# Optimization of the Value Stream for Washer Product Family

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MPI CORP — BUILDING BUSINESSES ENRICHING LIVES

## Client Background

MPI Corporation is a manufacturing-based holding company that specializes in **precision metal stamping and heat treating**. Their customer base spans various industries and includes companies such as Ford and General Motors. This project focused on the washer product family, which is among the key product families in MPI's portfolio and services the automotive industry. These washers are produced at two individual companies owned by MPI: Small Parts Inc. and Heat Treatment Inc.

## Problem Statement

Our project aims to analyze MPI's current manufacturing process for their washer product family by creating a comprehensive **value stream map** of all three facilities. Our goal is to **identify critical areas for future improvement**. We will identify these areas of improvement using an eVSM model and collected data from the company. Due to the time limitations of our project, we will not be able to provide any specific recommendations to improve these inefficiencies.

## Methodology

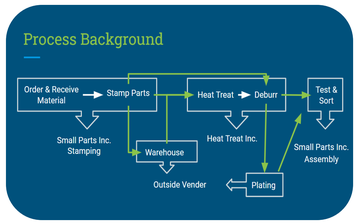



Figure 1: Initial Facility Level Process Diagram

The first step in our process was creating a **high-level diagram** which showed the interactions between the multiple MPI owned facilities used to produce products in the washer family, pictured in *Figure 1*.

After additional facility visits, our high-level diagram evolved into a **preliminary value stream map** which is shown in *Figure 2*. This whiteboard diagram focused primarily on the operations at the SPI–Stamping facility, and how they related to HTI and SPI–Assembly. We followed the process upstream and downstream to understand how material flows through the plant.

Our preliminary model evolved into the fully developed eVSM model shown to the right, after time study data was collected and routings were confirmed using the bills of materials (BOMs). Seven iterations were developed before the final model shown was completed.

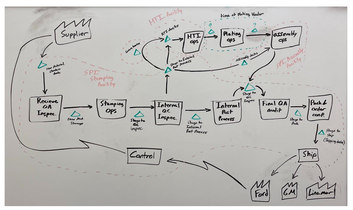
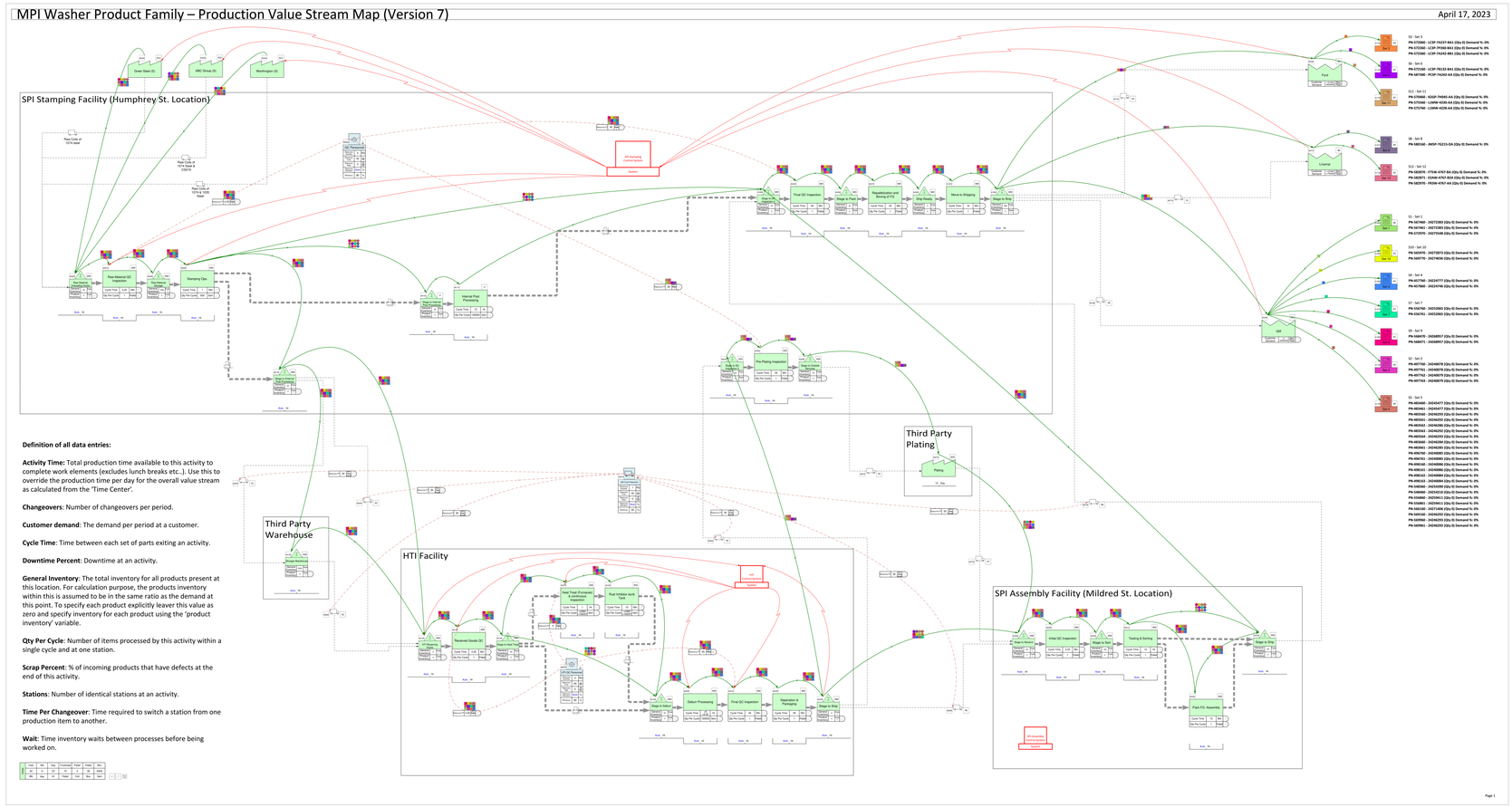



