

Collision Safety in the Malacca Straits and Singapore Waters

Introduction

The Malacca and Singapore Straits are the primary routes for vessels plying their trade between the Far East, the oil rich states in the Middle East and all the way to Europe. Currently, the Straits of Malacca and Singapore bear more than 100,000 vessel movements per year. When cross-straits ferry and other local traffic are included, the total exceeds 500 vessel movements per day. The large number of ships sailing through these straits means more risk, especially when such ships are concentrated at chokepoints. Moreover, traffic in the Straits is predicted to double in the next ten years, making these Straits the most congested in the world.

Type of Vessel / Year	2009	2010	2011	2012	2013	*2014
VLCC / Deep Draft	4221	4333	4539	4732	4825	5225
Tanker Vessel	16398	16247	16233	17345	18296	19335
LNG Carrier	3330	3579	3830	4014	4248	4658
Cargo Vessel	8560	8445	7996	7950	7613	7126
Container Vessel	22310	24806	25552	24639	24658	24615
Bulk Carrier	11186	11642	10851	11678	12658	12695
Ro-Ro	2394	2624	2545	2980	2998	3194
Passenger Vessel	1250	1071	877	861	1063	1169
Livestock Carrier	43	45	47	38	55	31
Tug / Tow	598	545	414	529	563	855
Government Vessel	67	37	57	50	58	25
Fishing Vessel	61	20	20	52	27	135
Others	941	739	577	609	911	991
TOTAL	71359	74133	73538	75477	77973	80055

Data from STRAITREP records, Marine Department of Malaysia, Jan 2014

Volume of vessel increase

Source: Marine Department of Malaysia, Jan 2014

Importance

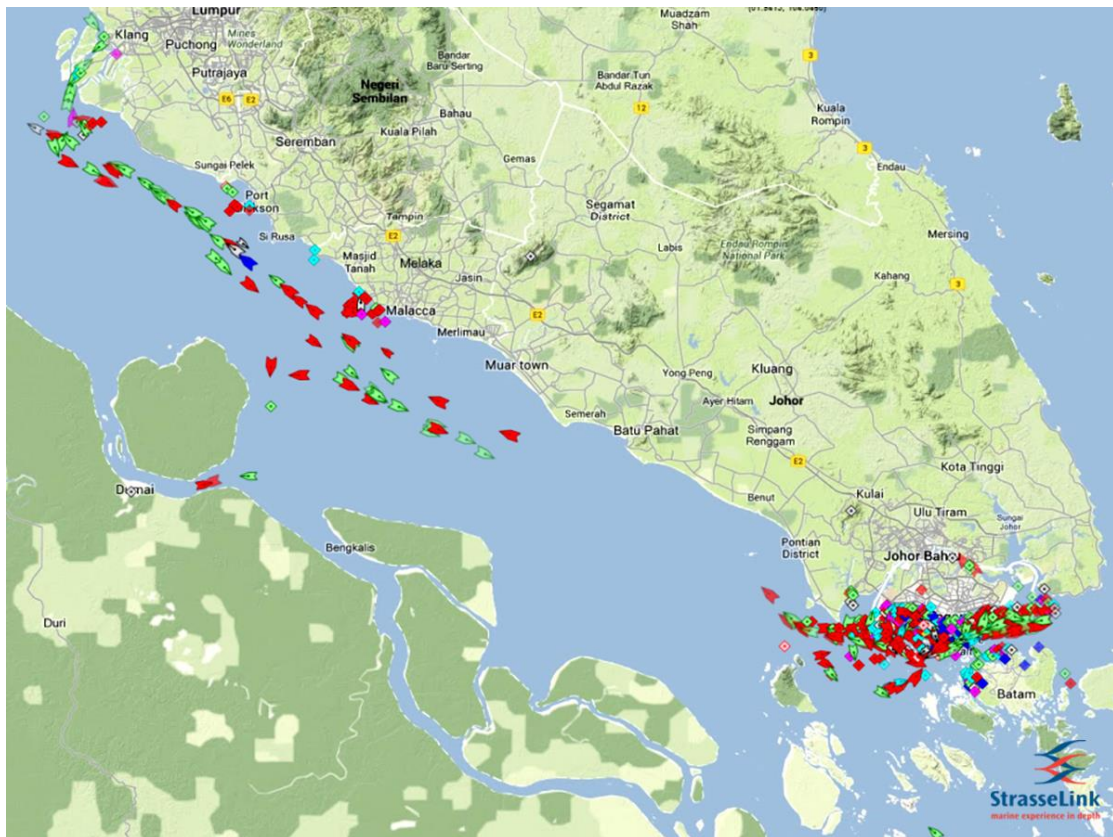
For centuries the straits have been the main shipping channel between the Indian Ocean and the Pacific Ocean. In 2011, hundreds of thousands of containers in thousands of box-ships crossed its waters carrying about one-quarter of the world's traded goods. In addition, approximately forty percent of all the oil carried by water goes through this area from the Middle East toward China, Japan, South Korea, and the Pacific Rim. The Malacca and Singapore Straits remain the key chokepoints of oil trade to and in Asia.

