Introduction of Hull Construction for Big Foot E-TLP

Jun-Ho Song*, Gi-Jae Kim, Kyung-Seok Lee and Man-Soo Kim

Structural Design Team, Daewoo Shipbuilding & Marine Engineering Co., Ltd.
Geoje, Gyeongsangnamdo, Korea

ABSTRACT

Recently, there was the explosion accident of the Deepwater Horizon rig and 11 workers were killed in Gulf of Mexico. And a huge quantity of oil has leaked from the blown-out well. At that situation, the most important thing is the safety and good quality of offshore structures from the design stage to in-place condition more than all. Especially, TLP structure is influenced by tension loads due to structural characteristics and vulnerable to fatigue failure, so more stringent welding and quality requirements than other offshore structures are required.

This paper introduces the structural construction procedure and some lessons learned items for hull construction of Big Foot E-TLP (Extended Tension Leg Platform) with design load cases such as normal operating condition at 10-yr winter storm, extreme condition at 100-yr hurricane and survival condition at 1000-yr design wave. Construction should be in accordance with the specification for the design, fabrication and erection of structure and all works should be carefully executed with good quality and testing procedures (API, 1997). During the construction stage of ETLP, yard constructability and design developments were applied to the hull structure. This experience and effort to improve the design through application of constructability are useful to other offshore structures.

KEY WORDS: E-TLP; Lessons Learned; Design development; Constructability; Comparative study

INTRODUCTION

Because of the strong influence of hurricanes such as Katrina, the design criteria of offshore platforms to be installed in Gulf of Mexico (GoM) needs to have more stringent requirement. To make matters worse, the explosion accident of the Deepwater Horizon rig was a warning of all of us. Especially, offshore structures such as fixed platform, compliant platform and TLP etc. are more difficult to escape from any dangerous situation due to excessive costs once the unit starts its operation.

As one of the offshore structures, Tension Leg Platform has always a tension load because the vertical force acting on the platform is balanced. So, it is vulnerable to fatigue failure due to the tension load. The complicated welding profiles such as “A” profile, “C” profile, ground flush and toe grinding etc. are required to the structure to improve fatigue strength (Ren et al., 2010; AWS, 2006). Of course, quality management and weight control of the platform are important keys to lead the successful operation of the unit. On the other hand, operability of TLP is more enhanced than other platforms because the vertical motion called heave is almost eliminated. In performance point of view, it has an advantage because one of the most important facts for design of offshore platform is to maintain the function easily in bad weather condition.