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*Trends in Mechanical Engineering Research*

# INSPECTION ZWP 12 OF OFFSHORE STRUCTURE SAFETY EQUIPMENT & FITTINGS DURING FABRICATION PT. XYZ

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## Graphical abstract

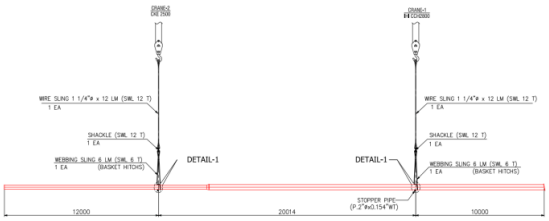


**Figure 1.** Rigging Scheme

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## Abstract

Fabrication is the arrangement of work of all components of the material, whether it is plates, pipes, steel, or other metals, that are then formed and sculpted from semi-finished material until it becomes a commodity that can be mounted into a chain of industrial or construction tools. All materials will be managed, received, stored, distributed, traceable and disposed of in accordance with material handling procedures. There are two reviews for the load on rigging, namely the horizontal load and the vertical load. The process of platform manufacturing starts with the process of marking, cutting, assembling, welding, and finishing. After that, the components will be blasted and painted. Once the manufacture is done, you can go straight to the installation stage. To go through the fabrication process requires calculations to match the values allowed to avoid unwanted things. The biggest load on the rigging load is 269.6 MT, which can determine which crane will lift the load allowed or not. The maximum load that can be lifted by a crane to lift a vent boom is 346.71 MT. For permitted thickness a variety of values according to the material used.

*Keywords:* Crane; fabrication; rigging load

## Abstrak

Manufaktur adalah pengaturan kerja dari semua komponen material, apakah itu piring, pipa, baja atau logam lainnya yang kemudian dibentuk dan diukir dari bahan semi selesai sampai menjadi komoditas yang dapat dipasang ke dalam rantai alat industri atau konstruksi. Ada dua ulasan untuk beban pada rigging, yaitu beban horisontal dan beban vertikal. Proses pembuatan platform dimulai dengan proses menandai, memotong, menyatukan, kemudian pengelasan, kemudian finishing. Setelah itu, komponen akan meledak dan dicat. Setelah pembuatan selesai, Anda dapat langsung pergi ke tahap pemasangan. Untuk melalui proses pembuatan, itu membutuhkan perhitungan untuk mencocokkan nilai yang diizinkan untuk menghindari hal-hal yang tidak diinginkan. Beban maksimum yang dapat diangkat oleh sebuah crane untuk mengangkat ventboom adalah 346,71 MT. untuk ketebalan yang diizinkan berbagai nilai sesuai dengan bahan yang digunakan.

*Kata kunci*: Derek; fabrikasi; beban tali
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## 1.0 INTRODUCTION

Corrosion on pipes, especially those made of ferrous metals, is one of the most significant problems in a variety of industries, including construction, transportation, and public utilities. This phenomenon could result in huge economic losses as well as serious security risks. A thorough understanding of the corrosion process and the factors that influence it is essential to develop effective prevention and mitigation strategies [1] [2] [3].

Industrial irrigation systems play an important role in a variety of sectors, including oil and gas, petrochemicals, and manufacturing. Efficient and secure construction design, installation and maintenance are key to ensuring smooth operation and operational safety. Studies of industrial welding cover aspects ranging from technical design to corrosion issues that can affect the performance and service life of pipes. This standard covers a wide range of piping types and related components, as well as provides strict guidelines to ensure the safety and reliability of welding systems.The research covers a range of factors that affect external corrosion, including environmental conditions, pipe materials, and protective methods that can be used [4] [5] [6].

Fabrication is the arrangement of work of all components of material whether it is plates, pipes, steel or other metals that are then formed and sculpted from semi-finished material until it becomes a commodity that can be mounted into a chain of industrial or construction tools. The manufacturing and construction processes are carried out directly at the site where the building is to be built. This work is done outside the workshop building which is work done in the open field area. All kinds of manufacturing processes are carried out from stockpiling materials, cutting and drilling materials, assembly process, welding process, finishing process, sandblast and painting process and construction installation process. In order to ensure smooth manufacturing, the workshop managers will usually provide a variety of electrical equipment, tools and machinery to support production. [7]

The pedestal crane is the primary equipment for transferring the load from the bottom to the platform where this device is still not running or permanent. Loads can vary from material, structure equipment, welding machine, spare parts, used material, etc. The capacity and range of the platform crane depends on the type of platform and its purpose of use.

