

Work Sample #2

Project Kickoff: Materials Management Transformation

Tyler Long | Supply Chain & Manufacturing Consultant

May 2021

Refresher*: Client's Business & Project Summary

Client's Business:

The company engineers and manufactures conveyor systems for customers like Amazon, UPS, and FedEx

Manufacturing Environment:

Blend: Engineer-to-Order / Configure-to-Order

Problem Statement:

Manufacturing (both fabrication & assembly) currently run on 100% JIT / make-to-order / procure to order. The reason they do this is because there is no centralized warehouse, and inventory accuracy is a key challenge.

Goal:

Move away from JIT and in the direction of a *new* blended model: make-to-stock, purchase-to-stock, and JIT manufacturing.

High-Level Project Scope:

To do that, we will need to create a physical warehouse (re-layout the plant accordingly), define new business and manufacturing processes, re-structure the material handling function, change management / training of the factory employees, and make significant changes and updates in their current ERP (IQMS).

Duration: 9 months, potential for extension (current likelihood: moderate)

Project Framework

Executive Summary – Project Snapshot

Financial Target – *Annual* Bottom Line Impact

Anticipated Improvement % *Primary Cost Drivers*

Estimated Business Value		
Direct Material	5%	\$ 2,892,781
Direct Labor	3%	\$ 359,726
Indirect Labor	3%	\$ 207,447

Total Value Prop: **\$3.5M**
Annually

Improvement
Gross Margin **3.6%**

% Change
Gross Margin **27.6%**

Based on Current Cost Ratios and 2021 Division Revenue Forecast

Key Deliverables

- Re-Designed Material Workflow & Processes
- Physical Warehousing of Materials
- Functional MRP

Timeline

NOV 23 – AUG 27



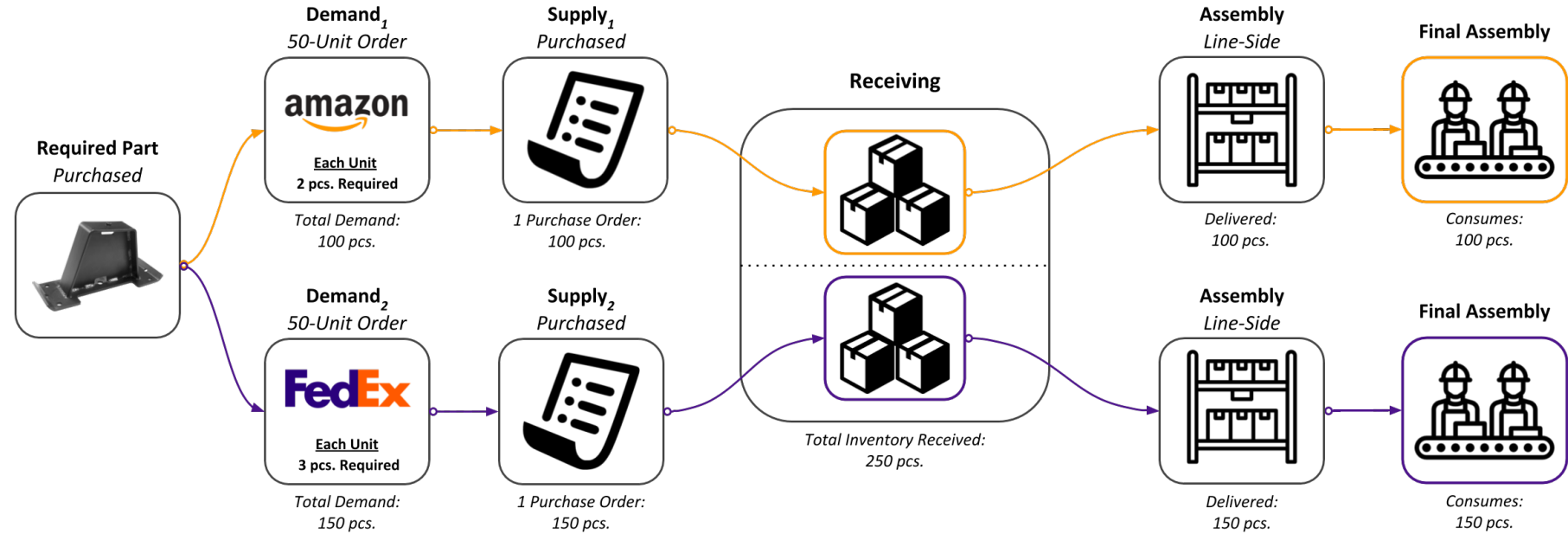
208 Total Days / 9 Months

Current & Proposed Future States: Supply Chain Process

Current State

Challenges

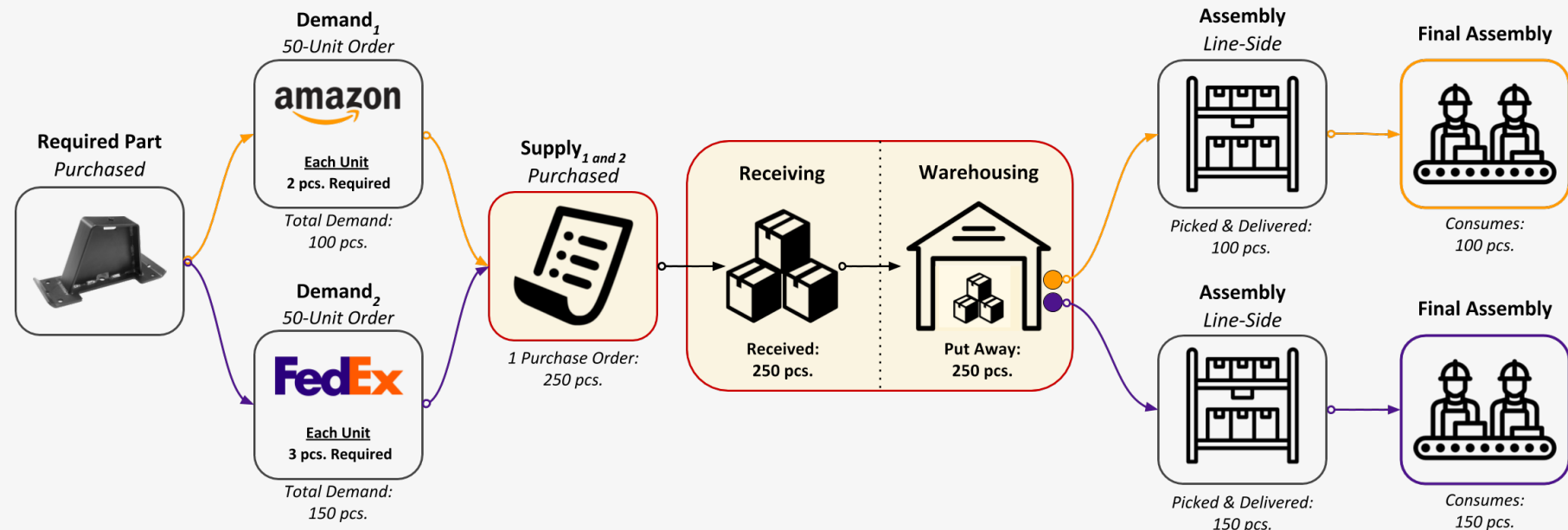
- Hard Allocation of Inventory
- More PO's & Receipts (Transactions)
- Lost / Damaged Inventory can result in Expedites & Assembly Disruptions
- Part Shortages Caused by Inaccuracies in:
 - BOM Quantities
 - Inventory Transactions



