CRITICAL WAREHOUSE DECISIONS

In large, automated distribution centers, properly organizing and sequencing orders is key to making sure products get out the door on time. With so many interactions and dependencies involved in today's warehouses, a simulation study is an effective choice to understand and help balance these systems.

For Bastian Solutions, simulation modeling was a critical component in helping their cosmetics distribution client design and implement a highly automated distribution center. ***The goal was to create a working simulation model of the facility to use as a decision support tool.*** Bastian Solutions and its talented team of engineers did just that, building a 3D simulation model using FlexSim simulation software.

This model is valuable because it provides immediate and tangible value to the client while adding flexibility for future use. With a working computer model of the facility to experiment on, decision makers can get quick and accurate information to investigate changes in: product slotting, order volumes and order mix, order release parameters (for workload balancing), Warehouse Control System logic, staffing and scheduling plans, and operator productivity.

FlexSim gives modelers the flexibility to customize a model in a variety of ways, so Bastian Solutions equipped it with an intuitive and user-friendly interface. The client doesn't need any training in using simulation software—Bastian's custom interface allows them to easily change model inputs and parameters for staffing, order release, capacity, picking rates, and more. The model can be changed, analyzed, and then changed again in a matter of minutes.

Overcoming Challenges

Bastian Solutions overcame several challenges they encountered while modeling such a complex facility. The model needed to manage 40,000 rows of SAP data and associ-

SUCCESS STORY

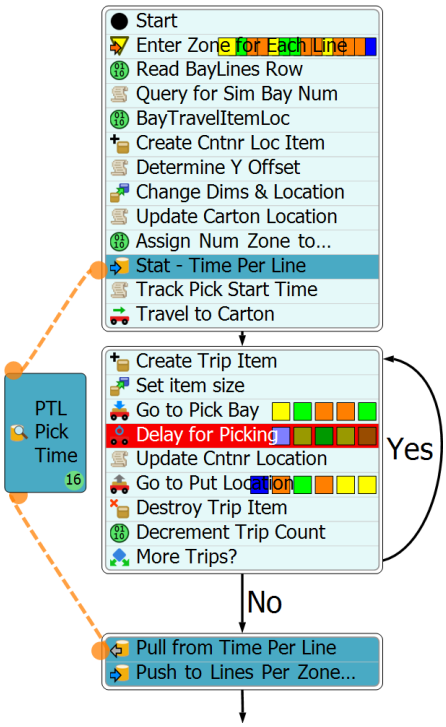
FlexSim problem solved.

Client
BASTIAN SOLUTIONS

Location
Indianapolis, IN

Type
Global Material Handling Systems Integration

Web Site
www.bastiansolutions.com



Example of Process Flow logic

ate this data with elements in FlexSim. This is a fair amount of data to manipulate. To solve this problem, Bastian used FlexSim's integrated SQL functionality to write a number of queries that made the data meaningful and useable in the model.

They also had to discover a way to replicate the logic of their own Warehouse Execution Software (WES), **EXACTA**, in FlexSim. The WES is the "brain" of the system, sequencing and regulating the release and flow of orders into the facility. FlexSim's Process Flow tool was used to replicate the WES logic—Bastian Solutions created an algorithm using Process Flow activity blocks to evaluate the system's capacity against the orders sitting in the pool, and then release the orders in a way that keeps the system balanced. This algorithm is advanced enough to consider order priority and system constraints as it releases and routes containers throughout the facility. It's also simple to read and follow the algorithm as it works, a feature of Process Flow's centralized and easy-to-digest logic building.

Bastian Solutions was also able to successfully manage communication between the logic created using Process Flow and the 3D space. The 3D component of the model is critical for dimensioning the facility and its conveyors and also to visually validate what's going on. Bastian Solutions made extensive use of FlexSim's "Wait for Event" functionality, which they cited as a ***powerful framework*** for communication and data transfer between the model's logic and its 3D presentation.

Results and Analysis

To help in analyzing and evaluating the model, Bastian Solutions used FlexSim's built-in dashboards and charting to mimic the four main outputs from their own WES. At the end of a simulation run, the dashboards could help answer the following questions:

- What is the state of the system right now?
- What happened throughout the entire picking day?
- What rates are operators working at, and how much are they utilized?
- How balanced are the pick areas and pick zones?

The model has been a valuable tool for the client to support decisions made in the facility. ***Since its custom interface has been set up to quickly change dozens of configurations and inputs, this model will continue to produce for months and even years to come.*** In future phases of the facility's lifecycle, the client will even be able to adapt this model to investigate material handling system design changes and expansions, adding even more value from modeling and simulation.