

Even this figure of 80% is contested in the industry as Sillitoe (2008, p.3) suggest that, these statistics could be misleading as they “do not tell the full picture”.

However, Mackenzie and Holmstrom (2009) offer a comprehensive view and suggest that, human error is not the cause rather it is a symptom of an underlying problem.

In view of the author technology is the way forward but, ships structure and system are a small part of the safety equation (Ehlers and Lagoni, 2007). Hence, by concentrating on the technical side the industry has kept the humans out of the safety equation (Goulielmos, 2001) and ignoring human element during introduction of new technologies is a painful mistake (Fitz-enz and Davison, 2002). Hence, realising the importance of people in 1991 IMO established “The Working Group on the role of the Human Element in Maritime Casualties” (IMO, 2002). Since then IMO has been promoting its message on human element and, Resolution A.850 (20) adopted in 1997 states,

“Human element is a complex multi-dimensional issue that affects maritime safety and marine environmental protection. It involves the entire spectrum of human activities performed by ships' crews, shore based management, regulatory bodies, recognized organizations, shipyards, legislators, and other relevant parties, all of whom need to cooperate to address human element issues effectively” (IMO, 2002, p.1).

Realising that technology is not the sole answer to reduce accidents the industry started a journey to address the importance of people, or human element and its role in accidents. Various national and international organisations are devoted in addressing the issue as highlighted in the following section.

2.3) Human Element is drawing attention

a) IMO:

IMO is the only “international rule-maker, the sole setter of maritime safety standards that apply universally” (Mitroussi, 2002, p. 16). As an agency of United Nation’s (UN), IMO has exhibited great interest in the human element.

The Human Element Working Group that was established in 1991 now works in combination with another group that deals with Formal Safety Assessment (FSA) (IMO, 2002). In brief FSA as stated by IMO (2002, p.1), “aims to generate a new approach for developing international regulations...” while addressing the human element. Due to the efforts of this combined group IMO has done significant work in addressing the human element. This according to IMO (2002) and Nielsen (2005) includes,

- 1) Safety management, through the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code);
- 2) Introduction of Standards of Training Certification and Watch keeping (STCW);
- 3) Human element principles and goals for the Organization;
- 4) Human element analysing process tool (HEAP) for addressing the human element in the regulatory process;
- 5) The problems associated with fatigue;
- 6) A taxonomy of terms used in human element analysis and;
- 7) Review of studies related to ship operations and management.

Human element has been high on IMO's agenda (Ahrend Witt, 2007; IMO, 2007; Trivedi, 2005). Determined to spread the message Resolution A.850 (20) (IMO, 1997; IMO, 2002) not only recalled all previous resolutions but, reflected an evident shift from a regulatory regime to that of a safety culture with a strong emphasis on human element (*Alert!*, 2003; IMO, 2000; Nielsen, 2005). The amendments to SOLAS (Safety of Life at Sea) which came into force in 2002 saw the addition of part-E for chapter II-2, a part which exclusively deals with human element such as training, drills and maintenance. In addition to that part-F sets out a methodology for approving alternative (or novel) designs and arrangements (IMO, 2002). In view of *Alert!* (2003), Nielsen (2005) and Barnett (2007) chapter V-15 of SOLAS addresses issues related to ergonomics principles and procedure for the bridge.

Furthermore, Resolution A.947 (23) (IMO, 2004) instructs all committees and sub-committees at IMO to consider human element during “developing new or amending existing performance standards” (*Alert!*, 2003; IMO, 2002). According to IMO (2006, p.1) under MSC-MEPC.7/Cir.1, all relevant IMO bodies are advised to use the checklist “before approving or adopting” amendments to mandatory and non-mandatory IMO instruments. Member governments are also encouraged to complete the mentioned checklist before submitting proposals for amendments or development of new instruments and to submit a completed checklist along the proposal (IMO, 2006).

Working on a global mandate of “safer shipping and cleaner oceans” (IMO, 2002, p.1), IMO is determined to spread awareness on human element as reflected in Resolution A. 1011(26) which states (2009, p. 5), “...IMO is to place increase

emphasis on the contribution of the human element...” in order to achieve even safer and environmentally friendly shipping.

b) ILO:

Since its formation International Labour Organisation (ILO) has had special “machinery” for seafarers such as the Joint Maritime Commission and the special Maritime Session of the International Labour Conference (ILC) (ILO, 2010, p.1). Furthermore, human element has been the *raison d’être* for ILO since its creation (Bolle, 2006; Doumbia-Henry, 2010),

As a result of this legacy on 23rd February 2006 during the 94th session of ILC at its 10th Maritime session we saw the advent of the Maritime Labour Convention (MLC) – 2006 (Orbie and Tortell, 2009; ILO, 2010). MLC – 2006 also known as, the “super convention” (DCOMM, 2010, p.1; ILO, 2010), consolidates and updates more than 65 international labour standards pertaining to seafarers (ILO, 2010). In view of Pierola (2010) and ILO (2010), the convention covers a wide range of issues ranging from decent working conditions to welfare and social security protection etc. and creates a fair playing field for the owners. MLC – 2006 is being referred as the “fourth pillar” of the IMO and it will compliment key conventions such as SOLAS, STCW and the International Convention for the Prevention of Pollution from Ships, 73/78 (MARPOL) (Somavia, 2006; IMO, 2002; UNCTAD, 2008).

c) ILO and IMO:

The collaboration between ILO and IMO dates back to 1959 as under Article I and III the two organisations are to cooperate on matters of common interest (ILO, 2010). A similar cooperation is seen between the two in addressing the human element .i.e. the Joint Working Group on the human element to address the role of the human element in shipping IMO (2009). Such cooperation between the two will result in enhanced maritime safety, labour and social conditions in the industry (IMO, 2009). Furthermore, Joint IMO/ILO Ad Hoc Expert Working Group on Fair Treatment of Seafarers and Joint IMO/ILO Ad Hoc Expert Working Group on liability and compensation regarding claims for death, personal injury and abandonment of seafarers are examples of the efforts in dealing with human element (IMO, 2002). In view of Doumbia-Henry (2010, p.2), the implementation of MLC – 2006 will give human element a “...front and central role in the maritime industry.”

d) MCA:

In United Kingdom Maritime and Coast Guard Agency (MCA) “delivers and implements the Government's maritime safety strategy” (Department for Transport, 2010, p.1). The Human Element Advisory Group (HEAG) created in 2006 addresses the human element and aims at making our seas cleaner, safer and protect the lives of those working at sea (MCA, 2010). With a wide range of membership the group meets at regular intervals and the 13 meeting so far have effectively addressed a wide range of topics concerning the human element in shipping (MCA, 2010). Recently, *"The Human Element: A guide to human behaviour in the shipping industry"* was launched at the 12th meeting of HEAG (MCA, 2010).

MCA has been at the heart of the issue and their efforts are reflected in various other projects .e.g. RP545 Guidance for interaction with automated systems, RP546 Development of a cognitive workload assessment tool and, RP547 Organisational/industry structures and their effects on safety management etc. (MCA, 2010). The agency has introduced two, Human Element Assessment Tools (HEAT) and the underpinning philosophy of these tools is to develop an effective safety culture within companies and on board ship (MCA, 2008). According to MCA's Marine Guidance Notice for merchant ships or MGN 365 (M) (2008, p.1),

- HEAT for ships or HEAT-S; "...complements Safety Management Certificate (SMC) audits and provides an assessment of the effectiveness of the safety management system on board ships" whereas;
- HEAT for companies or HEAT-C; "...complements Document of Compliance (DOC) audits and provides an assessment of the capability of ship operating companies to manage the human element safely".

On other fronts organisation such as Lloyd's Register has funded two major human element programmes for education, training and research (Lloyd's Register, 2007).

e) Lloyd's Register:

- Firstly, the *Alert!* project was launched by the Nautical Institute and is sponsored by Lloyd's Register, it is aimed at raising raise awareness about human element in the industry (Lloyd's Register, 2007) and;
- Secondly, in 2004 Lloyd's Register Educational Trust passed a grant to establish a human element research unit within the Seafarers' International Research Centre at Cardiff University. This unit carries out research in social

science so that the industry can have a better understanding in areas such as, perceptions of risk, technology, training and leadership etc. (Lloyd's Register, 2007).

As seen various organisations have devoted their expertises in addressing the issue because, human element contributes towards safety, security and environmental protection (IMO, 2008). Also evident from the above section is a significant shift within the industry as organisations exhibit an increasing interest in exploring the role of human element beyond the ships .e.g. ISM, HEAT-C, RP547 and IMO's checklist etc.

At this point the research points out that despite our knowledge on human element, the industry differs in opinion when it comes to define this crucial factor. Hence, the following section will explore and comment on this ambiguity.

2.4) What is the definition of Human Element?

Besides the explanation of the term provided by IMO, other definitions of the term are as follows,

- The *Alert!* (2003, p.1) proposes human element is a term that, “embraces anything that influences the interaction between a human and any system aboard ship”.
- United States Coast Guard (USCG) define human element (2010, p.1) as, “the human and organizational influences of marine safety and maritime system performances.

In view of Pyne and Koester (2005), there is no internationally accepted definition of human element. Schager (1998) suggests, the term is widely used in accident investigation but it lacks a clear definition.

Perhaps this is why human element is often used interchangeably with human factors, a view shared by Pyne and Koester (2005).

Although this particular point is not a part of this research and is subjected to further studies. However, in view of the author it is important to define human elements so that ambiguities and misperceptions could be removed.

In view of Hansen (2006, p.62), “when words and terms are commonly used to describe a particular phenomenon, assumptions may be made by both the author and their audience.” It is further argued by Hansen (2006, p.62), the assumptions that all parties “understand and agree with a specific term may be erroneous.”

In view of the author, the definitions of human element stated above are the result of an institution's perception of the term and is based on their own research and that of others. Perhaps this is the why various authors refer to different definition as, Sekimizu (2006), Christodoulou-Varotsi & Pentsov (2008) and Tzannatos (2010), rely on the explanation provided by IMO. Whereas, Lloyd's Register (2010) and MCA (2010), refer to all definitions stated earlier.

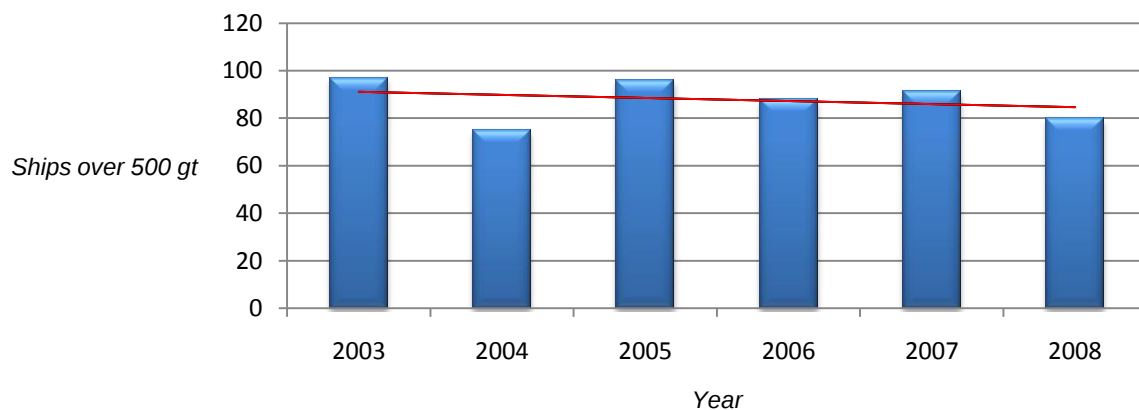
However, for the purpose of this research the term human element will refer to the explanation provided by IMO. Since, it provides a more holistic view of looking at people within the industry.

2.5) Accidents

a) Loss of ships subjected to IMO conventions:

The following graph is adapted from the latest IMO document on performance indicators (CWGSP 10/2(a)) and is based on Lloyd's Register Fairplay World Casualty Statistics (IMO Maritime Knowledge Centre, 2009, p.18).

Graph 1: Number of ships subjected to IMO conventions lost



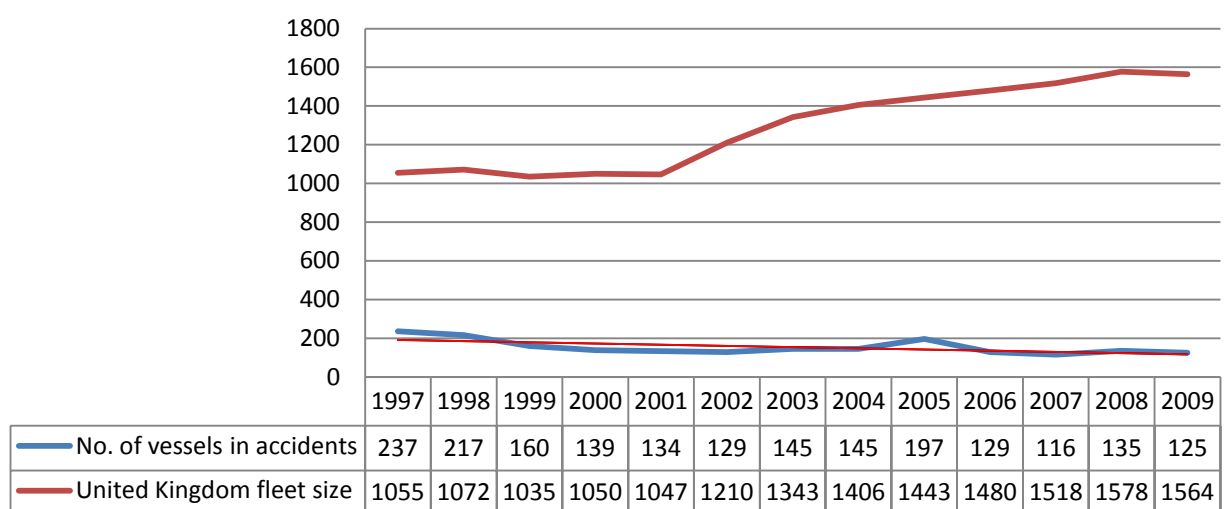
Source: IMO Maritime Knowledge Centre, 2009; Graph author generated

Based on the linear trend line (in red) over a period of six years we observe a decline in the number of ships lost for vessels over 500gt - (by total loss it means vessels which are beyond repair).

b) Marine Accident Investigation Branch:

The annual report for 2009 by Marine Accident Investigation Branch (MAIB) reflects a decrease in number of accidents with respect to an increasing fleet size (MAIB, 2010). This decrease in accidents is represented by the linear trend line (in red).

