



Safety and security management of traditional shipping in Tanjung Emas Port of Semarang

^{1,2}Andi Prasetiawan, ¹Muhammad Zainuri, ²Winarno, ¹Dian Wijayanto

¹ Faculty of Fisheries and Marine Science, Universitas Diponegoro, Tembalang, Semarang, Central Java, Indonesia; ² Merchant Marine Polytechnic Semarang, Wonodri, Semarang, Central Java, Indonesia. Corresponding author: A. Prasetiawan, andiprasetiawan117@gmail.com

Abstract. Safety and security aspects of traditional shipping are essential topics to discuss in the marine toll program. This research aimed to characterize the profile of traditional shipping vessels and crews and inventory the safety and security equipment and crews' competence of traditional ships in Tanjung Emas Port of Semarang, Indonesia. The standard requirement for the safety and security of traditional shipping was based on the NCVS. The NCVS is a regulation in the Decree of General Directorate of Maritime Transportation, Ministry of Transportation, Republic of Indonesia No. UM.008/9/20/DJPL-12. There were three categories of traditional vessels in Tanjung Emas Port of Semarang, including the non-enterprise (< 7 GT), the smaller enterprise (35-175 GT), and the larger enterprise (175-500 GT) vessel. The traditional ships in Tanjung Emas Port of Semarang had fulfilled most of the standard equipment and appliances of safety and security of non-convention vessels. However, the crews of traditional ships' did not fulfill the seafarers' standard requirement of non-convention vessels. Therefore, improvements are needed, especially to the manning aspect of traditional shipping.

Key Words: competence, enterprise, equipment, life-saving, NCVS, traditional vessels.

Introduction. The shipping industry is the driver of trade growth and a significant contributor to the global economy (Harlaftis 2014). During the past centuries, the development of shipping vessels was related to the industrial revolution. The evolution of the maritime shipping industry has entered the internet of vessel era, focusing on improving shipping efficiency and security (Tian et al 2017). However, in the middle of maritime transportation technology advancement, there is the traditional shipping industry.

Traditional shipping is an integral part of the development of the marine toll of Indonesia. Traditional ships represent the maritime culture of Indonesia as a maritime nation. Therefore, we cannot neglect its existence. Moreover, traditional shipping is considered an integrated sector in marine toll in Indonesia. Therefore, improvements in service quality are needed. This emphasizes the importance of the safety and security aspects of traditional shipping.

Tanjung Emas Port of Semarang is the main commercial port on the northern side of Central Java, which acts as the feeder hub for Indonesia's marine toll (Prihartono 2015). The shipping demand from Tanjung Emas Port was estimated to be increased (JICA 2004). However, the information concerning the current condition of the traditional shipping business is still lacking.

Regardless of the market condition of traditional shipping, there needs to be a better understanding of the safety and security aspects to improve its service quality. This research's objective was to characterize the profile of traditional shipping vessels and crews, observe the inventory of safety and security equipment, and inventory the crew's competence of traditional ships in Tanjung Emas Port of Semarang.

Material and Method

Literature review. Traditional ships had been used for centuries since ancient times. However, it still extant to the current days. The capital needed for gear renewal is one reason for traditional ships' existence (Gardner 1985). Traditional shipping is a shipping business carried out using traditional vessels such as sailboats or motor sailboats (Johny et al 2013). The traditional shipping sector is a less organized business (Beškovnik 2016).

In Indonesia, traditional ships have existed for centuries and extant to the current days. Traditional ships have essential roles in distributing goods, especially in the area unreachable by any other conventional fleets (Malisan et al 2017). Unfortunately, traditional ships' existence is threatened due to the decreased population and increased competitors from other vessels. Modern fleets currently take over most cargo handling, which caused the decrease of domestic cargo handling by traditional shipping from 16-24% to only 4-5% (Karana 2003). Instead of the market, traditional shipping also faced other problems regarding its performance. In eastern Indonesia, additional shipping performance is decreasing (Wicaksono et al 2017). Therefore, the traditional shipping business hardly survives as the traditional ships become obsolete.

Traditional ships are ships with cultural value due to Indonesia's geographical condition (Romadhon & Vikaliana 2017). Therefore, the ships consist of various vessels, including passenger ships, cargo ships, and fishing ships. Those ships also have various voyage areas, including inland voyage, limited port voyage, local voyage, near-coastal voyage, and un-restricted voyage, further specified by their size. However, most traditional ships operate in the local area (Karana 2003).

Unfortunately, traditional ships have a common concern for safety and security, leading to many accidents (Samekto 2019). The Indonesian government had arranged the Non-Convention Vessel Standards to improve the safety and security of traditional shipping. However, due to the managerial limitation and the "traditionalism" culture, the traditional shipping companies frequently neglected the safety and security requirements (Syafriharti 2012). Therefore, it is crucial to understand traditional shipping's safety and security aspects to provide appropriate information to develop the best management practices.

