Predicting Batch Plant Productivity using Linear Programming Models

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ABSTRACT

It is clear that most of mega and medium sized projects in Egypt are using **Ready-Mix Concrete (RMC)**, in their construction work. As it is important to improve the actual production rates of batch plant to optimize the usage of their outputs; the use of concrete batch plants by concrete mixers is rapidly increasing in the construction industry. This is an important step in securing high productivity in the industry. Concrete batch plant specialists are well aware of the importance of productivity, and hence, there is a great potential for productivity improvement in batch plant concrete industry, Batch plant of concrete is very essential part in construction process, which is defined as central plant on project site and is transported by transit mixers to projects, This research is to provide and analyze a clear understanding for how to improve the productivity of concrete batch plants through analyzing the data collected from batch plants to determine the most effective factors affect the productivity. This will be done through studying the collecting data from 2016 to 2017 and it illustrates transportation distance, time, quantities and factors effect productivity for the batch plant, this research attempts to classify, investigate, and sort causes that affect batch plant productivity. To perform that goal, researchers invited experts on this field by answering a detailed questionnaire survey. Brain storming was taken into consideration, through which a number of effective causes was identified in batch plant. Totally, forty five (45) related causes are classified into five (5) major categories. The survey was conducted with experts and representatives from private, public and local general batch plant. The data was analyzed using Confidence Factors, ranking and simple percentages. All ranked causes were demonstrated and mentioned against their most effective causes to the batch plant productivity; then factors effect on batch plant actual production rate have been studied to take them into consideration in improving productivity of the batch plant process and has given an equivalent formula model for the most ten (10) effective factors by using **Statistical Package for Social Sciences software (SPSS)** to predict the **Actual Production Rate (APR)**; then estimated **Linear Programming (LP)** model using **LINGO** Software was developed in the final form of the model. By using this model, the batch plant manager can forecast the behavior of the batch plant and it's **Actual Production Rate (APR)** for any new construction site orders after knowing the values of all variables.

Keywords: Ready Mix Concrete, Statistical Package for Social Sciences, Linear Programming and Actual Production Rate.