

Original Article

Navigating Compliance: An Analysis of the Traffic Separation Scheme in Indonesia's Sunda Strait and Its Implications for Maritime Law Enforcement

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Abstract: *The Indonesian government has implemented an international maritime routing system in the Sunda Strait through Ministerial Decree No. 130 of 2020. This regulation incorporates the establishment of a Traffic Separation Scheme (TSS), serving as a navigational guide for maritime transport entities traversing the strait. This initiative follows the Indonesian Archipelagic Sea Lanes (ALKI) policy, ratified in 2002 by international stakeholders following the United Nations Convention on the Law of the Sea (UNCLOS) 1982. Despite the TSS implementation from 2020 to 2022, instances of non-compliance by international shipping entities persist. This study employs a qualitative descriptive methodology, utilizing legal efficacy and sovereignty theories. The findings indicate that TSS infractions can be mitigated by imposing sanctions on non-compliant actors. The research concludes by advocating for enhanced law enforcement measures against TSS violators in the Sunda Strait.*

Keywords: *Indonesian Archipelago Sea Lanes, ALKI, Sunda Strait, TSS.*

I. INTRODUCTION

Indonesia established the Indonesian Archipelagic Sea Lanes (ALKI) in 2002 through Government Regulation No. 37/2002, implementing Law No. 6/1996 on Indonesian Waters and the United Nations Convention on the Law of the Sea (UNCLOS) 1982. Article 1, paragraph 8 of Law No. 6/1996 defines ALKI as designated sea lanes for foreign vessels and aircraft to conduct unimpeded transit passage through Indonesian archipelagic waters and adjacent territorial seas. The ALKI's primary objective is to facilitate continuous, direct, and expeditious international maritime and aerial transit (Hutagalung, 2017). Despite ALKI's 2002 establishment, its implementation required approval from international bodies, notably the International Maritime Organization (IMO) and the International Hydrographic Organization (IHO). In 2019, Indonesia secured IMO approval for the Traffic Separation Scheme (TSS) in the ALKI Sunda and Lombok Straits, a crucial step towards enhancing maritime safety in these waterways. Notably, Indonesia is the first archipelagic state to obtain IMO approval for TSS implementation (Buntoro, 2017).

In response to the TSS ratification for the Sunda and Lombok Straits, as stipulated by Law No. 6/1996 and Government Regulation No. 37/2002, the Minister of Transportation was mandated to establish shipping lanes, route systems, traffic procedures, and anchorage areas. Consequently, in 2020, the Ministry of Transportation issued Decree No. KM. 130/2020, delineating the Sunda Strait route system. This regulation encompasses the Traffic Separation Scheme, Inshore Traffic Zone, and Precautionary Areas (Ministry of Transportation, 2022). The TSS aims to enhance navigational safety in high-traffic, narrow waterways like the Sunda Strait, which measures only 30 km at its narrowest point. The scheme mandates channel usage to mitigate collision risks, vessel grounding, and coral reef damage. The Sunda Strait, a critical passageway for diverse vessel types between the Indian Ocean and the South China Sea, has experienced a significant increase in maritime traffic. According to the Banten Naval Base Command and Control Center, 29,351 vessels transited from 2007 to 2015. Furthermore, the Automatic Identification System data is from PT. Gemilang Ananta recorded 65,606 vessel transits between January 2015 and February 2016, indicating a substantial surge in maritime activity (Elvis, Faisal, & Warka, 2020).

The Sunda Strait's significance as an alternative international shipping route, particularly for East Asian merchant vessels en route to the Indian Ocean, is evidenced by the high volume of maritime traffic. While the Malacca Strait remains the primary route, various factors contribute to selecting the Sunda Strait (and Lombok Strait) as alternative passages. These three straits have become vital and strategic maritime corridors, especially for Vietnam, the Philippines, Hong Kong, Taiwan, China, Korea, and Japan (Mawaddah, 2021). This situation presents multifaceted challenges for the Indonesian government, encompassing transportation safety, maritime security, state sovereignty, and environmental concerns. Concurrently, the Sunda Strait serves as a crucial national shipping route, particularly for Java-Sumatra ferry crossings. In 2018, 69,974 passenger and



cargo ferry transits were recorded between Merak and Bakauheni ports (Utama, 2020). Moreover, the Ministry of Transportation reports an annual average of approximately 53,068 vessel transits in the Sunda Strait (Ministry of Transportation, 2022). These data underscore the strait's high traffic density, emphasizing the critical importance of safety considerations, especially in light of its designation as part of the Indonesian Archipelagic Sea Lanes (ALKI).

