About FMC Technologies

FMC Technologies is a global market leader in subsea systems and a leading provider of technologies and services to the oil and gas industry. The company has approximately 19,700 employees and operates 30 production facilities in 16 countries.
Challenge
When planning analysts at FMC ran a simulation model in Brazil, they realized that their manufacturing process would experience a lack of capacity in about three years. There were two alternatives: buy additional equipment or decrease manufacturing cycle time. Given the expense of buying additional machines, they decided to explore whether it would be possible to decrease manufacturing cycle time. Specifically, they needed to determine how much time had to be decreased while still meeting customer demand for their products and find the best way to achieve that. At the same time, FMC was experiencing a lack of capacity at its largest warehouse. They were at 80% capacity and realized that at the current rate, the existing infrastructure was not going to support the demand for storage required. There were two alternatives: accept less inventory at the existing warehouse or increase capacity. They elected to increase capacity. In exploring options to increase capacity, they identified the following choices:

- Buy/build a new warehouse
- Rent warehouse space
- Optimize the existing warehouse space

Storing parts in two different locations would have posed a logistics problem for the company, so it was not a great solution. Therefore, the company decided to explore how well the storage capacity was being utilized at its existing warehouse.

Solution
The warehouse and regional planning team began analyzing its current warehouse capacity utilization to determine if they could free up some space and optimize utilization. A tool was developed to evaluate the usage in each storage bin. According to the tool, 73% of the storage bins occupied less than 80% of their capacity. Clearly, there was an opportunity to improve utilization in the warehouse. Given the large number of parts and storage bins, the team decided than an AIMMS-based optimization model was the best solution.

To address manufacturing capacity, the Regional Planning team analyzed the work cell (as defined in cellular manufacturing) that was an existing bottleneck for its process as a pilot. For each product, they looked at predicted demand and hours needed for production on each work center. Then, the capacity was balanced across the work centers. The model created suggested a new flow for each part and the min/max for line balancing. They now use another AIMMS-based tool to set new targets for each work center and product.

Results
Manufacturing capacity was increased by 15% for the pilot work cell and storage bin capacity increased by 11%. FMC was able to avoid buying new machinery and ensured that they are able to meet customer demand without interruption. They now have a link with their SAP Warehouse system and run an allocation model once a month to optimize the bins. Savings are around $800K so far. The plan is to leverage this optimization model and implement it globally in the largest plants and warehouses.

Quantifiable results include
- 11% increase in warehouse capacity
- 15% increase in manufacturing capacity
- $800,000 in savings

“AIMMS is a great tool if you need an intuitive interface for end-users. It’s very flexible and great for developing an algorithm.” Ricardo Fernandes, Planning Specialist, FMC Technologies (Brazil)