

Key Success Factors of a Lean Strategy

Developing a Lean Culture



Maryland Technology Extension Service



OBJECTIVES

- To gain an awareness of the concepts, benefits and techniques of Lean
- To understand the key success factors required to develop a Lean culture of continuous improvement

AGENDA

- What is Lean?
- Overview of Lean Techniques
- Value Stream Mapping
- Implementation Processes
- Continuous Improvement Success Factors
- Summary

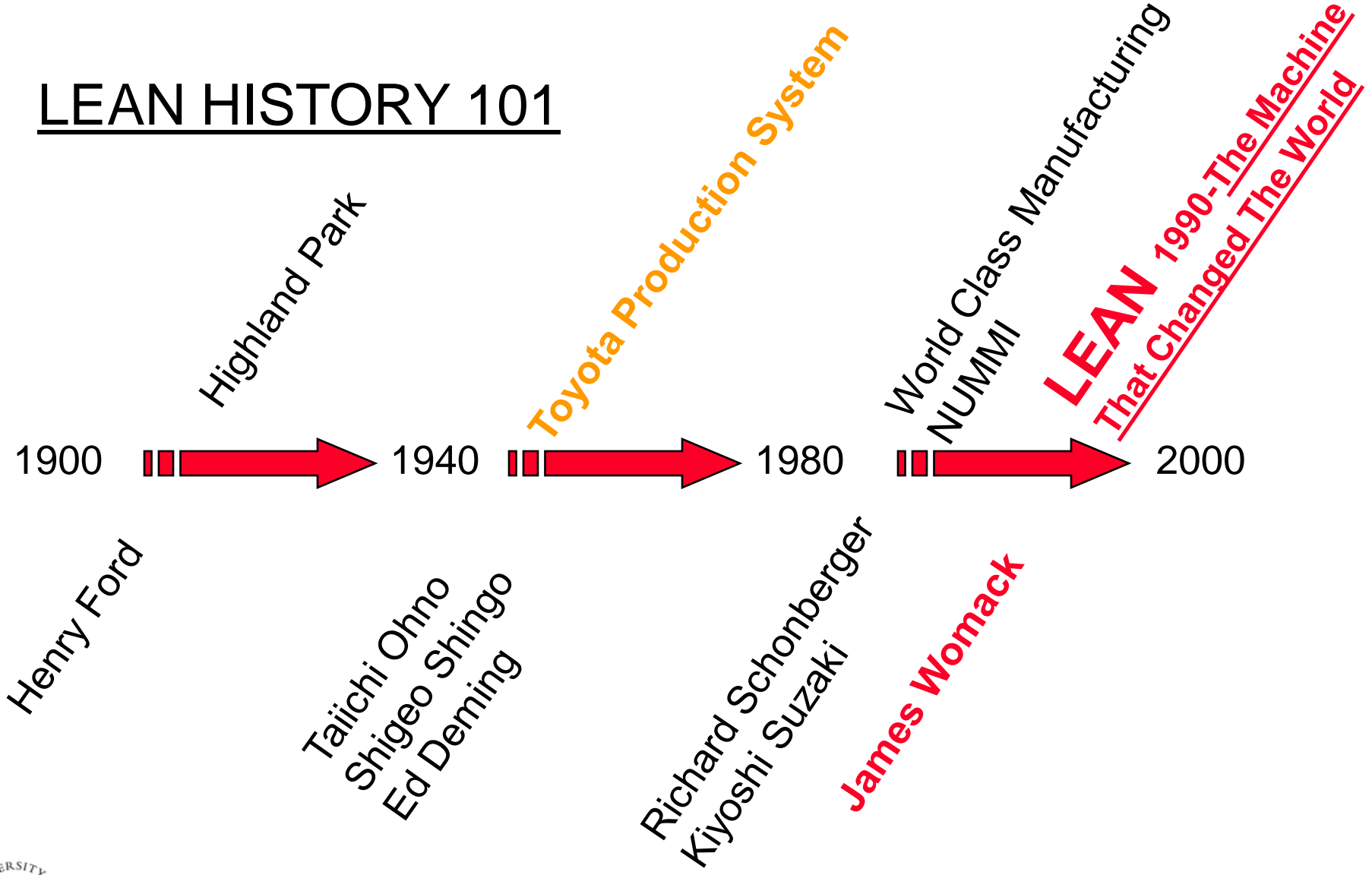
LEAN

- An improvement methodology which focuses on eliminating waste.
- A collection of tools and techniques.
- A continuous improvement process.