Maritime accidents in the Sunda Strait primarily involve vessel collisions. According to Lanal Banten (2016), notable incidents in 2014 included collisions between KMP Jatra III and MT. Soechi Chemical VII (January 28), KMP Portlink and Cargo FGA-138 (October 1), KMP Marinsa and MV. Qihang (May 3). A significant collision between KMP Bahuga Jaya and MT. Norgas Chatinka occurred on September 26, 2012. The strait's navigational hazards encompass narrow passages, coral reefs, shallow areas, and shipwrecks. The Koliot Reef, situated approximately 1 nautical mile northeast of the ALKI I axis near Sangiang Island, poses a significant threat to passing vessels, exacerbated by the absence of Navigation Aids (SBNP).

Dyan Pramana et al. (Sobaruddin, Armawi, & Martono, 2017) identify five risk categories associated with increased traffic in the Sunda Strait: safety, security, economic, environmental, and defense. These factors underscore the urgency and criticality of implementing the Traffic Separation Scheme (TSS). Aligning with Indonesia's World Maritime Axis vision, the government actively pursued international support for TSS approval in the ALKI Sunda and Lombok Straits from 2016, culminating in IMO ratification in 2019. Subsequently, the TSS was incorporated into Indonesian Sea Map number 170, issued by Pushidrosal and endorsed by the IMO as the official global maritime transportation route.

II. RESEARCH METHOD

The methodological framework of this study employs a comprehensive legal analysis to evaluate governmental policy implications regarding implementing the Traffic Separation Scheme (TSS) in the Sunda Strait. The research methodology incorporates primary data from the Directorate General of Sea Transportation within the Ministry of Transportation—the regulatory authority responsible for Sunda Strait TSS governance—and secondary data from an extensive literature review and relevant supplementary sources. This investigation adopts a descriptive-analytical research design, transcending mere problem delineation to encompass a thorough examination of regulatory frameworks pertaining to TSS execution in the Sunda Strait. Through this dual approach of empirical data collection and regulatory analysis, the study aims to provide a nuanced understanding of TSS implementation's legal and practical challenges.

III. FINDING

The Sunda Strait constitutes a critical maritime passageway connecting the Java Sea and the Indian Ocean, geographically delineating the islands of Sumatra and Java. The strait's northern boundary is demarcated by coordinates linking Tanjung Sumur Batu (5°50'S, 105°47'E) along Sumatra's southern coast to Tanjung Pujut (5°53'S, 105°02'E) on Java's northwestern shoreline, while its southern perimeter extends from Tanjung Guha Kolak (6°50'S, 105°15'E) on Java's southwestern coast to Tanjung Cuku Balimbing (5°56'S, 105°33'E) on Sumatra's southern coastline. As an integral component of Indonesian Archipelagic Sea Lane I (ALKI I), the Sunda Strait serves as a vital maritime corridor, facilitating Sea Lanes of Communication (SLOC) and Sea Lines of Oil Trade (SLOT) for both military vessels and commercial maritime traffic. The strategic significance of this waterway is underscored by its position within Indonesia's tripartite system of archipelagic sea lanes—encompassing the Malacca, Sunda, and Lombok Straits—which were established to ensure expeditious and unimpeded international navigation through the Indonesian archipelagic waters.

