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End-to-End Process Improvement

with FlexSim Simulation Modeling Software

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Achieving Success In **Process Improvement**

What does it take to be a successful organization? There is more than one right answer, yet all successful organizations seem to have one thing in common: they are constantly striving to improve. Whether that means using Lean, Six Sigma, or Business Process Management techniques, the goal should be understanding the entire system to find optimizations and remove inefficiencies. Does this sound familiar within your organization? If it does not, *why not*?

Simulation modeling is an excellent choice for adding value to your improvement strategies. It gives a holistic view of operations, showing how interrelated processes

WHAT IS SIMULATION?

Simulation modeling is the process of creating and evaluating a virtual prototype of a real-world system. The virtual environment provides a safe place where data is easy to come by and where mistakes result in improvement instead of ending careers. When it's presented in an intuitive and easy-to-use software package, simulation is a powerful problem-solving tool that allows decision makers to answer important "what if" questions about their business.

impact each other to affect the entire system. According to BPM.com: "In a complex system like a business, it is well known that local optimization of part of the system will rarely lead to good overall results." One should "consider the metrics of the entire system when evaluating a specific process."

So, what does FlexSim add to a solid process improvement strategy?

FlexSim is a uniquely powerful software package, with built-in tools and standard objects suited for modeling any scenario or environment. From supply chain to manufacturing to packaging to logistics, it's capable of considering any and all facets of the full system.

Once the system has been modeled, the analytical possibilities are endless. Do you have multiple changes or "what if" scenarios to test and validate? FlexSim can quickly process as many experiments, optimizations, and simulation runs as you need to get the best information for these critical business decisions.

One FlexSim client, **a leading pharmaceutical company**, used simulation modeling as part of a broader continuous improvement strategy to look at current operations and optimize them. The following series of short case studies demonstrate a smart organization that is willing to improve, evolve, and thrive.

1. Large Scale Manufacturing

Starting with a narrow scope for a quick win

In one of their manufacturing facilities, **the client** produces more than 10 billion tablets per year. These products, including moisture-sensitive effervescent tablets, must reside in a humidity controlled and clean environment.

In one part of the manufacturing process, operators must move extremely large bins through narrow corridors. These operators will also travel through clean rooms at different intervals while moving the bins. To better understand how these operations were performed, process improvement specialists traced every bin to determine:

- The count of the bin.
- How many times the bin was washed.
- The number of uses of the bin.

While doing this analysis, they noticed that the facility did not have the capability to fully trace the bins. An operator had to manually walk through the facility to keep track of what is happening.

