

CHALMERS



The Master's Perception of Maritime Safety -An explorative study

Master of Science Thesis

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Abstract

This thesis is intended as an explorative study of Swedish masters' perception of the concept of maritime safety, how to improve and maintain it and their, as well as other interested parties, role in relation to this.

Ten active shipmasters were interviewed and their statements on this subject were analyzed and compared to previous research in the field.

The results showed that Swedish masters assign a high priority to the safety of their vessel and those onboard it. Safety was in turn defined as the activity of ensuring that accidents are avoided. A high level of safety was furthermore believed to require safe behavior, entailing both rule adherence and safety initiatives. Such safe behavior was thought to be promoted through: informing individuals of the inherent risks involved in operations; monitoring activities and providing corrections; committed and supportive superiors who convey an impression of safety being important; involvement and participation in safety related activities and; good interpersonal relations in a non-hierarchical organization with a no-blame culture.

There were also indications that maritime safety management is in danger of becoming excessively formalized, that some rules and procedures are believed to be ill-advised or impractical to adhere to and that there is a certain degree of confusion on how to deal with conflicts of interest involving safety.

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A thesis examining the master's perception of maritime safety would hardly be worth the paper it's printed on if it didn't include the experience of individuals holding this position. Consequently I must extend my deepest gratitude to the respondents for the time devoted and patience shown during the interviews.

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1 Introduction

1.1 Background

When reviewing mission statements from contemporary shipping companies a notion that keeps reoccurring is that of safety and safe transportation. The very same conception is also headlining the web pages of organizations such as the International Maritime Organization and Intertanko (<http://www.imo.org>; <http://www.intertanko.com>). One might consequently assume that safety is a maxim of the maritime industry, -or, at the very least, that people have strong incentives to say that it is.

This apparent interest in safety is likely to have several explanations. First of all it is evident in contemporary history that maritime disasters involving large numbers of passengers or the escape of polluting substances may have a substantial impact on society at large. The nature of seaborne transportation also implies that the enormous assets tied in a vessel and its cargo is jeopardized in one single shipment. This shipment is carried out in one of the most treacherous environments that the planet has to offer with strong winds, high seas and often at great distances from available means of assistance. If such undertakings are to be economically viable it needs to be performed with a certain degree of predictability and without unnecessary losses of cargo, equipment and personnel. In other words the activity of shipping places stringent demands on the concept commonly referred to as safety.

The act of seaborne transportation is distinguishable from other modes of transportation not only by the considerable values involved but also since the safety of these values ultimately lies in the hands of one individual, the master. The obligations and duties of this position are depicted in numerous products of popular culture and most people seem to have a preconceived conception of what and how a ship captain ought to be. In order to review this position in an academic way it is, however, necessary to resort to more credible sources.

One example of such a source is the Swedish Maritime Code which includes the following sections about the master's obligations (Axel Ax:son Johnsons institut för sjörätt och annan transporträtt, 2006, p. 64):

- *"Before a voyage begins, the master shall ensure that the vessel is seaworthy..."*
- *"During the voyage the master shall ensure that the vessel is maintained in a seaworthy condition..."*
- *"The master shall ensure that the vessel is navigated and managed in a manner consistent with good seamanship. He shall keep himself informed of rules and regulations that apply to shipping in waters where the ship will sail and in ports where she will call."*

- *If the vessel becomes distressed at sea, the master must do all in his power to save those on board and to protect the vessel and cargo.”*

From this it can be concluded that the master is responsible for ensuring that the vessel is seaworthy, that it is operated safely and that any accidents are dealt with in the best practicable way. It is also apparent that the master has an obligation to ensure that all rules that apply to the vessel are adhered to. Although it is not stated explicitly in the code, the indirect implications of a number of provisions also stipulate that the master is the highest authority onboard (Falkanger, Bull & Brautaset, 2004).

It should, however, be noted that the responsibilities of the master are not confined to a legal context. An indication of this is provided by the Nautical Institute which has issued a practical guide to the obligations of ship masters in command (The Nautical Institute, 2000). From this publication it is apparent that the ship captain is required to represent the ship and cargo owners in commercial matters, look after the physical and psychosocial wellbeing of the crew and in general be a good leader that keeps track of all activities that goes on onboard. The position of the master is thus a multi-faceted one which undoubtedly will place great demands on the individual holding it. An illustration of this is provided by Capt. P. Chawla (The Nautical Institute, 2000, p.19) who states that the successive ship captain needs to possess the following attributes:

- S* – *Safety of crew, ship and cargo*
- H* – *Honest / hard-working*
- I* – *Ingenious and adequate knowledge of IT*
- P* – *Personnel management*
- M* – *Money / commercial and maintenance skills*
- A* – *Analytical thinker*
- S* – *Self motivated*
- T* – *Thorough knowledge / training*
- E* – *Emergency training skills*
- R* – *Relations with shore personnel*

1.2 Purpose

Although the list of attributes above is a mere play on words it does still indicate that the maritime industry, of which the Nautical institute might be seen as a valued part, considers the master to have a substantial influence on the shipboard organization. If this is true then it might be assumed that this individual affects the safety of a vessel, not only as a result of official obligations, but also indirectly in the course of his/her daily chores.

If this line of reasoning is taken one step further it is likely that the master's perception of maritime safety is a significant causal factor in keeping a vessel safe. This is also a subject that seems to have attracted little research attention from the academic world.

In order to compensate for this apparent lack of interest, this study aims at elucidating the masters' perception of the nature of safety, their apprehension of the mechanisms by which this entity is improved and maintain and their perception of the role of other interested parties in relation to this.

1.3 Method

In order to accomplish this goal, in-depth interviews were held with ten Swedish masters. The result from these interviews were then analyzed and compared with earlier research in the field.

2 Safety as a concept

2.1 What is safety?

One possible starting point when searching for the nature of safety is the online version of the Encyclopaedia Britannica ("Safety", 2010). This publication defines safety as:

"Those activities that seek either to minimize or to eliminate hazardous conditions that can cause bodily injury."

If this is true then safety is an activity rather than a state. This activity is also one that seems to refer to the protection of the physical wellbeing of individuals.

In a similar quest for the nature of safety, Rollenhagen (2005 p.32) turns to Reason (2000, cited in Rollenhagen, 2005) who defines safety as;

"...the ability of individuals or organization to deal with risk and hazards so as to avoid damage and losses and yet still achieve their goals."

In this case, safety seems to be the capability to effectuate actions rather than the actions themselves. The construct has thus taken a step away from the procedural nature of the Encyclopaedia Britannica definition and moved towards a more static one. Reason also broadens the object of concern from individuals to organizations and the hazards dealt with seem to include non-physical aspects as well. Another interesting feature of Reason's definition is the apparent assumption that safety could be in conflict with other goals that individuals and organizations might have.

An even more inclusive definition that Rollenhagen refers to is that of the Delhi Declaration of people's right to Safety (2000, cited in Rollenhagen, 2005). In this case safety is:

"A state in which hazards and conditions leading to physical, psychological, and material harm are controlled in order to preserve the health and wellbeing of individuals and communities. Safety is a dynamic state resulting from the interaction of human beings with their physical, social, cultural, technological, political, economic and organisational environment. The objective is to establish a permanent state of vigilance and develop the mechanisms to control dangers on a continuous basis."

According to this, safety is clearly a state of affairs and one that embraces not only individuals and organizations but whole communities as well. It is evident that this state requires actions and the declaration is also specifying that these actions needs to be of a continuous nature in response to an ever-changing and complex environment.

If one is to find a common denominator among the definitions above, perhaps the answer is that safety is something that involves actions that aim at protecting a certain entity from

undesired consequences of events. It is, however, obvious that the entity protected can be a number of different things and that a question of the nature of safety will yield slightly different answers depending on whom you ask.

2.2 Safety in the maritime industry

If the perception of safety can vary depending on the setting in which it's deployed, then a study of the shipmaster's perception of this concept must have its origin in how safety is approached by the maritime industry. One way of obtaining such an apprehension is to review how the legislative framework deals with the subject (Stenmark, 2000).

2.2.1 Safety by fear of punishment

When it comes to shipping, the International Chamber of Shipping and international Shipping Federation (1996) identify chronological stages in the procedural struggle towards higher safety. The first of these is characterized by a culture of punishment that concentrates on safety failures and the subsequent accidents and losses of life and property. When such incidents occur, efforts are made to identify and apportion the blame to individuals and organizations. The ultimate goal of this is to bring forth better standards of safety by fear of punishment, both within individuals and among companies.

2.2.2 Safety by prescription

During the 20th century, this original perception of safety administration was complemented by a view of safety by prescription. This is based on a number of rules and regulations that are enforced upon the industry by public authorities. The aim of these regulations is to set standards for how vessels are constructed, built, equipped, manned and how the shipboard activities are executed (International Chamber of Shipping and international Shipping Federation, 1996). The guiding principle is thus that the authorities are capable of foreseeing dangers that might materialize, that they know the measures needed to prevent this from happening and that safety is achieved if those measures are implemented.

This set of rules that governs shipping organizations are generally written in response to major accidents (Anderson, 2005). Consequently they can provide an overview of the hazards that threaten activities conducted within the industry.

The legislative body responsible for instituting rules and regulations in the maritime world is the International Maritime Organization (IMO), an agency of the United Nations. These rules

are issued in the form of conventions by the IMO and come into force when they are ratified by a sufficient number of member states (“Conventions”, n.d.). If reviewing the conventions that deal directly with safety, the following appears to be most influential:

The International Convention on Load Lines

- An early convention originally dating back to 1930. The aim is to ensure that the hulls of vessels maintain appropriate reserve buoyancy, stability and watertight integrity to safely perform an intended journey. This is achieved by prescribing measures to calculate a minimum required freeboard, taking in consideration the design characteristics of the vessel, the waters to be crossed and the season in which the journey is performed (International Convention on Load Lines, n.d.).

The International Convention for the Safety of Life at Sea (SOLAS)

- This convention, which originally saw light as a response to the Titanic disaster, is regarded by the IMO as *“the most important international treaty concerning the safety of merchant ships”*. The overall aim of the SOLAS is to *“specify minimum standards for the construction, equipment and operation of ships, compatible with their safety”*. These standards refer to technical characteristics of the hull, machinery, electrical installations, cargo handling equipment, fire protection, life saving appliances and radio communication. The operational requirements refer to issues such as the stowage of cargo, high speed crafts, vessel security and the role of coastal and flag states in radio communications as well as in matters of enforcing the convention. (International Convention for the Safety of Life at Sea, n.d.)

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)

- While the previous conventions aim at ensuring that vessels are built, equipped and operated safely, the STCW code deals with the issue of ensuring that they are crewed in an adequate manner. This is achieved by prescribing standards for the competence required by individuals holding the different positions onboard and, to a certain extent, the training needed to acquire this competence. This convention also contains provisions for the watch keeping procedures and minimum hours of rest (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, n.d.). The actual number of crewmembers required onboard a vessel is, however, not established in this convention. Instead this is determined by the appropriate flag state in consideration of IMO resolution A.890 (21) and other relevant regulations (IMO, 2000).

Convention on the International Regulations for Preventing Collisions at Sea (COLREG)

- This convention contains the rules of the road in the maritime field, i.e. rules for maneuvering vessels in different circumstances and the lights, shapes and sound signals that are to be used (Convention on the International Regulations for Preventing Collisions at Sea, n.d.).

The International Convention on Maritime Search and Rescue

- A convention instituted with the aim of providing an international search and rescue plan, ensuring that search and rescue operations will be adequately coordinated by an appropriate organization regardless of the position of the distressed.

When reviewing this list, it appears as if the hazards threatening merchant ships are related to phenomena such as fires, dangerous characteristics of the cargo, collisions, groundings and the sea itself. It is also apparent that the means prescribed by the legislators to prevent these hazards is concerning technical aspects of the vessels as well as the competence and conduct of the crews that work onboard.

The latter conclusion indicates that shipping is regarded as a socio-technical system. The theory of socio-technical systems is based on the assumption that the technical and social parts of organizations are integrated, codependent and need to be considered in relation to each other (Eriksson-Zetterquist et al., 2006). If the shipping company is regarded as an organization it is thus logical to say that technical artifacts in the form of a properly constructed and equipped vessel will not guarantee safety unless the crews are capable of handling them in the right way.

Another interesting observation that can be made from the safety legislation above is that some of the conventions deal not only with preventing peril from striking but also with handling the situation that arises when it already has. Maritime safety thus seems to contain both a preventive and a responsive part.

2.2.3 Safety by self-regulation

History did, however, show that universal rules regulating the technical aspects of the vessels and the competence of the crews were not enough to prevent accidents from occurring. Instead there was a surge of major disasters in the late 80s and early 90s that made the maritime industry realize that a new conceptualization of safety needed to be introduced. This new way of approaching safety had its origin in analyses of accidents which revealed that the main contributor was in fact human failure (Anderson, 2005). In order to

approach this problem the IMO drafted the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM code) which was incorporated in the SOLAS convention in 1994 (Anderson, 2005). This code can, perhaps, be regarded as the most prominent manifestation of what the International Chamber of Shipping and international Shipping Federation (1996) refers to as the third stage of approaching safety. According to them this approach is characterized by a culture of self regulation.

As previously stated, the earlier legislation regarding maritime safety deals primarily with the proficiency of the crews and the technical standard of the vessels. In other words one might say that it regulates the hardware of the socio-technical system. A holistic approach to such a system would, however, require that the software, in the form of organizational and behavioural factors, is addressed as well. This is also what the ISM code attempts to do. The methods it uses are as follows (International Safety management Code, 2002):

- It specifies that the shipping company is responsible for establishing a safety and environmental protection policy along with company and vessel specific safety management systems ensuring that:
 - Safe practices in ship operation and a safe work environment are provided
 - Safeguards against all identified risks are established
 - Mandatory rules and regulations are adhered to
 - The safety management skills of all personnel is continuously improved
- It stipulates the establishment of one or several designated persons ashore. These individuals, who shall have direct access to the senior management, are responsible for monitoring the safety and pollution-prevention aspects of the operation of each vessel and for ensuring that enough resources and shore-based support are given to the crews onboard.
- It specifies that the shipping company is responsible for ensuring that appropriate resources, personnel and support are given the designated person(s), the master and the shipboard organization in general.
- It requires that the shipping company ensures that plans and procedures for shipboard operations, emergency preparedness, non-conformity reporting and maintenance of vessels and equipment are developed and maintained.
- It demands that the shipping company establishes procedures ensuring that all documentation and data referring to the safety management system are maintained in an appropriate order and that they are reviewed in periodical internal audits.

- It stipulates that the safety management system of both the shipping company and the individual vessel are certified by a flag state administration, or by an organization recognized by an administration, and that periodical verifications are performed.

When reviewing these tools the following observations can be made:

- Unlike the earlier mentioned legislations, the ISM code apparently deals with procedures and organisational arrangements that concerns safety. It is thus a matter of how you work rather than what you have to work with.
- One of the main pillars of the ISM code is the development of company and ship specific safety management systems (SMS) that are created and monitored by the very same persons that are affected by them. The International Chamber of Shipping and international Shipping Federation (1996) refer to this as safety by self regulation and argue that it has advantages in that it creates safety standards that are better tailored to fit the individual organization. They also believe that it allows individuals within the organization to feel more motivated when it comes to safety awareness as they participate actively in the formation of the procedures that govern the struggle towards safer working conditions.
- The ISM code clearly highlights the responsibility of the managing company for the safety of their vessels and it also requires that this company is identified. This fact, along with the transparency that the documentation required by the code brings about, ensures that shipping companies no longer can conceal their identity in order to escape liability (Anderson, 2005). This consequence of the implementation of the ISM code is also interesting from an organizational point of view as the enforced liability might produce a higher commitment towards safety from the higher levels of management. Such a commitment is regarded by The International Chamber of Shipping and international Shipping Federation (1996) as vital for the successful implementation of a safety management system and Anderson (2005) emphasises that companies unable to demonstrate such concerns will face serious legal consequences if perils strike their vessels.
- Although the ISM code brings on a new era of self regulation, it also specifically states that one of its objectives is to ensure compliance with mandatory rules and regulations. It is thus to be regarded as a complement rather than a successor to the external regulations mentioned above. The International Chamber of Shipping and international Shipping Federation (1996) also acknowledge this fact and state that all three stages of safety regulation needs to coexist and complement each other in order to influence the behaviour of companies and individuals.

2.2.4 An alternative set of stages for organizational approaches to safety

As demonstrated by the review above, the approach to safety in the maritime sphere has developed through the years from a basic belief that accidents are caused by individuals and technology to the present consideration of the importance of organizational factors. Such a process of maturing safety apprehension has been classified by the International Atomic Energy Agency (IAEA, 1998) into three stages that apply to organizations involved in nuclear activities.

In their scale the first stage is characterized by a notion that safety is based solely on rules and regulations. An organization operating at this level regards safety as an external requirement that isn't aligned with the goals of the organization itself. Safety is also seen as a technical issue achieved by adhering to external rules and little attention is paid to the attitudinal and behavioral aspects of the matter.

For organizations operating on the next stage, safety is incorporated as a goal of the organization, which is emphasized independently of external regulations, and safety performance is measured along with other aspects of the activities of the organization. Technical and procedural solutions still constitute the core of safety management but behavioral aspects are receiving growing attention.

In the third and most evolved stage, organizations have acknowledged the need to constantly improve safety and realize that all individuals in the organization are vital in this process. Issues such as communication, training and management style have been incorporated into the safety management and the organization has the capacity to differentiate between constructive and destructive behavior when it comes to safety.

If comparing the maritime industry to these standards it appears as if the legislators behind the ISM code have attempted to supply the industry with the procedural tools to progress from the first of IAEA's stages of safety towards the second and ultimately third. How far along this line that individual shipping companies have reached and whether the ISM code is used as intended is, however, a matter that still might be debated.

3 Theoretical framework

As a result of the implementation of the ISM code, the master, as well as the maritime industry in general, seems to have an obligation to deal with the procedural, behavioral and attitudinal aspects of safety and accident causation. If so, then it would be interesting to have a closer look at what earlier studies have concluded on these matters.

3.1 Unsafe acts

When it comes to safe behavior, Zohar and Luria (2003) identify a paradox in that individuals indulge in careless behavior even though they know that it might have adverse consequences. They explain this by advocating that human behavior is guided by the principle of maximizing expected utility. The perception of this utility is in turn distorted by a melioration bias, meaning that people tend to overestimate benefits of short-term results, and a rare-event bias which means that people generally underestimate the assessed likelihood of being adversely affected by rare events.

As a result of these cognitive mechanisms, Zohar and Luria (2003) argue that individuals overestimate the short term costs of acting safely, such as time loss, increased efforts and personal discomfort, to an extent where it outweighs the likelihood of being struck by the negative consequences that risky behavior might have. Consequently the perceived equilibrium of maximized utility is placed at a position that, at a first glance, facilitates the procedures that the individual takes part in. Unfortunately the same equilibrium will, from a broader perspective, lead to an increased rate of injuries, accidents and ultimately disasters.

To make matters worse, Zohar and Luria state that the above mentioned phenomenon is augmented by the fact that safe behavior leads to non-events while unsafe behavior gives immediate feedback in the form of tangible benefits. This, in turn, results in a reinforcement-based learning that leads the individual towards unsafe behavior patterns.

