

On the Establishment of Particularly Sensitive Sea Area (PSSA) in the Strait for the Prevention of Vessel-sourced Pollution

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Keywords: the Strait; PSSA; Vessel-sourced Pollution

Abstract. Considering the particular physical geography and shipping status of the Strait, it is urgent to strengthen the management of maritime traffic, of which the establishment of PSSA and implementation of relevant management practices is an effective means for the prevention of marine accident and marine pollution. The Strait, which satisfies the requirements and a series of standards and procedures set by IMO for the establishment of PSSA, makes it possible to apply for various traffic management measures including traffic separation schemes - the traffic separation schemes would regulate ship's navigation in the Strait; the establishment of evasion area or the adoption of compulsory pilotage in Taiwan shoals and the Penghu Islands would minimize adverse the ecological environment and ensure the safety navigation of the vessels; the speed up in the implementation or perfection of VTS and SRS or the effective monitor and information exchange of vessels would guarantee the implementation of traffic management measures feasible.

Introduction

As an important international channel, the Strait bears heavy traffic. Once the vessel pollution is caused, especially by the spilled oil, radioactive and other toxic substances, it will directly affect the marine ecosystems, fisheries production, tourism, etc., and its influence on navigation should not be underestimated. In view of this, China can consider to apply to International Maritime Organization (hereinafter referred to as IMO) for the establishment of a Particularly Sensitive Sea Area (hereinafter referred to as PSSA) in the Strait, take the Associated Protective Measures (hereinafter referred to as APM), an implement the special maritime traffic management measures to prevent pollution from marine accidents.

The Nature Characteristics of the Strait and Marine Pollution Accidents

The Nature Characteristics of the Strait. The Strait is located between Taiwan Province and Fujian province, which runs from northeast to southwest and about 370 kilometers from north to south and 130 to 410 kilometers from east to west.^[1]The complicated natural environment and rough sea conditions have a significant influence on the shipping and production activity within and around the Strait. The Strait is an important passageway for coastal areas and the world at large. It is an essential path for most marine trades between northeast Asia and southeast Asia as well as coastal countries around the Indian Ocean. In addition, routes between north-south ports of China and cross-strait direct shipping routes are also through here.

Marine Accidents and Pollution Accidents in the Strait. Accidents are frequent in the Strait because of its strong wind, high wave and densely covered islands and reefs. According to statistics, in the period from 1994 to 2004, 92 major accidents happened within the strait, and caused 82 sinking of ships, and 104 dead and missing of persons. 586 fishing vessel accident caused 269 sinking of ships, and 638 dead and missing.^[2]Between 1973 and 2007, a total of 8 cases which caused major oil spill occurred in the west side of the Strait. During almost the same time (1977-2008), a total of 5 cases

whose oil spills were more than 100 tons have occurred along the coast of Taiwan, the most serious case caused 15,000 tons of oil spill.^[3]

Establishment of PSSA in the Strait

A PSSA “is an area that needs special protection through action by IMO because of its significance for recognized ecological, socio-economic, or scientific attributes where such attributes may be vulnerable to damage by international shipping activities.”^[4] The establishment of PSSA in eligible area and implementation of specific navigation management measures would effectively reduce or prevent pollution caused by vessels or the damage to the ecosystem of the area.

The Criteria for the Establishment of PSSA. According to documents from IMO, the establishment of PSSA shall meet three criteria, i.e. ecological criteria, such as some crucial areas for survival of fish or endangered species; social, cultural and economic criteria, such as some particularly important areas for the traditional livelihood, food production and cultural resources of local people; scientific and educational criteria, such as an area that has high scientific interest. At least one of the criteria exists throughout the entire proposed area, though the same criterion need not be present throughout the entire area.^[5]

In addition, the area should be at risk from international shipping activities, which is represented in two aspects: one is vessel traffic characteristics, such as the amount or density of traffic, intersection of ship routes and routes for the carriage of hazardous and noxious substances; hydrographical, meteorological and oceanographic factors, for instance, the bottom topography, the direction and strength of wind and the flow of tide might add the risk of collision.^[6]