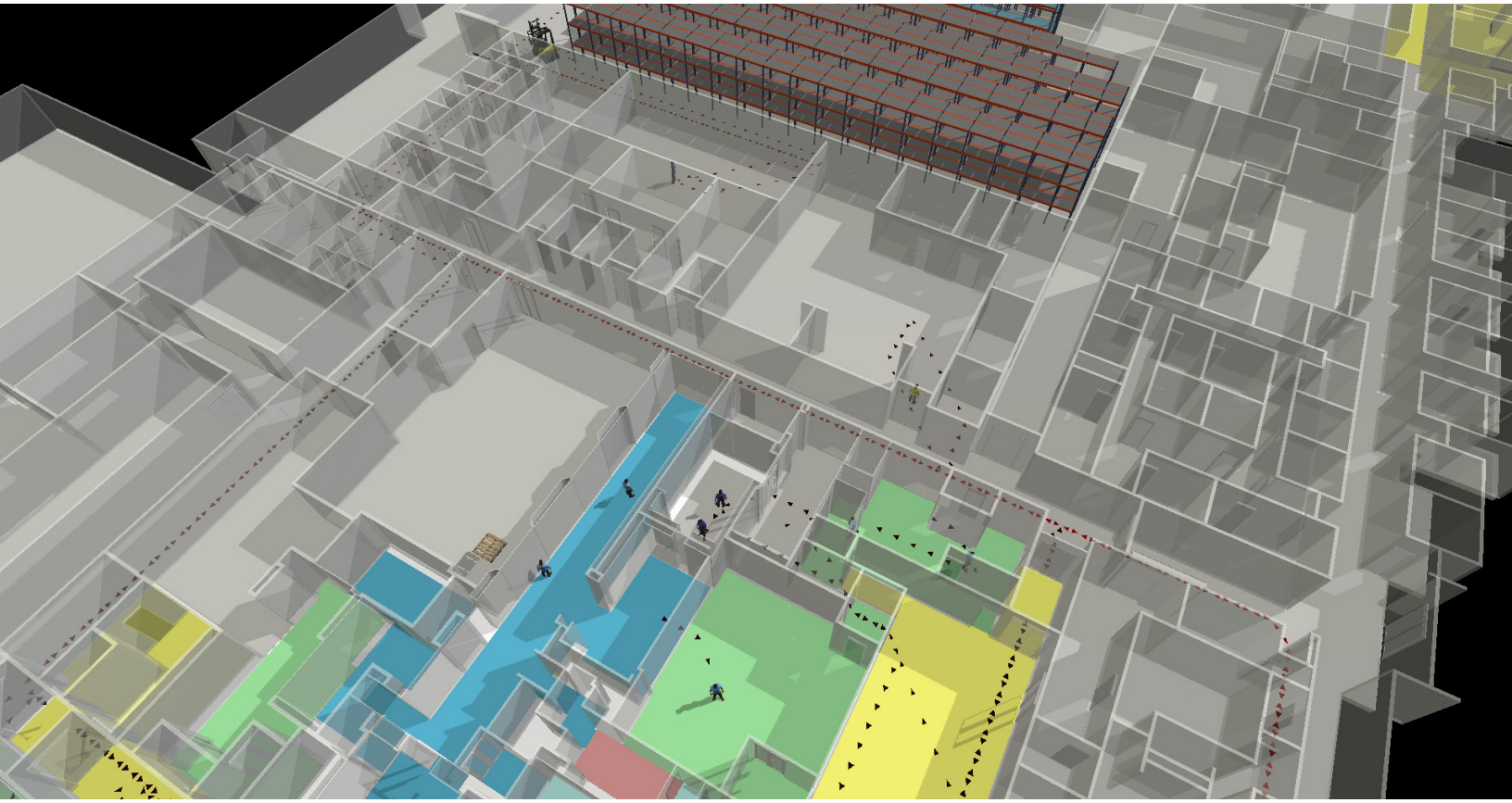
One possible solution to this problem is a scanning system to provide better traceability for the bins. The client successfully developed a simulation model in FlexSim to validate this proposed scanning system. **The model predicted a large reduction in the number of bins required for the process, from 200 to 100**. In addition to the financial savings involved with bin maintenance and replacement, **the model began to show improvements to product lead time**.

2. Lead Time Improvement

Widening the scope to consider the entire system

Building upon the previous model, the client developed a full Site Master Plan to help validate options for further improving lead time. FlexSim, with support from the operational excellence lead at the site, embarked on an ambitious project to model all product movement within the facility.

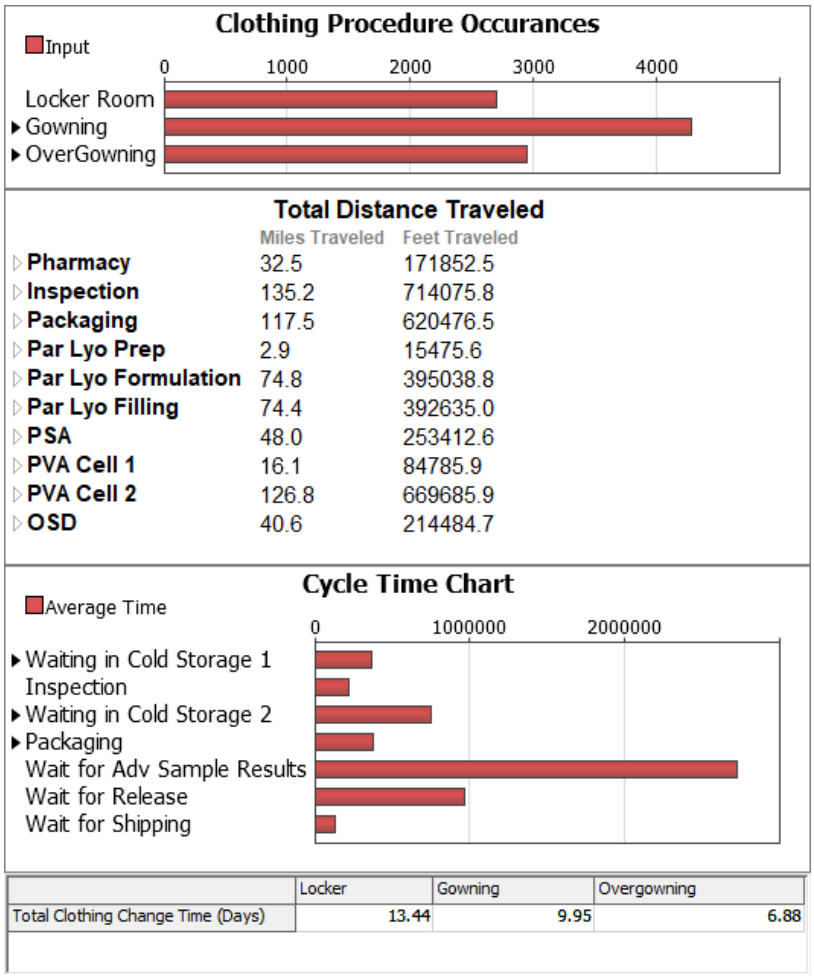
Travel was the focus of this model since operators move product around the facility and need to enter airlocks and change clothing at regular intervals. The model made use of FlexSim's automatic pathfinding algorithm to accurately mimic the paths operators would travel. This also made it easy to visually inspect travel path "heat maps" while the simulation runs.



