Research on Load Transference Technology of The Whole Large Topside

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ABSTRACT

LW3-1 CEP Topside plus Deck Support Frame (DSF) total weight reaches 32000 tons, is one of the Largest topsides in the world. The CEP Topside and DSF is fabricated separately due to existence of Deck Separate Unit (DSU). They are combined after fabrication by load transference method and load out as a whole structure, which is called reversed fabrication method and applied internationally. This paper introduce the load transference of LW3-1 CEP topside and DSF. A study is conducted on entirely weighing of large topside, theory and structure designing of load transferring and checking of bearing strength of ground. A load transference equipment is designed and the load transference operation is achieved.

KEY WORDS: Large topside; reversed fabrication; load transference.

INTRODUCTION

As one of the largest platforms in the world, the design weight of LW3-1 topside is 32000 tons, including a 28000-ton upper topside and a 4000-ton Deck Support Frame (DSF for short, see Fig.1). The two parts are connected by Deck Separate Unit (DSU for short, See Fig.2) which plays a elastic and buffering role in shipment and has tailor-made rubber inside. The rubber should not be loaded over 90 days, so the upper topside and DSF need to be fabricated separately. The weight of upper topside is transferred on DSF after it is dragged under the upper part. This is an international mature fabrication technology by which the load on DDSU is avoided and construction period is shortened due to separate fabrication. However, the achievement of the connection of upper topside and DSF and transference of upper topside’s weight to DSF is the biggest difficulty of this technology. Taking LW3-1 topside as an example, this paper intensively studies the load transference technology of large topside.

LOAD TRANSFERENCE DESIGN OF LW3-1 TOPSIDE

Load transference of ten-thousand-ton topside is usually accomplished by professional company on the international. The process is as follow: Fabricate topside and DSF separately; lift the topside to certain altitude with special equipment when the fabrication is completed; drag the DSF to the position right below the topside and then lower the topside onto the DSF.

Continuous jack-up equipment of MAMMOET and integral lift-up equipment of ALE are internationally famous in this field. They are really good at it but they also ask a price of about 5 million dollars, which is very expensive.

Design of Load Transference Structure

As is shown in Fig.3, different from the global way, in order to avoid the lift-up procedure, LW3-1 topside is fabricated at a high position by adding 8 extension columns along the 8 main columns at bottom of the topside and is lowered onto DSF when it’s dragged to underneath of the topside by removing temporary supporting. The 8 extension columns’ position is also where the jacking points locate. When the load transference is finished, remove the columns and the whole topside is completed. The whole process is also called reversed fabrication.