The traditional ship is an important transportation mode in Indonesia due to the archipelagic geographical condition. Traditional shipping plays an essential role in improving the marine connectivity index currently at a low level (Romadhon & Vikaliana 2017). However, due to the improvement of ship technology and the requirement of fast logistic transportation, traditional shipping services slowly undergo a reduced market. The Indonesian government is currently trying to integrate traditional shipping into the marine toll to maintain its existence and sustainability (Malisan et al 2017). Traditional ships act as feeder vessels that transport logistics from feeder hub to smaller ports such as inland areas or small islands, and vice versa (Priatno & Samudro 2010). The revitalization of traditional shipping is required to support the maritime toll in Indonesia. As proof of the support, the government has implemented the sabotage policy to promote traditional ships' operations to support the distribution of logistics and suppress the volume of foreign ships operational (Sahid et al 2019).

Traditional shipping still has a market share in some countries, including the Scandinavia, Baltic region, and Greece (Beškovnik 2016). Even though the population is decreasing, Indonesia's traditional shipping industry still exists (JICA 2004; Johny et al 2013). Traditional shipping in Indonesia includes several types of vessels, including sailboats, motorized sailboats, and motorboats. There are two categories of traditional shipping, including enterprise and non-enterprise traditional shipping. According to the Governmental Regulation No. 20/2010, the criteria of enterprise traditional shipping for the respective vessel includes 1) sailboats regardless of their size; 2) motorized sailboats with size < 500 GT; and 3) motorboats with size from 7 to 35 GT. Therefore, motorboats with a size under 7 GT is in non-enterprise traditional ships.

Safety and security are essential aspects of marine transport. Seafarers are vulnerable to various threats, such as accidents and injuries (Slišković & Penezić 2015).

The problem is the increased risk due to seafaring activity. During seafaring, seafarers are in a state of social isolation. Therefore, being in the middle of the ocean makes them unable to access any health care facilities and security and rescue. The risk of accident in maritime transport alters along with the low awareness of the ship crews.

Maritime transport casualties occur worldwide every year, causing ships and crew fatalities (Roberts & Carter 2018). Specifically, in Indonesia, based on the National Transportation Safety Committee (NTSC) data, there was an increasing trend of accidents in marine casualty between 2012 and 2016 (KNKT 2016). The accidents were including fire explosion, foundering, collision, and grounding. Therefore, enforcement in the implementation of safety and security standards is needed.

The risk faced by seafarers alters the concern on the safety and security aspect of seafaring. To ensure seafarers' safety and security, the international organization for maritime transport, such as IMO (International Maritime Organization), has determined the safety and security standards (Molenaar 2014). However, the international standards are not implementable in all shipping businesses, especially the local shipping activity. Thus, national regulation plays a vital role in regulating the safety and security standards of maritime transport.

The safety and security aspects of marine shipping had been available for a long time. United Kingdom (UK) had applied it since 1894, named the Merchant Shipping Act, 1894 (Ademuni-Odeke 1991). The Minister of Transportation regulates the safety and security of traditional ships in Indonesia through Regulation No. KM 65/2009 about the Indonesian-Flagged Non-Convention Vessel Standard. Various ships include the construction, equipment, life-saving appliances, machinery and electrical, load line, tonnage measurement, and man. However, according to the Indonesian Government Regulation No. 7/2000, the standard minimum of seafarer's competence is not applicable for seafarers who work in the following vessels: 1) motorized sailboats, 2) sailboats, 3) motorboats under 35 GT, 4) private non-commercial cruise ship, and 5) exclusive ships. Therefore, seafarers who work in the traditional shipping industry do not need any certificate of competence.

Research methods. The research was carried out from December 2019 to February 2020 in Tanjung Emas Port of Semarang, Central Java, Indonesia (see Figure 1). The research focused on the safety and security aspects of traditional ships, including the on-ship instruments and seafarers' competence. The study was carried out through field observation by a case study approach. Data collection was carried out by random sampling through an interview with the ship's crew concerning safety and security. The obtained information was including the ship equipment, life-saving appliances, and the certificate of competence of the crews. The data of required ship equipment, life-saving appliances, and seamen certificate was inventoried based on the applicable standard. The standard used was the Non-Convention Vessels Standards (NCVS) as regulated in the Decree of General Directorate of Maritime Transportation No. UM.008/9/20/DJPL-12.

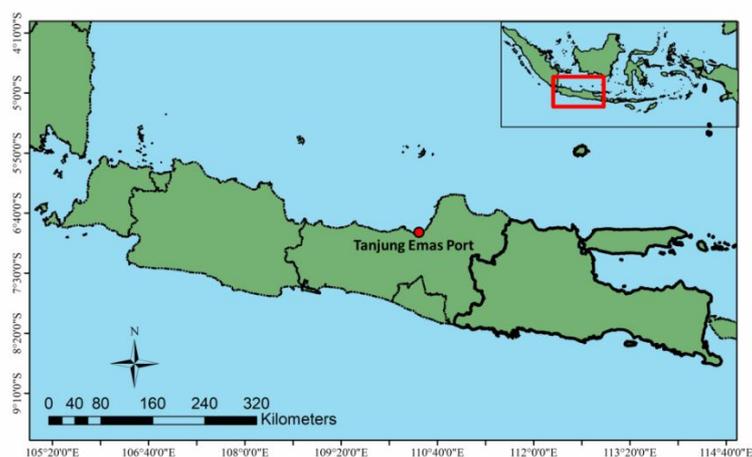


Figure 1. The research location.