In order to avoid such a scenario the perceptions of costs and benefits that follow with safe behavior must somehow be modified. Since this essay is concerned with the master's apprehension of how to promote safe behavior the question of what managers/leaders can do to modify these perceptions is naturally of special interest.

3.2 Normal accidents

Zohar and Luria's account of accident causation offers an explanation for why individuals commit acts that they know might have adverse consequences. This may very well be an eminent way to explain many accidents and mishaps that occur routinely in the daily operation of a vessel. It is, however, likely that we need to resort to more holistic theories in order to understand complex calamities that indicates considerable failures in the very organization that constitutes a ship.

One example of such a theory, frequently applied to shipping (Stenmark, 2000), is that of Perrow's (1999) normal accidents. Perrow sees a problem with highly complex organizations as a great number of interconnected components has a tendency to create unforeseeable chains of events. He goes on to subdivide complexity into two dimensions.

The first of these ranges from linear to complex interactions between system components where the latter indicates that the connections are characterized by "*...branching paths, feedback loops, jumps from one linear sequence to another...*" (p. 75).

The second dimension ranges from loosely to tightly coupled systems within the organization. In this case tight couplings mean that there is little slack or buffer between items so that what happens with one directly affect the actions of others. Tightly coupled systems are, according to Perrow, characterized by: a high time dependence within processes; inflexible operating sequences; little redundancy in the way the organization can achieve its goal; minimized buffers; reduced slack in resources and; a restricted ability to substitute supplies, equipment and personnel.

If the organization contains a large number of complex interactions and a high degree of tight couplings then the effects of malfunctions and erroneous acts tend to multiply to other parts of the organization in patterns that are very hard to predict or prevent. This will, according to Perrow, make the organization vulnerable to the phenomenon that he refers to as "normal" or "system" accidents. These accidents are differentiated from what Perrow calls "component accident failures", which involves "*...one or more component failures that are linked in an anticipated sequence*" (p.70) Since these follows a linear path they are possible to analyze using normal domino theories and relatively easy to address using normal preventive measures.

Normal/system accidents, on the other hand, involves "*...unanticipated interaction of multiple failures*" (p.70) and Perrow sees them as an inherit result of the organizational design. Consequently they are difficult to prevent by measures aimed at individual parts of the system. In fact, Perrow argues that such measures can be contra-productive if they are improperly designed or implemented so that they increase the complexity of the system.

3.3 The merchant vessel – a complex organization?

A merchant vessel is indeed an example of a complex socio-technical organization that often operates under a considerable amount of strain. Two of the most demanding changes that shipboard organizations have undergone in the last few decades are perhaps the reduction of crew sizes and the rapid introduction of new technology (Lundh, 2010).

The new technology introduced on vessels is generally intended to make the operation safer and more efficient. It has, however, also permitted the construction of ships that are larger, faster and more complex (Kharbanda, 2009) and allowed shipping operations to be performed at a higher pace and with a greater degree of flexibility (Stopford, 1997). It is thus possible that the increased safety margins offered by new technology are partly eroded by the operational possibilities that it provides.

A related problem is that modern technology involves a significant amount of automation and presents the shipboard personnel with a multitude of information and a rich variety of manufacturer-specific interfaces (Lloyds Register, 2008). This is not necessarily a disadvantage if everything works as intended. In a worst case scenario it can, however, act as a filter between the actual situation and the operator who becomes over reliant on the information provided by the systems (Lloyds Register, 2008). This increasing dependency on technology is also troublesome when systems are malfunctioning as integrated and highly automated equipment tend to be difficult to diagnose and repair (Lützhöft, 2004). Such a filter between the processes that occur and the operator controlling them is also something that Perrow specifically notes as challenging to an organization as it allows for small errors to *“propagate unexpectedly”* (1999, p.10). An additional concern is that an abundance of inappropriately presented information combined with badly designed interfaces can have a confusing effect (Lloyds Register, 2008). This is especially true in critical situations when the operator is in the direst need of assistance from the appliances at hand (Lützhöft, 2004).

The introduction of new technology has also enabled a significant reduction of crew sizes (Committee on the effect of smaller crews on maritime safety et al., 1990) which is driven by an ambition to reduce personnel costs (Branch, 2007). When the number of persons onboard are downsized to a level which is just enough to manage the operational requirements, this ought to increase the level of dependency on each individual, reduce the redundancy of shipboard positions and require more expertise from everyone onboard.

To sum up it thus seems as if the operational characteristics of modern vessels put greater demands on the organization with respect to speed and flexibility. These demands are to be handled by a small number of key individuals who rely on technology that can have a capacity to filter and distort their situational perception and reduce their ability to perform corrective actions when things go wrong. It is consequently not that farfetched to assume

that such an environment may contain both complex component interactions and tightly coupled systems.

This is also acknowledged by Perrow but according to him the malignant characteristics of the shipping world is not confined to the vessel itself. Instead he argues that issues such as commercial pressures, an inherent tendency to accept small safety margins, environmental factors, lack of central control, communication difficulties and inappropriate regulations all combine into making the entire maritime industry an error-inducing system.

When reviewing Perrow's description of the maritime sphere it is important to consider that it was written before the implementation of the ISM code and most of the courses of events he refers to seem to date to the seventies. It is thus likely that the contemporary situation is somewhat different. The notion of system accidents is, however, still valid and as such it provides an indication that the mere application of a number of prescribed operational procedures might not be enough to prevent the occurrence of accidents.

3.4 Man-made disasters

Another theory that deals with catastrophic breakdowns in organizational activities refers to such occurrences as man-made disasters (Pidgeon & O'Leary, 2000). Just as in the theory of Perrow's normal accidents the unpredictable nature of complex socio-technical systems is acknowledged but this model uses sociological concepts in order to explain how this leads to undesired events.

According to Pidgeon and O'Leary, organizational members share perceptions and assumptions of the system they are a part of, the hazards it may be subjected to and the appropriate actions to deal with such hazards. These perceptions and assumptions may over time be deflected away from reality to an extent where the organization is no longer capable of managing the situations in which it might find itself.

In other words this tendency for gradual collective deception allows for chains of discrepant events with potentially malignant effects to develop unnoticed in a process referred to by Pidgeon and O'Leary as a "disaster incubation period". In the end these unnoticed chains of events result in a disaster which is in this case is defined, not by its physical effects, but as "*a significant disruption or collapse of the existing cultural beliefs and norms about hazards, and for dealing with them and their impacts*" (Pidgeon & O'Leary, 2000, p.16). Consequently such a disaster may take place despite the fact that all involved parties has acted with the best intentions and in accordance with formal and informal rules and regulations.

Pidgeon and O'Leary differentiate between the man-made disasters described above and every day accidents, which don't threaten the cultural beliefs and norms. Consequently one might suspect that the theory is not meant to be universally applied to all kinds of undesired

events and mishaps that may occur onboard a vessel. It is, nonetheless, interesting from at least two perspectives.

Firstly it offers a valuable model of conceptualization when it comes to major maritime disasters. One likely example of this is the loss of s/s Titanic which might be argued to have been preceded by the development of collective perceptions and assumptions concerning the ability of naval architecture to conquer the perils of the high seas. If following the same train of thoughts this would have led to a disaster incubation period with gradually decreased safety margins with regards to both vessel operations and deployment of safety equipment until the existing cultural beliefs and assumptions collapsed in the 1912 disaster.

Secondly, and perhaps of greater interest for this study, it introduces the concept of shared perceptions, beliefs and norms as a factor of influence when it comes to risk appraisal and safety related behavior.

3.5 Organizational culture

The notion that a shared conceptualization in the form of beliefs, norms, perceptions etc. is a determinative for how people act is a fundamental element in organizational science in general (Schein, 2004; Alvesson, 2002) as well as in the specific field of safety research (Cooper, 2000; Guldenmund, 2000). This collective cognitive mechanism is normally referred to as organizational culture or climate but the scientific community has yet been unable to reach a consensus neither for how to define it nor for the mechanisms by which it exerts influence on behavioral patterns in an organization (Cooper, 2000; Guldenmund, 2000.)

In an effort to address this conceptual confusion, Guldenmund (2000, p.225) has summarized previous definitions of this construct into the following aggregate:

“Overall, organizational culture is a relatively stable, multidimensional, holistic construct shared by (groups of) organizational members that supplies a frame of reference and which gives meaning to and/or is typically revealed in certain practices.”

Guldenmund also notices that the term climate over time has become differentiated from organizational culture and now seems to be *“...defined or given by the aggregated attitudes of its members”* (p.221). Consequently it is not an equivalent to culture itself but rather an *“...overt manifestation of culture within an organization”* (p.221).

One of the definitions of organizational culture that Guldenmund refers to, and perhaps the most frequently cited one, is that of Edgar Schein. Schein (2004, p. 17) defines organizational culture as:

“...a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaption and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.”

Schein places this pattern of shared basic assumptions as an inner core of a three layer model of organizational culture. He argues that the inner core is characterized by *“Unconscious, taken-for-granted beliefs, perceptions, thoughts and feelings”* (p.26) that are used by the group to decipher and react to the reality in which it finds itself and thus, ultimately, providing the cognitive stability that the group needs to function.

The next layer in the model is made up of espoused values and beliefs. These consist of articulated strategies, goals and philosophies that the members consider to be significant for the organization.

At the outer surface of Schein’s model we find the artifacts of the organizational culture. This is the tangible part of the culture or, in other words, what meets the eye when encountering the organization. Examples of such artifacts are formal procedures, dress codes, equipment and ornaments, emotional displays, myths, rituals and ceremonies.

Similar models of organizational culture with a more or less unconscious core of shared cognitive mechanisms that influences outer layers of overt cultural manifestations are used by several researchers in this field (Guldenmund, 2000). One reason for this is undoubtedly that they visualize a need to approach the underlying foundation of an organizational culture in order to effectively understand and influence it.

3.6 Safety culture

The concept of organizational culture has attracted substantial attention, not only in the academic world, but also from practitioners and managers. This is largely due to the perceived causal link between organizational culture and organizational performance (Alvesson, 2002). In other words it is appealing to attempt to transform the prevailing culture of an organization in order to increase the likelihood of achieving its goals.

Since this study is addressing the issue of safety, the goal of interest is naturally that of the safety of the organization and its surroundings. The question at hand is thus: In what way does the culture of an organization affect its ability to stay safe? Or is it even possible to isolate a specific safety culture within an organization? These questions are unfortunately not easy to answer since there seems to be an abundance of definitions of safety culture and no uniform causal model for how such a culture actually affects the safety outcomes of an organization (Cooper, 2000; Guldenmund, 2000; Håvold, 2000).

3.6.1 Guldenmund's model of safety culture

Just as in the case of organizational culture, Guldenmund (2000) has reviewed earlier studies covering the area of safety culture and this time he cites eighteen earlier studies. Of these eighteen studies, sixteen contained explicit definitions of safety culture/climate which are listed in appendix I. Guldenmund notes that the majority of these definitions refer to cognitive phenomena that are shared by the organizational members. The phenomena most referred to are perceptions, beliefs and attitudes which appear nine, six and six times respectively. The most diverse part of the definitions seems to be the object of these perceptions, beliefs and attitudes which span from "safety", "work environment" and "organizational characteristics" to more abstract terms like "entity" and "attributes".

Not only do the definitions of safety culture/climate vary between the studies, but they also arrive at different dimensions in which the culture manifests itself and few specify the process by which this occurs. In an effort to address this confusion and ambiguity, Guldenmund (2000) presents his own model of safety culture which he bases on Schein's (2004) theories of organizational culture.

Just as in Schein's concept of organizational culture, safety culture is seen by Guldenmund as consisting of three layers. At the bottom layer (core) of safety culture he places basic, unconscious assumptions that the organizational members share about safety related issues specifically, but also about general affairs that may have implications for the safety of the organization. Safety culture at this level is consequently not a separate entity but rather an aspect of the organizational culture in general.

These basic assumptions manifest themselves in the next layer consisting of conscious, espoused attitudes. Guldenmund states that attitudes must be directed towards an object and in this case these object are divided into four groups, all relating to safety. These are:

- Hardware (personal protective equipment, physical safety measures etc.)
- Software (safety procedures, training etc.)
- People/liveware (managers, supervisors, colleagues etc.)
- Behavior (responsibility, safe/unsafe working behavior, safety related communication etc.)

Since the attitudes are aimed at safety related objects, Guldenmund argues that safety culture is differentiated from the general organizational culture at this level and denotes this as the safety climate of the organization.

The same distinction between the organizational culture and the safety culture is made at the third level where Guldenmund places safety related artifacts such as safety posters,

wearing (or not wearing) protective equipment, safety meetings, safe (or unsafe) behavior and ultimately the near-misses, incidents and accidents that this may result in.

According to this, the causal mechanism behind Guldenmund's safety culture is thus that basic, unconscious beliefs shared by the members of an organization work as antecedents in forming attitudes towards safety related objects. These attitudes then guide the behavior of the organizational members which results in tangible artifacts in the form of physical safety articles, safe (or unsafe) acts and ultimately the occurrence (or absence) of accidents.

To sum up, Guldenmund (p.251) concludes that safety culture can be defined as

"...those aspects of the organizational culture which will impact on attitudes and behavior related to increasing or decreasing risk"

3.6.2 Cooper's model of safety culture

Cooper (2000) also attempts to address the confusion in the field of safety culture. Unlike Guldenmund, who based his model on Schein's theories, Cooper approaches the area with an outset in a definition of safety culture adopted by the UK Health and Safety Commission (1993, cited in Cooper 2000, p.114). They define safety culture as:

"...the product of individual and group values, attitudes, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organisation's health & safety programmes. Organisations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures."

Cooper does not seem to consider this definition as being particularly better than any other. The basis of his interest is instead the fact that it is focused, not the values, attitudes, competencies and behaviors per se, but rather the product of these phenomena. He continues by arguing that the most suitable product of safety culture to consider would be the intensity and persistence of the *"observable efforts with which all organizational members direct their attention and actions towards improving safety on a daily basis"* (p.115).

According to Cooper, such an approach to safety culture is appealing since it provides a dependent variable that can be used to evaluate initiatives aimed at improving safety through modifications of the organizational safety culture. He also states that such an approach would broaden this field of research from the narrow focus of safety climate surveys by attitudinal questionnaires which he claims to be an insufficient mean to capture the holistic, multifaceted nature of the concept.

The activity of attempting to modify safety culture in order to achieve better safety outcomes is, according to Cooper, required to be goal-directed. This is due to the fact that goals, in the form of ideas for the future and ideas for a desired end-state, have a strong causal role in evoking actions. The process of bringing about a desired set of actions is, however, not as easy as just promoting an image of a desired end-state. First at hand, Cooper argues, the goal in question must be accepted by the people who are supposed to perform the desired action. Secondly, the process of goal-attainment is affected by moderators (ability, goal commitment, goal conflicts, feedback, task complexity, situational constraints) and mediators (self-efficacy, task specific strategies, direction of attention, effort and persistence).

In relation to safety, Cooper argues that examples of moderators might be safety- and job-related training (ability), degrees of commitments to safety at various hierarchical levels (goal-commitment), safety versus other organizational outcomes such as productivity and quality (goal-conflict), communication flows (feedback), managerial versus operative's role functions (task complexity) and job design issues, work pace and lack of resources (situational constraints).

Mediators, on the other hand, is exemplified by actual safety related behavior at various hierarchical levels (direction of attention, effort and persistence), the presence and quality of the decision-making processes of the organization (task specific strategies) and the confidence of individuals and groups of individuals in pursuing particular courses of action that aim at bringing about safety improvements (self-efficacy).

According to Cooper, these factors which mediate and moderate the endeavors to ensure higher safety are either referring to psychological, situational or behavioral aspects. The psychological factors are the perceptions, values, beliefs etc. which is normally labeled as safety climate. The situational factors constitute the context in which the safety related activities take place. The behavioral factors are finally the actual human conduct that has safety related implications.

To complicate things further, Cooper argues that the factors in each category not only affect the product of achieving safety within the organization but they also affect each other reciprocally. The beliefs and values of organizational members is thus a determinant for their behavior. The success or failure of this behavior will, however, also effect members' perceptions of what a viable course of action is which, in turn, will have an impact on beliefs and values. The same goes for situational factors (safety management systems, authorized procedures, communication channels, available resources etc.). These are a product of organizational beliefs, values and perceptions of how an organization should be arranged but they will simultaneously provide a framework in which both behavior and psychological characteristics are created and performed.

Based on this, Cooper argues that it would be futile to try to alter the psychological aspects of the safety culture (attitudes, perceptions etc.) without considering the situational characteristics in which they exist and the behaviors which they are directed towards and/or result in. Needless to say, the same goes for trying to manipulate behavioral or situational aspects singularly.

When summing up these mechanisms, Cooper (2000 p. 118) arrives at the conclusion that the construct of an organizational culture is *"...reflected in the dynamic reciprocal relationships between members' perceptions about, and attitudes towards, the operationalisation of organizational goals; members' day-to-day goal-directed behavior; and the presence and quality of the organisation's systems and sub-systems to support the goal-directed behavior."* The sub-construct of safety culture would then be essentially the same but with reference to goals that relate to safety.

3.7 Improving safety

As seen from the compilation above, the mechanisms behind safety are both complex and diverse. The next question to ask is naturally how these models can be used in order to raise the safety level of a shipping organization.

3.7.1 Improving safety according to Cooper

In Cooper's case the definition of safety culture itself is a prescription for how to improve safety. What the organization needs to do is simply to establish appropriate safety goals that everyone embraces and to ensure that the psychological, situational and behavioral aspects of the endeavor of reaching those goals interplay in an optimal way. Cooper (2000) also states that this process can be facilitated if the overall goal is broken down into more manageable sub-goals and that goal achievement is a function of goal-difficulty. It is, however, likely that such a process would be significantly more difficult to execute in real life.

3.7.2 Improving safety according to Guldenmund

In Guldenmund's model the safety related outcomes that we aim to address (protective equipment, procedural arrangements, safe/unsafe behavior etc.) are situated at the third, most superficial level. Since these artifacts have their origin in basic assumptions at the core level it is necessary to approach those in order to obtain a substantial, lasting improvement of the safety of the organization. Unfortunately this might prove to be a rather challenging

thing to do. Schein (2004) argues that these basic assumptions are unconscious, non-negotiable and a fundamental building block in the social identity of the organization. Consequently it follows that organizational members will respond with great resistance and discomfort if these assumptions are threatened. In order to overcome this resistance, Schein states that the organizations needs to be provided with a sufficient motivational force in an unfreezing or disconfirmation phase that creates a realization that the existing cultural assumptions of how to do things need to be reshaped. This unfreezing phase does, in turn, require the presence of three vital processes. First the organization needs to receive enough disconfirming data to prove that a change is indeed required. Secondly this disconfirming data needs to be connected to important goals and ideas in a way that it creates a sense of anxiety and/or guilt among organizational members. The last prerequisite is a psychological safety that enables individuals to see that the organization may solve the problem and learn something new without losing its identity or integrity. If these prerequisites are in place the organization will ideally have enough motivation to unlearn the malignant assumptions and relearn appropriate ones in a process of trial and error based on scanning the environment or by imitating role models through psychological identification.

In relation to this model of organizational change, Schein raises two items of concern that are of interest for this study. Firstly he argues that organizational leaders have an important role as change managers and that they can act as role models by highlighting and/or displaying the desired behavior. Another option is for the leader to bring in external individuals who can promote the desired concepts of how to act. Secondly, Schein states that although a change in behavior can be coerced, it will not prevail when the coercive force is lifted unless it is founded in a transformation of organizational assumptions as described above.

