

# ANALISIS OLAH GERAK KAPAL DAN PENGARUH PENAMBAHAN *FIN STABILIZER* TERHADAP *MOTION SICKNESS INCIDENCE* PADA KAPAL FERRY 500 GT

ARYA ADIWIDYO NUGROHO

## ABSTRAK

Gerakan kapal akibat ombak laut yang terjadi secara terus menerus akan mengakibatkan timbul gejala sakit seperti pusing kepala, muntah dan mual yang pada umumnya disebut mabuk laut atau *motion sickness*. Untuk kapal penumpang hal tersebut jadi syarat kenyamanan dan keamanan penumpang yang wajib dipertimbangkan pada tahap desain kapal. Pada penelitian ini diperoleh hasil simulasi respons gerakan pada kapal ferry Ro-Ro 500 GT dengan bantuan *software Maxsurf Motions Advance* sehingga bisa dilihat respons kapal terhadap kenyamanan penumpang dengan melakukan modifikasi penambahan *anti-roll* berupa *fin stabilizer* dengan bantuan *software Maxsurf Modeler, Autodesk Inventor* dan *Rhinoceros* untuk meningkatkan performa *seakeeping* dikoreksi dengan standar NORDFORSK dan juga nilai *Motion Sickness Incidence* dikoreksi dengan standar kriteria ISO 2631. Variasi pada *fin stabilizer* menggunakan 3 model dari Kongsberg yaitu NR22, Gemini 30 dan Gemini 20. Dari hasil simulasi diketahui model dengan *fin stabilizer* model Gemini 20 memiliki nilai *Seakeeping* dan MSI yang paling optimal, terjadi penurunan yang signifikan pada RMS *Roll Motion* dan penurunan nilai OMSI antara model awal dengan variasi model Gemini 20 dengan selisih rata-rata hingga 8%. Kapal dapat bergerak aman dan nyaman pada kondisi *slight (sea-state 3)* hingga *moderate (sea-state 4)* pada ketinggian gelombang hingga 1,6 m diprediksikan kurang dari 10% penumpang mengalami mabuk laut selama 2 jam kapal berlayar pada *heading bow quartering seas* dan *head seas*.

**Kata Kunci :** Kapal Ferry Ro-Ro, *Seakeeping*, *Motion Sickness Incidence*

# ***ANALYSIS OF SHIP MOVEMENT AND THE EFFECT OF ADDITIONAL FIN STABILIZER ON MOTION SICKNESS INCIDENCE ON 500 GT FERRY SHIP***

**ARYA ADIWIDYO NUGROHO**

## ***ABSTRACT***

*Ship movement due to sea waves that occur continuously will result in symptoms of illness such as headaches, vomiting and nausea which are generally called seasickness or motion sickness. For passenger ships, this is a requirement for passenger comfort and safety that must be considered at the ship design stage. In this study, the results of a motion response simulation were obtained on the Ro-Ro 500 GT ferry with the help of Maxsurf Motions Advance software so that the ship's response to passenger comfort can be seen by modifying the addition of anti-roll in the form of a fin stabilizer with the help of Maxsurf Modeler, Autodesk Inventor and Rhinoceros software. to improve seakeeping performance it was corrected with the NORDFORSK standard and also the Motion Sickness Incidence value was corrected with standard ISO 2631 criteria. Variations in the fin stabilizer used 3 models from Kongsberg namely NR22, Gemini 30 and Gemini 20. From the simulation results it is known that the model with the fin stabilizer is the Gemini 20 model has the most optimal Seakeeping and MSI values, there is a significant decrease in RMS Roll Motion and a decrease in OMSI values between the initial model and the Gemini 20 model variation with an average difference of 8%. Ships can move safely and comfortably in conditions of slight (sea-state 3) to moderate (sea-state 4) at wave heights of up to 1,6 m, it is predicted that less than 10% of passengers experience seasickness for 2 hours the ship sails on the heading bow quartering seas and head seas.*

***Keywords : Ferry Ro-Ro Ship, Seakeeping, Motion Sickness Incidence***