CASE STUDY | Improving Productivity and Freight Forwarding Costs

How an automotive parts distribution company improved productivity and freight-forwarding costs

The Challenge

Imagine a long row of more than 50 dock doors into which 18-wheelers drive in and out all day and night, while busy workers unload five million pounds of automotive parts each week. Parallel to this row is another row of 50 dock doors, which feed the same truck trailers with these same parts to be distributed under the NAPA brand.

That's basically the definition of a cross-dock operated by Rayloc Merchandise Distribution Service in Atlanta, Georgia. One of several such cross-docks in the Rayloc system, the Atlanta facility takes parts in from suppliers, then reloads them for transport to more than 60 distribution centers, which in turn parcel them out to wholesalers and retailers all over the country.

A Rayloc Black Belt, Mark Stewart's job was to make the Atlanta cross-dock more productive. "We knew there was opportunity to improve," he says. "Plus rising fuel costs demanded it."

One of the key areas for improvement, says Stewart, was to bring down the number of trailer loads that remained full or partially full from one shift to the next. The ripple effect of leaving freight from one shift to the next is significant. If incoming parts are not unloaded efficiently, they can't be reloaded optimally. Outbound trailers leave according to a schedule because their contents have to reach their destinations at certain times to meet customer demand. If outbound trucks leave the crossdock without full loads, the cost per pound for moving loads goes up.

> **"All this is why we needed Six Sigma, to figure out the chain of causation and how to optimize."**
>
> *— Mark Stewart, Black Belt*

The Process

Stewart started by studying the overall cross-dock process using the SIPOC (Supplier-Inputs-Process-Outputs-Customers) tool. Then he pulled a map of the process that he had by virtue of the facility's adherence to ISO standards. "We used this map to help us brainstorm all the possible causes for why certain trucks weren't unloaded in the most timely and efficient manner."

While filling out a Fishbone diagram, Stewart and his team identified many factors impacting productivity. Some of these included damaged freight, incorrect billing and packing documentation, rework related to loading outbound trailers, shortages of hardware for organizing loads and variation in unloadingloading requirements.

"Sometimes the load that comes off one trailer has to go straight into another," says Stewart. "Other times part of the load goes into another trailer, while another part of the load is held in a staging area for packing later. Some trailers have to be loaded in a special way because they make multiple stops along their routes. All this is highly interrelated. All this is why we needed Six Sigma, to figure out the chain of causation and how to optimize."

Having identified areas of pain, the team beefed up its original process map to show more detailed workflows. Then it honed in ontwo parts of the process that were the most problematic causes of the productivity issue. One, the staging areas were filling up and causing bottlenecks. Two, damaged goods were causing too much rework.

Stay with the logic, and let's take the staging areas as an example. If staging bottlenecks

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Summary

Organization

- Rayloc Merchandise Distribution Service, Automotive Parts Group, Genuine Parts Company. Atlanta, Georgia

Industry

- Automotive parts distribution

Business Problem

- Rising fuel costs and the need to improve productivity

Methodology

- DMAIC

Solution

- Improved measurement system
- Reconfigured staffing patterns
- Rewrote procedures
- Reduced staging bottlenecks
- Minimized rework

Benefits/Results

- Cut trailer backlog time nearly in half
- Increased trailer weights by 10 percent
- Realized more than $1 million in annual savings

were a main cause of productivity shortfall, then what was causing the staging bottlenecks? That was the question for Stewart. "We used a one-way analysis of variance to look at the variation in trailer backup," he remembers. "This gave us some very important clues as to why our staging areas got gridlocked from time to time."

Stewart further explains that management had been looking at this issue for some time, and that its natural expectation was that trailer load backlogs should be less varied and more consistently minimal with no major procedural or staffing changes. But upon further investigation and analysis, Stewart discovered a very important pattern in the variation: while backlogs seemed erratic, they were actually very consistent when compared week over week.

