

Lean & Clean Overview

Michigan Business Pollution Prevention Partnership

October 12, 2004

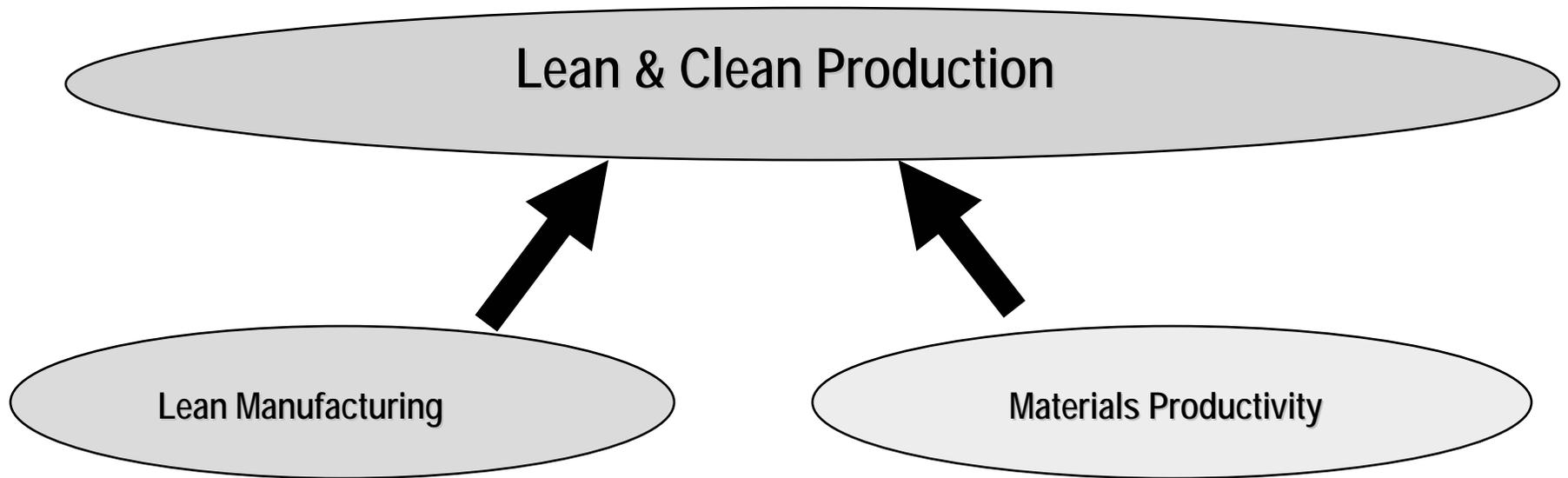
Bill Stough, MMTTC-West GSN Assessor
Sustainable Research Group, LLC



Objectives

- Need for Lean & Clean
- What is Lean Manufacturing
- Processing Wastes
- What is Clean Manufacturing
- Materials Productivity
- What is Lean & Clean
- Outline of Workshop

Lean & Clean Production



Need for Lean & Clean

Dual pressures on industry today:

1. Global competition is leading to the loss of manufacturing jobs in the US. Companies must find and eliminate waste in order to reduce cost and be more competitive.
2. Greater pressure on companies to minimize their impact on the environment for the benefit of the community and their workforce (e.g. ISO 14001)

Lean is...

- A way of thinking *and taking a systems approach to training & implementation*
- A culture of continuous improvement
- A philosophy of eliminating non-value added activities (i.e. waste)
- An approach of empowering people

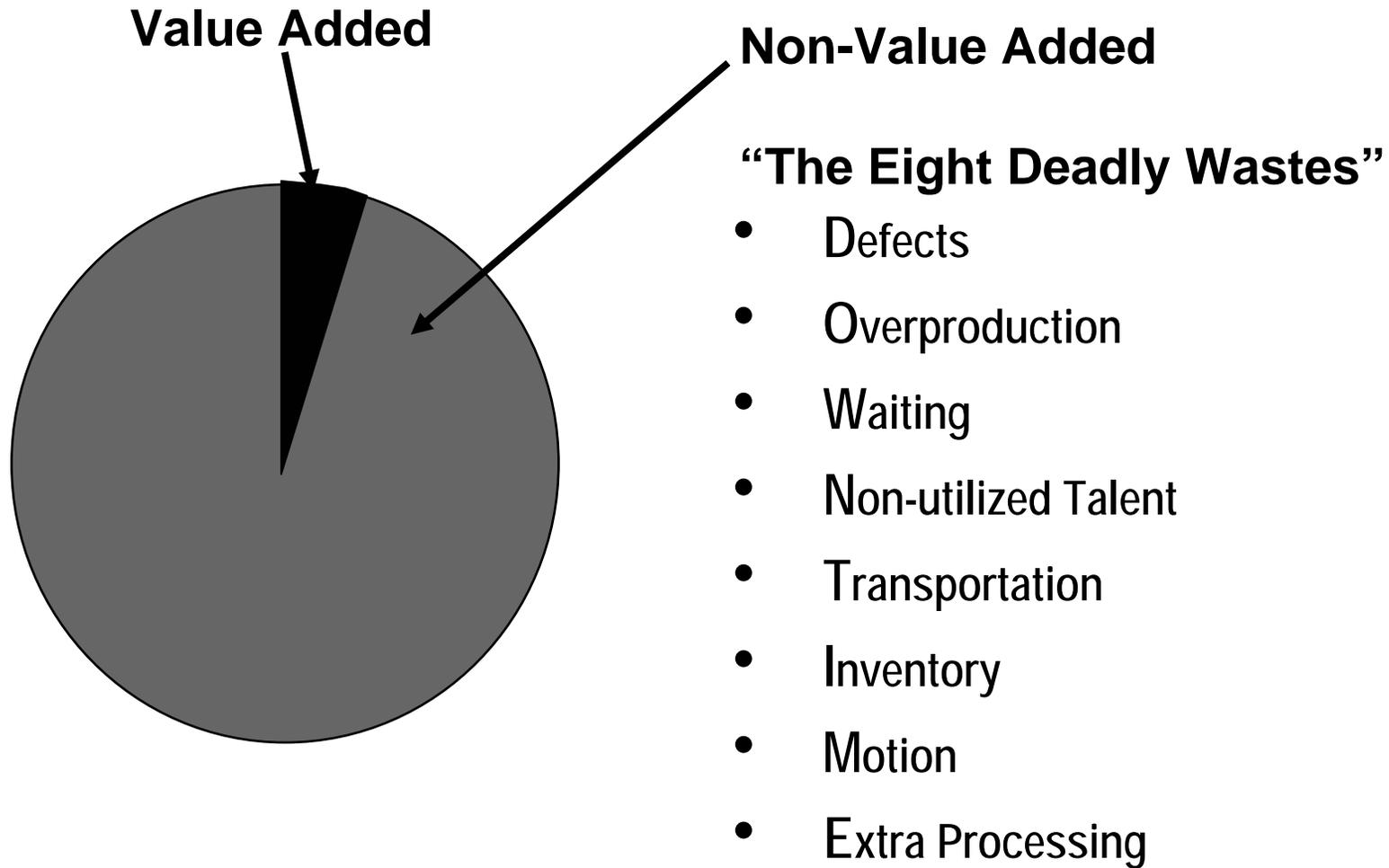
Lean Manufacturing...