According to Schein it is also important to note that the behavior found at the superficial level is influenced by other factors than shared basic assumptions. Examples of such factors include individually learnt assumptions, biological reflexes and situational contingencies. Schein (2004), as well as many other writers in the field of organizational- and safety culture (Cooper, 2000; Guldenmund, 2000; Alvesson, 2002 etc.), also acknowledge that an organization may contain several sub-groups. When dealing with the construct of safety culture it is thus important to address the right aggregate level so that the whole organization is not attributed cultural manifestations that refer to a sub-group or vice versa.

3.7.3 Improving safety according to Zohar and Luria

Another issue that both Cooper and Guldenmund refer to is that a good safety culture results in non-events. Similar concerns are also raised by Zohar and Luria (2003) in their explanations of why people commit unsafe acts. As we saw earlier this was considered as problematic since it reinforces the tendency of individuals to overestimate the short-term benefits of acting unsafely while simultaneously neglecting the distant possibility of being struck by the negative consequences this might have.

One way of addressing this malignant cognitive mechanism is, according to Zohar and Luria, for the organization to implement an intervention scheme that introduces short-term benefits that outweighs the costs of unsafe behavior. The intervention scheme that Zohar and Luria advocate has its origin in the ABC (antecedents-behavior-consequences) framework and aims at providing individuals with appropriate antecedents (e.g. training and goal setting in relation to target safety behavior) and consequences (e.g. positive/negative feedback and incentives) in order to stimulate the desired safety behavior.

In order for such an intervention scheme to exert maximum effect, Zohar and Luria argue that it should be focused, not on the level of the individual responsible for the behavior in question, but rather their supervisors. This is due to the fact that supervisors per definition are in an optimal position to monitor the behavior of their subordinates and already supply workers with behavioral antecedents and consequences in course of their daily activities. The basic idea behind Zohar & Luria's intervention is thus to intentionally modify supervisors' interactions with their subordinates so that it promotes safe behavior (i.e. stipulating models of safe behavior; informing about risks with unsafe behavior; inquiring about and monitoring behavior; expressing satisfaction, recognition and appreciation when observing safe behavior and; deploying corrective measures when encountering unsafe behavior)

Modifying supervisors' interactions with their subordinates does, however, implicate that the original interactions are challenged. Since these interactions, at least partially, are aimed at achieving organizational goals it follows that such a process easily could result in goal conflicts where the costs of safe behavior (slower work pace, use of expensive safety equipment etc.) are at odds with performance parameters such as productivity and cost control. In order to resolve this problem, Zohar and Luria argue that the intervention needs to be expanded so that it includes managerial levels as well. This is essential as managers that are committed to safety and communicate their safety priorities are necessary in order to provide supervisors with the leeway and support needed to tackle the goal conflicts that will arise.

The intervention scheme that Zohar and Luria (2003) refer to was part of a study conducted at three industrial companies and is thus to be considered as an isolated program with a

predefined goal. The mechanisms addressed are, however, universal and supervisory interactions with their subordinates, as well as managerial commitment to safety, are undoubtedly a vital aspect of the safety culture of an organization. This becomes even more apparent if Zohar and Luria's intervention scheme is compared to the theories of Guldenmund (2000) and Cooper (2000).

If compared to Cooper's model of safety culture the safety priorities communicated by managers, the supervisors' interactions with their subordinates and possibly also the subordinates' behavior could be seen as the desired product of safety culture as they constitute efforts to improve safety. These efforts could also be referred to the behavioral part of Cooper's triad of safety culture while the goal conflicts that may arise are an example of a situational factor. In order to apply Zohar and Luria's intervention scheme universally one does, however, need to consider the third part of Cooper's triad, namely the psychological aspects, as well. In other words one may assume that the antecedents and consequences provided by supervisors could shape the subordinate's perceptions, values and beliefs about safety and safe conduct. The act of providing such antecedents and consequences does, however, require certain psychological prerequisites among supervisors and managers and it remains unclear where those should stem from.

A similar conclusion can be drawn if comparing Zohar and Luria's scheme with Guldenmund's model of safety culture. The processes used can be seen as cultural manifestations at the superficial, artifact level. This is somewhat problematic since Schein (2004) argues that such manifestations need to be supported by appropriate basic assumptions at the core level if they are to remain over time. Another item of interest in relation to the theories of Guldenmund and Schein is that they seem to agree with Zohar and Luria about the importance of leaders (supervisors, managers) in promoting a desired behavior.

3.7.4 Improving safety according to Pidgeon and O'Leary

Safety culture is also playing a vital role in Pidgeon and O'Leary's (2000) theory as they define man-made disasters as the collapse of this construct. In order to prevent this they advocate a "good" safety culture which is both reflected in and promoted by the following four facets (p.18):

- 1. senior management commitment to safety;*
- 2. shared care and concern for hazards and a solicitude over their impacts upon people;*
- 3. realistic and flexible norms and rules about hazards;*
- 4. and continual reflection upon practice through monitoring, analysis and feedback systems (organizational learning).*

Since a disaster in their model is preceded by a developing system vulnerability that is concealed by social processes they focus their attention on the fourth facet which deals with organizational learning. According to Pidgeon and O'Leary this organizational learning is hampered by two kinds of barriers.

The first of these is made up of information difficulties that in turn have its origin in four sets of aggravating circumstances:

1. First at hand are cases where critical errors and events remain undiscovered or are misunderstood because the organization fails to correctly interpret their significance. This could in turn be a result of rigid beliefs about what is to be considered a hazard. The attention of the organization may also be distracted from the critical events by related "decoy" events that are resolved without approaching the root cause of the problem.
2. Second at hand are situations that are so ill-structured, complex and constantly changing that the process of information handling is substantially hampered.
3. The third example that Pidgeon and O'Leary bring up is uncertainty of how to deal with violations of formal safety regulations. Such violations may in turn be a result of the regulations being ambiguous, in conflict with other goals of the organizations or simply outdated.
4. Finally the information difficulties may have its origin in a tendency of the organizational members to perceptively minimize dangers or to deny that it threatens them personally.

The second barrier to organizational learning has to do with blame, organizational politics and cover-up. The mechanism behind this is that organizations in general contain several sub-groups, each with its own agenda and area of interests. This will inevitably result in political processes and power relationships within the organization in which indications of impending system malfunctions may be distorted in order to fit the purposes of the individual sub-group.

In order to approach the problems of the first barrier to organizational learning, Pidgeon and O'Leary suggest that the organization should tackle the trade-off between prescribed patterns of identifying and evaluating risk and an unprejudiced approach to risk assessment through thinking outside the box. Prescribed patterns of thinking in relation to safety is indeed required as it provides an expedient way to handle well defined hazards that falls within the organization's prior world view. To rely solely on such an approach is, however, inadequate as this will steer the organization's attention away from unnoticed errors and

events which may ultimately lead to a disaster. Pidgeon and O'Leary's solution to the problem is for the organization to develop a "safety imagination". This term refers to: an expansion of the assessment scope for scenarios that potentially could contain risks; a countering of complacency and "it won't happen to us" attitudes; a forced recognition that the most dangerous hazards during an incubation period are, by definition, characterized by ambiguity and uncertainty and; attempts to challenge institutionally and culturally defined assumptions about hazards and their consequences.

In order to facilitate the quest for such a safety imagination, Pidgeon and O'Leary (p.22) provide the following checklist:

"Attempt to fear the worst

Use good meeting management techniques to elicit varied viewpoints

Play the "what if" game with potential hazards

Allow no worst case situation to go unmentioned

Suspend assumptions about how the safety task was completed in the past

Approaching the edge of a safety issue a tolerance of ambiguity will be required, as newly emerging safety issues will never be clear

Force yourself to visualise "near-miss" situations developing into accidents"

When it comes to the barrier associated with blame, organizational politics and cover-ups, Pidgeon and O'Leary suggest that the solutions could be divided into macro and micro levels. On the macro level they advocate measures such as arbitration of power struggles, legal guarantees to whistleblowers and encouraging judicial inquiries to address organizational politics when reviewing accidents. Such measures are, however, of minor interest in relation to the master's view of safety. Their solution on the micro level is, on the other hand, more relevant. Here they bring forth the use of incident monitoring systems as an appropriate mean to channel organizational learning through the filters of internal politics and power struggles. But for such a system to work the organization must first address the dilemma of blame. Pidgeon and O'Leary argue that the mechanism of blame and accountability is necessary in order to establish a sense of responsibility among individuals. The use of blame must, however, be consistent so that a clear boundary between culpable and non-culpable behavior is established. If this is done then a necessary level of trust can be developed within the organization so that the individual member feels comfortable to report near-misses and incidents. These reports could then prove to be valuable indications of system malfunctions

within the organization. Another way of obtaining this level of trust is, according to Pidgeon and O'Leary, to implement strictly anonymous reporting systems. They do, however, argue that a consistent approach to culpability would still be required since clear indications of what constitutes an acceptable erroneous conduct entail the benefit of setting appropriate boundaries for behavior.

3.8 The leader's role in improving safety

The theories discussed above provide a general indication of how safety may be improved. In order to explore the master's perception of such an undertaking it would, however, be beneficial to utilize slightly less abstract sources as well. One example of such a source is a report by O'Dea and Flin (2003) which provides a compilation of previous studies of the role of managerial leadership in workplace safety outcomes.

The first item of interest that can be learnt from this study is that the impact that leaders' have on safety seems to differ depending on their hierarchical level within the organization. O'Dea and Flin argue that this phenomenon is associated with the fact that managerial activities at each level deal with slightly different aspects of the process of running an organization. These activities may also be divided with regards to the temporal extension of their focal point. Senior managers are thus concerned with the strategic issues of managing the organization and their actions have a relatively long time perspective (drawing up long-range plans, establishing policies, modifying organizational structures etc.) Mid-level managers are primarily dealing with tactical issues that have a shorter time perspective (interpreting policies, implementing procedures etc.) Supervisors are finally focusing on the operational issues of the organization's day-to-day activities (structuring, coordinating and facilitating the work performed, ensuring that policies and procedures are adhered to etc.).

The most relevant factors of influence are summarized in the following section (O'Dea & Flin, 2003):

Commitment – Management's commitment to safety is a strong predictor of safety outcomes. This commitment must, however, be overtly manifested in the form of allocation of resources to safety, involvement and participation of managers in safety related matters, prioritizing safety over production, clear and consistent safety policies etc.

Attitudes – Senior managers' attitudes to safety appear to be an important causal factor for their behavioral intentions and behavior. High management commitment, low fatalism, high safety priority and risk awareness seem to be particularly important examples of such attitudes. It is also interesting to note that O'Dea and Flin found studies indicating that the safety related attitudes of senior managers primarily stem from an ambition to comply with governmental regulations and avoid liability. Constructive safety attitudes are also important

in the case of middle managers as they have been found to correlate with lower accident rates within their organizations. Examples of such attitudes include risk perception; prioritizing safety; believing that accidents are preventable and that one's actions are effective; focusing on reducing accident numbers and not just their effects; believing that accidents reduce productivity and reflect badly on one's self and; believing that time spent on safety is appreciated.

Involvement – The fact that managers are involved in organizational activities (e.g. personal inspections of work areas; open and informal communication; frequent interactions between managers, supervisors and employees) is associated with good safety performance. There are also indications that this involvement acts as a motivational force for both managers and subordinates. The same basically applies to supervisors who can influence safety outcomes by applying a participative management style. Such a management style could in their case refer to: emphasizing team work within their group; valuing their work group; giving feedback; spending time communicating with their subordinates on non-work related issues etc.

Supportive superiors – O'Dea and Flin suggest that supportive supervision is associated with positive safety outcomes. This was exemplified with subordinates being more likely to report incidents and unsafe conditions if supervisors are open and responsive to such behavior. Open and frequent two-way communication was also found to be related to individual's willingness to engage in safety communication.

Organizational support – The perception of organizational support has been found to increase the willingness of individuals to engage in safety communication with their superiors. O'Dea and Flin argue that a possible explanation for such phenomena is that when employees are committed to the values of the organization an obligation is developed for future reciprocity aimed at benefiting the organization. This will in turn incite an ambition to perform better and make suggestions to improve the organization etc.

Decentralization of power – High levels of management command power and control over work organization and task structure reduce worker autonomy and integration which, in turn, is associated with higher accident rates. A possible explanation for this is that a higher degree of worker autonomy and integration could lead to an increase of employee knowledge about practices and safety procedures, beneficial changes in communication and interaction and finally a greater responsibility taken by individuals. This decentralization of power is especially interesting in relation to supervisors as studies have shown that employee safety compliance increases when supervisors are granted influence over decisions that affect the safety of their workgroups. If focusing directly on the floor level employees the pattern is essentially the same as workers who are granted reasonable and specific responsibilities, authority and goals tend to work more safely.

Labor-management relations – High quality relations between management and subordinates are likely to result in a more motivated and safety compliant workforce. Such quality relations are characterized by: an “open door policy” by management; the managers spending time on the floor level of the organization; informal contacts between hierarchical levels; feelings of pride within the company and; multiple communication channels including informal meetings.

Humanistic management practices – If management shows a high regard for their employees and treats them with respect and concern then this will promote a feeling among the employees that they are appreciated as individuals and that their contributions are valuable. These feelings might, in turn, foster a loyalty which is manifested in areas such as safety behavior.

Production versus safety – Organizations where safety is a real priority and safety practices and procedures are regarded as intrinsic to production goals shows a higher safety performance. Similarly the employees’ perception of the organization’s philosophy of production versus safety is an important factor in predicting safety performance. There are also clear indications that a high production pressure is linked to higher accident rates. In relation to this discussion it is also interesting to note that one study found that organizations with better safety records tend to be more productive.

Risk perception – Higher risk/threat perceptions seem to be related to worker’s readiness to participate in safety programs. This phenomenon is furthermore mediated by co-worker support for safety. There are also indications that higher appraisals of workplace hazards are related to positive perceptions of individual responsibility which, in turn, is affecting the level of safety activities.

Trust – Interpersonal trust between leaders and subordinates facilitates variables such as communication, problem solving and co-operation. Improvement of these may in turn have a positive impact on organizational performance measures of which safety could be one. This interpersonal trust is largely depending on the leader’s behavior. Examples of such behavioral factors are: behavioral consistency; behavioral integrity; sharing and delegation of control; accuracy and openness of communication and; demonstration of concern. The managers’ trust in their employees is also an important prerequisite for the delegation of power that is discussed above.

Worker involvement– O’Dea and Flin found evidence indicating that worker involvement in decision making processes and open lines of communication where individuals can communicate their thoughts and ideas and receive feedback will lead to lower incident rates. There are also indications that personal involvement in safety is related to self reported levels of safety activity. A related notion referred to by O’Dea and Flin is that

perceptions of involvement, communication and policy awareness improve perceptions of management commitment which, in turn, will suppress unsafe behavior.

Worker autonomy – Employees that have specific and reasonable responsibilities, goals and authority tend to work more safely.

Leaning on the earlier studies reviewed, O’Dea and Flin (2003) present a holistic model where the organizational culture affects the entire organization in general but especially the priorities, commitment and leadership style of the senior management. These senior management attributes will in turn have a strong impact on safety related attitudes and behavior of their onsite representatives, the mid-level managers. Such behavior should ideally include an involved, decentralized and participative leadership style towards their subordinates, the supervisors. If such leadership is combined with a sufficient decision making leeway for the supervisors then they are likely to develop more participative and supportive relations with the floor level employees. Such relationships are, in turn, associated with greater employee participation and involvement which results in an increased motivation for safety. This motivation is manifested in a willingness to take safety initiatives and comply with regulations which, finally, has an impact on incident and accident rates.

O’Dea and Flin’s model is thus a hierarchical chain of influence that has its origin in an organizational culture. They do, however, acknowledge that the processes described are not determined by internal organizational factors alone. Accordingly they present factors such as economic climate, national culture, shareholders, the public, regulators, the industrial sector and the competitive environment which exerts a complex and multidirectional influence of the safety of the organization. They also point out that the model includes a feedback loop so that safety outcomes in the form of accidents have a strong impact on the future behavior of all levels in the organization.

When relating O’Dea and Flin’s report to the master’s perception of maritime safety it is important to note that the studies referred to involved a variety of organization types, of which none was involved in shipping. It should also be mentioned that the report refers to a variety of measures for safety outcomes and it is not necessarily so that these are applicable to the situation onboard a merchant vessel.

4 Research questions

4.1 Main themes

As described in the opening part of this essay, safety appears to have different meanings in different contexts. Cooper (2000) also states that deliberate acts of modifying an organization in order to achieve better safety outcomes must be goal-directed. If this is true then a study of the master's perception of promoting safety must have its origin in how masters interpret the concept of safety. Consequently the first research question of this study is:

- *How do masters define safety?*

Besides the establishment of a desired end-state, the endeavours of increasing safety must inevitably include conscious efforts of the master as well as other organizational members. The second, overarching question is thus:

- *In the opinion of masters: How is safety improved and maintained?*

4.2 Sub-themes

The questions above refer to highly complex and abstract phenomena. It is thus unlikely that any useful findings will be achieved if they are approached head on. Rather than pursuing such a fruitless undertaking the problem will be broken down into several sub-themes which will enable a more constructive approach:

- *How do masters consider that the importance of safety should be emphasized?*

Many of the factors that O'Dea and Flin (2003) mention seem to refer to ways of promoting an apprehension that safety is important. Examples of such factors are managerial attitudes, commitment and involvement in relation to safety but also the allocation of resources and an articulated standpoint in the conflict between safety and production.

The perceived importance of safety is also interesting in relation to the antecedent part of the behavioral ABC framework and the cost-benefit ratio in the maximum expected utility principle (Zohar & Luria, 2003), the attitudes of the safety climate concept (Guldenmund, 2000) and, indirectly, the basic nature of safety culture as described by Guldenmund (2000) and Cooper (2000).

- *What are the masters' thoughts about encouraging crewmembers to take ownership of safety?*

According to the principle of maximum expected utility, as described by Zohar and Luria (2003), the realization that safety is important is not enough to invoke safe behavior among a workforce. In order to transform safety awareness to safe behavior the individual also needs to receive the positive feedback from safe acts that the non-event nature of safety fails to provide. In other words there needs to be a punishment and reward system governing safety related behavior. This punishment and reward system does, however, need to be far more all-embracing and subtle than just some formal compensation when following the rules or a disciplinary action when breaking them.

O'Dea and Flin (2003) also refer to research showing that factors such as decentralization of power, organizational support, quality of labor – management relations, supervisory involvement and support, workgroup cohesiveness and worker involvement and autonomy all have a positive impact on safety outcomes.

The common denominator for these factors seems to be that organizational members develop an emotional identification with the organization and its goals (of which a reduced number of accidents and injuries is supposedly one), that they obtain a possibility to influence the work situation (and thereby acquiring a sense of responsibility for ones action) and receive constant feedback from superiors and peers.

Another way of describing this could, perhaps, be that the individual takes ownership of safety and it would be interesting to find out how masters perceive the contributing factors mentioned above.