When Did Lean Begin?



LEAN HISTORY 101



NOTABLE QUOTES

“Ordinarily, money put into raw materials or into finished stock is thought of as live money. It is money in the business, it is true, but having stock of raw material or finished goods in excess of requirements is waste--which, like every other waste, turns up in high prices and low wages.”

- Henry Ford

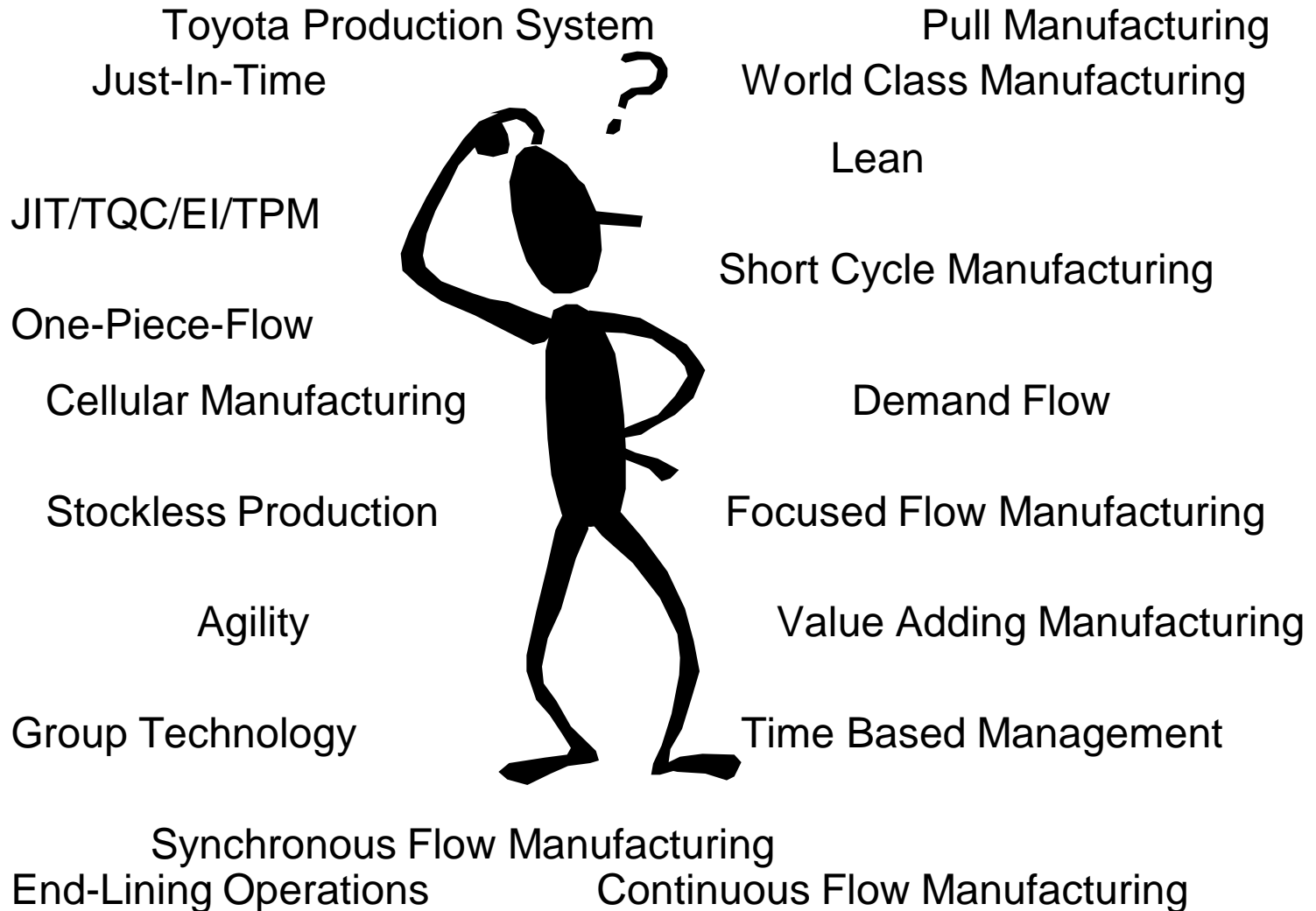
“The Toyota system is not opposed to the Ford system. Rather, it is a progressive enhancement--a system geared to the Japanese market that mass-produces in small lots with minimum stocks.”