- Focuses on time, (TIME = \$\$)
- Reduces all non-value added activities:
 - Shortens processing time
 - Gets products to customers quicker
 - Improves productivity
 - Improves quality
 - Lowers cost, and
 - Increases customer satisfaction

Lean Enterprise is:

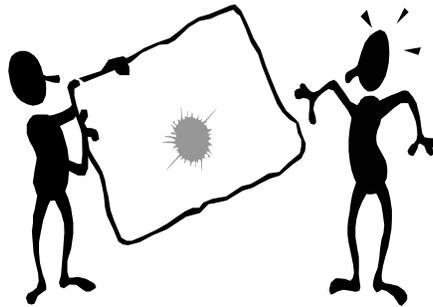
“A systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection.”

Lean = Eliminating the Wastes



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

Waste of Making DEFECTS



- Money and time wasted to find mistakes and fix or replace product

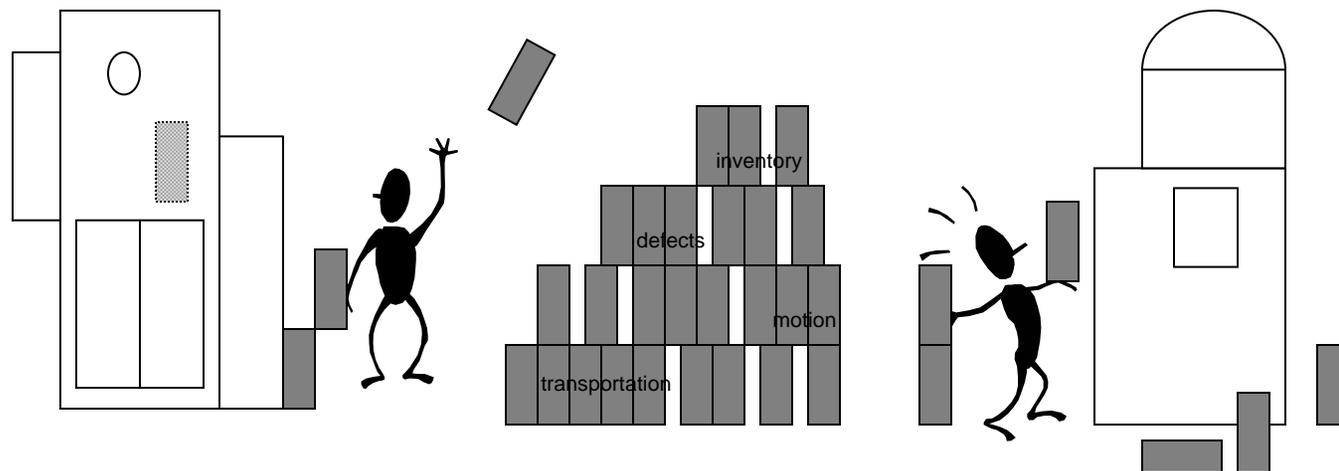
- Causes of Defects

- Lack of process controls
- Poor quality of incoming materials
- Lack of planned maintenance
- Inadequate operator training
- Poor work instructions



Waste of OVERPRODUCTION

- Making products Faster than needed!
- Making products Sooner than needed!
- Making More product than needed!