The importance and relevance of this area from geopolitical and geo-economic interests is wide and diverse. Moreover, in the last twenty years, all the major regional powers in the area have shown a special interest in protecting rights of passage through these waters.

Challenges

The route through the Straits of Malacca and Singapore is beset with challenges, natural and man-made.

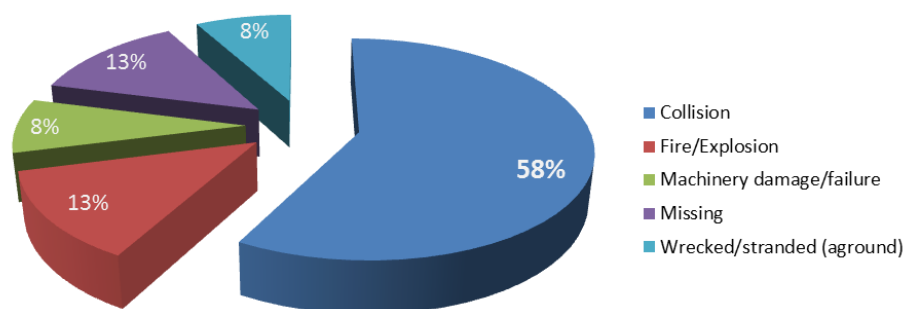
1. **Geography:** The most difficult stretch for navigation in the Straits of Malacca and Singapore is in areas spanned by the Traffic Separation Scheme (TSS) between One Fathom Bank off Port Klang (Malaysia) in the west and Horsburgh Lighthouse (Singapore) in the east. The TSS extends for 250 nautical miles and has six choke points where the average depth may be as little as 23 metres.
2. **Narrowness:** The Strait's narrowness of as little as less than 2 nautical miles creates one of the most important traffic choke points in the world. Due to the strait's shallow waters (at 25 meters or 82 feet in many areas) the passage of larger oil tankers currently takes place in the Lombok, Makassar, Sibutu and Mindoro Straits.
3. **Traffic:** The high shipping traffic coupled with the narrowness of the Straits make for navigational hazards. The narrowest breadth along the Strait of Singapore is off the southern tip at Phillips Channel, where it is about 1.96 nautical miles. The Straits of Malacca and Singapore also accommodate cross-strait traffic or coastal shipping, particularly in the TSS area. Since 2008, the steady increase of coastal shipping has been identified as one of the impediments to safe navigation through traffic.



AIS grab showing average no. of vessel passing through Malacca Strait

Source: Strasselink Marine Consultancy

4. **Weather:** The region is subject to frequent rain and squalls, and strong currents can be experienced during the transit through the Straits. During squalls and haze, visibility can decrease considerably making it difficult for mariners to navigate their vessels.
5. **Visibility:** Haze caused by forest and bush fires in Sumatra has also compromised safe navigation through these waterways and it remains a threat to mariners until today. The haze caused by forest and plantation fires could at times severely affect visibility, in the past forcing Malaysia to issue a hazard warning for ships sailing in the Straits of Malacca.
6. **Piracy:** Piracy and sea robbery activities also complicate navigation, though since 2006 the number of sea robbery incidents has gone down due to effective security measures by the littoral States, such as the coordinated naval patrols by Indonesia, Malaysia and Singapore. However, we have recently witnessed piracy activities resurfacing especially in the vicinity of Nipa anchorage off Indonesia, as well as reporting hijackings and cargo theft.
7. **Human error:** Human error is a significant form of navigational hazard in the Straits. The tighter sailing schedules and shorter turnaround times in ports have contributed to the increasing risk of crew fatigue and stress experienced by crew members.
8. **Groundings:** Groundings have also been a regular cause of accidents along the Straits. With the shallows along the Singapore Straits being most notorious for groundings, some ships also got stuck while navigating along the stretches of the Malacca Straits.
9. **Other hazards:** Other navigational hazards in the Straits include ship wrecks, small islands, isles and shoals in the south-eastern exit of the Strait of Singapore and potentially unreliable aids to navigation, especially in the Indonesian portion of the Straits.