The safety and security aspects of seafaring include two main objects, including the vessel and manning, which are differed based on the vessel's specification. The NCVS regulates the required specifications for various vessel sizes, from the smallest with the tonnage size under 7 GT to the largest with the tonnage size over 3,000 GT. However, traditional ships in Tanjung Emas Port of Semarang generally have a size under 500 GT. There are three groups of traditional ships based on the size in Tanjung Emas Port of Semarang, including the non-enterprise ship (< 7 GT), smaller enterprise ship (35-175 GT), and larger enterprise ship (175-500 GT). Table 1 shows the standard equipment and life-saving appliances' standard requirements based on the specification of traditional ships specifications in the Tanjung Emas Port of Semarang. Other than the ship equipment and appliances, the NCVS also regulates the manning aspects of traditional shipping. Based on the ship specification, the required position and certificate are presented in Table 2.

Table 1
Required ship equipment and life-saving appliances for traditional ships with local operational area

No.	Safety and security equipment	Boat's size		
		< 7 GT	35-175 GT	175-500 GT
A. Ship equipment				
1.	Radio	Y	Y	Y
2.	Navigation	Y	Y	Y
3.	Compass	Y	Y	Y
4.	Radar	Y	Y	Y
5.	Medical supply	Y	Y	Y
6.	Fire fighting equipment	Y	Y	Y
7.	General alarm	Y	Y	Y
8.	Public addresser	Y	Y	Y
B. Life-saving appliances				
1.	Life boats	Y	Y	Y
2.	Rescue boats	N	Y	Y
3.	Inflatable life-raft	N	Y	Y
4.	Life buoy	Y	Y	Y
5.	Life jacket	Y	Y	Y
6.	Parachute flare rocket	Y	Y	Y
7.	Hand fare	N	Y	Y
8.	Smoke signal	N	Y	Y
9.	Line throwing apparatus	Y	Y	Y

Notations: N = not required; Y = required. Requirements for ships sized 7-35 GT is not presented due to their unavailability in Tanjung Emas Port of Semarang.

Table 2
Required crew position and certificate for traditional ships with local operational area

No.	Certificate	Boat's size							
		< 7 GT	35-175 GT			175-500 GT			
			Master	Chief officer	Able bodied seaman	Master	Chief officer	Watch officer	Able bodied seaman
1.	Certificate of competence	N	Y	Y	Y	Y	Y	Y	Y
2.	Certificate of endorsement	N	Y	Y	N	Y	Y	Y	N
3.	Certificate of basic safety training	N	Y	Y	Y	Y	Y	Y	Y
4.	Certificate of medical first aid	N	Y	Y	N	Y	Y	Y	N
5.	Certificate of survival craft and rescue boat	N	Y	Y	Y	Y	Y	Y	Y
6.	Ship security officer	N	Y	Y	N	Y	Y	Y	N
7.	Seafarer's medical certificate	N	Y	Y	Y	Y	Y	Y	Y
8.	Seamen book	N	Y	Y	Y	Y	Y	Y	Y

Notation: N = not required; Y = required.

Results

The traditional shipping business in Tanjung Emas Port of Semarang.

Understanding traditional shipping actual condition traditional understanding shipping, and formulation of policies regarding the traditional shipping business will be more appropriate.

The traditional ships in Tanjung Emas Port of Semarang consisted of two main ship categories, namely non-enterprise vessels and enterprise vessels. The non-enterprise vessels consisted of the smaller boats (size under 7 GT), while the enterprise vessels consisted of the larger boats (size over 100 GT). The population of smaller boats was higher than the larger boats. A total of 45 units of non-enterprise vessels were observed during the field survey, while the enterprise vessels were only 13 units. The detailed specification of traditional ships in Tanjung Emas Port of Semarang is presented in Table 3.

Table 3
The population, tonnage, and power of traditional ships based on the size in Tanjung Emas Port of Semarang

No.	Boat's category	Size category	Number of vessels identified	Tonnage (GT)	Engine power (HP)
1.	Non-enterprise vessels	< 7 GT	45	1-6 (3.7±0.9)	12-30 (23.0±3.5)
2.	Enterprise vessels	35-175 GT	2	116-123 (119.5±4.9)	280-350 (315.0±49.5)
		175-500 GT	11	196-360 (253.8±53.2)	135-420 (372.3±87.2)

The focus of the research was on three main aspects of shipping, including ship profile, ship's safety, and security, and crew's competence. Those aspects provide essential information concerning the condition of the traditional shipping business in Tanjung Emas Port of Semarang. Understanding traditional shipping actual condition traditional understanding shipping, and formulation of policies regarding the traditional shipping business will be more appropriate.