"This was a major epiphany," says Master Black Belt Paul Beach, who guided and assisted Stewart with the project. "With clear data and analysis, we showed that certain days and times were more intensive than others from an incoming load perspective. Expecting that backlogs should stay the same with no operational adjustments was just unrealistic."

Naturally, management took notice when presented with the data, and supported a host of operational changes to improve flow through the staging areas. As well, Stewart's team implemented a number of improvements to address the problem with receiving and handling damaged freight.

"We completely revamped our measurement system by shifting from a paper to an electronically based approach using Excel," Stewart says. We rewrote many of our Standard Operating Procedures and provided additional training on them. "We reconfigured our scheduling to better service high-load times. And we became much more sophisticated in correlating our key palette-perman- hour metric with our key output metric of pounds-per-outbound-truck."

Measurement is always the key in Six Sigma. Before Stewart had reliable data and a way of analyzing it, he struggled to understand why the operation could have higher palette-per-manhour output yet lower pounds-per-outboundtruck performance. "We learned a lot at first by overanalyzing palettes per man hour," he says. "Our understanding of the process got a lot better, though, when we analyzed other variables in conjunction."

The Results

So what's the bottom line? Says Stewart, the Rayloc Atlanta cross-dock shifted its average inbound trailer backlog time fromabout 15 hours to less than 10. On the outbound side, it also increased its average trailer weights by 10 percent. All this was done, too, with no erosion in quality, that is, damaged or wrongly packed/unpacked freight.

So how impressive is that? With1,000 trailers moving five million pounds per week, these operational improvements added up to more than $1 million in annual savings. Not bad if your fuel costs are rising and you want to run a lean operation.

Key Tools Used

Define

- Problem statement
- Macro map
- Project metrics
- Objective statement
- Project forecasted savings

Measure

- Detailed process map
- 5S Lean techniques
- Cause & Effect Matrix
- Fishbone Diagram
- Capability estimates
- Descriptive statistics
- Graphical summary

Analyze

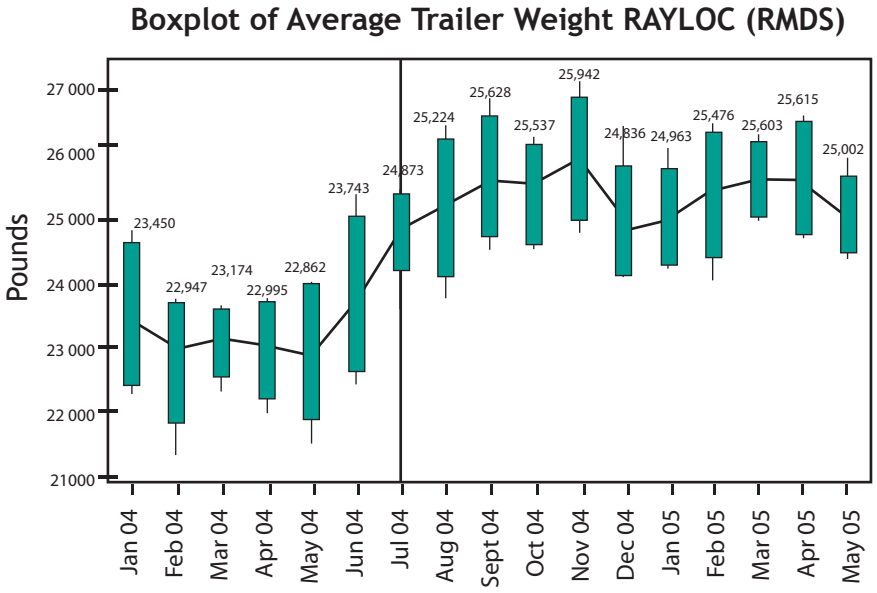
- Box plots
- Mean testing
- One-way ANOVA testing

Improve

- Experimental report
- Schedule Adjustment (Graphical
- Summary)

Control

- SPC
- Mistake Proofing (End of Shift report)



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