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Analysis of Effect of Bulbous Bow Shape to Ship Resistance in Catamaran Boat

 Chrismianto, Deddy ; [Kiryanto](#); [Arswendo Adietya, Berlian](#)
[Save all to author list](#)^a Department of Naval Architecture, Faculty of Engineering, Diponegoro University, Indonesia
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Ship resistance is one of the main factors affecting the design of a ship. Catamaran boat is a ship with small wet surface area that able to reduce drag and improve ship power. Generally, a bulbous bow is implemented to reduce wave resistance because the bulbous shape is believed to attenuate the bow wave system. Additionally, the bulbous bow also tends to reduce viscous resistance. When the flow around the body is smooth, the total ship resistance can be reduced significantly if the optimum bulbous bow is obtained. In this study, the main purpose is to get the bulbous bow shape in catamaran boat which produces the smallest ship resistance by using computational fluid dynamic (CFD). Generating the variation of the bulbous bow shapes apply the one-to-one correspondence of the cross section parameter (A_{BT}) and lateral parameter (A_{BL}). The result of investigation shows that application of bulbous bow on catamaran boat can reduce about 11-13% of total resistance of ship. © The Authors, published by EDP Sciences, 2018.

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Investigation on the Effect of the Bulbous Bow Shape to the Resistance Components and Wave Profiles of Small Ships

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Chrismianto, D. , Zakki, A.F. , Arswendo, B. (2015) *Journal of Marine Science and Application*

Design of Dihedral Bows: A New Type of Developable Added Bulbous Bows—Experimental Results

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Important Dates

Extended abstract submission	1 Feb - 1 May 2017
Notification of abstract approval	15 May 2017
Full paper submission	16 May - 5 Aug 2017
Conference day	24 - 26 Aug 2017

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A Comparative Analysis of Mental Workload between Train and Bus Drivers 02076

Hartomo Soewardi and Perdana Suteja Putra

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An investigation of spatial arrangement, form, and structural system of traditional houses in Pedawa indigenous village - Bali

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Abstract. The Balinese traditional architecture has become valuable inheritance from the ancestor which still exists and is preserved until now, it is a symbol of local culture and reflects its characteristics. However, overpopulation has become one of the major challenges for Bali to cope with, and the impact of this phenomena significantly transform the traditional houses both its use and its form. The uniqueness of the architecture of Pedawa village has not yet been investigated in previous research. This paper aims to explore the detail of spatial arrangement, form, and structural system of the traditional houses, and its conservational effort. The case study method is employed for this research. Both primary and secondary data from interview, site observation, and literature data are analysed with qualitative analysis. The results show that the locals make every effort to sustain their values. The unique spatial arrangement, form, and structural system of the houses are strongly influenced by local customs; lifestyles; beliefs, and the environment. Hence, challenges are due to lack of understanding about conservation by the locals of their values and lack of natural resources; lifestyles; beliefs sand the environment.

1 Introduction

The Balinese traditional architecture is one identity of Bali which has been preserved. There are many types of traditional architecture in Bali according to its area or region. The traditional houses from one region to the other have different shapes and forms, such as their sizes; functions; ornaments, and materials. Traditional indigenous architectures are also different from the common traditional architecture widely known as Balinese traditional architecture. However, they adopt similar concepts from the past. The important thing is the strong relationship between humans, the nature, and the gods known as the universal concepts of Tri Hita Karana. This concept maintains the harmonious relationships amongst them. It is the foundation of most indigenous village settlements, traditional houses, and villages across Bali.

The traditional house is a symbol of local culture and reflects its characteristics. A traditional house could reflect the characteristic of the local culture which includes norms, values, behavioural patterns, artefacts, and activities [2]. The expression of the local residents' sociocultural system is reflected on their architecture; therefore the architecture is based on their local norms, values, and behaviour [11, 15]. According to Samadhi [10]

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Analysis of Effect of Bulbous Bow Shape to Ship Resistance in Catamaran Boat