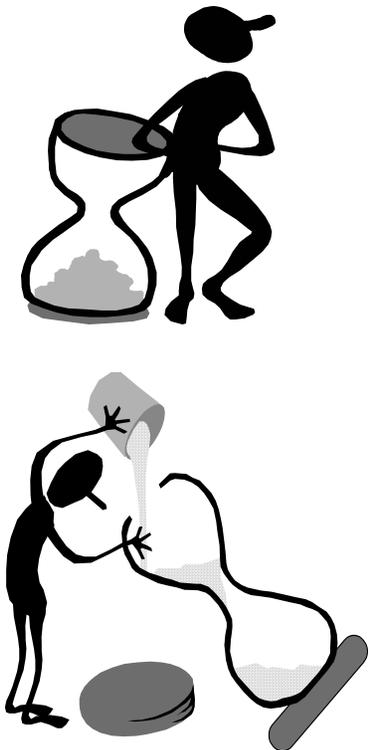


Waste of WAITING

- Time lost when people, material or machines are waiting....

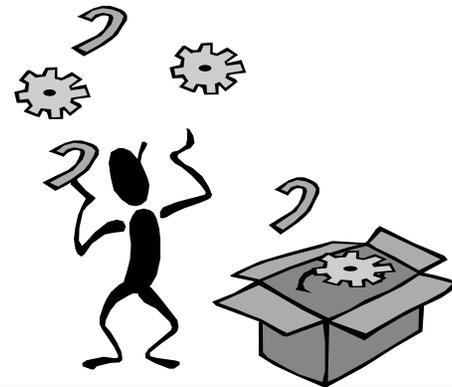
- Causes of Waiting Waste

- Unbalanced workload
- Equipment breakdowns
- Batch processing
- Long set-up times
- Poor material handling practices
- Scheduling problems
- Waiting for tools



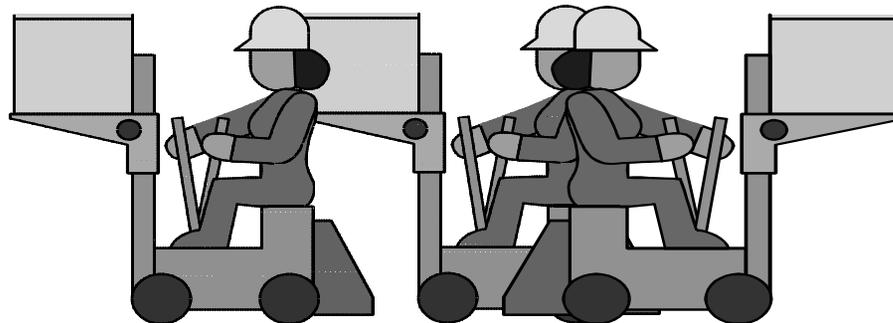
Waste of NON-UTILIZED TALENT

- The wasted potential for improvement that results when the people doing the work are not consulted for their ideas on improving the methods of work
 - Causes of unused talent waste
 - Old guard thinking, politics, business culture
 - Low or no investment in training
 - High turn over