Figure 2: Preliminary Door-to-Door Value Stream Map

## System Model: eVSM




## System Assumptions

**Product/Material movement:**

- All material is moved between facilities via a single company owned truck, assumed to be a standard 20-foot shipping truck.
- Products are moved between stations in batches utilizing boxes and pallets.
- All finished goods leave the system from the main building, the stamping facility.
- Products in inventory locations are pushed into the next operation when capacity is exceeded.
- Product batches are moved on pallets no more than 3 levels high for cardboard and 4-5 levels for plastic totes. 9 boxes per level.
- Schedules for each major operation are made by the shift supervisor daily with limited input from the plantwide system.

**Facility assumptions:**

- HTI inspection occurs continuously after the heat treatment process.
- Continuous production on furnaces with a 10-minute changeover time between furnace operations to clear the line.
- Plating takes approximately 10 business days at a maximum .
- 2 quality control personnel per facility on every shift. One material handler on first and second shift only. Each facility has its own control system.
- Deburring inspection occurs hourly with rework lasting 30 minutes. The maximum total rework time is 6 hrs.

**Customers**

- Customer owned pick up trucks arrive within 5 business days of part completion. Long term finished good storage is ignored.

## Results & System Analytics

Due to complications with the software and last minute flow modifications, the model has not been able to generate any graphs. Outlined below however are analytical charts and summaries available to be generated.

Charts & Graphs:

- Product Utilization
- Leadtime
- Capacity/Demand
- Changeover & Takt Time
- Energy
- Resource Balance
- Resource Utilization

Summaries:

- Cost
- Time
- Transport
- Inventory
- Resource

## How is the model tool actionable?

eVSM tool Benefits:

- Identify takt time bottlenecks
- Identify changes with system wide impact
- Customer value focus
- "What-if" simulation
- Material & Information flow is mapped
- Iterative development

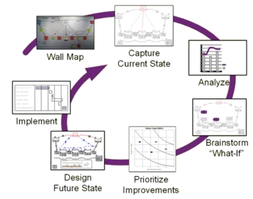



Figure 3: Iterative eVSM model development flow

Future use of this tool will follow the wheel shown above in *Figure 3*, beginning with the "what-if" analysis and concluding with the future system creation and project implementation.

With our project, MPI can optimize their production process in the most efficient manner by making informed decisions that directly improve system wide their production abilities from the customers perspective.