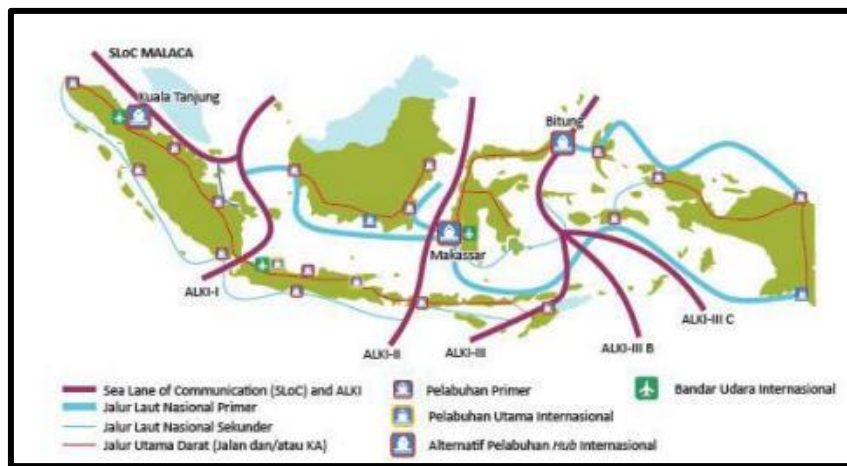


Figure 1: The Sea Passage of the Indonesian Archipelago

With the narrow width and heavy traffic in the Sunda Strait, regulations on the Traffic Separation Scheme were submitted to the IMO and approved in 2019. TSS was created to standardize the direction of ships in a channel. This is usually applied in waters with heavy traffic and aims to reduce the risk of ship collisions. The implementation of TSS in narrow and busy lanes is a policy used by the IMO since 1956 after the Andrea Doria collision and the grounding of the Torrey Canyon ship in 1967, as well as the collision of a large ship in the Dovers Strait in 1971 (Fadli, Rustam, & Munir, 2021). The implementation of TSS has been proven to reduce the accident rate in the Dover Strait since it was first implemented in 1956-1960 (60 collisions occurred), decreasing to only 16 collisions in the period 1960-1980. The Indonesian government has established the TSS that the IMO has recognized through the Ministry of Transportation by issuing the Decree of the Minister of Transportation KM. Number 129 of 2020 concerning the Determination of the Route System in the Lombok Strait and KM. Number 130 of 2020 concerning the Determination of the Route System in the Sunda Strait. In the KM, it is generally stipulated as follows:

- All ships sailing in areas using TSS must follow the TSS rules (unless otherwise stated). TSS is regulated by regulations issued by IMO called COLREG 1972 (International Regulations for Preventing Collisions at Sea) in Rule 10: Traffic Separation Scheme.
- Vessels sailing in TSS must comply with the provisions of rule 10 of COLREGs 1972 concerning TSS, namely:
 - a. Sailing in the direction of the appropriate traffic lane,
 - b. Staying away from the separation line/zone,
 - c. Entering/leaving the lane at the end of the lane,
 - d. Avoiding cutting traffic lanes,
 - e. Avoiding anchoring,
 - f. Avoiding fishing