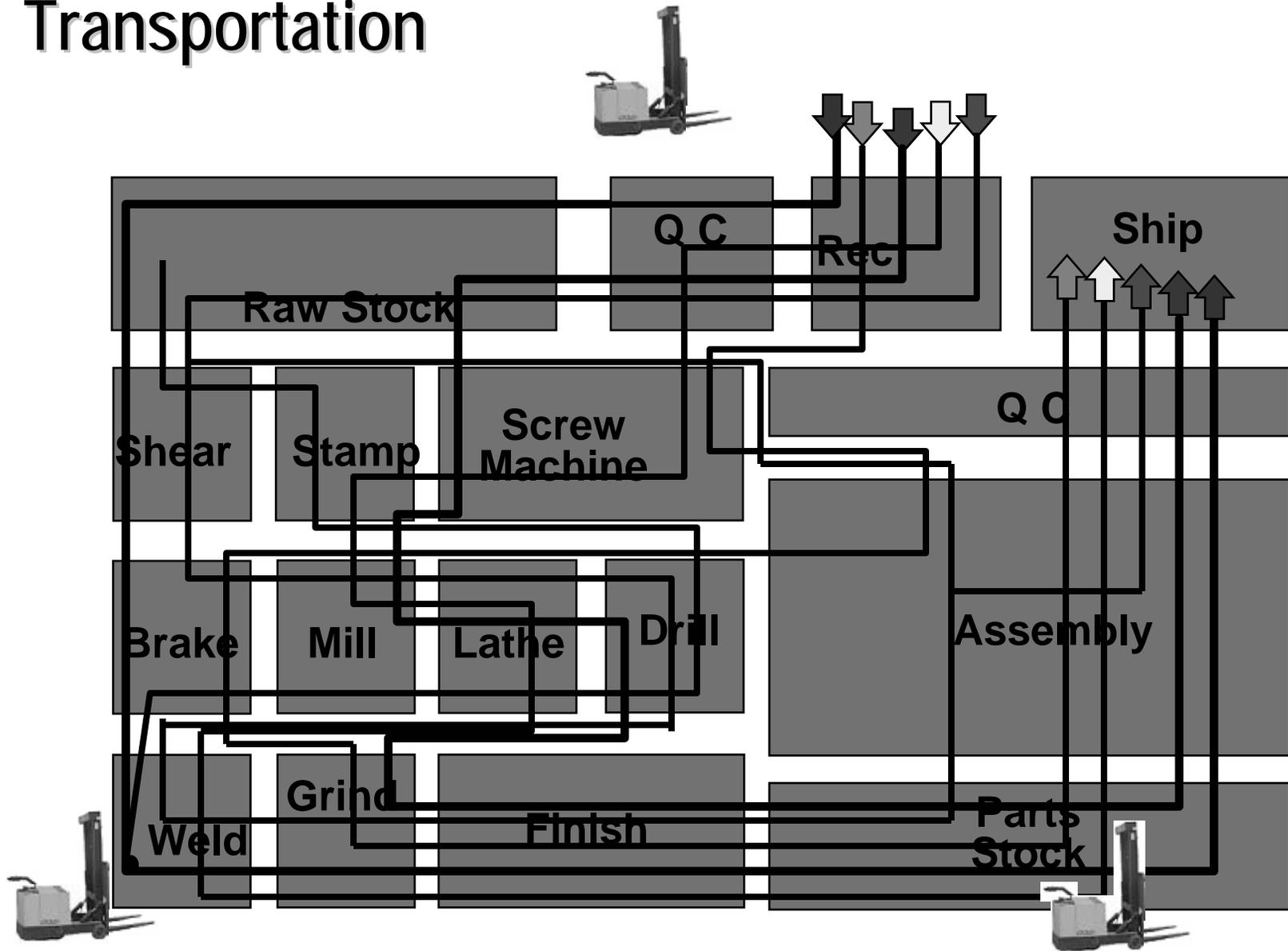


Waste of TRANSPORTATION

- Transporting parts and materials around the plant
 - Causes of Transportation Waste
 - Poor plant layout
 - Large batch sizes
 - Long lead times
 - Large storage areas

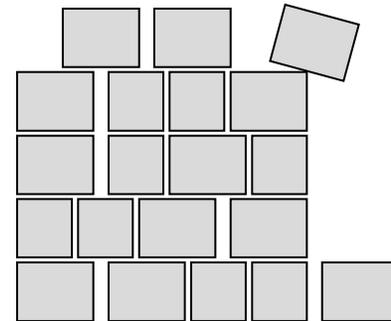


Transportation



Waste of INVENTORY

- Any material in excess of the amount required for production



- Causes of excess Inventory

- Inventory held "Just-In-Case" problems arise
- Non-level scheduling
- Unbalanced workload
- Unreliable shipments by suppliers
- Poor market forecast

Inventory: Raw Material



MANUFACTURING EXTENSION PARTNERSHIP

Inventory: Work In Process (WIP)

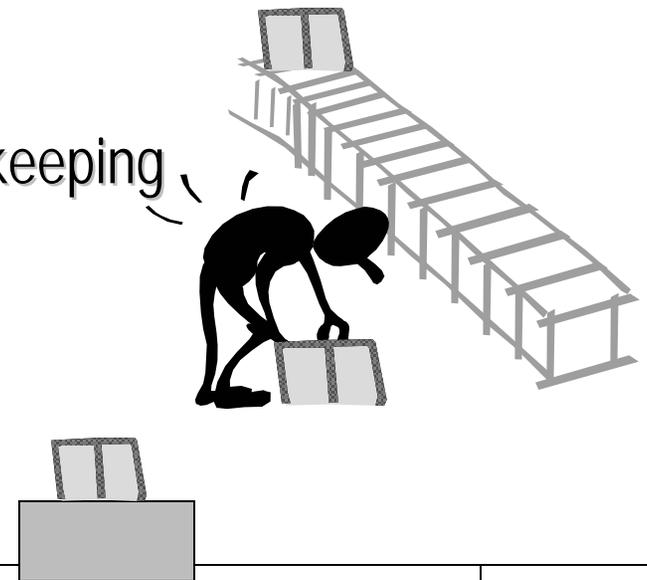


Inventory: Finished Goods



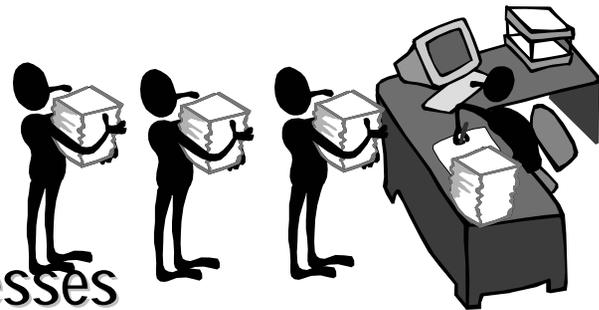
Waste of MOTION

- Any movement of people or machines that does not add value to the product
 - Causes of Motion Waste
 - Poor ergonomics
 - Poor plant or workstation layout
 - Poor workplace organization and housekeeping
 - Sorting/looking for items