- *How do masters regard the conflicts of interest that involve safety?*

As previously stated, safety can be viewed as a goal for activities within the organization. As such it could be in conflict with other goals that the organization, as well as individuals within it, might have. This conflict of interest is the basic driving force behind Zohar and Luria's (2003) argument of the maximum expected utility principle and people's assumptions and attitudes towards it is also a vital constituent in many definitions of safety culture/climate (Guldenmund, 2000). Evidence of the impact that such conflicts has on safety outcomes is also present in the research referred to in O'Dea and Flin's (2003) study. It would consequently be interesting to know how masters perceive these conflicts and how they consider that they should be dealt with.

- *What are the masters' thoughts about the support received from superior levels in the organization and how do they perceive the safety related obligations of their subordinates?*

The ISM-code strongly emphasizes that the safety organization of shipping companies should be characterized by a top to bottom commitment where the shore side part of the company has an active role and provides adequate support to the vessels (Anderson, 2005; International Safety Management Code, 2002). The positive effects of such a commitment on safety outcomes are also evident in the research referred to by O'Dea and Flin (2003). If this is true then it would be interesting to explore how the master perceives his/her relation to the shore side of the organization as well as to the supervisors (officers) and crew onboard.

- *How do masters ensure that the shipboard organization is adaptive and has the capability to learn when it comes to safety?*

One of the main principles of the ISM-code is that the shipboard safety organization should be adaptive and have the capability to learn from its mistakes (International Safety Management Code, 2002). Such a learning process is also a fundamental aspect of Pidgeon and O'Leary's prescription for how to prevent man-made disasters and if it involves receiving feedback from the organizational members then it can be categorized as worker involvement which makes it interesting from a safety culture/climate perspective as well.

- *From which hierarchical position does the master exert influence?*

O'Dea and Flin (2003) found that various levels of an organization influence safety by somewhat different mechanisms. Consequently it might be assumed that the hierarchical position of the master in the overall organization must be determined in order to relate data from this study to earlier research.

The master's position is, in part, prescribed by the provisions of legislations such as the Maritime Code referred to in the opening section of this essay. Regardless of this, it is still possible that the actual role of the master is quite different from that prescribed by his/her official obligations. It is also plausible that the hierarchical nature of the master's position differs from vessel to vessel depending on the size and nationality of the crew, the individual preference of each master etc. Consequently it might prove valuable to include this parameter as an inquiry in the interview part of the data collection.

4.3 Limitations

As described in the above sections, safety is regarded by both the academic world and the maritime legislation as a concept that includes technical as well as social aspects. In this study the perspective is, however, more narrow and all considerations of the technical side of maritime safety have been left out.

This study is also focusing exclusively on Swedish masters and the results are not intended to be applicable to masters of other cultural origin.

A third delimitation worth mentioning is the deliberate intention to exclude any evaluative aspects of the subject. This study is therefore in no way aiming at assessing the efficacy of the strategies and concepts advocated by the masters.

5 Method

This study aims at obtaining an apprehension of how Swedish masters perceive the concept of safety and their, as well as other interested parties', role in relation to this phenomenon. As such it can be considered to have an exploratory purpose which Robson (2007 p.19) describes as *"an exploration of some little known phenomenon"*.

In order to survey this complex issue at an appropriate depth, interviews were chosen as the primary method of data collection. This was supplemented by a literature review in order to gain insight into the theoretical implications of the subject. The use of interviews implies that the data collected will be of a qualitative nature which Berg (2009, p.3) characterize as *"...the what, how, when and where of a thing – its essence and ambience"*.

5.1 Interviews

Ten interviews of a length between 45 and 70 minutes were held. The questions listed in appendix II were used as a framework but the discussions ranged rather freely during the interviews. This approach made it possible to review the respondents' arguments in greater depth and allowed them to use their own words and line of reasoning. Some effort was, however, devoted to ensuring that all questions had been covered at the end of each interview. This kind of interview is referred to by Berg (2009, p.107) as *"semi standardized"* and as *"semi-structured"* by Robson (2007, p.75).

The respondents were all informed that they would remain anonymous, that no company names were to be mentioned in the thesis and that they were free to abort the interview at any time. It was also communicated that the study was intended as an exploratory survey of maritime safety management and it was stressed that it didn't involve an evaluation of the respective respondent's role in relation to this. The respondents had not been briefed about the questions to be used during the interview and they had not received any information about the theoretical background or more specific purposes of the thesis.

Four of the interviews were held in study rooms at Chalmers Lindholmen, one in the author's home and five on the vessel of the respective respondent.

5.2 The respondents

5.2.1 Method of selection

An invitation to take part in this study was forwarded to the masters of ten Swedish shipping companies through the respective personnel department. The companies were instructed to send it only to masters living in the western part of Sweden in order to facilitate the practical arrangements of the interviews. Two of the interviews were held with respondents contacted this way.

Seven of the respondents were approached directly by the author and asked whether they would consider being a part of the study. Four of these respondents were distant acquaintances of the author and three were approached while attending a course at Chalmers. The tenth respondent was approached by an intermediate person. The masters approached were selected on a basis of availability and not due to any special considerations of age, type of vessel etc. This method of selection is known as “*convenience selection*” (Borg & Westerlund, 2006).

5.2.2 Biographical data

All respondents were Swedish citizens.

Nine respondents were males and one female.

The age of the respondents ranged from 34 to 61 years with an arithmetic mean of 50.5 and a standard deviation of 9.5.

Their experience in the position ranged from 2 to 30 years with an arithmetic mean of 16.5 and a standard deviation of 9.6.

Five of the respondents had no safety related education other than that which is required for holding the position as a master. Two respondents had graduated from the Diploma Programme of Commercial Management and Organization in Nautical Science at Chalmers University of Technology. One of these stated that there weren't much safety related issues in the curriculum but the other mentioned that it had included safety management systems in his/her time. One respondent had taken university courses that related to organizational aspects of safety and one had received military safety education.

Five respondents had never worked with safety related issues in the shore side organization. One respondent had previously worked as a marine superintendent/inspector. One respondent was currently rotating between serving as a master and working ashore as a

marine superintendent/inspector. Three respondents had previously worked as inspectors at new buildings.

5.2.3 The respondents' vessels

The respondents were currently serving on the following tonnage:

Product/chemical tankers	4 respondents
Passenger/RoRo ferries	3 respondents
Bunker barge	1 respondent
General cargo (coaster)	1 respondent
Small passenger vessel	1 respondent (This respondent had served on RoRo vessels and bulk carriers until recently and was primarily referring to this experience during the interview.)

The size of the crew on the respondents' vessels ranged from 2 to about 90 persons with an arithmetic mean of 25.3 and a standard deviation of 26.2.

The nationality of the crews on the respondents' vessels was as follows:

Five of the respondents sailed on ships with all Swedish crews. One of these respondents pointed out that although the crewmembers were all Swedish citizens, some had their origin in other cultures.

One respondent sailed with Swedish, Pilipino, Ukrainian and Latvian crew members.

One respondent sailed with Swedish, Pilipino, Latvian and Russian crew members.

Two respondents were the only Swedish crewmember on their respective vessel. In one case the rest of the crew were Pilipino and in the other the crew were from Russia, Poland and Lithuania.

One respondent sailed on a vessel crewed by Swedish citizens except for two Pilipino deck ratings and a Rumanian engineer.

5.3 Method of analysis

Nine of the interviews were recorded on a digital Dictaphone. The tenth respondent preferred not to be recorded and in this case notes were taken during the interview. The recorded interviews were transcribed verbatim.

The transcriptions and notes were thoroughly read and the themes which emerged were subsequently divided into categories and subcategories. Some of these categories had a direct origin in the questions asked and some referred to issues that were identified as important during the course of the analysis.

The transcriptions of the interviews were kept in Swedish throughout the analysis. Key passages were translated into English when cited in the result section.

6 Results

6.1 The masters' definition of safety in their own words

Eight of the masters gave an articulated answer to the question of what safety really is:

The most concise and static definition was provided by a respondent who explained that good safety is *"when nothing happens"*.

The rest of the masters seemed to have a more procedural view.

One respondent stated that it referred to doing things in an ensuring way where damages are eliminated as far as possible. The respondent also argued that safety is not an ultimate goal and explained this with the notion that damages may occur even where there is safety.

A similar argumentation was put forward by a respondent who saw safety as *"risk handling"*. This respondent believed that *"all of life is a big compromise with safety"* and safety is thus the process of dealing with the risks that this leads to.

This procedural approach was shared by a respondent who believed that safety is *"everything that"... "reduces the risk of accidents happening, that injuries are sustained"*.

The same argument, but with a slightly different wording, was conveyed by a respondent stating that safety is *"that you work in a way where you aren't subjected to anything unforeseen, like accidents."* *"If you have safety then you won't have to worry"*. *"You know that everything works"*.

Three of the masters went further and divided safety into subcomponents.

The first one stated that safety is *"that the ship is handled in an ensuring way. That the crew, passengers and cargo feel safe. That there is a functioning organization if anything should happen onboard, fire, collision, whatever it may be."* The procedure of achieving this safety was regarded to have both technical and preventive aspects. The preventive aspects did, however, seem to refer to drills and training ensuring that the crew knows how to act when accidents already have occurred.

The second respondent divided the attributes characterizing a safe vessel into technical aspects (life vests, emergency exits, hospital material), training (fire drills, life boat drills) and a dialogue ensuring that the people onboard work together in an efficient way.

The third respondent illustrated safety with the notion that *"you can have a cup of coffee while you drive"*. The respondent went on to explain that this meant that one experiences a sense of control, a knowledge that everything is working and a confidence that any disruptions will be efficiently dealt with. The respondent was consequently referring to proactive as well as reactive aspects of safety.

6.2 Is it possible to achieve a permanent state of sufficient safety?

One aspect of the definition of safety is whether it is possible to reach a state where the hazards threatening the interested parties are sufficiently dealt with. In other words one might ask whether “good safety” can be achieved. This issue was addressed with nine of the masters in the study.

Four respondents emphasized the importance of never being satisfied when it comes to safety and that there is always room for improvements. One also highlighted the danger of stagnation if failing to apply such an approach.

One respondent expressively stated that safety *“is not a static condition but a constant development.”* However, the same respondent didn’t see any problems in the proactive safety behavior of the crew as the results of audits were reaffirming. The position of the respondent on this matter therefore seems to be rather ambiguous.

Two of the respondents believed that, although a state of ultimate safety will never be achieved, the organization will still reach a point where the costs of achieving higher safety will outweigh the benefits.

One respondent believed that a reasonable level of safety is achieved when there are no accidents and stated that this was pretty much the case onboard his/her vessel: *“There aren’t that many accidents, or almost no accidents, so it’s working rather well.”* The respondent did, however, consider that the formal procedures concerning safety need continuous improvement in a *“process that probably never will be finished”*.

One respondent stated that a sufficient level of safety is achieved *“when everything is working, when you feel that you can keep up with everything in the ISM and so forth...”* *“And people are content and don’t feel that it’s a burden.”* This respondent is apparently referring to an achievable state of satisfaction concerning the formal, procedural safety work in the organization. It remains unclear if the same applies to the notion of safety in its own right.

6.3 Inducing safe behavior

6.3.1 Realization of consequences

One of the most dominant themes in the masters’ discussions of how to get a crew to act safely is the need of information about consequences. This is an issue that was addressed by nine of the respondents.

All of these nine respondents stated that an emphasis on the consequences of unsafe behavior is a vital motivating force when trying to induce safe behavior. This was generally

specified with remarks about the effectiveness of highlighting previous accidents and a visualization of inherent dangers in the procedures and material used onboard. One of the respondents mentioned that the living memory of previous maritime disasters, such as Estonia, Scandinavian Star and Herald of Free Enterprise, is automatically inducing higher safety awareness among the crew. Another respondent brought up difficulties in ensuring rule adherence when it comes to situations that carries a relatively low risk of resulting in accidents as adverse consequences then becomes less apparent.

Six of the respondents mentioned a need to link rules and procedures to possible accidents that may arise if the rules are not followed.

One respondent believed that a higher degree of rule adherence would be obtained if shipboard personnel were given insight into the office ashore in order to see the implications that rules and procedures have on that part of the organization.

One respondent stated that the crew should be made aware of the fact that the rules are implemented in order to protect them rather than for the sake of oil, insurance companies or ship owners.

Another respondent seemed to have an opposing view and placed a heavy emphasis on the need to explain that the rules are there in order to meet legislative demands.

6.3.2 Monitoring the crew and providing corrective feedback

This is another dominant theme which was brought up by nine of the masters.

Seven of the respondents emphasized the need to monitor crew behavior and provide verbal corrections when encountering erroneous acts. The term *"nagging"* (*"tjata"* in Swedish) was commonly used. Only one of these went further and stated that formal corrective measures were to be used if informal actions proved unsuccessful.

Three of the masters highlighted the supervising duties of senior and junior officers.

Four of the respondents stated that monitoring could have negative aspects as well. One stated that it could eventually result in the master doing all the work himself. Instead the respondent believed that the master should monitor new employees closely in the beginning and then gradually step back and rely on random inspections. Another respondent realized that it would be impossible to *"be everywhere at the same time"* and that monitoring and corrective feedback thus is an insufficient method of ensuring safe behavior on its own. A third respondent believed that a too tightly monitored crew might get fed up and eventually become passive. Finally there was one respondent who believed in personal responsibility and that all individuals have an obligation to consider how to act safely and what protective

equipment to wear. He did, however, acknowledge that there are legislative requirements to supervise the crew and which needs to be taken into consideration as well.

Two of the respondents had an opposing view and stated that they didn't rely on a close supervision of their crews. One of these believed that it wasn't really needed, except for some occasional small items. The other referred to the master acting as a "*uniting force*" rather than a supervising one.

6.3.3 The role of superiors in promoting safe behavior

6.3.3.1 Committed superiors

Five of the respondents believed that superiors who are committed to safety will create a safety commitment among the crew. Examples of ways to express this commitment included to show an interest in the activities of the crew, participating in safety related activities, discussing safety with the crew and to have an open minded and encouraging attitude.

Two other respondents expressed similar views as they stated that the superiors should "*set a good example*" and be "*role models*".

6.3.3.2 Supportive superiors

Eight of the masters saw a connection between supportive supervisors and the safety commitment of the crew. Six of these believed that such a support would stimulate safety initiatives (exemplified by incident reporting, pointing out faults, making suggestions for improvement, being more active in safety related work etc.) among the crew. Examples of supportive behavior that were brought up included: commending initiatives and ideas; having an open and positive attitude; giving the crew space and leeway; allowing things to take time and; standing by individuals when things go wrong.

Four of the masters also mentioned that the shipboard organization requires a similar sense of support from the office ashore. One of these referred to the importance of feedback and quick replies from the organization. Three respondents argued that the office needs to give the master enough leeway to prioritize safety and that they should support the decisions that he/she makes. One of these also stressed that shipboard employees have an obligation to report unsatisfactory conditions to appropriate authorities if the company fails to take action.

6.3.4 Involvement and participation

Seven of the masters believed that the involvement and participation of the crew in safety related activities will lead to higher safety awareness. The nature of these relations did, however, vary substantially.

One master referred to the importance of being a valued part of the organization.

Another respondent stated that if the crew is thorough when conducting small, everyday duties then this will automatically lead to better safety awareness on the whole.

Two respondents believed that the activity of writing accident and non-conformity reports will lead to higher safety awareness and a tendency to spot hazardous conditions before they materialize into accidents.

Four respondents promoted a delegation of tasks that lies above that of the formal position of an individual. This would supposedly lead to the individual *“rising to the occasion”* and being more motivated and initiative.

Three respondents discussed the motivational benefits of having drills and training that are stimulating and amusing for the participants (SMS quizzes, drills in the form of competitions, evacuation exercises that include the evacuation of real, rather than imaginary, persons etc.). One of the respondents also stated that enjoyable drills would result in a sense of solidarity and unity among the crew. This should in turn foster a greater concern for the wellbeing of the fellow crewmates which hopefully would lead to higher safety awareness.

6.3.5 Interpersonal relations

Seven respondents believed that good interpersonal relations will have positive safety implications. This was exemplified with notions such as: good communication with co-workers; people being friends and helping each other out and; having an open and informal atmosphere onboard.

Four of the respondents highlighted the coffee break or Sunday dinner as an efficient arena for informal discussions of safety related matters.

6.3.6 Hierarchy

Six of the masters stated that a flat or non-hierarchical organization would benefit safe behavior. This was due to crewmembers then being more inclined to object to hazardous orders and report accidents and malfunctions to their superiors.

Two of these respondents did, however, emphasize that some authoritativeness would still be needed in order to ensure rule adherence in the crew. Another respondent also believed that the crew would prefer that the master kept a certain degree of distance.

6.3.7 No-blame culture

Nine of the respondents stressed the importance of having a non-blame culture onboard. The reasoning behind this was generally that allocating blame would alienate the crew, induce a sense of insecurity, disable constructive dialogue, encourage cop-outs and prevent incident reporting.

Two of the respondents also discussed the presence of a blame culture in the shipping world at large. One of these believed that the industry had a long way to go in this matter and that it has a tendency to search for scapegoats rather than learning from the mistakes that are made. The other respondent referred to the web page of a major shipping corporation stating that *"mistakes are not an option"*. He considered this to be an example of a highly counterproductive attitude.

6.3.8 Training and education

Four of the respondents referred to the importance of exercises and education when promoting safe behavior. Except for the argument reviewed in section 6.3.4, none of them pursued the subject further and most seemed to consider it to be self-explanatory.

6.3.9 Reward systems for safety

Two respondents worked for companies that had implemented safety related reward systems.

The first respondent's company had three different kinds of reward systems. First there was a cash prize awarded to the entire crew when a vessel received less than four remarks on oil company vettings. Then there was a scheme for awarding high-quality incident or non-conformity reports with a small prize (key rings or bags with the company logo). Finally the respondent's vessel had implemented a practice of arranging drills in the form of competitions with a small cash prize for the winning team. The respondent generally seemed to be positive to such award systems. He/she did, however, mention a couple of related dilemmas. When it came to awarding reports the respondent saw a problem in people making up near accidents in order to receive a prize. Regarding the rewarding

scheme for vetting inspections he/she acknowledged that it usually is easy to identify the individual responsible for the remarks received on inspections. The respondent argued that this had a motivating effect but that it also resulted in a public humiliation for the person in question.

The other respondent's company had a system that rewarded the best incident/non-conformity report each month and the vessel submitting most reports with a price. The respondent believed it to be a good idea to reward high quality reports but argued that rewarding great numbers of reports would result in useless statistics.

Three of the respondents who didn't have reward systems considered such schemes to be a good idea when the issue was brought up.

The first mentioned that the reward could be money to the welfare fund onboard if the ship managed to pass vetting inspections with few remarks. The respondent argued that such an arrangement would be beneficial since it would reward the whole crew for efforts made in the common interest of keeping the vessel safe. He/she did, however, believe that might be difficult to get the office interested in such a scheme since it would be an extra expense.

The second respondent believed that reward systems could be a good idea but that it might be difficult to determine what to reward.

The third respondent mentioned that rewarding suggestions for improvements might be beneficial. The respondent argued that this could motivate ratings, who work with safety equipment on a daily basis, to come up with technical improvements.

Two respondents stated that they didn't care for the idea of having safety related reward systems.

One considered such formal rewards to have a secondary significance. Instead the respondent argued that *"this is something you'll have to work with from within"* and mentioned feedback as an appropriate mean of informally rewarding good safety.

The other respondent didn't see any reasons for having formal reward systems for safety as this ought to be a self-interest. The respondent did, however, emphasize the importance of informal tokens of appreciation such as a case of beer to the crew after a well performed drill.

