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Research Articles

Strategy for Improving Ship Security Systems and Port Facilities with Implementation *International Ship and Security (ISPS) Code* in Branta Area

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Abstract: International Ship and Port Security (ISPS) Code or the International Code for Security of Ships and Port Facilities is an international regulation that complements the 1974 SOLAS Convention. Security of Ships and Port Facilities refers to port facilities and consists of Part A as orders and Part B as recommendations, which are stipulated in all ports in Indonesia, the Branta Area, one of them. ISPS Code created to facilitate shipping activities, both in terms of ship security and port facilities. The aim of this research is to describe strategies for improving ship security systems and port facilities through implementation ISPS Code in the Branta Area. The data collection technique in the research was carried out by interviews and then analyzed using SWOT. This research methodology uses mix method by collecting data directly in the field. This type of research is quantitative research analyzed using the SWOT method. The research was conducted within 12 months with. The population is ships entering and exiting the Branta area and also users of the sample port facilities Purposive Sampling. The research carried out this by distributing questionnaires that had been validated by experts. The results of the research can be obtained that the matrix value of the internal factors is 3.43 and the matrix value of the external factors is 3.44, the Cartesian diagram is in quadrant I, namely strategy aggressive .

Keywords: ISPS Code, Ship Security, Port Facilities

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1. Introduction

Safety and security issues in the transportation sector have become a topic that is often discussed in various fields, including politics, academia, and society, especially in recent years where maritime transportation accidents have frequently occurred. The maritime safety system has not been optimized, so it has the potential to have a negative impact on the movement of goods and the mobility of people on sea routes [1]

Security and safety of shipping and port facilities is very necessary in avoiding security risks for ships entering and exiting port users and for port facility users. There is implementation *International Ship and Port Facility Security (ISPS) Code* which is enforced in port areas, such as the Branta Area, in port activities. Standard Operating Procedures *ISPS Code* intended as a preventive measure from government elements, shipping companies, ship

personnel and port facility personnel to be responsible for detecting security, threats and taking preventive action against security disturbances on ships and port facilities [2].

The International Ship and Port Facility Security Code, hereinafter referred to as the Code, is an international regulation which is an amendment to the Convention. *Safety of Life at Sea 1974* for the security of Ships and Port Facilities consisting of part A as an order and part B as a recommendation[3]

The Branta area is located in Pamekasan Regency. This port is used by fishing boats as a docking port for loading and unloading fish catch activities with supervision from UPP Branta employees [4]. There are several ports that are the responsibility of the Branta KUPP, including Taddan Port, which is a port that does not comply with the ISPS Code, also known as Trunojoyo Taddan Port, located in Taddan village, Sampang Regency, Madura Island, East Java. This port was built with the aim of increasing regional connectivity, especially between Sampang and Probolinggo, and supporting local economic development. The port that has complied with the ISPS Code, HCML Port on Mandangin Island, Sampang Regency, Madura, East Java. This port functions as the main logistics function that supports HCML operations, especially in managing the gas field at MBH (Madura-Bangkalan). The facility includes materials, equipment and docks for loading and unloading staff required for HCML's offshore operational activities. Oyong Port which has complied with the ISPS Code is the main logistics facility to support the operations of the Oyong oil and gas field which is located off the north coast of Madura Island, East Java. This field is managed by Santos Ltd. with partners Singapore Petroleum and Cue Energy, with Santos as Main operator.

According to Indriyani (2024), a review of previous research described the obstacles faced during implementation *ISPS Code* field, such as the quality of the employees they have as well as the condition of facilities and equipment both on ships and ports, in addition to the understanding of the community around the port regarding security even though socialization has been carried out and other obstacles have been found, namely implementation *ISPS Code* does not run continuously, the activities of port security officers overlap in authority as well as external factors, namely different interpretations regarding IMO rules, so that in this research develops knowledge of increasing strategies in the security of ships and port facilities by implementing *ISPS Code* in Branta Area, is there a positive and negative relationship in handling in the field [5].

