

# **Simulating the Production Line of Reinforcement Bars and Determining the nondominant Solutions for the Number of Cranes**

## **Abstract**

In this research, it has been attempted to model the production line of reinforcement bars using discrete simulation modeling to determine the number of cranes required, considering the relevant factors such as, production line speed, failure rates of each machine and the space requirement. To achieve this, the production process was first investigated and an appropriate simulation model was formulated using the Enterprise Dynamics (ED) simulation package. The relevant data were then collected for each entity through time study. The sample size and the statistical distributions were identified. To check for model validation, the simulation results were compared with actual data using statistical tests. To determine the desired number of cranes and improve the production line performance, three indices i.e. output rate, productivity factor and mean waiting time were determined through expert opinion and eight different layouts were constructed as alternatives considering the space constraint. All three indices were determined through simulation taking a reproducible approach. The weights of the criteria were computed using the Entropy technique and the alternatives were ranked using the TOPSIS methodology.

## **Keywords:**

Simulation, non-dominated solutions, mean waiting time, work cycle, productivity factor

## **References**

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