

STRENGTH ANALYSIS ON THE REDESIGN OF THE FENDER JETTY OF PENAJAM PASER UTARA FERRY PORT

By : Achmad Dwi Risqi
Student Identify Number : 14211001
Supervisor : Ir. Destryani Liana Putri, S.T., M.T.
Co-Supervisor : Luh Putri Adnyani, S.T., M.T. AMRINA

ABSTRACT

fenders are bumper devices that serve to absorb impact when a ship docks at a pier or when a moored ship moves due to currents or waves in the harbor. The existing fenders at Penajam Ferry Port are currently damaged. This study aims to redesign the existing fender system at Penajam Ferry Port. The selection of fender size is based on calculations of berthing energy generated when the ship comes into contact with the fender, taking into account variations in conditions during the berthing process. Modeling and analysis of deformation and stress on the fender were conducted using ANSYS Workbench software. The calculation results show a berthing energy of 274.68 kNm at a berthing velocity of 0.26 m/s and a distance of 9.4 m between each of the six fenders. The total deformation obtained for the existing fender is 0.009 m, while for the alternative fender it is 0.006 m. Greater deformation occurs on the existing fender due to its inverted position. Meanwhile, the highest maximum equivalent stress occurs in the bolt hole area, which is 0.519 MPa on the existing fender and 0.681 MPa on the alternative fender, influenced by the difference in surface area due to the fender size. Based on the deformation and stress results, both are still within safe limits regarding structural failure. By conducting a Monte Carlo simulation on both fenders, a failure probability of 0% and a reliability value of 100% were obtained.

Keywords: Berthing Energy, Fender, Ferry, Port