

Analysis Of The Application Of Safety Culture On Motor Sailing Vessels In Supporting Shipping Safety

Rosnani

(Received: 05 August 2023 / Revised: 16 August 2023 /Accepted: 25 August 2023)

Abstract—Paotere Port is port that plays an important role in the delivery of basic needs to various islands in South Sulawesi. The problems faced by Paotere related to safety aspects include the lack of understanding of safety by the ship and the lack of socialization about safety and applicable rules so that a joint commitment is needed, both regulators, operators and service users to make safety a culture and necessity. The purpose of this study was to determine the application of safety culture by the crew of the shipping vessels in Paotere port in terms of situational and behavioral aspects. The type of research is descriptive quantitative with data collection methods of observation, interviews and questionnaires. Data analysis technique used was descriptive quantitative by using frequency and percentage table distributions to reveal knowledge/understanding of ship crews on safety culture. The results obtained were that the implementation of the situational aspect of safety culture has not been fully implemented, safety equipment and equipment are still lacking and unsuitable for use, from the behavioral aspect the description of the crew's safety culture regarding life safety equipment, work safety and safety signs on board is included in the category still lacking, as well as the lack of safety socialization to ship owners, public shipping companies and ship crews

Keywords—Shipping, safety culture, equipment, crew

I. INTRODUCTION

There are about 17,504 islands in Indonesia and most of them Indonesian territory is waters which makes Indonesia also called a maritime country (UN, 2017). Indonesia needs a strategic and efficient port area so that it can create security and comfort for employees and users of crossing services, especially at ports in the province [1].

The contribution of Indonesian shipyards when viewed from a world perspective The international community shows a fact that is very contrary to Indonesia's maritime characteristics, that Indonesian shipyards have only built 68 units or around 1.38% of the total 6,716 ships classified as Lyod Register. Indonesia's position is far behind compared to China which has built 1,480 units or around 30.1%, then South Korea which has built 1,426 units or around 29%, then Japan which has built 1,262 units or around 25.67%. (Basuki & Putra, 2014 in [2]).

The International Maritime Organization (IMO) has been steadily trying to improve the safety of ships at sea by putting policies into place through highly specific legal instruments since its founding. The International Convention for the Safety of Life at Sea (SOLAS) is the main instrument of the IMO with this focus; with the anticipated introduction of new technology applications that can drastically change how the shipping industry functions, such as Maritime Autonomous Surface Ships (MASS), further adaptations and changes in the scope of SOLAS should also be expected [3].

Implementation of sea transportation for the benefit of distributing goods and passengers from one island to another islands can run smoothly, so that economic development is not only centered on one area. To achieve this goal, the commercial ship fleet requires the operation of ship management that prioritizes safety management so as to minimize the risk of accidents that often occur such as collisions, sinking ships, running aground, fires on board lately [4].

Besides that, organizational culture is also important and necessary get the attention of company leaders because it is a very strong influence on work accidents and worker productivity, where organizational culture is the work rules that exist in the organization which will become a guideline for human resources in carrying out their obligations and values to behave in the organization.

In order to maintain the health and well-being of people and the community, safety is a condition in which risks and circumstances that could cause physical, psychological, or material harm are under control [5]. On the other hand, safety in the construction industry is an important issue and has become the most dangerous industry, especially in developing countries. Indonesia is a developing country where there are many construction activities [6]. There are many distinct definitions of safety depending on the situation, the territory it pertains to, and the industry it operates in. The idea of safety has changed substantially over the years, particularly in the past few decades of the 20th century. The perception of maritime and navigational safety received particular emphasis around the turn of the twentieth century because of changes in marine shipping and the worldwide environment. Meanwhile, the safety culture of an organization is the product of individual and group values, attitudes, competencies, and behavior patterns

that determine commitment, and style and proficiency in an organization's OHS program.

Shipping safety is an absolute necessity and a shared responsibility for regulators, operators, and users of sea transportation services, including ship passengers. Fulfillment of shipping safety factors before the ship departs must be carried out including the fulfillment of the safety aspects of the ship itself so that the ship is seaworthy and can be given permission to sailing with the issuance of a Sailing Approval Letter (SPB) issued by the local port harbormaster [2].

The importance of maritime transport is indicated by the fact that about 90% of the world's merchandise is transported by sea [7]. Considering the rate of shipping within world trade, maritime transportation issues have the potential to disrupt global trade [8].