The results of research from Septian et al., (2016), explain that the implementation *ISPS Code* can be realized well, this is proven by securing port facilities, checking people and goods entering and exiting the port area, as well as implementing the Port Facilities Security Plan (*Port Facility Security Plan*) which is explained in *ISPS Code* Part A.16 and Part B.16. The ship security plan (Ship Security Plan) implemented by *Company Security Officer* (CSO) officers appointed by the Company and Recognized Security Organizations (RSO) who have been appointed by the Director General of Sea Transportation based on *ISPS Code Part* A.9 and *Part* B.9, so this research hopes that there are similar factors in the Branta area [6].

In Anggrahini's (2020) research on the Quality of Implementation of the ISPS Code at Benoa Port, the results of the quality of implementation at Benoa Port were obtained by analyzing the level of availability of facilities and infrastructure [7]. Research results from Abdurrasyid (2023) Analysis of the Implementation of the International Ship and Port Facility

Security (ISPS) Code in Indonesia which focuses on analyzing the risks and threats and probabilities at the level of implementation of the ISPS Code [8].

Based on the results of previous observations and research, there is no security and efficiency system in ship movements and community activities at the port which has led to complaints from agents in carrying out port activities and with other previous research, it is hoped that there will be an increase in strategies in the security of ships and port facilities by implementing *ISPS Code* in the Branta area can be implemented optimally. Thus, researchers are interested in conducting research on the implementation of security systems in the Branta area with implementation *ISPS Code* as well as strategies for improving ship security systems and port facilities with implementation *ISPS Code* in Branta Area.

2. Literature Review

Ship Security

Ship Security Management is a collection of written and documented systems, procedures and mechanisms used by maritime transport companies and commercial ships for regulation, management, supervision and continuous review and improvement to ensure compliance with all ship readiness to face, defend and maintain ship security in order to increase ship safety [9].

According to Abdurrasyid et al. (2023) Security at the port is an effort to create conducive conditions and avoid threats or disturbances [8].

According to Talaie & Javidbakht (2021) the level of security determined by the government is applied to ships flying that government's flag and ports within that government's jurisdiction (ports that are included in the application of the Code)[10].

Determining this security level code is necessary to determine what security actions must be taken to mitigate security risks, deal with security threats, and deal with the impact of security incidents. In the ISPS Code there are three security level codes which are simply referred to as security level 1 (security level 1), security level 2 (security level 2), and security level 3 (security level 3) [8].

Several things that need to be considered in determining the level of security are:

- The level of credibility of the threat information;
- The level of security threat information is corroborated;
- The level of certainty of information regarding the nature and likelihood of the threat occurring;
- Potential consequences if the security incident occurs.

Port Facilities

Security fences, guard posts, monitoring equipment, detector equipment, communication equipment and lighting are the means and infrastructure for securing port facilities [9].

Important things that need to be checked during the initial inspection, intermediate (advanced) inspection and renewal (renewal) of the ship are as follows:

- Appointment of Company Security Officer (CSO) and Ship Security Officer (SSO).
- Recommendations are included in the Ship Security Assessment (SSA).
- Internal audit, namely ensuring compliance with ISM Code rules such as detecting and preventing deficiencies that could result in incidents or accidents.

- The minimum equipment and symbols that must comply are the Automatic Identification System (AIS), Ship Security Alert System (SSAS), IMO Number Identification, Restricted Area Identification and Standard Safety Equipment.

International Ship and Port Facility Security Code (ISPS Code)

In 2002, the IMO (International Maritime Organization) established the ISPS Code, which regulates international regulations regarding the security of ships and port facilities. This regulation was created with the aim of identifying security threats and preventing undesirable events at sea and ports. The ISPS Code consists of two parts: Part A describes mandatory requirements for governments, ships, companies and port facilities. Part B contains things that function as a basis, guide, reference, or guide. The ISPS Code is a modification of SOLAS 1974, which includes CHAPTER V regarding shipping safety. It was then added to CHAPTER XI to become CHAPTER XI-1 which discusses specific efforts to improve shipping safety, such as increasing survey activities and the application of ship identification numbers and ship history documents. CHAPTER XI-2 discusses special efforts to improve shipping security [8].