The Strait Compliance with the Establishment Criteria of PSSA. According to the aforementioned establishment criteria and factors concerned of PSSA, the Strait has met the requirements in ecology, society, culture and economy, and shipping. In the aspect of ecology, almost all kinds of ecotypes could be found in the Strait, and it is such ecological diversity that creates diversified species, of which not only ecosystems of estuary, beach land and coral reef, but pelagic ecosystem and deep sea ecosystem could be found in the area due to such various ecological environments. In the aspect of society, culture and economy, people of two sides of the Strait have made their living by fishing since ancient times, such as the residents settled on Penghu, Matsu, Pingtan and other islands, which makes it possible to see fisheries fill in the Strait and five major fisheries locate in the eastern, middle and southern of Fujian Province as well as shoals of Taiwan. Besides, the unique islands and human resources guarantee the high value for the exploitation of tourism. International shipping has a relative great impact on the Strait. The high ship traffic volume and complicated hydro-geological conditions and a large number of fishing vessels lead to more marine accidents in the Strait.^[7]

Cross-strait cooperation has not been placed on the agenda for a long time. However, both sides should push hard for cooperation in view of the urgent need in traffic safety and environmental protection. Relevant institutions on both sides of the Strait have good cooperation on search and rescue in Kinmen-Xiamen waters and Matsu-Mawei waters at present, which will provide guidance for promoting the coordination in the application of PSSA and marine traffic management.

Specific Waters Set as PSSA in the Strait. The application asks the entire Taiwan Strait to be set as PSSA, of which APM is conducted in defined special area. Generally speaking, the establishment of PSSA is only a platform which enables the implementation of special traffic management and enforcement measures taken in part of or the whole waters. That is to say, the establishment of PSSA itself will not directly regulate shipping, it only works and protect the defined area in real terms and influence the shipping via the implementation of APM.^[8] Therefore, it is easier to be approved to apply the whole Taiwan Strait as PSSA, but greater circumspection should be put in defining the waters with APM.

APM in the Strait Based on PSSA Rules

The coastal state is able to conduct APM, and a series of more strict shipping control measures than the rules in the United Nations Convention on the Law of the Sea (UNCLOS) can be taken after the approval of IMO to set specific waters as PSSA. To make sure of specific waters as PSSA and approve of the applicable APM in the area are two procedures that independent but related between each other.^[9] In fact, the PSSA system is a regulatory mechanism that consists of various protection measures, of which the adoption and application of APM should go through specific cases.^[10] Therefore, the key of establishing PSSA is the implementation of APM, which also lies in the purpose of states that able to conduct special measures on environmental protection and traffic management in specific area. These measures include the establishment of Traffic Separation Schemes(TSS), evasion area, mandatory reporting system, compulsory pilotage and anchorage-prohibited area.

Traffic Separation Schemes to Regulate Navigation in the Strait. TSS is used to regulate the traffic at busy waterway that is divided into defined area with separation lines or zones, regulating that ships navigating within a traffic separation schemes all sail in the same direction to avoid and reduce collision. TSS is one and the main form of ships' routing system regulated by IMO.^[11]

According to Article 22 (1) and 22 (2) of UNCLOS, coastal states have the right to ask foreign vessels sailing in territorial sea to follow TSS for controlling navigation of vessels if it is necessary for navigation safety. Therefore, both sides of the strait may adopt TSS for the navigation management within territorial waters of the Strait, and have the right to ask foreign vessels to sail in designated lanes to avoid shipping collision and protect environment in the Strait.