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Abstract. Ship resistance is one of the main factors affecting the design of a ship. Catamaran boat is a ship with small wet surface area that able to reduce drag and improve ship power. Generally, a bulbous bow is implemented to reduce wave resistance because the bulbous shape is believed to attenuate the bow wave system. Additionally, the bulbous bow also tends to reduce viscous resistance. When the flow around the body is smooth, the total ship resistance can be reduced significantly if the optimum bulbous bow is obtained. In this study, the main purpose is to get the bulbous bow shape in catamaran boat which produces the smallest ship resistance by using computational fluid dynamic (CFD). Generating the variation of the bulbous bow shapes apply the one-to-one correspondence of the cross section parameter (A_{BT}) and lateral parameter (A_{BL}). The result of investigation shows that application of bulbous bow on catamaran boat can reduce about 11-13% of total resistance of ship.

1 Introduction

A bulbous bow is a protruding bulb at the bow of a ship just below the waterline. The bulb modifies the way the water flows around the hull, reducing drag and thus increasing speed, range, fuel efficiency, and stability. Ships with bulbous bows generally have a 12 to 15 percent better fuel efficiency than similar vessels without them.

During the last decade catamaran boats have rapidly evolved into a dominant mode of sea transportation in Indonesian sea. Their particular area of proliferation is the short sea shipping where they show considerable superiority over competitive designs in attributes such as space availability and speed quality. However, resistance or drag characteristics are principal aspects of the catamaran boat design spiral as they are strongly coupled with speed and ship fuel and, consequently, the ship operating cost is one of problem on the catamaran boat that has to be solved.

Development of bulbous bow design for catamaran boat is a proposed model to solve the fuel problem. CAD-integrated CFD method is applied to obtain the better bulbous bow form of catamaran boat with minimum ship resistance. Recently, some of the studies CAD-integrated CFD and optimization method can be used simultaneously to solve any problems, including the optimization of hull shape. The use of the control points of the cubic B spline to generate the parametric of ship hull design as well as the parametric of

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A Comparative Analysis of Mental Workload between Train and Bus Drivers

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Abstract. Human error is one of the crucial problems in land transport, sea transport, and air transport that inflicting some undesirable occurrence such as delay, cancellation, or accident. This incident causes inconvenience and apprehension for passengers. Hence, drivers should avoid some errors in driving by improving alertness and reducing the excessive workload. This study presents a comparative study about mental workload between train and bus drivers based on subjective and objective criteria. NASA-TLX method is used to measure subjective variables by distributing questionnaires. While the content of a drivers' Salivary α -amylase (SAA) is measured as an objective parameter before and after driving. 30 drivers are participated in this study who have experience for more than 3 years. Statistical analysis is conducted to test the hypothesis for a difference. The result of this study shows that bus drivers' SAA level is significantly higher (Asymp. Sig. 0.49) than train drivers for both before (91.99 kU/l) and after (83.19 kU/l) driving activity. Similarly, weighted workload subjectively of bus drivers' mental workload (1051) is higher than train drivers (1031) insignificantly (Asymp. Sig. 0.561).

1 Introduction

Human error is one of the causes of an accident in modes of transportation [1-5]. Risypudin in [5], a traffic director of Polda Metro Jaya, stated that the main factor in an accident on land transportation such as bus, car, motorcycle, and a train is human error. This condition is an undesirable incident for all passengers because it can cause delay, cancellation, rescheduling, unclear information even accident particularly in public transportation such as bus and train [6].

The fact, accident level of train transportation is still in the high ratio [7]. Indonesian Ministry of Transportation stated that there are 42 accidents of train in 2010 (i.e. 3 crashing accidents, 25 fallen trains, 4 rolled trains, 6 floods and erosion cause, and 4 other reasons). In 2011, there are 33 accidents as if 1 crashing accidents, 23 fallen trains, 2 rolled trains, 1 floods and erosion cause, and 6 other reasons. While 33 accidents have occurred in 2012 i.e. 2 crashing accidents, 21 fallen trains, 2 rolled trains, 4 floods and erosion cause, and 2 other reasons. Most of the accidents take place in 2013 including 25 fallen trains, 1 rolled trains, 7 floods and erosion cause, 6 other reason. Moreover, [8] and [9] found that as much as 394 people have died that was caused by 23 bus accidents in 2012 and 14 bus accident in

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