Key Points

1. Around **300 vessels** pass through the Straits daily
2. Annual throughput of approximately **100,000 ships**
3. Carry **80% of the oil** transported to Northeast Asia
4. Carry 1/3 of the world's traded goods
5. At Phillips Channel, the straits narrows to 2.8 kilometres wide with **2.1 kilometres** in the shipping waterways
6. Creates one of the world's **traffic chokepoints**

Data from Global Integrated Shipping Information System (GISIS)

Statistics of accidents in the Malacca / Singapore Straits

Main Causes of Accidents

Accidents in the Straits involve collisions, contacts, foundering, strandings, fires, engine troubles, bilgings and leakages. An analysis of the types of vessels involved in a maritime casualty indicates that the risk of an accident can involve almost every type of ship plying the Malacca and Singapore Straits.

The situation is serious, considering the extent of the casualties, many of which result in loss of lives, pollution damage and loss of earnings for those whose livelihood depends on the Straits, as well as significant wreck removal projects.

The risks posed by smaller crafts moving in the Straits must not be underestimated. Large ships have got into serious trouble and even sunk after colliding with such crafts. Fire, explosions and pollution, too, have resulted from accidents between small and large ships.

The main causes of accidents in the area are:

1. **Human error and poor judgment:** Following three incidents resulting in oil spills, the Maritime and Port Authority of Singapore (MPA) conducted an investigation into the cause of the accidents. The main cause of the three collisions was found to be human error and poor judgment. There was found to be a lack of situational awareness of personnel on the bridge.
2. **Non-observance of rules:** The human element is the most important factor. Compliance with international safety standards and procedures has not been sufficient and has caused a situation which can best be described as “an accident waiting to happen”. The implication of this is that not all users of waterways may be maintaining the vigilance that is expected when navigating in straits.
3. **Inadequate use of collision prevention aids:** The MPA in its investigation has also found that equipment such as the Automatic Identification System (AIS), Automatic Radar Plotting Aid (ARPA), and Electronic Chart Display and Information System (ECDIS) is not being used properly or effectively by the bridge teams to avoid collisions.
4. **Navigational hazards:** Safety of navigation is one of the main challenges in the Straits. The safety of navigation is threatened mainly by navigational hazards and accidents, and occasional security threats as well. Despite vessels being installed with modern navigational aids and assisted by Vessel Traffic information systems, the Straits are still considered an accident-prone waterway. Apart from direct risk to lives and property, accidents can threaten the Straits eco-system, particularly if there are cargo and oil spills close to major fishing grounds and tourist beaches.
5. **Mechanical problems:** Ships that are either not properly maintained or are under way while suffering mechanical problems contribute to the risk of accidents. A power or steering failure while in busy or challenging waters can quickly turn into a serious situation.
6. **Traffic:** The most difficult waters of the Straits lie between Horsburgh Lighthouse and One Fathom Bank Lighthouse, a distance of some 217 miles. The remaining 500 miles have a more open sea environment. Since Masters are free (within rules and TSS) to plot their own course, the obvious tendency is to elect for the shortest route. This in turn will result in many ships drawing the same

courses which cause them to meet when overtaking within the narrow confines of the fairway. Although the introduction of Traffic Separation Schemes (TSS) had helped significantly in the regulation of traffic, with the various types of vessels going at different speeds and manned by crews exercising different standards, the risk of collision and grounding is still significant.

Recent Incidents

As the traffic volume grows, it is anticipated that the risk of accidents and pollution will increase too. Major and minor incidents in the Straits have been caused by accidents resulting from the constraints of the waterway or human error, including from failure to make correct situational assessments of developing situations. It is important to look at ways of reducing accidents from a proactive position rather than a reactive one.

Among the casualties that have taken place in the Malacca Straits, we highlight a few below:

1. B Oceania and Xin Tai Hai

In 2011, two large ships - MV B Oceania and Xin Tai Hai - en route to China collided 8 nautical miles southwest of Pulau Pisang, resulting in the sinking of the MV B Oceania. The MV B Oceania was reported to have experienced a failure of both generators, resulting in a complete loss of power. She started to lose speed and was unable to alter her course, drifting to starboard. Unable to avoid the MV B Oceania, the two vessels collided. In the early hours of 30th July 2011, the MV B Oceania sank, fortunately shortly afterwards all 23 crewmen were rescued by a passing container ship, the MV Ikaruga. The resulting wreck removal of the vessel turned in to a pool claim for both P&I Clubs of the two respective vessels.



Accident between MV Xin Tai Hai and B Oceania

2. NYK Themis and AZ Fuzhou

Towards the end of 2013, a Panama-flagged containership, "NYK Themis", collided into a barge "AZ Fuzhou", at East Keppel Fairway.

3. Hammonia Thracium and Zoey

In the same month, a Singapore departing Liberia-flagged containership "Hammonia Thracium" and the Panama-flagged chemical tanker "Zoey" also collided in the Singapore Strait, off Sebarok Island.

4. Al Gharrafa and Hanjin

The most recent high-profile and serious collision occurred late last year occurred between the Q-Flex LNG carrier Al Gharrafa, and boxes-hip Hanjin Italy between Batam Island and Singapore.