Paotere Harbor is the oldest port in the country, and used to be a major trading center in its heyday [9]. The harbor is filled with colorful boats and friendly locals. Visitors can take a boat to enjoy the beautiful beach views. The Paotere Port has long contributed greatly to the livelihoods of Makassar people, with activities such as fish auctions, transportation, and other services [10]. This is a port that plays an important role in the delivery of basic needs to various islands in South Sulawesi. This port also supports the distribution of various commodities to Kalimantan, Nusa Tenggara, Maluku, and Papua. The importance of the role of shipping must be supported by adequate safety factors because safety is a non-negotiable thing. The problems faced by ports related to safety aspects include the lack of understanding of safety by the ship's side and the lack of socialization about safety and rules applicable. Therefore, it is necessary to socialize the safety rules to ship owners, shipping companies and shipping crews. For this reason, a joint commitment is needed, both regulators, operators, and service users to make safety a culture so that the fulfillment of rules regarding ship safety, reliable Human Resources (HR) competence is no longer just the fulfillment of responsibilities and obligations but has become a necessity. To jointly understand the importance of shipping safety and make it a necessity [7], especially the fulfillment of aspects in ship safety [11].

There some previous studies stated that The study indicates that safety culture at different analytical levels, influence different types of unsafe behaviours, which in turn influence the risk of work injuries [7]. The higher the safety culture, the higher the safety leadership model, the higher the ism code, the higher the safety culture, the higher the work safety motivation [4]. The visualized safety culture results can enable group discussions about safety on different organizational levels and can constitute an important input to the continuous improvement processes for safety and safety culture [12]. The study indicates that shipboard safety is affected by actions and prioritization by external actors through safety climate [13].

Shipping safety must always be a priority for all ships, both large-capacity ships and small ships or traditional ships that are a means of public transportation such as

ships at Paotere Harbor must always meet the requirements and ship safety equipment before making a voyage.

This study aims to investigate the application of safety culture by the crew of the shipping vessels in Paotere port in terms of situational and behavioral aspects.

II. METHOD

This study used descriptive quantitative research. Given that it collects measurable data for statistical analysis of a population sample through surveys that can be used to find these numbers' patterns, relationships, and trends across time [14].

The data collection methods used are observation techniques, this means that to involve observing and gathering data on a population or phenomena without manipulating variables. It entails gathering data and analyzing it to see whether there is a relationship between the two variables in the study [15].

The interviews can be carried out using communication or interaction to collect information through questions and answers of researchers with informants. This technique aims to find the initial problem (preliminary study) and also know things in more depth [16]. Interview involves gathering information from crew on the ships at Poetere port in Makassar.

A questionnaire is a data collection technique that is carried out by providing a set of questions or written statements to the respondents to answer. The data collection technique with a questionnaire is very good if the researcher wants to collect data with a large or large number of respondents [17]. Data collection by questionnaire will be very efficient if the researcher already knows the variables to be measured and knows what is expected of the respondents. The technique of distributing questionnaires with a total of 20 respondents that people selected at random from 10 people's shipping ships docked in the port of Paotere.

The instruments used for data collection are motor sailboat, Ship's crew, Documentation, and checklist/questionnaire.

Based on the research theme, this research uses a quantitative approach. The quantitative approach is a research approach that uses data in the form of survey answer numbers which are distributed to the research sample and analyzed using statistical analysis techniques. The data analysis technique used in this research is descriptive quantitative using frequency and percentage table distributions to reveal the knowledge/understanding of ship crews on safety culture, the level of understanding is regulated using a Likert scale.

III. RESULTS AND DISCUSSION

Safety culture on motor sailing boats in terms of situational aspects

1. Manning and competencies of crew members

The number of crew members and competencies possessed by ship crews, from all samples in this study, almost all of them met the requirements for the number

of crew members and competency certificates owned by the crew, where for manning it was in accordance with the rules. the position of the maritime certificate and the number of crew members of motorized sailing vessels for local, limited and river shipping areas in accordance with the decision of the Director General of Perla number. UM.008/9/20/DJPL – 12. As for the competencies they have, they are certificates / letters of proficiency for level I and level II shipping, certificates / letters of people's shipping motorists for level I and level II, and have a certificate proficiency, certificate of basic safety skills (BST) and seaman's book.

2. Safety equipment and equipment for radio navigation equipment

Regarding the safety equipment available on board, of the 10 motor sailing vessels that were sampled, all ships were provided with life safety equipment such as life vests, signal parachutes, buoys, life rafts, the number of which was in accordance with the number of crew on the ship, even more, it's just that most of the safety equipment conditions are old/obsolete but can still be used even though they are not in accordance with the rule, and light fire extinguishers are also available, only some have expired/empty.