According to Lutfiyah et al., (2022) the ISPS Code has objectives to be achieved, including [11];

- Identify threats and impacts on the safety of ships and port facilities involved in international trade by establishing an international framework that includes cooperation between participating countries, government agencies, local governments, shipping and shipping industries, and ports.
- Determine the responsibilities and roles of each Member State, government agencies, local authorities, shipping industry and ports at national and international levels to ensure the safety of maritime transport.
- Collect and share security-related information proactively and effectively.
- Provides a security assessment methodology with a design and process for taking steps to change the level of security.
- Providing confidence that appropriate and proportionate maritime safety measures have been implemented.

3. Method

This research uses *mixed methods* research that collects and analyzes data, integrates results, and draws conclusions using two approaches or methods, namely, qualitative and quantitative research, in one study [12]. Collection using observation methods and systematic data analysis with the aim of taking action and creating change through generating practical knowledge. As a result of this observation, a questionnaire was then created which respondents would fill in with codes that made it easier to analyze the data.

The results of this research will be analyzed descriptively and qualitatively and using SWOT analysis. This analysis is based on logic that can maximize strengths and opportunities, but simultaneously minimize weaknesses and threats. Strength, weakness, opportunity and threat are company strategic factors that need to be analyzed in the current conditions. This is also called situation analysis using the SWOT analysis model. A common situation analysis model is SWOT analysis *Matrix Internal Factor Analysis Summary* And *Matrix Eksternal Factor Analysis Summary.*

IFAS (Internal Factor Analysis Summary)

Regardless of the number of factors included in the IFAS matrix, the total weighted average ranges between a low of 1.0 and a high of 4.0 with a mean of 2.5. If the total average is below 2.5, it indicates that the company is internally weak, while the total value above 2.5 indicates a strong internal position.

Table 1 IFAS Questionnaire

Factor Strategy Internal	Weight	Rating	Weight X Rating	Is
Strength	X	X	X	X
Amount	X	X	X	X
Weaknesses	X	X	X	X
Amount	X	X	X	X
Total	X	X	X	X

EFAS (External Factor Analysis Summary)

The highest possible total score is 4.0 and the lowest is 1.0. A total score of 4.0 indicates that the company responded to existing opportunities in an extraordinary way and avoided threats in its industrial market. A total score of 1.0 indicates the company's strategies do not take advantage of opportunities or do not avoid external threats

Table 2 EFAS Questionnaire

Factor Strategy External	Weight	Rating	Weight X Rating	Is
Opportunity	X	X	X	X
Amount	X	X	X	X
Threat	X	X	X	X
Amount	X	X	X	X
Total	X	X	X	X

SWOT Matrix

Instruments for the preparation of strategic elements of objects. This matrix clearly shows how the external opportunities and threats facing an object can be aligned with its internal strengths and weaknesses.

Table 3 SWOT Matrix Concept

IFAS / EFAS	*STRENGTH* (S) Determining the 4 main factors of Branta Area's strength	*WEAKNESS* (IN) Determining the 4 main factors of Branta Area's strength
OPPORTUNI TIES (THE) Determining the 4 main factors of the Branta Area's external opportunities	SO STRATEGY A strategy that aims to utilize the internal strengths possessed by combining the opportunities obtained	WO STRATEGY A strategy that utilizes internal strengths by combining the opportunities obtained.
THREATS (T) Determine the 4 main factors of external threats to the Branta Region	STRATEGY ST A strategy that utilizes existing strengths to be used to overcome the threats faced	WT STRATEGY A strategy that utilizes a defensive system by minimizing its weaknesses by avoiding the threats it faces

Diagram Analisa SWOT

To help understand data analysis, SWOT analysis and SWOT analysis charts provide data about the direction of benchmark trends for each factor variable.

Figure 1 SWOT Analysis Diagram

4. Results and Discussion

Place and Time of Research

This research was carried out in the KUPP Branta area, specifically ships that use port facilities and storage yards. The duration of this activity is from 14 July 2023 to 19 July 2024.

Calculation Results *IFAS*

Mark *IFAS* obtained from distributing questionnaires to respondents and calculated cumulatively.