6.4 The master's role in promoting safety

6.4.1 How safety priorities are visible in the master's activities

Eight of the masters were asked if they considered safety to be important. All of these gave an affirmative answer. As a response to this they were asked to explain how this safety priority was manifested in their daily work.

Seven respondents then referred directly to rules and procedures concerning safety.

Five of these stated that they showed their commitment to safety by ensuring that rules and regulations were adhered to. One added that he/she also kept track of developments concerning safety by reading industry journals and then discussed this with the crew.

One respondent stated that his/her commitment to safety was visible in pretty much all activities since these activities were guided by safety rules demanded by oil companies.

Another respondent stated that he/she tried to arrange drills that were realistic and rewarding for the crew.

One respondent only referred to procedures indirectly. He/she emphasized the importance of reviewing the shipboard organization when arriving as a master to a new vessel. If any flaws were detected the respondent stated that he/she would check if there were any procedures for this that was not followed.

6.4.2 How the master works with promoting safety

All ten respondents were asked how the master, in general, contributes to the safety onboard.

Five respondents stated that the master has a vital role in ensuring that rules and regulations are adhered to.

Three respondents stated that it is important that the master sets a good example for the crew.

Three respondents stated that the master should ensure that people onboard are adequately trained and familiarized with shipboard operations.

Two respondents mentioned that it is beneficial if the master delegates tasks. One of these referred to the redundancy achieved if officers know how to handle the master's duties. The other mentioned motivational effects when people are given more responsibility.

Two respondents argued that the master should ensure that there is good communication within the crew.

Two respondents stated that it is important that the master is attentive and listens to the crew.

Two respondents stated that the master should show a commitment to safety and show an interest in the crew's safety related activities.

One respondent believed that the master should forward praise and positive feedback from the office ashore in order to motivate the crew.

One respondent emphasized that the master should provide backup to the crew and ensure that they felt confident.

6.5 Conflicts of interest involving safety

6.5.1 The nature of the conflicts

All ten masters agreed that safety can be in conflict with other goals and performance measures of the organization. The following conflicting goals/performance measures were brought up:

6.5.1.1 Economy

Nine of the respondents believed that safety might be in conflict with economical/commercial interests.

Four masters simply stated that economical considerations could affect safety in a negative way. One of these respondents exemplified this with the cost of using tugs when berthing in windy conditions and the office ashore being reluctant to supply equipment and parts in order to cut expenses.

Five respondents agreed with the conclusion of the previous four but believed that this was true only in everyday situations with a short time horizon. In a wider perspective they argued that a high degree of safety could attract customers and therefore have a positive impact on the commercial aspect of the organization.

Three of the respondents stated that customer demands from oil companies and passengers have brought about higher safety standards.

One of the respondents discussed that safety has a commercial value only if it is efficiently communicated to the customers. Otherwise safety efforts were believed to be in vain from an economical point of view.

Another respondent divided the world's commercial fleet into one category that can capitalize on safety (oil tankers trading in regions where environmental concerns are regarded as important) and one category that can't (container vessels, bulkers and tankers trading in developing regions). The reasoning behind this was that oil companies are conscious of the bad publicity that oil spills bring about when occurring in developed regions. Since they are major customers they have the power to put a commercial pressure on tanker owners trading such waters to improve safety. Container operators and bulk owners, on the other hand, were believed to negotiate with a more diversified market that lacks larger customers with the power to bring about an implementation of higher safety standards.

6.5.1.2 Time / Speed

Seven of the masters believed that safety could be in conflict with temporal concerns.

Two respondents stated that ambitions to save time may affect safety without specifying this further.

Four respondents discussed the conflict between safety and time but with an apparent realization that time have economical implications.

The first of these described a perceived obligation towards the employer to ensure speedy operations during his/her first period of serving as a captain. This was linked to the notion that shorter turnaround times resulted in higher profits for the company. Eventually the respondent had realized that the time he/she was able to save made a marginal contribution on the whole. He/she had consequently adopted the philosophy that it now *"may take an hour longer if it has to, as long as it is safe"*.

The second respondent stated that *"...if you are to follow all the rules, then you have to consider that this takes time and time is money. Then it's not that popular anymore."*

The third respondent believed that safety might be compromised due to existing time margins and continued to state that this was ultimately an economical concern.

The fourth respondent argued that seafarers in general are highly loyal towards their employers and readily compromise safety in order for everything to *"run smoothly and on time"*.

One respondent seemed to regard time from another perspective and stated that individuals suffering from excessive workloads may compromise safety in order to buy the time needed to handle their commitments.

6.5.1.3 Convenience

Seven of the respondents believed that convenience could have an impact on safety. The perceived mechanism behind this generally seemed to be that rule adherence involves extra efforts and that this makes it tempting for individuals to cut corners in order to facilitate their duties.

6.5.1.4 Vanity

One respondent suggested that vanity could hamper rule adherence. This was exemplified by crewmembers being reluctant to wear obscuring safety equipment when trying to touch up their suntan during outdoor work in nice weather.

6.5.1.5 Conflicting legislative demands

Another respondent stated that requirements of the international ship and port facility security code (ISPS) sometimes interfere with safety concerns. The respondent believed that safety should be prioritized in such cases.

6.5.2 Pressure from the shore side organization to compromise with safety

Four masters acknowledged that they had been subjected to pressure from their superiors to compromise with safety.

Two of these respondents stated that this involved pressure to reduce time and cut costs.

The third respondent referred to the recent recession which had forced the ship manager to try to reduce the level of spare parts kept onboard to dangerously low level.

The fourth respondent gave an affirmative answer to the question of whether he/she was subjected to pressure but stated that there was a joint understanding that corners occasionally needed to be cut and that the final decision usually was left to the captain. Just like the previous respondent, this master also mentioned problems with acquiring sufficient equipment and parts from the ship manager.

Four of the respondents expressively stated that they had not been subjected to any pressure to compromise with safety.

One of these referred to the nature of the trade his/her vessel was engaged in and stated that the low value of the cargoes meant that time was of less concern. The same respondent had, however, experienced difficulties acquiring everyday consumables (exemplified by safety footwear) but he/she didn't consider this to be a major problem.

The other three respondents referred to a company climate which precluded any pressure to compromise with safety.

6.5.3 The master putting pressure on subordinates to compromise with safety

One respondent stated that there are occasions where the master must pressure the crew to compromise with safety and seemed to consider this to be an inherent consequence of the nature of the business. The compromises involved were, however, believed to refer to safety procedures of minor importance and not issues that could involve real danger.

This conclusion was shared by another respondent who added that seafarers are a very loyal group of people who usually have an understanding attitude towards such demands. The same respondent did, however, emphasize that the crew were not supposed to compromise safety on its own initiative without informing the master.

One respondent answered that he/she didn't know whether he/she might apply such pressure but the respondent stated that he/she tried not to.

One respondent believed that he/she might unconsciously put pressure on the crew. The respondent also discussed the possibility of the hierarchical nature of the shipboard organization preventing people from objecting in such situations.

Four masters expressively stated that they didn't put pressure on their subordinates to compromise with safety.

One of these referred to a reluctance to rush people and it is difficult to ascertain whether his/her reply was concerning this aspect alone or if it had a broader meaning.

Two respondents added that any attempts to put pressure on the crew would be met with resistance since the safety awareness of the crew was high.

6.5.4 How the master believes that conflicting interests should be handled

Two masters stated that they normally didn't compromise with safety.

One of these discussed this matter in a reply to the question of whether it is acceptable to violate safety rules. The respondent argued that these are normally implemented as a response to previous accidents and believed that there is normally no reason to divert from prescribed procedures.

The other respondent stated that he/she always went "*by the book*" since the master is the one who will ultimately face the consequences when things go wrong and that strict rule obedience is the only defense in such situations.

Six respondents seemed to refer to a difference in degree when it comes to the situations in which one may compromise with safety. The dominant theme seemed to be that small deviations from the safest possible way may be quite in order if the risk entailed is minor or the possible consequences is less severe. None of the respondent believed that they would compromise with more important safety aspects. Examples of this reasoning includes: using the necessary safety equipment but not the unnecessary one; following the appropriate procedure but maybe not documenting this fully and; breaking rules regarding rest time in order to meet other safety demands and operational requirements.

Another dominant theme in the argumentation of these six respondents seemed to be that legislative requirements often include demands and procedures that are of less value for what they considered as "real safety".

One respondent pursued a more detailed argumentation and stated that all activities onboard inevitably involve a compromise with safety to some extent and that ultimate safety could only be achieved if the vessel never left berth. The respondent believed that the proper way to handle this dilemma was to review everything you do and consider if it is possible to do it in a safer way.

6.6 Formal safety and the regulative framework

6.6.1 The driving force behind procedures and regulations concerning safety

6.6.1.1 Customer demands

Three of the masters who were serving on oil tankers stated that the procedural safety work onboard their vessels were driven by customer demands from oil companies. Two of them also argued that such customer demands had resulted in regulations being more stringent in the tanker sector than in the rest of the maritime sphere.

One of the masters serving on passenger vessels mentioned that the passengers acted as a driving force for higher safety levels since they would be reluctant to travel if they believed that the vessels were unsafe. It was, however, difficult to ascertain if the respondent referred to rules and regulations specifically or if he/she was talking about safety in general.

6.6.1.2 Regulations as a manifestation of the reality onboard the vessels

One of the masters mentioned above believed that even though the rules were brought about by customer demands they still had their basis in problems and accidents experienced in the shipping industry.

The latter conclusion was shared by another respondent who pointed out that all major maritime conventions were supposedly a reaction to major maritime disasters.

Two respondents emphasized that the SMS (safety management system) used onboard their vessels was developed and updated locally by the ship manager taking in account the experience gained onboard. Both stated that they were very content with these documents.

Two respondents stated that the content of the ISM code is nothing more than basic seamanship. One of these believed that if everyone just used their common sense then the rules would not be needed. The other argued that the procedures stipulated in the ISM code had always been used at sea and that the only difference is that it now has to be documented.

6.6.1.3 Conflicting interests

Two of the masters serving on oil tankers brought up a problem with different oil companies prescribing their own interpretation of safety and which rules to adhere to.

Another respondent came to a similar conclusion and stated that port authorities, shipping companies, governmental agencies and the IMO each have their own view of safety with an accompanying regulative agenda.

One respondent also argued that there are parties that have an interest in less stringent safety regulations. This was exemplified by ship owners with a business strategy aiming at providing cheap transportations with sub-standard tonnage and flag states targeting such owners in order to boost the revenues from their registers. The respondent also believed that the influence of such parties has hampered the legislative efforts of the IMO.

6.6.1.4 *Safety for the sake of regulative bodies*

Three respondents saw a problem in that the abundance of regulations that applies to the contemporary shipping world has created a situation where procedures are carried out and documented for the sake of keeping inspectors happy rather than to improve safety. One of the respondents described this phenomenon as a *“paper safety”*: *“Look how nice documents we have!”...“But under the paper there’s a hole in the boat.”*

Three of the respondents made several remarks that indicated that they seemed to regard the regulations themselves and/or the legislative bodies responsible for them as the very heart of safety. In other words they seemed to believe that the goal of safety is to fulfill regulations rather than to prevent or handle accidents and that legislative bodies hold the key to what safety really is. The discussions containing these remarks were, however, difficult to interpret and the same respondents made remarks pointing in other directions as well.

6.6.2 Regulations and the workload of the organization

Seven of the masters believed that the regulations applied to shipping have increased the workload onboard. Four respondents stated that this workload is so severe that it actually has a negative effect on safety.

Three respondents specified that requirements to document safety procedures is so time consuming that it prevents the crew from performing the safety related work that needs to be done. Examples of such documentation included filling in checklists, writing protocols of risk assessments and issuing permits for hazardous activities. One of these respondents went further and mentioned a perceived attitude in the industry that it is more important to have a ticked of checklist than that the items the checklist covers actually is performed.

Three respondents referred to various supervising instances having different demands which made preparations for inspections more difficult. One of the respondents also pointed out a problem in different oil companies still preferring to make their own inspection of tankers. According to the respondent this meant that the number of vetting inspections was far higher than it would have to be if the oil companies cooperated more and shared information.

Two respondents stated that the amount of rules and procedures applied to shipboard activities had a confusing effect. One of these argued that it was generally difficult to be up to date and keep track of the rules that apply. The other respondent referred to the number of documents carried onboard containing rules and regulations. He/she seemed to consider

it to be difficult to find the appropriate procedure to follow when conducting various operations onboard.

6.6.3 Rules and motivation

Five masters made remarks indicating that sub-optimal regulations may have an adverse effect on the motivation of the shipboard personnel.

One respondent referred to the amount of paperwork concerning safety related activities that has to be completed in order to satisfy supervising parties. He/she also stated that these parties had a view of safety that differed from that of the shipboard personnel. The respondent believed that this resulted in a perception of a “fictive safety” that had little to do with keeping the vessel safe.

Another respondent came to a similar conclusion but stated that formal reviews of shipboard safety activities still have a positive effect on safety.

Two respondents argued that rules and regulations must be relevant for the reality onboard the vessel in order for them to be taken seriously.

Another respondent referred specifically to the importance of the shore side organization fulfilling their obligations in the safety management systems, such as responding to non-conformity reports. If they failed to meet these requirements people were believed to get fed up with the system.

6.6.4 Pragmatic attitudes towards safety regulations

Four of the masters stated that there are occasions where one may deviate from rules and stipulated procedures. The level of this flexibility did, however, vary.

The first respondent initially stated that all rules must be adhered to, no matter what you think of them. After a while the respondent did, however, admit that some corners might be cut when the regulations are too far up the wall or when they leave room for interpretation.

The second respondent stated that essential safety rules were adhered to but that minor items such as documentation, insignificant incident reports and unnecessary safety equipment occasionally might be overlooked.

The third respondent argued that it was impossible to go strictly by the book and that it's necessary to use one's head and take short cuts on some occasions.

The fourth respondent stated that *“the whole shipping industry is a big lie”* and that there is a common understanding among ship owners and seafarers that rules occasionally need to be broken. Just like the previous masters this respondent did, however, emphasize that this was only in the case of less important rules and that the safety of the vessel must never be jeopardized.

Two respondents seemed to have a more ambiguous attitude to this question.

The first one agreed that there are unnecessary safety rules and argued that the right way to handle this was to write a suggestion for amendments. When asked if one were supposed to follow inappropriate rules the respondent answered affirmative at first but later he/she arrived at the conclusion that it’s a *“matter of conscience”*.

The second respondent referred to the master’s position and argued that this individual has a right to deviate from regulations when considering that this is in the interest of the safety of the vessel. When asked how to tell if the situation demands such a deviation the respondent acknowledged that this is difficult in the heat of the moment.

Two respondents simply stated that rules are to be followed at all times. One of them did, however, mention that this could be difficult in some situations.

6.6.5 The masters’ opinion of contemporary safety legislation

Eight of the masters responded to this question. When reviewing these answers it should, however, be noted that it generally is uncertain which rules they actually referred to. The ISM code is perhaps the most influential piece of legislation that has been implemented recently but there are many others. The masters serving on oil tankers also indicated that new legislation per se is not the only aspect of this matter and that more stringent vetting inspections from oil companies have played a role as well.

Five respondents believed that the new regulations have in fact improved safety even though there are negative aspects such as an increased workload. Two of these stated that although the new legislation has brought about positive changes, things are now starting to go over the top and become over-regulated.

One respondent believed that contemporary legislative demands have improved safety on his/her vessel but was more hesitant when it came to the question of whether safety had been improved in the shipping industry at large. This hesitation had to do with doubtful behavior of other vessels navigating the high seas and the respondent speculated about poor education standards and cultural issues onboard those vessels.

One respondent believed that safety standards had been improved to some extent but that the excessive demand for documentation in many occasions creates a fictive safety.

One argued that it was difficult to have an opinion about the ISM code since it is open for interpretation. The same respondent did, however, state that he/she was satisfied with the onboard safety management system (SMS) and that this was subjected to continuous reviews and updates.

6.6.6 How to improve the formal or legislative part of maritime safety

This issue was addressed by five respondents.

The first master argued that the actual procedural demands should not be reduced but that there should be less management in detail. The respondent also stated that oil companies should consolidate their vetting efforts in order to reduce the number of inspections and that their interpretations of regulations ought to be more harmonized.

The second respondent mentioned that increasing the manning level onboard could be beneficial when trying to cope with the administrative burden that contemporary legislation entails. This respondent acknowledged that the rules are based on experience and previous accidents but argued that the IMO needs to be more agile in amending the legislations as the situation in the industry changes. The respondent also highlighted the importance of shipboard safety management systems being adequately adapted to the vessels they are used on and that they should be less detailed.

The latter conclusion was shared by the remaining three respondents. One mentioned that his/her company originally had implemented a way too explicit safety management system so that they *“made a rod for their own back”*. Another stated that: *“Many companies have SMS systems containing file after file and no one knows what’s in them”*.

6.7 The master and the organization

6.7.1 The cooperation between the master and the shore side organization

This issue was addressed by eight of the respondents.

6.7.1.1 Support

The most commonly mentioned characteristic when describing a good shore organization was that of support. One of the respondents believed this to be important as it provides the master with the sense of assurance needed to make crucial decisions. Others mentioned

that it is beneficial as it helps to motivate the master. The signification of this concept did, however, differ slightly between the respondents.

Two of the respondents referred to the company standing by the decisions made by the captain, even though they may be uncomfortable.

One mentioned that the office should stand by the master when he/she has made a mistake. This respondent stated that the company in which he/she worked had a policy of always supporting the master in the initial stage of an accident and leave any divisions of fault or blame to a later stage.

The issue of allocating blame was addressed by three other respondents. Two had experienced such tendencies in the companies they worked for and one of them stated that this will lead to a loss of confidence in the leadership ashore. The third referred, as already mentioned above, to the website of a major shipping corporation which stated that *"mistakes are not an option"*.

6.7.1.2 Response

Two respondents emphasized the importance of receiving adequate response from the office ashore. Both exemplified this with quick responses to incident and non-conformity reports. One of them also mentioned response to master's reviews, audits and the possibility to *"lift the phone"* and reach someone at the office immediately.

6.7.1.3 Climate

One respondent argued that a relaxed, friendly relationship between the ship and the office is important. This was exemplified by superintendents addressing the shipboard personnel by first name and individuals within the organization knowing each other on a personal level.

6.7.1.4 Teamwork

Two respondents emphasized the importance of the shipboard and shore side organizations developing teamwork. One of them expressed it as *"everyone working together towards a common goal."*

One respondent mentioned that a larger shipping company which is controlled from the top might be less safe since decisions are made at a distant place and the organization becomes unwieldy.

6.7.1.5 Bilateral insight

One respondent mentioned that it might be beneficial if the office and shipboard personnel were given insight in each other's situations. The respondent argued that this might be accomplished if senior officers spent periods working in the office ashore and the shore based personnel visiting the vessels during vetting inspections.

6.7.2 Whether the master can influence the company he/she works for

This issue was addressed with nine of the respondents.

Eight of these stated that they were not in a position to influence the business strategy or overall operational decisions of the company they worked for (e.g. which tonnage to use, the trade to be engaged in and economical decisions concerning the whole company rather than the individual vessel). One master, who was working for a smaller shipping company and spent periods ashore as an inspector, stated that he/she had such influence.

