



INTRODUCTION

The goals of the International Safety Management (ISM) Code, and the goals of Safety Management Systems (SMS) are the attainment of peak safety performance (i.e. no operational incidents, no personal injuries, and no harm to the environment). The maritime industry is still some way from achieving this goal since while these tools aid compliance with regulation, they do not necessarily embed the mature safety culture needed to improve safety performance.

While many organizations recognize the need to move beyond compliance (e.g. to be more proactive in striving for peak safety performance) this is a challenge at a time when recruitment, retention, and costs issues afflict the industry. The pressure to move beyond compliance stems from:

- Tougher requirements and more scrutiny on safety
- Increased emphasis on the value of reputation
- More demanding stakeholders (insurers etc.)

There is a general recognition in the industry that more rules, regulations, and procedures are unlikely to improve safety performance. Instead, the industry needs a better understanding of the social and organizational factors that foster professionalism in the seafarer in routine and emergency situations. The impact of safety culture on the outcome of safety performance is well documented and notes that operational incidents are not a result of human error, technical failures, or environmental factors alone, but a combination of those and others such as failure of management, employees not performing their duties, and a breakdown in documented systems.



A mature safety culture ensures that the working environment cultivates safe attitudes and behaviors benefitting safety performance. There should be a close relationship between an organization's safety culture and a SMS. An effective SMS has to take account of all factors that have an impact on safety including the human and organizational; and conversely the safety culture influences the way in which the SMS is implemented. Consequently, the assessment of safety culture and the SMS should be complementary.

TERMS/DEFINITIONS

Accidents: Accidents are undesired events that result in personal injury.

Incident: An unplanned sequence of events and/or conditions that results in, or could have reasonably resulted in a loss event.

International Safety Management (ISM) Code: A code established to provide an international standard for the safe management and operation of ships and for pollution prevention.

Safety Culture: (1) That assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, [nuclear] plant safety issues receives the attention warranted by their significance (the original definition).

(2) The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management (ACSNI, 1991).

Safety Climate: (1) Safety climate sometimes refers to local (group) subculture. (2) A snapshot of the organization taken at a certain point in time, usually obtained by a safety culture survey.

Safety Factors: The features of a mature safety culture are called safety factors. These include safety awareness, promotion of safety, feedback, respect, communication, problem identification, reward safety, responsibility, empowerment, multi-cultural operations, integrity, anonymous reporting, and hiring quality people, etc.

Safety Management System: A documented process for managing risks that integrates operations and technical systems with the management of financial and human resources to ensure the safety of the organization, public and environment.

Seafarer: Any person onboard a vessel, including the Master, who is not a passenger.

DISCUSSION

Safety Culture

In the past couple of decades there has been a realization that the reliability of complex work systems in achieving operational goals safely depends not only on technology, but also on social structures. This was the repeated finding of a number of investigations into well-publicized disasters undertaken in the late 20th century and into the 21st century. As a result, in all hazardous industries it is now accepted good practice to have a Safety Management System (SMS) in place, and to institutionalize safe working practices through the development of a mature safety culture.

Therefore, the importance in assessing the social processes behind the safety performance of the maritime and other potentially hazardous industries has been acknowledged. Accident investigations have moved away from a focus on proximal circumstances operating at the individual level, to investigating more latent, systemic organizational or managerial flaws. Collaborative efforts with the maritime industry in assessing maritime safety culture have been undertaken in an effort to potentially reduce the number and severity of maritime accidents/incidents.

Safety culture is defined in a number of different ways, but generally contains the following elements (Zhang *et al.*, 2004):

- Safety culture is a concept defined at group or higher level and reflects on the shared values among all the shipboard, shore side, and organization members.
- Safety culture is concerned with formal safety issues within an organization.
- Safety culture emphasizes the contribution from everyone at all levels of the organization.
- The safety culture of an organization has an impact on its employees' behavior at work and potentially away from work.
- Safety culture may be reflected by the relationship between the reward system and safety performance.
- Safety culture is reflected in the organization's willingness to develop and learn from errors, incidents, and accidents.
- Safety culture embraces communication and teamwork.

The literature on safety culture often distinguishes between safety culture and safety climate, where the result of a safety culture survey is called 'safety climate' to show that it is a snapshot of the organization taken at a certain point in time. However, this distinction is not always upheld, sometimes safety climate refers to local (group) subculture instead. For the sake of simplification, the term 'safety culture' is used throughout this write-up.

Importance of Measurement

Some measurement techniques focus on attitudes, values and opinions, where others focus on behavior and work activities. The goal of a positive safety culture is the fostering of professional behavior in routine and emergency situations, but assessing behavior is not straightforward because:

- People have a tendency to change their behavior when they know they are being watched
- Apparent routine behavior may not be sustained in an emergency, or stressful situations
- Behavior assessment can be very time-consuming
- Behavioral assessment requires corroboration by assessments of attitudes and values.