As for the navigational tools on board, such as GPS, Compass, Radio, AIS, and binoculars, all of them are light fire extinguishers. must be available for motorized sailing vessels with a GT 35 in accordance with a safety certificate for traditional ships carrying goods with a gross tonnage of GT 35 to GT 500, issued according to the provisions of the Republic of Indonesia Law No. 17 of 2008 concerning Shipping and Minister

of Transportation Regulation No. KM 65 of 2009 regarding standards for non-conventional vessels with Indonesian flags.

3. Ship construction/building and stability

Of the 10 (ten) motor sailing vessels that were sampled, all of the ship constructions were made of wood, and from the monitoring results, they were still in good condition with an average year of construction between 2004 and 2015 and the condition of the ships was still good, although some of the ships were very old. for example, the year of manufacture, the results of observations in the field that still need supervision are that there are still several ships whose cargo control system on board exceeds the limit and exceeds the loading capacity of the ship.

4. Machinery and Electrical

For the machinery and electrical equipment, they are still in good condition, whereas for the machinery and electricity used on the motor sailing ship, almost all of the samples are in good condition and can be used.

Safety culture in terms of Behavioral Aspects

The description of the crew's safety culture in terms of the behavioral aspect is measured using a checklist consisting of 4 indicators and each indicator has 5 statements of choice so that the total number of statement items is 20 statement items. And the number of samples of crew members in this study was 20 respondents.

TABLE 1
 RECAPITULATION DESCRIPTION OF LIFE SAFETY EQUIPMENT

Answer				Total	
Yes		Not			
f	%	f	%	f	%
11	55	9	45	20	100.00
2	10	18	90	20	100.00
17	85	3	15	20	100.00
15	75	5	25	20	100.00
8	40	12	60	20	100.00
53	265	47	235	100	500
11	53	9	47	20	100

TABLE 2
 RECAPITULATION OF THE DESCRIPTION OF PERSONAL PROTECTIVE EQUIPMENT

Answer				Total	
Yes		Not			
f	%	f	%	f	%
7	35	13	65	20	100.00
2	10	18	90	20	100.00
1	5	19	95	20	100.00
4	20	16	80	20	100.00
6	30	14	70	20	100.00
20	100	80	400	100	500
4	20	16	80	20	100

TABLE 3
 RECAPITULATION DESCRIPTION OF SAFETY SIGNS ON BOARD

Answer					
Yes		Not			
f	%	f	%	f	Total
11	55	9	45	20	100.00
8	40	12	60	20	100.00
17	85	3	15	20	100.00
13	65	7	35	20	100.00
4	20	16	80	20	100.00
53	265	47	235	100	500
11	53	9	47	20	100

TABLE 4
 RECAPITULATION DESCRIPTION OF SAFETY PROCEDURES/INSTRUCTION MANUAL

Answer					
Yes		Not			
f	%	f	%	f	Total
4	20	16	80	20	100.00
9	45	11	55	20	100.00
7	35	13	65	20	100.00
8	40	12	60	20	100.00
1	5	19	95	20	100.00
29	145	71	355	100	500
6	29	14	71	20	100

The results of observations at the research location illustrate that the understanding of safety culture was still less, and ship crews and ship owners did not fully understand the importance of implementing a safety culture, according to observations related to safety equipment and equipment. Less and many are no longer suitable for use. As well as observations in the field, things that are still vulnerable, seen from the loading system on shipping vessels were still not conditioned according to the construction and stability of the ship, so there are still some shipping ships that load beyond the limit and are not in accordance with the ship's capacity which will affect the stability of the ship in shipping safety.

Various studies stated that Investigators can draw conclusions regarding safety culture at the time of the accident by looking at company activities and decisions immediately following an accident rather than attempting to examine safety culture directly [18]. This demonstrates that the public views the placement of ship safety equipment and attempts to improve ship safety as being positive and excellent things. There would be more options available than relying solely on legislation [19]. Instead of relying just on laws, it would be possible to find more effective solutions by taking into account how seafarers themselves feel about safety. This would also help to reduce incidents while at sea. This article offers helpful advice on how to pinpoint the elements that improve the safety climate on board ships [20].