- Shigeo Shingo

“One of the most noteworthy accomplishments in keeping the price of Ford products low is the gradual shortening of the production cycle. The longer an article is in the process of manufacture and the more it is moved about, the greater is its ultimate cost.”

- Henry Ford

MANY NAMES, BUT THE SAME CONCEPT



DEFINING LEAN

“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”

- systematic approach
- eliminating waste (non-value-added activities)
- continuous improvement & pursuit of perfection
- product flow & customer pull

LEAN

A systematic approach to identifying and eliminating waste (non-value-added activities).

If it doesn't add value, it's WASTE.

When is value being added to a product (or service)?

VALUE

- Value is added only when the product is changed towards what the **CUSTOMER** is buying.
- It must be done right the first time.

Consider the “internal” customer along with the “external” customer.

GOAL

ELIMINATE WASTE
CREATE CONTINUOUS FLOW

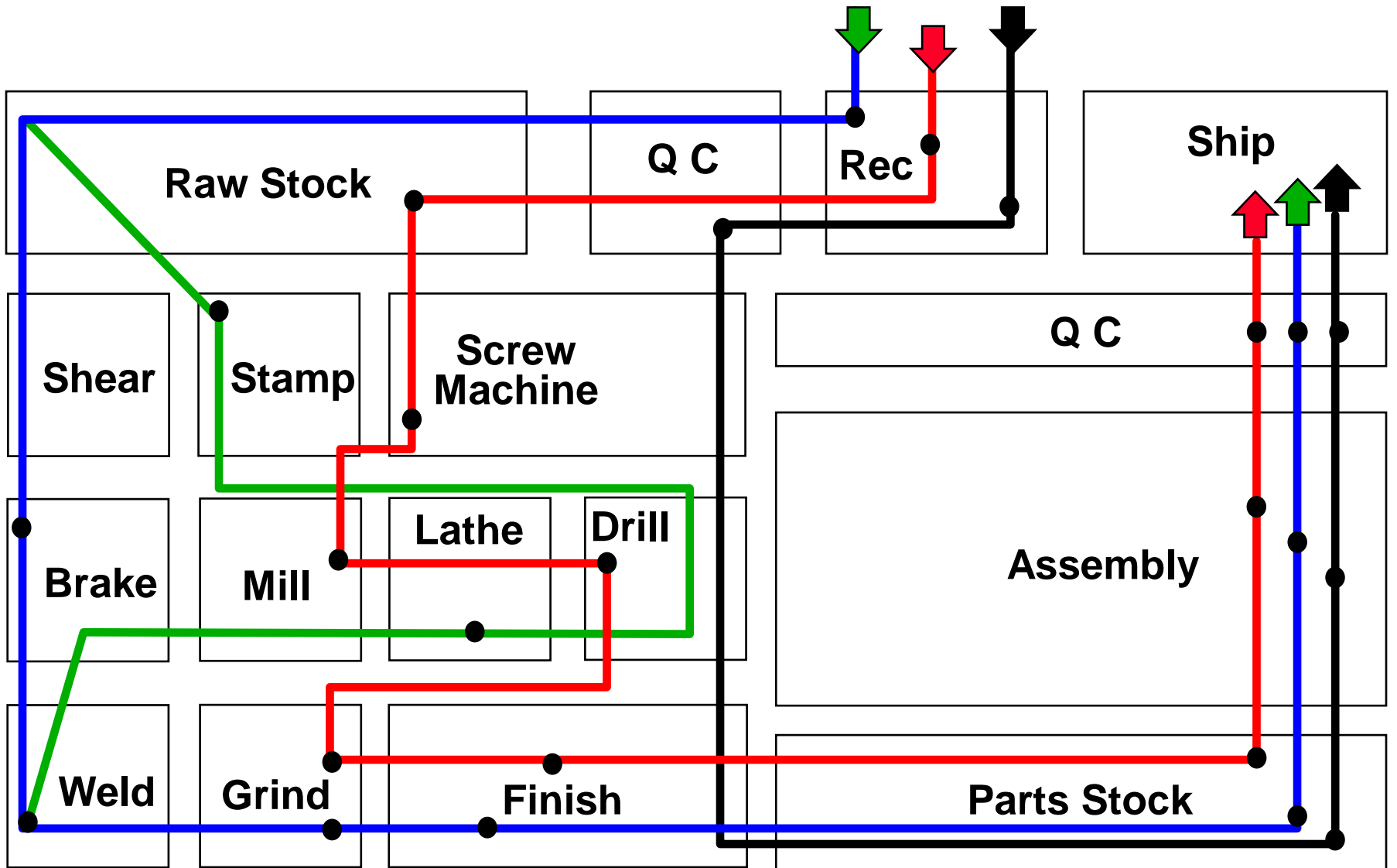
One-piece, continuous, flow of product from value-adding step to value-adding step with no stoppages, scrap, or backflows.

