

Formulation and Filling - Scheduling and Throughput Analysis

Vertical

Manufacturing **Pharmaceutical** Healthcare Portfolio Logistics Financial Government Business

Genre

Case Study

Project Review

White Paper

Technology Overview

Client

Major Biotech Manufacturer

Situation

This biotech company's only final stage bio-manufacturing facility in the world was struggling to meet rapidly increasing customer demand. Repeated unanticipated production delays and starvations at critical parts of the operation were causing not only late and missed deliveries, but the expiration of batches of product at a cost of approximately \$1 million per batch.

The production team at the facility had not been able to identify the root cause of the delays, nor find a suitable solution. As a result, they were planning to invest \$1.2 billion to add another 500,000 square feet to the existing biotechnology bulk manufacturing facility.

Objectives

The client engaged ProModel to help develop a solution to understand the best course of action to fix the manufacturing problems. The major objectives were to:

- Uncover the root cause(s) of the unanticipated delays creating the late and missed deliveries.
- Provide the client with a solution that allows them to analyze and identify, in a risk free environment, which potential changes will eliminate the delays.
- Determine if and when the additional capacity from the new facility would be required.

Solution

ProModel worked with the client to create an integrated production simulation and scheduling solution within 8 weeks. This solution allowed them to run multiple production scenarios taking into account parameters such as workforce resources, process flow, material availability, equipment, scheduling, and product mix. The information generated by running these scenarios empowered the Production Planning Team to test schedules, visualize the impact on throughput and cycle time when changes are made to these parameters, and provide the optimum schedule to the Production Execution Team.

While developing the solution, the Industrial Engineering Team discovered that Production Planning was scheduling using a push system. The team thought that changing to a pull system might help reduce the delays. Changing to a pull strategy required answers to the following questions before implementation:

- What levels of inventory should be used to ensure line continuance, but not result in lost batches due to expiration?
- If/when would additional labor be required?
- When in the future, if at all, would additional line capacity be required?

The following was done to arrive at the solution:

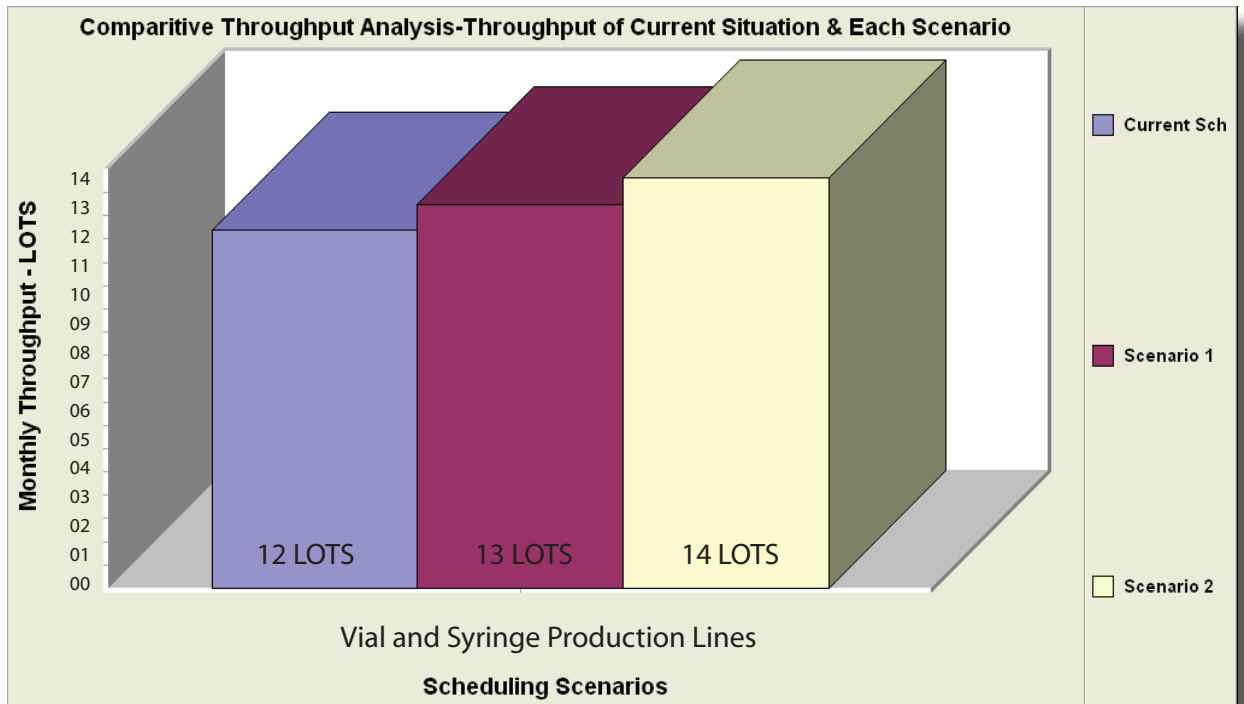
- Microsoft® Visio was used to map out the process flow and used as the foundation for the model. If the analysts want to change or add a new process they simply change the flow chart and it automatically updates the model and the Microsoft® Excel input templates.
- The Excel input templates made it easy to change production tasks, process times, and the resource requirements.
- Scheduling software was integrated with the model and was used to evaluate the proposed schedules with Gantt chart output reports.
- Easy to use Design of Experiment capabilities in concert with a set of user definable Key Performance Indicators provided the method to rapidly evaluate system performance across an unlimited number of scenarios.
- Provided a way to quickly optimize production schedules to alleviate the impact of line problems as they occurred.
- User friendly input settings were implemented to adjust varying levels of inventory controls by sub-process and lot type (vial, syringe, drug type).

Results

The client project team, working together with ProModel and the solution above, were able to accomplish the following:

- Determined how, the facility could produce two more lots per month, which has resulted in a monthly revenue increase of over \$25 million.
- Defined the right combination of in-process inventory levels and process changes (going to a pull system) that would virtually eliminate line starvations, which resulted in cost avoidance of over \$3 million per year.
- Provided a user friendly interface for scheduling and evaluating the schedule of the production operation.
- Developed the capability to quickly schedule around the impact of significant unplanned downtimes.
- Provided the ability to optimize labor use and eliminated the need for additional staff.
- Provided a better way to do long-term expansion planning and predicted when and where more line capacity would be required.

An example output chart which displays the monthly throughput of the current push scheduling strategy compared to two different variations using a pull strategy. The pull strategies clearly improve the monthly throughput. Scenario 2 improves it by two lots per month from 12 to 14. This has resulted in a monthly revenue increase of over \$25 million.



ROI Range