Attitudes, values and opinions should be drawn out as they are central to most definitions of safety culture. If direct observation of behavior is excluded, then it should be included indirectly by asking employees about their perceptions of their own and co-worker's behavior. There may be a reluctance to comment on others behavior unless anonymity is guaranteed.

It is possible to assess safety culture with a variety of tools and techniques, but most have disadvantages. For example:

- The interview technique is time-consuming, and responding may not be accurate
- Focus groups are useful for eliciting key concepts and issues, but likewise may not be accurate
- Examination of key records can provide useful supplementary material, but it is invalid as the primary tool for safety culture as it only shows compliance
- The survey is a primary tool used as it allows the views of a large number of employees to be collected and statistically analyzed.

Each of these issues needs to be understood and addressed for any organization that undertakes a safety culture assessment. Well-designed questionnaires can give valid and reliable quantified assessments of the attitudes, values, and perceptions throughout the organization. The questionnaire should cover the following:

- Ship safety
- Health and safety
- Demographics, and
- An opportunity for feedback about relevant issues not covered.

The questionnaire should contain questions about all of the safety factors that are pertinent to that type of operation. Safety factors are features of a positive safety culture.



Differences between shore side operations personnel's perception of safety culture and shipboard personnel's perception of safety culture may indicate opportunities for safety improvement. Similarly, safety culture perception within the shipboard personnel groups may also indicate an opportunity for safety improvement. A shipping company may believe that they have developed a strong safety program and have addressed issues at every level. However, if the safety culture perceptions are inconsistent within the organization, then most likely there are areas for this organization to strengthen its safety program. Examples of different personnel groups which should be considered are:

- Shore side personnel
 - Position
 - Location (BU/Office)
 - Experience

- Shipboard personnel
 - Position
 - Nationality
 - Age
 - Gender
 - Experience in the marine industry
 - Experience at the current company
 - Experience in current position

To identify if and where perceptions differ at various levels within an organization, it may be important to conduct a safety culture survey at various levels of the organization's operations. Usually, the higher an individual is on the organization chart, the more optimistic he or she will be about the company's program. Upper management generally understands the program's intent and is cognizant of its cost and 'feel' that it must be working. Higher ranking crewmembers may tend to have a more practical view and provide more critical feedback on actual implementation of any safety recommendations. This feedback may be also based on maritime experience, corporate memory, and cultural influences. Lower ranking crew members may be most apt to respond to "what really happens on board", however these responses may be influenced by the lack of maritime experience where their judgment is based on their previous employers or different cultural norms/expectations.



IMPROVING SAFETY CULTURE

The considerable variation in circumstances experienced by employees due to the diverse nature of the company, presents a problem when applying effective recommendations involving company-wide issues. To address these difficulties, many of the recommendations refer to specific occupational groups which appear to experience greater problems with certain issues. It is anticipated that these issues can then be addressed by a particular occupational section (e.g. officers). However, it is also understood that even within occupational groups there is considerable variation in working conditions. Improving safety culture is slow and often uncertain. Approaches include:

- Greater employee involvement.
- The development of leadership skills in safety management.
- Provides data to drive decisions, direction and leadership for the improvement of SMS
- Safety culture maturity modeling

The results of the safety culture assessment should be used in the organization's continuous improvement program. There are three primary reasons for this:

1. The personnel who shared their views and contributed to the safety culture assessment will feel a certain amount of ownership of the project and will expect improvements based on their efforts and activities. If no changes are attempted, they could feel that their input and effort have been disregarded. This could negatively affect safety culture.
2. The analysis is likely to uncover areas for improvement that require addressing for a lasting improvement in safety.
3. The analysis is likely to uncover areas of organizational strength that require action to ensure these strengths are sustained.

SUMMARY

The information contained in this ABS Ergonomic Design and Safety Toolkit Module is based upon successful maritime application of the techniques discussed, as well as state-of-the-art science in a variety of peer-reviewed sources and were selected to provide a basic introduction to safety culture.

REFERENCES

ACSNI Study Group (1991). Study Group on Human Factors, report: Human Reliability Assessment – a Critical Overview. *Advisory Committee on the Safety of Nuclear Installations*.

ABS (2012). Guidance Notes on Safety Culture and Leading Indicators of Safety, American Bureau of Shipping, Houston, TX.

Zhang, H., Wiegmann, D. A., Thaden, T. L. v., Sharma, G., and Mitchell, A. A., 2002, Safety Culture: A concept in Chaos? Paper presented at the 46th Annual Meeting of the Human Factors and Ergonomics Society, Santa Monica.