The product can be a physical product or an information product.

WASTE

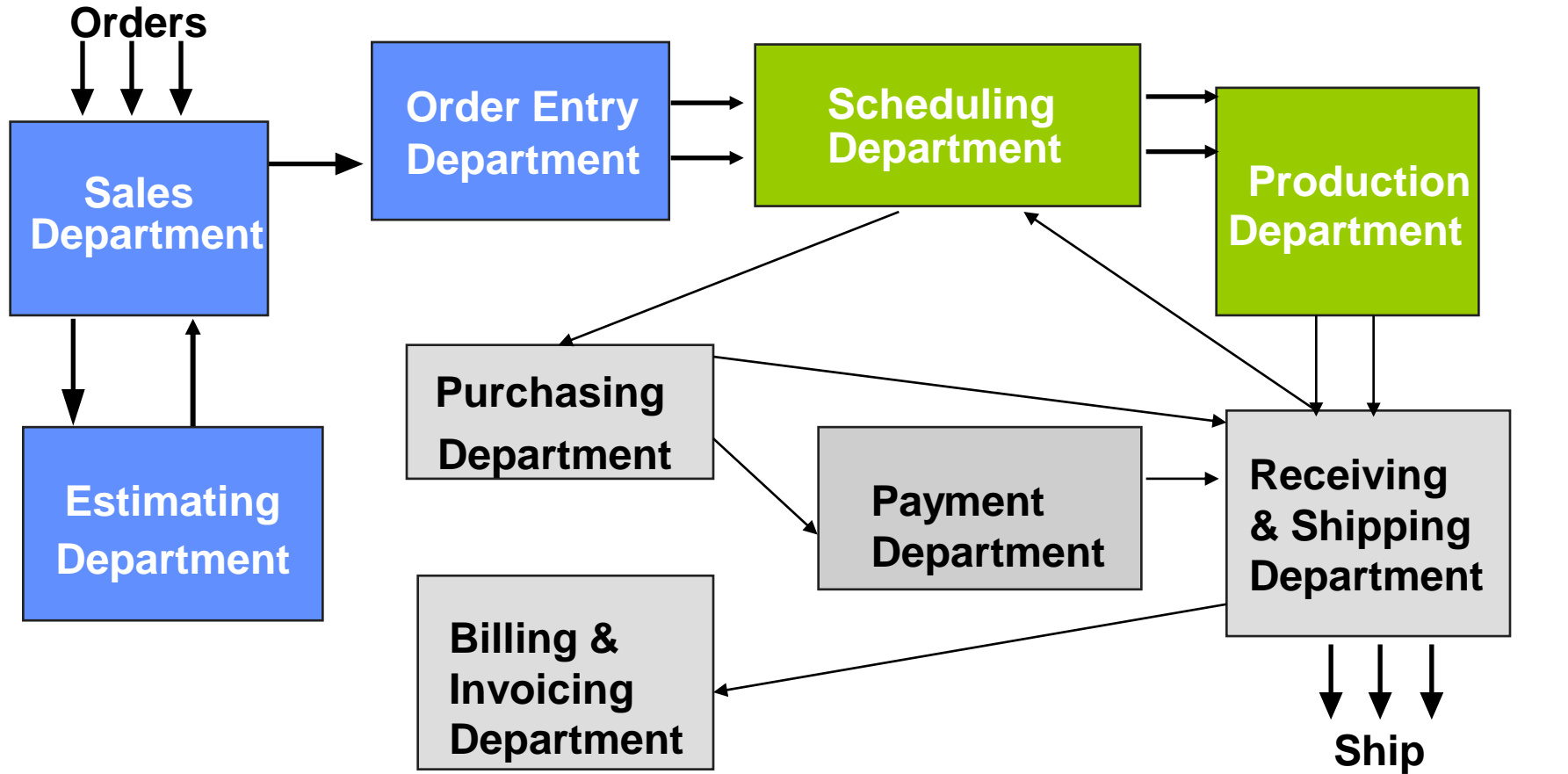
- Fujio Cho of Toyota defined waste as:
Anything other than the minimum amount of equipment, materials, parts, space, and worker's time, which are absolutely essential to add value to the product.
- Waste - those things that add time and cost but no value from the customer's perspective
- KEY QUESTION – Are my customers willing to pay for this activity? If not, it is waste!