According to the data collection result, as presented in Table 3, the non-enterprise vessels' size ranges from 1 to 6 GT with an engine power of 12-30 HP. The enterprise vessels consisted of two size groups, including smaller sized boats with the size between 116 and 123 GT with the engine power between 280 and 350 HP, and the larger sized boats with the size between 196 and 360 GT with the engine power between 135 and 420 HP. Based on the result, there were no ships with sizes between 10 to 100 GT. Therefore, the data revealed an obvious segmentation between size categories.

Further observation was carried out to the tonnage certificate of the ships. Unfortunately, only the enterprise vessels had the tonnage certificate. Therefore, no information concerning the profile of non-enterprise vessels could be presented. As many as 13 vessels were used as the samples, consisting of 2 ships of the smaller sized vessel and 11 ships of the larger sized vessel. According to the data acquired, the measurements of smaller sized enterprise traditional ships were between 23.65 and 25.18 m (24.42±1.08 m) in length, 8.50-9.00 m (8.75±0.35 m) in width, and 3.50-4.20 m (3.85±0.49 m) in depth. While the larger-sized enterprise ships had the measurement between 26.40 and 34.85 m (29.79±2.67 m) in length, 8.60-11.64 m (10.03±0.90 m) in width, and 2.87-5.10 m (3.96±0.74 m) in depth. All of the ships had local operational areas. The routes included Semarang – Sukamaran, Semarang – Ketapang, Semarang – Pontianak, and Semarang – Kumai.

Inventory of the traditional ships' safety and security equipment was carried out based on the NCVS as explained in the Decree of General Director of Maritime Transportation No. UM008/9/20/DJPL-12 as described in Table 1. However, only the ship

equipment and life-saving appliances are listed. The number of ships that had the required equipment and life-saving appliances is presented in Table 4.

Table 4

The number of ships occupying safety and security equipment and life-saving appliances in Tanjung Emas Port of Semarang

No.	Safety and security equipment	Ship's category			
		35 to 175 GT		175 to 500 GT	
<i>A. Ship equipment</i>					
1.	Radio	2	100.00%	11	100.00%
2.	Navigation	2	100.00%	11	100.00%
3.	Compass	2	100.00%	11	100.00%
4.	Radar	1	50.00%	10	90.91%
5.	Medical supply	2	100.00%	11	100.00%
6.	Fire fighting equipment	2	100.00%	11	100.00%
7.	General alarm	1	50.00%	11	100.00%
8.	Public addresser	2	100.00%	10	90.91%
<i>B. Life-saving appliances</i>					
1.	Life boats	1	50.00%	2	18.18%
2.	Rescue boats	1	50.00%	6	54.55%
3.	Inflatable life-raft	2	100.00%	11	100.00%
4.	Life buoy	2	100.00%	11	100.00%
5.	Life jacket	2	100.00%	11	100.00%
6.	Parachute flare rocket	2	100.00%	11	100.00%
7.	Hand flare	2	100.00%	11	100.00%
8.	Smoke signal	2	100.00%	11	100.00%
9.	Line throwing apparatus	1	50.00%	11	100.00%

Table 4 shows that there were eight equipment and nine life-saving appliances required for traditional ships. However, not all of the traditional ships in Tanjung Emas Port of Semarang had fulfilled the equipment and appliances. Nevertheless, the fulfillment level was high in the smaller-sized vessel and the larger-sized vessel. Lifeboats and rescue boats were the appliances absent from most of the vessels. Table 4 shows that not all of the enterprise ships had complete equipment and life-saving appliances. Therefore, analysis on the level of fulfillment was carried out to calculate the level of fulfillment of traditional ships for the 17 equipment and appliances required. The number of ships that had the required equipment and life-saving appliances is presented in Table 5.

Table 5

Number of ships based on the percentage of fulfillment of equipment and life-saving appliances

No.	Percent of fulfillment	Ship category			
		35 to 175 GT		175 to 500 GT	
		Number	Proportion	Number	Proportion
1.	80-100%	2	100%	10	90.91%
2.	60-80%	-	0%	1	9.09%
3.	40-60%	-	0%	-	0%
4.	20-40%	-	0%	-	0%
5.	0-20%	-	0%	-	0%
	Total	2	100%	11	100%

The ship's equipment and appliances' level of fulfillment was between 60 and 100% based on the analysis result. There was only one ship that had a level of fulfillment under 80%. Therefore, it could be suggested that most of the traditional ships had high fulfillment of safety and security equipment and appliances.

Traditional shipping is characterized by its vessel and manning. Besides the fact that it is a part of the maritime transport industry, the vessel and manning are still managed traditionally. During the research, as many as 71 respondents were surveyed for their competence as seafarers. Seafarer's traditional ship profile is described in several indicators, including age, education, experience, and first sail age. The following figures show seafarers' profile of the traditional shipping industry in Tanjung Emas Port of Semarang. Thus, Figure 2 shows the proportion of seafarers' age of traditional ships in Tanjung Emas Port of Semarang. According to the data collection result, the traditional ship crew's age in Tanjung Emas Port was between 22 and 68 years old. The Figure 2 also shows that the traditional ships' crew's dominant age ranged between 41 and 50 years old.

