

A large, stylized, light blue 'W' logo is centered in the background. The 'W' is composed of thick, rounded strokes. The top horizontal bar of the 'W' is a light gray color, while the rest is light blue. The text 'TAKT TIME APPLICATION' is overlaid on the top horizontal bar of the 'W'.

TAKT TIME APPLICATION

Probe Assembly

HISTORY

The probe was the piece that sent measurements to the read out unit as to flow speed and amount in open trenches.

This unit would eventually be consumed by the environment during normal usage and have to be replaced.

The units sold for \$250 each and were in high demand.

Schedules were never met, even though this area was on overtime.

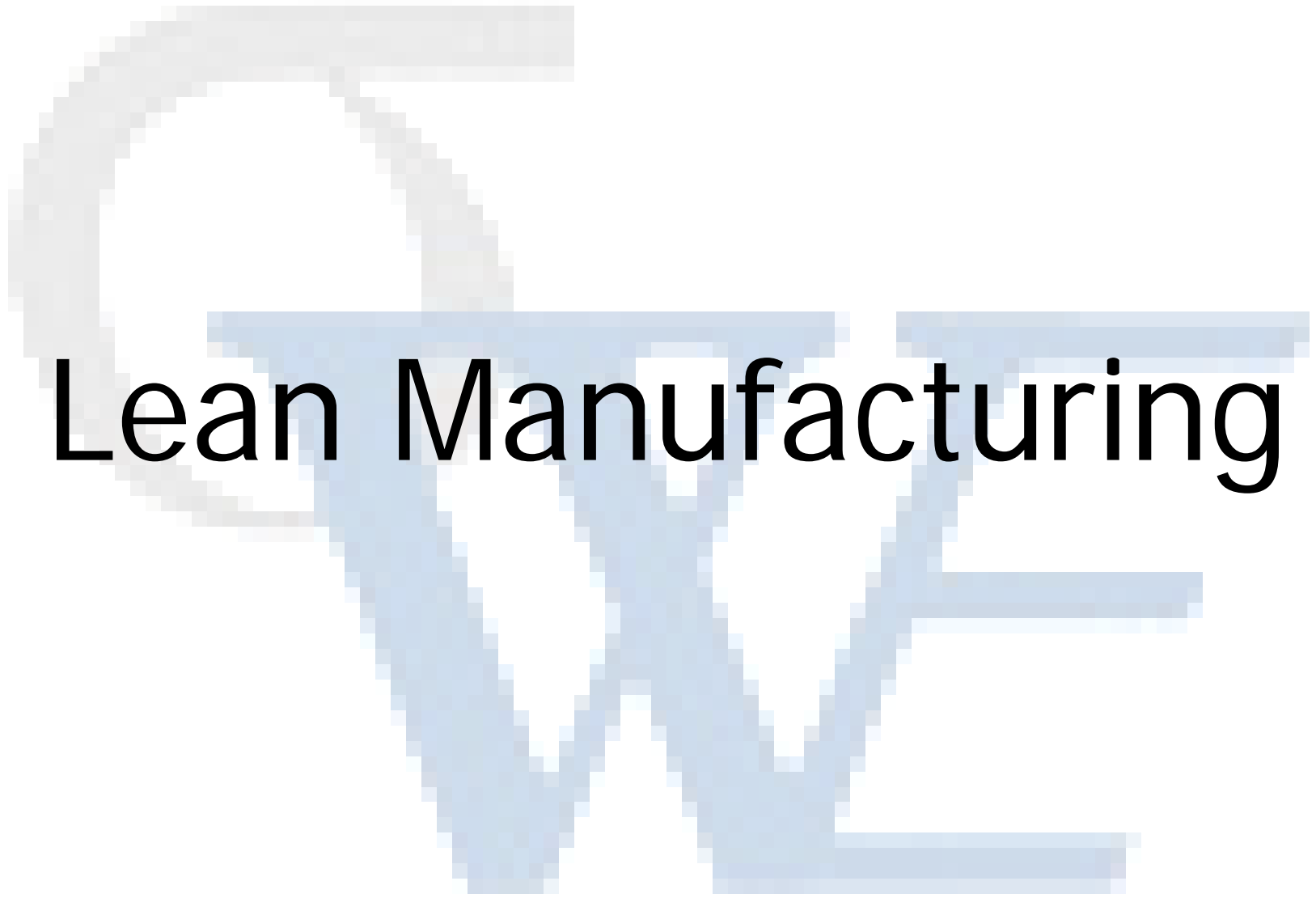
This area always operated in "crisis" mode.