Value-Added Time : Minutes
Time in Plant : Weeks



“QUOTE TO CASH” LEAD TIME

Request for Quotations

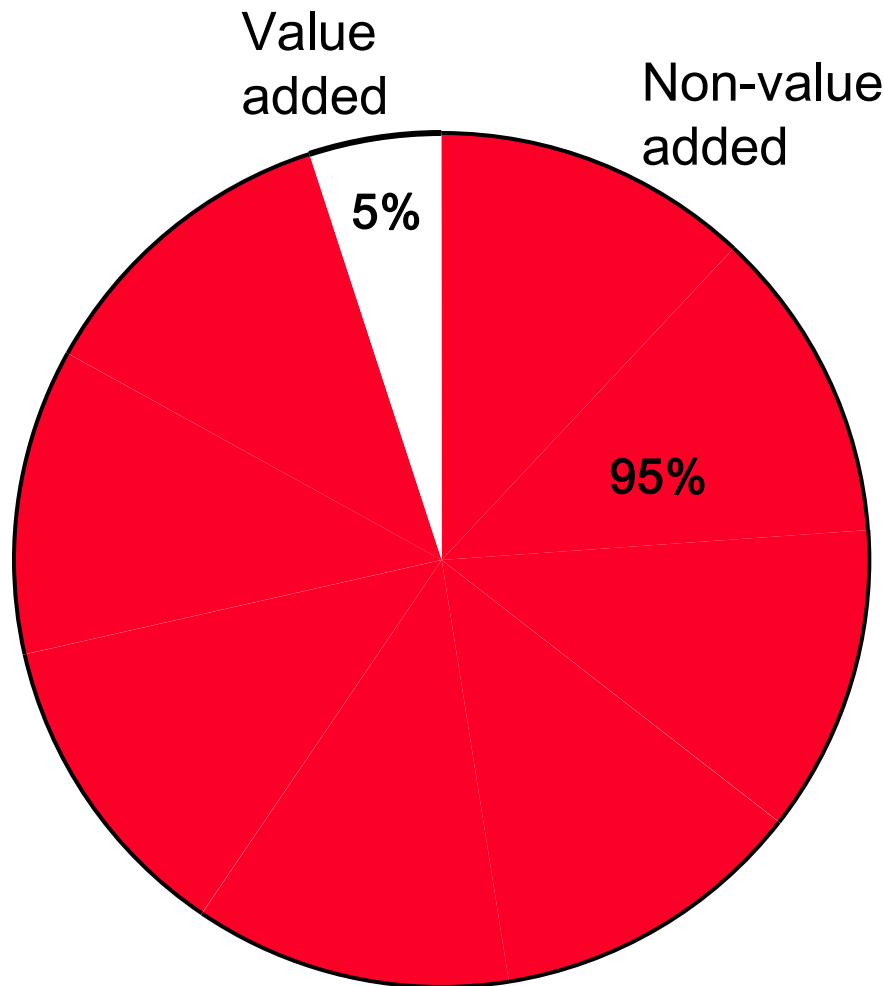


Value-Added Time : Minutes
Total Time: Weeks +

QUOTE

CASH

LEAN = ELIMINATING THE WASTES



- Defects
- Overproduction
- Waiting
- Non-value added processing
- Transportation
- Inventory
- Motion
- Employees who are underutilized

Typically 95% of Total Lead Time is Non-Value Added!!!