The most important key performance indicator (KPI) here is the batch cycle time: how long it takes to manufacture and ship a single batch. Using FlexSim's Process Flow tool, the client was able to lay out an accurate imitation of the real-world process steps that each batch goes through. This includes flow logic, process times, and processing locations for each batch type. These process steps then interact with the 3D environment to visually show all product and operator movement, delays, and bottlenecks that may arise in the system.

The model showed, on average, a 120-day lead time to get one batch of product through the facility. In addition, it showed that operators are walking about a marathon (more than 40 kilometers) per week while working at the facility. These initial findings helped the facility managers understand the complexity of the end-to-end process and provided a baseline for making improvements.

This is what sets FlexSim apart from other analytical methods. The client now has a flexible and scalable baseline model that they can continue to extract value from. Process improvement specialists immediately went to work experimenting with possible changes to the process. **Several early solutions showed a more than 20-day lead time reduction for each batch**. These changes have been elevated to other departments to check for feasibility.



3. Capacity Analysis

Checking the capacity of other links in the supply chain

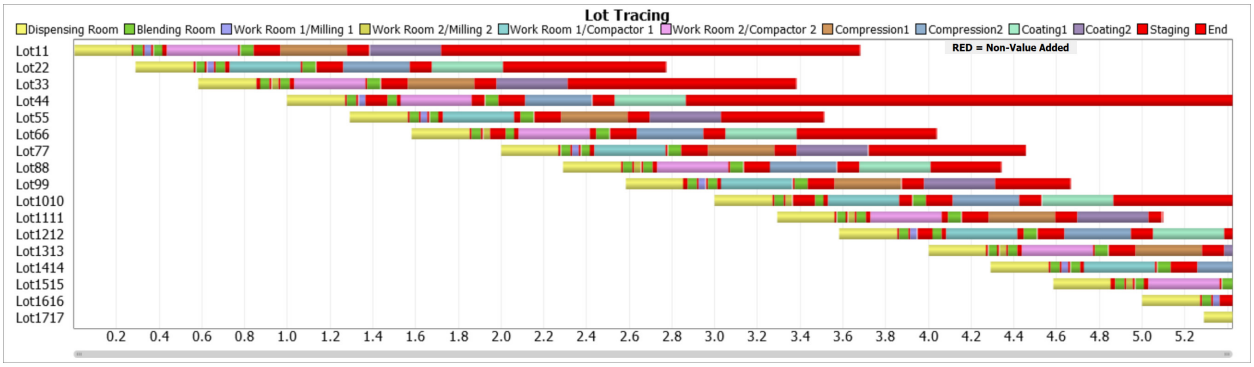
At a different facility, FlexSim was used to identify improvement opportunities in a specific area of tablet production. As demand for certain products increased, the facility wanted to increase production from 15 batches per week to 25 batches per week. As part of this effort, an expensive piece of equipment was identified as a possible solution.

The client's process improvement specialists had some suggestions for improvements, but they wanted to validate their hypothesis before taking recommendations to the board. The goal was to find and eliminate the bottleneck in the process.

It seemed like the blending step was the source of the bottleneck, but the model would provide more understanding of the problem areas.

The throughput of batches was the most crucial KPI to see if the facility was meeting new production goals. Machine utilization was also closely monitored to see if the utilization changed in any significant way, showing potential bottlenecks.

