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2nd International Seminar on Ocean and Coastal Engineering, Environment and Natural Disaster Management, ISOCEEN 2014

The investigation of launching parameters on the motion pattern of freefall lifeboat using FSI analysis

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Abstract

The freefall lifeboats have been designed to be fast and reliable evacuation system. Once the occupants have gone onboard, the lifeboat is simply sliding from a skid before the freefall. Some second after the water impact, the propulsion system can be started and the lifeboat can sail away from parent vessel. During the launching process, trajectories of freefall lifeboats can be divided into such categories, depending on the headway and advance speed after water entry and surfacing of the lifeboats. The aim of the paper is investigating the influence of the launching parameters such as, sliding distance, angle of skid and the falling height on the motion pattern of the freefall lifeboats by using Fluid Structure Interaction (FSI) analysis. The fluid structure interaction analysis is simulated using penalty coupling algorithm. The fluid is treated on a fixed mesh using a Single Material Arbitrary Lagrangian Eulerian formulation and the lifeboat structure on a rigid shell element mesh using a Lagrangian formulation. The results of the numerical simulations provide the magnitude of launching parameters for safely launching of the freefall lifeboat.

Peer-review under responsibilty of the Department of Ocean Engineering, Institut Teknologi Sepuluh Nopember.
Keywords: Freefall Lifeboat; Motion Pattern; Launching Parameters

1. Introduction

The performance of the freefall lifeboats is affected by initial launching parameters, such as, length of the launch rail, angle of the launch skid and freefall height. These parameters interact to influence some factors such as: the

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Risk of Navigation for Marine Traffic in the Malacca Strait using AIS

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Abstract

The Malacca Strait experiences high-density vessel traffic, and therefore is a busy area with high potential for collisions. Analyses of marine traffic that reflect the real conditions of ship navigation are performed to enhance maritime traffic safety. An automatic identification system (AIS) allows for the accurate investigation of actual ship encounters, ship collisions, and sea traffic management systems. For this study, an AIS receiver installed at the Universiti Teknologi Malaysia (UTM) provided AIS data, which focused on a selected area in the Malacca Strait. The 1972 International Regulations for Preventing Collisions at Sea (COLREG) guided the assessment of navigation safety based on real conditions using AIS and geographic identification systems (GIS). Based on estimates of the probability and consequence indices from a risk matrix, the time and encounter conditions determined the level of risk. This study also conducted safety measurements. The analysis indicated that ship safety would improve significantly if the vessels followed the guidelines established in this study.

Keywords: Risk of navigation, Ship collision, Malacca Strait, AIS

1. Introduction

The Malacca Strait is a vital strategic region for seaborne trade. However, it is a high-risk area for navigation because collisions are a major safety concern in many seaports. To enhance navigational safety, the analysis of marine traffic safety in the Malacca Strait is crucial. The Malacca Strait is the longest strait in the world, used for international navigation. It has long been an important trade route linking the Indian Ocean to the South China Sea and the Pacific Ocean. The Malacca Strait is located between the east coast of Indonesia's Sumatra Island and the west coast of Peninsular Malaysia, and links with the Strait of Singapore at its southeast end. The Malacca Strait extends from its

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Modification of the Intact Stability Criteria to Assess the Ship Survivability from Capsizing

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Abstract

Assessment of ship survivability is a main requirement that must be satisfied before the ship is operated. Some assessments of ship survivability which has been applied by IMO such as Intact Stability and Damage Stability in calm water needs to be developed. Sometimes ships are operated in rough water with irregular waves, so the future criteria of ship stability should be associated with ship motion and capsizing in the waves. Ship capsizing is always correlated with non-linier ship motion. This paper discusses how to modify intact stability criteria to be righting lever arm on the calm water which can be used to assess ship survivability from capsizing in the waves using safe basin erosion method. The results shows that the modified IMO's Intact Stability Criteria can be considered as assesment of survival of ship capsizing. And the bilge keels have significat effect for improving the survivability of ship capsizing.

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Keywords: Ship Capsizing; Intact Stability Criteria; Safe Basin Erosion;

1. Introduction

Ship accident usually occur for not only one cause but many causes such as human error, fatigue machine, bad weather etc. Weather always change during ship operation; this is the reason why a ship must be prepared for the worst condition of weather. Bad weather should be main concern because it is usually a main cause of ship accidents. Weather prediction technology have been developed to ensure safety when the ship is operated. For example, satellites

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Development of Risk Based Collision (RBC) Model for Tanker Ship Using AIS data in the Malacca Straits

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Abstract

Analysis of ship collision is very important to establish in the field of maritime transport, especially in areas that have a high degree of risk. Strait of Malacca is international shipping that has a high degree of risk. In these areas, tankers have a high degree of probability of an accident. Based on AIS (Automatic Identification System), Tanker has seen the highest density of traffic volume density, reaching approximately 50% every day. In this paper, a risk analysis performed using the actual data from AIS. In this case, the value of the CPA (Closest Point Approach) and TCPA (Time to Closest Point Approach) obtained from AIS is used to generate the value of risk. After we know the value of a risk, it must be measures to avoid accidents ship on sea transportation. AIS data in this study were drawn from the AIS receiver that has been installed in Malaysia UTM.

Keywords: Ship Collision, Tanker, AIS, Malacca Strait.

1. Introduction

The Strait of Malacca is located between the east coast of Sumatra Island in Indonesia and the west coast of Peninsular Malaysia, and is linked with the Strait of Singapore at its south-east end. The Malacca Straits is a high-risk area for navigation. For centuries, concerns over safety in navigation have focused on issues of security, and the loss of lives and property. Currently of growing significance, is concern over environment protection. In the Malacca Straits, an examination of the casualty data between 1975 and 1995 shows that serious accidents have occurred in high-density traffic areas[1].

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