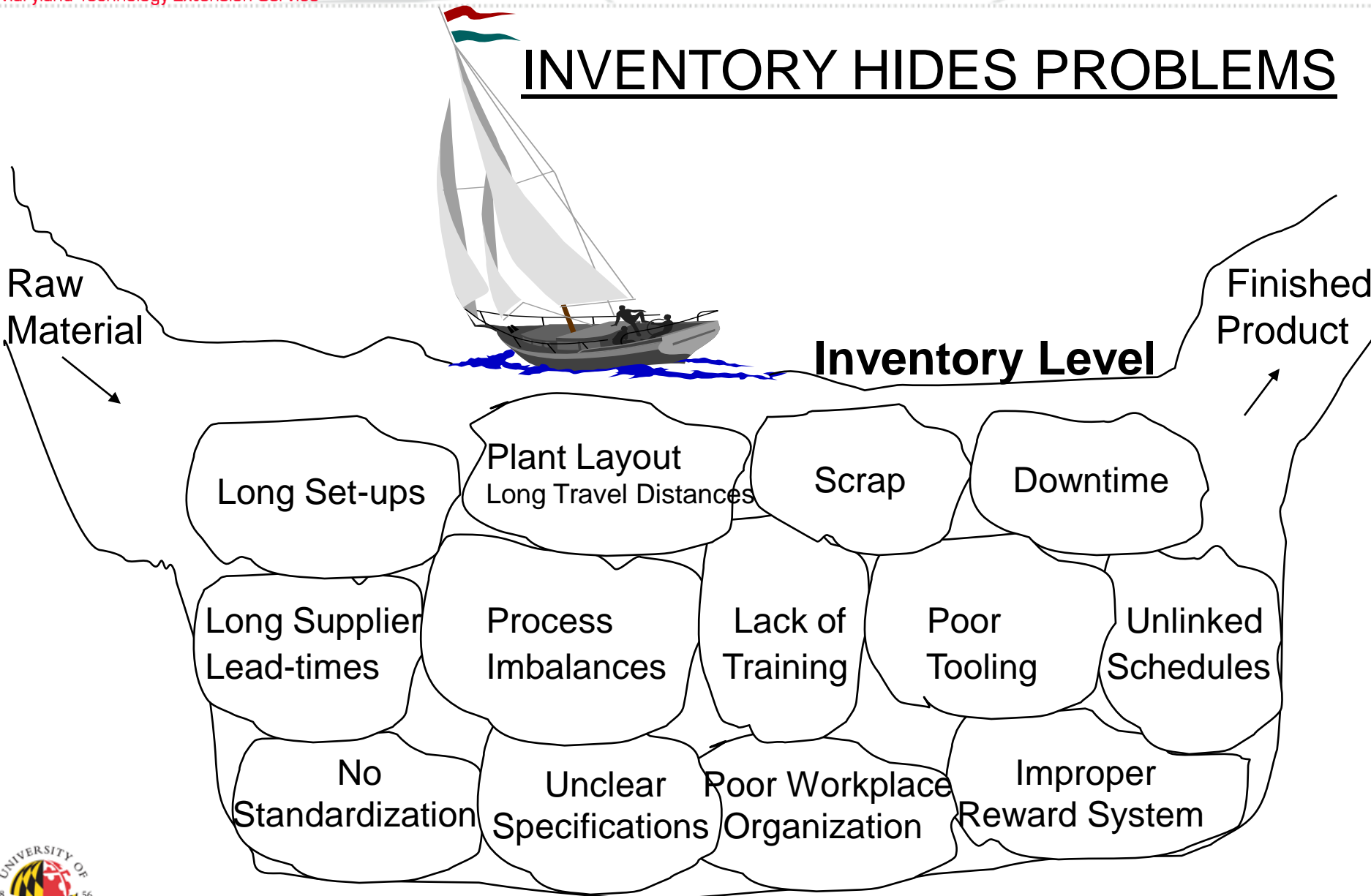
WASTES

- **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
- **Defects**
 - Scrap and rework
- **Non-value Added Processing**
 - Effort that adds no value to the product or service from the customer's viewpoint

