ABSTRACT

The configuration on semi-submersible consist of deck with a straight column and on the bottom of the structure has pontoon for bouyancy. Structural strength analysis is important for semi-submersible structure because the analysis can find out the strength of the semi-submersible structure. This current study is concentrated on structural strength analysis of the semi-submersible with six columns and two pontoons for the bouyancy, and the displacement of the structure is 24173 ton on Natuna Sea at water depth 90 m with the significant wave is 5.3 m. The first stage of evaluation is to analyze the hydrodynamics motion to obtain the motion characteristics of the structure due to excitation wave. The second stage is to analyze the structure response due to excitation wave that is shear force and bending moment, analysis performed in two condition that is at wave length 107 m and at wave length on T = 100 years. The distribute load on the structure with plate thickness is 30 mm transformed into structure response than become stress on the structure. Analysis performed in three model that is : structure semi-submersible without deck, structure semi-submersible with rigid deck, and structure semi-submersible with smeared deck. In each model obtained maximum stress 201 Mpa, 155 Mpa, and 121 Mpa in different locations. The largest stress in structure without deck is located in transverse beam near deck in column three, in structure with deck rigid the largest stress located between column and pontoon in column three, and the largest stress in structure semi-submersible with smeared deck the largest stress located in transverse beam inside pontoon under column one.

Keyword: Semi-submersible, structure response, Shear force, Bending moment, structural strength