Future State

Benefits

- Inventory Shared by Multiple Projects
- Fewer PO's & Receipts Required
- More Accurate Inventory – Warehousing
- Higher Inventory Availability & Visibility
- Increased Manufacturing Schedule Flexibility
- Less Firefighting



Team & Reporting Structure

Client Leadership

Chief Information Officer

President – Manufacturing Division

Project Leadership



Tyler Long

Engagement Lead

Plant Manager

Project Manager

Workstream

Supply Chain

VP, Supply Chain

Fabrication & Assembly

Director, Materials Management

Warehousing

ERP

Team

Lead / Consultant

Support / Consultant

Support / Consultant

Lead / Consultant

Support / Consultant

Lead / Consultant

Lead / Consultant

Team Background & Bios

Leadership

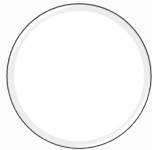
Tyler Long
Engagement Lead



Strategy & Optimization – Supply Chain & Mfg.
B.S. SCM | Certifications: 6 Sigma, Lean Mfg., APICS

- **Relevant Industries**
Oil & Gas, Aerospace, Fabrication – Sheet Metal, Manufacturing – Engineer-To-Order Machinery
- **Experience**
Process Engineer – CAT Innovation
Principal Consultant, Mfg. & Supply Chain
- **Client Project Leadership**
Mfg. Routings, Kanban Inventory, Post-Merger Integration (European division)

Project Manager

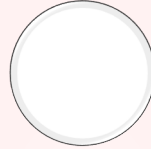


Strategy – Manufacturing & Supply Chain
Flow Design – Warehousing + Materials Mgmt.
MBA | B.S. Mechanical Engineering

- **Relevant Industries**
Aerospace, Automotive, Industrial Manufacturing, Transportation
- **Experience**
Sr. Manager – (redacted)
Project Engineer – MTO Environment

Supply Chain

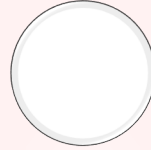
Workstream Lead



Global Leadership & Strategy – Supply Chain & Mfg.
M.S. & B.S. Mechanical Eng., 6 Sigma, ISO 9001

- **Relevant Industries**
Industrial Mfg., Engineered Materials, Automotive, Aerospace, PE Portfolio Operations
- **Experience**
VP Supply Chain – (redacted)
VP Operational Excellence – (redacted)
Head of Manufacturing Operations – (redacted)

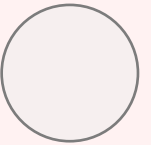
Workstream Support



Finance Background w/ an Operations Focus
M.Sc. & B.S. Accounting and Finance

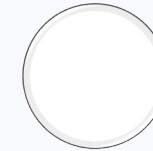
- **Relevant Industries**
Private Equity, Asset Management, Consulting
- **Experience**
Due Diligence – Buy-Side
Technology Implementation Mgmt & Process Design

TBD
Workstream Support



Fabrication & Assembly

Workstream Lead



Manufacturing Process and Facility Design Specialist
MBA | B.S. Manufacturing Engineering Technologies
ISO 9001 – Lead Auditor

- **Relevant Industries**
Conveyors, Welded Fabrication, Industrial Equipment Design & Build, CNC Machining
- **Experience**
VP Engineering – (redacted)
Principal Consultant – Manufacturing & Process Manager – Safety & Facilities, Manager – Manufacturing Engineering

Workstream Support

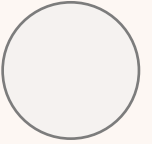


Mfg. & Warehouse Design & Optimization
B.S. Industrial Technology | 6 Sigma Certified

- **Relevant Industries**
Steel Fabrication, Automotive, Hydraulic Pumps & Motors, Manufacturing – Industrials, Aerospace
- **Experience**
Warehouse Industrial Engineer – Golden Books
Warehouse Consultant – TransTech Consulting
Mfg. & WH Consulting Engagements:
Parker Hannifin, Siemens, Honeywell, Navistar

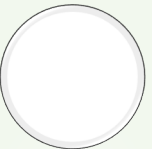
Warehousing

TBD
Workstream Lead



ERP

Workstream Lead



Solution Architect - ERP / Warehouse Management System

- **Relevant Industries**
Automotive, Medical, Custom Molding, Compounding, Manufacturing
- **Experience**
Consultant – ERP & MES Implementation
Solution Architect & Project Manager

Primary Objectives

- Bottom-Line improvement via strategic sourcing and relationship improvements with key suppliers
- Inventory tracking / reduction of lost and re-manufactured parts

**Cost Savings –
Direct Material**

- Reliable, system-driven demand and supply signals
- Reduction in Supply Order Volume
- Manufacturing WIP Tracking