All of these masters did, however, state that they could influence economical and operational decisions that concerned their vessel. Examples of such influence included budget issues, what equipment to use and the process of rebuilds and repairs. Four of the respondents stated that the captains in their respective company were involved in the design and/or construction phase of new-buildings.

6.7.3 Whether the master can influence safety related issues in the company he/she works for

This issue was addressed with nine respondents as well.

The master who was working for a smaller shipping company and spent periods ashore as an inspector stated that he was involved in setting the guidelines for the safety work in the company.

Seven of the respondents seemed to experience that they had a relatively large influence of the safety procedures used onboard their vessel and some influence on safety guidelines and policies in the company at large. Several of them pointed out the provisions in the ISM code that requires the managing company to respond to any safety related suggestions from the shipboard organization.

One master who was working for a major shipping corporation stated that he unfortunately had little influence on policies and procedures concerning safety.

6.7.4 The role of the officers in relation to safety

This issue was addressed by eight respondents.

Three respondents stated that the officers had a supervising or superintending role in relation to safety. This was exemplified by the officers being in charge of the work conducted by the ratings and monitoring that this was done in a safe way. One respondent specified this further and stated that the higher the position, the more responsibility with regards to safety involved.

Two respondents pointed out that inspections and maintenance of safety equipment is a part of some officers' duties.

Three respondents made remarks indicating that they considered the officers to have a role in providing the master with information about things going on onboard. In other words they seemed to regard the officers as extra pair of eyes.

One respondent stated that the officers should be role models and set a good example for the crew.

One respondent argued that the officers had a role in motivating the crew.

One respondent stated that officers who are committed to safety will, in turn, stimulate a higher safety commitment among the ratings.

Two respondents emphasized the importance of the officers taking things slow and not rushing the crew.

One respondent argued that it is important that the officers take initiatives of their own.

6.7.5 How the master works with the officers in relation to safety

This issue rendered a rather diverse set of answers from the respondents.

Three respondents advocated an open and informal relationship with the officers. One stated that both he/she and the officers of his/her vessel were young and that they had developed a non-hierarchical, friendly atmosphere where people worked close together and helped each other out. The other two referred to frequent and informal discussion and both mentioned coffee brakes as a suitable arena for bringing up safety related matters. One of them specified that such informal discussions would allow officers to feel relaxed and comfortable enough to bring up safety concerns.

Another respondent mentioned that the relationship between the master and the officers nowadays is very work oriented. In the old days it had involved more social activities and parties but this has died away as crews became diminished in numbers.

Three respondents believed that delegation of duties to the officers was beneficial as it allowed them to *“grow with the task”* and take more pride in their duties. Two of these respondents stated that the master role then would be to monitor that the delegated chores were being completed correctly. The third respondent expressed this somewhat differently and stated that the master should delegate and then maintain a supportive role.

Two respondents mentioned that they usually monitored new officers closely. One of them continued to state that the officer was subsequently given a freer role, if proven worthy, and that the master then would retreat and only conduct random checks of the work done.

One master argued that it is important to be attentive when dealing with department heads onboard. When asked about the benefits of such attentiveness the respondent seemed to refer to an information gathering function, seen from the masters point of view, rather than any motivational effects.

Another respondent stated that he/she actively tried to ensure that the mates involve the seaman on watch in the navigational duties conducted on the bridge.

6.7.6 How the master works with the ratings in relation to safety

This issue was approached with seven masters but only five provided an explicit answer.

The first two stated that they didn't treat the ratings any different than the officers since the crews are so small nowadays.

The third stated that there usually is a bigger distance between the master and the ratings than between the master and the officers. The respondent also believed that the ratings preferred a certain degree of distance to the person in command and that *“everyone has a need to slander their boss sometimes”*.

The fourth respondent believed that there is a difference in the feedback one gets from the ratings since their tasks are different from those of the officers. The respondent did, however, emphasize that he/she didn't treat the various hierarchical levels or departments differently and that the shipboard organization nowadays is so slender that everybody has safety related tasks.

The fifth and final respondent stated that there are more discussions with the officers since they are the ones responsible for the safety related activities.

6.8 Organizational learning in relation to safety

6.8.1 Answers to the direct question

All ten masters were asked the question of how to ensure that the safety organization is in phase with the world around it, adapting to new risks or “learning” .

One respondent simply stated that *“Well, you have to communicate what has happened.”* *“And what to do in order to avoid it.”*

The second respondent stated that such organizational learning is accomplished *“By making sure that information is thoroughly spread.”* The respondent continued by referring to: systems for incident reports and suggestions for improvements which are forwarded to other vessels in the company fleet; the ship manager submitting reports about incidents in other companies; the use of the INSJÖ system which stores anonymous incident reports from Swedish vessels and; sharing technical information between sister vessels.

The third respondent also brought up systems for distributing non-conformity reports and suggestions for improvements within the company and added that insurance companies sometimes issue warnings about possible hazards.

The fourth respondent referred to: quarterly meetings where the work environment committee review and revise chapters of the SMS; internal and external audits; continuous amendments of procedures and; a system where reports are distributed between vessels in the company. The respondent emphasized the importance of these reports reaching everyone onboard.

The fifth respondent referred to: a working system for non-conformity reports, that reports are read and discussed on safety meetings and that new developments are brought up to discussion. The respondent also emphasized the importance of an ongoing dialogue concerning safety and mentioned coffee brakes as an appropriate arena for discussing smaller items that don't require the issuing of a non-conformity report.

The sixth respondent argued that it is difficult to obtain such an organizational learning since there are so little personnel and time and that the safety organization usually is a matter of routine. When asked if the company had a formal procedure to update the safety organization the respondent stated that *“it is discussed occasionally”*. The respondent continued by mentioning that there are always discussions when things have happened in order to ensure that it won't happen again. He/she also emphasized the importance of continuous amendments of procedures onboard and stated that the master should be attentive and consider suggestions from the crew.

The notion of continuous discussions of amendments to procedures was also addressed by the seventh respondent who argued that Saturday meetings and debriefings after drills were suitable arenas for the crew to bring up ideas and suggestions.

The eighth respondent stated that master's reviews, weekly meetings and formal, as well as informal, discussions provided opportunities to review the safety organization and identify possible improvements.

The ninth respondent answered that the legislative demands are constantly changing and that the shipboard organization then receives directives of "*how it should be*". The respondent also stated that there is a continuous dialogue with the transport agency which acts as the approving instance for the amendments made onboard. When asked if this meant that it is the transport agency or the regulative framework which is the driving force behind the safety onboard the respondent answered affirmative and stated that "*...they are the ones who'll have the final word*". When asked if this then would mean that the transport agency has a correct apprehension of the nature of safety the respondent stated that this depended on their interpretation of the SOLAS and acknowledged that this interpretation sometimes could be questioned. When asked whether accidents would be avoided if the rules were followed the respondent argued that this was not the case and that this has to do with "*the human factor*" and people cutting corners and not following prescribed procedures.

The tenth and final respondent had a similar rule oriented view and argued that an adaptive/learning safety organization is maintained through keeping track of new rules and discussing them at safety committee meetings.

6.8.2 Items brought up during subsequent discussions

6.8.2.1 Formal procedures

As seen from the answers above, four respondents seem to view systems for reporting accidents and non-conformities as a vital tool in ensuring that the safety organization is adapting to new risk. Five of the respondents who didn't mention such systems spontaneously seemed to agree to their significance when the issue was brought up by the interviewer.

The last respondent addressed this issue in a way that was difficult to interpret. The respondent stated that he/she generally had been spared of this and that there hadn't been that many incidents. When asked about the importance of writing such reports the respondent answered that one should write as little as possible. From the following

argumentation it did, however, appear as if the respondent referred to writing short and concise reports rather than writing few.

Three of the respondents mentioned a problem in getting seafarers from the Philippines to write incident reports. Two of these argued that this had to do with a tendency of Philippine sailors to be reluctant to acknowledge mistakes made. Another respondent mentioned that ships manned by seafarers from a northern European country had a lower incident reporting rate. The respondent speculated that this had to do with cultural issues but didn't specify this further.

Two respondents argued that it is important with an organizational climate that encourages incident reporting. One referred to a leaflet that was given to new employees which emphasized the importance of writing reports. This respondent also stated that the reports must be anonymous in order for people to write them. The other believed that the willingness to write reports would increase if there is a no-blame culture, the management is attentive and the shipboard personnel feel confident and assured in their situation onboard.

Two respondents mentioned that their companies had reward systems aimed at encouraging non-conformity and incident reporting. In both cases the authors of high quality non-conformity reports were awarded a small price.

Three respondents emphasized the importance of the office ashore providing an adequate response to the reports.

Three respondents mentioned that they were using a formal procedure of risk assessment onboard their vessels. One of the respondents described this procedure further and stated that it involved writing down possible risks involved in unfamiliar activities and then systematically identifying ways to reduce those risks until a reasonable level is obtained. None of these three respondents seemed to consider such risk assessments to be a way of ensuring that the shipboard organization is adapting to new hazards or "learning".

6.8.2.2 Informal ways of organizational learning

Six masters seemed to argue that an attentive climate onboard is important in order for people to point out faults, hazards and make suggestions for improvements to their superiors.

One respondent stated that a flat organization and an active encouragement could help to facilitate this.

Three respondents mentioned that open and informal lines of communication could be beneficial.

Three respondents seemed to believe that a no-blame culture is essential as this reduces tendencies to cover up mistakes.

Two respondents mentioned that people higher up in the hierarchy have to have confidence in their subordinates in order for such information flows to take place.

6.9 National culture

6.9.1 “Pilipino culture”

Eight of the respondent discussed various aspects of national culture and safety. Six of them referred specifically to working with Pilipino seafarers.

Two of these respondents mentioned a problem with Pilipino sailors covering up mistakes in order to *“save face”*.

One respondent argued that the notion of *“loosing face”* meant that it is important to address errors made on a face to face basis rather than doing it in public. The respondent seemed to believe that the latter strategy could lead to the sailor withdrawing and adopting a hostile attitude. The same respondent also mentioned that younger Pilipino officers may fail to properly supervise older ratings due to a *“respect for the elders”*. In a subsequent discussion he/she also argued that friendly enquiries about the families of Pilipino crewmembers would be beneficial as this would improve the relationship between the master and the individuals in question and make them more willing to bring up safety related concerns.

Two respondents argued that Pilipino sailors need to be supervised more closely.

One respondent believed that Pilipino seafarers show a higher degree of rule adherence than their Swedish colleagues.

One respondent had a conflicting view and mentioned a *“macho attitude”* among Pilipino sailors which made them reluctant to wear protective equipment. The respondent added that such an attitude had prevailed among Swedish sailors as well in the old days but that this had vanished during the last decades. The same respondent also mentioned that arranging drills in the form of competitions was good idea on ships with Pilipino crews as *“they love sports and competitions”*.

6.9.2 Other national cultures

Two respondents stated that vessels with foreign crews sometimes navigate in sub-optimal ways and argued that there could be cultural reasons for this. None of them specified this further.

One respondent mentioned that Americans tend to apply excessive rules and regulations.

Three respondents mentioned aspects of the organizational culture in companies owned by corporations from north European countries other than Sweden.

The first referred to a tendency to question the master's decisions when these had economical implications.

The second stated that the company was "*controlled form the top*" which, according to the respondent, meant that the organization would become unwieldy.

The third respondent mentioned a lack of transparency when it came to economical concerns.

7 Discussion

7.1 Results

7.1.1 The definition of safety

Most of the masters interviewed seemed to regard safety as the activity of ensuring that their vessel, as well as those onboard it, is protected from accidents. Some respondents also included technical aspects and the proficiency to effectuate actions aimed at preventing or mitigating accidents. Such a conceptualization is generally in agreement with the definitions cited in section 2.1. In the case of the respondents the entity protected is, however, specified as a vessel and not a generic person/organization/community. This focus on one particular entity is likely to be associated with the master's formal and informal obligations in relation to his/her vessel. In other words one might say that the master's status as a practitioner and official is apparent in their answers.

It should also be noted that the question concerning the definition of safety was generally posed towards the end of the interviews. The respondents' replies could thus have been influenced by the discussions held up to that point.

7.1.1.1 Whether it is possible to obtain a permanent state of safety

This issue was addressed with an ulterior motive of detecting a basic assumption among the masters. The realization that safety is not a permanent end-state but requires constant efforts is also a vital constituent of the third stage of IAEA's model of organizational safety apprehension as well as the safety definition of the Delhi Declaration of people's right to Safety. The latter definition indicates that such an attitude is essential as the dynamic and ever-changing nature of the world requires that the efforts of achieving safety is constantly revised and updated in order to match the current risks at hand. Apart from that it is also likely that there are motivational benefits of never being content with the current level of safety.

As it turned out, the quest for a common assumption regarding this issue was futile as only four respondents unreservedly believed that safety is an unachievable end-state. The answers of four of the others did, however, indicate that they were aware of that safety can be regarded this way. One of them apparently considered this as the appropriate answer to give but resorted to another line of reasoning when the subject was addressed from a different angle.

Three respondents introduced a practical aspect to the issue as they argued that the organization will reach a point where things are working in a satisfactory way and further

efforts to improve safety involves more trouble than it's worth. This is indeed a valid point to consider and one of the respondents was undoubtedly right when concluding that a quest for ultimate safety could result in the vessel never leaving port. Just as in the case of the definition of safety this also goes to show that the master is a practitioner rather than a theorist.

It is, however, not necessarily so that a quest for ever increasing safety must result in enforcements and restrictions that hamper the practicability of the operations onboard. Instead it should be possible to include this parameter in the striving for higher safety so that it aims, not only to minimize and control hazards, but also to do this in a way that is increasingly in line with the operational demands on the shipboard organization. Such a consideration of the practicability of the organization is apparent in Reason's definition of safety and the realization that safety is an intrinsic goal of the organization is also a parameter in IAEA's evaluation of safety maturity.

7.1.2 Emphasizing the importance of safety and encouraging individuals to take ownership

In general it appears as if the masters' argumentation on this matter is in line with salient themes of many of the theories reviewed in the theoretical framework of this study. It is also evident that most of the masters have spent considerable time contemplating this issue and that their apprehension of the problem is both profound and multifaceted.

Since the ISM code was created with a deliberate intention to induce such a consideration for organizational and behavioural aspects of safety the respondents' thoughts could be seen as an indication that the code has had some success. On the other hand it is also possible that the apparent interest for the social mechanisms behind safety is a result of an increasing awareness of such factors in society at large.

7.1.2.1 Antecedents and consequences

Almost all of the respondents argued that an emphasis of the dangers involved in shipboard activities will bring forth a higher safety motivation among the crew. Seven of the masters also believed that it is important to monitor the crew and correct any unfavourable behaviour.

Both of these interventions have the effect of altering the perception of the maximum expected utility as defined by Zohar and Luria. Highlighting possible risks and consequences of activities performed will achieve this by creating a visualization of the negative effects that safety measures aim to prevent. Supervision and verbal corrective measures

complements this strategy by implementing an alternative set of negative consequences to risky behaviour that have a much higher probability of materializing than the actual hazards involved. The possibility of facing both accidents and the disfavour of one's superiors will also mean that the negative consequences of risky behaviour not only are more likely but also more severe.

It is, however, apparent from the argumentation of the respondents that the method of supervising and correcting the crew is not entirely unproblematic. Two of the respondents seemed to have a reluctant attitude towards supervising the crew and another specified that a close supervision could have a negative effect on the overall motivation of individuals. There was also one respondent who pointed out that the responsibility of the tasks might be gradually transferred to the master if he/she meddles too much with the activities of the crew. Part of this reluctance is likely to be related to the negative tenor of the Swedish word "övervaka" (supervise) used in the interview. Regardless of this it is still evident that some of the masters have realized that supervision needs to be utilized with caution and finesse in order to make the crew take ownership of their tasks and obtain a sense of satisfaction in their jobs.

Another conundrum related to the use of supervision and corrections is Schein's argumentation that such a coerced change of behaviour will not be lasting unless it is supported by a modification of the basic assumptions of the organization. In other words it is unlikely that the crew will maintain the desired safe behaviour when the attention of the supervisors is directed elsewhere.

Schein's solution to this problem is an intentional transformation of the very foundation of the culture of the organization. This is indeed a rather abstract conceptualization and it is not that surprising that the respondents fail to identify such a theoretical mechanism. They do, however, realize that individuals need to be provided with a motivational force that goes beyond the mere apprehension that procedures and substances have inherent risks.

In doing so they introduce concepts that are related to the antecedent part of the ABC framework that Zohar and Luria use. This primarily refers to the seven respondents who mentioned the importance of committed superiors in relation to safety. This was exemplified by having an encouraging attitude, discussing safety with the crew, participating in safety related activities and the supervisors setting good examples and being role models. Such behaviour is likely to point out that safe behaviour is important and desired and it could thus act as an antecedent for the safe behaviour of the crew. The same could theoretically be said about supportive behaviour of superiors but the respondents seemed to relate this to safety initiatives rather than safe behaviour.

7.1.2.2 The master's thoughts on how to induce safe behaviour compared to the study by O'Dea and Flin

As discussed above, several of the respondents believed that committed superiors will create a safety commitment among the crew. Others mentioned the importance of superiors acting as role models and setting good examples. This is in line with the empirical evidence referred to by O'Dea and Flin and both parties seem to agree that the commitment needs to be overtly manifested.

Eight of the masters regarded it as vital that superiors give their subordinates adequate support. Four of the masters also referred to the importance of the shore side organization providing feedback to the vessel and supporting the decisions of the master. In general their thoughts on the subject seemed to conclude that superiors should display a supportive attitude towards the behaviour of their subordinates and that this subsequently will lead to individuals taking safety initiatives. A similar line of reasoning is also apparent in the literature reviewed by O'Dea and Flin. They did, however, also discuss a mediating step where organizational support induces a sense of loyalty among individuals. This loyalty towards the organization and its goals will in turn make individuals more inclined towards safety initiatives and safe behaviour. The masters, on the other hand, seemed to be less concerned with the cognitive mechanisms behind the effects of supportive behaviour. This, however, is not that surprising as their primary concern would be the cause and effect relationship and not a conceptualization of the mechanisms that lie beneath.

In relation to this matter it is also interesting to note that an almost identical discussion of loyalty was brought up by one of the respondents. In that case it referred to the unifying effect of amusing drills which were supposed to foster a sense of concern for the wellbeing of the fellow crewmember which, in turn, were believed to result in safety awareness.

A majority of the masters seemed to believe that involvement and participation could play a part in inducing safety awareness, even though the proposed relationships varied. This is also discussed by O'Dea and Flin and they refer to this as worker involvement and worker autonomy. In the studies they refer to this involves participation in decision making processes, that superiors takes one's ideas seriously and that individuals have specific responsibilities, goals and authorities. The masters interviewed seemed to have a more practical approach as their examples often referred to individuals actually participating in safety related activities which were believed to have motivational benefits. The remarks of four masters did, however, concur with the findings reviewed by O'Dea and Flin as they stated that delegation of tasks had positive motivational effect. The reluctance of some masters to advocate excessive supervision is also interesting in connection to this since such supervision ought to reduce the autonomy of the crew.

Most of the masters argued that a non-hierarchical organization is beneficial when trying to promote safe behaviour. This organizational characteristic is also advocated in O’Dea and Flin’s report. Again, however, the respondents mentioned a simpler mechanism of influence than those found in the discussions of O’Dea and Flin. When it comes to non-hierarchical organizations the masters primarily seemed to regard this as beneficial since it increases the likelihood of individuals objecting to hazardous orders and reporting accidents and malfunctions. In the case of O’Dea and Flin they seem to regard decentralization of power as a contributing factor in the involvement and autonomy of workers discussed above and that this, in turn, will motivate both rule adherence and safety initiatives.

