FlowVision Helps IMMI Reduce Lead Time by 90%, Improve Customer Service and Reduce Operational Costs

"I knew there had to be better ways to manufacture our products."
"…We are operating today at levels beyond what I ever imagined possible."

Joe Campbell, Director of Commercial Operations at IMMI, a major manufacturer of commercial vehicle restraint systems, knew that he had a *"pretty efficient manufacturing system"* - he had benchmarked his competitors and his engineering and manufacturing team had made many improvements in the past.

IMMI is recognized as the world leader in commercial vehicle occupant safety technology and child safety restraint components. Since 1961, IMMI has produced safety systems for the heavy truck, construction, agriculture, emergency vehicle and child seating industries.

But now he was facing a raft of major challenges:

- IMMI's major customers were demanding faster and faster order turnarounds. The manufacturing floor typically took from 2 to 4 weeks to complete an order. The IMMI sales force was pushing for **2 to 4 day** response times to satisfy their customers.
- IMMI's owners were looking for cost reductions an order of magnitude greater than the improvements Joe's team had achieved in the past. Joe knew that the old incremental-improvement approach would fall far short of his cost reduction target.
- At the same time, IMMI's financial management group was looking for dramatic inventory savings – on the order of a three-fold decrease in total inventory.

IMMI 2001 Results from Flow

Reduced Response Time from around 10 days to under 8 hours

Decreased In-Process Inventory by 85%

Improved Quality by 25%

Improved On-Time Delivery from 95% to 99.7%

When Joe scrutinized his manufacturing operation, he saw that
"There were no real synchronization efforts between the various supporting functions, such as Planning, Purchasing, Warehouse, Manufacturing Engineering, and Shipping. We had an undisciplined shop floor that independently made whatever they wanted to."
"Our pay system, prior to Flow, rewarded large batches of work-in-process that did nothing to serve our end customer"
"Even with improvements under our old system, we still lacked total control of our manufacturing process."

Senior consultants from FlowVision, LLC helped the IMMI team to completely redesign the manufacturing operation. The previously batch-driven, inflexible manufacturing groups were reconfigured into Lean/Flow cells capable of producing a large mix of products every day – and could respond to customer orders in just a few hours instead of weeks.

"FlowVision helped us understand these better ways through Lean/Flow principles and they guided our implementation to where we are operating today at levels beyond what I ever imagined possible. Our quality improved 25%; our on time delivery for the last half of last year was 99.7% and we reduced work in process from 1-1/2 weeks to less than 8 hours. But best of all, our planning group has complete control of what manufacturing is working on. Thank you FlowVision." – Joe Campbell

The FlowVision process followed a formal path. FlowVision consultants assessed the IMMI operation, quantifying projected benefits and also mapping out the timeline and resources required for the Lean/Flow project.

Next, FlowVision trainers led the IMMI team through a comprehensive hands-on workshop demonstrating and teaching all the tools and techniques that would be used to design the line, material kanban and planning systems.

Senior consultants then worked with the IMMI team every step of the way to design the flow lines. First the team collected data on process flows, work content details, and future sales volumes. Following the steps practiced in the workshop, the team calculated takt times for each process, calculated the number of resources required and designed the cells. They balanced the manufacturing lines using the set of tools and techniques from the training workshop. As part of the lean/flow implementation, FlowVision provided the IMMI team with the calculation tools to perform the line design calculations, and to perform and maintain the material kanban calculations.

While many of the IMMI products followed a common path through the first portion of the manufacturing process, each specific product then required a different combination of the dozens of unique finishing processes. This resulted in several hundred potential process paths for each product line, totaling thousands of unique SKUs.

Previously, operators worked on large batches of product at finishing processes. Orders typically took weeks to move through the line.

Each of the finishing processes had historically been characterized by large amounts of in-process inventory as the operators produced large batches of product at one workstation before moving the batches to the next workstation. Demand at each finishing process was of course highly variable from day to day, dependent on the mix of products.

In the FlowVision lean/flow line, the products flowed directly off the end of the common process portion of the line into that product's specific finishing process path. Machines were arranged close to each other, so the products could be moved in small quantities from machine to machine. Between each machine were placed IPKs ("in-process kanbans") that were precisely calculated

to accommodate the run-time and demand imbalances between successive processes. The IPK quantities were also linked to the planning algorithms used for the line.
As each IPK filled with product, this signaled the manufacturing associate to move from one machine to the other – to where the work needed to be done – so the product could continue to flow toward the customer. Even with large and dramatic work content time imbalances between machines, and highly varied process paths, the IPKs and operator movement enabled the IMMI lines to flow smoothly and efficiently.

In the Lean/Flow line, operators produce only enough pieces to fill the in-process kanban (IPK). Signaled by the IPKs, each operator moves to the correct station at the right time in order to keep the product flowing toward the customer. Raw materials are presented in kanban containers.

Raw materials were supplied directly to the line via material kanban – these kanban signals were transmitted back to IMMI's suppliers and enabled IMMI to recognize immediate and accelerating reductions in both raw material inventory and parts shortages. The kanban quantities were calculated by the team using FlowVision's mathematical approach. This statistical method enables kanban inventory to cover variable material usage.

IMMI used the FlowVision calculation tools to perform daily staffing calculations based on the customer orders for that day. Before, the IMMI planners spent much of their time expediting and chasing down orders on the floor. Supervisors spent a large part of their day moving operators from one workstation to another, trying to achieve the production plan – even so, actual daily production quantities often varied substantially from plan. Customer "drop-in" orders (last-minute changes or additions) had particularly severe impacts on the planners and the manufacturing floor, as the production plans and work sequences were urgently re-jigged, and workers instructed to stop work on one order and start another.

Since the FlowVision line has been in place, there has been a crucial change in the daily activities of the IMMI planners and supervisors. The FlowVision calculation tool enables the planners to calculate precisely the required daily staffing level for each day's plan. IMMI's flow line now completes orders more than 10 times faster than before – and the product flow off the end of the line is much more consistent and predictable. The line now performs so closely to the daily plan that, as Joe Campbell says, *"It's almost scary."* Even better, *"Customer drop-in orders are invisible to the shop floor. Everyone is working together toward the goal of customer satisfaction."*

The team at IMMI had, in a few months, put in place a Lean/Flow system – providing the company with order-of-magnitude market, strategic and operational advantages: reduced customer response time, decreased in-process inventory, improved quality and productivity, and near-perfect on-time delivery. Yet, they were still not inclined to rest on their laurels.

The systemwide change that IMMI made in implementing Lean/Flow has proven to be a solid foundation for ongoing continuous improvement efforts. Waste, variation, cash-flow and cost-reduction opportunities, quality issues – Lean/Flow highlights them all. Using the calculation tools, data and methodologies they absorbed as part of the FlowVision implementation, IMMI is working to continually improve the performance of the line. They are seeking to reduce IPK sizes by eliminating their causes, such as work imbalance or process design; and a major effort is underway to work with key suppliers so that kanban quantities can be reduced through a program of more frequent signaling and supply. Joe Campbell summarizes IMMI's sustained Lean/Flow benefits:

"We can very accurately evaluate changes to the system, such as components to a product or shifts in volume, where as before we could only guess at what impact they might have. Waste is easily identified. Any element of the manufacturing process that adds cost without adding value needs to be attacked."