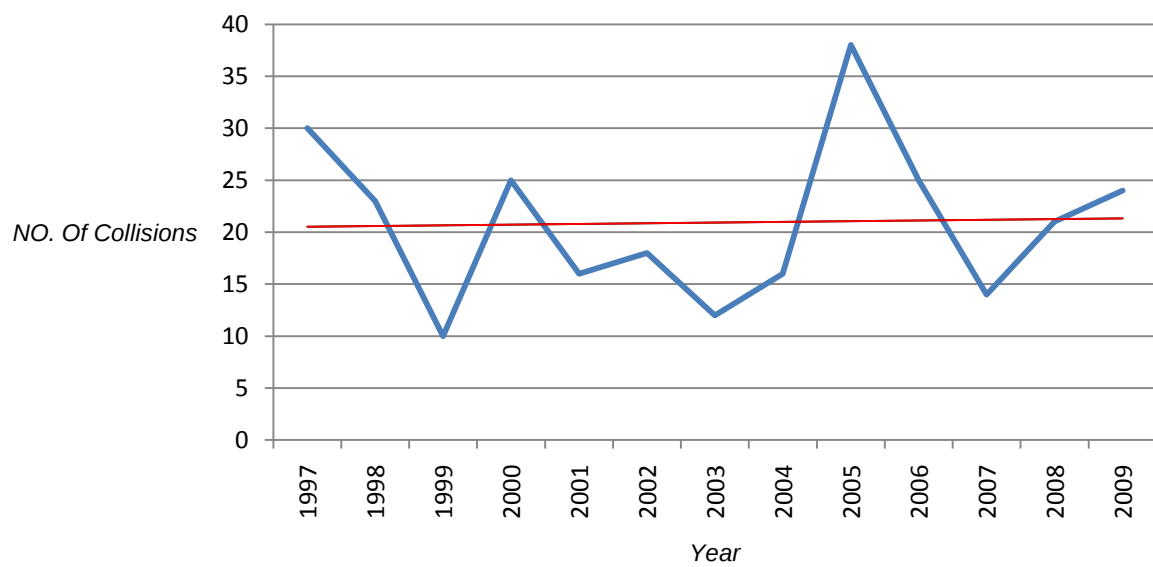
Graph 2: Merchant vessels in accidents (1997-2009)



Source: MAIB, 2009, p.56; Graph author generated

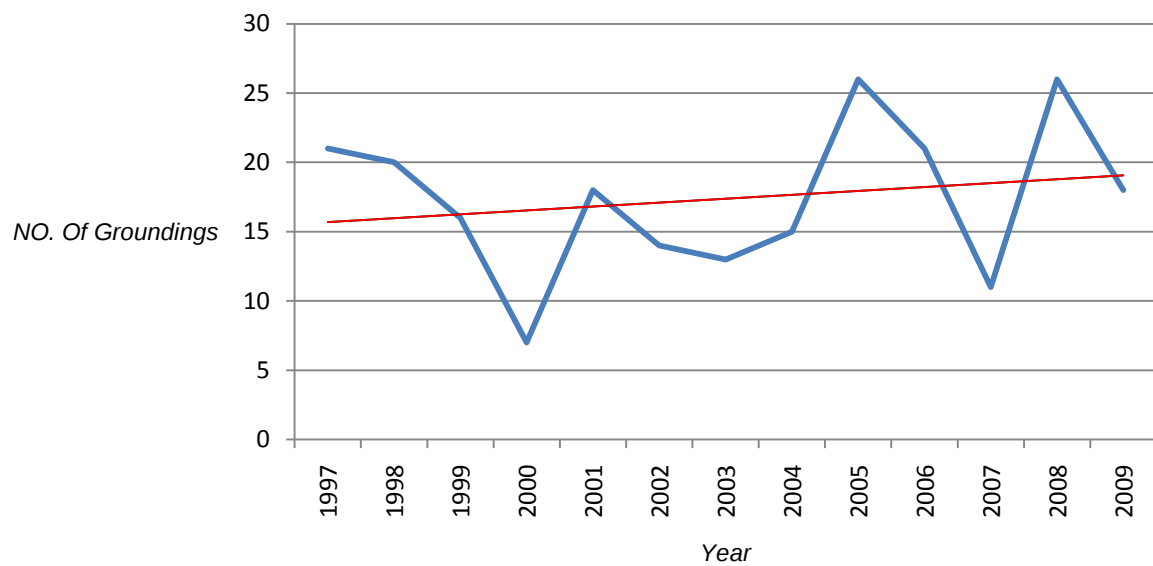
However, on further analysis of the data it is observed that in the total number of accidents reported historically - the number of collisions, groundings and contacts have steadily risen, as represented by the linear trend lines.

Graph 3: Merchant Vessels in Accidents (1997-2009)



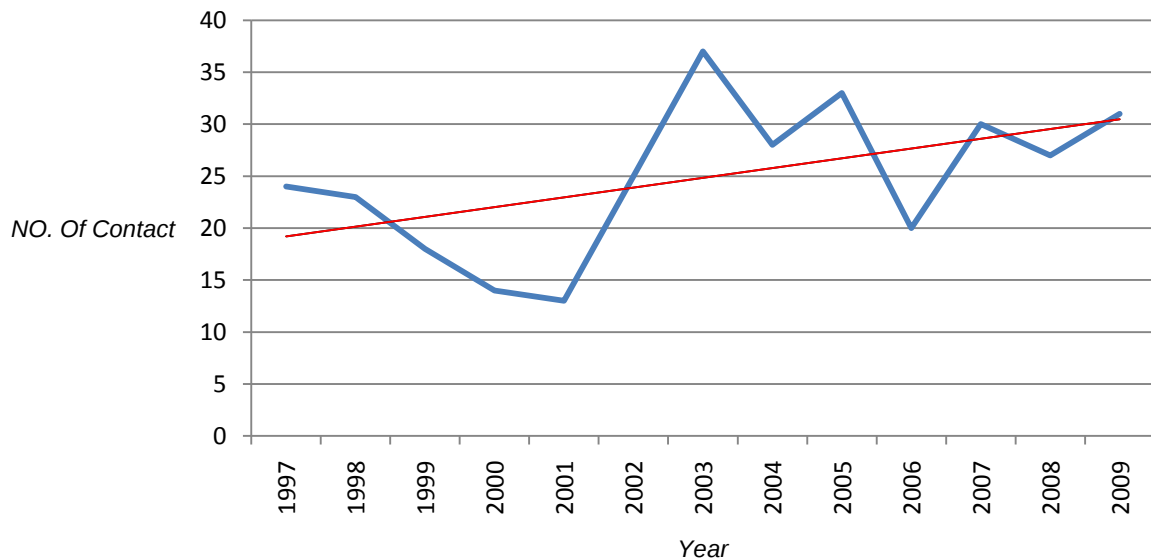
Source: MAIB, 2009, p.57; Graph author generated

Graph 4: Merchant Vessels in Accidents (1997-2009)



Source: MAIB, 2009, p.57; Graph author generated

Graph 5: Merchant Vessels in Accidents (1997-2009)



Source: MAIB, 2009, p.57; Graph author generated

In view of the data from MAIB it is concluded that with respect to an increasing fleet size the number of overall accidents have decreased. But on the other hand various types of accidents have actually risen.

The data presented in this section highlights two points,

- 1) Overall accidents have reduced and,
- 2) Individual accidents for United Kingdom ships worldwide and other ships in United Kingdom's territorial waters have risen.

Within the limits of the data author is of the opinion that there are still an enormous number of shipping accidents. It is also accepted that on the basis of the data it is difficult to assert that these accidents are all due to human error. However, statistics such as "80% of accidents and incidents are attributable to the human element,

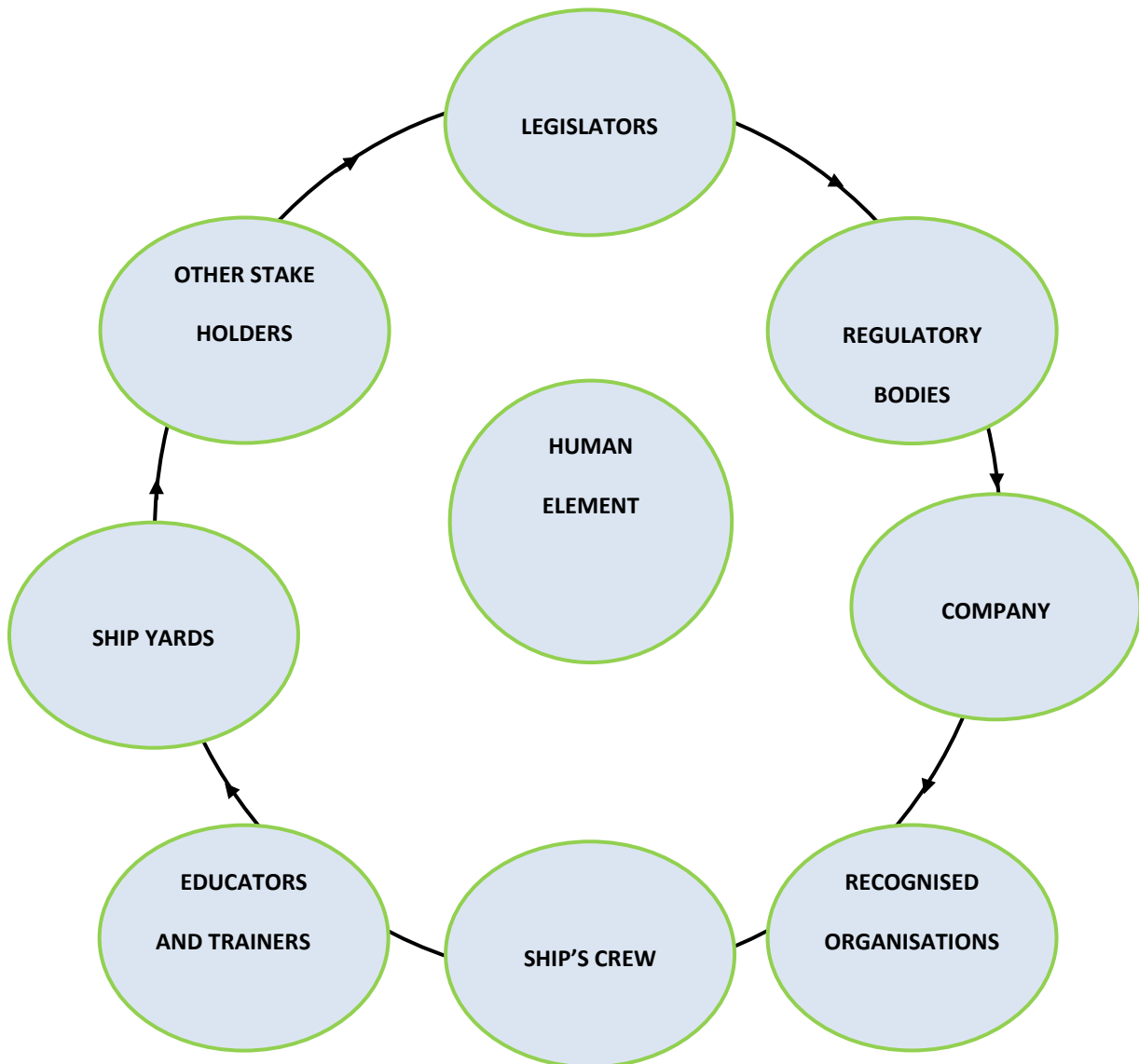
either through direct human error... or by failing to deal effectively with incidents...” (MCA, 2010, p.1) are constant reminders for the industry that more has to be done. Furthermore, investigations into accidents of *Savannah Express*, *Maersk Doha*, *ERRV Viking Islay* and, *Pride of Canterbury* have highlighted serious human element issues. These issues include ergonomics, training, bridge resource management and leadership etc. (MAIB, 2006; MAIB, 2007; MAIB, 2008, MAIB, 2009)

So how do we reduce this ‘*magical percentage*’?

Perhaps the answer to this riddle is in the recent shift in dealing with human element as mentioned in section 2.3.

2.6) Human Element is every where

Diagram 2: Human Element



Source: Diagram author generated

The diagram portrays that it is the ability of each organ to work hand in hand which enables the industry to operate in a smooth and effective manner. It is argued that each organ is unique in its own way as they have their own set of rules, regulations, procedures and guidelines.

Hence, one size fit all approach will not work in addressing the human element and the industry has to shift its attention towards the other organs in order to reduce the number of accidents (as highlighted in section 2.3).

Furthermore, it is argued by the author that hierarchy holds no importance in addressing the human element. It is the understanding of human element within each organ that is imperative because, only then will we be able to address the issue on hands in a more effective manner and perhaps reduce the '*magical percentage*.'

It is beyond the scope of this research to explore each organ. Hence, this research aims at identifying human element within a company.

2.7) The Company

According to IMO (2006, p.1) the importance of human element should be applied to “all phases of the ship life cycle including... operations, management...and recycling as well as the education and training of the people involved”. MCA (2007, p.1) has identified, “...management policies (or lack of)...”, as a factor affecting human element. *Alert!* have identified various stakeholders in the industry, although the list is non-exhaustive but, ship owners-managers are a strategic element towards the “integration of human system” on ships (2003, p.4-5). IMO’s Resolution A. 884(21), identifies shore side management as one of the important factors affecting the human element. Witzel (2001, p.73) suggests that, management has a “responsibility not only to the human element within the industry but also to the human element which industry serves ...”and Etman (2007) suggests, human element is vital in maritime safety as human error may occur due to an error on part of the management or the way ships are maintained.

Following Lord Justice Sheen inquiry into Britain’s worst peace time sea disaster in modern times (Rousmaniere, 2002), the capsizing *Herald of Free Enterprise* eventually resulted in the adoption of ISM (IMO, 2002). The objectives of ISM are to ensure safety at sea, preventing human injury and avoiding damage to the environment and to property (IMO, 2002). ISM created a system aimed at eliminating the human element as a contributing factor towards accidents, this is because ISM integrates the “responsibilities of shore-based safety personnel, up to the highest levels of management and shipboard personnel” (Rodriguez and Hubbard, 2001, p.6). With the purpose of providing an international standard for the safe management and operation of ships (IMO, 2002).