WASTES

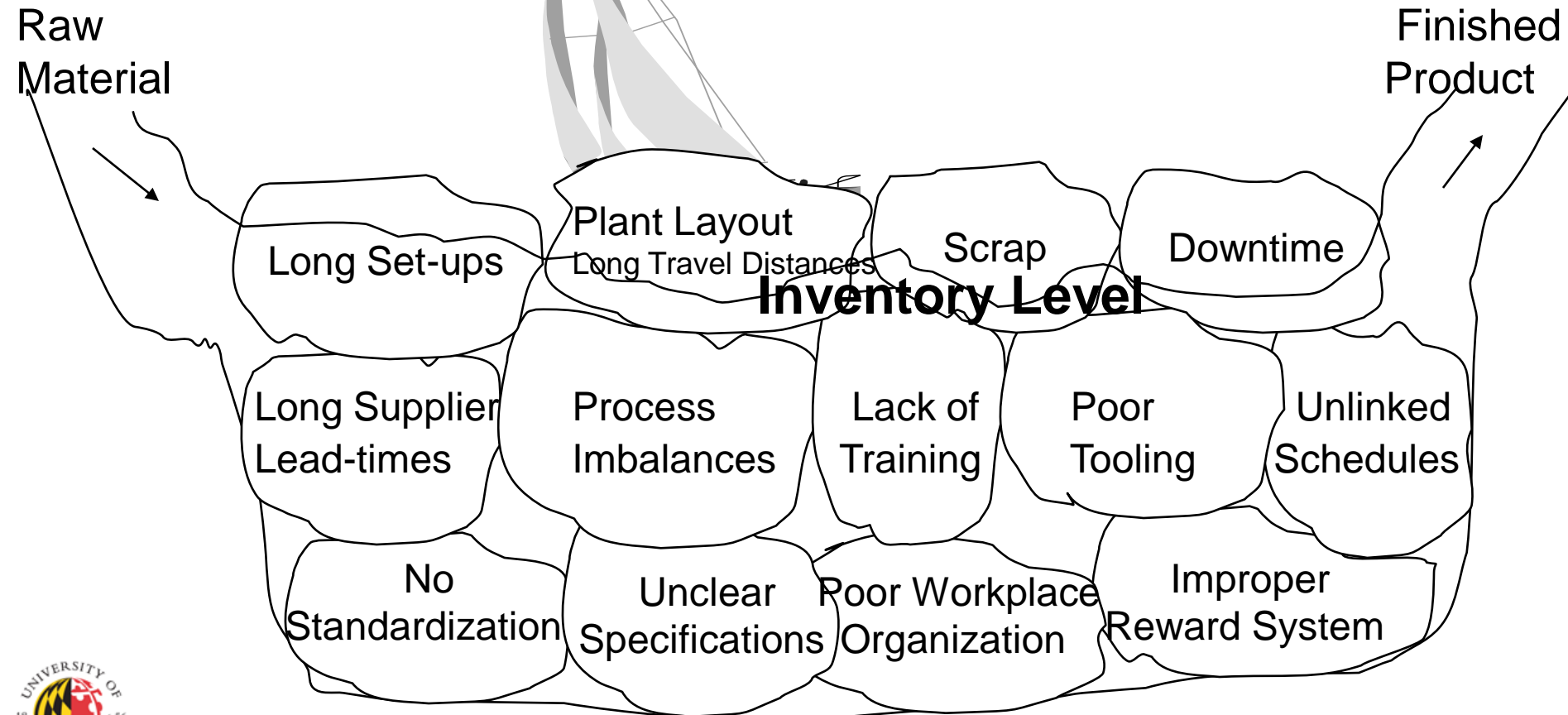
- **Waiting**
 - Idle time created when waiting for...?
- **Excess Motion**
 - Any movement of people or machines that does not add value to the product or service
- **Transportation**
 - Movement of parts and materials around the plant
- **Excess Inventory**
 - Any supply in excess of one-piece flow through your process