As for the EEZ of the Strait, TSS can also be adopted in accordance with Art.211 (1) and Art.211(5) and Art.221, i.e., measures may be taken beyond the territorial sea proportionate to the actual or threatened damage to protect the Strait from pollution or threat of pollution following maritime casualties. To this end, legislations, which conform to generally accepted international rules and standards established through the competent international organization, may be adopted for preventing, reduction and control of pollution from vessels in the EEZ of the Strait, and TSS is the rule and standard which is highly recommended by IMO. By 2010, IMO has approved 159 sites with TSS.^[12]

At present, the scope of vessel activities is mainly from the middle line of the Strait to coastal outlying islands of Fujian and Guangdong Province, the breadth of which reaches 28 to 34 nm except the south end of the Strait. Therefore, part of the waters in territorial sea and EEZ will be included in the waters under TSS when both sides of the strait take 12 sea miles as breadth of territorial sea. TSS adopted in such waterways should comply with IMO's relevant standards and agreed by IMO.. According to past experience of China, the application of TSS in territorial sea is generally submitted to IMO, and the establishment, modification and abolition of such TSS beyond territorial sea must be submitted and approved by IMO.

TSS and passage planning of the Strait are listed in the "Overall Plan for the National Ships' Routing in Coastal Areas" and "Overall Plan for the National Vessel Lines in Coastal Areas" published and executed by Ministry of Transport in 2011 and will be put into practice in ten years. In terms of passage planning, considering the current status concerning the waterborne traffic management, only sea routes close to the Mainland in the Strait become part of the planned area.

Establishing Evasion Area in Taiwan Shoal and Penghu Islands waters. The evasion area, which is an important part of the vessel traffic management system, is that authorities of a country with the purpose of achieving the safety of maritime navigation and protection of the marine environment establish an area that prohibits or limits the navigation of certain vessels in waters under the jurisdiction or (and) the high seas through ship's routing system.^[13] It helps to protect the maritime navigation and marine ecological environment. The application for establishment of evasion area should be submitted to the IMO by coastal states. Once approved, it comes into force for other contracting states and involved vessels.^[14] In accordance with IMO documents, the evasion area can

be established in the certain area where it is dangerous for navigation and significant to avoid ship accidents.^[15]

Taiwan Shoal and Penghu Islands are characterized by rich living marine resources and shallow waters. Once strong wind occurs, when vessels approach Taiwan Shoal and Penghu Islands waters, they are inclined to run aground and on the rocks to result in catastrophes. Meanwhile, large vessels crossing the shallow waters may disturb the marine organisms and damage the ecological environment. Therefore, from the perspective of navigation security and environmental protection, to establish evasion area in Taiwan Shoal and Penghu Islands waters is in line with the relative conventions and IMO's criteria.

Based on others' experience, China should pay attention to the following two aspects in the establishment of evasion area in Taiwan Shoal and Penghu Islands waters:

Firstly, the area should not be too large, or it will be rejected by IMO. In practice, IMO suggests that this treasure should suit a small area because putting large PSSA as area of evasion is contrary to the intention of the ships' routing system, that is to say, to manage navigation of vessels instead of banning them is its intention, and it is also an inappropriate limit on vessel's right of navigation.^[16]

Taiwan Shoal spans 250 kilometers from east to west, occupying most of the Strait. If all are established as area of evasion, it will deeply affect domestic and foreign ships which navigate in the Strait. The western part of Taiwan Shoal is deeper, navigation is relatively safe here and has a very limited influence on the marine organisms, so only a small area is necessary here. The key point is on the eastern part of Taiwan Shoal and the western part of the Penghu Islands waters.

Secondly, routes should be designated for light-tonnage vessels in order to reduce operating costs. Establishing evasion area doesn't mean that all ships should be banned. For the economic development along the coast, in general, small vessels can be allowed to navigate. In establishing area of evasion in Taiwan Shoal and Penghu Islands waters, ships' operating costs should also be considered. Under the scientific planning, routes should be opened up in the region for light-tonnage vessels or vessels with shallow draught,^[17] except for special vessels which carry oil or toxic or hazardous stuff.

As for establishing evasion area in Taiwan Shoal and Penghu Islands waters, it will not have a significant impact on shipping, because currently the main channel in the Strait is mainly located in the west side of the middle line of the Strait and there is only a small number of ships to navigate near Taiwan Shoal and the western part of Penghu Islands. Moreover, in view of current situation on management of Taiwan Shoal and the Penghu Islands, the application submitted to IMO should be based on the full negotiation between both sides, and the following information communication and coordination of vessel management should be ensured.