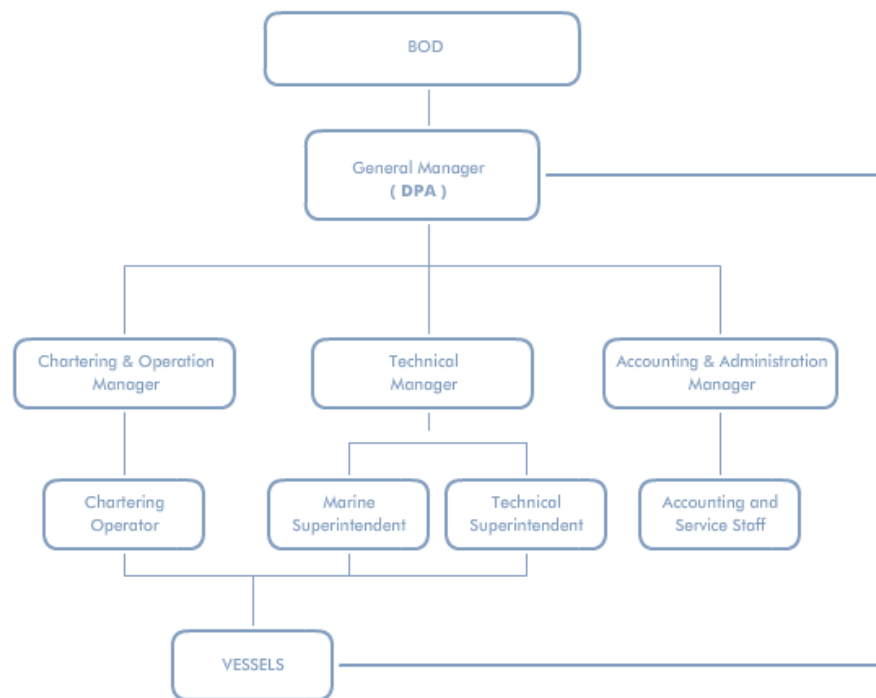
ISM defines a company as,

“the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the ship owner and who, on assuming such responsibility, has agreed to take over all duties and responsibility imposed by the Code.” (IMO, 2002, p.1)

In order to ensure safety, prevent human injury, avoid damage to the environment and to property a company is required to create a SMS (IMO, 2002). This structured document enables the company to implement its safety and environmental protection policy (IMO, 2002). Furthermore, it is incumbent upon the company to nominate a DPA. Acting as a vital link between the ship and the company DPA should have a direct access to the highest level of management (IMO, 2002). DPA is required to monitor the safety and pollution-prevention aspects while ensuring that adequate resources and shore-based support is available (IMO, 2002). Whereas, it is the duty of the company to ensure that the DPA has the resources and shore-based support to carry out their functions (IMO, 2002).

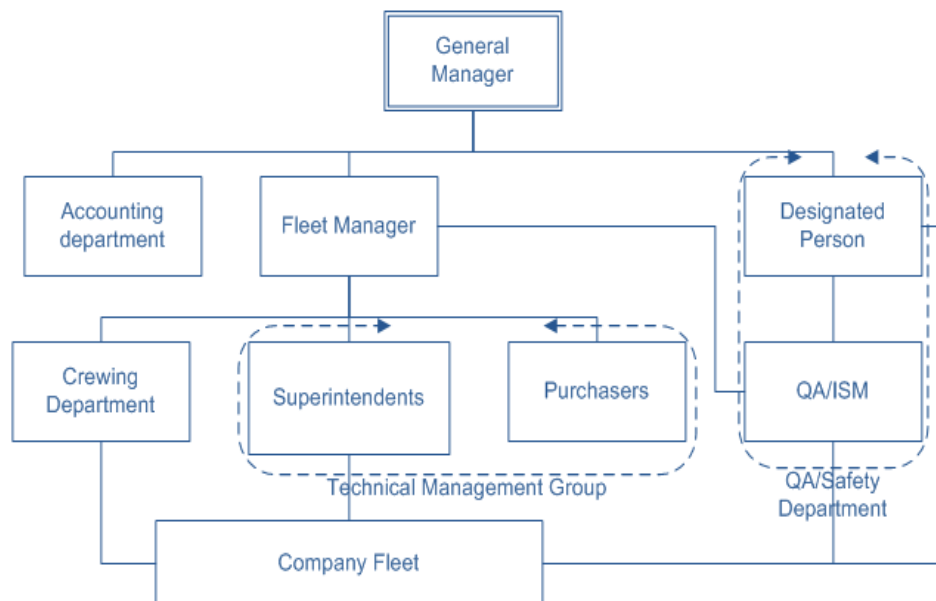
ISM requires the company to define and document the responsibilities, authorities and interrelations of personnel responsible for managing, performing and verifying work related to safety and pollution prevention (IMO, 2002), as seen below;

Diagram 3: Organisational chart



Source: Densan Shipping Co., 2010

Diagram 4: Organisational chart



Source: Fjord Shipping Management, 2010

In light of the above literature it is argued that, a company plays a pivotal role in establishing and maintaining safety on ships. As suggested in section - 2.6, company is part of the wider industry and is affected by human element in its own unique way. Hence, the people working for a shipping company will also be affected by human element.

This research will be focused on managers in a shipping company, because their decisions have an impact on vessels operation. The next sections will comment on the importance of decision-making and safety culture.

2.8) Decisions

Ability to make decisions is a part of our psychology and a common research topic in psychology (Thangard, 2010; Hancock, 1987). Furthermore, aeronautical industry not only see decision-making as psychological theory and practice but, the research into the human factor (or human element as known in maritime industry) has highlighted “decision-making as a crucial element” (Croucher, 2005, p.3).

In view of (Alston, 2003; Butler and Seung Park, 2005; Carter and Rausch, 2006) decisions concerning safety are strategic decisions and are made by senior figures in the company (Alston, 2003). Harrison and Pelletier (1997, p.358) are of the opinion that such decisions “constitutes the strategy of the organization.” For managers to choose the “right road to run on” (Wang, 2010, p.2) it is essential that they maintain a balance between safety and profits.

Hollnagel (2009) defines efficiency as a process, where completion of a task is carried out with limited resources or investment. Whereas, when a task is carried out only when the organisation is confident that the preconditions are met and that such activity will meet its objective without creating unwanted results is known as thoroughness. Hollnagel (2009) suggests, an organisation's needs to be both efficient and thorough or, an organisation must be profitable and safety conscious (MCA, et al., 2010). This brings us to Hollnagel (2009), The Efficiency –Thoroughness Trade off Principle (ETTO) principle .i.e. the trade off between being efficient or thorough. Since, people make tradeoffs between the two it is impossible to maximise profitability and safety at the same time (MCA, et al., 2010). In view of Hollnagel

(2009), the trade off between thoroughness and efficiency can happen due to several reasons such as,

- Limited availability of resources;
- Social pressure from managers and;
- Organisational pressures etc.

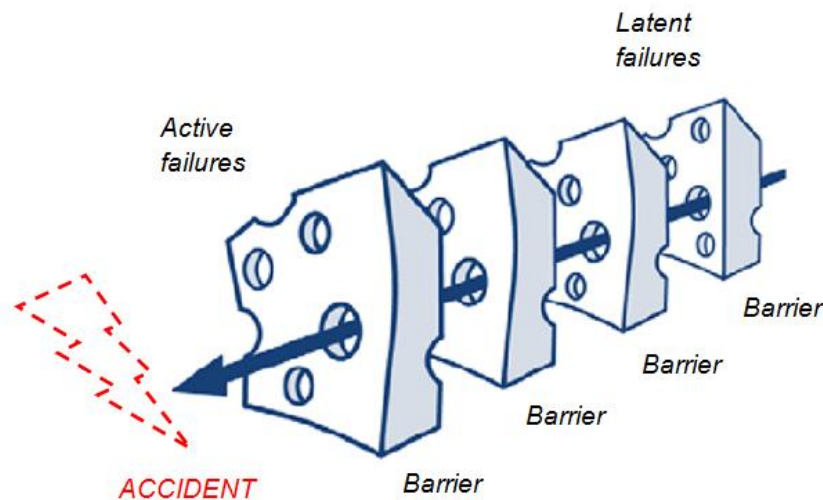
Another view on the topics is that of Carrillo (2005), who suggest that profitability and safety are interlinked and neglecting either will result in negative consequences.

“Paradoxes or polarities are set of opposite that appear to be in conflict” yet, both are necessary for success (Carrillo, 2005, p.31). Koestenbaum (1991), applied the concept of polarities to business world and noted the choice between wrong and right is easy but, it is the choice between right and right that is difficult for the management .e.g. profits or safety.

In view of the above arguments the author shares the views of (Lorange, 2009; Lorange, 2005) that, operating in a rapidly changing, highly volatile and capital intensive industry managers in a shipping company may need to make fast decisions. Thus, operations in such an environment can affect the decision-making ability of a manager. After all a wrong decision is one of many reasons for an error (Doty, 1989; Vincoli, 1994; Strater, 2005).

Human error can be described as an end result of various factors those act independently or together to influence the human element during the performance of a task (Vincoli, 1994). Hence, the author is of the opinion that wrong decisions made by mangers can lead to human error and cause accidents.

Diagram 5: Swiss Cheese model of accident causation



Source: Reason (1997, p. 12): Diagram author generated

In the above diagram it is seen that barriers act as a defence against potential failures, these barriers can be in many forms .e.g. human element, technology etc. Normally one or more barrier should prevent the accident but, sometimes only the last barrier will be enough to prevent an accident (Barnett, 2005). However, when all the holes in the system will align an accident will occur (Barnett, 2005). The model is known as the Swiss Cheese Model of Accident Causation by Reason (1997). Furthermore, Kohn, et al. (2000) and Wilpert and Qvale (1993) suggests, two types of errors also known as the Multi-Causality model (Whittingham, 2008).

- *Active errors* are committed by frontline operator's (.e.g. seamen) and their effects are felt almost immediately and;
- *Latent errors* tend to be away from the direct control of the operator's such as, bad management decisions.

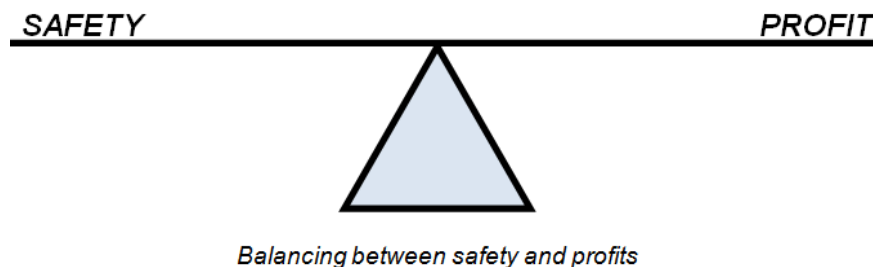
It is further argued by Kohn, et al. (2000) that, latent errors pose the greatest threat to safety and can lead to multiple active errors .e.g.

- *Challenger* accident;
- *The Three Mile Island* accident;
- *Chernoby* accident and;
- Capsizing of *Herald of Free Enterprise*,

Inquires/reports into these accidents not only reflect short coming of the active errors but, are a constant reminder that managerial decisions and attitude towards safety culture is of unprecedented importance. As reflected in the works of Greenhalgh (1989), Noyes (2001), Hendrick and Kleiner (2002) and Redmill and Anderson (2006).

Finally, decision-making is affected by human behaviour and when choosing between safety and profits managers are faced by a dilemma. But if a balance between the two is not maintained then accidents are bound to happen.

[Diagram 6: Balancing between safety and profits](#)



Source: Diagram author generated

Hence, the next section will discuss the effect of decision-making on safety culture.

2.9) Safety culture

According to IMO MSC 77/17 (2003 cited in Drouin, 2010, p.4) safety culture can be defined as,

“a culture in which there is considerable informed endeavour to reduce risks to the individual, ships and the marine environment to a level that is as low as is reasonably practicable. Specifically, for an organisation making efforts to attain such a goal, economic and social benefits will be forthcoming, as a sound balance between safety and commerce will be maintained.”

Literature on management emphasises that, for any organization commitment to safety culture starts from the top management and includes all of its members (Mathis and Jackson, 2008; Perezgonzalez, 2005; Organisation for Economic Co-operation and Development, 2003). Jahn, et al. (2008) suggests, though commitment from top is important but, it is the level of employee commitment that eventually determines the safety performance.

However, author adopts the view of Hughes and Ferrett (2009, p. 64) that, it is a process which requires a “joint commitment in terms of attitude and values,” and such a commitment should be visible at the top and at the bottom.

Values play an important role at individual and social level. On an individual level values are affected by ones concept, status and occupational roles whereas, on social level they are acquired by cultural conditioning (Agarwal and Pachal, 1986). According to Pandya and Mathu (2003, p.135), “main function of value is to establish standards which are necessary for decision-making.” In view of Mayo (2001, p.104), attitudes have a close relationship with values and suggest that attitudes are shaped by education, the culture to which people belong and the environment and its

demand. As argued by Sherif (1936, p. 203), “man’s socialization is revealed mainly in his attitudes formed in relation to the values or norms of his reference group or groups.”

Hence, if these values or norms are low then it is argued that an organization with high accident rates will most likely have a poor safety culture (Hughes and Ferrett, 2009). Furthermore, in extreme situation the success or failure of an organization depends on a positive safety culture (Furness and Muckett, 2007). This statement can be weighed against a report by ILO (Safety Culture at Work), in 2003 job related accidents and illnesses claimed 2 million lives and cost the global economy US\$ 1.25 trillion (ILO, 2003).

Finally the author is of the opinion that, attitudes and values are parts of human psychology, managers are affected by these two elements in their decision-making process and this in turn affects the safety culture.

Summary:

Shipping is a highly invisible industry (Bajpaee, 2004) and people are unaware of the fact that almost every product has been transported by sea at some stage (Peters, 1993; Jones, 2010). However, the industry's visibility is only apparent in case of a tragic incident (Farthing & Brownrigg, 1997) and such accidents negatively influence the perceived safety of shipping (Mitropoulos, 2004).

Nevertheless, the author is of the opinion that no matter how significant the industry is we have to consider its negative side effects .e.g. accidents. Because, in view of Elbanna and Naguib (2009), in today's world a company's performance is measured not only against financial indicators but, also against non-financial indicators such as quality, employee participation, customer satisfaction and leadership (Kaplan and Norton, 1992). Therefore, it is essential for the management to makes decisions those are capable of maintaining a positive safety culture (Skelton, 1997). In view of Florczak (2002, p.181), "the judgement that management uses in everyday decision-making process is big part of a safety culture.

The literature review has identified decision-making and safety culture as factors affected by human behaviour. Hence, forming the hypothesis of this study .i.e. existence of human elements in a company can contributes towards accidents on ships.

Companies have to address this issue because, in view of Sims (1994, p.8), members of an organisation should have a conscience and "public safety prevails over duties to stockholders".

CHAPTER THREE

Methodology

The aim of this chapter is to present the methods used for achieving the research objectives.

