Volume 2, No. 4 April 2023 - (301-307)
p-ISSN 2980-4868 | e-ISSN 2980-4841
https://ajesh.ph/index.php/gp

SAFETY OPERATION ON BOARD AN ECONOMICAL HUMAN FACTORS PERSPECTIVES

Andri Yulianto
Politeknik Transportasi Sungai Danau dan Penyeberangan Palembang, Indonesia
Emails: andribplp@gmail.com

ABSTRACT:
This research was aimed to present some research-based information about conditions and obstacles which commonly become issues on board. This research provided various human factors related to safety operation on board which more or less influence seafarer's duty and responsibility. The research data were collected through questionnaire. Some literature studies of factors on board were also presented including ship familiarization, life-saving appliances, sanitary and hygiene, accommodation, food, wages, work hours/rest hours, communication, interpersonal relationship, teamwork, language and culture diversity. The research showed that Indonesian seafarers who work on either national or international vessel definitely require human factor fulfillment to guarantee their safety. Human factors play important roles which determine seafarer's safety. Several studies proposed numbers of maritime accidents which were caused by human factors were greater that numbers caused by weather and technical factors. Safety operation and working motivation will be increased as some regulations were established. They included STCW (Standard Training, Certification and Watchkeeping for Seafarers), SOLAS (Safety of Life at Sea), ISM (International Safety Management) Code, and MLC (Maritime Labour Convention). They are all covered in IMO (International Maritime Organization). Ship companies need to ensure that their crews follow the safety procedures and regulations.

Keywords: Seafarers, human factors, safety, work motivation

Article History
Received : 20 March 2023
Revised : 01 April 2023
Accepted : 20 April 2023
DOI : 10.xxxxx

INTRODUCTION

One of safety components on board is seafarer (crew). Seafarers play an important role in determining the vessel safety. Thus, skill and qualification are importantly needed. Professional seafarers have to prioritize safety as the prominent element (Mitroussi & Notteboom, 2015). Ship company needs to ensure that their crews follow the safety procedure, security, regulation on board. However, even when safety and security have been carried out, in fact, numbers of maritime accidents still increasingly occur. The high number of cases prove that we need to concern more on this issue. It is the responsibility of all elements such as vessel owner, the government, parties, and the citizens (Chin et al., 2013). Based on the database of National Transportation Safety Committee (NTSC) of Indonesia, in 2016 – 2021, rate of maritime accident cases in past six years was inclined. The cases included fire, vessel mishaps, ship grounding (Chandra, 2023).

HEADING

Based on the investigation, it was found that some of maritime accidents were not caused by technical problems, sea and weather conditions (Wang et al., 2021). Some previous studies had proposed that human errors take into account for the numbers of accidents. The studies mostly used questionnaire and interview as the data collection techniques (Dindar et al., 2020). Subjects of the studies were seafarers who had worked on board in a certain period of time. The questionnaire and interview included various factors which lead to safety issues. Based on the researches, it was found that there were some factors which influenced safety in Indonesia. The factors include human factors, safety, and work motivation (Riyanto et al., 2017). Particular factors were also included. They are familiarization training, vessel condition, life-saving appliances, medical kits and appliances, sanitation and hygiene, accommodation, food, wages, work hours/rest hours, communication, interpersonal relationship, teamwork, and language and culture diversity.

This research objective was to identify human factors on vessel operation safety. The investigation was based on facts which indicate that human factors played important role to determine safety (Maurino et al., 2017). The research was done by comparing experiences of various seafarers of various vessel and companies towards both national and international maritime policies. LITERATURE REVIEW Human factor is identified as seafarers, human to human interactions, and interaction of human to system or vessel machine and engine. Based on International Maritime Organization (IMO, 2010), human element vision, principles, and goals propose that: “Human factors need to be taken into account in vessel operation. It is due to the needs to achieve and maintain environment’s safety and security which leads to the decrease of maritime accidents.” A professional seafarer would not only depend on his educational

standard and training but also his basic needs: mind, body, and passion.