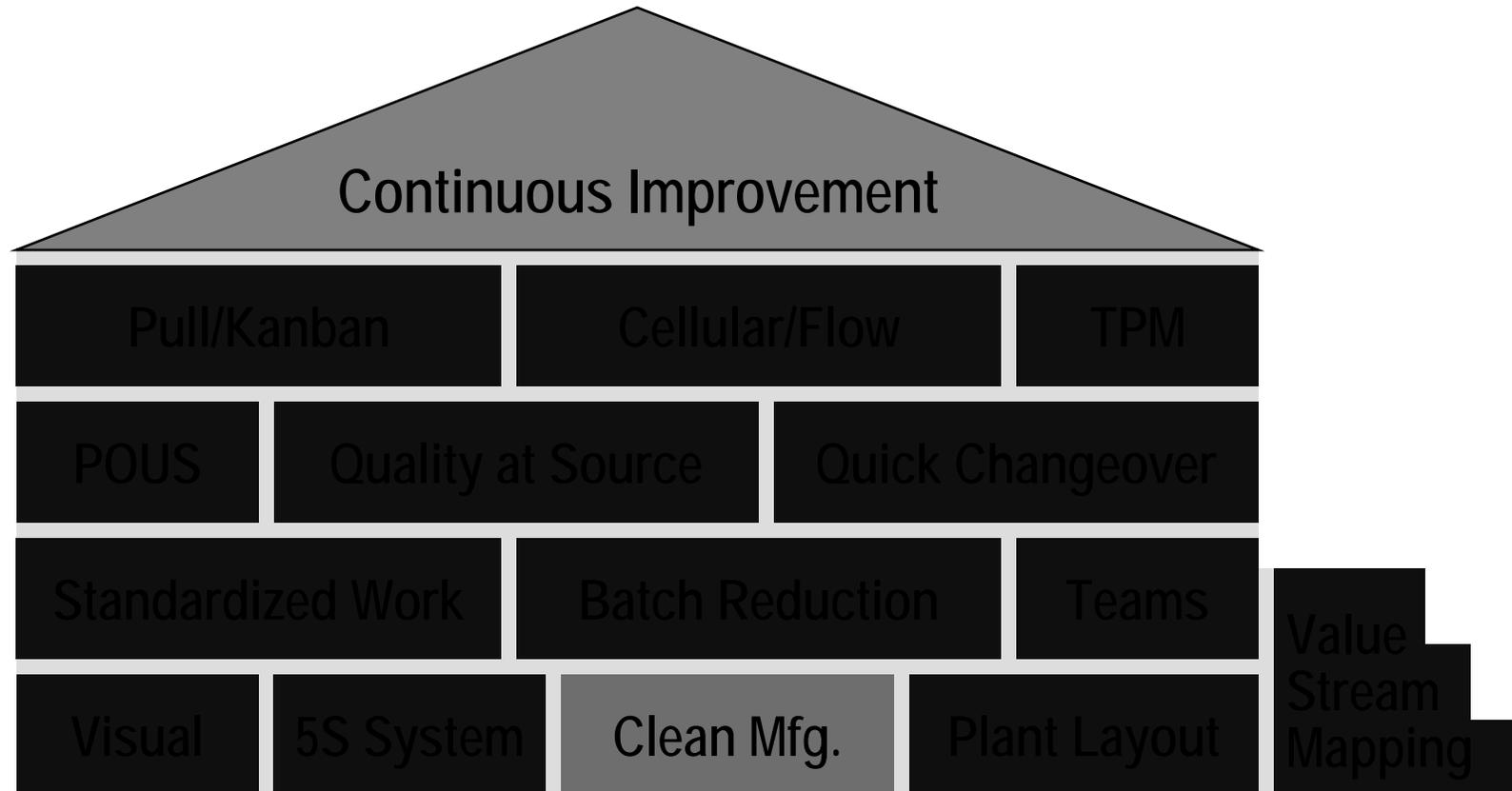
Waste of EXTRA PROCESSING

- Doing more than the minimum required to transform material into an acceptable product



- Causes of non-value added processes
 - Over processing to accommodate perceived customer needs
 - Poor process design (e.g. temporary packaging)
 - Unnecessary paperwork requirements
 - Redundant approvals/inspections required
 - Unnecessary reports produced

Lean Building Blocks



Clean Manufacturing

Seeks to continuously improve products and processes to increase companies' competitiveness and lessen their impact on the environment.

Optimizes use and selection of resources and technologies to aim for elimination of waste. The term for this is Materials Productivity.

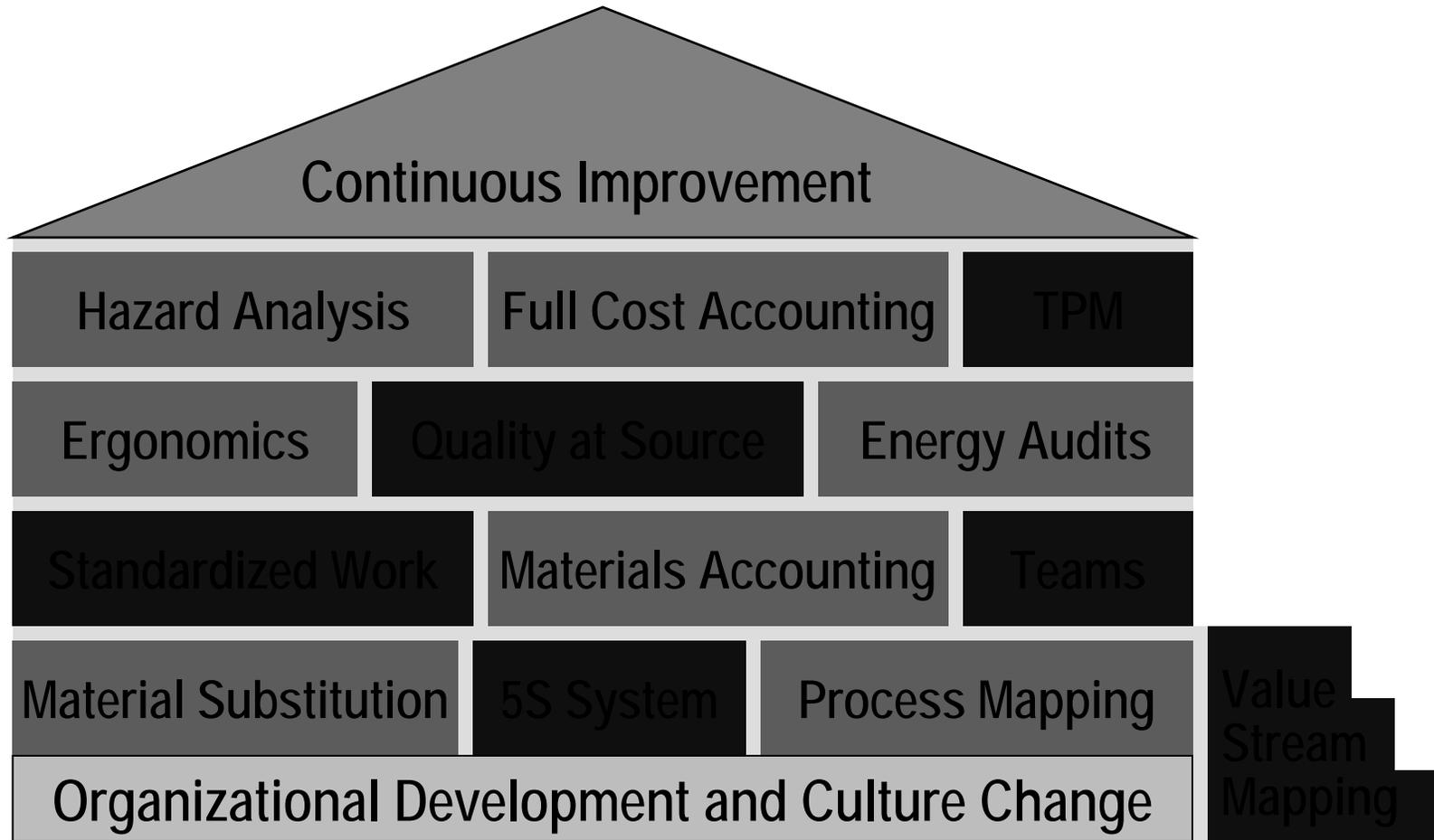
Materials Productivity- What is it?