The development and maintenance of offshore platforms is one of the most challenging and critical aspects of the oil and gas industry. These structures must be designed and constructed with high precision to ensure operational safety, efficiency, and resistance to harsh environmental conditions. The conference outlined the standards and procedures to be followed to ensure that offshore platforms are built with the highest level of safety and reliability. These requirements cover various aspects ranging from material selection, welding procedures, to inspection and final testing. Contrast measurement using computerized radiography (CR) is an advanced technique that allows internal inspection of pipes without the need to dismantle or damage the structure. Welding distortion is a common problem in the manufacture of metal structures, especially those of large size and complexity such as offshore platform cabins. The application of this technique can improve the accuracy and quality of offshore structure manufacturing, ensuring that the resulting structure meets design specifications and operational requirements [8] [9] [10].

Increasing the fire resistance of building structures in the oil and gas complex is a critical aspect in the design and operation of the facility. Steel structures used in shipbuilding and offshore platforms must have high fire-resistance to prevent structural collapse during fire incidents, which can result in large losses and risks to human safety [11] [12].

## 2.0 METHODOLOGY

The 1D Zawtika Development Project Structure consists of 4 Offshore Wellhead Platforms (ZWP12, ZWP13, ZWP14 dan ZWP15). ZWP 12 contains 4 deck: Sump deck, Lower deck, Mezzanine deck and Upper deck. It has 9 wells with the ZMFP model. ZWP 13 contains four deck with the Sump Deck, the Lower Deck and the Upper Deck. There are 20 wells in the ZOCP model. ZWPs 14 contains the 4 wells of the ZP14 model: SUMP, LOWER DECK, mezzanine deck and upper deck. All materials will be managed, received, stored, distributed, traceable and disposed of in accordance with material handling procedures.

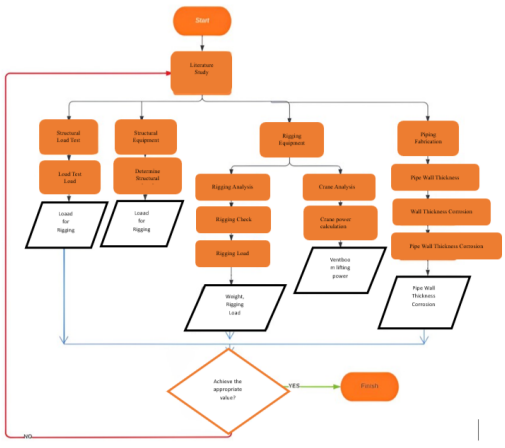


**Figure 1.** Workflow Diagram

As for the research procedures and research steps in achieving the purposes of this report are described as follows:

1. Literature studies In this study, the literature studied is previous research and journals directly related to this research as well as books as additional reference in the solution of problems.
2. Data collection At the data collection stage, the source of the research to be carried out is required. From the data is then carried out analysis which will later be continued on the modeling using software to facilitate data processing: Data Structural load test used is taken from the file Structure load test Procedure. Data Structure Equipment used is from the files List Equipment. Data list savety equipment used is obtained from the list Savety Sign Equipment file.
3. Factor determination There are some factors that need to be reviewed to anticipate the unwanted things that may occur during the manufacturing process.
4. Rigging analysis The rigging analysis carried out is a review of the strength of the rigging equipment against the load to be lifted. The Rigging equipment analysed includes the lifting power of the load. 5. Crane analysis To determine the type of crane suitable for the ventboom rigging process, it is necessary to carry out analysis to avoid failure during this riging process. The selection of the crane is adjusted to the analysis that has been done.
5. Crane analysis To find out the type of crane suitable for the ventboom rigging process, it is necessary to carry out analysis to avoid failure during this rigging.