According to Hussey and Hussey (1997), there are two research paradigms or philosophies, positivist and phenomenological. It is further suggested by Hussey and Hussey (1997), it is essential to recognise ones paradigm because, the view a researcher hold about the world will be reflected in their work.

3.1) Positivist paradigm:

The preferred approach for this study was positivist paradigm. The reason behind the selection is best seen in the table.

Table 3: Positivism

<i>Positivism</i>	
<i>Ontology;</i> Researchers view on reality	Enables the observer to be independent
<i>Epistemology;</i> Researchers view or relationship with knowledge	Researcher uses only observable phenomena, focuses on facts and reduce the phenomenon to simplest form
<i>Axiology;</i> Researchers view of the role of values in research	Independent of the data the researcher maintains an objective stance.
<i>Data collection techniques</i>	The researcher uses highly structured, quantitative/qualitative and measurement

Source: Saunders, Lewis and Tornhill, 2009, p.119; Table author generated

Since the philosophy is based on facts and allows the researcher to be independent. It is argued that, not only did it enabled the researcher to obtain results that were based on logical reasons but, “precision, objectivity and rigour” were also achieved a view shared by Hussey and Hussey (1997, p.52). Furthermore, in view of Hussey and Hussey (1997) and Collis and Hussey (2009), it allows the researcher to test the hypothesis and the research was aimed at testing a hypothesis.

3.2) Methodology:

The selected methodology under positivism for this research was a survey. This further allowed the use of a deductive approach as suggested by Saunders et al. (2009). Furthermore, it permitted to “draw samples from the population those were studied to make inferences about the population (Collis and Hussey, 2009). Adopting Hussey and Hussey (1997) view, this research followed the descriptive survey as it helped in understanding the “attitudes of an organisation’s work force” (Reeves and Harper, 1981).

Furthermore, methodological triangulation was employed to obtain both qualitative and quantitative data (Hussey and Hussey, 1997). The process of triangulation facilitated in overcoming the pitfall of employing single method approach .e.g. biases (Hussey and Hussey, 1997; Creswell, 2002).

3.3) Data collection:

The secondary data for this study was obtained from academic journals, publications, reports and conferences - HEAG - 12 and HEAG - 13. These conferences were attended by the author on 29th April 2010 and 3rd November 2010. Literature was gathered from books on management, psychology and maritime industry. Information was also gathered from government publications, *Alert!* Magazine, IMO, MCA, ILO and UNCTAD etc. This process enabled the author in formulating the hypothesis for this research.

Primary data for the research was collected by questionnaires and interviews, as suggested by Kothari (2009). Questionnaires were validated by the supervisor and by conducting a pilot survey, as suggested by Kothari (2009). Furthermore, the pilot survey for the manager's questionnaire was conducted with the help of a human element specialist within the maritime industry. Whereas, the pilot survey for seafarer's questionnaire was conducted with the help of two senior officers in the merchant navy.

After validation the questionnaires were distributed to seafarer's whereas, the manager's questionnaire was made available at the HEAG - 13. Both questionnaires contained a separate page for respondents the purpose was to obtain their views on the questions and the research. It is important to highlight that due to the anonymity the comments provided by the respondents proved to be a reliable source of information (see annex B and C for both questionnaire).

In order to obtain "uniform information" which assured the "comparability of the data" the research carried out two structured interviews, as suggested by Kumar (2005, p.126). Under positivism interviews are based on closed questions (Collis and Hussey, 2003). However, the interviewees were asked additional questions in order

to help them in explaining their answers as suggested by Mathis and Jackson (2008). The interviewees were both from United Kingdom and were selected on the basis of their ranks .i.e. Captain and manager in a shipping company (see annex D for questions asked in the interviews).

3.4) Population and sample:

According to Gravetter and Forzano (2008, p. 141), convenience sampling is considered “a weak form of sampling.” It is further stated by Gravetter and Forzano (2008), since there is little control over the representativeness of the sample there is a high possibility of it being biased. However, this study was based on convenience sampling because, it was “an easier, less expensive, more timely technique than any other kind of sampling...” (Gravetter and Forzano, 2008, p. 141)

To address the problems associated with convenience sampling guidelines provided by Gravetter and Forzano (2008) were followed.

In order, to address the problem of biasness a broad cross-section of individuals was selected .e.g. the population had a varying degree of experience and belonged to various sectors of the industry. Secondly, the sample was collected within the United Kingdom and a detailed breakdown of the participants can be seen in chapter 4. Hence, the research clearly describes how the sample was obtained and who the participants were (see Chapter 4). Finally, quota sampling was used for controlling the composition of a convenience sample. By adopting this method it was ensured that subgroups are adequately represented in the sample.

ISM identifies owners, ship managers and operators as one entity .i.e. Company. Hence, the sample of seafarers represents the sample of company in approximately the same proportion, as suggested by Ghauri and Gronhaug (2005).

However, the view of other respondents (for segregation of other respondents see section 4.1) provided a rich source of information and was considered essential for the research.

3.5) Data analysis:

Data was analysed using exploratory or descriptive statistics. This approach enabled the results to be presented in tables, graphs and other forms of diagrams, as suggested by Hussey and Hussey (1997). Furthermore, graphical presentations helped in testing the hypothesis, as suggested by Lovie (1986). Analysis was conducted by the help of computer programme, Statistical Package for the Social Sciences (SPSS 16).

3.6) Ethics:

Under the University of Greenwich Research Ethics policy the aim was to achieve high quality with the highest standards of integrity and practice (University of Greenwich, 2010). Broadly the research followed the following guidelines provided by the University,

- *Voluntary participation and Informed consent*; all participants were provided with an ethical letter (Annex A) which requested for their assistance. Furthermore, the completion of questionnaire was taken as an evidence of consent to participate.

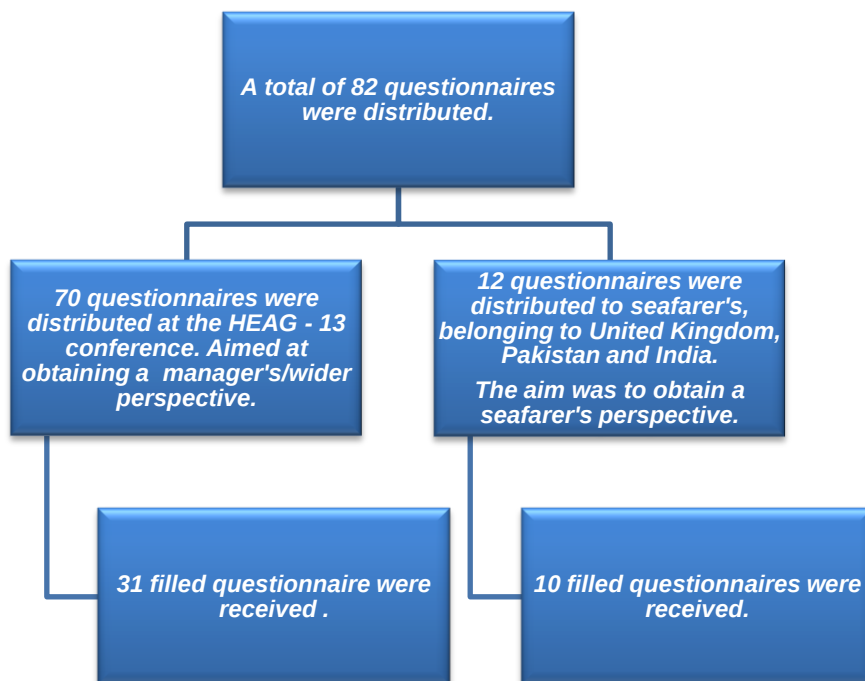
- *Confidentiality*; the participants were informed that the information provided by them will only be used for educational purposes.
- *Anonymity of respondents*; the participants were anonymous to the researcher as individuals completed their questionnaires and placed them in a separate box. Furthermore, the participants were not required to provide their personal details or the name of their organisation.
- *Plagiarism*; to eliminate the dangers of plagiarism Harvard style referencing was used as guided by the University.
- *Human related research*; to address this issue prior commencement of research ethical approval was obtained from the University.

Before the results are displayed in the next chapter, it is important to highlight that the lack of interviews for this research was compensated by the comment section in each questionnaire. Furthermore, the comments were considered reliable due to anonymity and confidentiality of the respondents.

CHAPTER FOUR

Results

This chapter will present the results of questionnaires which, were achieved as represented below,



Hence, the research achieved an overall response rate of 50%. It is important to point out that in order to meet the requirements of quota sampling (as discussed in section 3.4) seafarer's were restricted to 12 respondents. However, due to the non responsiveness of two candidates only 10 filled questionnaires were collected (response rate 83.3%).

Both questionnaires contained a similar set of questions the only difference being in demographic questions and, more importantly (Q9) in seafarer's questionnaire differed from (Q10) in manager's questionnaire. The reason for this choice is stated in section 4.2 (c).

For the purpose of this study owners, operators and ship manager are referred to as, '*representatives from shipping companies*' and accounted for a total of 12 respondents out of 31. Whereas, the remaining sample .i.e. 19 is referred to as '*other respondents.*' This group represented the insurers, classification society, accident investigators, non-government organisation, hazardous incident reporting, publishing, flag administrator, educational/training institutes and safety regulators offshore. Finally, seafarer's accounted for a total of 10 respondents and are referred to as '*seafarer's*' in this study.

Views of representatives from shipping companies were evaluated against the perspective of seafarer's. However, in order to achieve precision, objectivity and rigour (as discussed in chapter 3) results obtained from other respondents were also utilised.

4.1) Analysis of results:

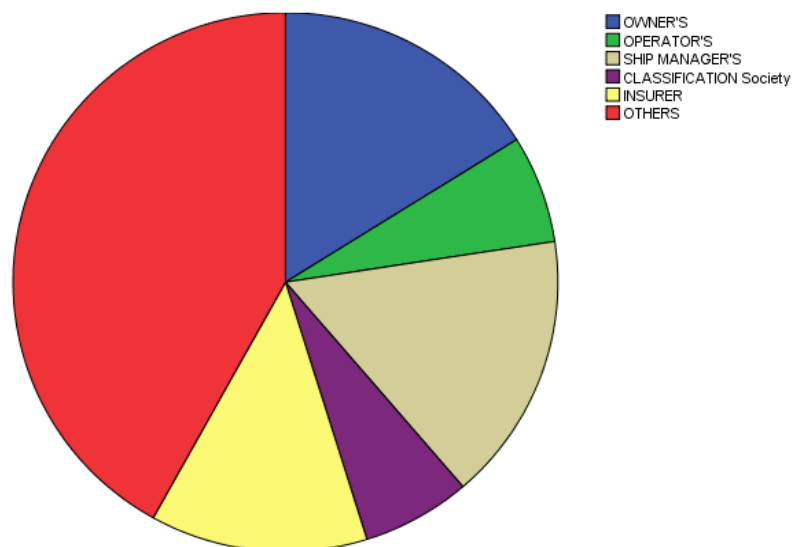
Section (a) will represent the demographic results for manager's questionnaire, section (b) will present the results for demographic questions for seafarer's and, finally section (c) will show combined results for both questionnaires.

a) Manager's questionnaire:

Q1. What type of organisation do you represent?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	OWNER'S	5	16.1	16.1	16.1
	OPERATOR'S	2	6.5	6.5	22.6
	SHIP MANAGER'S	5	16.1	16.1	38.7
	CLASSIFICATION SOCIETY	2	6.5	6.5	45.2
	INSURER	4	12.9	12.9	58.1
	OTHERS	13	41.9	41.9	100.0
	Total	31	100.0	100.0	

Q1. What type of organisation do you represent?

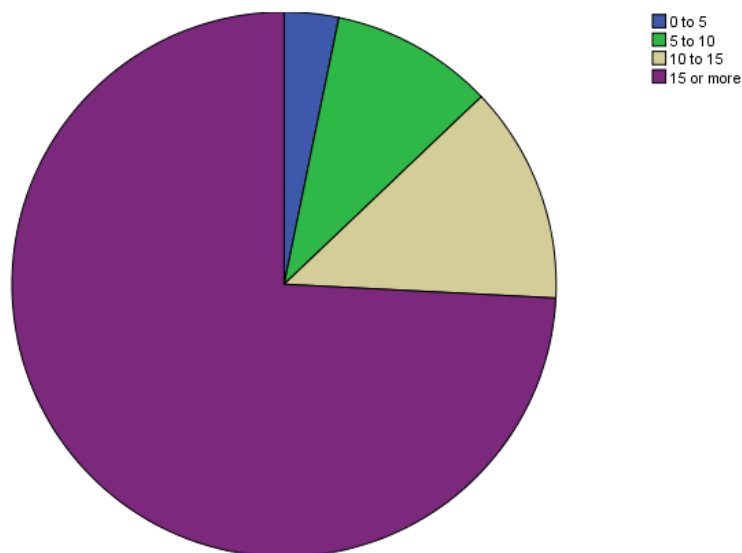


The pie chart represents that respondents in the survey belonged to various sectors of the industry. This was considered essential because, it added a different perspective to the research.

Q2. For how many years have you been associated with the shipping industry?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 to 5	1	3.2	3.2	3.2
	5 to 10	3	9.7	9.7	12.9
	10 to 15	4	12.9	12.9	25.8
	15 or more	23	74.2	74.2	100.0
	Total	31	100.0	100.0	

Q2. For how many years have you been associated with the shipping industry?

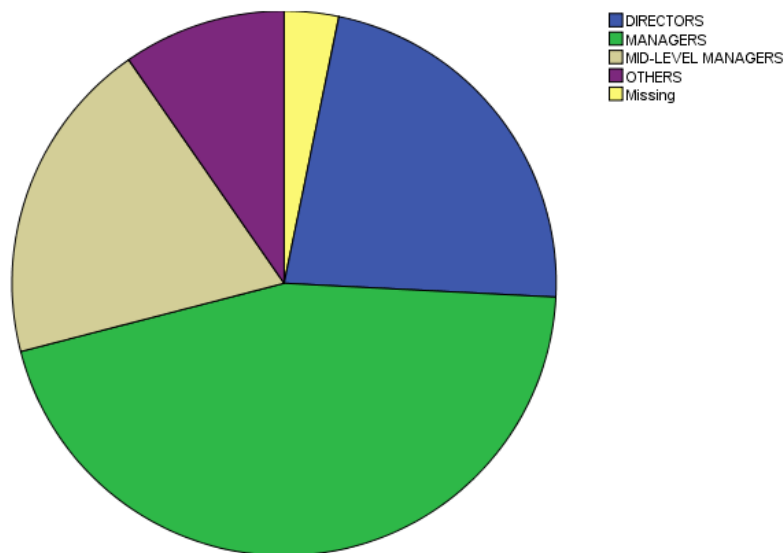


Majority of the respondents had an experience of 15 years or more. This factor was important for this research because, knowledge is a blend of experience and values, a view shared by Davenport and Prusak (1998).