- A fundamental re-examination of how, when and why materials are used
- An approach to achieving manufacturing and environmental excellence *simultaneously*
- A powerful approach of going “Beyond Compliance” to lower costs

Materials Productivity because...

- Materials that are bought but not sold cost you twice, once when you buy them, again when you dispose of them
- Materials that are bought but not sold increase costs and decrease profits
- The more material and processing invested into a part, the greater the cost of throwing it away

Clean Manufacturing Building Blocks

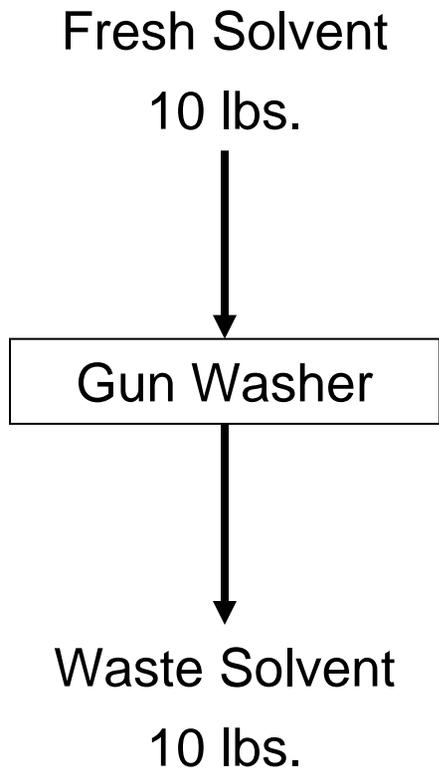


Clean Manufacturing Seeks to Eliminate Non-Value Added Aspects

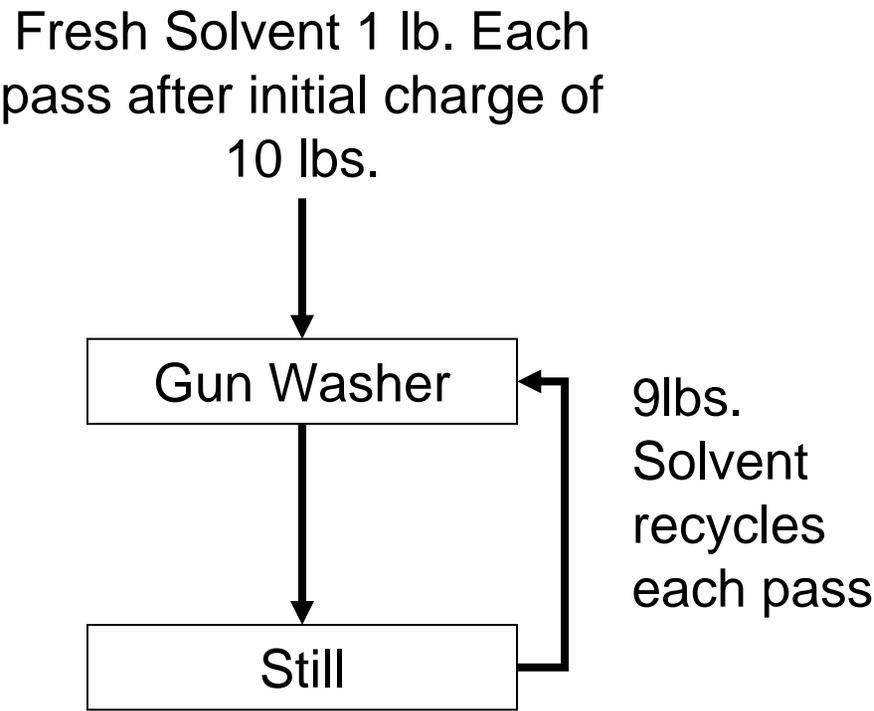
1. Underutilized resources
2. Inefficient energy use
3. Wasteful byproducts and scrap
4. Excessive regulatory requirements
5. Workplace health and safety issues
6. Liability and risks faced by owners

Example: Resource Efficiency

Current State



Future State



Example: Byproduct Elimination

Disposable Packaging



Returnable Totes



Companies Committed to Clean Manufacturing Can Expect to:

- Reduce their dependency on nonrenewable resources
- Eliminate wasted energy, raw materials, and labor
- Simplify their processes with less administrative burden
- Continually improve their performance
- Develop employees who constantly question the status quo
- Improve community relations

All these achievements will contribute to a company's pursuit of high performance and unparalleled competitiveness.