Table 4 IFAS Matrix (*Internal Factor Analysis Summary*)

No	Internal Factors	Weight	Rating	Score
	Strength (*Strength*)			
1.	Officer *security* port in accordance with main duties and functions	0,13	3,61	0,46
2.	Inspection of vehicles and luggage	0,13	3,47	0,45
3.	The existence of a structural structure of the FPSO organization	0,13	3,69	0,47
4.	Carry out *drill* once every 3 months	0,13	3,72	0,48
	Subtotal	0,52		1,86
	Disadvantages (*Weakness*)			
1.	Personnel on the ship who handle security issues frequently change positions	0,11	3,11	0,34
2.	An integrated security post needs to be created	0,12	3,33	0,39
3.	Separated between the ports *complai* with no port yet *complai*	0,12	3,56	0,42
4.	Surveillance system for FPSO parties	0,12	3,58	0,42
	Subtotal	0,48		1,57
	Total	1,00		3,43

From the analysis results in table 4 IFAS, the strength and weakness factors have a total score of 3.43. Because a total score above 2.5 means this shows a very strong internal position.

Calculation Results *DELETE*

Mark *DELETE* obtained from distributing questionnaires to respondents and calculated cumulatively.

Table 5 EFAS Matrix (*Extenal Factor Analysis Summary*)

No	External Factors	Weight	Rating	Score
	chance (*Oppurtinity*)			
1.	Regulations that encourage implementation *ISPS Code*	0,13	3,75	0,48
2.	Collaboration between shipping companies and ports	0,13	3,67	0,47
3.	The development of IT makes it easier to monitor port facilities	0,13	3,72	0,48
4.	Meng-*update* facility standards *ISPS Code*	0,13	3,67	0,47

	Subtotal	0,52		1,90
	Threat (*Threat*)			
1.	Implementation *ship security* on the ship / ship security design strictly	0,13	3,50	0,45
2.	The ship's crew entered goods without documents	0,11	3,31	0,36
3.	Maximizing the goods tracking system	0,13	3,61	0,46
4.	The community's desire to get a share of the profits from marine products	0,10	2,78	0,27
	Subtotal	0,48		1,54
	Total	1		3,44

From the analysis results in table 5 of EFAS, the opportunity and threat factors have a total score of 3.44. Because the total score is close to 4.0, this means that it shows that it responds to existing opportunities in an extraordinary way and avoids threats.

SWOT Analysis Results

The SWOT Matrix is a tool that measures the strategic factors possessed in the Branta Region. This matrix can clearly explain external opportunities and threats. This matrix can create four alternative strategies which can be displayed in the following table:

Table 6 SWOT Matrix

		STRENGTH	*WEAKNESS*
	IFAS	S1 Officer *security* port in accordance with main duties and functions S2 Inspection of vehicles and luggage S3 The existence of a structural structure of the FPSO organization	W1 Personnel on the ship who handle security issues frequently change positions W2 An integrated security post needs to be created W3 Separated between the ports *complai* with no port yet *complai*
EFAS		S4 Carry out *drill* once every 3 months	W4 Surveillance system for FPSO parties
OPPORTUNITY		SO STRATEGY	WO STRATEGY
O1 Regulations that encourage implementation *ISPS Code*		• Officer *security* carry out their duties well so that there are no obstacles in implementing ISPS regulations	• Personnel on board ships who handle security issues often change positions and can affect the application of regulations *ISPS Code*
O2 Collaboration between shipping companies and ports		• Optimal inspection of vehicles and luggage thus facilitating cooperation between shipping companies and ports	• Building an integrated security post so that it can optimize the security system at shipping companies and ports
O3 The development of IT makes it		• Having a structural structure of the FPSO organization so that it	

