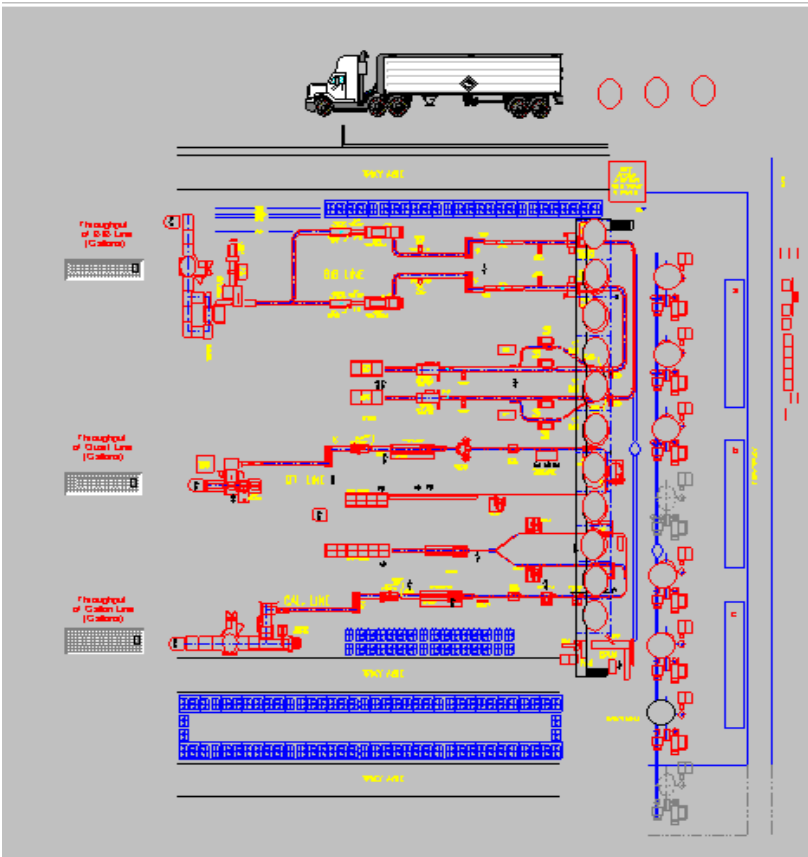


Household Cleaner Producer

Racine, Wisconsin

Facility Planning & Analysis Services

- Facility Layout Design and Optimization
- Simulation Modeling
- Scheduling



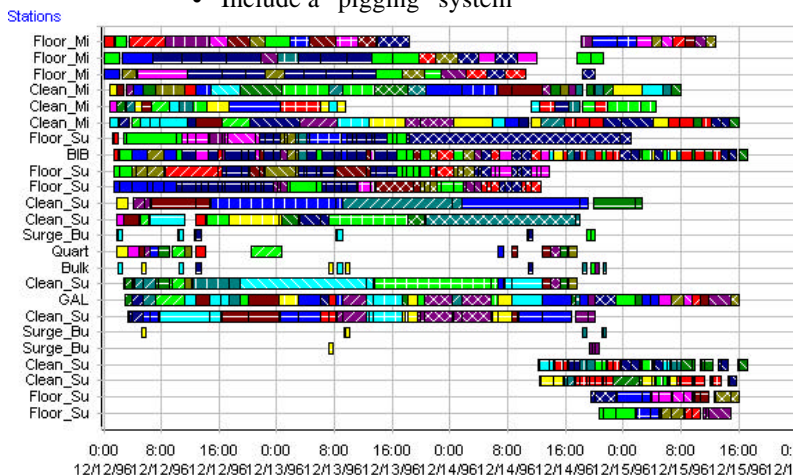
Simulation Model of the Proposed Manufacturing Facility

To meet an increase in demand, a household cleaners producer had to improve their floor finish and cleaner production facility. They selected a design/build firm to develop the preliminary design of this new facility. To minimize capital cost, the design included relocating many of the existing vessels, as well as, designing improved vessels. Op2mize personnel developed a simulation model to assist the design team in assessing which vessels to relocate and which to redesign.

The manufacturer was also concerned with the volatility in the market, so they required that the new system be designed to handle variability in batch sizes, production mixes, production times, vessel downtimes, and staffing. Along with the client, the design team developed and tested over 20 different production scenarios. The simulation model was employed to evaluate the effects of the variability on the proposed system. Through this analysis, it was determined the new production design would meet the production capacity requirements during the extreme cases of variability and would exceed expectations under normal working conditions.

Partial List of the Scenarios Tested

- Increase the size of the largest mix vessel by 25%
- Increase system surge capacity
- Front load the production schedule with bulk orders
- Increase the number of packaging lines
- Include a “pigging” system
- Reduce the number of mixers
- Include delay times for missing/lost raw materials
- Change the number of operators at the mixers
- Change the number of fork trucks in the system.
- Vary mixing times



Gantt charts are very useful tools that allow a process designer to graphically depict the equipment states over time. In the graph to the left each color represents a different batch that the a given piece of equipment is working on. These Gantt charts were used to validate the system's performance.