Safety Excellence – Safety that Lasts

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Abstract

A recent study has revealed an increase in accident frequency in shipping the last few years. Simultaneously, the maritime stakeholders' tolerance for poor safety decreases. This development has caused more and more shipping companies to put safety at the top of their agenda. Success or failure of these initiatives is dependent upon their ability to handle human and organizational factors. This article first describes the key safety challenges for the maritime industry. Secondly, the article outlines ours perspective on how to successfully address and improve human and organisational factors in shipping. It is argued that shipping has a lot to learn from other industries like, for instance, offshore and aviation to reach the goal of safety excellence.

Keywords

Safety; safety culture; Safety performance; Human and organizational factors; Change-management

1. Introduction

Historically shipping has used references as seamanship, seaworthiness and compliance to describe the safety standard of a vessel (Soma, 2004). History has also demonstrated that these parameters have restricted potentials when it comes to accident prevention (Kristiansen, 1999). *Safety Excellence* is a reference to available safety best-practices that easily can be applied in shipping irrespective of regulative requirements.

2. The shipowners challenge

In a historic perspective, shipping is known for its poor focus on safety. However, significant improvements have been achieved. On average the total loss ratio is reduced by 2 - 3% every year (Soma, 2003). Despite this development there has been a tendency in recent years that the frequency of serious accidents (partial losses) is increasing (DNV, 2007).

Although the frequency of total losses is declining, the consequences of such accidents have been, and still are, increasing. The public now have a zero tolerance for accidents and environmental damages. Today the cargo owners consolidate into fewer and larger companies. These companies are more vulnerable both in terms of disturbances to logistic chains and loss of reputation. As a result most stakeholders (i.e. the public, cargo owners, regulators etc) demand high transparency on safety issues. Port states, underwriters, vetting and media are more frequently addressing safety issues in general, but especially after accidents with severe consequences.

Given that the frequency of accidents is reduced, how can then safety be a business challenge for shipowners? The key reason for this is that the increased consequence of accidents is not outweighed by reduced accident frequency. Hence, the risk faced by shipping companies may actually be higher than ever. The tendency for increasing frequency only makes risks even higher. Risk considerations is a fundamental component of sound and sustainable business management, and the increasing safety risks poses a challenge to shipowners.

An additional challenge is that shipping in fact is so safe today that a significant share of ships sail through their life time without any serious accidents. Therefore, shipping companies that hold on to their reactive approach of making safety improvements solely based on incident information will have little information to assure that they manage the increasing risks effectively. The key to reducing the risks shipping companies face is to address and improve the complex interrelations between human and organisational factors.

3. Focus on human and organisational factors

A century of research into accidents has shown that most incidents involve the human element (Soma, 2003). We also know that humans by nature make mistakes, errors and shortcuts. In the airline industry this has been an accepted fact for years, but not so much in the maritime industry until just recently. Research has shown that an airline pilot makes an average of 4.9 errors per hour, but still this industry is among the safest in the world. That implies that any organisation handle errors when they occur, not only prevent them. Therefore we need to focus on how to develop organisations and systems that do not allow errors to escalate into incidents. This implies a holistic view on human an organisational factors. Therefore the hypothesis of this study is that shipping has a lot to learn from other industries in improvement of human and organisational factors through a holistic view on safety.

3.1 A holistic view on safety

The core of a holistic view is to address a wide range of organisational dimensions having an effect on safety and being fundamental in creating a learning safety organisation (Rasmussen, 1997; Perrow, 1999; Sagan 2004). The key organisational dimensions are:

(1) Strategy and Goals
(2) Processes
(3) People and Competence
(4) Roles and Responsibilities
(5) Tools

The five organisational dimensions point to arenas where improvement potentials can be identified and achieved. There are interactions between these dimensions that are critical for safety, and that is the reason why a holistic view on safety is of utmost importance (Rasmussen, 1997). Generally, all the five dimensions should be addressed, but for a specific organisation the improvement potentials may be more obvious and important within some of the dimensions.

3.2 What can we learn from other industries?

Other industries like offshore, space, nuclear energy, aviation and process industry are typically at least a decade ahead of shipping when it comes to safety. This is important as research has proved that there common characteristics for safe organisations across industries (LaPorte, 1991; Hollnagel, 2004; Reason, 1997; Rasmusen, 1997; Weick, 2001; Soma, 2004). These characteristics are summarised as:

Strategy and Goals
Clear and well-formed strategy and no conflicting goals is the cornerstone of all safety work, and a safety strategy is a prerequisite for success in achieving safety beyond compliance.