In line with the other findings conveyed that marine safety culture can exhibit integration, distinctiveness, and ambiguity characteristics all at once. Generally speaking, marine employees see safety management systems favorably because they see the value and necessity of safety management in general [21]. Applying the knowledge gained from process safety accident investigations to address organizational

flaws found during the inquiry is one strategy to improve system safety. Investigators can draw conclusions regarding safety culture at the time of the accident by looking at company activities and decisions immediately following an accident rather than attempting to examine safety culture directly [18]. By enforcing rules and strengthening corporate management, efforts must be made to create a culture of order that increases factors related to comfort, safety, order, and security [22]. Transport safety can be defined in a number of ways. This article presents definitions of maritime safety, safety at sea, navigational safety and safety in general [5].

Yet safety culture, despite its origins in an accident investigation and its increasing acceptance by companies and regulators, has rarely been directly addressed in investigations of operational accidents. In this paper I raise the question of whether safety culture can and should be examined in accident investigations.

According to the analysis of the data, the safety culture of the ship's crew is still less in terms of behavioral aspects connected to life safety equipment, work safety tools, safety signs on board, and safety procedures. The lack of awareness of safety culture by ship parties and crews, as well as the lack of safety socialization and the norms that apply to ship owners, shipping firms, and ship crews, are among the issues with safety culture on shipping boats at Paotere Harbor now.

IV. CONCLUSION

The application of safety culture on motor sailing vessels in supporting shipping safety at the Makassar Paotere port is viewed from the situational aspect, related to manning and competence, ship construction and stability, safety equipment and equipment as well as

machinery and electricity. Those have met the requirements related to the number of crew and certificate competencies owned by the crew.

The safety culture of the ship's crew in terms of Behavioral Aspects related to life safety equipment, work safety tools, Safety Signs on board and Safety Procedures / Instruction Manual, from the results of data processing, is categorized as still lacking. The problems of safety culture on shipping vessels at Paotere Harbor today include the lack of understanding of safety culture by ship crews and ship parties and the lack of safety socialization and the rules that apply to ship owners, shipping companies and ship crews.

It is expected that motor sailing vessels, in this case the ship's captain and crew, are expected to supervise at the time of loading. Excess cargo can cause ship accidents, so loading on people's shipping vessels must be in accordance with the existing capacity. Laying the cargo on the ship must prioritize the elements of security and safety. Thus, supervision and inspection of loading must always be carried out properly before the ship sails.

It is hoped that the regulators will provide an understanding of safety culture to ship crews as well as socialization of safety and applicable rules to ship owners/people shipping companies and ship crews so that the implementation of safety culture is always applied and used as a culture in supporting shipping safety in sea transportation. The safety aspect is not only the duty of the government as a regulator, but also should be the concern of shipping managers (operators) as well as ship crews and ship owners.