Adopt Compulsory Pilotage in Taiwan Shoal. Pilotage refers to that the professional personnel board the vessel to guide its direction, or guide the vessel into or out of the port, or change its position in the port.^[18] When entering a port, the foreign vessels must accept pilotage of harbor states. It is not only necessary to safety, but also a demonstration of sovereignty, and it is compulsory. However, with the international community's growing concern on the navigation safety and marine environment, the compulsory pilotage is no longer limited to the surrounding waters of the port. International laws stipulate that the coastal states can adopt compulsory pilotage in their jurisdiction waters, for example, establishing PSSA to apply this measure. In 1991, the first PSSA was approved by IMO, namely, establishing PSSA and adopting compulsory pilotage in Great Barrier Reef waters in Australia. The effect was quickly seen and the number of navigational accidents reduced from 1667 to 727.^[19] Three of the PSSA approved by IMO have applied the compulsory pilotage.

Given the larger width of the Taiwan Shoal, compulsory pilotage can be seen as the second best choice for the area of evasion. In other words, if the area of evasion is too large to be approved, for some waters like the deeper waters of the western part of Taiwan Shoal or waters between Taiwan Shoal and the Penghu Islands, compulsory pilotage can be an alternative for the choice of establishing area of evasion. The measure applies for vessels whose total length or draught exceeds a certain number, and all oil tankers, liquefied gas carriers and vessels carrying toxic or hazardous stuff. In this

way navigational accidents can be avoided as much as possible and the ecological environment security of Taiwan Shoal can be ensured.

Implementation of VTS and SRS in the Strait. For the effective implementation and enforcement of marine traffic management, it requires for effective monitoring ships to keep track of vessel movements in real time so as to correct violations and render timely assistance. Therefore, it's necessary to implement vessel management system in the Strait, mainly including Vessel Traffic Services (hereinafter referred to as VTS) and Ship Reporting System (hereinafter referred to as SRS). VTS refers to a marine traffic monitoring and consulting system implemented by a competent authority, designed to improve the safety and efficiency of navigation as well as the protection of the marine environment. It is able to offer real-time vessel tracking, forward planning of vessel movements to arrange berthing/unberthing and operational management of traffic within the VTS area so as to improve navigation efficiency.^[20] Thus, VTS is not only a navigation management system, but also a service system with accurate traffic information in the VTS area to provide reports on the navigation environment, render navigation guidance and assistance under the purpose of traffic management.^[21] China has established VTS centers in many sea regions. VTS in the Strait was built in January 2012, which stretches across the north-south end of Fujian Province.^[22]

For improving the effectiveness of marine traffic management, the vessels are obliged to maintain adequate exchange of information with the management organization of coastal states. In other words, the competent authority keeps track of the vessels and provides environmental information for navigation. Meanwhile, it also receives information in relation to management and navigation from the vessels. SRS is a mechanism that vessels reports to the traffic management organization.

SRS is a system which focuses on providing information to the ship reporting center on navigation when vessels enter a certain area, following the appointed communication procedure and report format. By dint of wireless communications and other means, it's able to provide, collect and exchange information on vessel rescue, traffic control, pollution prevention and weather report. One of its targets is to standardize the vessels traffic management. SRS, generally affiliated with VTS, aims to collect the relevant parameters of the vessels, get in touch with the vessels and offer corresponding information service and navigational aid service at any time. Under such circumstance, ship reporting is mandatory for certain classes of ships, and they are obliged to report in accordance with the regulation.^[23]

To introduce the aforementioned two systems in the Strait would provide effective supervision to vessels on the observance of maritime traffic regulations. In addition, information on navigational guidance will be provided to vessels on a timely basis. The fact that oil tankers and ships carrying toxic or hazardous substances (like nuclear waste) can be kept under strict control lends greater significance to navigation security and prevention of pollution from marine perils.