Lean & Clean Production

- Combines Materials Productivity with Lean Manufacturing
- Involves the *complete manufacturing model*



Eliminating Wastes- “Lean and Clean” Mfg.

“Lean” eliminates...

- Defects
- Overproduction
- Waiting
- Non-utilized talent
- Transportation
- Inventory
- Motion
- Extra processing

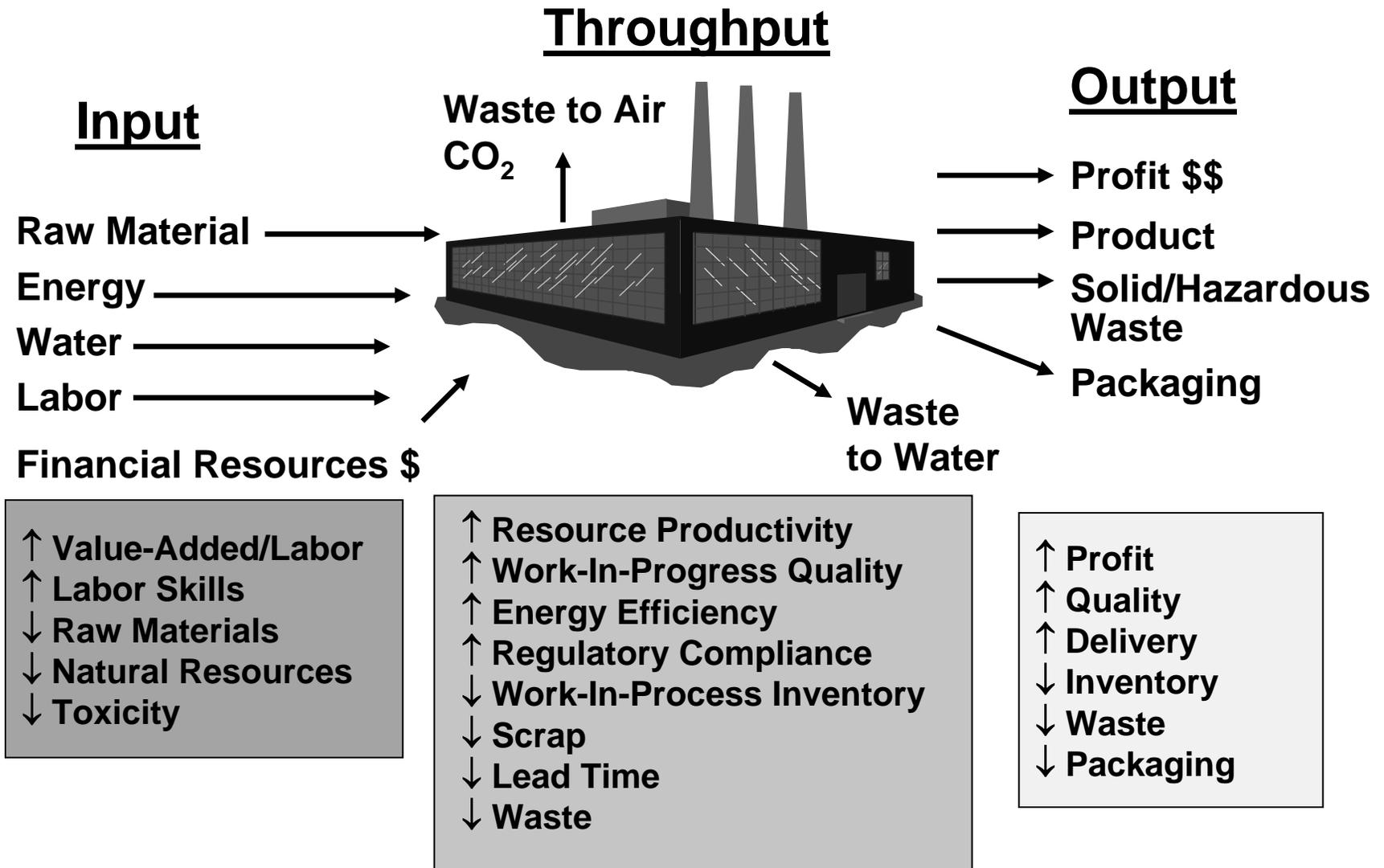
“Clean” adds...

