Cream Cheese Manufacturing Case Study

SUMMARY

Flexsim Software Products recently assisted a major food manufacturer with a simulation study of their cream cheese manufacturing process. The manufacturer provided Flexsim with detailed descriptions and data of the process as well as a tour of the facility. Flexsim built the simulation model and provided training on how to use, maintain and update it as needed. The manufacturer then performed the analysis and what-if scenarios using the model.

PROJECT'S OBJECTIVES & GOALS

This study had two goals. The model was built to achieve both of these goals. The first was to help the manufacturer understand the actual capacity of the plant as it currently exists. Due to constraints in raw material arrivals and unexpected delays in packaging, this capacity was not well known. The second goal was to determine what areas of the manufacturing process were the causes of major bottlenecks that decreased the plant capacity. The model was also expected to be usable to determine the equipment needed to overcome these bottlenecks. The plant had a goal of producing a certain amount of cream cheese each week. This amount was roughly 120% of the estimated current capacity. If the model could be used to show that this amount was possible with minimum new equipment required, the plant could justify the expenditures for the new equipment, and they would be able to take more customer orders than they currently do.

MODELING APPROACH

Due the nature of the cream cheese manufacturing process, Flexsim's typical modeling approach of using discrete, individual items flowing through the model was not appropriate. Instead, a new library of objects that Flexsim was developing was used. These objects were designed to handle fluid flow. This model became one of the first testing grounds for this library and it performed as well as Flexsim expected.

These new fluid objects were used to simulate the various tanks, mixers, and pipes in the cream cheese manufacturing process. There were no operators modeled, as they were not considered potential bottlenecks. Other simplifying assumptions were made, such as modeling a series of small tanks with a single, larger tank. It was also decided that the model would only simulate the production of a small number of finished products that the plant can make. The other products either required one of these "basic" products to be made first or required a complicated sub-process that was considered out of the scope of this project. It was decided that the raw materials for the products that required the sub-process would be included in the model, but they would be removed steadily over the course of the model run. This allowed the manufacturer to understand how raw material arrivals affected the overall capacity of the model, even if not all products were being modeled.

Data for the model was entered using an Excel spreadsheet that could be easily changed by the model user. This spreadsheet contained such information as the production schedule for a week, the recipes for the products that were being modeled, the capacities of the tanks, the times required for mixing, culturing and transferring the in-process product and the arrival schedule of raw materials. At the end of a model run, data from the model could be exported to an Excel spreadsheet that could be used for analysis. This data included information about what times objects in the model changed state (empty, full, etc.) and what the throughput of objects in the model was at various times throughout the model run. This data was exported in a fairly “raw” format, allowing the user to perform whatever post-run analysis they required. This included creating custom charts and graphs of the data. The result spreadsheets from different runs of the model could be saved under different names so that they could be easily compared.

SUMMARY & BENEFITS

Once the model was completed, it was given to the manufacturer so they could run their what-if scenarios. They ran the model to determine where the bottlenecks were and they simulated adding additional equipment in those areas. The additional equipment was simulated by increasing the capacity of the objects already in the model. This was less accurate than creating new objects, but it required less work and training. It was found that by adding one additional resource in each of the three largest problem areas, the increased capacity goal could be reached.

As the manufacturer continues to use the model, they will become more familiar with the intricacies and details that make it work and they will be able to make larger, more accurate adjustments to it for their future simulation studies.

SREEN SHOT OF MODEL

See page following