The balance would be represented on how well he works. A book entitled The Human Element in 2008 explains that mind is closely related to competence. This competence is influenced by effective education and training which are based on realistic goals. It is also considered as a self-ability to absorb knowledge and understand self-skill and competence. A seafarer's attitudes towards education and training are influenced by his mentality, aptness, personality, characters, and sensitivity through self-awareness and self-reflection (Koopman & Hakemulder, 2015). Motivation is one of the requirements needed to generate a good work. Besides, an equitable appreciation, a good communication, clear responsibility, teamwork, motivation character building, leadership, interoperability, and adaptation skill are also required. A healthy lifestyle, a balanced diet, hygiene, exercises, proper sleep and recreation along with healthy habits and a regular medical checkup affect one's physical condition, health, strength, stamina, and prosperity to perform his duty and responsibility. A safe and secure work environment, good ergonomic, safe working practice, life-saving appliances fulfillment, and a proper physical security will enhance a safe atmosphere at work and increase crew's safety awareness (Jiskani et al., 2019).

IDENTATIONS AND EQUATIONS

Self-actualization, self-ethic, the integration of culture and leadership, togetherness, proper supervision and adequate remuneration lead to pride, goals, identity, loyalty, dan work safety.

Moral value, ethics, honesty, integrity, appreciation, and tolerance are main values mostly needed by the crews (Wertheimer, 2017). Human factors applied on vessel's design, operation and system means considering human's capability, limits, and needs. Human employment as one of system components is presented as follows: work – what to do, person – who does the job, organization and management – how to organize and control. Human resources applied on vessel's plans, operation, and systems are related to the proper development and preparation to the required job. A good planning is definitely required to support the seafarers. It should be ensured that their health and safety fulfillment are not interrupted due to a safe operation of a vessel.

Habits – an adequate accommodation including utensils and washing facility are required. Messroom and recreational facility are also needed (Akyurek, 2018). However, the size, shape and variations of the utensils and equipments, and the mariner's gender have to be considered in choosing the facility and accommodation. Besides, environment factors such as noise, heat, and vibration are also important considerations. Maintainability – designing a safe and effective operation plan possibly enables equipment and system to

reach a required performance. It includes the consideration of access, transfer route, equipments, competence, disposal, dan lifetime support.

Workability – system's users, duty, equipment (including software), material and procedure, and physical and social environment have to be taken into consideration. Rate and numbers of information presented on the manual books have to suit the required technical skill. Moreover, the books need to be reader-friendly (Sarstedt & Mooi, 2014).

Controllability – it is related to the central control, machine control, cargo, etc. Moreover, seafarers have to master the integration of user and equipment; interface system such as communication facility, control, display, alarm; and video display unit and computer work station (Gaspar et al., 2019).

Maneuver – mariners are required to acquire maneuver skill based on their role, lifting pattern, and vessel operation. This skill covers types, numbers, and strength of propulsion system, steering system and prime mover. However, the environment and fuel saving also need to be taken into consideration (Nuchturee et al., 2020).

Survivability – this factor is influenced by the availability of extinguisher, detrimental control, and rescue facility, and security system. They are needed for the sake of safety and security of both crews and passengers. Methodology used in this research is qualitative and quantitative approaches (Dietkov, 2020). The data were collected through questionnaire and interview. Those were primary data source. Questionnaire was given to some respondents including seafarers, Captains, Chief Officer, Second Officer, Third Officer, Radio Officers, First Engineers, Second Engineers, Third Engineers, and Oilers. Interview was also held. The interviewees included 113 seafarers who had worked on board over six months for Officers and nine months for rating crew members.

FIGURE AND TABLES

This research was held to investigate the fulfillment of seafarer's safety needs as an individual. The findings are as follows:

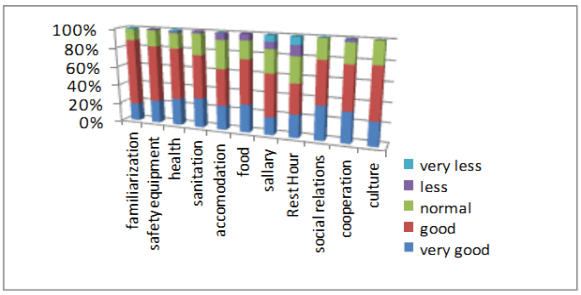

Figure 1.
Statistical chart of factors of seafarer's needs fulfillmen

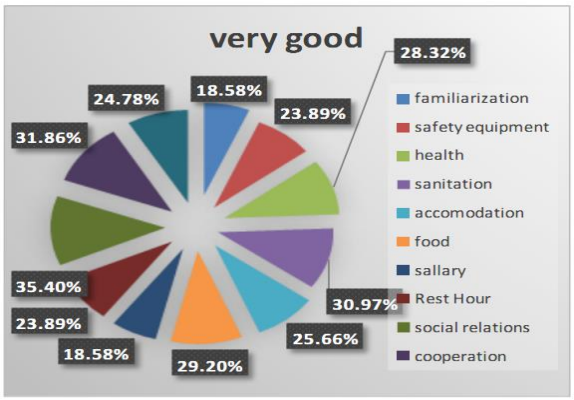

Figure 2.
Statistical pie diagram of factors of seafarer's needs fulfillment

The questionnaire and interview resulted that a good familiarization of vessel operation and safety was performed. Lack of familiarization leads to mariner's impossibility to acknowledge his vessel's condition in an urgent situation. Based on STCW, amendment of 2010 in ISM code (International Safety Management) element 8 and MLC (Maritime Labour Convention) in causal 1, it was stated that a good handling skill to an emergency is needed by a seafarer. Moreover, Ship Company is required to develop safety plans and personal safety training for the seafarers. Based on the research, life-saving appliances were in a good condition. The equipments were definitely needed during an emergency on board. According to STCW amendment of 2010 in SOLAS (Safety of Life at Sea) chapter III, it is explained that life-saving appliances and arrangement have been clearly regulated. Healthcare, based on the findings, had been well performed. A good healthcare leads to a good working motivation. The statement is supported by MLC policy on forth and first clausal which says that seafarers can easily access the medical care and facility on board for free. It is also stated that vessel's owner is required to cover the crew's financial issues related to workplace accidents. Salary should be given at least 16 weeks after the accident. Health protection and work safety: a safe and hygiene workplace is also required. The safety measurement (danger identification and risk control) has to be performed to prevent any workplace accident. Health status: seafarer has to enclose his medical report.

According to the questionnaire and interview, it was found that sanitation and hygiene were n a good condition. It is supported by the policy established by the minister of health on ship sanitation certificate article 1: vessel sanitation certificate is defined as document which corroborates a ship compliance with maritime sanitation and quarantine, sanitation inspection is activities to examine the risk factor to crews' health on board. Based on Code of Safe Working Practices for Merchant Seaman 2011 chapter 14 it is stated that "catering staff should have a basic knowledge of food safety and hygiene as they have a responsibility for ensuring that high standards of personal hygiene and cleanliness of the galley, pantry and mess rooms are always maintained". Based on the statement above, an adequate sanitation and hygiene condition on board was definitely required to increase work safety and motivation. Crew cabins/accommodation, based on the questionnaire and interview, had been fulfilled. It was supported by SOLAS Chapter II-1 on construction-structure, subdivision, and stability, machinery, and electrical installations. Based on MLC, it is stated that health and freshness factors are important considerations for accommodation of cabins and workspace. There are several requirements including berth, recreational

space, and dormitory. Food management has been based on ISM Code. A bad food management leads to a low motivated working and turns into an obstacle in vessel operation. MLC states that food quality and quantity need to follow the Flag State. Wage is labor's basic need. Based on the research, it was found that the labors wage had been based on Marine Working Agreement (MWA). However, overtime pay was not given as based on MWA, it was included in the total wage. The wage was sometimes overdue. MLC has explained that seafarer's wage has to be given monthly and transferred regularly into their family's bank account. The regulation and agreement will hopefully increase their work motivation. Another findings showed that work hours/rest hours had been determined. The determination is based on STCW which says that rest hours are one of seafarer's rights. The fulfillment can possibly increase performance and motivation to work. MLC states that:

1. Rest hours: ILO (International Labor Organization) Maritime Labor Convention states that maximum number of ship working hours should be 14 hours in any 24 hour period or 72 hours in any seven day period. On the oher hand, minimum number of rest hours should be 10 hours in any 24 hour period or 77 hours in any seven day period. The hours of rest cannot be divided into more than two periods, one of which should be at least at least 6 hours in length.
2. Annual leave: it is one of seafarer's rights in which he could propose an annual leave. Based on the findings, it was also found that communication/interpersonal relationship, teamwork, language differences were not crucial issues since the seafarers used an international language and Indonesian language.

