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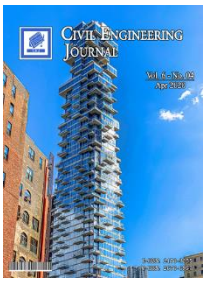

Rational Hybrid Analytical Model for Steel Pipe Rack Quantification in Oil & Gas Industries

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Abstract

The objective of this work is to develop an analytical model to overcome the shortfalls in current engineering practices that are being used to estimate the pipe rack steel quantities during the pre-bid engineering phase in Oil & Gas industries. The research methodology consists of performing data analysis of past projects and devising a new system by developing suitable structure formulation techniques, loading system creation, structural stability analysis and LRFD design calculations, along with steel quantification procedures, which are completed in a single run. Then this rational hybrid analytical model is applied to examine a real-time project pipe rack structure module. As research findings, the results of the analytical model are compared with the outcome of both the conventional methods as well as the bench mark detailed engineering calculations. It is found that the quantity obtained using the new method is extremely close to the detailed engineering quantity with the least time consuming. Hence, this novel analytical model has proved to be a boon to structural engineers working in Oil and Gas industries since the crux of pre-bid engineering is to process voluminous data and calculate the quantities more precisely within a shorter time frame to be a successful bidder.

Keywords: Steel Pipe Racks; Steel Quantity Estimation; Oil and Gas Industries.

1. Introduction

The energy sector is the key factor in the economic growth of any country. The production process is highly based on the growth of energy sectors in a country, and due to this fact, the economic development of all countries has a strong correlation with high energy consumption levels. The per capita Gross National Product (GNP) is naturally having a relationship with the energy consumption activity. Countries with higher per capita GNP obviously consume a lot of energy per person. As an illustration, the per capita energy consumption in the United States is around 16 times that of India. Similarly, Japan's energy consumption is almost 8 times that of India.

The energy industry represents all the forms of industries in total, which are occupied in the production and sale of energy, covering drilling and extraction of crude fuel, processing, refining and distribution to the retail market. Civilized mankind uses huge quantities of fuel, and the energy sector plays a crucial part in the development of infrastructure and maintenance of the societal needs in almost all nations. Oil and gas are vital to many factories and are very important for the creation and development of industrial civilization, and thereby are a real concern for all countries.

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