Introducing Installation Methods of the Jacket Riser

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ABSTRACT

Riser is a critical component part of the offshore oil structure. Installation riser is a complicated and technical work. The jacket riser is widely used in offshore oil engineering. And its installation is difficult. This paper introduces the ocean risers and the jacket riser’s installation methods, and compares the advantage and disadvantages of those installation methods, which include the monorail guide method, the J-shape guide pipe method and the traditional slinging installation method. The slinging installation method was used in the modification project of QHD33-1 WHPC platform, and the installation process is briefly introduced in this paper. It is hoped that this paper will provide a reference for riser installation in the future.

KEY WORDS: Riser; installation.

INTRODUCTION

At present, the marine petroleum exploitation is remarkable exploitation of the ocean. The exploration shows that there is an abundant petroleum resource in the transitional zone between the continental shelf and isolated islands. Today, at the different water area of every continent, there are various offshore oil structures built for exploitation the benthal petroleum resources. However, the ocean riser is necessary to the offshore oil structure, such as oil and gas riser pipe, oil production riser, water injection riser, and so on. Riser is a critical component part of the offshore oil structure. Riser’s failure will affect the safety of the total production system. For the oil and gas field with many wellhead platforms around the central platform or submarine production system, the platform needs production pipe, testing pipe, water injection pipe, and so on (Chen, YS, 2008). So the importance of riser is obvious. Riser installation is a complicated operational and technical work. The jacket riser is most widely used in offshore oil engineering. And its installation is very difficult. This paper introduces the definition and constitution of riser briefly, and introduces and compares several installation methods of jacket riser. The QHD33-1 WHPC platform modification project is taken as an example, describing the field process of installation riser by the traditional slinging installation method.

Definition and Constitution of Ocean Riser

Riser is the section pipe of submarine pipeline up and down platform, connection the submarine pipeline with gathering pipeline or equipment on the platform (Zhou, HJ, et al., 2004). Ocean riser has various structures, such as Steel Catenary Riser (SCR), Top Tensioned Riser (TTR), Lazy S Shape Riser, Steep-S Riser, Lazy Wave Riser, Steep Wave Riser, etc. Because these risers have a great slenderness ratio, they are regarded as flexible risers. In China, most offshore oil fields are neritic, so short and hard risers are used usually. And the riser, which is used in China presently, includes riser pipe and supporting member. The basic component parts of the riser are as follow:

I. Submarine Pipe, which lay on the marine bed or under the marine bed, is regarded as a component part of the riser.
II. Intermediate pipe: it connects the fixed point of submarine Pipe and vertical pipe.
III. Vertical pipe: it connects the intermediate pipe and the process pipe on the platform deck, and it is vertical nearly.
IV. Riser supporting member: it is the supporting structures along with the riser, which includes the contact point of submarine pipe and marine bed, riser clamp, bulkhead, etc.

Installation Methods of the Jacket Riser

By the structure attached, the riser is sorted into two kinds: jacket riser and riser on bridge or independent pole. The jacket riser is used most widely. Its installation is harder than other risers (Zhu, SH, 1999).

By the platform attached, the installation of riser includes adding the riser for the existing platform and installing riser on the new constructing platform (Fu, C, 1998). The installation methods are different between them.

Installation riser for the existing platform mainly uses the traditional slinging installation method. Firstly, the riser system is fabricated and assembled on land. Secondly, the riser is transported to offshore by shipping. Then, the riser is slung by crane barge and installed on the outside of the jacket. Lastly, divers fix it in position with the riser clamps.