**Functional
MRP**

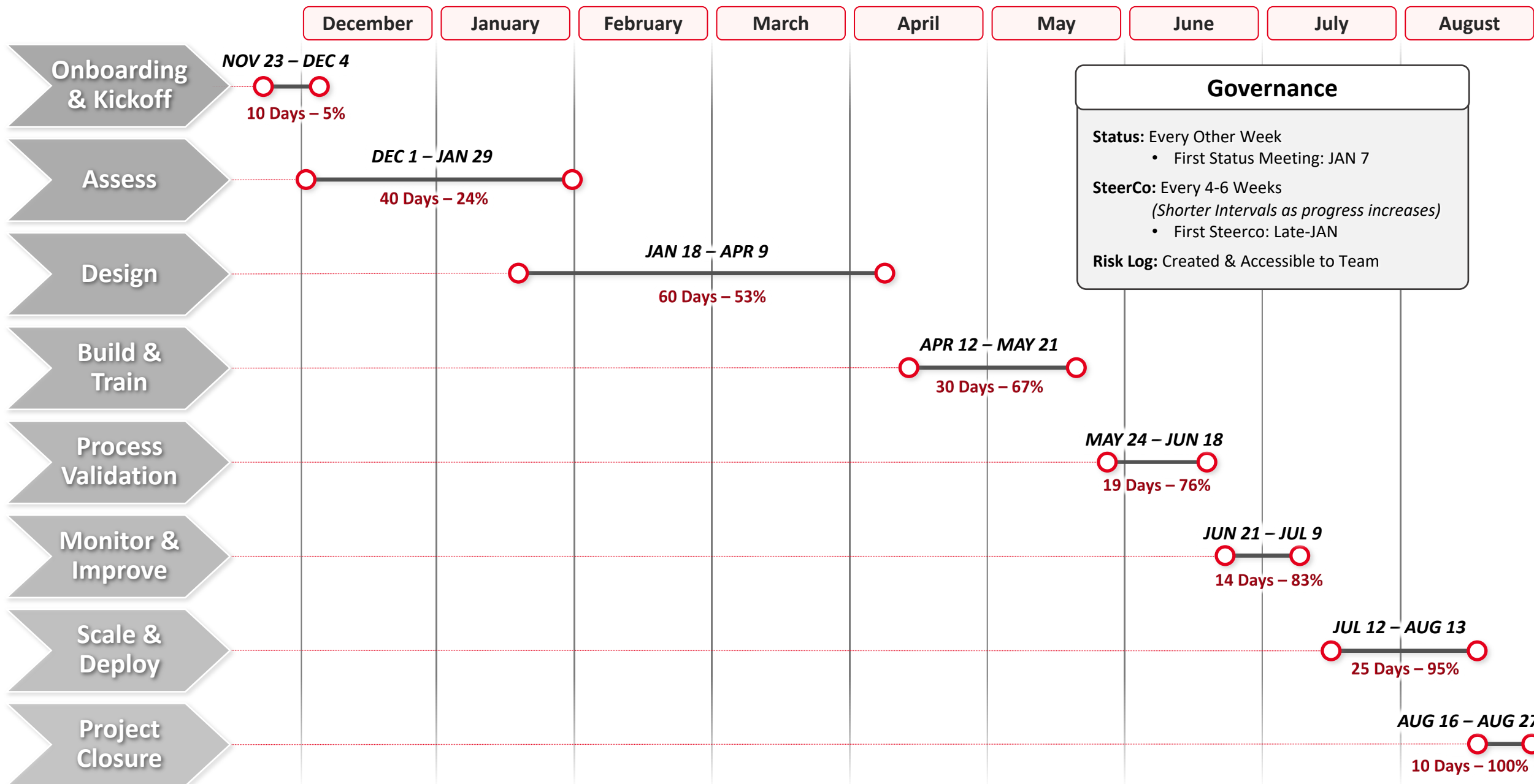
- Execute project during normal business volumes
- Reduce shop floor employee frustration
- Improve capital equipment utilization

**Minimize
Manufacturing
Disruption**

- Shorter total Lead Time
- Greater Master Schedule Flexibility
- Improved On-Time-To-Promise Performance

**Position
for Growth**

Timeline by Phase



Governance

Status: Every Other Week

- First Status Meeting: JAN 7

SteerCo: Every 4-6 Weeks
(Shorter Intervals as progress increases)

- First Steerco: Late-JAN

Risk Log: Created & Accessible to Team

Background & Path to MRP

MRP Strategy Roadmap | August 2020

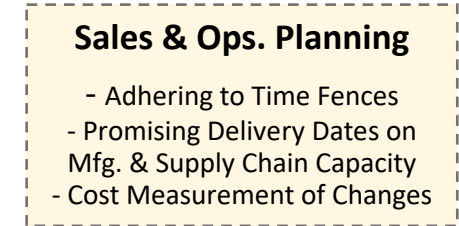
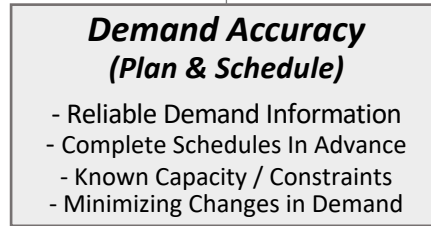
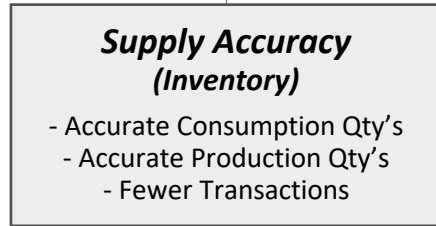
Goal



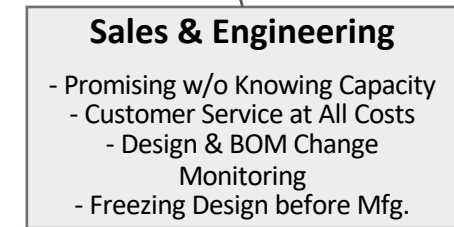
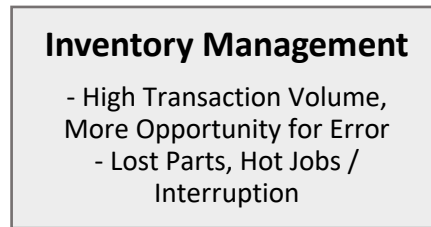
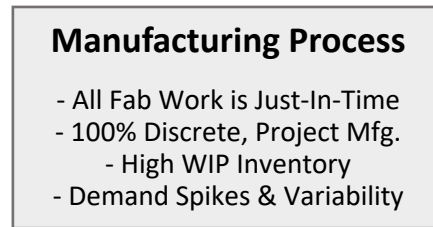
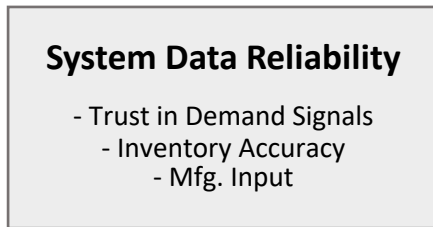
Benefits

