Lean Overview

Northeast Indiana Advanced Manufacturing (Lean) Network Meetings:
February 21 – Fort Wayne
February 29 - Warsaw
I love Lean
What is “Lean”

• "Lean," is a production practice that considers the expenditure of resources for any goal other than the creation of value for the end customer to be wasteful, and thus a target for elimination.

• Working from the perspective of the customer who consumes a product or service, "value" is defined as any action or process that a customer would be willing to pay for.
Definition of Value-Added

Value-Added
Any activity that increases the market form or function of the product or service. (These are things the customer is willing to pay for.)

Non-Value-Added
Any activity that does not add market form or function or is not necessary. (These activities should be eliminated, simplified, reduced, or integrated.)
Non-Value-Added - “The 8 wastes”

1. Overproduction
2. Waiting
3. Transportation
4. Non-value-added processing
5. Excess inventory
6. Defects
7. Excess motion
8. Underutilized people

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

• Inspection and repair of material in inventory

• Causes of defects:
  – Weak process control
  – Poor quality
  – Unbalanced inventory level
  – Deficient planned maintenance
  – Inadequate education, training, or work instructions
  – Product design
  – Customer needs not understood
Overproduction

• Making more than is required by the next process
• Making earlier than is required by the next process
• Making faster than is required by the next process

• Causes of overproduction:
  – Just-in-case logic
  – Misuse of automation
  – Long process setup
  – Unlevel scheduling
  – Unbalanced workload
  – Over engineered
  – Redundant inspections
Waiting Waste

• Idle time created when waiting for...?

• Causes of waiting waste:
  – Unbalanced workload
  – Unplanned maintenance
  – Long process setup times
  – Misuses of automation
  – Upstream quality problems
  – Unlevel scheduling
People Waste

• The waste of not using people’s mental, creative, and physical abilities

• Causes of people waste:
  – Old guard thinking, politics, the business culture
  – Poor hiring practices
  – Low or no investment in training
  – Low pay, high turnover strategy
Transportation Waste

• Transporting parts and materials around the plant

• Causes of transportation waste:
  – Poor plant layout
  – Poor understanding of the process flow for production
  – Large batch sizes, long lead times, and large storage areas
Inventory Waste

• Any supply in excess of a one-piece flow through your manufacturing process

• Causes of excess inventory:
  – Need for buffer against inefficiencies and unexpected problems
  – Product complexity
  – Unleveled scheduling
  – Poor market forecast
  – Unbalanced workload
  – Misunderstood communications
  – Reward system
  – Unreliable shipments by suppliers
Motion Waste

• Any movement of people or machines that does not add value to the product or service

• Causes of motion waste:
  – Poor people or machine effectiveness
  – Inconsistent work methods
  – Unfavorable facility or cell layout
  – Poor workplace organization and housekeeping
  – Extra “busy” movements while waiting
Extra Processing

• Effort that adds no value to the product or service from the customers’ viewpoint

• Causes of processing waste:
  – Product changes without process changes
  – Just-in-case logic
  – True customer requirements not clearly defined
  – Over-processing to accommodate downtime
  – Lack of communication
  – Redundant approvals
  – Extra copies or excessive information
Defects
Overproduction
Waiting
Non-Utilized Employees
Transportation
Inventory
Motion
Extra Processing
STOP / REDUCE THE WASTE
Lean Building Blocks

Continuous Improvement

Pull/Kanban

Cellular/Flow

TPM

POUS

Quality at Source

Quick Changeover

Standardized Work

Batch Reduction

Teams

Visual

5S System

Plant Layout

Value Stream Mapping
Faces of Quality

Henry Ford (1863-1947) was an American businessman and automotive pioneer. He is considered by many to be the first practitioner of Just In Time and Lean Manufacturing.
Modern Day Example

- YouTube – search Ford Brazil Plant

http://www.youtube.com/watch?v=J1OkZ3xowKQ
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http://ipfw.edu/lean-network/  - Lean Network Website

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•  http://www.mep.nist.gov/