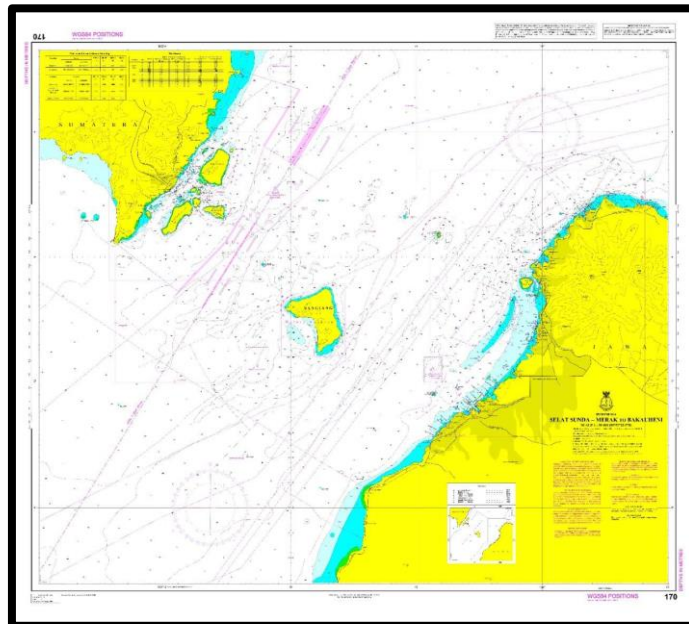


Figure 2 TSS in ALKI Sunda Strait

TSS in the Sunda Strait and Lombok Strait came into effect simultaneously in July 2020, involving the Ministry of Transportation, the Indonesian Navy, and other stakeholders as implementers and supporters. To implement the KM, the government has prepared various monitoring devices equipped with sophisticated technology. The monitoring is carried out so that the TSS is complied with by all ships crossing the Sunda Strait, both domestic and international ships. During the two years that the TSS has been implemented in the Sunda Strait, various parties have begun to feel the positive impacts. Based on observations seen on <https://www.marinetraffic.com>, the situation in the Sunda Strait is more orderly. Since the implementation of the TSS, ships have begun to comply and pass through the lanes in accordance with the TSS regulations in the Sunda Strait as stipulated in the Decree of the Minister of Transportation Number KM 130 of 2020 concerning the Determination of the Sunda Strait Route System. This is in line with the opinion of Muhammad Fadli et al. (Fadli, Rustam, & Munir, 2021) that TSS is relevant in responding to challenges related to Indonesia's legitimacy as a maritime nation and Indonesia's role in securing its maritime territory, while also carrying out the mandate of UNCLOS which has been ratified, one of which is the obligation to provide safe sea lanes for international shipping. TSS is one of several policies implemented

by the Indonesian government to realize the vision of the World Maritime Axis, strengthening Indonesia's legitimacy and bargaining position in the international world.

KM. Number 130 of 2020, there are points of regulation for ships sailing in the Sunda Strait in accordance with the TSS. These regulations are very detailed and technical. Some examples are listed below: The regulatory framework stipulates specific navigational protocols for vessels operating within the Traffic Separation Scheme (TSS). These protocols mandate that vessels engaged in lateral crossing, entry, or exit maneuvers are prohibited from penetrating separation zones or traversing separation lines, with exceptions granted solely for emergencies involving imminent danger or authorized fishing activities. The regulations emphasize heightened vigilance for vessels navigating near TSS termination points and discourage anchoring within the scheme or its peripheral areas. Furthermore, vessels not actively utilizing the TSS are required to maintain the maximum possible distance from the designated lanes, while fishing vessels are explicitly prohibited from impeding the progress of vessels adhering to prescribed traffic lanes. These detailed operational guidelines reflect a comprehensive approach to maritime traffic management, prioritizing navigational safety and operational efficiency within the confined waters of the Sunda Strait.

Ships that are less than 20 m (twenty meters) in length or sailing ships must not obstruct the safe passage of power-driven vessels that are following the traffic lane;

This Ministerial Decree also includes regulations for reporting ships before, during, and after crossing the Sunda Strait. The regulations are quite detailed, as quoted below.

Navigation Reporting and Information System

- Mandatory reporting protocols are enforced within the Sunda Strait Traffic Separation Scheme (TSS) for all vessels registered under Indonesian jurisdiction traversing the Precautionary Area.
- Vessels of foreign registry are strongly encouraged to participate in the Sunda Strait Reporting System (SUNDAREP) when navigating the designated Traffic Separation Scheme.
- Maritime communications within the Sunda Strait must adhere to concise, comprehensible protocols via VHF Radio channels 22 or 68, utilizing the call sign "VTS Merak." All vessels transiting the TSS are obligated to maintain continuous radio watch.
- To optimize traffic management efficiency and enhance both navigational safety and marine environmental protection, vessels intending to transit the Sunda Strait TSS are strongly advised to provide advance notification of their dimensions in both ballast and laden conditions, including the presence of any hazardous or toxic cargo as defined by pertinent international conventions.
- It is recommended that all vessels navigating the Sunda Strait utilize the information disseminated by VTS Merak, which provides Information Navigation Service (INS) and Navigational Assistance Service (NAS). Vessels should maintain proper radio watch in accordance with established maritime safety and environmental protection protocols.

