This research is aimed to complement and to correct previous research carried out by Wahyudi (2009), in predicting the fatigue life of crane pedestal of the Belanak FPSO. In that research, dynamic response of the lifting load was not calculated. Therefore, this research tried to take into account the contribution of the dynamic response due to lifting load on the crane. Dynamic response of the crane lifting load is reviewed in two conditions, i.e static and dynamic conditions. Static condition is the condition when the crane began to lift the load, while the dynamic condition is a condition where the lifted load began to oscillate. Load lifting oscillation include two degrees of freedom based on the rolling and pitching motions of the FPSO. Variation of lifting load starting from 5 tons to 50 tons with 68.2 m of maximum moment arm. Lifting operations are assumed to occur as much as 86,400 times during the service life, which is 30 years. Based on this calculation, it is obtained that wave load has a significant effect on the fatigue life of the crane pedestal of about 96.39%. Wind load has only 0.005% of the total load, and the lifting load of the crane has an influence of 3.605%, where the load at static conditions is 3.6% and the dynamic condition is 0.005%. The result of the fatigue analysis of the crane pedestal on the Belanak FPSO using Palmgren-Miner law, indicates the fatigue life of the crane pedestal is 148 years, that is approximately 5 times of the FPSO operational life.

Keywords: crane pedestal, fatigue, FPSO, Palmgren-Miner