Practical Steps to Transform Manufacturing Logistics: Assessment, Measurement and Problem Solving

By Three Way Logistics, Continuous Improvement Team

Introduction

Manufacturing logistics and fulfillment operations often face similar challenges: essentially, how to run as efficiently as possible. Optimizing these operations helps deliver measurable benefits: reduced costs, fewer delivery errors that damage customer relationships, and improved employee morale through smoother workflows.

When seeking optimization opportunities, particularly within logistics environments, the number of potential starting points can be overwhelming. This article provides a systematic approach to continuous improvement by focusing on three critical components: initial assessment, implementing effective KPI measurements, and applying practical problem-solving techniques when KPIs fall outside acceptable parameters.

Where to Start

Choosing where to begin your improvement journey is important, but the most crucial step is simply to start. You can prioritize based on:

- Account-specific activities with performance issues
- Warehouse segments experiencing delays or incidents
- Areas with recurring problems or bottlenecks

Begin by categorizing the different operational areas that require evaluation. Prioritize them based on impact and urgency, then methodically work through your list.

Our Scenario

To illustrate our approach, we'll examine a specific case that keeps the scope focused and manageable. We'll walk through the assessment, measurement, and problem-solving process for a raw materials fulfillment operation at one of our facilities supporting a semiconductor manufacturer. While this operation occupies only a small section of our warehouse, it serves as an excellent example for demonstrating our improvement methodology.

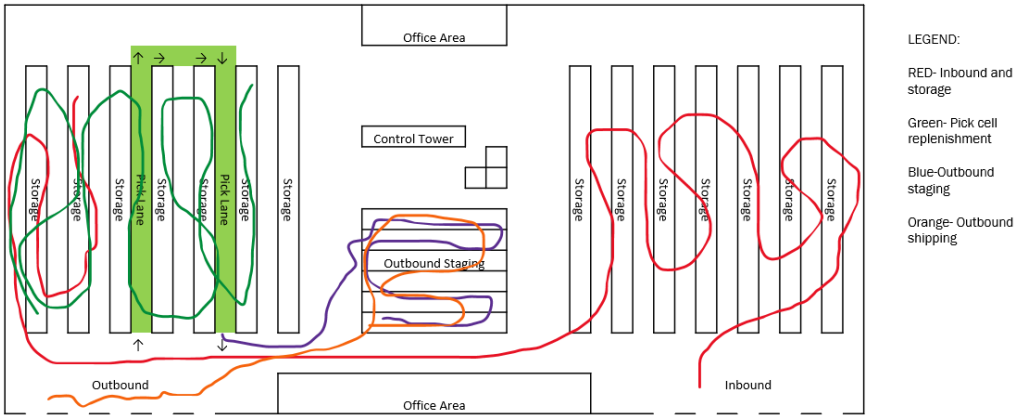
Initial Assessment

An effective assessment doesn't require weeks or even days. A focused 4-8 hour review can provide comprehensive insights into operational performance. In many cases, daily Gemba walks are enough to identify significant improvement opportunities. For our case's fulfillment operation, I spent one day examining building layout, operational flow, picking processes, safety considerations, and other key factors. *[For a more in-depth assessment checklist for fulfillment logistics operations, download our resource guide here.]*

For this article, we'll concentrate on two critical assessment components: building layout and order picking flow. Key aspects examined included:

1. **Material flow mapping:** Tracking the movement of products from receiving to storage to picking to shipping, visualized through a spaghetti diagram that reveals inefficient movement patterns.

Spaghetti Diagram Example



2. **Movement analysis:** Measuring the actual steps required to fulfill common orders, providing quantitative data on travel distance per operation.

Process Cycle Time Analysis Example

Process Time Improvement Savings										
Current State	Process Cycle Time (Mins)	# Cycles per Day	Total cycle minutes per day	# of hours per day	Hourly Rate	EE Daily Co$t	# of EEs	Total Daily Co$t	Total Monthly Co$t	Total Annual Co$t
	90.00	10.00	900.00	15.00	$21.35	$320.25	5.00	$1,601.25	$32,025.00	$384,300.00
Future State	Process Cycle Time (Mins)	# Cycles per Day	Total cycle minutes per day	# of hours per day	Hourly Rate	EE Daily Co$t	# of EEs	Total Daily Co$t	Total Monthly Co$t	Total Annual Co$t
	30.00	10.00	300.00	5.00	$21.35	$106.75	2.50	$266.88	$5,337.50	$64,050.00
Savings	Process Cycle Time (Mins)	# Cycles per Day	Total cycle minutes per day	# of hours per day	Hourly Rate	EE Daily Savings	# of EEs	Total Daily Savings	Total Monthly Savings	Total Annual Savings
	60.00	0.00	600.00	10.00	0.00	$213.50	2.50	$1,334.38	$26,687.50	$320,250.00

** Update yellow cells

These assessment elements, while just a subset of a complete evaluation, revealed significant improvement opportunities for our case.