A safety philosophy is worth nothing without unequivocal commitment from all management tiers, top management included (Rundmo, 2003). Safety must be an integral part of the corporate strategy and an important organisational goal. It must also be recognised that safety as an organisational goal can come into conflict with other corporate goals (e.g. to be a profitable business), and in reaching the corporate goals, some level of risk will always have to be accepted. The objective of safety work is to eliminate unacceptable risk.

Processes
There is always a set of key organisational processes that create a drive towards improved safety. If these safety processes fail, safety work and continuous improvement will be suboptimal. These processes need to be more "intelligent" than the systems' ability to produce errors and accidents.

In many shipping organisations the safety processes are not functioning optimally, and hence there is a considerable improvement potential to be gained if this process is improved and strengthened. Well-functioning safety process should be both reactive and proactive. The process should be reactive in the sense that measures are implemented as a learned response to near-misses and accidents, and proactive in the sense that findings of risk assessments onboard and onshore, suggestions from crews, efforts to improve attitude and competence etc result in a continuous strengthening of the safety barriers.

People and Competence
Addressing people and competence are of utmost importance in safety work and is the key in achieving lasting improvement in safety performance. In accident free organizations people have an in-depth understanding of the shipboard operations combined with a paranoia for failures.

Attitude is an aspect of this dimension where considerable improvement potential can be achieved. Correct attitudes act as "lubrication" to safety-critical processes, and behaviour is strongly rooted in attitudes. Attitudes are therefore a key dimension to address in realising improvement potentials. It is however very difficult to change attitudes directly. Therefore it is important to focus on behaviour. When you do things correctly you will over time modify attitudes addressing the behaviour.

Roles and Responsibilities
Accident free organisations are characterised by safety commitment from the top. This commitment is shared by the whole organisation and fuelled by extremely efficient communication. Because it is acknowledged that errors do occur, it is important to focus on organisational redundancy. Organisational redundancy implies that the operators have the possibility to reveal and correct errors through overlapping responsibilities, competencies and possibilities to monitor each other.

Another characteristic is flexible organisations. This implies that the organizations adapt to what the situation requires. Addressing and understanding the culture of an organisation is therefore of utmost importance in understanding and realising improvement potentials.

Tools
Tools (and technology) are put in place to support important processes, people and competence issues, as well as organisational roles and responsibilities.

Tools and technology should be understood to cover a wide range of measures. In a shipping safety perspective, tools and technology would include risk assessment tools, incident investigation tools, crew resource management, IT systems for ship-to-shore communications etc.

4. Safety Excellence program

The objective of a program to reach *"Safety Excellence"* is to obtain a sustainable positive impact on safety performance through a holistic view on safety. To do so there is a need for both knowledge about safety and knowledge on how to make successful changes. A key is to access best practices and to effectively implement them in the shipping organisation. Without ownership and significant tailoring the implementation will fail. Therefore it is important to follow a specific work method by first identifying improvement potentials, defining appropriate solutions before entering the implementation phase. Through the phases some key areas are of special importance:

- **Benchmarking of leading indicators:** How is the company performing on key organisational factors?
- **Safety best practices:** What are the best practices both within shipping and other industries regarding safety?
- **Implementation of best-practices:** How to implement new safety practices in a specific shipping company?

Most international shipping companies today collect information about incidents and accidents on its vessels and are able to draw lessons learned from these events. Such organisational learning is of course of great importance, but we commonly see a need to improve how this learning is communicated and used with organisation in order to achieve real improvement. Most companies do not put the required resources into implementation of lessons learned. Again, successful implementation is the key to achieving this.

4.1 Three phase approach

Too often safety improvement initiatives arise from insufficient or biased information; an incident, an external requirement, a few observations or an idea. Typically the initiative is materialised in a procedure everybody is expected to comply with after an e-mail distribution. And over and over again, naturally, the procedures cause more frustration than effect, if it is recognised at all.

A good way of structuring this program is to apply a three phase approach. First identify improvement potentials, then design solutions and at last conduct a sustainable implementation of the solutions. The order and quality of the phases is important.