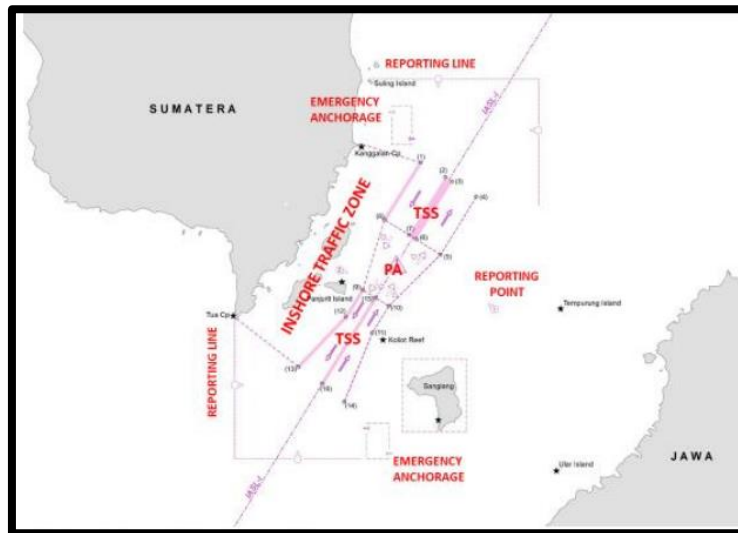


Figure 3: TSS Reporting Points in ALKI Sunda Strait (Source: Directorate General of Hubla Ministry of Transportation)

However, the level of compliance of shipping actors in the Sunda Strait TSS is quite low and does not comply with KM. Number 130/2020. This can be seen from the still high number of violations that occur. The number of ships violating the Sunda Strait TSS regulations fluctuates and does not show significant progress. This can be seen from the data from the Directorate General of Sea Transportation, Ministry of Transportation, since the TSS came into effect from July 2020 to March 2022. The data is attached below.

DATA TRAFFIC NOT USE TSS / EAST SANGIANG												
2020	JULI	AGUST	SEP	OKT	NOV	DES						
	195	43	114	106	84	78						
2021	JAN	FEB	MAR	APR	MEI	JUN	JUL	AGUST	SEP	OKT	NOV	DES
	88	61	70	67	73	106	69	122	124	104	102	118
2022	JAN	FEB	MAR									
	180	113	133									

Figure 4: Data on the number of violations of the Sunda Strait TSS (Source: Directorate General of Hubla of the Ministry of Transportation)

Analysis of the empirical data indicates a high frequency of Traffic Separation Scheme (TSS) violations in the Sunda Strait, occurring at an average rate of 60 incidents per month, or approximately two daily infractions. Notably, the period from August 2021 to March 2022 demonstrated an elevated incidence rate exceeding 100 violations monthly, translating to three to four daily occurrences. These findings are corroborated by observational data from the Indonesian Navy's Hydrology and Oceanography Center (Pushidrosal), which monitors maritime traffic patterns in the region. Specific documented incidents include violations by the US-flagged vessel Ortolan Alpha Strait on April 25, 2022, and the Crown Vision vessel en route to Singapore on April 28, 2022. Both vessels deviated from designated TSS routes, traversing the eastern sector of the Sunda Strait (visual reference provided). Such navigational non-compliance poses significant risks to maritime safety and traffic management in this crucial waterway.

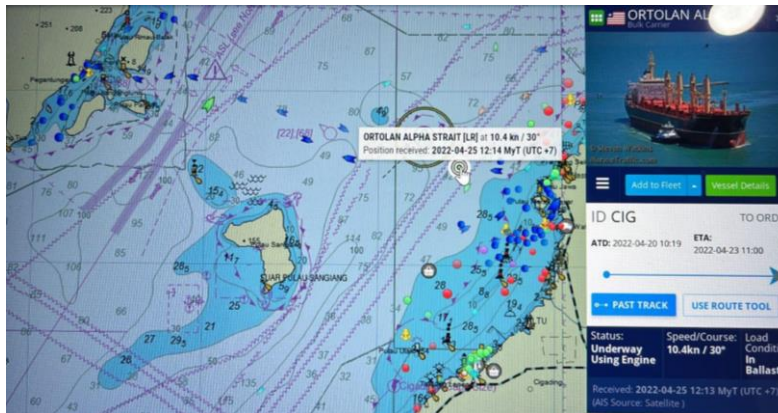


Figure 5: Data on ship violations against TSS in the Sunda Strait on April 25, 2022