One factor of influence that the respondents and O’Dea and Flin seems to agree more closely on is that of interpersonal relations. On this issue, both parties argue that high quality relations between members within the organization have positive impacts on safety and both seem to regard this as self-explanatory. O’Dea and Flin do, however, primarily refer to relations between superiors and subordinates as their report is focused on the leader’s role.

7.1.2.3 Espoused values among the masters?

Another way of approaching the statements of the masters is to regard them as espoused values. This would imply a search for aspects of the organizational culture on the vessels that the respondents serve on but also the overall culture in the Swedish maritime industry.

The most prominent value appearing is perhaps that safety is important. This was implied by all respondents and all of them maintained this attitude during the discussion of how safety can be in conflict with other interests. (Some admitted to compromising with safety but they all referred to minor items that weren’t supposed to involve any real hazards.) If one is to search for a basic assumption beneath this espoused value then perhaps it is that the master’s ultimate obligation is to ensure the safety of his/her vessel.

When it comes to the matter of how safety is achieved it appears as if the masters believe that people acts safely if they are informed of the dangers involved, if they are supervised and corrected when committing unsafe acts and when they have committed superiors that set good examples. If we are to speculate about presumptions underlying such statements it could be argued that the masters seem to assume that people have an inherent tendency to compromise with safety unless they are motivated through interventions from external parties. When reviewing the statements about conflicts of interest concerning safety it is also apparent that such compromises are believed to be driven primarily by concerns of economy, time and convenience. The discussions regarding temporal and economical concerns did, however, mostly refer to a pressure on the organization and the master to compromise with safety. When it came to individual crewmembers the major issue seemed to be convenience as safe behaviour was believed to involve extra efforts.

Another interesting observation that can be made is that a majority of the masters apparently regard safe behaviour as something that includes pointing out hazardous conditions, filing reports of accidents and non-conformities, objecting to erroneous orders and making suggestions for improvements. In other words the masters generally included safety initiatives and not just rule adherence in their conceptualization of safety. When it comes to this aspect of safety the respondent seemed to believe that individuals need to feel that such behaviour is appreciated by their superiors. It also seems as if it was considered as vital that the organization is arranged so that individuals are involved in safety related activities. This was proposed to be accomplished when the organization is non-hierarchical so that individuals are allowed to express their concerns. It was also mentioned by a couple of respondents that the actual activity of writing incident reports could lead to an increased safety awareness which involved pointing out hazardous conditions. A third factor mentioned as a contributor to safety initiatives was that of a no-blame culture. In other words it seemed as if the masters believed that individuals would be deterred from taking initiatives if those could lead to unduly reprimands.

7.1.2.4 Mediators and moderators in maritime safety

The respondents' thoughts on how to promote safety can also be compared to Cooper's model of safety culture. In his conceptualisation of how safety is achieved, moderators and mediators to the striving for higher safety are divided into attitudinal, behavioural and situational aspects.

If the same is done with the items that the respondents brought up it appears as if the desired behaviour primarily refers to the safe conduct of procedures onboard and the safety initiatives discussed above. There are, however, other behaviour mentioned as well. Examples of such behaviour include: emphasizing risks involved; supervising the crew and providing corrective feedback; providing support to one's subordinates; being forgiving when mistakes are made and; resisting external pressure to compromise safety. All these behaviours are examples of the efforts aiming at improving safety that Cooper refers to.

Cooper continues to state that such behaviour has attitudinal or psychological prerequisites and mentions goal commitment and self-efficacy as prime examples. When it comes to the respondents they seem less concerned with the attitudinal aspect of safety which, in part, could be a result of the absence of such issues in the questions used for the interview. There are, however, indirect indications of beneficial attitudes. Examples of such are the realization that safety is important, the assumption that safety requires constant improvements (shared only by a minority of the masters), the opinion that every individual is a valued part of the crew, that people must be allowed to make mistakes and a belief that

safety procedures are a vital part of running a vessel (a matter on which the respondents had plenty to say).

So far we have addressed the behaviours that the master's regards as beneficial for the safety of the vessel and the attitudinal aspects that lies beneath. According to Cooper's models these notions will in turn be affected by (and affect) the situational aspects of the organization.

In relation to this issue it is interesting to review the respondents' discussion about goal conflicts concerning safety. It appears as if the favourable behaviour advocated by the respondents often is in conflict with economical, temporal and practical concerns. In other words one might suspect that conflicting interests restrict the possibility to act safely and that it might influence the attitudes towards safe behaviour as well (e.g. the need for short turnaround times gradually eroding perceptions of safety margins or the cost of mistakes making it hard to maintain a no-blame attitude). According to Cooper the influence does, however, run both ways. It is thus likely, for instance, that the attitude of never compromising with more serious safety issues (which many respondents advocated) will tilt the equilibrium between safety and other interests in a favourable direction.

The other major situational aspect brought up by the respondents is the regulative framework concerning maritime safety. This obviously has direct effects on the safe behaviour mentioned above as it is implemented to stimulate and modify this very behaviour. However, from the respondents' remarks it is also apparent that improperly designed rules and regulations may have a negative effect on both attitudes and behaviour.

7.1.2.5 Reward systems for safety

This issue was not included in the initial questions used during the interviews and none of the respondents who weren't already using such systems referred to them spontaneously. Since it appears as if they are being introduced to the maritime industry it might still be interesting to mention them briefly.

Reward systems obviously affect the targeted behaviour since they introduce an artificial reward that compensates the efforts entailed in this behaviour. As a couple of respondents pointed out it can, however, be difficult to identify the right behaviour to reward and to design the system so that undesired consequences are avoided.

In relation to this issue it is also interesting to bring up the discussions of O'Dea and Flin which indicates that reward systems may have a broader effect than just stimulating a particular behaviour. In their report they pointed out that the safety commitment of managers is a vital part in stimulating safe behaviour. Since reward systems are

implemented by managers it is thus likely that they promote an image of the management's commitment to safety and that this will lead to an apprehension among the crew that safety is important. This could, in turn, lead to a higher safety motivation in general that stimulates safe behaviour that goes beyond that which is directly targeted by the reward systems.

None of the respondents discussed these motivational effects in detail but most of them seemed to be generally positive to such reward systems. The two masters who had an opposing view seemed to regard the formal implementation of reward schemes as unnecessary. Both did, however, acknowledge the positive effect of informal tokens of appreciation. This is indeed a valid point and it is likely that informal tokens of appreciation such as verbal feedback or a case of beer can be just as effective as official reward systems. The use of such rewards is also indicated by the discussions of a majority of the respondents in the section dealing with supportive superiors.

7.1.3 Conflicts of interest involving safety

7.1.3.1 The nature of the conflicts

It appears as if all masters believe that safe behaviour is challenged by competing interests that both the organization at large and individuals within it might have.

The interests of concern seemed to be either economical aspects of running the shipboard organization or the convenience of individuals within it. Time was also mentioned by a majority of the respondents but this was in turn referring to the economical consequences of a slow pace or the convenience of doing things fast.

In the case of economical interests it seems as if the respondents had a rather complex apprehension of the problem. Nine masters believed that economical concerns may obstruct safety in isolated situations with a short time horizon. Four of these also acknowledged that they had been subjected to pressure from the shore side organization to compromise with safety in order to cut costs. On the other hand there were five of these respondents who believed that efforts aimed at improving safety can have a positive economical effect since a high safety standard can be used as a marketing tool towards customers. If combining these remarks it appears as if there is an apprehension among masters that safety concerns have a cost when it comes to everyday decisions and procedures. There are, however, also indications that these costs are believed to be recoupable if the resulting safety standard is communicated to the customers. Another interesting observation in relation to the financial aspects of safety is that none of the respondents discussed the economic benefits of reducing the number and severity of accidents.

When it comes to the issue of convenience it seems as if a majority of the masters agree with Zohar and Luria's conclusion that safe behaviour involves extra efforts. This notion is also implied by the respondents' apparent belief that the crew will succumb to the inconvenience of such efforts unless properly supervised. It is also interesting to note that the discussion of convenience seemed to be limited to rule adherence. The same line of reasoning ought to apply to the efforts of safety initiatives as well but none of the masters mentioned such relations.

7.1.3.2 Pressure to compromise with safety

As noted above, all ten masters indicated that safety can be in conflict with other interests. This is a logical conclusion since both organizations and individuals have a multitude of interests and it would be very strange if none of them interfered with safety from time to time. If this is true then it would also be reasonable to assume that both the office ashore and the master sometimes apply pressure on subordinates to compromise with safety. In relation to this it is very interesting to note that almost half of the respondents stated that they hadn't been subjected to pressure from their superiors or that they, themselves, would not apply such pressure on the crew.

One explanation for these statements could possibly be that they actually work in an environment where it is possible to avoid applying such pressure on individuals. This, however, is rather unlikely. More plausible explanations would be that they haven't realized that such pressure is applied, that they are reluctant to admit to such occurrences or that the issue was addressed by the interviewer in an indistinct way. Either way it is safe to say that a conscious approach to this issue is vital in order to deal with the related dilemmas that are bound to arise.

7.1.3.3 How to deal with conflicting interests

Two of the respondents stated that they never compromise with safety. This is indeed an admirable ambition but it might prove to be very difficult to adhere to in many situations. On the other hand it is likely that there are benign motivational effects of applying such a guideline for one's behaviour.

Six respondents stated that they would compromise only with less important items which didn't pose any major threats. This is a practical approach to the problem and it is likely that such compromises are required in order to maintain the practicability of shipboard operations. Such an approach does, however, entail the dilemma of how to decide when compromises are called for and when they are not. It is also difficult to ascertain who has the

right to make that call. An illustration of the latter dilemma was provided by the respondent who saw it as quite in order that he/she compromised with safety but stated that the crew was not allowed to do the same without seeking prior approval.

In the respondents defence it should, however, be noted that this issue is perhaps one of the most challenging problems in the conceptualization of safety and it is therefore not surprising that they didn't have a ready solution to it.

7.1.4 Formal safety and the regulative framework

Rules and regulations were not initially considered as an area of concern for the interviews, nor was it included in the first set of questions. However, it quickly became apparent that the regulative framework is an extremely vital part of the masters' apprehension of maritime safety and all respondents were constantly referring to it. An illustration of this is provided by the statements of eight respondents who were asked how their safety commitment was manifested in their daily work. All of them referred to rules and regulations in some way.

In general it appears as if the regulative framework directs almost all safety related efforts performed on modern vessels. This is also an ambition of the ISM code but there are indications that this might have negative consequences as well. The first item of concern seems to be that rules and formal procedures have become so paramount in the striving towards higher safety that they might get in the way of the apprehension of the actual safety that the rules aim to achieve. Evidence of this is present in the remarks of three respondents indicating that they seemed to believe that the goal of safety is to comply with regulations rather than to keep the vessel safe.

An even greater problem seems to be that legislative demands have increased the perceived workload of the shipboard organization. According to the respondents this primarily seems to be a result of requirements for transparency which has led to substantial demands for documentation. This is not necessarily a problem in itself but almost half of the respondents stated that the work involved is so demanding that it gets in the way of other safety related activities that the crew needs to perform.

A related issue is the apparent belief of half of the respondents who stated that inappropriately designed rules and procedures may have a negative effect on the safety motivation of the crew. This seemed to be particularly related to the shipboard organization having a view of what constitutes appropriate measures that differs from that of the legislative framework.

All the problems mentioned above indicates that the industry is experiencing difficulties in implementing a regulative framework that is properly adapted to the shipboard reality in

which it is supposed to be used. From the remarks of several respondents it also appears as if part of the problem could be that the shipboard organization lacks adequate resources to comply with current regulative demands.

This apparent discontent with contemporary regulations that half of the masters share is alarming from several perspectives. First of all it is evident that formal rules and regulations have an all-pervading effect on today's shipping industry. If these rules are perceived as unsatisfactory by a substantial part of the individuals subjected to them it would mean that this problem is salient in almost all activities performed onboard. Second at hand is the likely danger of individuals losing faith in rules that are considered as inappropriate or difficult to adhere to. This could in turn result in a situation where the crew adopts an excessively pragmatic attitude towards the regulative framework so that both appropriate and inappropriate rules are broken on a regular basis. Finally, Pidgeon and O'Leary mention that ill conceived regulations may have a confusing effect that disguises the hazards involved in organizational activities.

The apparent discontent with current legislations is, however, not that surprising since the regulative framework has undergone substantial modifications in recent years and such processes are bound to take time before they reach a state of satisfaction. It is also interesting to note that although many of the respondents identify problems with the legislation a majority of them still believed that they have had a positive effect on the overall safety level.

7.1.5 The master and the organization

7.1.5.1 The master's position in the organization

In general it seems as if the masters experience a rather high level of influence on organizational activities that concern their vessel. This appears to be especially true when it comes to safety related matters but most of the respondents had the same apprehension in the case of economical affairs. The apprehension of influence on the organization at large seemed to be more restricted. The statements of several respondents did, however, indicate that they were utilized as a source of information and expertise when it comes to issues that relate to safety, vessel operations and technicalities.

When reviewing the respondents' statements about their relations with the onboard personnel it's not surprising that they considered themselves to be heads of the shipboard organization. Many of them did, however, make remarks indicating that they had a supervising function in the daily operations as well.

If combining the statements above it appears as if the position of the master resembles that of the mid-level managers whom O'Dea and Flin refer to. In other words the master is primarily occupied with tactical issues such as interpreting policies and implementing strategies which are drawn up by the senior management ashore. As noted above, the master also appears to have duties which O'Dea and Flin primarily assigns to supervisors (e.g. structuring, coordinating and facilitating the work performed, ensuring that policies and procedures are adhered to). A possible explanation for this somewhat diversified role could be that the shipboard organization is smaller than those that were studied in the literature which O'Dea and Flin refers to. In a smaller organization it is likely that the on-site manager will be closer to the activities performed on the "floor" level and thus takes on a more supervisory role.

7.1.5.2 The cooperation between the master and the shore side organization

The most dominant theme in the masters' discussion of the shore side organization was that they should provide the master with adequate support. Two respondents also mention the importance of receiving adequate response. In relation to this they seemed to argue that a sense of support from the shore side organization will make the master more inclined to effectuate the responses that the safety of the vessel requires. Three respondents also referred to the importance of being able to take actions without risking inappropriate blame from their superiors. Their thoughts on this matter thus resemble those that were brought up in the section of how safe behavior is induced in general. From these statements it is also evident that the respondents agree with the conclusion of O'Dea and Flin, the ISM code and Zohar and Luria which indicates that safety requires a commitment from senior levels of the organization.

7.1.5.3 The master and the crew

According to O'Dea and Flin, mid-level managers (such as the master) should ideally show an involved, decentralized and participative leadership style towards the supervisors (officers). If such leadership is combined with a sufficient decision making leeway for the supervisors then they are likely to develop more participative and supportive relations with the floor level employees (ratings). Such relationships are, in turn, associated with greater employee participation and involvement which results in an increased motivation for safety.

A few of the respondents followed a similar line of reasoning in their answers to the questions of how the master promotes safety in general and how they deal with the officers and ratings. These remarks primarily referred to the importance of having an open, informal and supportive relation with the officers and the beneficial effects of delegating tasks. Most

of the masters did, however, resort to an argumentation that referred more to the officers' practical obligations of monitoring behavior and gathering information about/from the crew. Again this is an indication that the master is a practitioner (who needs to keep track of what goes on onboard his/her ship) and not a theorist indulging in the abstract mechanisms that lie beneath observable behavior.

It is also likely that the question of how the master works with officers and ratings entails a couple of factors that may have a confusing effect. First of all the crews on modern vessels are often so small that a close working relationship is likely to develop. If this results in people regarding individuals as friends rather than officials then this could possibly make it difficult to theorize about relationships and functions. Another problem is that officers are a relatively diversified group. This designation could refer to mates, engineers and catering personnel and it is difficult to ascertain what groups the respondents were talking about. There may also be great variations of experience within the group. An officer could, for instance, be a 23 year old graduate with very limited sea-time but it might also be a retiring chief mate who went to sea when the master was still a child. Finally the question regarding the master's relations with the ratings was ill-designed as it related to the previous question about the officers and not to the relationship with the ratings in its own.

7.1.6 Organizational learning in relation to safety

When asked a direct question, eight of the respondents seemed to believe that organizational learning in relation to safety is a matter of learning from experience. Four of these primarily referred to formal schemes aimed at forwarding information about incidents and improvements within, and among, companies. Three discussed the importance of a continuous dialogue onboard where identified hazards and suggestion for improvements could be brought up.

Two respondents initially seemed to believe that organizational learning is about keeping track of new regulations. This must be considered as a suboptimal attitude and it also relates to the previous discussion of how rules and regulations may get in the way of constructive safety efforts.

In the subsequent discussion nearly all of the masters agreed on the importance of having reporting systems for incidents, non-conformities and suggestions for improvements. Since this is a vital part of the ISM code it can be seen as evidence that this piece of legislation has had an impact on the way masters perceive organizational learning.

Even more interesting is that six of the respondents believe that an attentive and encouraging attitude among superiors is important in order for subordinates to point out

faults, hazards and make suggestions for improvements. Three also mentioned that a no-blame culture could be beneficial in relation to this.

If combining these notions it appears as if the masters believe that the organization is adapting to new risks and circumstances if individuals have an opportunity to raise their voice and articulate experiences of accidents, incidents, hazards and make suggestions for possible improvements. This opportunity could, according to the respondents, be provided either through reporting schemes or through informal discussions. There are also indications that these communication channels are considered to be facilitated by an open and encouraging atmosphere and a no-blame culture.

The masters' thoughts on this subject resemble, to some extent, those of Pidgeon and O'Leary. The similarities primarily refer to the use of reporting systems. It is also possible to compare the respondents' emphasis of formal and informal discussions to the good management techniques that Pidgeon and O'Leary sees as important in order to elicit varied viewpoints.

There is, however, an obvious difference in that the respondents primarily seem to refer to a continuous update to new hazards and changing conditions that lie within the current conception of safety. Pidgeon and O'Leary acknowledge that this is a vital part of organizational learning but they also argue that the organization must challenge its own preconceptions of how safety is achieved. Such an approach is, according to them, necessary in order to tackle the information barriers that allow chains of discrepant events to go unnoticed and ultimately lead to accidents and disasters. Since the masters interviewed can be seen as prominent representatives of the shipboard part of the maritime industry it might be suspected that Pidgeon and O'Leary's thoughts about challenging preconceived apprehensions have not yet gained a hearing in this environment.

When discussing the subject of organizational learning in the maritime field it is also necessary to review what the ISM code has to say on the matter. This piece of legislation requires that the organization should safeguard against all identifiable risks. Such a statement implies that some kind of scheme for risk assessment needs to be implemented and three of the respondents also mentioned that this had been done on their vessels. Unfortunately the code fails to specify exactly how these risks are supposed to be identified. Such an approach from the legislators could possibly be considered as helpful when trying to promote an unprejudiced risk assessment. It is, however, plausible that this lack of guidance allows ship managers to implement standardized schemes that aim at little more than to meet formal obligations. Combined with the generally procedural nature of the code (which is highly dependent on safety management systems) this could make people regard risk assessment as just another procedure that must be completed rather than as a chance to evaluate activities and their related risks from "outside the box". This risk is even bigger if

the procedural part of safety is believed to be a burden, which some of the respondents apparently do.

