

Capacity and Labor Resource Analysis - Water Purification Unit Refurbishing

Vertical

Manufacturing	Pharmaceutical	Healthcare	Portfolio	Logistics	Financial	Government	Business
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Genre

Case Study	Project Review:	White Paper	Technology Overview
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Client

Repair depot of the United States Army



Situation

One of the critical functions for which the repair depot is responsible is the reset (refurbishing) of the water purification unit (WPU). These units are also referred to as 3K units, because they can purify 3,000 gallons of water per hour. They conduct the process from “site arrival through reset complete”. These water purification units are used to convert polluted river or lake water to potable water for troops in the field.

The facility can currently reset 73 units per year. The repair depot was anticipating increased demand due to the continued high level of troop deployment throughout the world, and needed to know what their maximum capacity was.

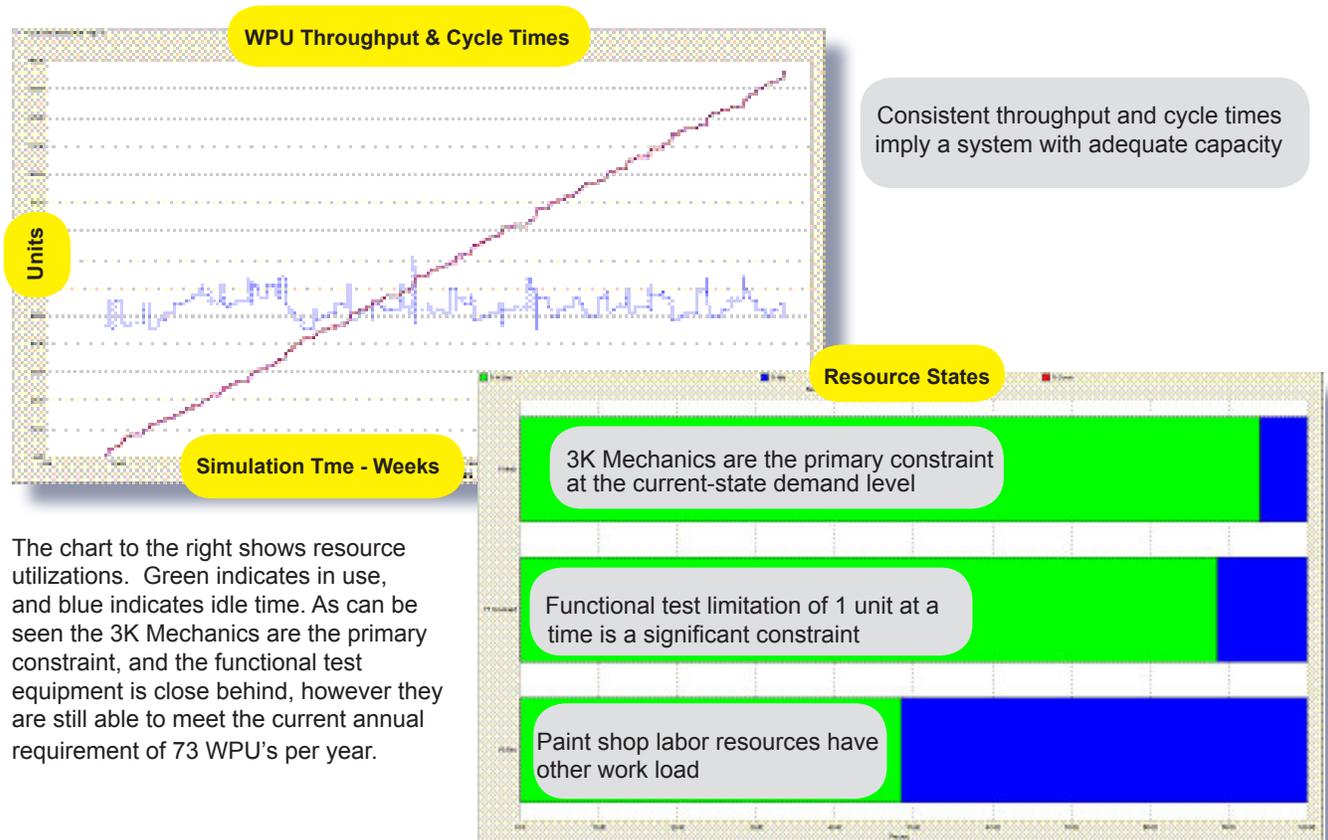
Objective

The depot engaged ProModel to help develop a simulation solution which would give them the capability to Visualize, Analyze, and Optimize their Reset operations. The two immediate objectives desired from the solution were as follows:

- Identify the maximum possible throughput with current staffing
- Identify primary and secondary system bottlenecks

Results

The current state model helped validate that the model is reflective of the actual process. The graph below shows steady reset cycle time per 3K (blue line) and even accumulated throughput of completed resets (red line) which indicates a system with adequate capacity.



The chart to the right shows resource utilizations. Green indicates in use, and blue indicates idle time. As can be seen the 3K Mechanics are the primary constraint, and the functional test equipment is close behind, however they are still able to meet the current annual requirement of 73 WPU's per year.