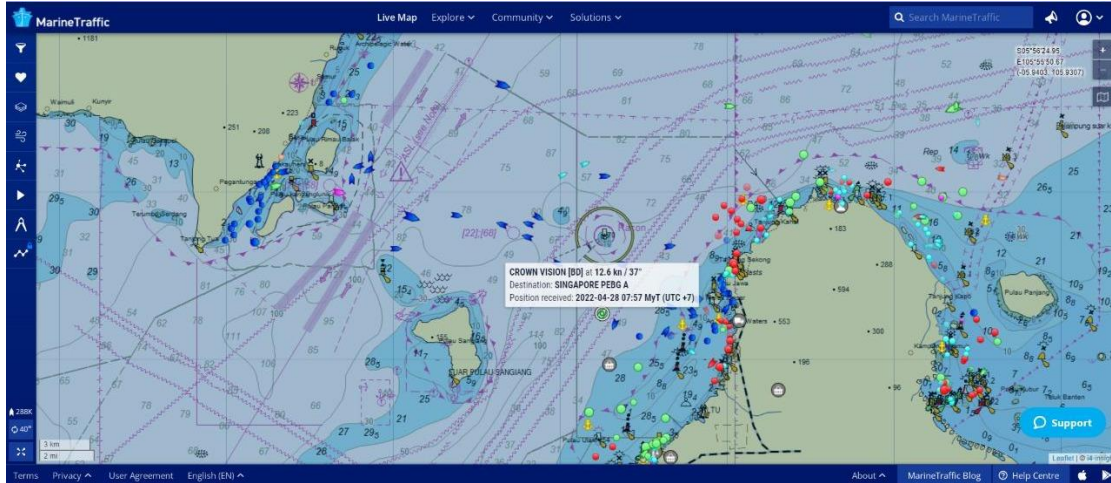


Figure 6: Data on ship violations against TSS in the Sunda Strait on April 25, 2022

Regulation KM Number 130/2020 exhibits a notable absence of punitive provisions encompassing criminal, civil, or administrative sanctions for regulatory non-compliance. This limitation is consistent with Article 15, paragraph (1) of Law Number 12 of 2011 on Legislative Formation, which explicitly restricts the inclusion of sanctioning provisions to three specific legislative instruments:

- a. National Law;
- b. Provincial Regulations; or
- c. Regency/City Regulations.

The aforementioned hierarchical constraint precludes incorporating sanctions in ministerial-level decrees, including KM 130/2020.

This analysis employs the Legal Effectiveness theoretical framework developed by Anthony Allott, a distinguished legal scholar from the University of London (Cahyaningsih, 2020). Allott posits that law primarily regulates societal behavior by establishing permissible and prohibited actions implemented via institutional frameworks and regulatory processes. According to this theoretical perspective, legal efficacy is achieved when the existence and application of legislation successfully deter undesirable conduct. Allott identifies the absence of supporting mechanisms—such as implementing regulations, institutional frameworks, or procedural guidelines—as a critical factor contributing to regulatory ineffectiveness. The efficacy of legislative implementation is intrinsically linked to robust enforcement mechanisms. These mechanisms typically manifest through a tripartite sanctions system: criminal, civil, and administrative. Setiadi (2009) delineates the typology of administrative sanctions as follows:

- a. Verbal admonition;
- b. Written admonition;
- c. Governmental coercive measures (bestuursdwang/politie dwang);
- d. Revocation of favorable determinations;
- e. Pecuniary penalties;
- f. Imposition of coercive monetary measures (dwangsom).

Law Number 12/2011 further expands the scope of administrative sanctions to encompass permit revocation, organizational dissolution, regulatory oversight, temporary cessation of operations, financial penalties, and the application of police enforcement authority. In the civil domain, sanctions primarily manifest as compensatory measures (UURI, 2011).

