Abstract

FLNG (Floating Liquified Natural Gas) is a floating facility for production and temporary storage liquified natural gas which is permanently moored in the operation site. Spread mooring system of external turret is one type of mooring system configuration that could be employed to reduce the dynamic motions of the FLNG due to environmental loads. This final project is aimed at analyzing the motion characteristic of FLNG, sized 450 m x 73.8 m x 33.48 m (L x B x H), having a displacement of 470,934 tons, equipped with an external turret mooring system. The significant tension of the FLNG mooring lines and excursions were predicted in time-domain using analytical software MOSES 7.00.044. From the investigation on the moored FLNG, it can be concluded that mooring system with configuration of 12 lines is sufficient to withstand an extreme loading condition corresponding to ultimate limit state (ULS) criteria. The significant responses for surge, sway and yaw are, respectively, 0.201 m, 1.474 m dan 0.083° propagating in the direction of 45° (Hs=5.46 m), 90° (Hs=5.92 m), dan 45° (Hs=5.46 m). In the condition of moored single body FLNG, ie. no LNG carrier attached, the minimum factor of safety as permitted by API RP 2SK 2nd edition for ULS condition is satisfied by the line configuration, in which the significant tension in line 2 is as high as 2491.17 kN, with minimum SF of 2.59. Whereas in ALS condition with one line broken (line 2) the configuration remain adequate and yields a maximum significant tension in line 3 in the order of 2951.31 kN with minimum SF of 2.15. For the condition where LNG carrier is moored side by side to the FLNG, minimum factor of safety for ULS condition is also satisfied by the external turret mooring system configuration, having maximum significant tension in line 1 in the order of 3303.69 kN with minimum SF of 1.90. Whereas for ALS condition with one line broken (line 1), the configuration remain sufficient and gives a 4044.38 kN maximum significant tension in line 2 is with minimum SF 1.53.

Key words: FLNG, external turret mooring system, safety factor, excursion, ULS