Q3. Please indicate the best possible description of your position.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	DIRECTORS	7	22.6	23.3	23.3
	MANAGERS	14	45.2	46.7	70.0
	MID-LEVEL MANAGERS	6	19.4	20.0	90.0
	OTHERS	3	9.7	10.0	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

Q3. Please indicate the best possible description of your position.



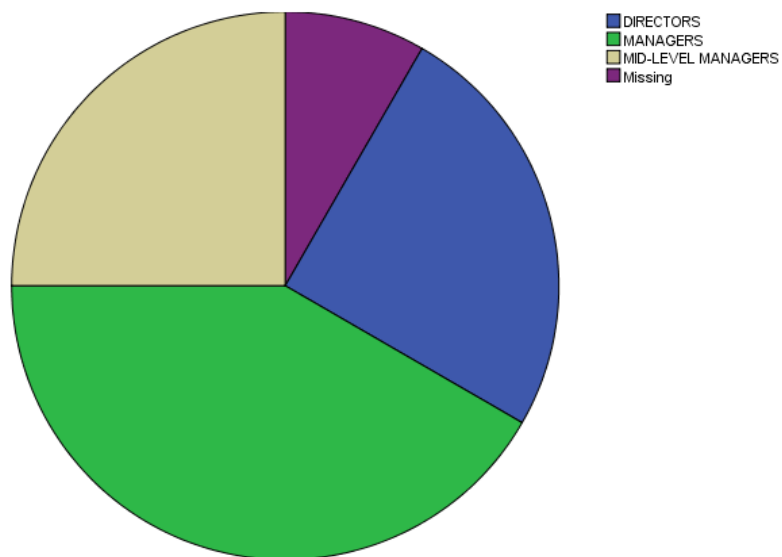
The pie chart represents the position held by respondents in their organisations.

However, the following pie chart highlights the position held by the representatives from shipping companies.

Position held by representatives from shipping companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	DIRECTORS	3	25.0	27.3	27.3
	MANAGERS	5	41.7	45.5	72.7
	MID-LEVEL MANAGERS	3	25.0	27.3	100.0
	Total	11	91.7	100.0	
Missing	System	1	8.3		
Total		12	100.0		

Positions held by representatives from shipping companies.



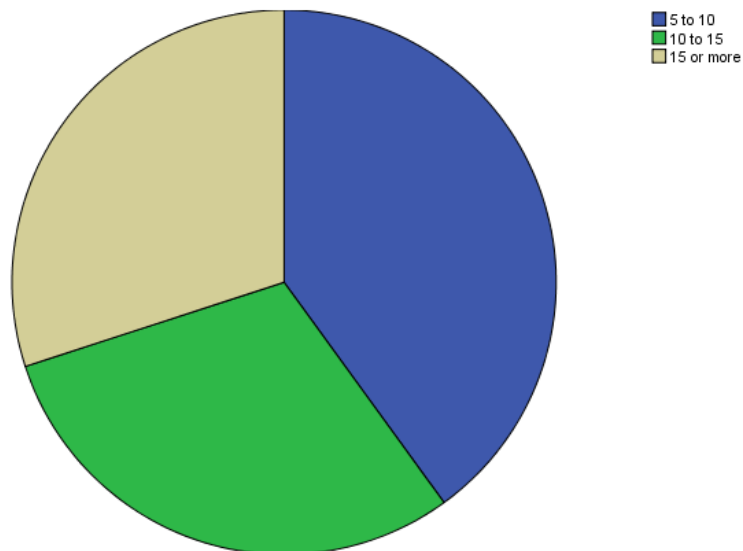
47.1% of respondents were managers whereas, the rest were directors or mid-level managers. Due to the high level of experience (Q.2) the results obtained for the questionnaire were reliable and informative.

b) Seafarer's questionnaire:

Q1. For how many years have you been associated with the shipping industry?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5 to 10	4	40.0	40.0	40.0
	10 to 15	3	30.0	30.0	70.0
	15 or more	3	30.0	30.0	100.0
	Total	10	100.0	100.0	

Q1. For how many years have you been associated with the shipping industry?

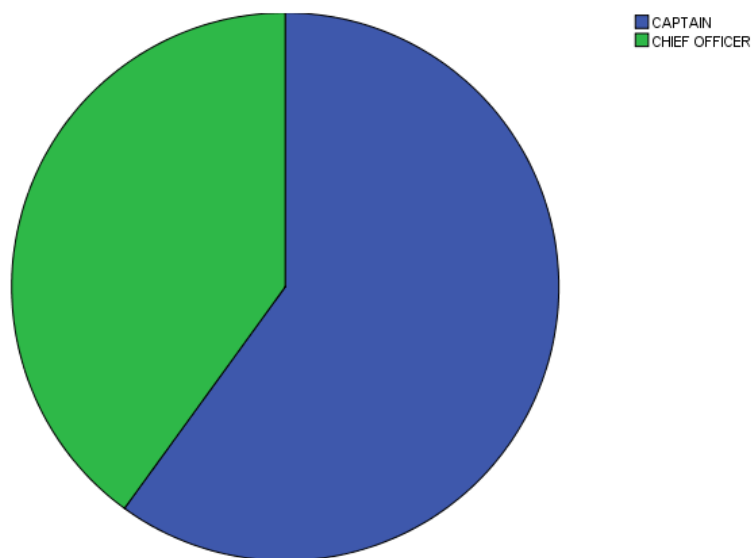


The pie chart represents a good blend of experience for seafarer's.

Q2. Please indicate your rank?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CAPTAIN	6	60.0	60.0	60.0
	CHIEF OFFICER	4	40.0	40.0	100.0
Total		10	100.0	100.0	

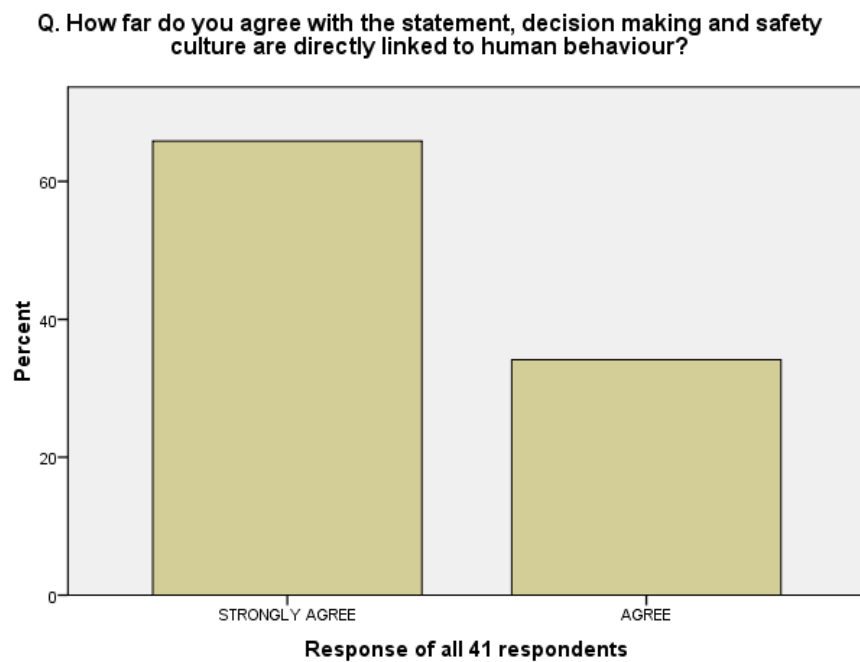
Q2. Please indicate your rank.



The lack of representation from engine department is noted here but, it is argued that a majority of respondents were ship Captains and because, Captains have the overall responsibility of a ship their views were vital for this research.

c) Combined results:

- i) Human element involves an entire spectrum of human activity (IMO, 2002). Hence, the question tested the hypothesis (no.1) that decision-making and safety culture are activities linked to human behaviour and can be classified as human element.



Response of all 41 respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	27	65.9	65.9	65.9
	AGREE	14	34.1	34.1	100.0
	Total	41	100.0	100.0	

The results reflect that all 41 respondents either agreed or strongly agreed to the statement. Hence, in light of the evidence presented hypothesis (1) is validated.

The questions (ii, iii, iv, v and vi) in the following section were aimed at testing the hypothesis (no.2) that, with a high priority assigned to safety ship managers are well trained and respond effectively to safety related issues. Sufficient resources are allocated towards safety and managers understand the importance of cooperation between ship and shore for developing and maintaining a positive culture.

- ii) Safety is of the highest priority for the maritime industry, as discussed throughout the literature review. Hence, the rationale behind this question was to assess the perspective of respondents.



Response of all 41 respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	9	22.0	22.0	22.0
	AGREE	24	58.5	58.5	80.5
	NEITHER AGREE NOR DISAGREE	5	12.2	12.2	92.7
	DISAGREE	3	7.3	7.3	100.0
Total		41	100.0	100.0	

The results reflect that, 58.5% of all respondents agreed to the statement, 22% strongly agreed and, a cumulative 19.5% were either undecided or disagreed.

The above results are best analysed in view of various respondents,

Respondent:

“There is a large variance across the industry.”

Respondent:

“Having worked at sea and then ashore with an oil major and now working for a management company it has drastically opened my eyes to the differences those exist with safety prioritisation...”

Respondent:

“As with most industries there are the good, the bad and the indifferent.”

An interviewee (seafarer) presented an alternative view to this question and mentioned that,

“Managers have to put safety high on their agenda not because they want to but, because they have to .i.e. due to the regulatory regime.”

Even though the results reflect that safety is of importance for a ship manager but, attention is drawn towards the group who were either undecided or disagreed to the statement. The evidence collected from this group suggested a variance within the industry with respect to safety prioritisation. However, with respect to the comment on regulatory regime it is argued that regulatory regime is important for the development of safe and efficient maritime transportation, a view shared by Nordquist and Moore (1999).

- iii) As discussed in section 2.7, under ISM it is the duty of a company to provide resource to ensure that safety prevails. Hence, the rationale behind this question was based on the claim that assigning high priority to safety is irrelevant unless the resources are available to do the job safely.



The mode value of seafarer's and representatives from shipping companies reflected that majority of the respondents agreed to the statement. Results also highlighted that a cumulative of 70% seafarer's were of the opinion that companies provide sufficient resources towards safety as seen below,

Seafarer's

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid STRONGLY AGREE	1	10.0	10.0	10.0
AGREE	6	60.0	60.0	70.0
NEITHER AGREE NOR DISAGREE	1	10.0	10.0	80.0
DISAGREE	2	20.0	20.0	100.0
Total	10	100.0	100.0	

However, majority of other respondents were undecided on this question as seen below.



One reason for this indecisiveness can pointed out in words of an interviewee (manager),

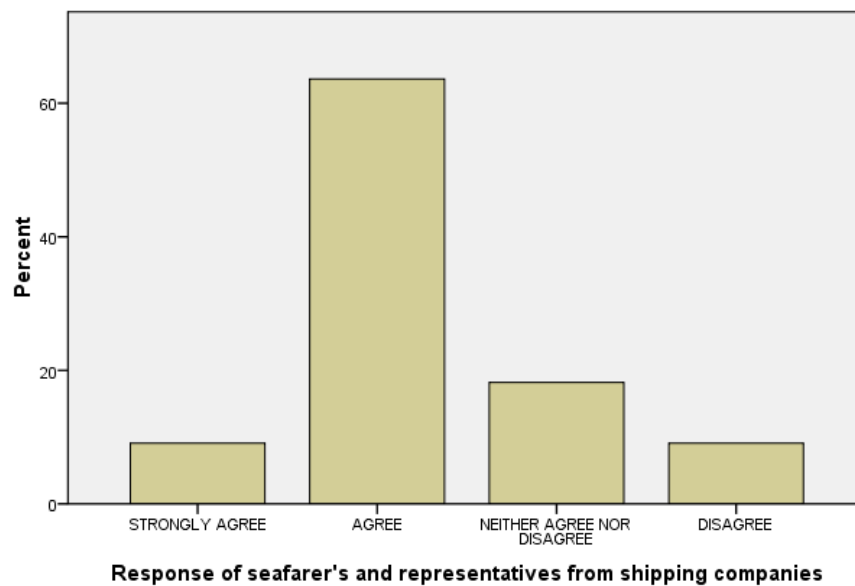
“owners go to managers to save money and this is where we have the problem, in my short (1year so far) experience with ship management we can have the best intentions and, communicate those intentions to owners. But, the funds are not always forthcoming for us to carry through our intentions.”

On one hand the results prove that shipping companies allocate resources towards safety and on the other hand the results indicate a variance in standards. A trend observed in the previous question (II).

The results also indicate that some companies do not allocate sufficient resources towards safety despite clear guidelines from ISM. Hence, it is argued that such compromise on safety would increase the chances of error both at shore and on ships.

- iv) Section - 2.9 of the literature review pointed out that cooperation between management and employees is vital for safety culture. Hence, the rationale behind the question was to collect evidence and to establish whether these two components were cooperating or not.

Q. Shore based and ship board management work together to address safety related issues.



The above bar chart reflects that 63.6% of seafarer's and representatives from shipping companies agreed to the statement. But when results for both groups were compared it revealed that seafarers had a higher degree of agreement to the statement, as seen below.

