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From Experience

Three Key Reasons for Utilizing Simulation

Spreadsheet programs are used for data analysis by nearly every organization across the globe. While these programs work well for quick data analysis, they struggle with modeling complex systems. In manufacturing, simulation provides a more advanced solution for developing models that include the various micro-processes making up a larger production line.

When it comes to simulation for food and beverage facility design, three major use cases exist:

1. **Manufacturing Line Design.** One method of design validation is V-graph verification, where the simulation confirms that equipment rates are sufficient to ensure the line operates as intended. Simulation can also assist in sizing and placing accumulation. A user can place equipment on the line and program the Mean Time Between Failure (MTBF) values for each piece of machinery. The modeler can then collect data at various points on the line to understand how machine failure affects product buildup. This data helps determine the optimal location and size of accumulation.

2. **Flow Control and Logistical Analysis.** Simulation can be used to validate operator and forklift processes within a facility. For forklifts, a modeler can examine traffic patterns. The data collected from analyzing forklift traffic could confirm whether the number of forklift aisles is sufficient.

Additionally, simulation can help analyze forklift and operator utilization. This data tracks the state of a forklift at any given time, such as moving to drop off a load, picking up a load, or idling while waiting for a task. By using simulation, one can determine the optimal layout and the ideal number of forklifts to minimize idle time and maximize utilization.

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A key use of simulation is comparing two prospective processes to understand the effects each will have on a manufacturing facility. (For example, comparing hand palletizing versus automated palletizing (see images on next page). By analyzing utilization or product throughput data, simulation can provide valuable insights to help inform the design.

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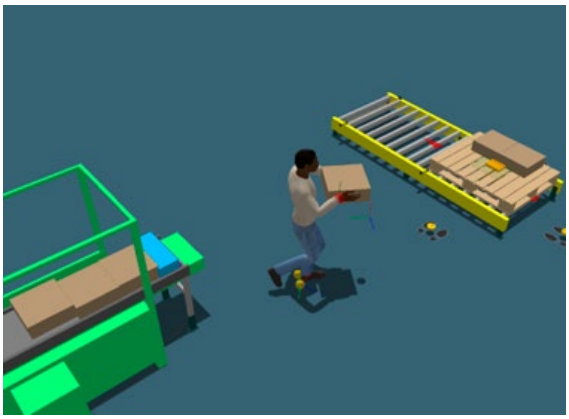
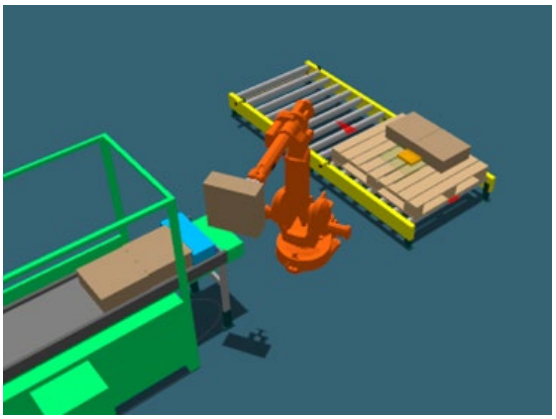
3. **Visual Appeal and Process Comprehension.** Process comprehension is an often-overlooked benefit of simulation. Instead of relying on static images and layouts, users can visualize the operation of their line. For example, they can see a pallet of bottles being delivered to a depalletizer, then watch as the bottles move down the line, are filled and capped, and are finally palletized and stored in racking. This can be especially beneficial in demonstrating how each machine center manipulates a product.

Simulation can be an invaluable tool for collecting data to inform decisions early in the design process. It enables the creation of comprehensive models that encompass the micro-processes supporting a production line.





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