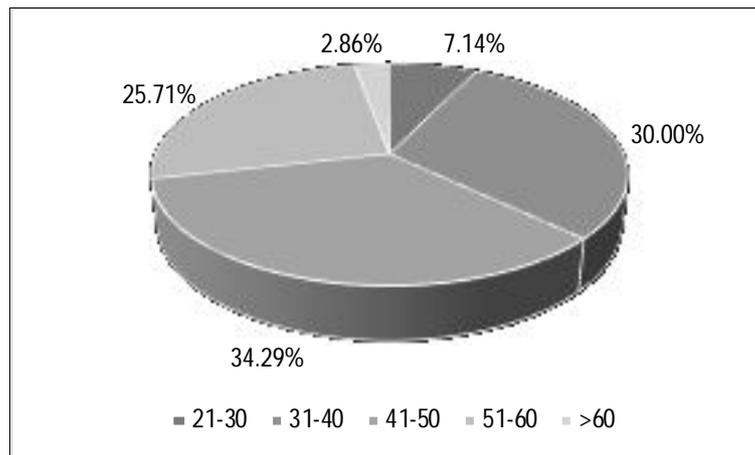


Figure 2. Seafarer's age of traditional ship in Tanjung Emas Port of Semarang.

Figure 3 shows the educational level of the traditional ships' crew. According to the figure, traditional ships' human resources consisted of only three categories of education levels, including elementary school, junior high school, and senior high school. The junior high school graduates dominated the ships' crew, followed by the elementary school graduates, while the senior high school graduates took the least proportion. Therefore, it could be considered that the seafarers of traditional shipping generally had low to medium education levels.

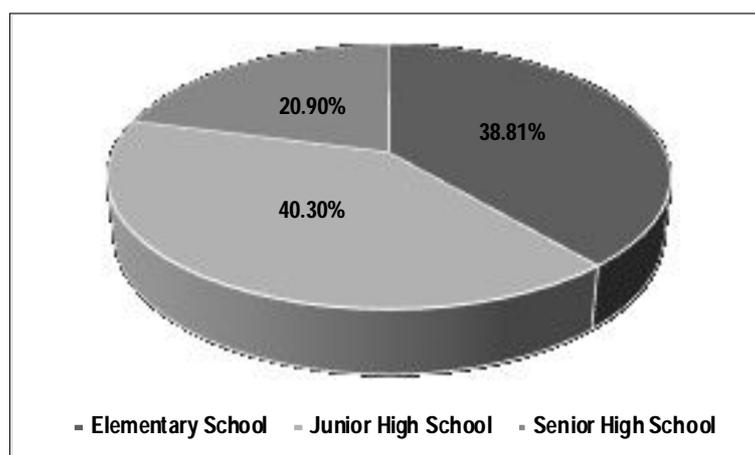


Figure 3. Education of traditional ship seafarers in Tanjung Emas Port of Semarang.

Figure 4 shows the seafaring experience of the traditional ships' crew. Based on the data obtained, the seafarers' minimum experience was five years, while the longest was 39 years. According to the figure, crews with experience between 16 to 20 years were

dominating. Therefore, most of the crews had been working in the traditional business for quite a long time.

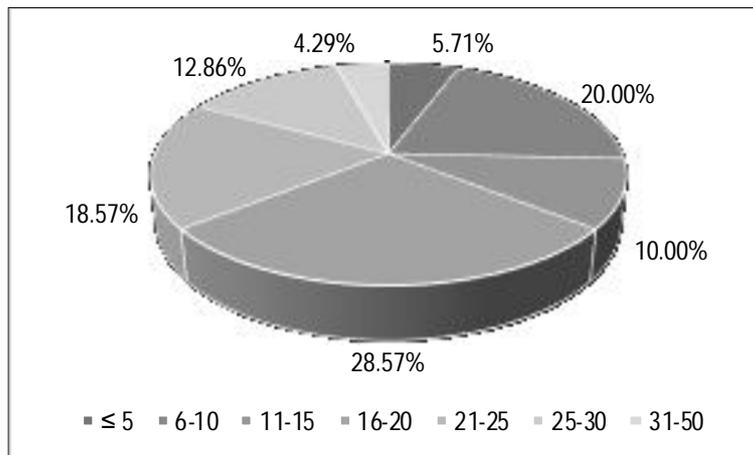


Figure 4. The seafaring experience of traditional ship seafarers in Tanjung Emas Port of Semarang.

Traditional shipping businesses and the traditional ship itself generally do not apply for specific roles in the recruitment of ship crew. Therefore, based on the crews' age and experience, the analysis to identify the age at the first sail was carried out. Figure 5 shows the age at the first sail of traditional ship manning in Tanjung Emas Port of Semarang. A surprising result was obtained from the analysis. Based on the analysis result, a crew started working from the age of 9 years old. However, most of the crews started to work from the age of over 20.

