Improving Inbound Logistics Process Using Lean, Six Sigma, Simulation Integrated Approach

Student's Name: V. Suresh  
Academic Supervisor(s): N. Sandeep  
Industrial Supervisor(s): A. Suresh, TVS Motor Company Limited, Hosur

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Abstract:

In an era of global manufacturing, a company must flexibly change its strategies when new markets are explored and when demand changes frequently. With the intense market competition, automobile manufacturing enterprises are upgrading their logistics system timely, in order to adapt to the internal and external changes. Business seeks to increase value through efficient SCM, thus achieved by reducing waste in the supply chain and lowering operating cost. The inbound supply chain is a critical part of a manufacturer's supply chain. Higher turnaround time would affect the delivery lead-time from suppliers to manufacturing setup of the OEM's and increase transportation cost. The truck turnaround time for loading and unloading can be reduced by improving the warehouse and incoming receipt processes to ensure minimal waiting time for trucks.

The purpose of this project was to improve the inbound logistics process of an automobile industry and thereby reduce the turnaround time of trucks. Optimisation of resources was needed for reducing the turnaround time of truck. The objective of the project was achieved by using Lean, Six Sigma and Simulation integrated approach. Data collection and analysis uses Six-Sigma techniques and the proposal and validation uses simulation as a vital tool. The causes for high turnaround time were filtered using various Six-Sigma tools and finally classification and regression tree assisted to find the main root cause. The main findings in this project are mode of package that contributed to high turnaround time. The solutions derived to optimise the mode of package are palletizing operation, addition of unloading dock and ergonomic factor improvement.

The scope of the project covers optimisation of resources such as workforce, facility, Material handling equipment and space using Discrete Event Simulation approach. The main result of the project is the reduction of turnaround time of trucks from 240 minutes to 86 minutes. The final assembly line stoppage is expected to reduce by 50%. The project was validated using Discrete Event Simulation approach.