Area typically overloaded with inventory in different stages of development.

Scope of Project

Reduce the overall cycle time of the flow meter process through the development of a continuous throughput process, while ensuring the system supports an end quality product.





Lean Manufacturing

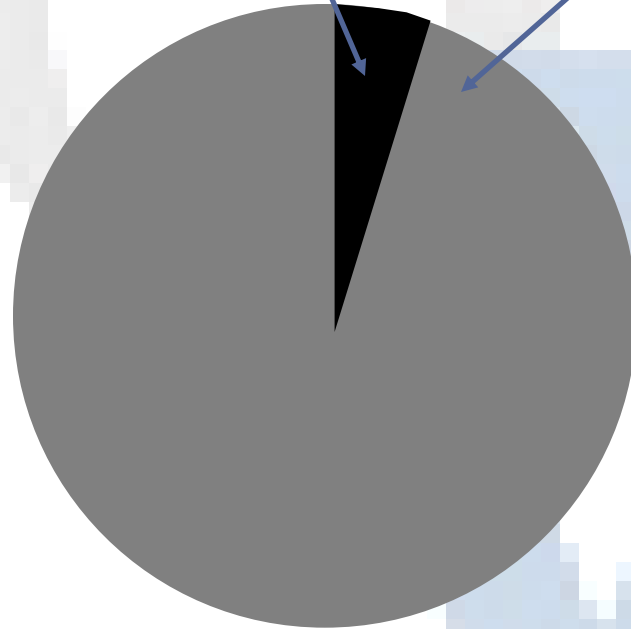
What is Lean Manufacturing?

It is focusing on the ELIMINATION of WASTE (non-value-added activities) through CONTINUOUS IMPROVEMENT!



Lean = Eliminating Waste

Value-Added



Non-Value-Added

- Defects
- Overproduction
- Waiting
- Not Utilizing Employees
- Transportation
- Inventory
- Motion
- Excess Processing

Typically 95% of all lead time is non-value-added.

Waiting

- **Idle time created when waiting for...?**
- **Causes of waiting waste**
 - Unbalanced work load
 - Unplanned maintenance
 - Long process setup times
 - Misuses of automation
 - Upstream quality problems
 - Unlevel scheduling



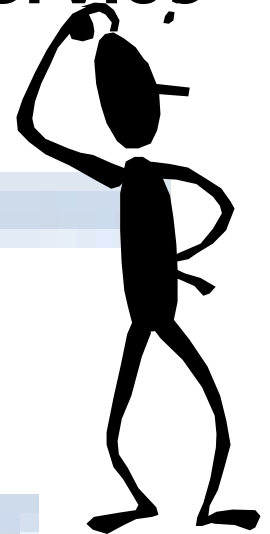
Inventory

- **Any supply in excess of a one-piece flow through your manufacturing**
- **Causes of excess inventory**
 - Misconception that this protects the company from inefficiencies and unexpected problems
 - Unleveled scheduling
 - Poor market forecast
 - Unbalanced workload
 - Misunderstood communications



Motion


- Any movement of people or machines that does not add value to the product or service
- Causes of motion waste
 - Poor machine/people effectiveness
 - Unfavorable facility or cell layout
 - Poor workplace organization and housekeeping
 - Extra “busy” movements while waiting



Excess Processing

- **Effort that adds no value to the product or service from the customers' viewpoint**
- **Causes of processing waste**
 - **Product changes without process changes**
 - **Over-processing to accommodate downtime**
 - **Lack of communication**
 - **Redundant approvals**





Visual Factory and 5S

What is 5S?

- A method to improve and sustain workplace organization
- Represents 5 disciplines for maintaining a visual workplace
 - 1) Sort
 - 2) Set in Order
 - 3) Shine
 - 4) Standardize
 - 5) Sustain





Steps to Create Visual Factory using 5S



- Mark-off the inventory locations
- Mark-off equipment/machine locations
- Mark-off storage locations (cabinets, shelves, tables)
- Visually indicate amount of allowed inventory
- Keep metrics, wall charts, and other information current
- Label all cabinets, shelves, etc with their contents
- Post production status, upcoming jobs