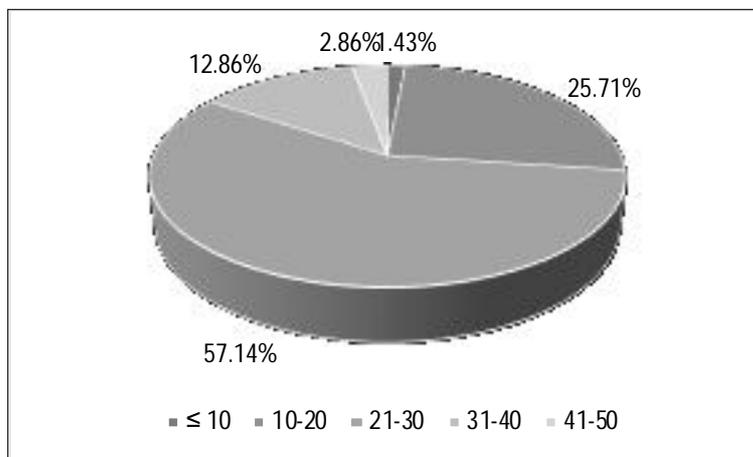


Figure 5. Age of first sail of traditional ship seafarers in Tanjung Emas Port of Semarang.

The traditional shipping industry generally neglected the requirement of education level during the recruitment of ships' crew. Therefore, it is very likely that the seafarers rarely own the certificate of competence. Therefore, this research was carried out to inventory the crew's competence by checking their competence certificate. Table 6 shows the ownership of seafarer's certificate of competence of traditional shipping crews in Tanjung Emas Port of Semarang.

Table 6 shows that the certificate compliance increases along with the increasing ship size. However, not all of the required certificates were fulfilled by any of the seamen. The seamen of the non-enterprise traditional ships only had the seamen book. They did not even have the necessary safety training certificate. In contrast, some of the traditional enterprise ships' seamen had additional certificates, such as the certificate of endorsement, necessary safety training certificate, and seafarer's medical certificate.

According to the data presented in Table 6, none of the seamen had fulfilled all the required certificates. Of all eight certificates, the seamen owned a maximum of only four of the required certificates.

Table 6
Number of traditional ships' crew based on certificate ownership in Tanjung Emas Port of Semarang

No.	Types of certificate	Non-enterprise boats		Enterprise boats			
		≤ 7 GT (number, %)		35 to 175 GT (number, %)		175 to 500 GT (number, %)	
1.	Certificate of competence	0	0.00%	0	0.00%	0	0.00%
2.	Certificate of endorsement	0	0.00%	1	12.50%	8	50.00%
3.	Certificate of basic safety training	0	0.00%	8	100.00%	16	100.00%
4.	Certificate of medical first aid	0	0.00%	0	0.00%	0	0.00%
5.	Certificate of survival craft and rescue boat	0	0.00%	0	0.00%	0	0.00%
6.	Ship security officer	0	0.00%	0	0.00%	0	0.00%
7.	Seafarer's medical certificate	0	0.00%	1	12.50%	8	50.00%
8.	Seamen book	42	89.36%	8	100.00%	14	87.50%

Further analysis was carried out to identify the certificate ownership of traditional ships' seamen. Table 7 shows the level of certificate ownership of traditional ship seamen in Tanjung Emas Port of Semarang.

Table 7
Number of respondents based on the percentage of certificate ownership of traditional ship crews in Tanjung Emas Port of Semarang

No.	Percent of certificate ownership	Enterprise boats			
		35 to 175 GT (number, %)		175 to 500 GT (number, %)	
1.	80-100%	0	0.00%	0	0.00%
2.	60-80%	0	0.00%	0	0.00%
3.	40-60%	1	12.50%	8	50.00%
4.	20-40%	7	87.50%	6	37.50%
5.	< 20%	0	0.00%	2	12.50%
6.	None	0	0.00%	0	0.00%
	Total	8		16	

Table 7 shows the level of certificate ownership for enterprise ships seamen. Since seamen for traditional ships with a size under 7 GT have no standard competence certification requirement, it is excluded from the table. Based on the information presented in Table 7, the seamen of traditional ships in Tanjung Emas Port of Semarang only fulfilled under 60% of the required certificates. The certificate ownership shows that the competence of traditional ships' seamen is low.

Another critical piece of information concerning the traditional ships' crews is how they acquire the seafaring skill. Generally, the traditional ships' crews never took formal education related to seafaring. Therefore, the information concerning their capability in seafaring is essential. During the research, the information concerning traditional ships' crew seafaring skill acquirement was collected. Table 8 shows the skill acquirement of the seafarers of traditional shipping in Tanjung Emas Port of Semarang.

Nearly all of the non-enterprise boat seamen acquired their skills from training. However, the crew of enterprise ships acquired their skill either autodidact, by experience, or both. The result emphasized that traditional shipping seafarers are not supported with appropriate maritime transport activity.