- **Financial:** Reduce Overtime, Increase Margin
- **Operational:** On-Time-Delivery Improvements
- **Operational:** Load Balancing & Production Planning
- **Collaboration:** Visibility & Communication

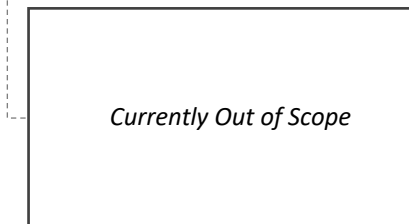
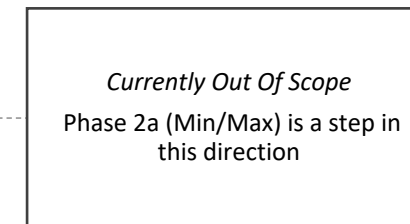
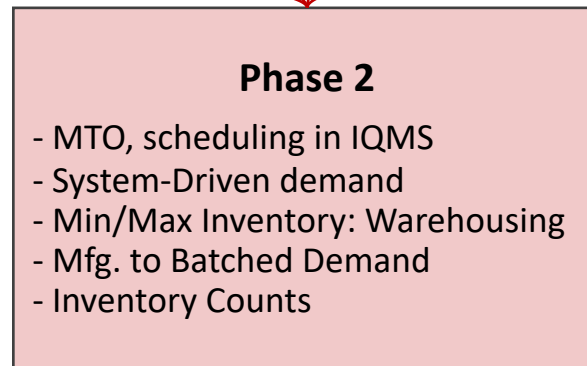
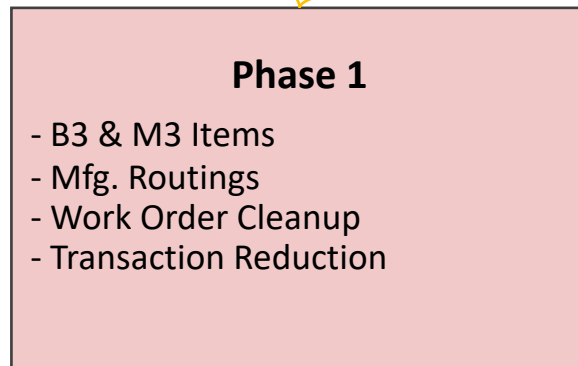
Capabilities
What's Needed



Challenges
Roadblocks



Solution Plan
Path to Achieve



MRP Strategy Roadmap | Today, Addressed in This Project

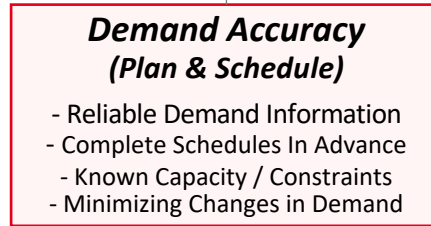
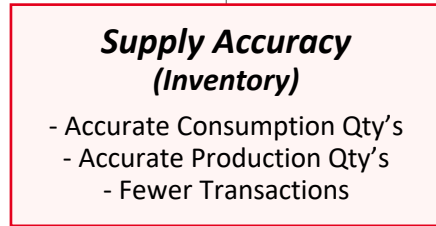
Goal



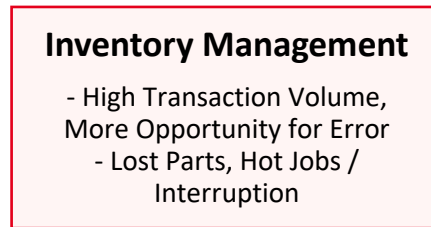
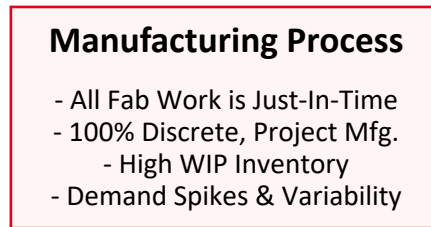
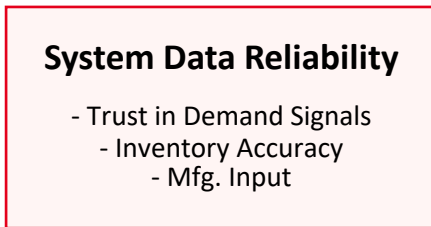
Benefits →

- **Financial:** Reduce Overtime, Increase Margin
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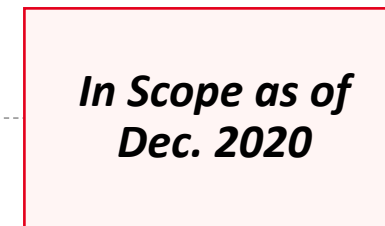
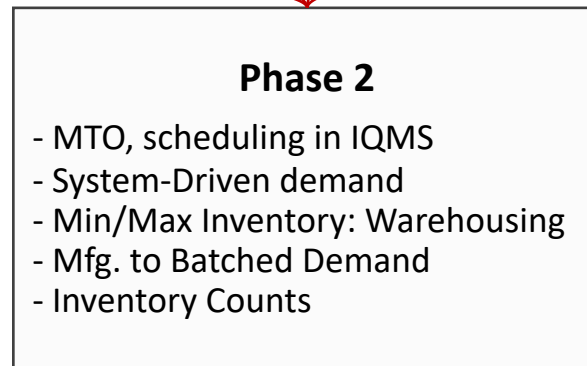
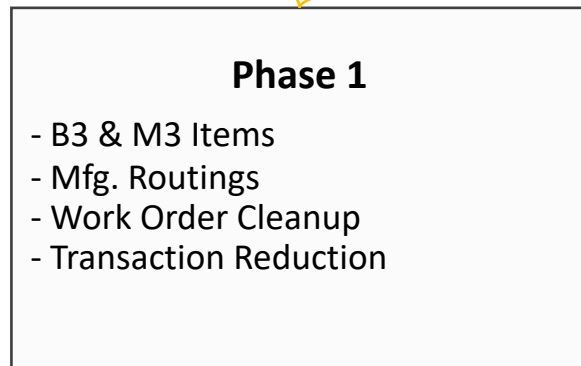
Capabilities
What's Needed



