Gen 5 Camshaft Throughput Improvement

Overview
Gen 5 V8/ V6 Camshaft lines at Bay City are currently running 24/7 due to unsatisfied customer demand. Camshafts are manufactured by moving through different workstations. One of these workstations is cell OP25 which is a bottleneck to the entire production line. Cell Op25 consists of a single robot responsible for moving camshafts from one server to the other. The goal of cell OP25 is to harden the camshafts after being machined in previous operations.

Objectives
The group has to understand what operational and equipment improvements need to be made in order to attain an overall throughput improvement of 10% and reduce downtime that results from coil cleaning process.

Approach
• Observed cell OP25 during plant visit and conducted times on the video footage of the cell
• Suggested potential solutions that decrease robot’s movement time and increase throughput
• Simulated the existing system of cell OP25 using Simio to get the current robot’s movement time and modified the model to illustrate the suggested solutions
• Conducted experiments to observe the impact of changing multiple variables on the performance of the system
• Examined CAD drawings of the induction hardener to find ways to automate coil cleaning process
• Prepared CAD drawing of the suggested coil cleaning method
• Built a physical prototype using drill, lathe and other tools and tested its functionality
• Formulated cost/benefit analysis on the suggested solutions and coil cleaning

Outcomes
• Suggested solutions were double camera and double EWAB pickup, double stamping and orientator spacing.
• Double stamping increase throughput by 7.85% and saves $2,256.25/day.
• Orientator spacing increase throughout by 18.2% and saves up to $10,977.88/day.
• Implementing all solutions lead to an increase in throughput by 39.2%.
• The coil cleaning is automated by installing a motor, which is connected to the tailstock using a chain. Bristles are attached to the tailstock to remove dirt from the coil that moves upwards.
• Automating coil cleaning reduces downtime by 45 minutes/day and increases throughput by 54 more camshafts/day.