Table 8

Seafaring skill acquirement of traditional ship seafarers in Tanjung Emas Port of Semarang

No.	Skill acquirement	Non-enterprise boats		Enterprise boats			
		< 7 GT		35 to 175 GT		175 to 500 GT	
		Number of respondents	%	Number of respondents	%	Number of respondents	%
1.	Autodidact	0	0.00	6	25.00	4	16.67
2.	Training	40	86.96	0	0.00	0	0.00
3.	Experience	0	0.00	1	4.17	1	4.17
4.	Experience and training	0	0.00	1	4.17	11	45.83
5.	No answer	6	13.04	0	0.00	0	0.00
	Total	46	65.71	8	33.33	16	66.67

Discussion. Traditional ships used for commercial purposes should have the engine size 7 GT (Pujiastuti & Samekto 2019). Therefore, ships with the size under 7 GT is considered as personal/private purposed vessel. Referring to the research result, the condition of traditional shipping business in Indonesia, especially in Tanjung Emas Port of Semarang, was under several limitations. The population of non-enterprise ships was more than the enterprise ships. However, since non-enterprise ships are not used for cargo handling, therefore from here on, the discussion is focused on the enterprise ships.

The traditional shipping business has been facing various issues threatening its sustainability. The threats come from the expanding steam vessels (Gardner 1985) to the recently expanding autonomous vessels (Komianos 2018). Therefore, improvements in the quality and service should be carried out to maintain its competitiveness in the shipping industry. Safety and security are among the aspects that need to be improved in traditional shipping.

Currently, traditional shipping is heading to distinction. For example, Syafril (2018) showed a significant reduction of traditional ship visits in Sampit port from 1.910 visits in 2005 to only 405 visits in 2016. However, traditional shipping is vital to be kept sustainable to improve the self-reliance in maritime transportation. Indonesia has more than 15.000 islands as an archipelagic country, while foreign ships' inter-insular trading traffic is partially served (Sasono 2008). The threat increases along with the emergence of the free trade era due to the eradication of sabotage policy, allowing foreign ships to take over the traditional shipping operational area (Tangkilisan 2013).

Traditional shipping in Indonesia had existed for a very long time. The estimation suggested that it even existed before 1500 A.D (Syafril 2018). The traditional ships extant to the current days generally are old ships with limited features. The Indonesian government in 2012 issued the NCVS. Therefore, not many of the ships consider adopting the standard into the construction. Considering that the traditional shipping fleets are generally quite old and build while the NCVS was not applicable, the fleets' renewal is suggested as a prioritized solution to improve its safety and security to match the standard. The idea was suggested by Abdullah (2015) as the chairman of the Traditional Ship Association. Therefore, the government needs to arrange a program to stimulate traditional ship owners to replace their old ships with new ships. Fleet renewal implies the possibility to integrate safety and security equipment and appliances into the newly constructed ship. However, since traditional ships are unique between originalities, there should be a win-win solution to integrate the equipment and appliances along with the maintenance of its cultural value.

The safety and security aspects are essential in maritime transportation. It becomes one of the drivers of reducing traditional shipping cargo transport in Indonesia (Malisan 2014). Therefore, an improvement in the safety and security aspects of traditional shipping needs to be prioritized. To support the integration of traditional ships in the marine toll, the government had stimulated a machine's adoption into the sailboat through light loans (Tahara 2016).

Safety and security are essential aspects of the maritime transportation industry, including the traditional shipping business. Maritime casualties could occur at any time to

any ship regardless of the size (Hasugian et al 2017). However, through appropriate safety and security instruments, the casualties could be reduced (Felsenstein et al 2013). Safety at sea includes several aspects, such as the technological and operational safety of ships, navigation safety, the safety of people in emergencies, and pollution prevention (Galic et al 2014). This involves complex management and control of the various instruments.

The Ministry of Transportation regulates the safety and security standard of enterprise traditional ships in Indonesia through Minister Regulation No. 65/2009. Later on, the act was translated into the Indonesian Flagged Non-Convention Vessel Standard. The standard contains the specification of the instruments for the non-convention vessels. In contrast, each vessel category's standard equipment was explained in the Decree of Directorate General of Sea Transportation No. UM.008/9/20/DJPL-12 on the Technical Guide of the Implementation of Indonesian Flagged Non-Convention Vessels.

The traditional enterprise ships in Tanjung Emas Port of Semarang operate in local shipping voyages. Therefore, according to Government Regulation No. 20/2010, the vessels require a Grosse certificate, Mee Debrief, and safety certificate to operate. All of the ships observed also had fulfilled the requirements according to the standard of equipment and appliances.

Low awareness of the ship's crew is one factor altering the risk of accidents in maritime transport (Faturachman & Mustafa 2012). Human resource also plays an essential role in the safety and security of maritime transport. Ship crews need to be responsive and manage an emergency efficiently (Felsenstein et al 2013). Therefore, adequate training is needed for every ship's crew.

According to the result, none of the crews of traditional ships in Tanjung Emas Port of Semarang met during the research had adequate education regarding maritime transportation. Therefore, they did not have the required certificate. According to the Decree of General Director of Maritime Transportation No. UM.008/9/20/DJPL-12, manning in the traditional ships are at least consist of:

- 1) one master with a certificate of competence of desk officer class IV and another 19 standard certificates;
- 2) one chief officer with a certificate of competence of desk officer class V and another 18 standard certificates; and
- 3) three non-disabled seamen with eight standard certificates.