A given batch of product goes through the same basic process steps each time. However, FlexSim was able to accurately model other intricacies in the system. Logic was developed to easily restrict the movement of batches and to reserve and prepare rooms before the batch was moved into place.



In this case, the model provided information contrary to the popular beliefs in the facility. The bottleneck ended up being the dispensing step instead of the blending step. Once this was discovered, they were able to test different improvements to the dispensing area. One improvement, coupled with adding a separate blending room, increased throughput to 20 batches per week. The model can be easily changed to experiment with additional scenarios, so it is only a matter of time before the optimal solution is found to meet the new production goals.

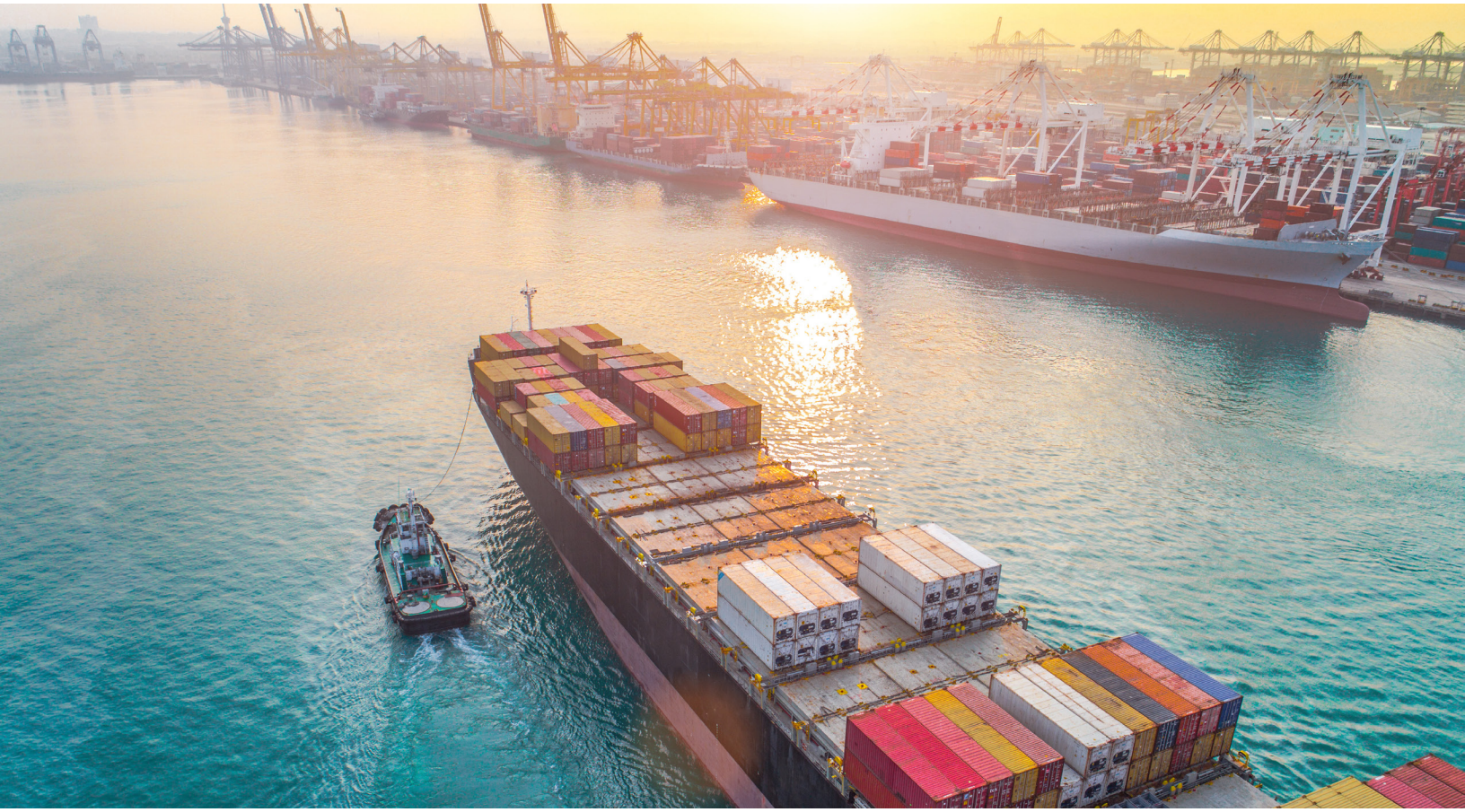
In the process of creating this model, **the client determined that the proposed $50 million new technology was no longer necessary to meet production goals**. This decision to develop an improved process instead of making a new investment represents a massive cost savings.