Conclusions

To safeguard adequately navigation safety and the marine ecology in the Strait, it is sensible for China to apply for the establishment of PSSA in the Strait and put into effect diversified marine traffic management measures. As the international competent organization, IMO has provided a whole series of standards and procedures for the establishment of PSSA. The particular physical geography and shipping status therein qualify the Strait for the establishment of PSSA, and diversified marine traffic management measures, including TSS, are also potentially viable. First, the practice of TSS will regulate navigation in the Straits. Second, establishment of area of evasion or adoption of compulsory pilotage in Taiwan shoal and the Penghu Islands waters will minimize adverse impacts on the ecology and ensure the navigation safety. Finally, prompt implementation or perfection of VTS and SRS for the effective supervision over vessels and information exchange would ensure the effective implementation of traffic management measures.

References

- [1] “The Taiwan Strait”, [http://www.baike.com/wiki/the Strait](http://www.baike.com/wiki/the%20Strait) March.2, 2016.
- [2] Weng Yuezhong, Zhang Shougui. “Research on Plan and Design of Ship’s Routing in The Strait”, *Navigation of China*, Vol.2, 2006.
- [3] Zhang Guodong, etc. “Risks and Countermeasures of the Oil Pollution Accidents in the Strait”, Proceedings of seminar on cross-strait Emergency planning for Marine Oil Pollution, held in Kinmen University, November 2009.
- [4] Paragraph 1.2, IMO Resolution A.982(24), Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, 2005.
- [5] *Ibid.*, Paragraph 4.4.
- [6] Han Wen. “Development of PSSA and Legal Reflections on the Establishment of PSSA in the Strait” (Master Thesis), Xiamen University, 2010, P5.
- [7] *Ibid.*, P16-18.
- [8] Julian. Roberts, *Marine Environment Protection and Biodiversity Conservation: The Application and Future Development of the IMO’s Particularly Sensitive Sea Area Concept* [M]. Berlin: Springer-Verlag Berlin Heidelberg, 2007. 85.
- [9] Guan Song. “Study on Coordination Mechanism in the Conflicts on Navigation Rights and Sea Jurisdiction of the Disputed Maritime Area” (Doctor Thesis), Xiamen University, 2012, P115.
- [10] Markus.J.Kachel, *Particularly Sensitive Sea Areas: The IMO’s Role in Protecting Vulnerable Marine Areas* [M]. Berlin Heidelberg: Springer-Verlag, 2008. P156.
- [11] Ships’ Routing system is a scheme that designates the lines, routes or sailing lanes of certain vessels in some areas with the aim to ensure the navigation safety in vessel-convergent regions, areas with busy traffic and waters with restricted water area or poor weather conditions, avoid or decrease the adverse impact of pollution or other dangers that caused by collision, grounding or anchoring of vessels in or adjacent environmental sensitive areas. See “Overall Plan for the National Ships’ Routing in Coastal Areas”.
- [12] See “Overall Plan for the National Ships’ Routing in Coastal Areas”.
- [13] Li Zhiwen, Ma Jinxing. “On Legal Problems of Establishing Area to be Avoided in Waterways within the ‘Dotted Line’ of South China Sea”, *Social Science Front*, Vol.9, 2014.
- [14] *Ibid.*
- [15] Paragraph 2.1.12, IMO Resolution A.572(14), General Provisions on Ship’s Routing, 1985.
- [16] *Supra* note 10, P193.
- [17] *Supra* note 6, P29-30.
- [18] Yang Jinglei, Hou Mengya. “Evolution and Inspiration of Compulsory Pilotage Scheme in China”, *Port Economy*. Vol.7, 2012.
- [19] Paragraph 5.2, IMO NAV 50/3, Torres Strait PSSA Associated Protective Measure-Compulsory Pilotage, 2004.
- [20] *Supra* note 13.
- [21] “Vessel Traffic Management and Ship Report System”, <http://www.docin.com/p-342826076.html>, 2016-2-25.

[22] “Successful Completion of Acceptance of VTS Projects in the Strait/ Meizhou Bay”, <http://www.fjmsa.gov.cn/data/html/hsjwwwz/2012-01-09/480762.html>, 2016-2-24。

[23]Supra note 21.