Challenges
Roadblocks



Solution Plan
Path to Achieve

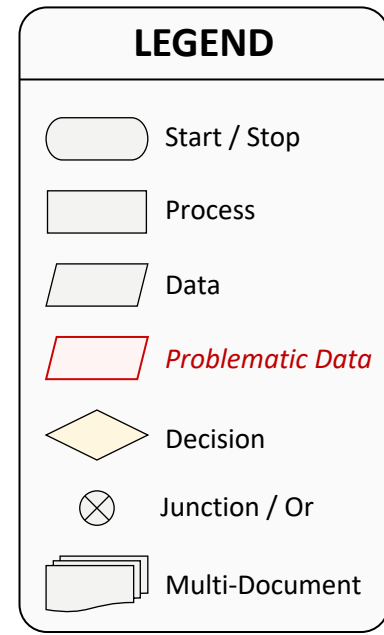
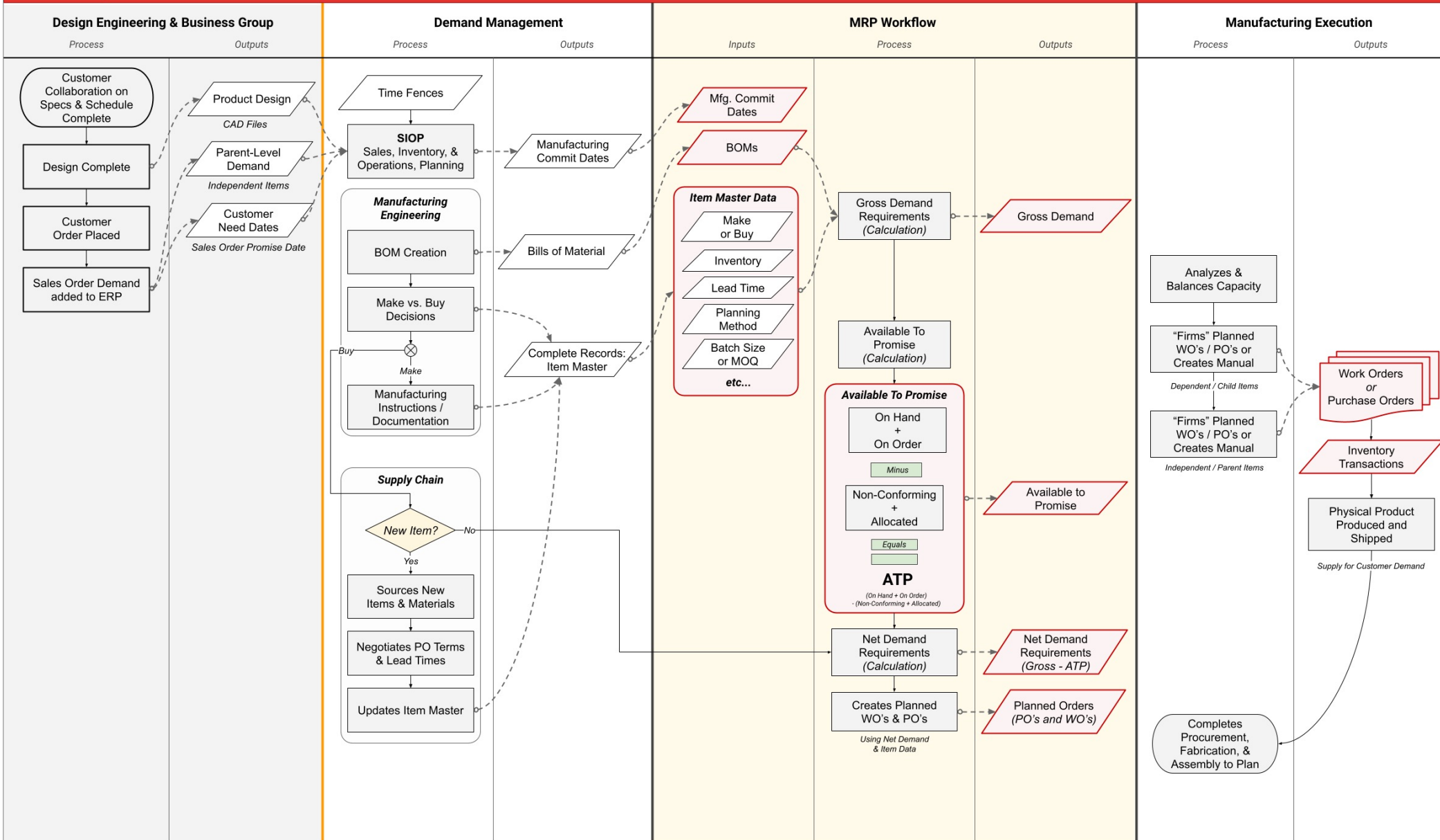


