

## Successful Lean Application

### Consultant

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### Client

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Greg Hart, President

Bob Gibson, Plant Manager  
Steve Reohr, Process Engineer

**Title of Project:** TRW Auburn Plant Reconfiguration

**Timeframe:** November 1998 to July 1999

### Company Profile

TRW is a worldwide manufacturer of automotive parts and assemblies, space, defense, aerospace and information systems. TRW sales in 1999 exceeded \$19 billion. The company has over 49,000 employees.

The TRW Auburn plant manufactures keyless entry systems for automobiles. Customers include the top automobile manufacturers with Chrysler, Ford and Toyota combined representing over 80% of the total production volume. The keyless entry system includes two primary components – a transmitter and a receiver. The transmitter is the pushbutton device, which attaches to a key-chain. The receiver is installed in the automobile to receive the signal and operate items such as door locks, trunk, starter and panic alarm.

The Auburn plant employs over 400 people operating on three shifts. It is highly automated including surface mount technology and automated placement equipment for PC board assembly and paced / robotic assembly lines for final assembly. Plant operations are ISO and QS9000 certified. The plant has over 66K square feet of space on one level.

### Situation

#### *Background*

The plant was arranged in functional areas grouping similar equipment. New equipment purchases had been placed in available space, often not conducive to material flow. Product traveled over lengthy flow paths. Batch production coupled with disconnected operations resulted in large queues and extensive work in process inventory. The plant faced a significant backlog of work for a major customer.

#### *Opportunity*

TRW had instituted a corporate program in lean manufacturing and the Auburn plant was moving along the learning curve. They had held a couple of kaizen events with good success. An engineering team was chartered to look at rearranging the factory for improved flow. Key resources on this team were Walt Hubbs - maintenance manager, Tom Szumloz - process engineering manager and Steve Reohr – process engineer. Existing and preliminary proposed layouts were documented and some planning underway.

#### *Relationship*

Greg Hart of Hart Innovative Solutions was engaged in late October 1998 to manage the project and provide layout consultation. He provided full time support through July 1999.

## Solution

The team completed the plant reconfiguration over the period from November 1998 to July 1999. The project started with extensive planning. Major phases of the move included 1) converting office area to production space and moving offices, 2) populating opened area with equipment, 3) rearranging remaining production equipment, 4) moving warehouse wall and preparing warehouse and 5) installing upgraded warehouse configuration. Contracted services included such things as moving or removing interior walls and doors, upgrading HVAC, installing static dissipating and epoxy flooring, installing air lines, running electrical services and moving major equipment. Plant and machine maintenance staff handled the majority of equipment and office moves. Many moves were accomplished on weekends to minimize downtime.

Following were the major steps followed to achieve the objectives:

- Defined project objectives and limitations
- Reviewed and documented the current situation through a series of interviews
- Visited TRW plant in Marshall, Indiana to incorporate best practices
- Evaluated alternative straight-line and U-shaped layout alternatives using weighted criteria analysis
- Decided on straight line flow and started implementation
- Documented detailed project plan, budget and expenditure justification
- Continually upgraded layout with equipment numbers, improvements in flow and increased precision
- Incorporated new processes including in-line-in-circuit test and in line insertion equipment
- Maintained production with minimal downtime during the moves
- Communicated regularly through project update meetings, group meetings, newsletters and postings
- Analyzed material flow and methods to balance cycle times to takt time and improve quality
- Moved direct operating support offices to production floor and staff offices closer to point of use
- Incorporated kaizen improvements such as 5S and line-side storage optimization
- Built in flexibility for future moves through choices of mechanical and electrical installation
- Maintained schedule and budget through rigorous coordination and excellent execution
- Obtained NY State support for consulting and education expenses

## Results

- Project was completed on time and within 5% over budget
- All equipment and majority of offices in the 66K sq. ft. facility moved during a six month period
- Product flow distance was reduced from 340 feet to 140 feet for typical transmitter products and from 630 feet to 280 feet for typical receivers.
- The plant achieved 8% improvement in productivity overall with 15% increase in the transmitter area
- Inventory was reduced from 41 days of supply to 27 days through this project combined with other plant lean and material control efforts
- Quality improved with implementation of in line in circuit testing less rework and improved feedback
- Product backlog was eliminated
- Empowered teams took over management and operations on the production floor
- Set the stage for continuous improvement with teamwork and lean manufacturing follow-through

TRW Auburn plant is well positioned for effective operations with streamlined product material flow, empowered teams and a continuous improvement process utilizing lean thinking with ongoing training and development. The plant reconfiguration was a major force in improving their competitive position.