simulation

VISUALIZING THE EFFECTS OF CHANGE

Computer modelling and simulation are well-known tools and are invaluable aids to decision-making. Here at Foster Wheeler, we also offer operability modelling as well as capacity modelling for debottlenecking and utility analysis.

We use static and dynamic simulation packages such as WitnessÆ and SuperPro DesignerÆ with a customised user interface in Microsoft ExcelÆ for easy and efficient data input and results analysis.

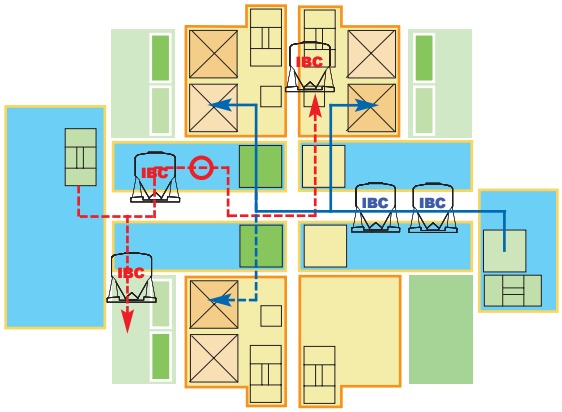
Operability modelling

Operability modelling can be applied to primary, secondary and biotechnology facilities, and includes the support activities required to operate a manufacturing process.

By conducting operability modelling, it is possible to:

- Plan labour (number of operators, operator position etc) and simulate operating procedures to ensure satisfactory operations
- Demonstrate movements to optimize layouts, eliminate cross-contamination and determine numbers of intermediate containers required
- Optimize dispensing points, use of intermediate containers and buffer storage
- Optimize utilities and services

The benefits of operability modelling include reduced capital cost, and also reduced operating cost, resulting from increased efficiency, improved labour utilization and reduced inventory.



Examine material movements in real time

Operability modelling in action

Oral Solid Dosage

Our operability model of an oral solid dosage facility for a global client was used to calculate the minimum number of intermediate bulk containers required by the facility (approximately half the number initially proposed) and to determine the capacity of local storage areas throughout the facility. In addition, the model demonstrated that the required annual production could be achieved and, through an assessment of equipment occupancy, that the number of dispensing stations could be halved.

API Manufacturing

Our operability simulation model of a new API production plant advised the facility management team of the number of operators required to run the facility, and their appropriate training needs. The same model incorporated all the manual activities in the plant, and was used to simulate material movements into and around the facility, identifying the need for additional storage space.

Further interrogation of the model for a ‘what if?’ study requested by the client underlined the benefits of introducing bulk storage: fewer material movements and a reduction in the demand for plant operators.

Capacity modelling

A European case study

We also undertake capacity modelling and recently modelled a simulation for a building expansion to increase production capacity of the existing active pharmaceutical ingredient plant as part of a feasibility study for a European client.

Our goals:

- Model the existing facility, building a basic model and also debottlenecking within the existing facility
- Model an expanded plant with maximum possible capacity of one product and maintaining the existing capacity of another (the two products share process utilities and some process equipment)
- Verify whether existing process utility capacity and support systems would be sufficient for the planned expansion and, if not, determine additional requirements

The results:

- Both reverse-osmosis-water and water-for-injection capacities could meet the demand of the planned expansion
- There would be insufficient capacity, determined by combining the clean steam peak consumption rate of the expanded plant with fill-finish plant data, without an extensive consumption optimization program
- The existing clean-in-place unit would be unable to service the new line and a spare unit would need to be adapted and dedicated to the new production line
- A new buffer preparation vessel would be needed - various alternatives were considered

Using the data from the study, our client is proposing to debottleneck and streamline the existing plant.

Pharma i

For a copy of our Simulation flyer, please contact:
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