

# Lean Manufacturing Case Study - BTO

## Profit-Chain Consulting

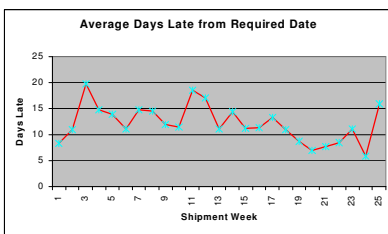
### Our Client

Designs and builds lifts for vehicles and commercial buildings. Lifts are configured to specific applications based on a standard set of feature and options. Most customer orders are for 1-3 similar units requiring assembly to order and in some cases make to order.

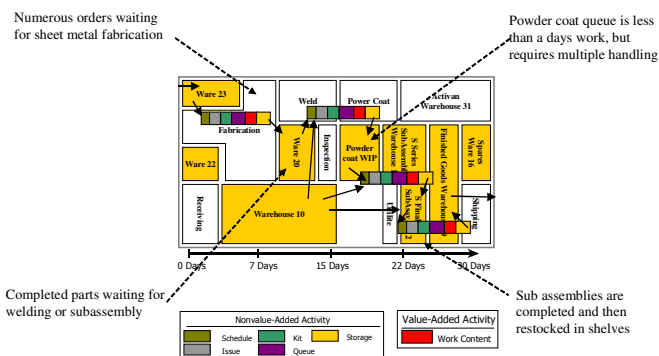
Growth and profitability had recently stalled causing executives to pause and seek new directions. The successful implementation of a new ERP application had improved order handling capabilities, but not manufacturing responsive or cost. While the status quo was acceptable, the organization sought higher returns and growth.

### Seeking Operational Improvements

The order backlog was under constant pressure to reduce lead times to win business. Customer deliveries typically were on time, but the reduced lead times put on constant pressure. Analyzing shipment history reinforced the concern to improve service:



The assembly schedule was not the bottleneck: part shortages for major subassemblies seemed to be the highest schedule disruption. Analyses of work-in-process and parts inventories showed material in stock, but not always the correct type. Planners spent most of their time changing priorities on work orders, keeping track of WIP and asking for more time to make the correct parts.



The Client was focusing on forecasting in their ERP system and building some configurations to finished inventory. The result was inventory that subsequently did not turn into orders and minimal improvement in the ability to respond to shorter lead times.

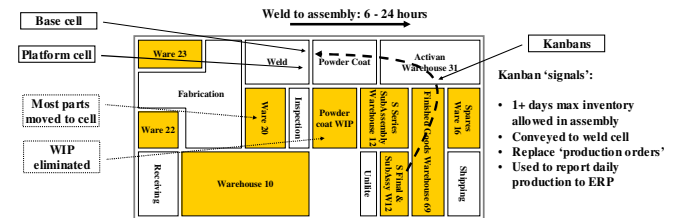
To assess lead time, the team mapped production flow and found orders spent more time waiting and in storage than being processed:

Current material flow resulted in high WIP inventory, lots of material handling and extra floor space. The concern on everyone's mind was the lead time necessary to meet shorter customer delivery windows, which became the focus for the Lean transformation.

### The Lean Solution

The linkage between starting a new batch of parts and the assembly schedule had been driven from customer order forecasts and MRP planning/scheduling. Based on the WIP and parts inventory analyses, it was clear that these plans changed several times per day and created a confusing set of priorities that could not be effectively followed. So, the initial focus was to stabilize the part fabrication schedules and link them directly to usage in assembly.

Part inventories to support assembly were assessed and reset to accommodate a short, but reasonable lead time through fabrication. Some safety was added based on demand fluctuation and supply variability. Once set, only Kanbans created replenishment "orders":



The trick with these critical assembly parts was insuring that fabrication work was only driven by Kanbans. Custom parts were accommodated with special Kanbans. Lead times became stable as work was released on a more uniform basis only as needed.

Tackling the cycle time issue required setup time reduction and a relentless pursuit to eliminate handling. Both of these factors created large batch sizes that took too long to flow through the shop. As setups and handling were addressed, smaller batches enabled shorter lead times and more predictable fabrication times.

As cycle times, batch sizes and material handling were decreased, floor space was reduced. Although the shop flow was not optimal, only minor changes were made to group some operations and provide quick wins rather than to redesign the facility layout.

### Results

Simplifying production flow and directly connecting supply/demand with Kanban enabled dramatic short term benefits:

- Inventory reduced over 30%
- Floor space reduced 40%
- Customer orders shipped on time exceeds 95%

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