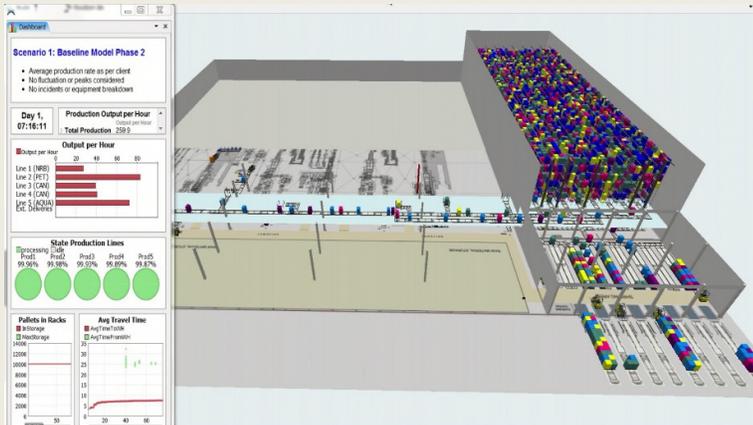


HIGH-BAY WAREHOUSE



CUSTOMER: SSI SCHAEFER / PepsiCo

WEBSITE: www.ssi-schaefer.ae

LOCATION: Al Jomaih, KSA

YEAR: August 2015

SOFTWARE: Flexsim

SERVICES:

- ✓ Simulation/Feasibility Study
- ✓ Analysis & Consulting
- ✓ Visualization / 3D Animation

THE CHALLENGE:

Our client was planning a new high-bay materials warehouse with more than 13,000 pallet positions as well as a conveyor system connecting the beverage filling lines in the attached production area to the Automated Storage and Retrieval System (ASRS) as well as the dispatch area. The warehouse will serve as the National Distribution Center serving many major clients and regional distribution hubs.

We were requested by the equipment supplier to run a full simulation study during the bidding stage to validate the layout and system performance. The high-bay warehouse project consists of 2 phases, the first to be completed in 2016 and the expansion to be completed by 2020, which will increase the planned output from about 150 pallets per hour to more than 260 pallets per hour.

THE OBJECTIVES:

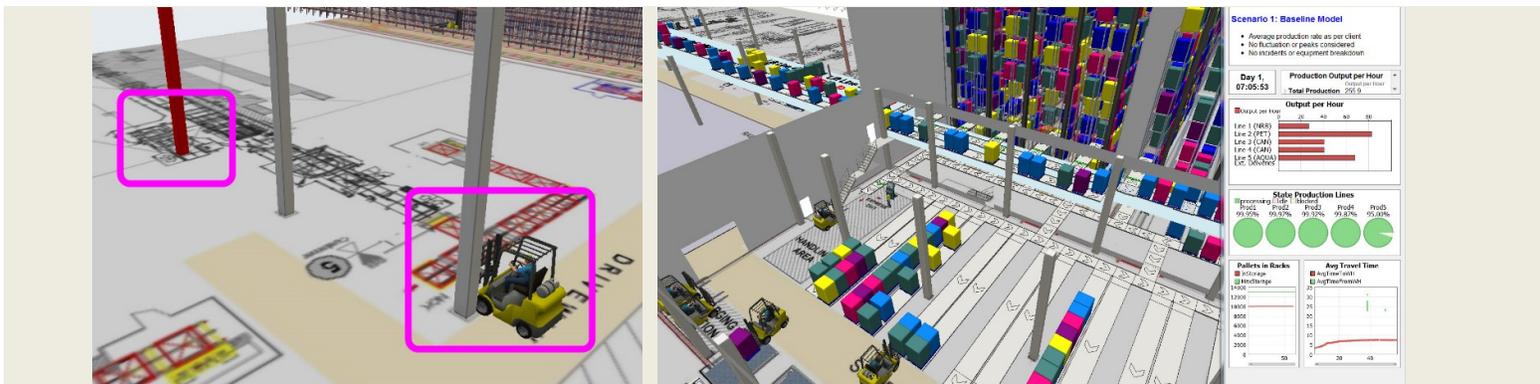
- *The client has requested a simulation study to be conducted as proof of concept*
- *Concept validation conveyor system vs. monorail system*
- *Demonstrate the throughput capacity of conveyor system and its buffer capacity in case of equipment failure (e.g. conveyor module or ASRS system)*
- *Determine whether there are any bottlenecks and required throughput can be easily met for both phases 2016 and 2020 expansion*
- *Highlight optimization potential for material flow and operations in shipping area*
- *Provide statistical results & short videos and screenshots for final presentation*

THE APPROACH:

First we discussed various layout options and proposed a simplified and lean layout, which on one hand required a slightly larger mezzanine floor, but it was going to be more cost-effective than additional conveyor elements and implementing a complex routing logic for crossing material flows.

We also clarified design details, such as truck size and loading method as well as bottling line positioning within the building that would impact the conveyor system layout. We detected a column was too close to the bottling line and the forklift wouldn't have been able to maneuver around it. We also detected that pallets should reach the shipping area in other angle to optimize truck loading, which also entailed changes to the original conveyor layout.

We designed a spreadsheet-based input file to be imported, where users can easily define equipment parameters, hourly production profiles for all 6 filling lines as well as which scenario to run (Phase I or Phase II Expansion). Besides testing the maximum throughput capacity and fluctuation in production, we also included scenarios for equipment failures and operators to go and fix the issues within a certain time to see how the system can cope and whether any production lines had to be stopped in such event.



THE SOLUTION:

We let the simulation run with the constant production data given as planning data, but also created a more realistic scenario with variance across all production lines and temporary peaks of up to 130%. The system could cope at overcapacity for up to 3 hours and was quickly recovering the backlog when production slowed down to 100% or below.

We could also measure that production could continue without interruption if an ASRS crane or critical conveyor module breaks down and is repaired in the time frame as per maintenance agreement.

The statistics together with the video clips of the 3D virtual facility helped SSI Schaefer to make a great impression during the final bid presentation.

We provided our client a proof of concept in terms of peak throughput performance, an improved conveyor system layout as well as statistics on the system robustness in case of critical equipment breakdown.