Challenge Summary

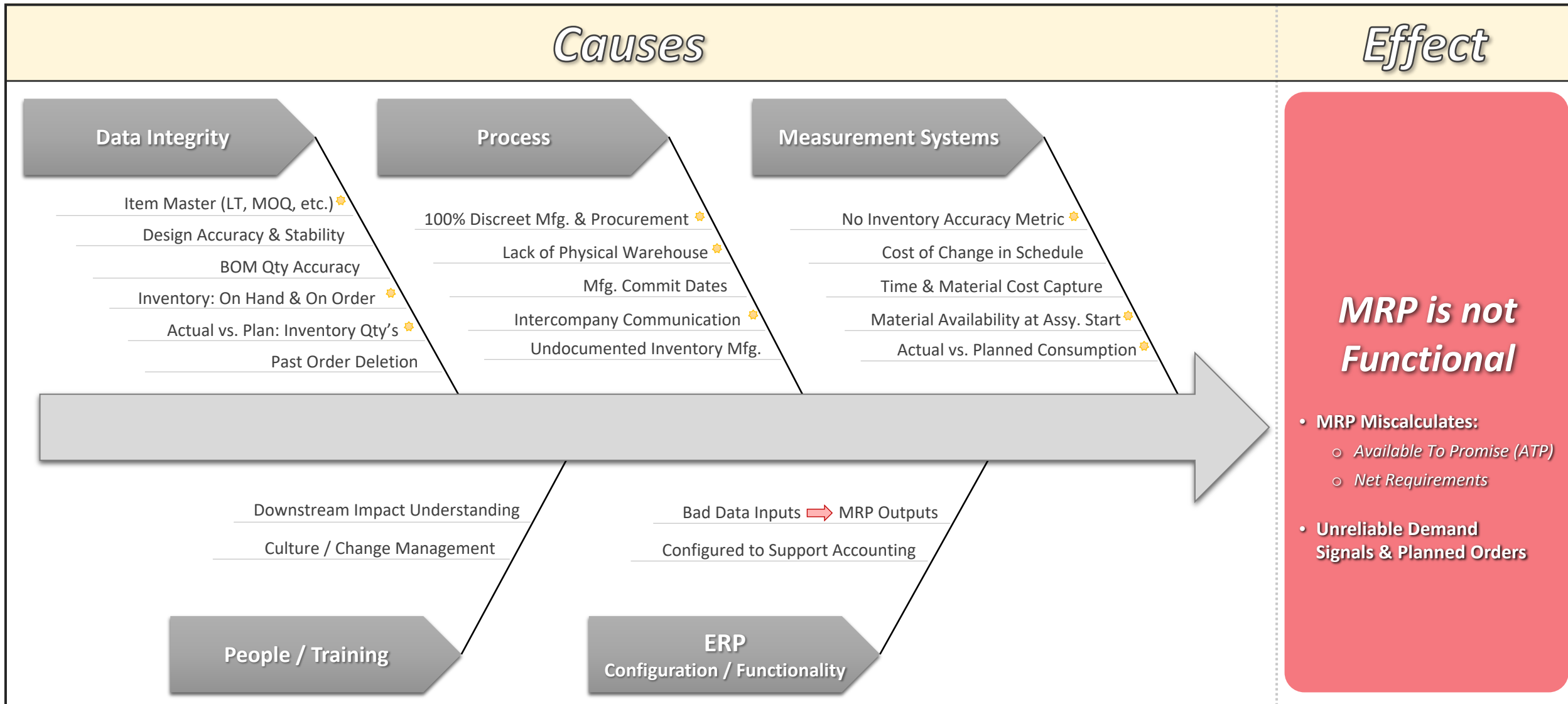
Baseline: How MRP Works, *All ERP Systems*

MRP Logic Overview | Plant-Level

v0.1 09-24-20 3PM



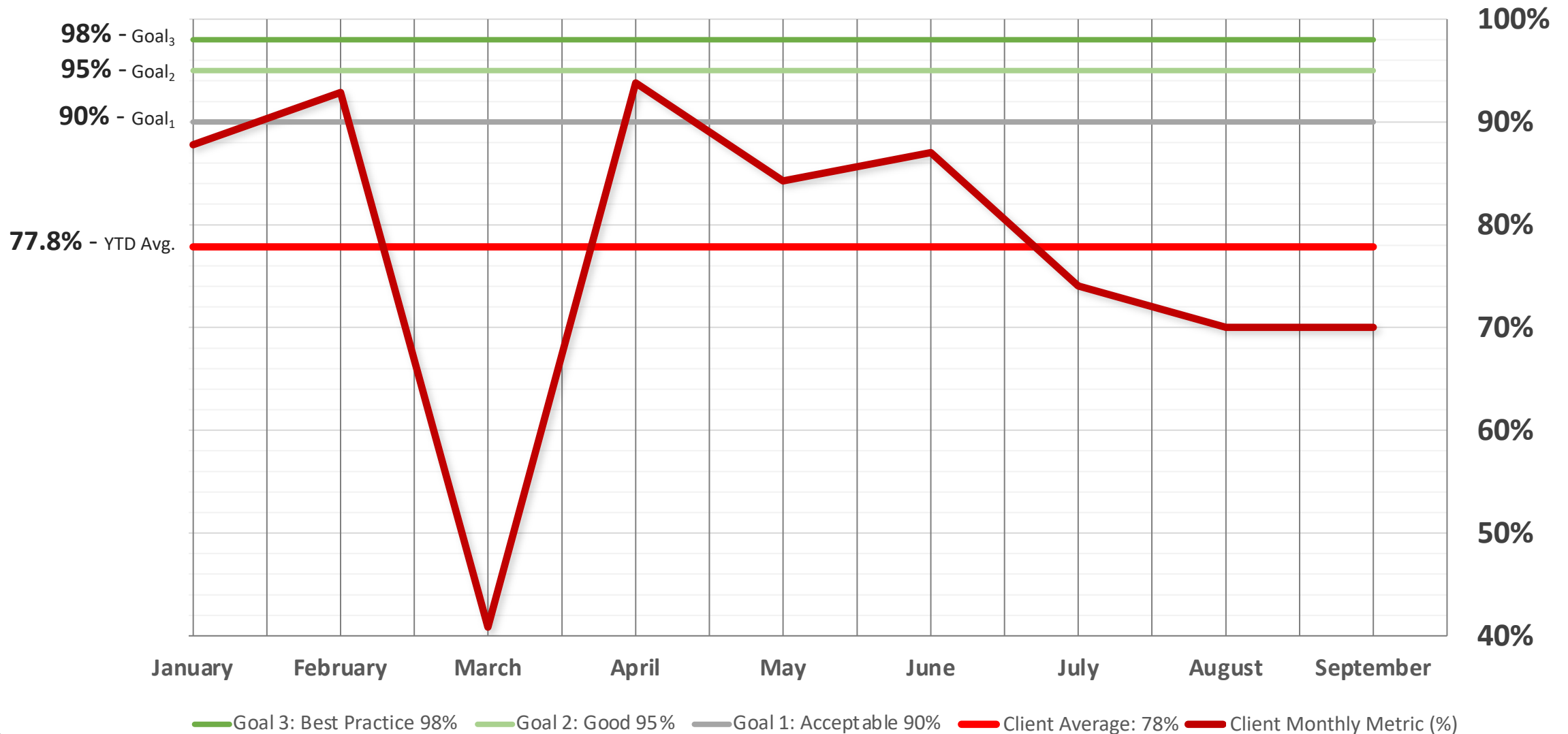
MRP Challenges: Causes & Effect



⭐ **Key Challenge**

Key Challenge: *Inventory Accuracy*

Inventory Accuracy: Client vs. Industry Goals



Most Important Data Inputs to MRP

MRP Uses Common Inputs to Calculate and Balance Demand & Supply

*The primary inputs & MRP logic are the same in **any** ERP*

1. BOMs & Manufacturing Instructions

- Item Numbers & Quantities
- Dependencies / Indenture: *Y consumes X*
- Time Required to Manufacture the Item