Seafarer's

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	AGREE	7	70.0	70.0	70.0
	NEITHER AGREE NOR DISAGREE	2	20.0	20.0	90.0
	DISAGREE	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

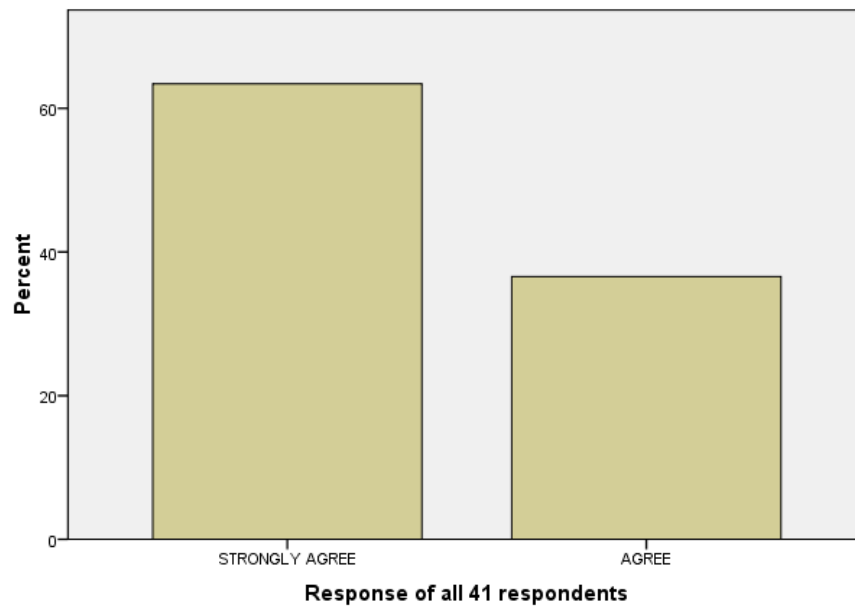
Representatives from shipping companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	2	16.7	16.7	16.7
	AGREE	7	58.3	58.3	75.0
	NEITHER AGREE NOR DISAGREE	2	16.7	16.7	91.7
	DISAGREE	1	8.3	8.3	100.0
	Total	12	100.0	100.0	

Despite the overall consensus on the high level of cooperation it is also evident from the tables that both groups chose from the lower end of the Likert scale and, this lack of cooperation on behalf of seafarers or companies can induce human error (Blache, 1988).

- v) Section 2.8 and 2.9 of literature review respectively commented on the importance of the decision, leadership and joint commitment. Hence, the question was designed to verify if these factors were necessary for a safety culture.

Q. Safety culture is not established by written policies, but rather by decisions, leadership and a joint commitment from ship and shore based management.



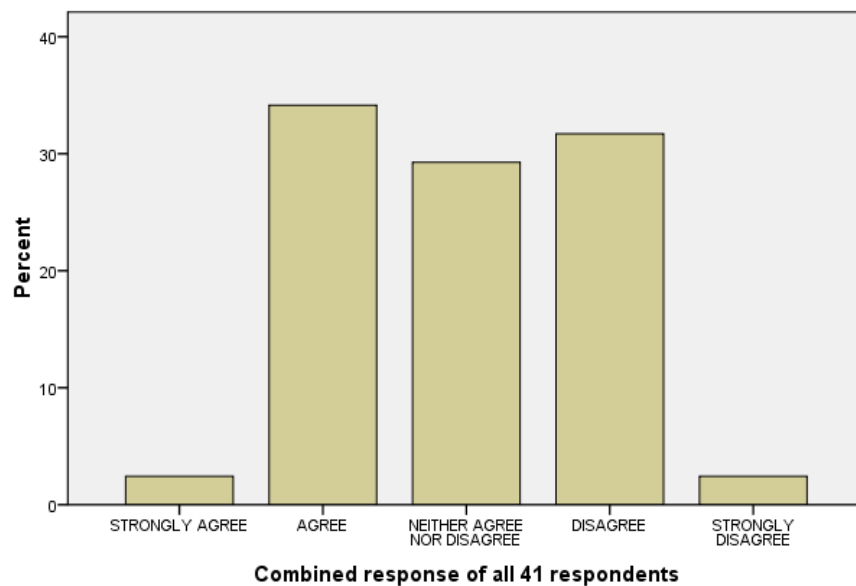
The bar chart above reflects that all respondents either agreed or strongly agreed to the statement. In light of the evidence for a safety culture to flourish the factors mentioned were considered important by the industry.

However, results derived from this question might not be true for organisations that exhibited a lack of cooperation as discussed in question (iv). Such organisations might only offer a lip service which in view of Roughton and Mercurio (2002) would be ineffective. Or on the other hand there might be a lack of cooperation from the employees.

vi) “Foundation of any culture is human element” (Nielsen, 2005, p.151)

hence, educating and training are important for preparing the personnel to deal with safety culture. The question was aimed to determine if shipping managers were trained to handle safety related issues.

Q. Shipping managers are adequately trained and respond effectively with respect to safety issues.



Response from all 41 respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	1	2.4	2.4	2.4
	AGREE	14	34.1	34.1	36.6
	NEITHER AGREE NOR DISAGREE	12	29.3	29.3	65.9
	DISAGREE	13	31.7	31.7	97.6
	STRONGLY DISAGREE	1	2.4	2.4	100.0
Total		41	100.0	100.0	

The results for this question are best analysed in view of following responses,

Respondent:

“Some managers are trained to a good standard, however in my experience some managers have had no sea going experience and this can lead to misunderstanding and unwanted stress.”

Respondent:

“Improper or no training leads to wrong decisions, which in turn leads towards accidents. Unless manager/company employees are trained properly the crew cannot be blamed. The trainer should be correctly trained to enable to provide training to crew-for the crew to perform.”

With 29.3% undecided and almost an equal percentage of respondents either agreeing or disagreeing to the statement, it is difficult to arrive at a conclusion. However, the varying standards within the maritime industry are once again visible. In light of the results it can be assumed that some companies employ highly trained managers whereas, other will settle for lower level of competence.

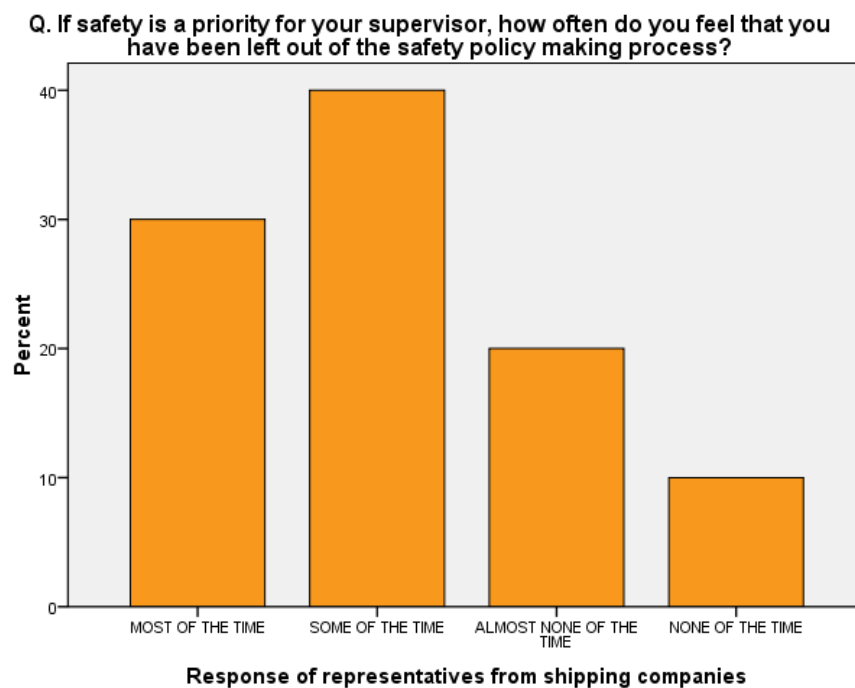
Attention is drawn towards the objectives of ISM which state that, “safety management objectives of the company should, continuously improve safety management skills of personnel ashore...” (IMO, 2002, p.1) Furthermore, training is an essential factor that affects human element in shipping, a view shared by MCA (2010). Hence, inadequately trained managers are a threat to the overall safety regime in shipping.

Status of hypothesis (no.2):

The evidence for hypothesis (no.2) has created two opposing views. Firstly, there is a part of industry where safety is of importance, resources are sufficiently available, ship and shore are working hand in hand, their managers are well trained and as a result of their decisions and leadership a positive safety culture can be established, this the '*exemplary group*.' However, the evidence has also identified a group that is deviating from the normal expectations and this is the '*atypical group*.'

Finally, the evidence has resulted in an inconclusive hypothesis.

- vii) A good safety policy is essential for a safety culture and in developing a policy the inclusion of employees at all level may improve workplace safety (Butler and Seung Park, 2005). Hence the aim was not only to determine if seafarers were a part of this process but, also to see whether managers were a part on this chain. For this reason the questions were worded differently for managers and seafarer's. However, both questions were developed to test hypothesis (no.3) that, in developing a safety policy the views of all relevant members should be taken into account.



There were two respondents who did not reply to this question due to their position and marked the question as not applicable.

The results revealed that, none of the respondents were consulted at all times in developing a policy. However, a majority of managers were either consulted most or some of the times and a fewer percent of mangers were not consulted in developing a policy, as seen below.

Representatives from shipping companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MOST OF THE TIME	3	25.0	30.0	30.0
	SOME OF THE TIME	4	33.3	40.0	70.0
	ALMOST NONE OF THE TIME	2	16.7	20.0	90.0
	NONE OF THE TIME	1	8.3	10.0	100.0
	Total	10	83.3	100.0	
Missing	System	2	16.7		
Total		12	100.0		

Seafarer's response to the question was as follows,

Seafarer's response

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SOME OF THE TIME	4	40.0	40.0	40.0
	ALMOST NONE OF THE TIME	5	50.0	50.0	90.0
	NONE OF THE TIME	1	10.0	10.0	100.0
	Total	10	100.0	100.0	



Once again no seafarer was consulted at all times in developing a safety policy, only 40% stated that they were consulted sometime and 50% belonged to the group who were almost never consulted.

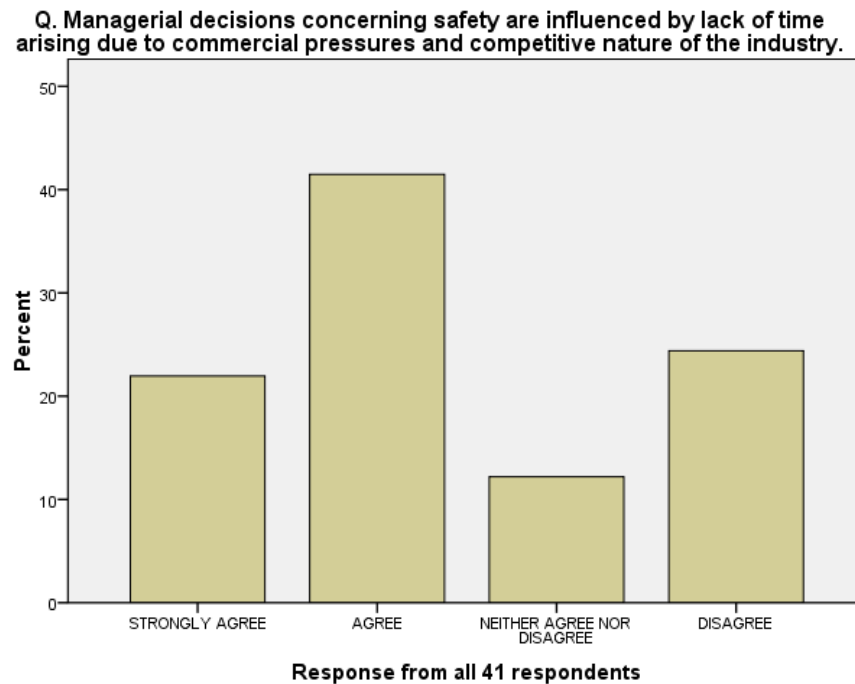
Earlier it was established that 63.6% of seafarer's and representatives from shipping companies agreed that, both departments work together in addressing safety related issues. However, the results of these questions reflect a picture contrary to earlier claims.

In view of the evidence it is suggested that safety culture is significant part of human element (Crawl, 2007) and there should be an increased level of cooperation between the ship and shore. It is because of cooperation that leaders and employees can accomplish organisational goals as a member of one team (Barrow, 2004).

In view of seafarers a majority was not being consulted during the formulation of a safety policy hence, hypothesis (no.3) is disapproved.

However, when tested against the manager's perspective the hypothesis stands proven because of a higher level of involvement.

- viii) The question tested the hypothesis (no.4) that, decision-making is a process affected not only by human behaviour but also by the demands of business.

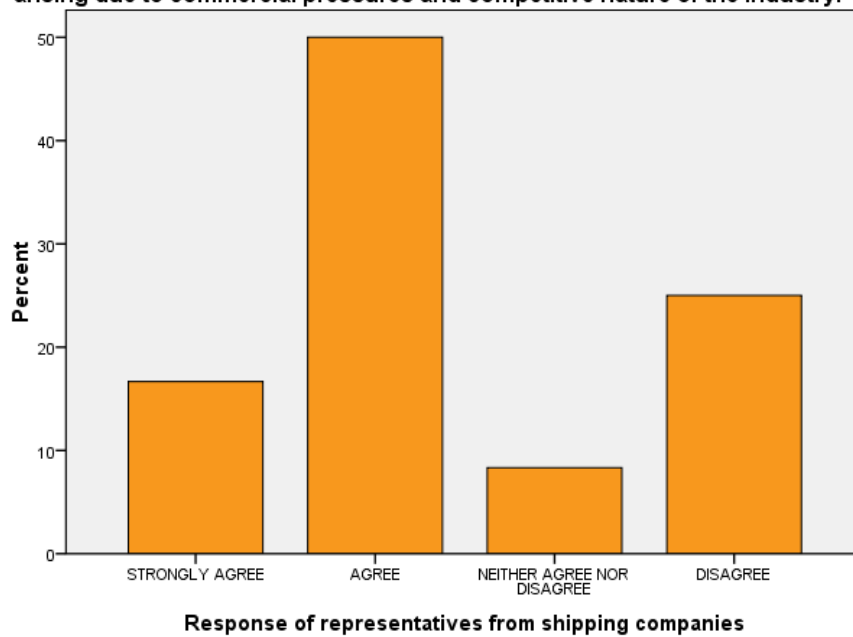


A cumulative 63.4% of all respondents either agreed or strongly agreed to the statement, 12.2% were undecided and, 24.4% disagreed. However, in order to get a true perspective on the question it is vital to display the result for representatives from shipping companies, as seen below.

Representatives from shipping companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	2	16.7	16.7	16.7
	AGREE	6	50.0	50.0	66.7
	NEITHER AGREE NOR DISAGREE	1	8.3	8.3	75.0
	DISAGREE	3	25.0	25.0	100.0
	Total	12	100.0	100.0	

Q. Managerial decisions concerning safety are influenced by lack of time arising due to commercial pressures and competitive nature of the industry.



A cumulative 66.7% of representatives from shipping companies agreed or strongly agreed to the statement, 8.3% were undecided and 25% disagreed.

These results clearly indicate an agreement to the statement however, a respondent representing the seafarer's group commented on the question and stated,

“Due to profit driven mentalities within shore based management decisions are made focused more on yield and revenue, instead of employee safety and well being. There seems to be a lack of cause and effect analysis with regards to safety in the mind of today's shore based manager. Safety is routinely by passed in order to 'hit target' and exceed key performance indicators (KPI's). This is probably due to these targets and KPI's - being directly linked to shore bonus payments.”