Utrecht conceptualizes sanctions as consequential outcomes or responsive actions, whether initiated by individuals or societal institutions, to human conduct (Utrecht, 1992). Amnesty International offers a complementary definition: "Sanctions encompass all actions, including legal and disciplinary measures, that constitute negative responses to undesirable behavior" (Amnesty International, 2022). Asshiddiqie (2022) contextualizes law enforcement within a broader framework, characterizing it as the operationalization of legal norms in practical contexts, serving as behavioral guidelines in societal and governmental juridical interactions.

The efficacy of KM. 130/2020, promulgated by the Ministry of Transportation, is significantly constrained by the absence of explicit sanctioning provisions within its framework. The regulatory instrument merely references external

legislation, such as the Law on Shipping, with enforcement delegated to the Directorate General of Sea Transportation. Applying Allot's theoretical framework, this legislative limitation substantially impedes the regulation's capacity to effectively govern maritime traffic in the Sunda Strait. Empirical evidence spanning 2020-2022 demonstrates persistent and escalating instances of non-compliance despite the critical importance of adherence to Traffic Separation Scheme (TSS) protocols due to potentially severe consequences.

Comparative analysis of international practices reveals more robust enforcement mechanisms. A notable case study involves TSS Off Texel, Netherlands, where, on February 25, 2015, the vessel Tina contravened Rule 10c COLREGs during its transit to Denmark. The Maritime Disciplinary Court of the Netherlands imposed a two-week conditional suspension of navigation permits on the vessel's officers.

Historical precedents demonstrate the significant safety implications of TSS violations. Two illustrative cases merit examination:

- Dover Strait TSS (England): An unidentified vessel, detected by CNIS Radar, initiated physical contact with a cargo ship after deviating into opposing traffic lanes, constituting a violation of COLREG Traffic Separation Rule 10 (b) (i) as documented in Dover Strait Report No. 97016.
- Terschelling-German Bight TSS (Netherlands): On August 3, 2020, a collision occurred between the Belgian-flagged Z.575-Hein Senior and the Luxembourg-flagged MV Aceromar following a TSS violation. This incident was classified as a Serious Marine Casualty under IMO Resolution A.849(20).

The empirical evidence suggests that implementing administrative sanctions in various Traffic Separation Schemes (TSS) has demonstrably enhanced navigational safety and mitigated collision risks. This observation necessitates a comprehensive regulatory review of the Sunda Strait TSS implementation framework to ensure alignment with its foundational objectives: accident prevention, environmental protection, and defense and security risk mitigation. Such regulatory refinement would aim to establish protocols for domestic and international vessels to adhere to proper navigational practices (safety of navigation).

The regulatory framework requires careful consideration of mechanisms to ensure foreign vessel compliance with national regulations despite the current lacuna in international maritime law regarding this aspect. Enhanced regulatory provisions for the Sunda Strait TSS could potentially elevate compliance levels, thereby establishing this Indonesian Archipelagic Sea Lane (ALKI) as a secure maritime corridor for international navigation. This outcome would substantively contribute to Indonesia's strategic vision of establishing itself as a Global Maritime Fulcrum.

IV. CONCLUSION

From the above explanation, it can be concluded that:

1. The implementation of TSS in the Sunda Strait has not been effective, as evidenced by the still high number of violations of ships passing through the TSS that have not been determined. The violations occur almost daily and do not show a downward trend.
2. Violations of the implementation of TSS in the Sunda Strait can be suspected because of the absence of sanctions given to violators in KM. 130/2020, as the legal basis for the implementation of the Sunda Strait TSS, does not include clear sanctions for violators. Based on comparisons in other countries, the implementation of sanctions is very effective in increasing compliance of TSS traffic actors.
3. Therefore, it is recommended that the government review the regulations for the implementation of the Sunda Strait TSS by including clearer and more detailed sanctions for violators. Of course, the inclusion of these sanctions must be in accordance with the regulations for the formation of legislation in Indonesia and in accordance with international law.

Interest Conflicts

The author(s) declare(s) that there is no conflict of interest concerning the publishing of this paper," authors should write if there isn't one.

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