	easier to monitor port facilities	can facilitate monitoring of port facilities in accordance with the main duties and functions assisted by IT developments	• Separating the ports*complai* with unopened ports*complai* thereby maximizing monitoring of port facilities with the assistance of IT developments
O4	Meng-*update* facility standards *ISPS Code*	• Carry out *drill* every 3 months so you can find out the standard of facilities *ISPS Code* what needs to be done*update*.	• Maximize supervision of the FPSO in order to optimize the renewal of facility standards *ISPS Code*
	THREAT	STRATEGY ST	WT STRATEGY
T1	Implementation *ship security* on the ship / ship security design strictly	• Increase officer understanding *security* in accordance with the main tasks and functions so that you can understand the application *ship security* on the ship	• Personnel on the ship who handle security issues often change positions so they cannot maximize implementation *ship security* on ship / ship security planning
T2	The ship's crew entered goods without documents	• Maximize supervision of vehicles and luggage entering the port area so as to prevent ship crew from entering goods without documents	• There is a lack of an integrated security post so that ship crews are still found loading goods without documentation
T3	Maximizing the goods tracking system	• Has a structural structure of the FPSO organization so that it can maximize goods tracking	• There are different port systems *complai* with unopened ports*complai* so that the goods tracking system is not optimal
T4	The community's desire to get a share of the profits from marine products	• Doing activities *drill* every 3 months so that you know about activities in the field, including the community's desire to get a profit share from marine products	• The monitoring system for FPSOs is less than optimal, making it easy for community demonstrations to occur regarding profit sharing at sea

Source: Internal and External Factors for Improvement Strategy *ISPS Code* in Branta Area.

Discussion

Port security officers carry out their performance in accordance with their main duties and functions. This is because to avoid continuous ship accidents which start capsizing into fishing vessels, sinking ships, burning, capturing ships, and causing many losses through both ship material losses [13]. Therefore, so that security officers can be more optimal in carrying out their activities, namely always doing them *drill* which is in accordance with the ISPS Code so that in implementing the ISPS Code there are no obstacles. This is confirmed that the implementation of training and drills in accordance with the ISPS Code can prevent causing security disturbances, and trained officers are better prepared to deal with emergency situations that have the potential to threaten [14].

Inspection of vehicles and luggage entering port areas and ships, as intended in the Minister of Transportation Regulation Number PM 51 of 2021 concerning Procedures and Procedures for Implementing Security Management Verification of Ships and Port Facilities, which is an effort to prevent the smuggling of illegal goods, must be carried out with strict safety checks in accordance with standard operating processes, product marking and assistance, training of security personnel, number of surveillance cameras, number of law enforcement agencies, and increased coordination with relevant authorities[15] as well as the discovery of illegal goods entering by attaching fake documents[16]. The recommended strategy to strengthen inspection activities is to collaborate between shipping companies, ports and related agencies in inspecting vehicles and luggage to obtain more optimal results, one of which is preventing smuggling and ensuring compliance with regulations [17].

Personnel on ships dealing with security issues often change positions, personnel who frequently change can reduce the effectiveness of supervision and increase the risk of accidents [18] and cause loss of goods during guard change procedures [19]. According to (Lestari & Pasandang Nari, 2021) it is said that communication between guard duty officers must always be prioritized so that in carrying out their duties there is no negligence, one of which is a collision between ships [20]. Therefore, a strategy that can be applied in the field is, carrying out guard changes in accordance with the implementation of the ISPS Code, such as conducting training for personnel regarding security procedures, including changing guard services [21].

It is necessary to create an integrated security post, the lack of adequate security posts increases the risk of accidents and threats to port facilities [14]. Therefore, it is necessary to create an integrated security post, because it is an important step in preventing potential security disturbances and monitoring effectiveness [22]. Strategies that can be implemented in efforts to create security posts include highlighting the importance of stakeholder coordination in implementing the ISPS Code in creating integrated security posts [23] as well as identifying security facilities such as CCTV, X-ray and integrated security posts [22].

5. Conclusion

- Based on the results of research using SWOT analysis, it was found that it was in Quadrant 1 in the SWOT analysis, indicating an ideal position, where the internal strengths of KUPP Class II Branta are in direct contact with significant external opportunities. In the context of implementing the ISPS Code, this quadrant reflects that KUPP Class II Branta has strong internal capacity, such as security officers who work according to their main duties and functions, and inspection of vehicles and luggage that runs well. At the same time, in supportive external environmental conditions, such as international regulations that urge the implementation of the ISPS Code.
- The appropriate strategy in this quadrant is an aggressive or expansive strategy. This means that it is necessary to actively develop and perfect the implementation of the ISPS Code by utilizing its strengths to respond to global opportunities. This can be realized by increasing the understanding of security officers, maximizing supervision of vehicles and luggage entering the port area, having an FPSO structural structure, and carrying out drill activities every 3 months.

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