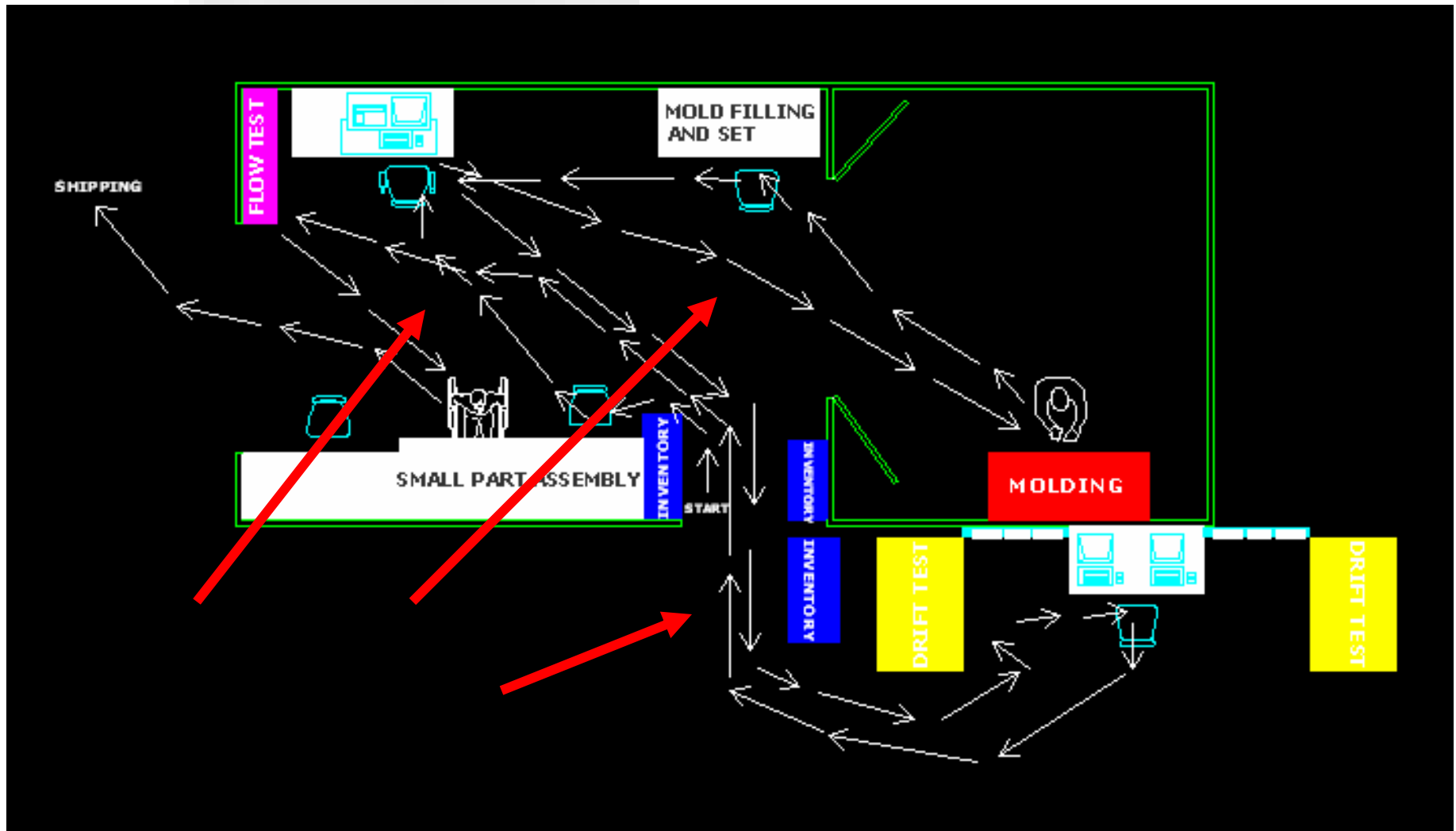
Plant Layout and Process Flow

Factory Flow Analysis: Methodology

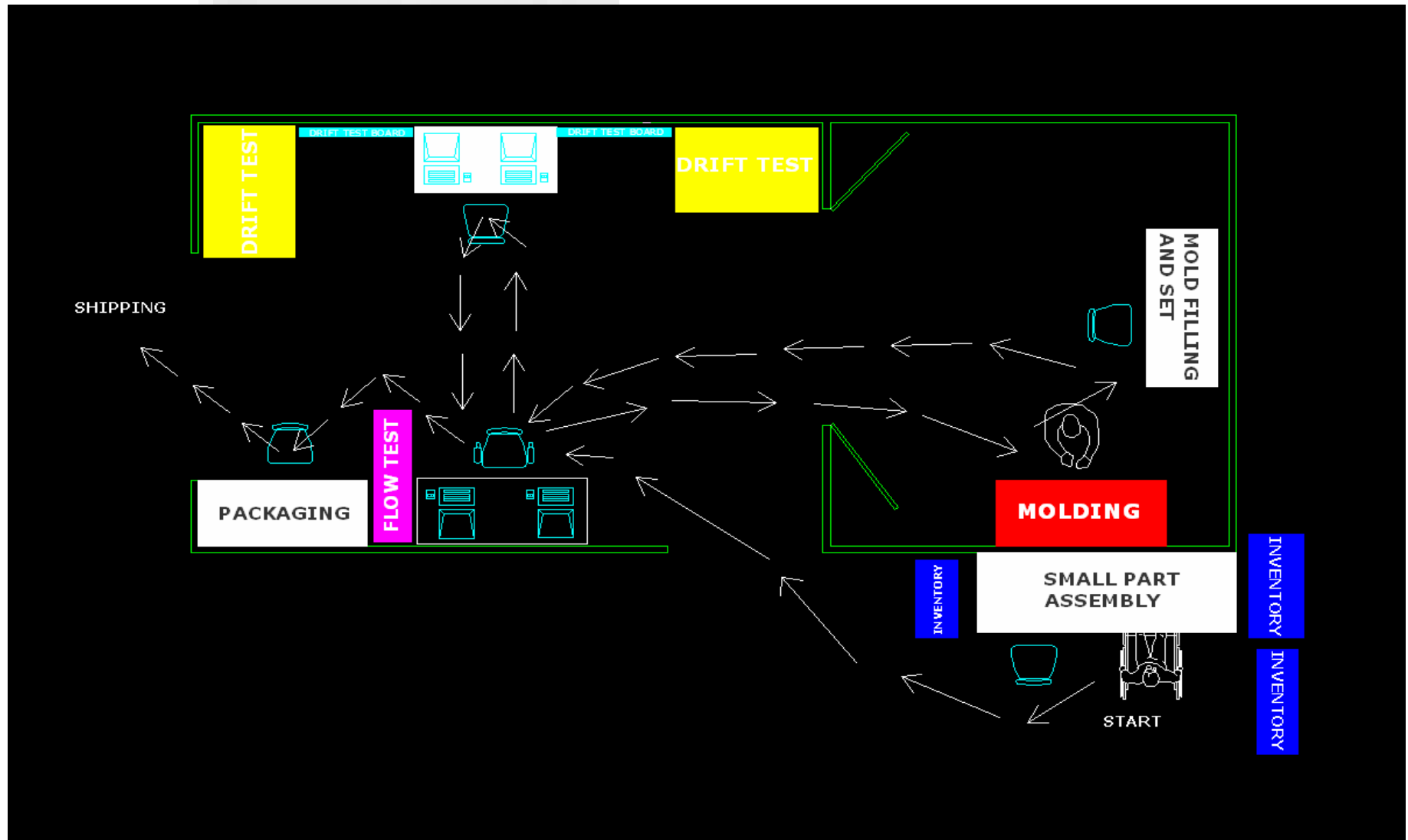
- Study and map the existing flow system
- Identify the dominant material flows between shops (or buildings)
- Combine closely associated processes at departments that complete most of the parts they make
- If parts are observed to backtrack then such flows are eliminated by minor redeployment of equipment