4. Supply Chain

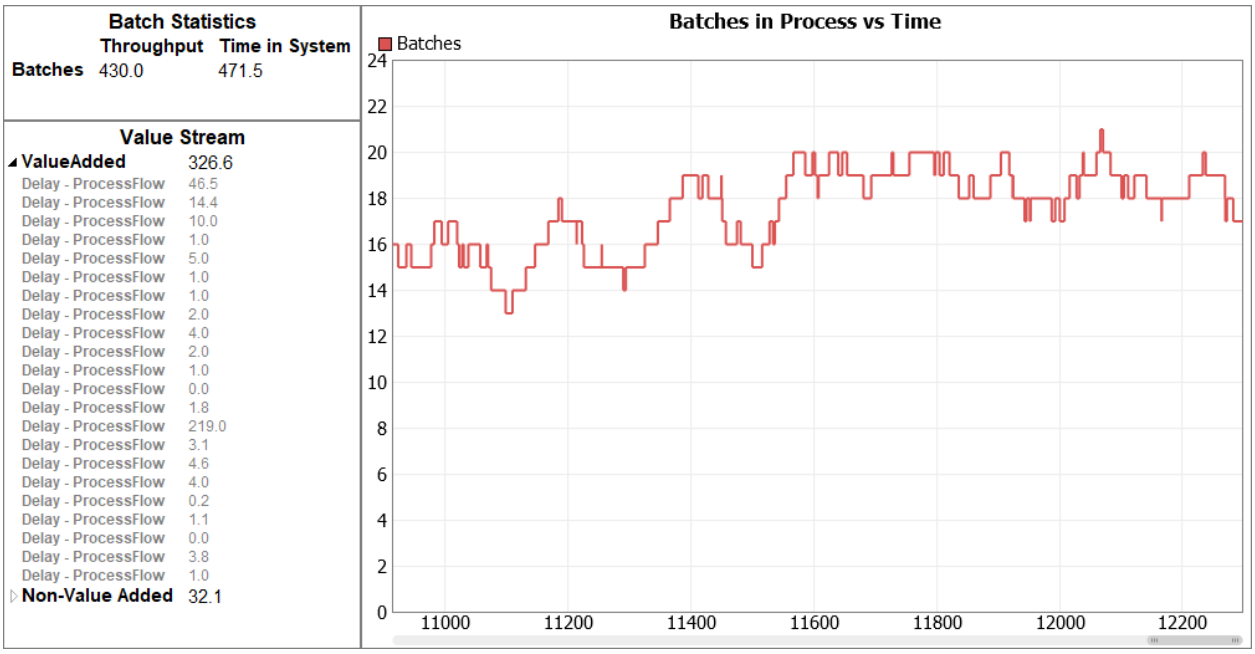
A global perspective on the system

What happens to inventory levels if there is an interruption in the supply chain network? The client sought to answer this question and developed a FlexSim model to find an answer.

The global supply chain model they created first examined the selling market to clients. As the model progressed, it began to account for the entire end-to-end network to see where the supply chain can be improved. This made it a proving ground for important "what if" questions. *What happens if we lose a site? Can we ramp up on production at another site? How long would inventory be depleted?*



This model took a unique approach, enabled by FlexSim's Process Flow tool. The supply chain process and logic were arranged like a value stream map, showing value added and non-value added time throughout the supply chain. At the same time, the 3D model view showed a map of the world with the various facilities laid out in their respective locales. The model considered transportation times to and from these facilities, by truck, plane, and cargo ship.



Through this model, the client has been able to predict more accurately what would happen during disruptions to their supply network. This is crucial information to have when planning to fulfill future demand.

Conclusion

Process improvement specialists at FlexSim's pharmaceutical client demonstrated a willingness to take an end-to-end process management approach. While doing this, they learned more about the individual processes in their system to make the best possible decisions.

The benefits they experienced range from **multi-million dollar savings by avoiding unneccesary changes** to **critical information to strengthen the supply chain**.

These are just a few examples of how simulation modeling provides businesses with crucial information to make informed decisions as they constantly strive to improve.

Are you concerned about impending changes in your operations? Frustrated with a process that needs to be improved? Get in touch with FlexSim today at www.flexsim.com to see how we can help!

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