The same respondent compared shipping industry with the banking sector and commented,

“behaviours such as above have direct consequences as recently seen within the banking industry where bankers failed to recognise that what they did on computers and on paper, directly affected the average workers live.”

Whether it is commercial pressure or profit driven nature of managers the results clearly reflect that, safety decisions are affected due to commercial and competitive nature of the industry hence, proving the hypothesis (no.4) correct.

On a positive note 25% of the respondents from shipping companies disagreed to the statement. In view of a respondent,

[Respondent:](#)

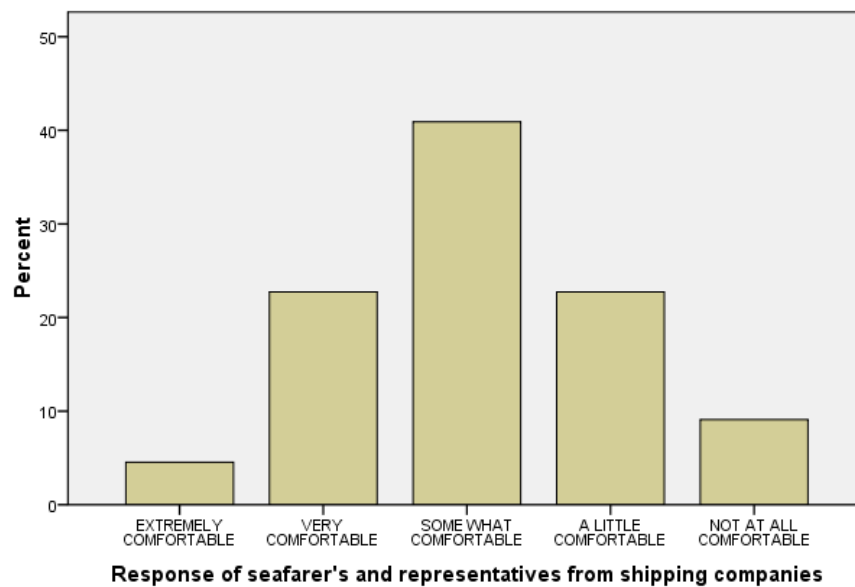
“In any good company this would not be a problem.”

The reason for their achievement can be due to several factors and it is beyond the scope of this research to comment on them. Nevertheless, we have to learn from the

practices of these companies and introduce them for the benefit of the wider industry
.e.g. un-trained managers might find it difficult to make sound decisions in the fast
business environment and could trigger errors.

- ix) In developing this question it was admitted that growth of global trade (as discussed in section 2.1) and the “increasing drive for competitiveness is a fact of life,” a view shared Hawkins (2005, p.116). Hence, this question tested hypothesis (no.4) at a deeper level by assessing the level of comfort for decision-making when balancing between safety and profits.

Q. How comfortable are ship managers with their decisions when balancing between safety and profits?



Response of seafarer's and representative from shipping companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	EXTREMELY COMFORTABLE	1	4.5	4.5	4.5
	VERY COMFORTABLE	5	22.7	22.7	27.3
	SOMEWHAT COMFORTABLE	9	40.9	40.9	68.2
	A LITTLE COMFORTABLE	5	22.7	22.7	90.9
	NOT AT ALL COMFORTABLE	2	9.1	9.1	100.0
	Total	22	100.0	100.0	

The results indicate that 40.9% of respondents from this group belonged to the middle scale .i.e. somewhat comfortable, a cumulative 27.3% of respondents belonged to the upper scale and an equal percentage were a little comfortable in balancing between safety and profits whereas, 9.1% were not comfortable at all.

Although hypothesis (no.4) was proved correct but when tested here the evidence suggests a need for improving the art of balancing between safety and profits.

Hence, within the limits of this research a managerial decision is questionable if,

- They are unable to attain a balance between safety and profits,
- They are inadequately trained in dealing with safety related issues and,
- Their decisions concerning safety are influenced by commercial pressure and competitiveness.

However, in replying to the question a respondent provided an alternate view and stated,

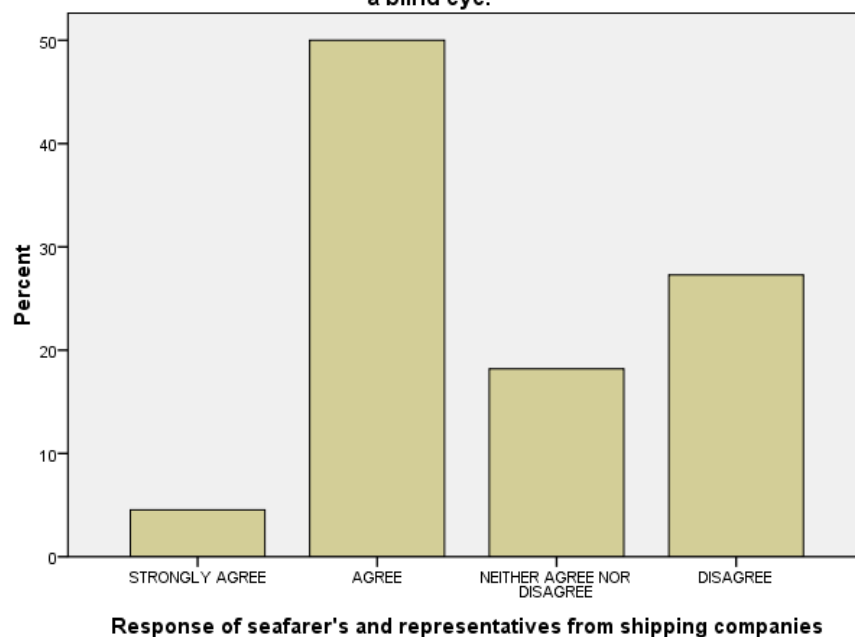
“Shore based managers are very good at promoting/selling safety initiatives and getting employees ‘on side’, however when these initiatives impact commercially, these initiatives tend to be forgotten or by-passed and, are quietly phased out or ‘fall in by the wayside’.”

The above comment reflects that there is a deliberate attempt from the management to ignore the balance between safety and profits. In words of Fuller and Vassie (2004, p.410), if it is decided to achieve profits any cost then it is classified as unethical management whereas, when profits are achieved within the principle of “fairness and justice” for all share holders it is known as ethical management.

However, the results also identified a group who is '*very*' and '*extremely*' comfortable in maintain this balance and their practices have to be shared with the industry, for it will help in understanding the concepts of ETTO/paradoxes and polarities (as discussed section 2.8)

- x) Section 2.3 highlighted how various organisations have raised awareness about the importance of human element. Hence, the question was designed to the hypothesis (no.5) that, due to the awareness (.e.g. ISM) and consequences of neglecting human element (.e.g. *Herald of Free Enterprise*) management does not ignore the breaches in safety but adopt a proactive attitude towards safety.

Q. If on board safety procedures are by passed, sometimes management turns a blind eye.



Response of seafarer's and representatives of shipping companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	1	4.5	4.5	4.5
	AGREE	11	50.0	50.0	54.5
	NEITHER AGREE NOR DISAGREE	4	18.2	18.2	72.7
	DISAGREE	6	27.3	27.3	100.0
	Total	22	100.0	100.0	

A cumulative of 54.5% respondents either agreed or strongly agreed to the statement whereas, 18.2% were undecided and, 27.3% disagreed to the statement.

The results reflect that at times management deliberately ignore the breaches in safety procedures. Attention is drawn towards a study conducted by Santiago (2007), who defines violation as a deliberate deviation from established procedures, a view shared by UK P&I club (2010). These violations stem from motivational factors and are shaped by beliefs and attitudes (Barnett, 2005; Santiago, 2007 and UK P&I club, 2010). Furthermore, these violations are classified as human error (Reason, 1997) and by-passing an established procedure is considered as highly dangerous (Santiago, 2007).

Before commenting on the status of hypothesis (no.5), it is important to mention that according to Santiago (2007), violations are not only applicable to management but such behaviour is applicable to everyone in a company.

Finally, in light of the evidence presented hypothesis (no.5) is proved wrong.

Furthermore, in view of the arguments stated above these violations of ISM are considered detrimental to a safety culture.

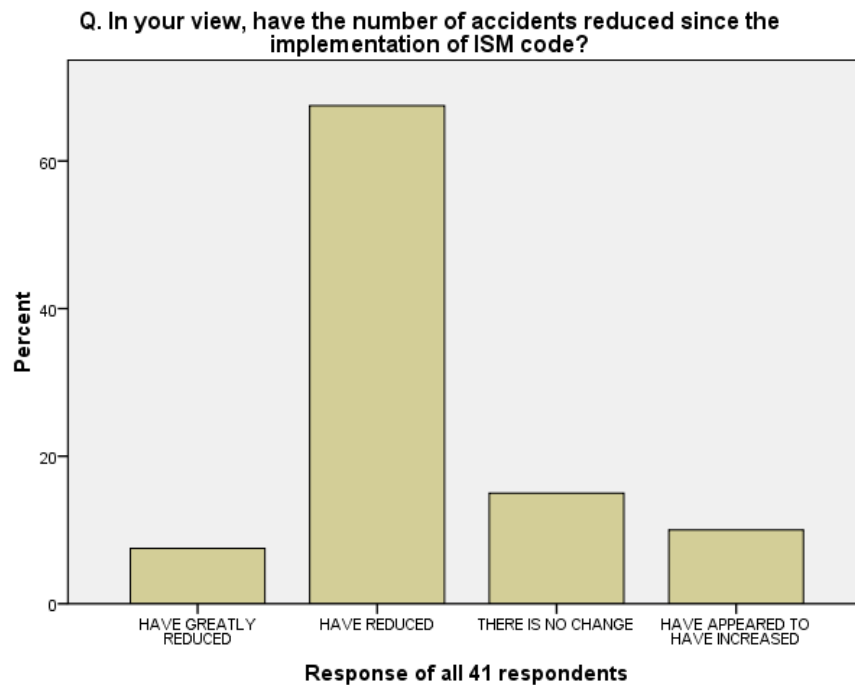
However, a possible solution to the problem lays in the comments of an interviewee (seafarer),

“ISM will do wonder if seafarer’s will stop cutting corners .i.e. either on their own or, on behalf of the owner.”

- xi) As discussed in section - 2.7, the objective of ISM was to reduce maritime accidents. Hence, the question was aimed at testing the hypothesis (no.6) that ISM has successfully addressed the human element issues in accidents.

Response of all 41 respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	HAVE GREATLY REDUCED	3	7.3	7.5	7.5
	HAVE REDUCED	27	65.9	67.5	75.0
	THERE IS NO CHANGE	6	14.6	15.0	90.0
	HAVE APPEARED TO HAVE INCREASED	4	9.8	10.0	100.0
	Total	40	97.6	100.0	
Missing	System	1	2.4		
Total		41	100.0		



The results identified that 67.5% of the respondents suggest that ISM has reduced the number of accidents, 15% were of the view that there is no change and 10% suggested an increase in accidents.

In view of the overall consensus it will be justified to say that ISM has been a success. However, when answering this question a respondent commented that it is,

“Very difficult to quantify, ISM has increased the level of reporting accidents, whether an overall decrease? Not sure.”

Another respondent replied that he or she, “*doubts*” if accidents have reduced due to ISM.

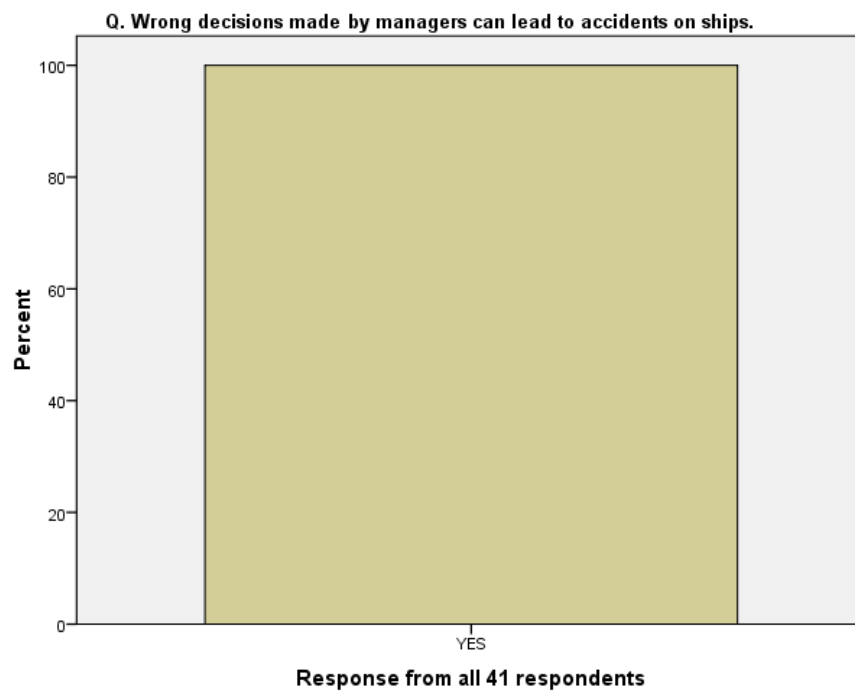
However, on the basis of the results for this question and the statistics presented in section (2.5) which indicated a reduction in accidents and total losses, hypothesis (6) proves that ISM has addressed the issues of human element in accidents.

Despite the importance of ISM section (2.5) also highlighted an increase in different types of accidents hence, it is emphasised that the industry has to expand its knowledge on role of human element in accidents.

- xii) As discussed in the literature review decision-making is a part of human behaviour. The question tested the hypothesis (7) that, wrong decisions made by managers can cause accidents on ships.

Response from all 41 respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	41	100.0	100.0	100.0



All 41 respondents agreed to the statement hence, hypothesis (7) is proved to be correct.

