Slip Ring Value Stream Mapping

MOOG

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Background

- Process Capabilities Unclear
- Over 10,000 Different Types of Slip Rings
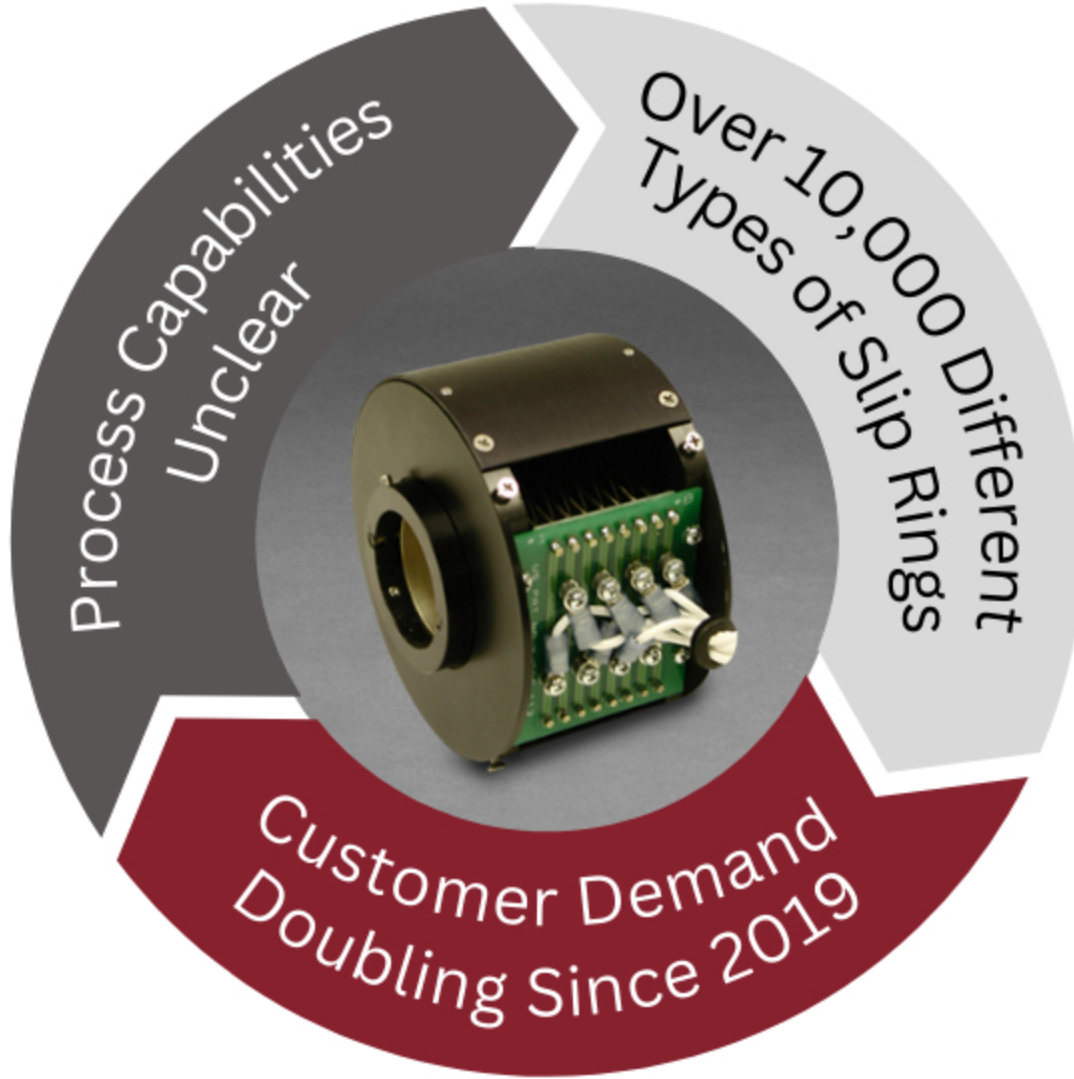- Customer Demand Doubling Since 2019

Objectives

- Improve product throughput by 10%
- Improve on time shipments by 10%
- Reduce scrap and rework by 10%

Constraints

- **Processing Time** — Extensive processes longer than 2 weeks.
- **Operator Experience** — Varying levels of experience.