In relation to this it is also interesting to note that the risk assessment scheme described by one of the respondents has several items in common with Pidgeon and O'Leary's checklist for safety imagination. None of the three respondents using such schemes did, however, think of them in relation to organizational learning.

7.1.7 National Culture

As seen in the theoretical framework of this study, organizational culture is considered by the academia as a vital aspect of safety management. When it comes to the influence of national cultures on maritime safety, as well as safety in general, it appears as if this area has attracted less attention. It is, however, apparent that a majority of the respondents regard this as an essential factor in shipboard relations and one that has safety implications as well. Consequently it might be assumed that practitioners, such as the ship captain, could benefit if the academia devoted more research attention to the practical safety implications of working with the multi-cultural crews that dominate the contemporary shipping world.

When it comes to the actual statements concerning national culture they tend to be so diverse that it is difficult to draw assertive conclusions from them. Nonetheless, it is still interesting to note that the respondents refer directly to the influence of national culture but mainly mention organizational culture in indirect terms. Since the academic world seems to agree that organizational culture has an impact on safety outcomes it might thus be concluded that it would be beneficial to raise the awareness of this aspect so that it is considered by the masters as a contributing factor as well.

7.2 Methodological discussion

7.2.1 Interviews

The use of semi-structured interviews is in many ways an appealing method of obtaining this kind of qualitative data as it allows the respondents to describe occurrences and opinions in great detail and with their own words. It will also allow the interviewer to pursue items of interest and demand explanations for statements that are made. When reviewing data obtained this way there are, however, a few things that need to be taken into consideration.

First of all the statements of the masters can't be taken as evidence of how their organizations are arranged or how they actually work with safety. Their argumentation should instead be seen as a description of how their situations are perceived and as opinions

of how to achieve safety. In other words the data obtained is an aggregate of perceptions and opinions rather than an objective description of the issues at hand.

A similar concern is that the master's answers are reactions to the questions asked by the interviewer. It is therefore misleading to draw exclusive conclusions from them. Another way to put this is to say that the items discussed are part of how masters believe that safety is achieved but not necessarily the whole perceived solution.

Another dilemma associated with use of interviews is that the interviewer might influence the respondent's perception of the issues discussed during the session. It is also possible to speculate in a shared conceptualization developing during the interview. In the case of this study it is thus possible to regard the discussions as partly emerging from the author's perception of safety and not just from that of the respondents.

Yet another conundrum is that the act of improving safety appears to be a core activity of today's shipboard organizations. It is thus likely that the respondents consider this issue to be a part of their professional identity. This could pose a problem if the respondents perceive the study as a threatening evaluation of how they work with safety onboard. In order to mitigate this problem the aim of the study was explained to all respondents before the interviews and it was emphasized that it does not involve an evaluation of the individual master. Nonetheless, it is still possible that the sensitive nature of the subject might have affected the respondents' arguments to some extent.

When it comes to the practical issues of analyzing the data obtained it is apparent that there are some difficulties there as well. First at hand is the possibility that the activity of transcribing has a filtering effect. In other words there is a chance that information is lost or distorted when the statements on the audio file is transformed into written words. It is also possible that dividing the statements into themes and subthemes will result in them ending up in contexts where they originally weren't intended to be.

7.2.2 Respondents

The decision to use ten interviews for this study was primarily driven by an ambition to adjust the administrative and analytical burden to a suitable size for a master's thesis. Although the number of respondents is relatively small it is still likely that they encompass a sufficiently large cross section of the population of Swedish masters for general conclusions to be drawn. The number of respondents won't, however, allow for comparisons within the group (i.e. comparing masters from the tanker sector to those serving on passenger vessels).

The selection of respondents is another important issue to consider when reviewing the data of the study. Eight masters were approached directly by the author or an intermediate

person based on availability rather than any consideration of personal characteristics. The reason for selecting such a method was basically that other attempts to get hold of masters proved to be rather unsuccessful. Unfortunately the use of this method of selection meant that four respondents were, in some way or another, distant acquaintances of the author. However, it can still be regarded as a relatively random selection with respect to other factors of influence.

The method of asking the respondents directly will also make it more difficult to decline the offer to participate. This will hopefully eliminate part of the problem of only receiving replies from masters with a keen interest in safety issues. The same cannot be said about the two respondents who answered invitations forwarded by their employer. In their case it is also possible that the employers made a conscious choice of which masters to forward invitations to.

If we look at the biographical data of the respondents it is apparent that they constitute a relatively diverse group of individuals with respect to age as well as experience. This is considered to be an advantage for the study as it implies that the perspective of both newly promoted masters and more experienced ones will be included.

When it comes to gender it is obvious that the group is very homogenous. This, however, is believed to be in line with this predominantly male profession.

The selection of vessels which the respondents served on is dominated by tankers followed by RoPax vessels and individual bulkers, bunker barges and passenger vessels. This resembles, to a reasonable extent, the nature of the fleet controlled by Swedish ship owners (Nilsson, 2010).

Another issue that could cause problems is the previous safety related experience of some respondents that lies beyond that which is required in order to qualify for the master's position. More specifically this refers to the two respondents who have worked ashore as inspectors/marine superintendents and the four respondents who had undergone safety related education exceeding that which is required for their positions. In the case of the respondents with experience of the shore side safety organization it is likely that spending periods ashore in such positions is a relatively normal duty for Swedish masters. The inclusion of two such individuals in the study is thus deemed as representative for the profession at large. When it comes to education it is likewise probable that some masters in the Swedish controlled fleet have devoted themselves to studies that relates to safety. It is, however, highly possible that the ration in the profession at large is substantially smaller than the four out of ten masters included in this study. In both cases it should also be noted that no statistics of these occurrences could be obtained and the above conclusions is thus of a highly speculative nature.

7.2.3 Reliability

Borg and Westerlund (2006) state that reliability is about the extent to which coincidences affect the results of a survey. In a similar line of reasoning Robson (2007, p.71) argues that *“Data collection is reliable if you get essentially the same data when a measurement is repeated under the same conditions.”*

In an interview study like this it is possible that the reliability is affected by occurrences such as misunderstandings, respondents or the interviewer having a “bad day”, personal resentment towards the questions or that they were asked in an inconsistent way. A related concern is that the rather small number of respondents implies that such sources of error have a relatively large impact on the aggregated result.

Since the data from this study is of an entirely qualitative kind it is difficult to perform any statistical calculations of the reliability. An alternate way to estimate the significance of the problem would have been to try to replicate the study. Unfortunately the extent of this project did not allow for such attempts. Instead we have to settle with the observation that the discussions of the respondents showed some degree of similarity which indicates that the reliability is not that far up the creek.

7.2.4 Validity

Validity is defined as the extent to which a survey actually measure what intends to measure (Borg & Westerlund, 2006; Robson, 2007). When it comes to the validity of this study one might discuss whether the sample group is representative for the collective of Swedish masters, if the respondents felt comfortable to talk about these issues and to what extent the interviewer asked the right questions in a way that didn't influence their replies. As stated above it is also possible that the statements of the respondents were misinterpreted or distorted during the process of analysis.

Regarding the sample group's representativeness it is argued above that they do constitute a fairly good cross section of the population of Swedish masters. In other words the external validity is believed to be relatively good as long as the generalization is confined to masters from Sweden. However, it is very important to note that culture is a vital factor in the subject of this study. Consequently it must be stressed that the result obtained cannot be generalized as applicable to masters from other countries as their national culture would imply very different answers to the questions at hand.

In the case of the internal validity an assessment is more difficult to make. The fact that the study is descriptive rather than explanatory does, however, mean that the problem is less severe as there are no causal chains that can be misinterpreted.

8 Conclusions

8.1 General conclusions

The aim of this study was to examine how Swedish masters perceive the concept of maritime safety, their thoughts on how safety is maintained and promoted and their, as well as other interested parties, role in relation to this.

The results of the study show that Swedish masters assign a high priority to the safety of their vessel and those onboard it. Safety was in turn defined as the activity of ensuring that accidents are avoided. In order to achieve a high level of safety there is an apparent consensus that safe behavior, entailing both rule adherence and safety initiatives, is required. Such safe behavior was believed to be promoted through: informing individuals of the inherent risks involved in operations; monitoring activities and providing corrections; committed and supportive superiors who conveys an impression of that safety is important; involvement and participation in safety related activities and; good interpersonal relations in a non-hierarchical organization with a no-blame culture.

From these statements it can be concluded that Swedish masters have spent some time contemplating the organizational mechanisms that lie behind safety and safe behavior. This is indeed a pleasant finding and the maritime industry would undoubtedly benefit if this apparent interest is maintained and developed further. There are, however, some aspects of the masters' discussions which indicate that there are areas of maritime safety management that need to receive further attention.

First of all the regulative and procedural framework of maritime safety management seems to entail an inherent risk of formalizing shipboard safety activities to an extent where the actual goal of safety is obscured by formalities. In other words there appears to be a trade-off between the operational and evaluative benefits of having a formal and documented approach to safety and the motivational and inventive effects of a more unprejudiced and free method of dealing with the subject. There are also indications that some rules and procedures are believed to be ill-advised or impractical to adhere to and that the resulting workload may have negative safety implications. The presence of such dilemmas is not surprising in a heavily regulated business such as shipping. Nonetheless, it does indicate that the industry needs to evaluate and debate how the regulative framework is perceived and implemented in the shipboard reality where it is intended to be used.

The results of the study do, furthermore, show that such a discussion of how safety is perceived and approached needs to be extended beyond a regulative context. In particular this refers to the apparent confusion concerning how to deal with situations when safety is at odds with other organizational goals. Most masters are obviously aware of the presence of such conflicts but they seem to be less certain of how to adjust safety objectives to the

practicability and economical reality of shipboard operations. In addition there seems to be a lack of awareness of how such conflicts exert pressure on the shipboard organization and how this pressure should be dealt with.

8.2 Future research

This study has a rather narrow focus as it is designed as an explorative survey of Swedish masters' perception of maritime safety. It could, however, provide a point of origin for research with a wider scope.

Firstly it would be interesting to use the research questions of this study as a basis for a questionnaire survey. If such a survey was conducted among Swedish masters it would provide a broader array of data which could be used to confirm or disprove the results reviewed above. Since such a questionnaire survey would enable the use of a much larger sample group it would also allow for internal comparisons with respect to age, experience, type of tonnage etc. Another benefit of a larger questionnaire survey is the possibility to include masters of different nationalities. This way the influence of national culture could be examined.

Secondly it might be rewarding to perform some sort of observational study in order to find out if the solutions and concepts advocated by the masters actually are put into practice onboard their vessels.

If time and resources were available it would also be tempting to examine this subject with an evaluative research design. Examples of such studies could be: questionnaire surveys of the crew's perception of the behavior displayed by masters; comparisons between accident rates or self reported safety behavior and cultural artifacts (such as manifestations of leadership) and; evaluative surveys (questionnaires/interviews/observations) of how the interpretation and implementation of regulations are perceived and reacted to.

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Appendix I - Definitions of safety climate and safety culture

<u>Reference</u>	<u>Definition of safety culture/climate</u>
Zohar (1980)	A summary of molar perceptions that employees share about their work environments (safety climate)
Glennon (1982)	Employees' perceptions of the many characteristics of their organisation that have a direct impact upon their behavior to reduce or eliminate danger (safety climate) and, safety climate is a special kind of organisational climate
Brown and Holmes (1986)	A set of perceptions or beliefs held by an individual and/or group about a particular entity (safety climate)
Cox and Cox (1991)	Safety cultures reflect the attitudes, beliefs, perceptions, and values that employees share in relation to safety (safety culture)
Dedobbeleer and Béland (1991)	Molar perceptions people have of their work settings (safety climate)
International Safety Advisory Group (1991)	Safety culture is that assembly of characteristics and attitudes in organisations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance (safety culture)
Pidgeon (1991)	The set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimising the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious (safety culture)
Ostrom et al. (1993)	The concept that the organisation's beliefs and attitudes, manifested in actions, policies, and procedures, effect its safety performance (safety culture)

Cooper and Philips (1994)	Safety climate is concerned with the shared perceptions and beliefs that workers hold regarding safety in their work place (safety climate)
Geller (1994)	In a total safety culture (TSC), everyone feels responsible for safety and pursues it on a daily basis (safety culture)
Niskanen (1994)	Safety climate refers to a set of attributes that can be perceived about particular work organisations and which may be induced by the policies and practices that those organisations impose upon their workers and supervisors (safety climate)
Coyle et al. (1995)	The objective measurement of attitudes and perceptions toward occupational health and safety issues (safety climate)
Berends (1996)	The collective mental programming towards safety of a group of organisation members (safety culture)
Lee (1996)	The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, and organisation's health and safety management (safety culture)
Cabrera et al. (1997)	The shared perceptions of organisational members about their work environment and, more precisely, about their organisational safety policies (safety climate)
Williamson et al. (1997)	Safety climate is a summary concept describing the safety ethic in an organisation or workplace which is reflected in employees' beliefs about safety (safety climate)

Appendix II – Questions used in the interviews

Rundtursfrågor / General questions

1. Tycker du att säkerhet har hög prioritet?
 - *Do you consider safety to be of high priority?*
2. Hur syns det i ditt arbete? / På vilket sätt visar du det?
 - *How is this visible in your daily activities? / In what ways do you show that it is?*
3. På vilket sätt bidrar positionen "befälhavare" till säkerheten ombord?
 - *In what way does the master contribute to the safety onboard?*
4. Bör skepparen ha en passiv övervakande funktion eller en aktiv, deltagande? -> Vad är för / nackdelarna med detta? -> På vilka sätt deltar du aktivt i säkerhetsarbetet?
 - *Should the master have a passive, surveying function or an active, participative? -> What are the benefits and drawbacks of such approaches? -> In what ways do you participate actively in safety related activities?*
5. Vilka är de största problemen när det gäller säkerheten ombord på ditt fartyg? -> Vad gör du för att komma tillrätta med dessa?
 - *Which are the biggest problems when it comes to safety on your vessel? -> What do you do in order to overcome those problems?*
6. Vilken strategi bör skepparen ha för att driva på säkerhetsarbetet? -> varför då?
(Aktiv vs. Passiv)
 - *What strategy should the master use when it comes to increasing safety? -> Why? (Active vs. Passive)*
7. Hur får man en besättning att agera säkert?
 - How do you get a crew to act safely?*
8. Kostar säkerhet?
 - *Does safety have a price?*
9. Vad är det som orsakar olyckor till sjöss?
 - *What are the causes of accidents at sea?*

10. Vad skiljer ditt sätt att tänka runt säkerhet och agera i säkerhetsfrågor nu från när du började segla skeppare? -> Vilka lärdomar har du dragit under din karriär?

- *What has changed in your way of thinking about safety, and in the way you act in relation to safety, from when you started to sail as a master? -> What lessons have you learnt during your career?*

Kategorifrågor / Detailed questions

Intressekonflikterna / Conflicts of interest

11. I vilka lägen har du känt ett behov av att kompromissa med säkerhet?

- *In what situations have you felt a need to compromise with safety?*

12. Hur ska man göra för få en besättning att prioritera rätt i sådana lägen? -> Vad är rätt prioritering? -> Finns det lägen där man kanske bör vara flexibel med säkerheten?

- *How do you get the crew to prioritize in a proper way in such situations? -> What is the right way to prioritize? -> Are there situations where you should be flexible about safety?*

13. Har du upplevt ett tryck från rederiet att kompromissa med säkerhet? -> Hur hanterar du det? Kan du själv utöva ett sådant tryck på besättningen?

- *Have you experienced any pressure from the shipping company to compromise with safety? -> How do you act in such situations? -> Do you think that you may put such pressure on the crew?*

14. Är det okej att bryta mot säkerhetsföreskrifter?

- *Is it okay to break safety rules?*

Skepparens hierarkiska position samt synen på landorganisation och besättningen / The master's hierarchical position and the relation to the office ashore and the crew

15. Hur arbetar du med kontoret iland när det gäller säkerhet? -> Hur ska ett bra rederi agera i dessa frågor?

- *How do you work with the office ashore when it comes to safety? -> How should a good shipping company act in these issues?*

16. Hur stor påverkan har du på målsättningar, polycies, strategier i rederiet? -> I vilken utsträckning kan du justera direktiv när du implementerar dem ombord?

- *Can you affect the shipping company when it comes to goals, policies and strategies? -> To which extent can you adjust directives when you implement them onboard?*

17. Hur ser din relation till styrmännen och maskinbefälet ut? -> Vad ser du som deras viktigaste uppgift när det gäller att höja säkerheten ombord? -> Hur bör de agera? -> Vad gör du för att hjälpa dem?

- *What is your relation to the officers onboard? -> What do you consider to be their most important task in relation to safety? -> How should they act? -> What do you do to help them?*

18. Hur ser din relation till manskapet ut? -> Vad ser du som deras viktigaste uppgift när det gäller att höja säkerheten ombord? -> Hur bör de agera? -> Vad gör du för att hjälpa dem?

- *What is your relation to the ratings? -> -> What do you consider to be their most important task in relation to safety? -> How should they act? -> What do you do to help them?*

19. Behöver man övervaka besättningen för att de skall följa säkerhetsregler? -> Vad händer om man övervakar / inte övervakar? -> Hur kan man annars göra?

- *Do you need to supervise the crew in order for them to follow safety rules? -> What will happen if you supervise / don't supervise? > What could you do instead?*

Hur man skapar en dynamisk, lärande säkerhetsorganisation / How to create a dynamic, learning safety organization

20. Hur håller man säkerhetsorganisationen uppdaterad mot förändringar, nya risker o.s.v.?

- *How do you keep the safety organization updated to changes, new risks etc.?*

21. Om någon har begått ett misstag ombord, hur ska man hantera det? Bör man bestraffa dem?

- *If anyone has made a mistake onboard, how do you handle that? Should they be punished?*

22. Vad kallar ni rapporteringssystemet i SMS:en i ert rederi? -> Hur använder ni detta? -> Finns det något i detta du skulle vilja förändra? -> Rapporterar ni enbart incidenter och olyckor?
- *What is your reporting system called? -> How is it used? -> Is there anything about you would like to change? -> Is its use restricted to incidents and accidents?*
23. Finns det något belöningsystem ombord för bra säkerhetsarbete? -> Tror du att det skulle kunna vara bra? -> Finns det andra sätt att betona vikten av säkerhet?
- *Do you have a reward system for safety onboard? -> Do you think that such systems could be beneficial? -> Are there other ways to emphasize the importance of safety?*
24. Vad tycker du om regelsystemet för säkerhet inom sjöfarten? Har säkerheten höjts?
- *What is your opinion of safety related legislations in the maritime world? Have they raised the safety standard?*
25. Finns det onödiga säkerhetsregler? -> Hur kommer man tillrätta med detta?
- *Are there unnecessary safety rules? -> What do you do about that?*
26. I vilket läge kan man känna att man uppnått säkerhet?
- *At what stage can you feel that you have reached a sufficient level of safety?*

Avslutande frågor / Concluding questions

27. Vad är säkerhet? -> Hur definierar du begreppet?
- *What is safety? -> How do you define this concept?*
28. Finns det något mer du tycker att jag bör fråga om? Har jag missat något väsentligt?
- *Is there anything else you think that I should ask? Have I missed anything important?*