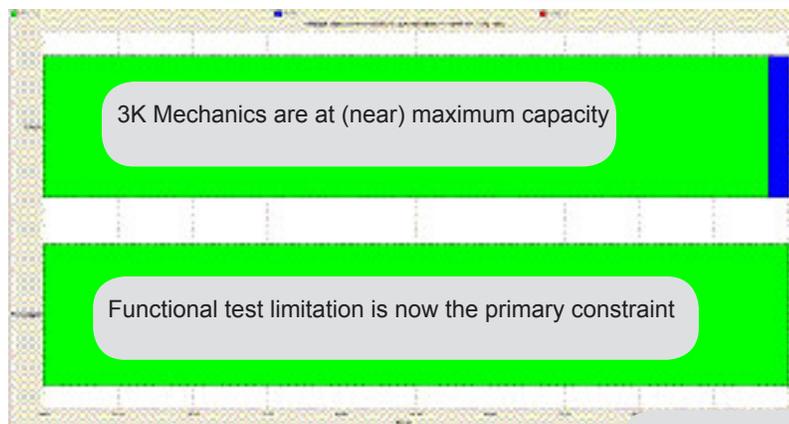
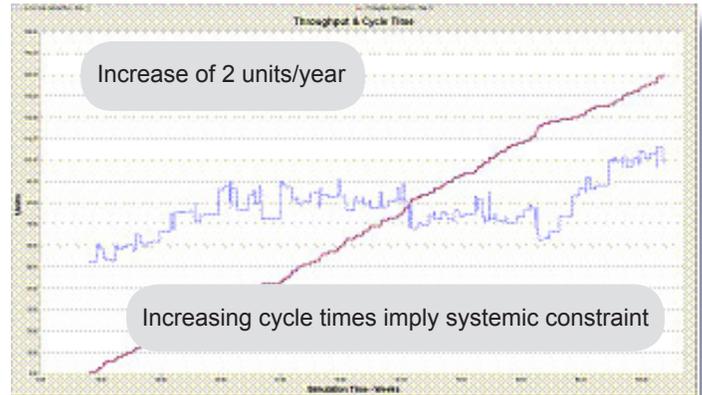
Consistent throughput and cycle times imply a system with adequate capacity

The next step was to model the future state scenario by experimenting to determine the system's maximum capacity with the current staffing and then identify the primary and secondary system bottlenecks while running at maximum capacity. The model input parameters were altered as follows:

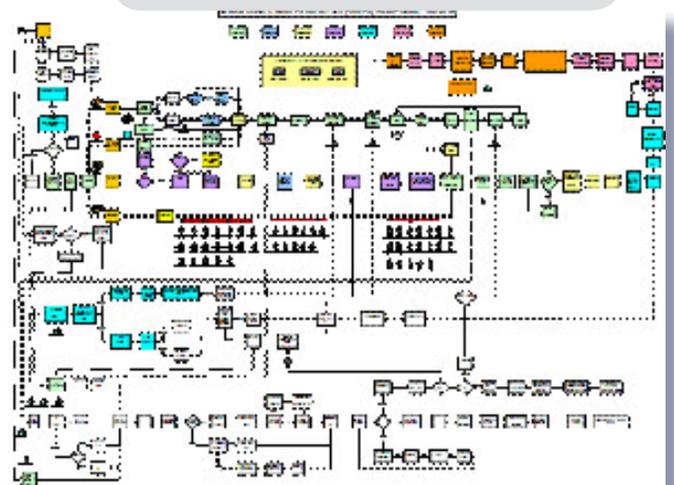
- Leave everything in the model the same except for the input rate of WPU 3K's
- Assume a 10% demand increase by increasing the frequency of arrivals; input now = 80 units/year

Reviewing the same two output charts it can now be seen that the maximum capacity is actually 75 3K's per year, an increase of only two more WPU's. The increasing cycle times (blue line) indicate a system that is now constrained. Additionally, now the functional test equipment is the primary constraint and its utilization is at its maximum of 100%, and the 3K mechanics are the next constraint.

The client was able to achieve their objectives of determining their maximum capacity with the current staffing, and identifying their primary and secondary constraints when running at maximum. They now know what they need to do to increase their capacity, should increase in demand become a reality – first increase functional test capacity, then add to the 3K Mechanic staff.



ProModel process maps are built in ProcessSimulator, a plug-in to Microsoft Visio.



Solution

A predictive analysis solution was developed using ProModel ProcessSimulator technology. This technology is a plug-in to MS Visio which enables the creation of simulation models from value stream maps and flowcharts built in Visio. Given the ProModel ProcessSimulation technology, the depot not only achieved its objectives, but proved that simulation is a valuable technology for process analysis, Lean transformation, and continuous improvement. Using our VAO (Visualize, Analyze, Optimize) project methodology, ProModel's certified in-house consultants combined industry experience and model building expertise with proprietary simulation technology to deliver this turn-key solution. Through methodology and technology, ProModel assisted the depot in making Better Decisions – Faster.

"Most people spend more time and energy going around problems than in trying to solve them."

— Henry Ford