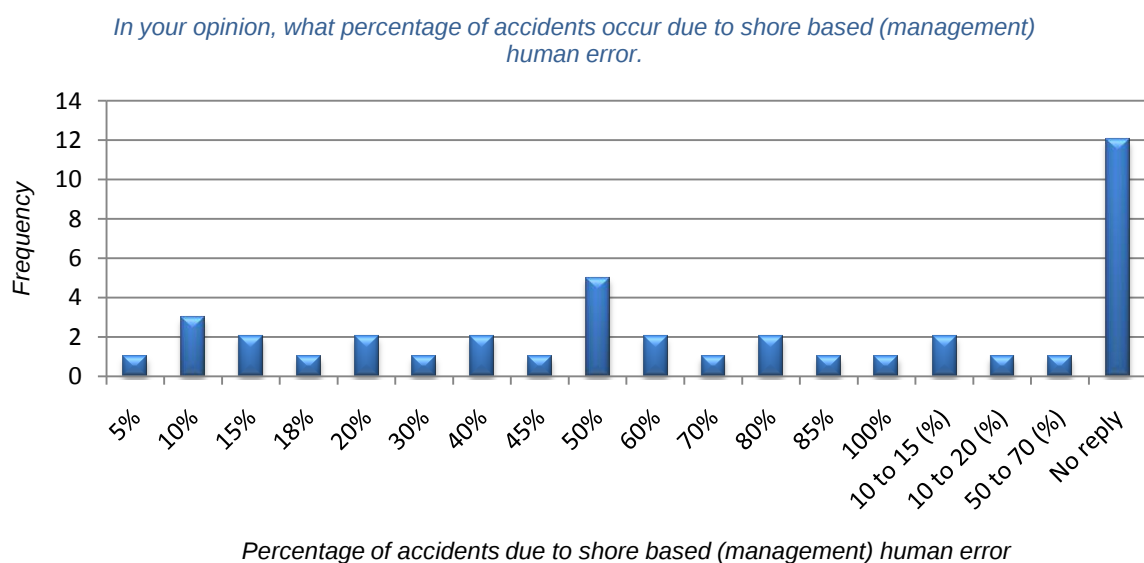
Managerial decisions can lead to accidents, because such decisions can induce errors or latent errors. Hence, the second part to this question asked the

respondents to state a percentage that they would allocate towards accidents which are induced due to shore based (management) human error.

Before the results are displayed it is important to highlight that, there is very little evidence within the industry which underpins the percentage of accidents which are attributed to shore based human error. However, Marine Information Note (MIN) 392 (M) published by MCA mentions that, "...20% of accidents and incidents are attributable to latent human element issues." (MCA, 2010, p.1)

Perhaps due to the lack of statistical data twelve respondents did not provide any answer and had the following comments to support their choice,

- *"Too big a question"*
- *"Not a clue"*
- *"I find it very difficult to have an opinion on this as there is no evidence, even though it must be right."*



However, the opinion of the other 29 respondents is displayed above. The graph clearly highlights an important point that wrong decisions made by managers can cause accidents on ships.

Summary:

The above findings indicate that, decision-making and safety culture are affected by human behaviour and can be classified as human element. The research identified a degree of variance with respect to adequately trained managers, allocation of sufficient resource by the companies and the lack of involvement of relevant members in developing a safety policy, especially seafarer's. Majority of the managers were somewhat comfortable in balancing between safety and profits, while being affected by the lack of time arising due to the competitive nature and commercial pressures. ISM is an important tool for the maritime industry but evidence has indicated a high percentage of managers who deliberately ignored the breaches in safety and do not have a proactive attitude towards safety culture. Finally, the research identified that wrong decisions made by managers can lead to accidents.

The finding of this research holds great importance for a manager in a shipping company because, in view of Mankabady (1987) and Krintiansen (2004) maritime accidents lead to various consequences such as,

- Injuries or loss of life;
- Environmental damage;
- Economic losses;
- Social and;
- Legal.

Shipping is no stranger to regulatory regime but, in view of The Law Commission (2010), a large number of criminal legislations has been introduced those are targeting the business sector. Hence, the following chapter will look into the legal and financial importance of this research for managers.

CHAPTER FIVE

Managerial importance of the research

Our decision-making ability is a part of our psychology and our decisions also affect the safety culture (as discussed in previous chapters). Today the laws in United Kingdom are reflecting that the decisions made by the management should be ethical and beneficial for everyone otherwise, the companies will be accounted for their actions as seen below.

5.1) Companies Act 2006 (CA):

The CA 2006 is now fully implemented in the United Kingdom and the law addresses the director's decision-making criteria's. Under section (172) it is stated that, for the success of a business director's have to consider the interests of employee's, customer, the long term effect of decisions, the community and the environment (Medhurst, 2010, p.1). Though the list non-exhaustive but one thing is clear that director's can no longer offer "lip service" (Companies Act 2006, 2006, p.51).

5.2) Corporate Manslaughter and Corporate Homicide Act 2007:

The Corporate Manslaughter and Corporate Homicide Act is also fully functional in the United Kingdom. The Act applies to a wide range of organisations across the public and private sectors (Ministry of Justice, 2007). Under the Act organisations will

be liable to conviction “where a gross failure in the way activities were managed or organised results in a person’s death” (Ministry of Justice, 2007). Under the new approach courts will look at the management systems and practices across the organisation in order to curb the corporate failures to manage health and safety (Corporate Manslaughter and Corporate Homicide Act, 2007). According to the Act figures at senior level within an organisation will be liable for prosecution and Ministry of Justice (2007), define senior level as people who make strategic decision regarding the organisation or for a substantial part of it, it also includes personnel at operational management level.

5.3) Merchant Shipping Act 1995:

Part IV, Section 98 of the Merchant Shipping Act 1995 states if a ship in United Kingdom or a United Kingdom ship in any other port is dangerously unsafe then the master and the owner of the ship shall each be guilty of an offence which could result in a fine, imprisonment or both (Merchant Shipping Act 1995, 1995).

5.4) Financial Losses:

In view of Schaltegger, et al. (2003, p.197), “economic risks are mirrored best through liability claims, fines and compensation payments.” This statement can be best seen by following examples,

- P&I Club in 1997 reported that human error was responsible for 58% of major claims (UK P&I Club, 2010).
- The Standard P&I Club reported that, over a recent ten-year period, insurance claims cost the P&I industry US\$15 billion. Furthermore, 65% of this payout

.i.e. US\$10 billion were for incidents in which human played a central role (MCA, et al., 2010).

- In 2008, a maritime disaster occurred nearly every week (on average), with an insurance claim of over US\$17m, or had an economic impact of over US\$85m. In 2008, maritime insurers paid out over half a billion US\$ for casualties (MCA, et al., 2010).

The above chapter can be summarised by the following example,

The formal investigation into the accident of *Herald and Free Enterprise* stated that, the Board of Director's had no sense of responsibility, they failed to fulfil their duties and the shore management was a contributory factor toward the accident (Davies, 2008). Despite the evidence P & O were not prosecuted on the charges of corporate manslaughter (Davies, 2008). However, today there are clear directions for a company under the CA 2006 and had the case of *Herald of Free Enterprise* been prosecuted under The Corporate Manslaughter and Corporate Homicide Act 2007, then "there would seem to be every likelihood that P & O would have found itself convicted of corporate manslaughter" (Davies, 2008, p. 20).

Hence, the managerial importance of this research is embedded in the fact that addressing human element effectively will empower the managers to make decisions which are considered beneficial for safety culture and, in doing so they can avoid prosecutions and reap immense financial benefits.

CHAPTER SIX

Conclusion and Recommendations

Today the industry accepts the importance of human element and its role towards accident causation. Human element involves an entire spectrum of human activities and as indicated by the results decision-making and safety culture can be classified as human element. The research identified that written policies are not enough for the establishment of a safety culture but, it requires ingredients such as leadership and joint commitment.

The variance identified in the industry was categorised by defining two groups, one that adhered to the best practice the '*exemplary group*' and the one that deviated from these practices the '*atypical group*'. The '*exemplary group*' is considered important for this research because, in light of the literature review their practices are based on sound knowledge and experience.

However, critics of the above statement would point out towards accidents such as *Herald of Free Enterprise*, *Exxon Valdez* and *The Deep Water Horizon*. These accidents happened to companies who were well established and took safety seriously. But within the limits of this research rather than under estimating the importance of the '*exemplary group*' these accidents suggests that it is imperative to expand the current knowledge on human element.

By expanding its horizon the research discovered that, decisions regarding safety are affected not only by human behaviour but are also affected by the business

environment. Furthermore, decisions made under such environment are also affected by the principle of ETTO and paradox and polarities.

On the basis of the evidence and in conjunction with literature review it is argued that, our values and attitudes are some of the factors which influence our decisions and in turn affect the safety culture. Hence, the decision by management to deliberately ignore the breaches in safety is negatively affecting the safety culture.

Even though training is considered as an important factor that affects the human element the results identified a high degree of indecisiveness amongst the respondents. Hence, ignoring the breaches in safety and inadequately trained managers are a clear violation of ISM, which is recognised as an important tool to address the role of human element in accidents.

The literature review pointed out that human element and organisational issues are factors that induce human error. In this context the research reached its zenith when it was unanimously agreed that wrong decisions made by managers can lead to accidents on ships.

The present research concludes that managers in a shipping company are affected by human element, their decisions are influenced by their values and attitudes and safety culture is considered as a significant part of human element.

Hence, failure to address these issues properly will result in maritime accidents and even though there are clear financial gains to be reaped from addressing human element, attention is drawn towards the introduction of MLC – 2006, The Companies Act 2006 and The Corporate Manslaughter and Corporate Homicide Act

2007. These legislations are clear indications that companies are required to make decisions which are beneficial for all and, if they fail to meet the required standards they will be held responsible for their actions.

Recommendations:

On the basis of the deductions made in this research it is recommended that,

- (1) Companies should analyse the current training standards for their managers and act in accordance to the guidelines provided by ISM.
- (2) Seafarers should be involved in developing a safety policy for they are the ones who actually follow these policies.
- (3) The industry should further enhance its knowledge on human element and its role in accidents by investigating beyond ships.

This research is a small yet significant step in a direction that will open new avenues for future research and it enable the industry to achieve the motto of International Maritime Organisation, “safe, secure and efficient shipping on clean oceans.”

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Annexes

Annex A: Ethical letter

Respected Sir/Madam,

I am a student at Greenwich Maritime Institute, pursuing my Masters of Business Administration in Maritime Studies. As an integral part of my course I am required to conduct an original piece of research.

The topic of my research is;

“Does the presence of human element in shipping companies contribute towards accidents on ships?”

I request your kind assistance in completing the attached questionnaire. Your valuable input is important for the research. Please feel free to provide any additional comments on the topic or the questionnaire.

I hereby assure you that the information provided in the questionnaire is anonymous, shall only be used for strict academic purposes and, will be treated confidentially. Furthermore, the whole process is based on the ethical guidelines provided by the University.

I would like to thank you on behalf of myself and the University for participating in this research.

Regards,

Tipu Parvez

Annex B: Manager's questionnaire

1. What type of organisation do you represent?

- ☐ Owner
- ☐ Operator
- ☐ Ship manager
- ☐ Classification society
- ☐ Insurer
- ☐ Manning agent
- Others (please specify): _____

2. For how many years have you been associated with the shipping industry?

- ☐ 0-5
- ☐ 5-10
- ☐ 10-15
- ☐ 15 or more

3. Please indicate the best possible description of your position?

- ☐ Director
- ☐ Manager
- ☐ Mid level manager
- Others (please specify): _____

4. How far do you agree with the statement; "decision making and safety culture are directly linked to human behaviour?"

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

In companies you have worked for, or closely with, how far do you agree with the following statements?

5. Ship managers give a high priority to safety.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly Disagree

6. Shipping companies allocate sufficient resources towards safety.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

7. Shore based and ship board management work together to address safety related issues.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

8. Safety culture is not only established by written policies, but also by decisions, leadership and a joint commitment from ship and shore based management.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

9. Shipping managers are adequately trained and respond effectively with respect to safety issues.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

10. If safety is a priority for your supervisor, how often do you feel that you have been left out of the safety policy making process?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ Almost none of the time
- ☐ None of the time

11. Managerial decisions concerning safety are influenced by lack of time arising due to commercial pressures and competitive nature of the industry.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

12. How comfortable are ship managers with their decisions when balancing between safety and profits?

- ☐ Extremely comfortable
- ☐ Very comfortable
- ☐ Somewhat comfortable
- ☐ A little comfortable
- ☐ Not at all comfortable

13. If on board safety procedures are by-passed, sometimes management turns a blind eye.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

14. In your view, have the number of accidents reduced since the implementation of ISM code?

- ☐ Have greatly reduced
- ☐ Have reduced
- ☐ There is no change
- ☐ Have appeared to have increased

15. Wrong decisions made by managers can lead to accidents on ships.

- ☐ Yes
- ☐ No

If you have answered “Yes” to the above question, then in your opinion, what percentage of accidents occur due to shore based (management) human error.

_____ %

Comments:

Annex C: Seafarers questionnaire

1. For how many years have you been associated with the shipping industry?

- ☐ 0-5
- ☐ 5-10
- ☐ 10-15
- ☐ 15 or more

2. Please indicate your rank?

- ☐ Captain
- ☐ Chief Officer
- ☐ Chief Engineer
- ☐ 2nd Engineer

Others (please specify): _____

3. How far do you agree with the statement; “decision making and safety culture are directly linked to human behaviour?”

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

In companies (or a company) you have worked for, how far do you agree with the following statements?

4. Shore based managers give a high priority to safety.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly Disagree

5. Shipping companies allocate sufficient resources towards safety.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

6. Shore based and ship board management work together to address safety related issues.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

7. Safety culture is not only established by written policies, but also by decisions, leadership and a joint commitment from ship and shore based management.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

8. Shipping managers are adequately trained and respond effectively with respect to safety issues.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

9. How often do you feel that you have been involved in the safety policy making process, in the company?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ Almost none of the time
- ☐ None of the time

10. Managerial decisions concerning safety are influenced by lack of time arising due to commercial pressures and competitive nature of the industry.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

11. How comfortable are ship managers with their decisions when balancing between safety and profits?

- ☐ Extremely comfortable
- ☐ Very comfortable
- ☐ Somewhat comfortable
- ☐ A little comfortable
- ☐ Not at all comfortable

12. If on board safety procedures are by passed, sometimes management turns a blind eye.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

13. In your view have the number of accidents reduced since the implementation of ISM code?

- ☐ Have greatly reduced
- ☐ Have reduced
- ☐ There is no change
- ☐ Have appeared to have increased

14. Wrong decisions made by managers can lead to accidents on ships.

[] Yes

[] No

If you have answered “Yes” to the above question, then in your opinion, what percentage of accidents occur due to shore based (management) human error.

_____ %

Comments:

Annex D: Interview questions

- Ship managers give a high priority to safety, Yes or No.

If No, briefly describe what seems to be a higher priority

- Ship companies allocate sufficient resources towards safety, Yes or No.

If No, briefly describe what seems to be a potential problem.

- If on-board safety procedures are by-passed sometimes management turns a blind eye, Yes or No.

If No, briefly describe why they are inclined to do so.

- Human element is an important tool to reduce accidents, Yes or No.