Accident between Hanjin and the Al Gharrafa

Practical Loss Prevention Advice

1. **Undertake proper voyage planning:** The commitment to proper voyage planning is critical in ensuring the success and safety of the vessel on the intended voyage. Passage planning basically consists of four stages: appraisal, planning, execution, and monitoring. Care and commitment must be exercised in every stage of the plan so that there is no chain of events that could lead to a mishap. Enhancing communication and information sharing between Masters and Pilots is also vital to preventing incidents.
2. **Instil a strong safety culture on board:** The Master and crew should be well-aware of the challenges they may face when passing the area. There should also be a strong safety management framework instituted on board to prevent accidents.
3. **Ensure crew are qualified and trained:** The basis of preventing maritime casualties and pollution of the sea is that ships must not only be properly designed, constructed, equipped and maintained; but must also be operated by an adequate number of qualified officers and trained crews.
4. **Ensure crew are not stressed or tired:** It is well recognised that the human element is a significant factor in a number of maritime casualties. In order to prevent human error becoming the contributing factor to an incident, Ship Owners and Masters should be mindful of stress and fatigue

management. Officers and Crew should not be subjected to long hours of watch-keeping beyond permissible limits under SCTW 2010 or the MLC 2006, which can lead to a degradation of human performance, a slowing down of physical and mental reflexes and an impairment of the ability to make rational judgements. This also applies to Masters of ships who may need to ensure they are available to being on the bridge during long Straits and river transits.

5. **Ensure adequate watch keeping:** Ships with few watch keepers, usually including the Master, when transiting the Strait will be challenged to ensure an effective bridge watch-keeping team. The demand of doubling the watch if required would cause their officers to work on very strenuous schedules. The situation is compounded for deep draft vessels whose navigation must be precise, more so when such vessels require staging in order to meet the “tidal window” at specified target time over areas of critical controlling depths. In situations like these, the vessel managers or charterers should look into available services which can provide assistance to the Master who would then have the opportunity to be rested and be mentally and physically fit to meet challenges when they arise.

How can a Marine Advisory Service Assist?

Recognising the importance in assisting deeply laden and sensitive vessels to safely navigate the narrow waterways of the Malacca and Singapore Straits, Capt. Fadzlon Ahmad, MD of StrasseLink, conducted a development study for Malacca Straits pilotage services back in 1999.

It was noted that the Straits Pilotage service could offer optimal professional support and nautical assistance for the captains who are not familiar with navigating in the constraint waters. The service would contribute to the overall navigational safety for all users in the Straits and also help in the protection of the environment of the littoral nations bordering the Malacca and Singapore Straits.

In line with IMO’s recommendation on fatigue management, StrasseLink’s pilotage assistance will:

- contribute to enhancing the safety of navigation of a vessel in the Malacca and Singapore Straits
- help the bridge team manage their resources more effectively to prevent fatigue of the team members
- provide the Master with the opportunity to consult the professional when in doubt
- be of extra value to the bridge management team where his professional skillset as a ship-handler will be most welcome in times of need
- provide a double check on the ships navigation system and proceed on the most optimum route by using independent state-of-the-art equipment and thereby saving bunkers and time to next port of call

With about a decade of experience, Strasselink provides safe, quick and reliable 24/7 service all year round. Being Class A1 pilots, StrasseLink’s pilots are well-experienced in handling all types of vessels including deep-draft VLCCs, LNG/C, FPSO, Oilrigs, semi-subs etc.

As a consultancy company, StrasseLink has been actively contributing local knowledge and expertise to enhance Witherby’s publications of the “Passage Planning Guide: Malacca and Singapore Straits”.

Capt. Fadzlon had been providing inputs and vetting both the 2011 and 2013 editions of this guide. This book serves as a comprehensive step-by-step guide for Masters of vessels transiting the Malacca / Singapore Straits.

More information can be obtained from StrasseLink's website : www.strasselink.com



Witherby's Passage Planning Guide

Additional information

In May 2014, a pamphlet on the safe passing in the Straits of Singapore and Malacca was officially launched at the 93rd session of the IMO Maritime Safety Committee. The pamphlet highlights the unique navigational considerations when passing through this area and the importance of adhering to the COLREGs in various situations.

The pamphlet provides useful information on:

1. collision prevention measures
2. night signals for vessels crossing the Traffic Separation Scheme in the Singapore Strait
3. local rules for ships transiting the Straits
4. advice on anchoring
5. climactic effects on navigation such as haze conditions and heavy rain

The pamphlet can be found on the Cooperative Mechanism website:

<http://www.cooperativemechanism.org.my/images/PDF/Publication/2014-Safe%20Passage%20Pamphlet.pdf>

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