#### CF 10/5/2/1

10<sup>th</sup> Cooperation Forum under the Cooperative Mechanism between the Littoral States and User of the Straits on Safety of Navigation and Environmental Protection in the Straits of Malacca and Singapore



# Technical Assessment on Designation of Ship's Routeing System in Indonesian Waters

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# **General introduction**

- Selat Lombok (Lombok Strait) and Selat Sunda (Sunda Strait) Straits are passed by domestic and international vessels and also crossed by ferry routes
- There are several areas designated as marine conservation area, marine protected area, marine nature and aquatic park in these straits
  - In recent years, there are several incidents involving vessels in Indonesian waters including water area in Lombok Strait and Sunda Strait that causing causalties to people as well as giving effect to environment.
- To assure the navigation safety in these straits, a ship's routeing systems are designed and assessed by mean of risk assessment.

# The strategic of Lombok Strait

- Indonesian Act No. 6, 1996 dan Government Regulation No. 37, 2002, where Lombok Strait is dedicated for Indonesian Archipelagic Sea Lanes (IASL) II
- Ministerial Decree of The Ministry of Marine Affairs and Fisheries of Indonesia No. 24/Kepmen-KP/2014 about The Seawater Area of Nusa Penida as a Marine Conservation Area
- Ministerial Decree of The Ministry of Marine Affairs and Fisheries of Indonesia No. 57/Kepmen-KP/2014 about Management Planning and Zonation of Aquatic Park of Pulau Gili Air, Gili Meno and Gili Trawangan
- Lombok Strait as a domestic and international sea lane and also crossed by ferries between Bali and Lombok



# The strategic of Sunda Strait

- Indonesian Act No. 6, 1996 and Government Regulation No. 37, 2002, where Sunda Strait is dedicated for Indonesian Archipelagic Sea Lanes (IASL) I
- Ministerial Decree of The Ministry of Forestry No. 55/Kpts-II/1993 about Determination of Sangiang Island as Marine Nature Park.
- There are two cluster of coral reefs namely Koliot Reefs and Gosal Reefs
- Sunda Strait as a domestic and international sea lane
- Sunda Strait also crossed by ferries between Java and Sumatera





Pulau Sangiang

# **Objectives**

To give information on the design of ship's routeing system in Indonesian waters especially in Selat Lombok (Lombok Strait) and Selat Sunda (Sunda Strait).





Data Collection and Analysis

Design Scenarios of Ship's Routeing

Hazard Identification

Risk Assessment

Proposed Ship's Routeing System



# **Consideration factors**

- Vessel size
- Vessel speed
- Local piloted ship control
- Channel cross section and alignment
- Current, wind, and wave height
- Navigation pattern
- Vessel traffic density
- Visibility



## Nusa Penida marine protected area





## Gili Matra Marine Park as marine protected area



## Marine traffic density in Lombok Strait (2016)



# Marine traffic density in Sunda Strait (2016)



#### IWRAP – mathematical software tool recommended by IALA



## Traffic modeling, shipping lane and environment modeling

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# **Risk assessment using IWRAP**

#### **IWRAP** Modeling



#### Ship's Routeing System Design



# Result of collision risk assessment of ship's routeing system in Lombok Strait



Colors depicted in each leg and way point shows the level of collision frequency. The darker color given in figure above, the higher the risk of collision in the leag and way point.

#### Summary of frequency of collision

Collision	Width of Shipping Lane						
(incident per year)	1 NMiles	2 NMiles	3 NMiles				
Crossing	0.00267	0.00267	0.00267				
Head On	0.03075	0.01537	0.01024				
Overtaking	0.01463	0.0073	0.00488				
Total Collision	0.04805	0.02534	0.01779				

According to analysis, the narrower the shipping lane, the higher potential of collision withing the shipping lane.

However, the analysis found that 1NMiles resulted the annual frequency of collision less than unity (=1), which is the risk due to ship collision is acceptable.

## Design of ship's routeing system in Lombok Strait



### Design of ship's routeing system in Sunda Strait



# Conclusion

- Risk assessment that conducted using IWRAP has several benefit such as:
  - It can calculate different types of grounding frequencies and ship-ship collision frequencies.
  - Several scenarios of collision can be simulated such as head-on collisions of meeting ships, over taking situation, and collisions due to crossing routes.
  - It also possible to assess the frequency of collision for vessels that not follow the formal routes such as fishing vessel and pleasure boats.
- The conducted risk assessment shows that the design of ship's routeing system both for Lombok and Sunda Straits will minimized the potential hazards (collision and grounding situation) in those areas.
- The design of ship's routeing system will be distributed to stakeholders in order to have further supports and valuable inputs.
- The design of ship's routeing system for Lombok and Sunda Straits will be submitted for IMO Meeting on Sub-Committee on Navigation, Communications and Search and Rescue (NCSR)19-23 February 2018.

# **Thank You for Kind Attention**