4.2 Improvement identification

Phase 1 is designed to provide answer to three key questions:

(1) Is the Client OK with regard to safety?
(2) What challenges and problems do they have?
(3) What are the prioritised improvement areas?

The real benefits of the program are realized in phase 2 and 3. Phase 1 will provide the required information to structure a Phase 2 (solution development) project. Since all client organisations have a unique set of safety challenges and problems, the Phase 2 project will need to be customized based on the findings from Phase 1.

4.3 Solution development

The second phase is less rigid than Phase 1, as there may be a range of unique challenges and problems that the specific company should prioritise. The scope for a Phase 2 will therefore need to be customized based on the Phase 1 results.

The design of the solutions should include descriptions of the desired behaviour or practice (the "to be" situation) and how this is preformed today (the "as is" situation). The approach used in bridging the gap between the "as is" and the "to be" situation is what solution development is all about. The implementation plan should detail the activities required in actually bridging this gap.

4.4 Implementation and follow up

When the appropriate solutions targeting the prioritised improvement potentials have been developed, together with an implementation plan for these solutions, it is about to realise the improvements through implementation (phase3). The implementation process will normally be done in three stages:

Pilot: Implementation on a few vessels or onshore departments (depending on the solution in question) where the implementation concept is tested, evaluated and adjusted accordingly
Roll-out: When the pilot stage is finalized a full-blown roll-out is conducted. A roll-out should in some cases also be performed stepwise to assure the quality of the implementation.
Completion: When approaching full implementation according to the implementation plan, it is important to assure that the "to be" situation is achieved and that the improvements are sustainable.

To make a successful implementation it is necessary to monitor performance of the project and the benefits it creates. Such benefit tracking will be described in more detail later in this document.

5. Case – "Concerned CEO"

DNV has several examples of the "Concerned CEO" scenario. In the specific case briefly presented here the CEO had joined the company six months earlier. Even though the company had not yet experienced any serious accidents the CEO realised that if something happened, the company could potentially loose business. The project was carried out by DNV in close cooperation with the Client. All three phases were performed in succession, each phase being tailored to the findings and results of the previous phase.

A phase 1 was initiated with the following actions: Review of strategy / mission statements, review of safety performance data, questionnaire survey to all crews, interviews of key shore and sea personnel, workshops with key personnel. The objective of this was to gather and structure the existing knowledge within the organisation and to determine the status of key safety processes in order to develop the "as is" situation. The conclusions were:

- **Is the safety OK**?: No, huge variance and increasing frequency trends.
- **What challenges?:** Strategy: Low cost not quality. Processes: learning process failed. People: new / inexperienced crews. Responsibilities: Unclear / not taken. Tools: Training, procedures
- **Prioritised improvement areas:** Safety department revitalisation, Management safety awareness. Communication, Teamwork, Leadership both ashore onboard and ship/shore.

The phase 2 (solution development) was initiated by a series of risk assessment and root cause analysis workshops of key shipboard operations (Soma, 2006) to explore the findings in phase 1 and increase insight and awareness of the participants. Based on this a "to be" situation was structured. Key solutions areas were:

- Shore management alignment and awareness
- Adjustment of KPIs ashore and onboard
- Improved induction and familiarisation training.
- General safety training though seminars and CBTs

The various solution areas are currently being implemented. The general safety and awareness training is in the rollout phase while the remaining solutions are in the pilot phase. Already several quick wins were observed.

- The communication improved
- The trust in management improved
- Captains became committed
- Near miss reporting boomed
- Lost Time Incident decreased
- Number of risk assessments boomed
- TMSA score improved from 1 to almost 4
- Improved reputation in the market

6. Conclusion

This paper has presented why shipping has a need for extensive safety improvements in the coming years. Shipping is behind other industries. That means that we can learn and improve safety quite easily. The hypothesis was that an improvement project taking a holistic view on human and organisational factors would have a significant impact on safety performance. This has been demonstrated through a safety excellence program where best-practices were transferred to shipping from other industries.

Secondary benefits have also been identified. It will be better in the eyes of the stakeholders such as shareholders, insurance, class, finance, yards, authorities and not the least the employees. This is essential to retain human resources in a global maritime labour market increasingly characterised by a lack of competent personnel and competition between the shipping companies.

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