2. Item Master Data

- Make or Buy
- Lead Time
- Minimum Order Qty

3. Inventory: Item-Level

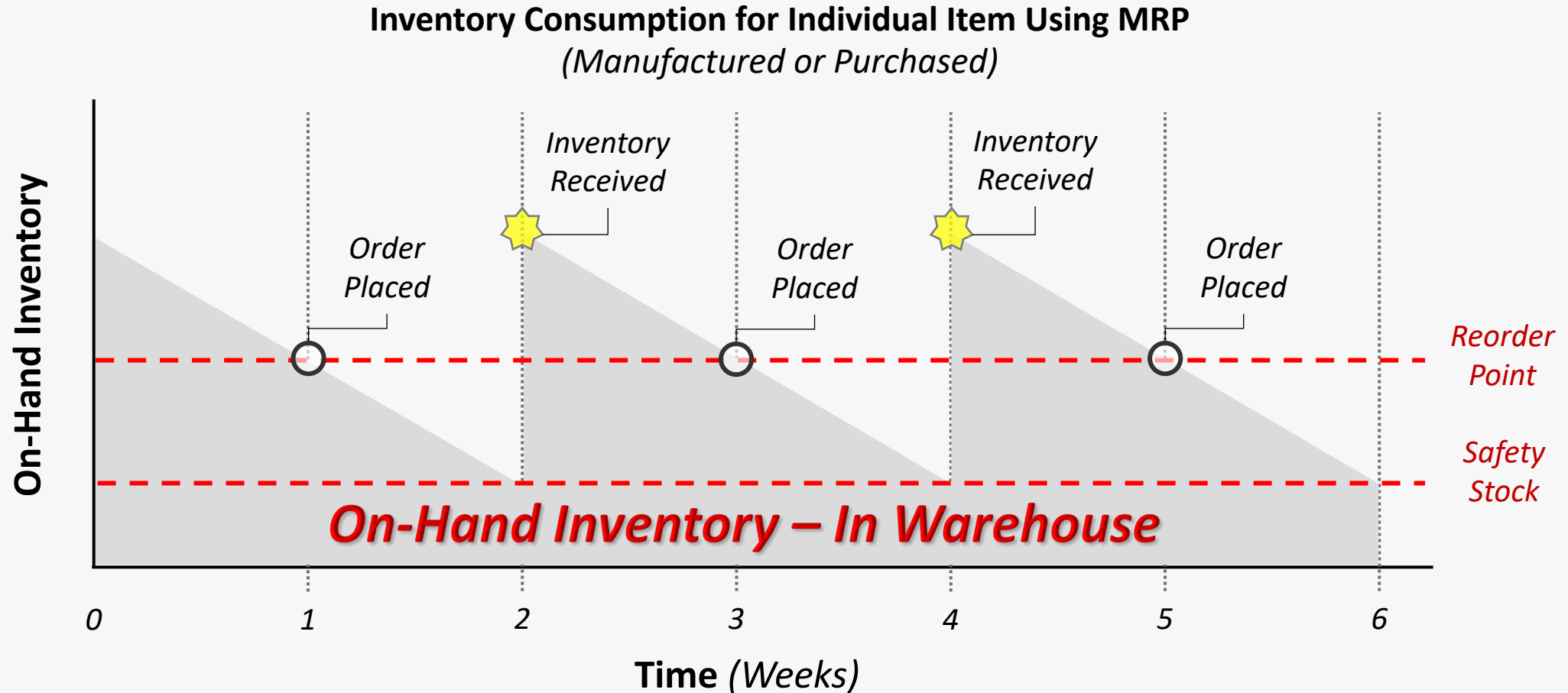
- On Hand
- Non-Conforming
- On Order

4. Supply Orders – PO's or Work Orders

- Open / Unreceived PO Lines
- Planned Receipt or Completion Dates

Typical Use-Case of MRP – Why Warehousing is Necessary

Assuming: • Lead Time = 1 Week • Safety Stock is Required



Summary: MRP & Client Data Challenges

MRP's Main Objectives

1. Guarantee Material Availability
2. Timely Production to Meet Customer Demand

Benefits Summary

- **Customer-Facing**
 - Optimize Service Level
 - Two-Way Communication
- **Financial**
 - Minimize Costs & Capital Lockup
 - Reduce Overtime, Increase Margin / EBITDA
- **Operational**
 - Manufacturing Visibility & Predictability
 - On-Time Delivery Improvements
 - Maximize Available Capacity

Data Accuracy Requirements

Element	MRP's Use
Product Design	BOM Creation <i>(Input)</i>
BOMs	Gross Requirements <i>(Output)</i>
Item Master Data	Planned Order Dates & Qty Calculations <i>(Output)</i>
Inventory Counts <ul style="list-style-type: none">○ <i>On Hand</i>○ <i>Allocated</i>○ <i>On Order</i>○ <i>Non-Conforming</i>	Net Requirements <i>(Output)</i>

Impact / Risk

ATP & MRP Outputs will be flawed without Accurate Inputs

Key Activities & Deliverables by Phase

Phased Workplan | Assess

Onboarding
& Kickoff

Assess

Design

Build &
Train

Process
Validation

Monitor &
Improve

Scale &
Deploy

Project
Closure

Key Activities

- Baseline Metrics Assessment & Improvement Measurement Framework
- Current State Manufacturing Process Study
by Product Family
- 'Fab Deviation' Process Study
- Product Volume, Mix, & Associated Inventory
Current State and with Forecasted Growth
- Supply Chain Health Risk & Cost Analysis
- Collaboration with Business on Paint Handling
- Warehouse Management System (WMS) Enablement Study

