MP17043 Prosperity - Data Collection and Transformation Report

Date of Analysis: 11-Dec-2023

Introduction

The Prosperity project represents a significant undertaking in terms of scale and complexity. This report delves into a meticulous analysis of Material Take Off (MTO) files, focusing on key materials including Piping, Valves, Special Piping, Bolts, and Structural Equipment. The objective is to aggregate and assess the weight and quantity of each material utilized, providing a comprehensive overview of the material aspects of the project.

Overview of Scopes and Materials

This analysis of the Unity Project consists of two different scopes, including:

a. SBM Scope

- Piping
- Special Piping
- Valve
- Bolt

b. YARD Scope

- Piping
- Special Piping
- Structure
- Valve
- Bolt

Data Collection and Transformation: Enhanced Project Analysis Report

Overall Summary

The Prosperity project encapsulates a vast array of materials, each playing a pivotal role in the overall construction. An in-depth analysis of MTO files reveals substantial data on quantities and weights, reflecting the project's magnitude. Upon examining, the total material weight for the project is approximately 3301.728 metric tons. This includes various components from small fittings to major structural parts. The Material Take Off (MTO) shows an equipment cost of $55965.881 thousands USD. Including all aspects of the FPSO Project, the total financial implication is about $1128723.02 thousands UDS (a sum of all purchased order). Manpower and time are crucial. We obtained approximately a total of 518904.59 hours for this project. Additionally, the inclusion of valves, bolts, and special piping materials adds layers of complexity and significance to the material inventory. The project demands 556235 individual material pieces, highlighting its intricacy. About 79328.930 meters of material is needed, with 15507.8 meters sourced from the YARD. This summary underscores the critical role of efficient material management and cost analysis in large-scale projects like Prosperity.

Detailed Scope Analysis

The Prosperity project's scope is expansive, with a detailed analysis of materials across SBM and YARD Scopes. Under the SBM scope, there's a total of 29097 pieces, markedly higher when compared to the YARD scope, which totals 527138 pieces. When considering weight, materials in the SBM scope amass to 3130.172 tons. On the other hand, YARD scope materials have a cumulative weight of 3306.571 tons. This delineation between scopes highlights the project's diverse material requirements.

Material Types Breakdown

The weight distribution across various material types reveals key insights into the project's construction. Piping materials range from Carbon Steel, with a net weight of 780,915 kg in meters and 419,127 kg in pieces, to more specialized materials like Super Duplex Stainless Steel, weighing 63,832 kg in meters and 43,396 kg in pieces. Following we have valves, which contribute 1079.318 tons, making them the second most weighty category in the project. Structural elements, pivotal to the project, register a total weight of 2337.2 tons. Not to be overlooked, special piping materials, a distinct category in our inventory, weigh 115.093 tons. This variety underpins the project's engineering complexities and design necessities, necessitating careful planning and execution.

Understanding Surplus and Wastage

In the evaluation of the project's material management, we identify two essential components: surplus and wastage. The surplus primarily manifests in piping, where an additional 453 pieces are noted. These surplus materials represent an associated cost of $883648 thousands of dollars, highlighting the need for efficient utilization.Concurrently, we have identified wastage within structural equipments. Approximately 2327.2 structural equipment wastage have been observed. This insight emphasizes the significance of meticulous material planning and allocation to minimize waste and align with budgetary constraints.

Purchase Order Metrics

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Piping Analysis

General Piping Data: The project utilized a total of 107292.0 pieces of piping, covering 63821.13 meters, with a total net weight of 4160677.24 kg.

SBM Scope Piping: In the SBM scope, there were 15630.0 pieces of piping, totaling 12842.04 meters and weighing 1947249.15 kg.

YARD Scope Piping: The YARD scope accounted for 91662.0 pieces of piping, extending 50979.09 meters, with a net weight of 2213428.09 kg.

Valve Analysis

Valve Data: The total weight of valves used was 1079317.74 kg, with 7255.0 valves utilized across both SBM and YARD scopes.

Bolt Analysis

Bolt Data: The project required a total of 434240 bolts, with a net weight of 136521.81 kg.

Structure Analysis

Structure Data: The structural components totaled Quantity UOM ... Total Gross Weight

0 PCS ... 5.2

[1 rows x 9 columns] pieces, covering Quantity UOM ... Total Gross Weight

0 m2 ... 1144.0

[1 rows x 9 columns] square meters and Quantity UOM ... Total Gross Weight

0 m ... 1188.0

[1 rows x 9 columns] meters, with a gross weight of 2337.20 kg.

Special Piping Components

Special Piping Data: The project used 7434.030000000001 meters of special piping, weighing 115093.37 kg.

Cost and Quantity Overview

Project Expenditure and Manpower: The total project cost was approximately $1128723021.00, with around 518904.59 man-hours spent.

Conclusion

The Prosperity project, with its impressive array of materials, marks a milestone in offshore engineering. The use of over 4 million kg of piping, including key materials like Duplex Stainless Steel (803,459 kg) and High Yield Carbon Steel (1,022,999 kg), illustrates the project's scale and complexity. Valves, weighing around 1,079,318 kg, and bolts totaling 136,522 kg, further emphasize the enormity of the undertaking. The structural components, contributing a massive weight of 2,337 tons, highlight the project's focus on robustness and safety.In the realm of special piping, 11,509 kg is used, reflecting the project's attention to specialized requirements. The data reveals a meticulous balance between functionality and durability, with a keen focus on optimizing material usage. The project's success in handling such a vast array of materials, from the 2,104,980 kg surplus in piping to the 2,327 tons of structural wastage, offers critical insights for future projects.This in-depth analysis of the Prosperity project underscores the importance of strategic material selection and efficient resource management in large-scale engineering projects. The lessons learned here, particularly in balancing diverse material types and quantities, set a new benchmark for future offshore constructions, ensuring enhanced efficiency, sustainability, and economic viability.