

STUDY ON THE ANALYSIS OF ROUGE WAVES IN INDONESIAN WATERWAYS

Fredhi Agung Prasetyo¹, Mohammad Arif Kurniawan^{2*}, Siti Komariyah³

1) Dr. PT. Biro Klasifikasi Indonesia (Persero), Yos Sudarso 38-40, Tg. Priok Jakarta, Indonesia, 14320
e-mail: fredhiagung@bki.co.id

2) PT. Biro Klasifikasi Indonesia (Persero), Yos Sudarso 38-40, Tg. Priok Jakarta, Indonesia, 14320
e-mail: arif.kurniawan@bki.co.id

3) PT. Biro Klasifikasi Indonesia (Persero), Yos Sudarso 38-40, Tg. Priok Jakarta, Indonesia, 14320
e-mail: siti.komariyah@bki.co.id

Abstract

The ship structural and operational safety aspect have to fulfill in order to make zero tolerance accident on Indonesian maritime transport system. Based on the storm model, the rough wave occurs in Indonesian waterways is examined. The European Centre for Medium-Range Weather Forecasts (ECMWF) hind-cast data are used for the reference of oceanography data. The rough wave for target points in Indonesian waterways are generated based on H_W history of reference data and rough wave condition are identified by using modified equivalent triangular storm.

Keyword: storm model, rough wave, Weibull distribution, Normal distribution, long-term probability, short-term distribution

1. INTRODUCTION

The development of ship sizing and types that is operated at Indonesian waterways be increased and varied in last decades. This condition affect to the accuracy of ship structural safety assessment in the design, production or operation stage. An example of the assessment is fatigue assessment.

Fatigue assessment could be conducted by using the classical cumulative fatigue damage method or fracture mechanic method. The fracture mechanic method could be solved by fatigue crack propagation analysis (FCP). The most important aspect in the FCP process is the sequence of fatigue load that is used in analysis. These fatigue load should express the ship load due to the wave phenomena, include with the changing nature of wave during ship operation.

For those purpose, the met-ocean data that be measured from buoy, satellite imaging, hind-cast data and or onboard ship observation are useful information. Some researchers was initiated to develop a wave model in which could simulate the changing nature of wave during ship voyage. Tomita [1][2] developed storm model in order to simulate the changing nature of ocean phenomena. The storm model consist of two waves type, there are calm-sea and storm. Tomita develop storm model based on the wave data that is measured during the voyage on the North Pacific Ocean. Prasetyo [3] in order to get the advanced of the storm model, collect another wave data with the different sources and location, the North Atlantic Ocean. He developed the advanced storm model by taking into account as the following: i. Automatic configuration of storm profile; ii. Could simulate the variation of storm duration; iii. Could applied by using met-ocean data with variate measurement periode.

In order to support the development of maritime transportation in Indonesian waterways that is complying with all ship structural and operational safety aspect, the study on the changing nature of wave at Indonesian waterways/ Indonesian ocean is conducted. This paper will present the analysis of rouge wave along Indonesian waterways by using the storm model approach that is firstly developed by Tomita [1][2] and last updating by Prasetyo [3]. The statistical characteristic of changing nature of ocean phenomena of Indonesian waterways is described.