## 3.0 RESULTS AND DISCUSSION

### 3.1 Fabrication Analysis

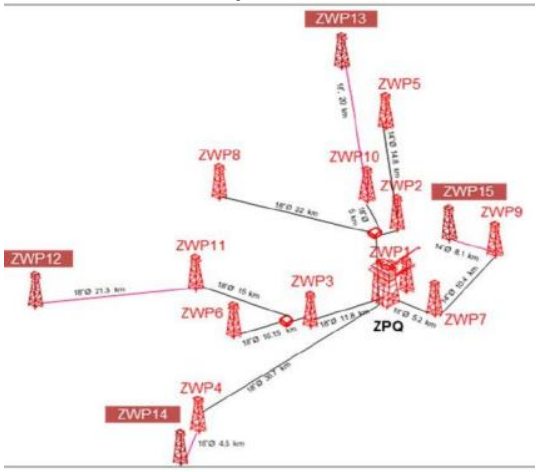


**Figure 2.** Manufacturing Platform

Offshore Wellhead Platforms (ZWP12). Where ZWP12, is the ZMFP model and is designed for 9-axis slots while ZWp13 is theZOCP model and was designed for the 20-axis slot type platform. Equipped with 4 intra-field pipes with spool tie-in with Brownfield modification and binding to existing platforms and integration of telecommunications systems and working controls into existing ones.

### 3.2 Ventboom Rigging Analysis

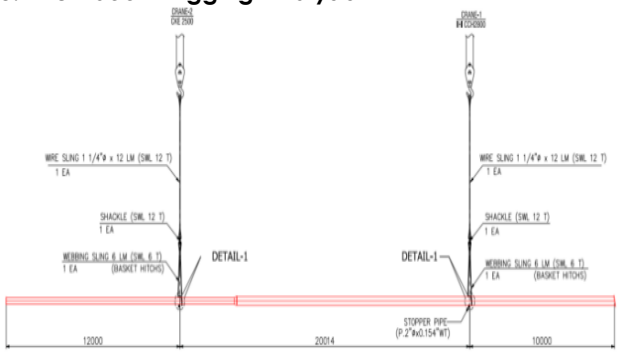


**Figure 3.** Rigging Scheme

Rigging Load the load received by the rigging equipment is the load that has been multiplied by the factor. There are two reviews for the load on rigging, namely the horizontal load and the vertical load. However, in this calculation is ignored and used factored load.

Maximum crane voltage at 0 degrees = (Load x Contingency Factor x DAF x SKL)

= (170,5 x 1,1 x 1,15 x 1,25 )

= 269.6 MT

### 3.3 Crane Analysis

The total weight of the crane is obtained from the calculation:

Total Load = (High tension × DAF × Contingency Factor) + Rigging Weight + Winch Arrangement Weigh + Main Hook Weight

= (269.6 × 1.15 × 1.1) + 0.67 + 3.2 + 1.8

= 346.71 MT

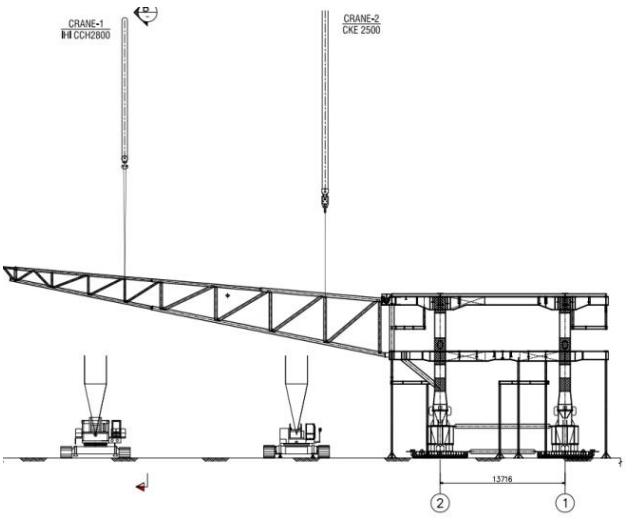


**Figure 4.** Crane Rigging vent Boom

## 4.0 CONCLUSION

The process of platform manufacturing starts with the process of marking, cutting, assembling, then welding, then finishing. After that, the components will be blasting and painting. Once the manufacture is done, you can go straight to the installation stage.

Methods of installation of equipment & safety equipment structures can be known by conducting

literature studies, live observations, and interviews with experts in the field. The study of literature can be done by reading books/journals that discuss the methods of installation of structures equipment & safety equipment so as to provide a comprehensive understanding of the various existing installation methods. Direct observation can be done by visiting the production/installation facility to give a clearer picture of the installation method applied in the field. Interviews with experts can be conducted to obtain more in-depth information about the installation methods can be done with engineers, technicians or others who have experience in their field.

To go through the fabrication process requires calculations to match the values allowed to avoid unwanted things. The biggest load on the rigging load is 269.6 MT, which can determine which crane will lift the load allowed or not. The maximum load that can be lifted by a crane to lift a ventboom is 346.71 MT. For permitted thickness a variety of values according to the material used.

## Acknowledgement

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