Current Plant Layout



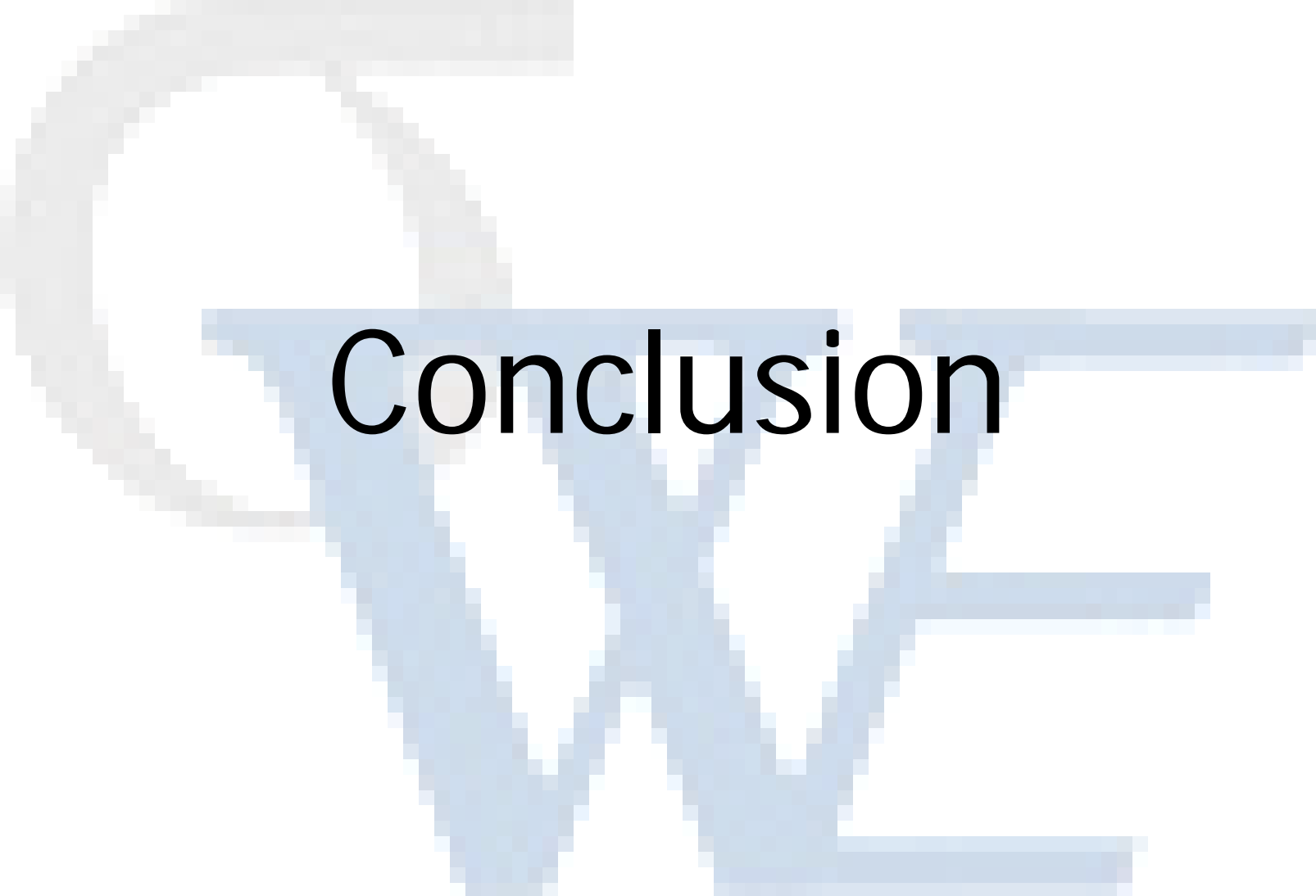
Proposed Plant Layout



Removing Bottlenecks

By:

- Eliminating the batching and moving to one piece flow
- Changing the potting solution to cure in 20 minutes versus 8 hours
- Eliminating the final 100% submersion test thus reducing cycle time by 48 hours
- Making sure all the proper parts are on hand before starting on an order
- Rearranging the layout to eliminate large amounts of inventory between operations
- Rearranging the layout to a more cellular structure thus giving the assemblers input into stopping the production due to a problem



Conclusion

Benefits

By removing the bottlenecks and moving into one piece flow a production rate of 280 per month could be attained. This is an increase of 700% over existing production.

By establishing controls on inventory and order fulfillment, lead time is reduced to 8 hours. This is an reduction of 80% over existing production.

By instituting quality at the source final 100% inspection is a non-value added activity that can be eliminated without causing customer problems.



Benefits

Distribution (Tested to Not Tested)	Number Produced in 30 Days
100% to 0%	100
75% to 25%	163
50% to 50%	196
25% to 75%	234
0% to 100%	280

Distribution (Tested to Not Tested)	Profit gain per Month
100% to 0%	\$0
75% to 25%	\$15,120
50% to 50%	\$23,040
25% to 75%	\$32,160
0% to 100%	\$43,200

Conclusion

- Drift test creates bottleneck in the process
- 5S will keep order in the area and allow for visual factory
- Layout causes excess travel and material handling
- Process capability described to possibly change inspection procedures
- Continuous Improvement plan created to ensure effectiveness of project