However, the crews of traditional ships owned nearly none of the certificates. All crews owned only the Basic Safety Training (BST) certificate. At the same time, some crews also had the certificate of Basic Safety Training for Motorized Sail Boat, Engineer for Traditional Shipping, Desk Officer for Traditional Shipping, and Able Bodied Seaman for Traditional Shipping. Therefore, it could be considered that the manning of traditional ships in Tanjung Emas Port of Semarang was lack of competence.

The casualties in maritime transportation are significantly related to the vessel types. For example, the general cargo ships with 501 to 1,500 GT of size are more vulnerable to collision than any other ships, while the ships with < 500 GT are more vulnerable to single accidents (Hasugian et al 2017). Therefore, the safety and security standards are differed based on ship categories. Improvements of ship navigational aids, rescue services, ship designs, and management of loading carriage are among the efforts that could be carried out to reduce maritime transport casualties (Roberts & Carter 2018).

Improvements on traditional ships' crews' competencies are required to increase traditional shipping's safety and security aspects. The competence of seafarers is crucial in the safety of maritime transport. Seafarers are frequently faced with unfavorable situations during seafaring activity (Lappalainen et al 2013). Therefore, competent seafarers are expected to be able to solve the problems effectively. Unfortunately, the qualification for manning is frequently neglected in the traditional shipping business. Seafaring competencies are mostly obtained from the training events.

Accidents and injuries in the workplace occasionally occur regardless of the size of the impact. Therefore, information concerning the accident and injuries is vital to improving workplace safety and security management. Unfortunately, it is mostly

underreported (Oltedal & McArthur 2011). Appropriate ship equipment and competent seafarers are expected to reduce the risk of maritime accidents and fatalities.

The strategy to maintain the sustainability of traditional ships would be the diversion of the shipping business. Traditional ships have advantages concerning their size. Therefore, it can travel to inland waters and small island waters (Sasono 2008). Therefore, the government integrated traditional shipping in the marine toll program as feeder vessels to transport goods from and to the inland and small island areas. The idea applies to cargo ships. However, smaller traditional ships could be used as tourism boats to support marine tourism (Ardiwidjaja 2016). To improve traditional shipping in the marine toll, the government has arranged the gradual increase of traditional ship's population to a total of 500 units in 2019 (Adam 2015).

The seamen in the enterprise ships did not acquire their sailing capability by just training. Most of them acquired their skill autodidact by experience and by the combination of experience and training. However, the result is ordinary for traditional shipping activity. Generally, a traditional ship's crew does not have adequate formal education and joined the ship early (Susilowati 2016). Therefore, they acquire sailing skills practically through sailing activities.

The government occasionally held basic safety training to improve the seamen's competence as a part of the safety and security aspects in maritime transportation (Syafriharti 2012). However, basic safety training is only one of eight required certificates for traditional ships' crew. As a result, showed low ownership of competence certificate indicated that the seamen did not have a chance to join the training. This could be due to the high training-cost, or because the training is rarely held. Therefore, the government needs to consider holding training for other potential competencies, such as certification of medical first aid and survival craft and rescue boat.

Conclusions. There were three vessel categories of traditional ships in Tanjung Emas Port of Semarang. The vessels groups were the non-enterprise vessels (< 7 GT), small-sized enterprise vessels (35 to 175 GT), and large-sized enterprise vessels (175 to 500 GT). The crews were characterized by low education level and competence. The safety and security standards for non-convention vessels had been available since 2012 and are currently implemented. The standards include the ship equipment and seafarers' competence. However, there still exists a gap between the regulation and the factual condition. The enterprise ships, showed by high fulfillment level, had fulfilled most of the required equipment and appliances. The research implies the need to enforce safety and security standards, especially regarding the ships' crew's competencies.

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Received: 19 April 2021. Accepted: 03 May 2021. Published online: 28 May 2021.

Authors:

Andi Prasetiawan, Coastal Resources Management, Postgraduate Program, Universitas Diponegoro, Jl. Imam Bardjo SH No. 5, Pleburan, Semarang, Central Java, Indonesia 50241; Merchant Marine Polytechnic Semarang, Jl. Singosari Raya No. 2A, Wonodri, Semarang, Central Java, Indonesia 50242, e-mail: andiprasetiawan117@gmail.com

Muhammad Zainuri, Faculty of Fisheries and Marine Science, Universitas Diponegoro, Jl. Prof. Soedarto, SH, Tembalang, Semarang, Central Java, Indonesia 50275, e-mail: muhammadzainuri@lecturer.undip.ac.id

Winarno, Merchant Marine Polytechnic Semarang, Jl. Singosari Raya No. 2A, Wonodri, Semarang, Central Java, Indonesia 50242, e-mail: winarno@pip-semarang.ac.id

Dian Wijayanto, Faculty of Fisheries and Marine Science, Universitas Diponegoro, Tembalang, Jl. Prof. Soedarto S.H., Semarang, Central Java, Indonesia, e-mail: dianwijayanto@gmail.com; dianwijayanto@lecturer.undip.ac.id

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How to cite this article:

Prasetiawan A., Zainuri M., Winarno, Wijayanto D., 2021 Safety and security management of traditional shipping in Tanjung Emas Port of Semarang. *AACL Bioflux* 14(3):1417-1430.