Chengi Kuo, in his book entitled Safety management and its maritime application in 2007, proposes that the key features of safety culture can be considered under the following heading 1) safety thinking: safety culture is related to how people think about in the context of what they do in various activities and the decisions they take, 2) human behavior: this is very much concerned with how a human would behave in various situation, 3) attitudes: this is influenced by the attitude held and this can vary from a very responsible and positive attitude to an irresponsible and negative attitude. DISCUSSION Based on the research and findings, it showed that vessel safety operation is highly influenced by human factors. "Human factors need to be taken into account in vessel operation. It is due to the needs to achieve and maintain environment's safety and security which leads to the decrease of maritime accidents."

CONCLUSION

Based on the research, it was concluded that human factors play an important role in vessel safety operation. The factors include familiarization training, life-saving appliances, healthcare, sanitation

and hygiene, accommodation, foods, wages, work hours/ rest hours, communication interpersonal relationship, teamwork, and language and culture diversity. Vessel safety operation rate and work motivation would increase by the accomplishment of these following policies, namely STCW, SOLAS, ISM Code and MLC which are all covered by IMO.

BIBLIOGRAFI

Akyurek, E. (2018). Lighting Standards for Ships and Energy Efficiency. *Trends and Challenges in Maritime Energy Management*, 169–182.

Chandra, S. (2023). *Accidents and Disasters: Lessons from Air Crashes and Pandemics*. Springer Nature.

Chin, M. K., Hambrick, D. C., & Treviño, L. K. (2013). Political ideologies of CEOs: The influence of executives' values on corporate social responsibility. *Administrative Science Quarterly*, *58*(2), 197–232.

Dietkov, D. (2020). *Aircraft armoring system for protection the aircraft crew from light firearms*.

Dindar, S., Kaewunruen, S., & An, M. (2020). Bayesian network-based human error reliability assessment of derailments. *Reliability Engineering & System Safety*, *197*, 106825.

Gaspar, J. F., Teixeira, Â. P., Santos, A., Soares, C. G., Golyshev, P., & Kaehler, N. (2019). Human centered design methodology: Case study of a ship-mooring winch. *International Journal of Industrial Ergonomics*, *74*, 102861.

Jiskani, I. M., Ullah, B., Shah, K. S., Bacha, S., Shahani, N. M., Ali, M., Maqbool, A., & Qureshi, A. R. (2019). Overcoming mine safety crisis in Pakistan: An appraisal. *Process Safety Progress*, *38*(4), e12041.

Koopman, E. M., & Hakemulder, F. (2015). Effects of literature on empathy and self-reflection: A theoretical-empirical framework. *Journal of Literary Theory*, *9*(1), 79–111.

Maurino, D. E., Reason, J., Johnston, N., & Lee, R. B. (2017). *Beyond aviation human factors: Safety in high technology systems*. Routledge.

Mitroussi, K., & Notteboom, T. (2015). Getting the work done: motivation needs and processes for seafarers and dock workers. *WMU Journal of Maritime Affairs*, *14*, 247–265.

Nuchturee, C., Li, T., & Xia, H. (2020). Energy efficiency of integrated electric propulsion for ships–A review. *Renewable and Sustainable Energy Reviews*, *134*, 110145.

Riyanto, S., Sutrisno, A., & Ali, H. (2017). The impact of working motivation and working environment on employees performance in Indonesia stock exchange. *International Review of Management and Marketing*, *7*(3), 342–348.

Sarstedt, M., & Mooi, E. (2014). A concise guide to market research. *The Process, Data, And*, *12*.

Wang, H., Liu, Z., Wang, X., Graham, T., & Wang, J. (2021). An analysis of factors affecting the severity of marine accidents. *Reliability Engineering & System Safety*, *210*, 107513.

Wertheimer, R. (2017). The morality of military ethics education. In *Empowering Our Military Conscience* (pp. 159–196). Routledge.