DEC 1 – JAN 29

40 Days – 24%

Deliverables

- Value Stream Maps – by Product Family
- 'Fab Deviation' – Root Cause Analysis
- **Supply Chain – Improvement Strategy & Recommendations**
 - *Direct Material Cost Reduction Opportunities*
 - *Supplier / Purchasing Spend Optimization & Relationship Improvement*
 - *Risk Mitigation Strategies – Supply-Base*
- Plan for Handling Fabricated Items – Same Item #, Painted multiple colors
- WMS Requirements

Phased Workplan | Design

Onboarding
& Kickoff

Assess

Design

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Project
Closure

Key Activities

- **Warehouse Design**
 - *Plant Layout / Flow*
 - *Foundational Metrics & KPI's*
 - *Racking – Specs & Required Space*
- **Resource Modeling**
 - *Warehouse Staffing*
 - *Capital Equipment Requirements*
- Future State Material Workflow Analysis
- Warehouse & Inventory Management Practices
- MRB /Quality Inventory Handling
- WMS Deployment Planning
- Approval of Recommended Plant Layout Changes and Capital Equipment Investments (*if necessary*)

JAN 18 – APR 9

60 Days – 53%

Deliverables

- Warehouse Layout & Flow Design
- WH Staffing & Capital Equipment Requirements
- **Inventory Management Processes**
 - *Label, Receiving, Putaway, Pick, Deliver to Assembly*
 - *Inventory Cycle Counting*
- **Process Maps – Future State**
 - *Future State Material Flow*
 - *Fab Deviations*
 - *Fabricated Items – Same Item #, Multiple Colors*

Phased Workplan | Build & Train

Onboarding
& Kickoff

Assess

Design

**Build &
Train**

Process
Validation

Monitor &
Improve

Scale &
Deploy

Project
Closure

Key Activities

- Physical Space Creation & Plant Layout Changes
- Inventory Rack Installation
- Mat'l Handling Staff Re-Structuring
- Acquisition of Mat'l Handling Capital Equipment
 - Operator Training (*as needed*)
- WMS Functionality Enablement

APR 12 – MAY 21

30 Days – 67%

Deliverables

- New Inventory Warehouse(s) – MHSE-Led
- **SOP's & Training: Inventory Management Functions**
 - *Safety*
 - *Purchasing*
 - *Receiving*
 - *Labeling*
 - *Pick & Deliver*
- **WMS Functionality**
 - *Conference Room Pilot*
 - *User Acceptance Testing*
- **Workshops – Supply Chain & Inventory Control**
 - *Supply Chain – Purchasing Practices*
 - *Workshop – Receiving / Inventory Control*
- **Workshops – Fabrication & Assembly**
 - *Master Scheduling for MTS*
 - *Fab & Material Handling*
 - *Assembly Inventory Consumption Training*

Phased Workplan | Process Validation

Onboarding
& Kickoff

Assess

Design

Build &
Train

**Process
Validation**

Monitor &
Improve

Scale &
Deploy

Project
Closure

Key Activities

- **(Plan) Process Pilot #1: Buyouts**
 - *Subset of total Purchased Items*
 - *Purchase-to-Stock / Inventory In Warehouse*
- **(Plan) Process Pilot #2: Fabrication & Assembly**
 - *Subset of total Fabricated Items*
 - *Make-to-Stock, Inventory in Warehouse*
 - *Pick & Deliver to Assembly from Warehouse*

MAY 24 – JUN 18

19 Days – 76%

Deliverables

- **(Conduct) Process Pilot #1: Buyouts**
- **(Conduct) Process Pilot #2: Fabrication & Assembly**
- **(Deploy) Min/Max – Buyouts**
Assess & Design work completed in 2020

Phased Workplan | Monitor & Improve

Onboarding
& Kickoff

Assess

Design

Build &
Train

Process
Validation

**Monitor &
Improve**

Scale &
Deploy

Project
Closure

Key Activities

- Assessment of Pilot Results
- **Voice of the Customer**
 - Business & Manufacturing Feedback Loops

JUN 21 – JUL 9


14 Days – 83%

Deliverables

- **Revisions – Future State Process Maps**
 - *Warehousing & Inventory Management*
 - *Fabrication*
 - *Purchasing*
 - *Assembly*

Phased Workplan | Scale & Deploy

Onboarding
& Kickoff

Assess

Design

Build &
Train

Process
Validation

Monitor &
Improve

**Scale &
Deploy**

Project
Closure

Key Activities

- **Process Model Expansion**
 - *Increase Warehouse(s) Space & Footprint*
 - *Buyouts – Add all SKU's*
 - *Fabricated – Add all selected SKU's*
- **Training**
 - *Mfg. Engineering: Criteria for MTS v. MTO*

JUL 12 – AUG 13

25 Days – 95%

Deliverables

- **Final Process & Inventory Migration**
 - *Buyouts - All Purchased Items Moved to PTS + Warehousing Model*
 - *Fabricated Items – Move remaining selected items to MTS (based on Fab Item Selection in Design Phase)*
- **SOP's**
 - *Mfg. Engineering: MTS v. MTO Criteria*
 - *ABC Analysis & Cycle Counting – Best Practices*

Phased Workplan | Project Closure

Onboarding
& Kickoff

Assess

Design

Build &
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Process
Validation

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Deploy

**Project
Closure**

Key Activities

- Impact Assessment Analysis
- Final Deliverable Preparation

AUG 16 – AUG 27

10 Days – 100%

Deliverables

- Present Impact Assessment & Project Close-Out

Project Success Dependencies

1. Timeline – Supply Chain Item Data Master Cleanup

2. Data Quality – On Return of Item Data Master Update

3. Business Resources – Available & Willing to Support

4. Purchase Orders – Re-Designed Process Adherence / Data Inputs

5. Plant Layout – Timely Action & Resourcing to Approved Changes

6. Capital Equipment – Timely Acquisition of Material Handling Equipment (*if necessary*)

7. Onsite Work – Plant 1 Remaining Open & Available with Staff to Support