- Full use of Raw Material
- Energy Efficiency
- Eliminating Toxic Material
- Reducing Generation of Waste
 - Solid/Hazardous Wastes
 - Packaging Wastes
 - Emissions to Air
 - Emissions to Water
- Anticipating social needs

“Lean” focuses on operations to maximize efficiency (flow)

“Clean” focuses on resources to reduce waste and cost

Results of “Lean + Clean” Approach



Lean & Clean Production

- Efficient use of labor, time & capital
- Efficient use of energy & raw materials
- Maximize quantity of products from least number of inputs
- Minimize waste
- Creates a pathway for growth without an equal rise in consumption

Goal: Sustainability

Lean & Clean Production

- In essence, they become:
 - Lean (efficient)
 - Mean (competitive)
 - Clean (low waste, good workplace)
 - Green (environmentally responsible)

Workshop Process

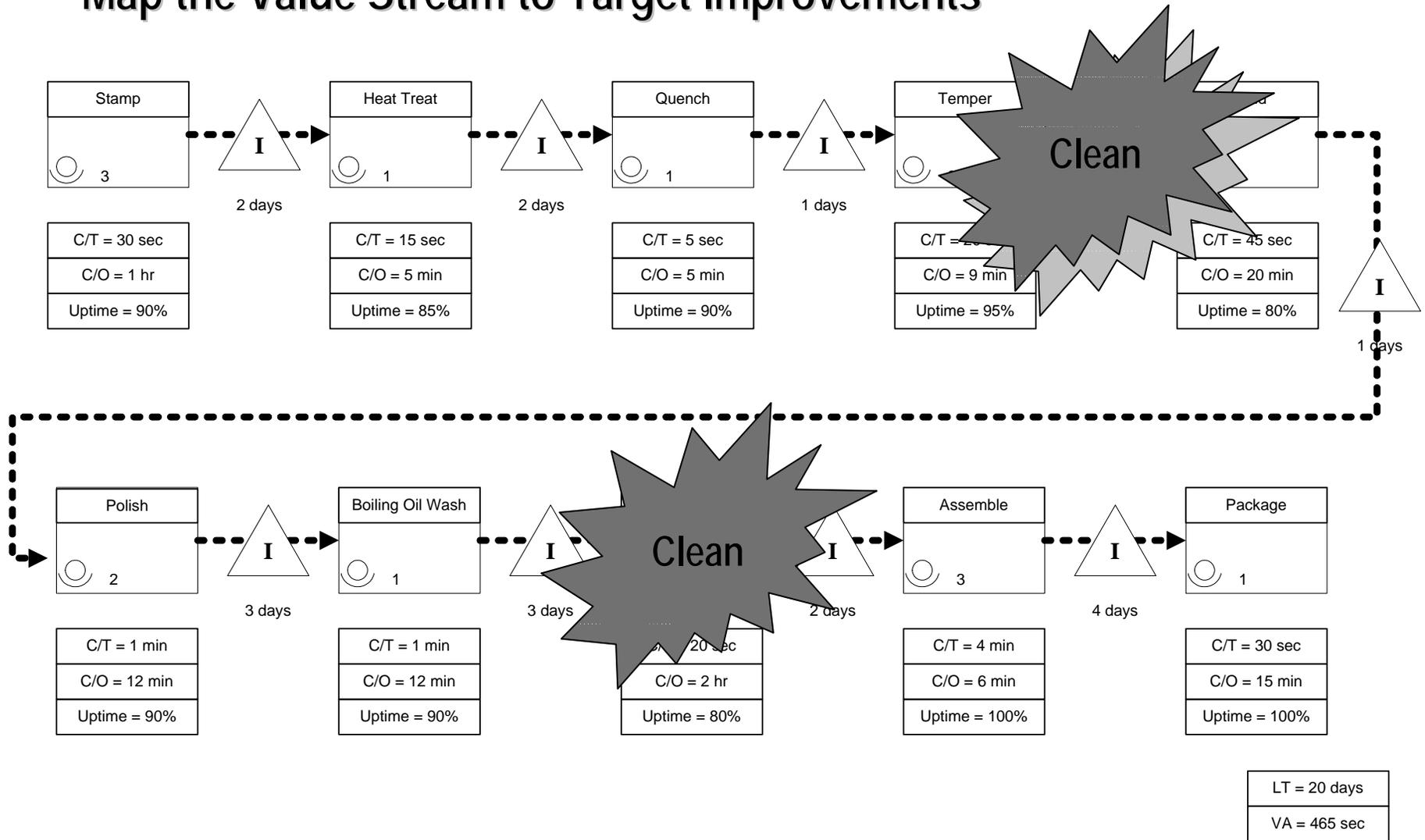
- **Define the problem** – use mapping and business metrics to evaluate current productivity
- **Measure process variables** – collect data and facts to assist in decision-making.
- **Analyze available information** – seek out root causes of waste
- **Improve processes** – implement plan of action to eliminate waste and improve productivity.
- **Control Activities** – identify methods & controls to put in place to eliminate variability and backsliding
- **Improve Continuously** – encourage constant improvement and long-term commitment.

Workshop Format

- Lean & Clean Overview
- Value Stream Mapping Training
- Mapping your Value Stream (Current & Future)
- Brainstorm Improvements
- Determine Costs and Benefits of Ideas
- Present Recommendations to Management

MANUFACTURING EXTENSION PARTNERSHIP

Map the Value Stream to Target Improvements



Develop List of Action Items

- Brainstorm improvement ideas for the model line
- Determine reasonable cost estimates for ideas
- Determine likely cost savings
- Calculate pay back period or ROI
- Select action items based on financial and environmental impact

MANUFACTURING EXTENSION PARTNERSHIP

Action Item List

- Assign responsibility and target date

<u>Action #</u>	<u>AI Description</u>	<u>Person Responsible</u>	<u>Target Date</u>	<u>Results</u>
001	Implement pull system for tempered parts	Bill Smith	8-16-03	5%
002	Investigate reusable dunnage	Jane Smith	6-15-03	60%
003	Trial of alternative lacquer	Robert Smith	12-31-02	80%

Questions?

Contact: Bill Stough
Sustainable Research Group
616.365.3246
srg@iserv.net

