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Adam Weintrit, Editor-in-Chief

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Analysis of Effect of Pillars Position on Longitudinal Strength in Perintis Ship Structure Type 1200 GT

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ABSTRACT: Perintis ships are sea transportation highly relied upon by the people in remote, frontier, underdeveloped, and border islands, considering the absence of other types of vehicle operating in the area. Perintis Ships can carry up to 500 people and connect islands categorized as 3TP with larger ports. This ship will be analyzed in longitudinal strength with variations in pillar positions. The analysis results will be compared, and whether the research results allowed the BKI regulatory standards. The maximum stress value produced by the variation without pillars is 21.76 N/m2 in calm water conditions, 41.19 MPa in sagging conditions, and 10.67 MPa in hogging conditions. The variation of the pillars on the side is 21.95 MPa in calm water, 41.54 MPa in sagging conditions, and 10.76 MPa in hogging Conditions. The variation of the pillar in the middle obtained maximum stress 21.96 MPa in calm water conditions, 41.55 MPa in sagging conditions, and 10.77 MPa in hogging conditions. Of all the variations, it has met the criteria of the BKI regulations, where the allowable stress is not to exceed 140.14 MPa. From the analysis that has been done, it can be concluded that the position of the pillar laying does not significantly affect the longitudinal strength of the ship.

1 INTRODUCTION

Indonesia is a commodity for sea transportation where the economic sector through loading and unloading is done chiefly at sea because it is more efficient and cheaper as well as transportation from one island to another island, therefore the government has launched a program that can provide overall welfare to its people through shipbuilding programs. Perintis in several shipyards as a supporter of sea transportation commodities in Indonesia.

Perintis ships are one of the sea transportations that are highly relied upon by people living on remote islands and borders because there are no other types of transportation operating in these areas. Without a Perintis ship, the economic veins in the region will be disrupted, where this ship can carry passengers up to 500 people and can accommodate cargo for the needs of remote communities, and also functions as a liaison for islands that have category 3TP with larger ports [1].

The ship used in this study is a Perintis ship with a type of 1200 GT, which uses a transverse construction system because the ship's structure does not have an elongated bulkhead, which is construction braces are installed using steel pipe pillars.

To regulate all forms of activities in the Indonesian sea transportation sector, regulations are issued directly by BKI (Ship Classification Bureau), where BKI is a state-owned business in charge of issuing rules and regulations in the sea sector in Indonesia, including shipping, offshore buildings, and others related to the Indonesian sea sector to ensure the safety of Indonesian-flagged vessels and offshore

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Research on Capacity of Mixed Vessels Traffic Flow Based on Vessel-Following Theory

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ABSTRACT: In order to study the characteristics of mixed vessel traffic flow, based on classical head distance model and probability analysis, by studying the combination time head way of different vessel-following sequences, the capacity model of mixed vessels traffic flow was established. Through analyzing two representative types of vessels, research results indicate that the capacity of mixed traffic increase with the traffic flow speed in a certain speed range, but the increasing trend slow down. The closer length and inertial stopping distance of different kind vessels are, the more capacity of mixed traffic increases. And the influence of reaction time on the capacity is related to proportion of different kind vessels.

1 INTRODUCTION

In the maritime traffic engineering, traffic capacity refers to the capacity of a channel to manage vessel, which is measured by the maximum number of vessels passing through in a certain time [1]. At present, the formulas for calculating the passage capacity mainly include the West German formula, the Polish formula, the Yangtze River formula and the Changjiang formula. Its common characteristic is that a series of parameters need to be analyzed and determined according to the actual situation and data of the channel. The value of parameters varies from person to person and is highly subjective, which leads to the non-standard calculation of channel passing capacity. Moreover, existing studies on channel passing capacity often take traffic flow velocity and vessel density as fixed values without considering their mutual influence, and lack of further study on their internal traffic characteristics and mechanism [2][3].

The study of traffic flow theory shows that flow rate, velocity and density are a kind of dynamic equilibrium relation vessel. In recent years, some scholars have been aware of the deficiencies in the previous studies on channel passage ability, and have begun to make a preliminary discussion on channel passage ability using the macroscopic traffic flow theory. Shao Changfeng made a preliminary dynamic exploration and analysis of vessel traffic flow by applying fluid model [4]. Using the research method of highway traffic for reference, He Liangde and Zhu Jun established the direct functional relation vessel between vessel density and vessel speed by using the following theory, and strengthened the analysis of vessel traffic mechanism [5][6]. However, the above researches are limited to the analysis of a single vessel type in the waterway. In practice, due to the different sizes and types of vessels in the channel, the sequence composition of vessel following in the mixed vessel flow is also random, resulting in different vessel spacing, which has a great impact on the channel passage capacity. Therefore, it is significant to study the passage capacity in the case of mixed traffic flow.

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Autonomous Ships Concept and Mathematical Models Application in their Steering Process Control

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ABSTRACT: Advances in computer systems and innovative technologies along with their implementation into the shipping industry not only enabled efficient data exchange between the ship and the shore, but also created a single integrated information network linking all participants of the process and all elements of the maritime sector. Development of the concept of autonomous ships and automated control facilities for their functionality became the next stage in the evolution of innovations. The process of software adaptation, additional electronic steering systems, optical and digital means of monitoring as well as satellite communication facilities for autonomous ships are among the tasks which require search and development of the solutions. Provision of reliable and safe functioning of such ships in the autonomous mode requires development of models and methods for ensuring their accident-free navigation both in relation to the process of ships divergence and improvement of automatic steering systems of movement and course steadiness. In the given work, the analysis of realization of the crewless navigation and possibility of ship automatic movement control systems advancement on the basis of application of mathematical model for the purpose of enhancement of process of the autonomous ship steadiness on the set course is proposed.

1 INTRODUCTION

Maritime transport recently has evolved into one of the prospective industries for the application and development of information technologies. Conventional conservative foundations of the industry manifested in long cycles of ship design and operation and, as a result, expensive telecommunication infrastructure based mainly on satellite technologies at a time when transmission of large volumes of information online has already become the main criterion of commercial relations efficiency. The world merchant fleet, seaports and shipping companies, national and international regulators, seafarers and personnel engaged in international shipping and transportation had limited information exchange.

For many centuries, the shipping industry has relied on the knowledge and experience of seafarers who were the crew of the ships. Today, however, autonomous technology is ready to restructure the maritime sector using unmanned craft, meaning ships with no physical presence of crew. Small-unmanned vessels have already begun to operate, while the technology for larger vessels is still at the developmental stage. The maritime industry is about to change with the advent of the autonomous navigation concept and it is necessary to assess how this approach will shape the future of the industry and how it can be used most effectively. Certainly, the design and construction of autonomous ships will have an impact on ship operating processes, shipbuilding projects, port infrastructure operations, interfaces, regulatory and legislative frameworks.