Our Solution

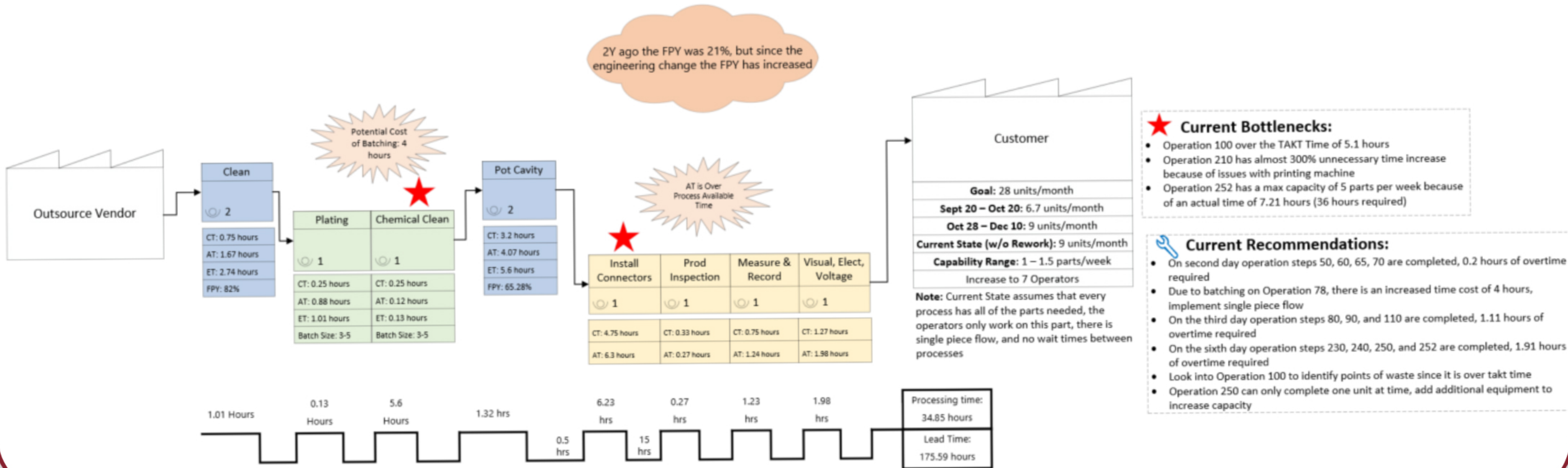This is a concise version of one of the completed Value Stream Maps.

- Color-Coded Work Centers
- Processing & Lead Times
- Material Handling
- Capability Ranges
- Kaizen Bubbles

2Y ago the FPY was 21%, but since the engineering change the FPY has increased

AT is Over Process Available Time

Potential Cost of Batching: 4 hours

Outsource Vendor

Clean
- 2
- CT: 0.75 hours
- AT: 1.67 hours
- ET: 2.74 hours
- FPY: 82%

Plating
- 1
- CT: 0.25 hours
- AT: 0.88 hours
- ET: 1.01 hours
- Batch Size: 3-5

Chemical Clean
- 1
- CT: 0.25 hours
- AT: 0.12 hours
- ET: 0.13 hours
- Batch Size: 3-5

Pot Cavity
- 2
- CT: 3.2 hours
- AT: 4.07 hours
- ET: 5.6 hours
- FPY: 65.28%

Install Connectors
- 1
- CT: 4.75 hours
- AT: 6.3 hours

Prod Inspection
- 1
- CT: 0.33 hours
- AT: 0.27 hours

Measure & Record
- 1
- CT: 0.75 hours
- AT: 1.24 hours

Visual, Elect, Voltage
- 1
- CT: 1.27 hours
- AT: 1.98 hours

Customer
- Goal: 28 units/month
- Sept 20 – Oct 20: 6.7 units/month
- Oct 28 – Dec 10: 9 units/month
- Current State (w/o Rework): 9 units/month
- Capability Range: 1 – 1.5 parts/week
- Increase to 7 Operators

Note: Current State assumes that every process has all of the parts needed, the operators only work on this part, there is single piece flow, and no wait times between processes

⭐ **Current Bottlenecks:**
- Operation 100 over the TAKT Time of 5.1 hours
- Operation 210 has almost 300% unnecessary time increase because of issues with printing machine
- Operation 252 has a max capacity of 5 parts per week because of an actual time of 7.21 hours (36 hours required)

🔧 **Current Recommendations:**
- On second day operation steps 50, 60, 65, 70 are completed, 0.2 hours of overtime required
- Due to batching on Operation 78, there is an increased time cost of 4 hours, implement single piece flow
- On the third day operation steps 80, 90, and 110 are completed, 1.11 hours of overtime required
- On the sixth day operation steps 230, 240, 250, and 252 are completed, 1.91 hours of overtime required
- Look into Operation 100 to identify points of waste since it is over takt time
- Operation 250 can only complete one unit at time, add additional equipment to increase capacity

Timeline:
1.01 Hours | 0.13 Hours | 5.6 Hours | 1.32 hrs | 0.5 hrs | 6.23 hrs | 15 hrs | 0.27 hrs | 1.23 hrs | 1.98 hrs

Processing time: 34.85 hours
Lead Time: 175.59 hours

Methodology

Data Collection
- Collect process data from client.
- Transform data to conform to standards.

Value Stream Map
- Project process data onto a value stream map.
- Organize by work-centers.

Consult Engineers
- Review initial map accuracy with engineers.
- Incorporate engineer feedback.

Analyze Map
- Identify the bottlenecks.
- Identify continuous improvement opportunities.

Results

- Improved throughput by **156%**
- Improved on time shipments by **41%**
- Increased revenue by **50%** and gained an additional **1.5%** of profit

- Reduced scrap by **15%**
- Reduced rework by **6%**

Key Deliverables

- **5 Value Stream Maps**
- **22 Recommendations**
- **12 Bottlenecks**

Impact

- **Labor Allocation** — Redirected labor to bottlenecks enhanced throughput.
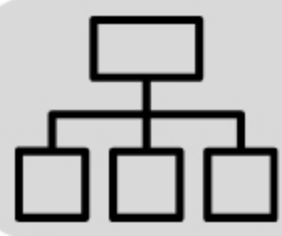- **Focused Investment** — Clear performance drove investments and boosted profits.
- **Customer Fulfillment** — Customer satisfaction rose with increased on-time shipments