REFERENCES

- [1] J. Rosliawati, A., & Jumriani, "An Analysis of Service Capacity at Ambon Port," *Int. J. Mar. Eng. Innov. Res.*, vol. 8, no. 1, 2023, doi: <http://dx.doi.org/10.12962/j25481479.v8i1.15383>.
- [2] E. Wijanarko, "Analisa Dampak Penerapan Kebijakan Terhadap Industri Perkapalan Indonesia. Thesis. politeknik transportasi sungai danau dan penyeberangan Palembang," 2016.
- [3] D. Guevara and D. Dalaklis, "Understanding the Interrelation between the Safety of Life at Sea Convention and Certain IMO 's Codes," *TRANSSAV Int. J. Mar. Navig. Saf. Sea Transp.*, vol. 15, no. 2, 2021, doi: [10.12716/1001.15.02.15](https://doi.org/10.12716/1001.15.02.15).
- [4] H. B. Santoso *et al.*, "Budaya Keselamatan dan Model Kepemimpinan Keselamatan Dalam Menjamin Terwujudnya Motivasi Keselamatan Pelayaran Kapal-Kapal Niaga dengan Moderasi Sistem Manajemen Keselamatan (ISM Code)," *J. Marit. POLIMARIN*, vol. 6, no. 1, pp. 17–25, 2020.
- [5] K. Formela, T. Neumann, and A. Weintrit, "Overview of Definitions of Maritime Safety , Safety at Sea , Navigational Safety and Safety in General," *TRANSSAVthe Int. J. Mar. Navig. Saf. Sea Transp.*, vol. 13, no. 2, pp. 285–290, 2019, doi: [10.12716/1001.13.02.03](https://doi.org/10.12716/1001.13.02.03).
- [6] N. Sigit, "Effect of Organizational Culture and Institutional Aspects on Safety Behavior in Shipbuilding Industries," 2016.
- [7] T. O. Nævestad, R. O. Phillips, K. V. Størkersen, A. Laiou, and G. Yannis, "Safety culture in maritime transport in Norway and Greece: Exploring national, sectorial and organizational influences on unsafe behaviours and work accidents," *Mar. Policy*, vol. 99, no. October 2018, pp. 1–13, 2019, doi: [10.1016/j.marpol.2018.10.001](https://doi.org/10.1016/j.marpol.2018.10.001).
- [8] U. Canimoğlu, Refik Yildirim, "Cultural Diversity Onboard: A Study About Crew Characteristics," *J. Mar. Eng. Technol.*, vol. 3, no. 1, pp. 14–19, 2023, doi: [10.58771/joinmet.1295372](https://doi.org/10.58771/joinmet.1295372).
- [9] L. S. Idris, Purnomo, Agus, Muhamad Alif Haji Sismat Sultan, Zawawi Isma'il, "Exploring New Horizons and Challenges for Social Studies in a New Normal," 2022.
- [10] N. Rukminasari and A. Tahir, "Dinoflagellate cyst composition , abundance , and assemblages in surface sediment of Paotere Port , Makassar , Eastern Indonesia : preliminary study for dinoflagellate cyst identification and collection," *AACL Bioflux*, vol. 14, no. 3, pp. 1107–1117, 2021.
- [11] D. Prayogo, "Pelatihan Basic Safety Training (BST) kepada Nelayan Tegal untuk Menunjang Keselamatan Pelayaran," *E-Dimas J. Pengabd. Kpd. Masy.*, vol. 11, no. 2, pp. 236–239, 2020, doi: [10.26877/e-dimas.v11i2.5476](https://doi.org/10.26877/e-dimas.v11i2.5476).
- [12] Å. Ek, M. Runefors, and J. Borell, "Relationships between safety culture aspects - A work process to enable interpretation," *Mar. Policy*, vol. 44, pp. 179–186, 2014, doi: [10.1016/j.marpol.2013.08.024](https://doi.org/10.1016/j.marpol.2013.08.024).
- [13] J. Fenstad, Ø. Dahl, and T. Kongsvik, "Shipboard safety: exploring organizational and regulatory factors," *Marit. Policy Manag.*, vol. 43, no. 5, pp. 552–568, 2016, doi: [10.1080/03088839.2016.1154993](https://doi.org/10.1080/03088839.2016.1154993).
- [14] J. W. Creswell, *Research design : qualitative, quantitative, and mixed methods approaches*, 4th ed. California, United States of America: SAGE Publications, Inc., 2014.
- [15] P. Leavy, *RESEARCH DESIGN: Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches*. New York, United States of America, 2017.
- [16] K. Cohen, L., Manion, L., & Morrison, *Research methods in education*. Routledge, 2017. [Online]. Available: https://books.google.com/books?hl=id&lr=&id=9mYPEAAAQBAJ&oi=fnd&pg=PP1&dq=cohen+methodology&ots=GGs3Uj2_Cd&sig=bW-Lt6AgQfRBgBROe47xM6WA8g0
- [17] L. R. Mills, Geoffrey E.; Gay, *Educational Research: Competencies for Analysis and Applications, 12th Edition*. 2019.
- [18] B. Strauch, "Can we examine safety culture in accident investigations, or should we?," *Saf. Sci.*, vol. 77, pp. 102–111, 2015, doi: [10.1016/j.ssci.2015.03.020](https://doi.org/10.1016/j.ssci.2015.03.020).
- [19] B. Siswoyo, "Public Perception of Safety Equipment Marine Vessel and Ferry in the Province Maluku," *War. Penelit. Perhub.*, vol. 28, no. April, pp. 146–156, 2016.
- [20] Y. Bhattacharya, "ScienceDirect Measuring Safety Culture on Ships Using Safety Climate : A Study among," *Int. J. e-Navigation Marit. Econ.*, vol. 3, pp. 51–70, 2015.
- [21] J. Lappalainen, *Finnish maritime personnel's conceptions on safety management and safety culture*. 2016. [Online]. Available: https://www.utupub.fi/bitstream/handle/10024/123659/Annales_AII316Lappalainen.pdf?sequence=2
- [22] C. N. Siregar, "Upaya Membangun Budaya Masyarakat Dalam Menggunakan Jasa Transportasi Kapal Motor Antarpulau Di Maluku," *J. Sosioteknologi*, vol. 12, no. 29, pp. 441–456, 2013, doi: [10.5614/sostek.itbj.2013.12.29.7](https://doi.org/10.5614/sostek.itbj.2013.12.29.7).