

Tofus-FIAT Realizes 48% Reduction in WIP with ProModel Simulation

Tofas - Fiat

Success Story

Automotive
Manufacturing

Process Simulator



CHALLENGES

Turkish automotive company Tofas, founded in 1968, is the 6th biggest industrial enterprise of Turkey and brings together six global brands: Fiat, Alfa Romeo, Lancia, Maserati, Ferrari and Jeep. The Fiat Corporation, Analysis Department at TOFAS-Fiat in Turkey needed to understand the behavior of its system and evaluate various strategies to reduce Work In Process (WIP).

Manipulating a real life automobile manufacturing system for the purposes of trying different production strategies is difficult and costly, especially because it interrupts actual production. Therefore, simulation was the most suitable tool for understanding and experimenting with these changes in systems variables and work in process.

OBJECTIVES

Fiat needed to detect which of the following were the most important reasons for excess WIP:

- large lot sizes
- long set-up times
- long lead times
- Ineffective production scheduling
- breakdowns of machines
- non-value-adding activities of operators

VALUE PROVIDED

As a result of the modeling effort, there was a 48% reduction in the average WIP. The most important results of the project were:

- Cost reduction
- Reduced lead times
- Better quality monitoring
- Space reduction
- Better scheduling rules

As a result of the improvements the cost of material was reduced by the same amount. There was a 14% improvement by implementing only the scheduling rules.

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This study revealed the importance of one piece flow, over batch production and bearing the cost of excess WIP. Minimizing WIP forces recognition of all waste and abnormalities in the system because excess WIP hides the non-value-adding activities. It also facilitates quality control by making the full process observable. Communication was improved both among the operators and their leaders by discussing the results or their suggestions. Fiat planned to increase the use of simulation in other productivity improvement studies.

SOLUTION

A model of the actual system was constructed. Then the model was verified and validated and reasons for excess WIP in the workshop were analyzed and identified. Next they tested the results of various changes to system variables, to establish a minimum stock level. ProModel was used for gaining an insight into the relationships among these different variables. The model was used to run scenario experiments and set new rules for the production system to improve productivity. Through these experiments Fiat gained a better understanding of the relationships between WIP and lead times, lot sizes and set up times. The proposals for decreasing WIP were divided into two categories, scheduling and technological. Scheduling recommendations included:

- Creating lot sizing methods
- Material pulling to the system (the number of pieces going into the systems should be equal to the required number of output)
- Lead time monitoring and lead time reduction through waste elimination
- Prioritizing machine-operator assignments
- Increasing the number of multi-process material handling operators

The technological recommendations included:

- Reduced set up times
- Methodical improvements
- Machine automation where possible
- Layout optimization
- Preventative and productive maintenance