Practical Problem Solving (Part 1)

With our assessment data on pick flow and travel distance, we applied structured problem-solving methodologies to develop improvements. Practical Problem Solving (PPS) employs standardized processes, templates, and frameworks to systematically address issues and define expected outcomes.

For the excessive travel distance identified in our assessment, we utilized our Travel Distance Savings Framework to:

1. **Document current state:** Calculate total daily travel distance by multiplying average distance per order by orders per day.
2. **Quantify cost impact:** Apply hourly labor costs to time spent traveling to determine total cost associated with current movement patterns.
3. **Design improved state:** By analyzing picking patterns and identifying frequently picked items, we redesigned the warehouse layout to optimize product placement. Our solution reduced travel distance by 40% per order.
4. **Calculate savings potential:** Using the same template, we maintained the same order volume but reduced the distance per order, revealing significant labor and time savings (replace "labor and time savings" with "hard and soft savings) when projected annually.

Travel Distance Savings Example

Distance Traveled Savings														
Current State	Distance per Cycle (feet)	# Cycles per Day	Total distance per day	# steps per day	# seconds per step	# seconds per day	# minutes per day	# of hours per day	Hourly Rate	EE Daily $	# of EEs	Total Daily $	Total Monthly $	Total Annual $
	27.00	35.00	945.00	378.00	0.60	226.80	3.78	0.06	$57.63	$3.63	3.00	$10.89	$217.84	$2,614.10
Future State	Distance per Cycle (feet)	# Cycles per Day	Total distance per day	# steps per day	# seconds per step	# seconds per day	# minutes per day	# of hours per day	Hourly Rate	EE Daily $	# of EEs	Total Daily $	Total Monthly $	Total Annual $
	13.00	35.00	455.00	182.00	0.60	109.20	1.82	0.03	$57.63	$1.75	3.00	$5.24	$104.89	$1,258.64
Savings	Distance per Cycle (feet)	# Cycles per Day	Total distance per day	# steps per day	# seconds per step	# seconds per day	# minutes per day	# of hours per day	Hourly Rate	EE Daily Savings	# of EEs	Total Daily Savings	Total Monthly Savings	Total Annual Savings
	14.00	0.00	490.00	196.00	0.00	117.60	1.96	0.03	0.00	$1.88	0.00	$5.65	$112.95	$1,355.46

According to the book Making Materials Flow, each step of walking is equivalent to 2.5 feet. Each step (2.5 ft) is equivalent to 0.6 secs.
If you use the metric system, one step equates to 0.762 meters. Said another way, for every 4.166 feet traveled (1.27 meters), one second of time is wasted.
10,000 ft / 4.1667 ft/sec = 2400 seconds = 40 minutes = 0.67 hours

KPIs

For each improvement initiative, appropriate performance metrics are essential. Effective KPIs must genuinely measure what they claim to measure. A metric that fluctuates without accurately reflecting operational performance provides no value.

For our travel distance improvement, we implemented two complementary KPIs:

1. **Order Cycle Time:** Measuring the duration from when an associate begins processing an order until it's ready for shipment. This directly tracks the efficiency of preparing each order.
2. **Pick Accuracy:** Tracking the percentage of orders fulfilled without errors. This ensures that speed improvements, or other factors, don't come at the expense of quality.

These paired metrics allow us to confirm that our new layout truly delivers better results while maintaining order integrity.

Practical Problem Solving (Part 2)

Even well-designed processes will eventually experience performance issues. When KPIs fall outside acceptable parameters, proactive management is critical—not just acknowledging the problem but systematically addressing it.

In our case, after implementing our new layout, Order Cycle Time remained within acceptable parameters, but Pick Accuracy declined by 12%. To address this, we employed the A3 Project Management methodology—a structured problem-solving approach that:

1. **Documents the problem:** We identified that similar-looking parts with similar identification numbers were being confused during picking.
2. **Analyzes root causes:** Through direct observation and data analysis, we determined that poor lighting in storage areas and minimal visual differentiation between packaging contributed to the errors.
3. **Develops countermeasures:** Our solution included enhanced lighting in picking areas, color-coded storage locations for similar items, and modified labeling with visual indicators to distinguish similar parts.
4. **Implements and validates:** After implementing these changes, we monitored Pick Accuracy for three weeks, confirming a return to acceptable levels.

The A3 framework provided a concise, logical narrative that enabled team alignment and focused problem-solving.

To see an example of an A3 storyboard, see HERE.

Summary

Continuous improvement in logistics operations requires a systematic approach:

1. **Regular assessments** of operational areas based on management priorities, conducted on a scheduled cadence to identify issues that may not be captured by existing KPIs alone.
2. **Implementation of targeted KPIs** that accurately measure performance in critical areas.
3. **Proactive management** of KPI deviations through structured problem-solving methodologies.

This cyclical process—assess, measure, solve, repeat—creates a foundation for ongoing optimization that drives meaningful operational improvements and competitive advantage.

[For templates, checklists, and additional resources referenced in this article click here.]