INVENTORY HIDES PROBLEMS

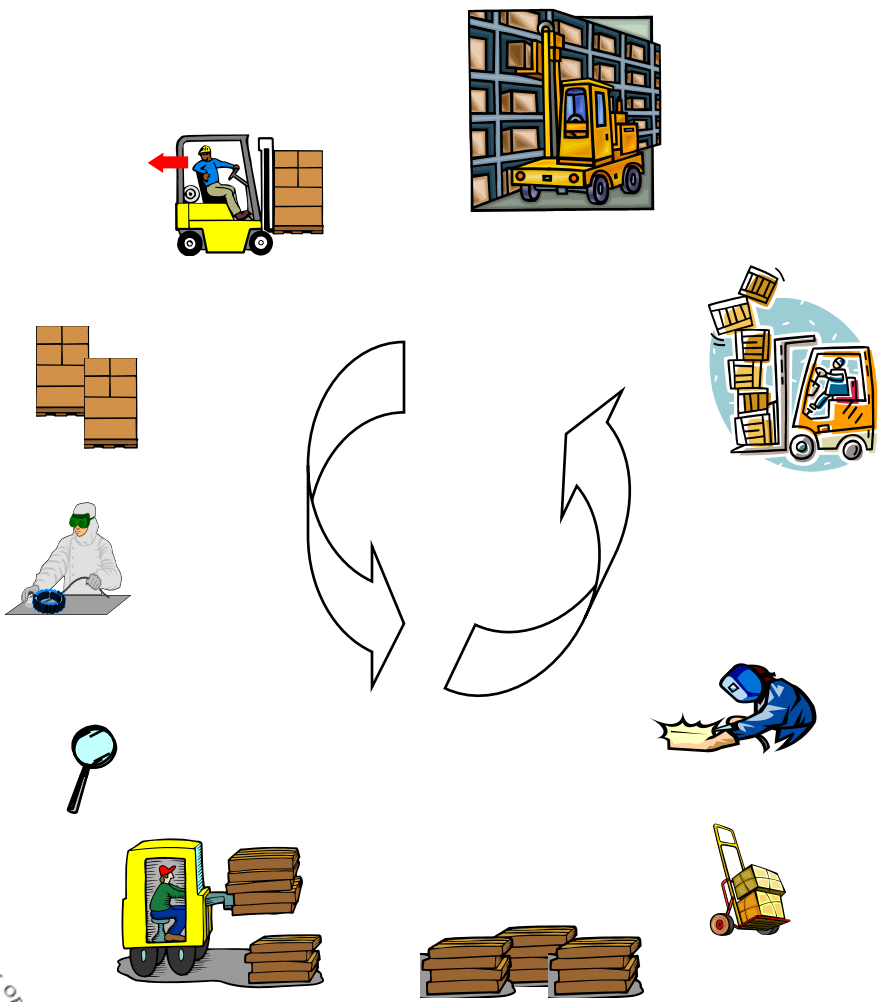


REDUCING INVENTORY WITHOUT SOLVING UNDERLYING PROBLEMS

Must get to the root cause(s) of all waste in order to create effective, long-term solutions!



MATERIAL PROCESSING



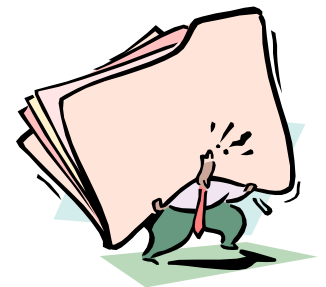
- 1) Material arrives/inspected 1 hr.
- 2) Moved to storage rack 30 min.
- 3) Waits in storage 15 days
- 4) Moved to sub-assembly dept. 15 min.
- 5) Waits in staging area 4 hr.
- 6) Moved to machine 10 min.
- 7) Processed into sub-assembly 1 min.
- 8) Waits for batch to be complete 2 hr.
- 9) Inspected 30 min.
- 10) Defects sorted/reworked 2 hr.
- 11) Move to final assembly dept. 30 min.
- 12) Waits in staging area 2 hr.
- 13) Moved to machine 5 min.
- 14) Processed into final assembly 3 min.
- 15) Waits for batch to be complete 1 hr.
- 16) Inspected 5 min.
- 17) Packaged 2 min.
- 18) Moved to warehouse 30 min.
- 19) Put into storage rack 10 min.
- 20) Waits in storage 15 days

TOTAL TIME= 30 days, 14 hours, 51 minutes
 TOTAL Value Time= _____

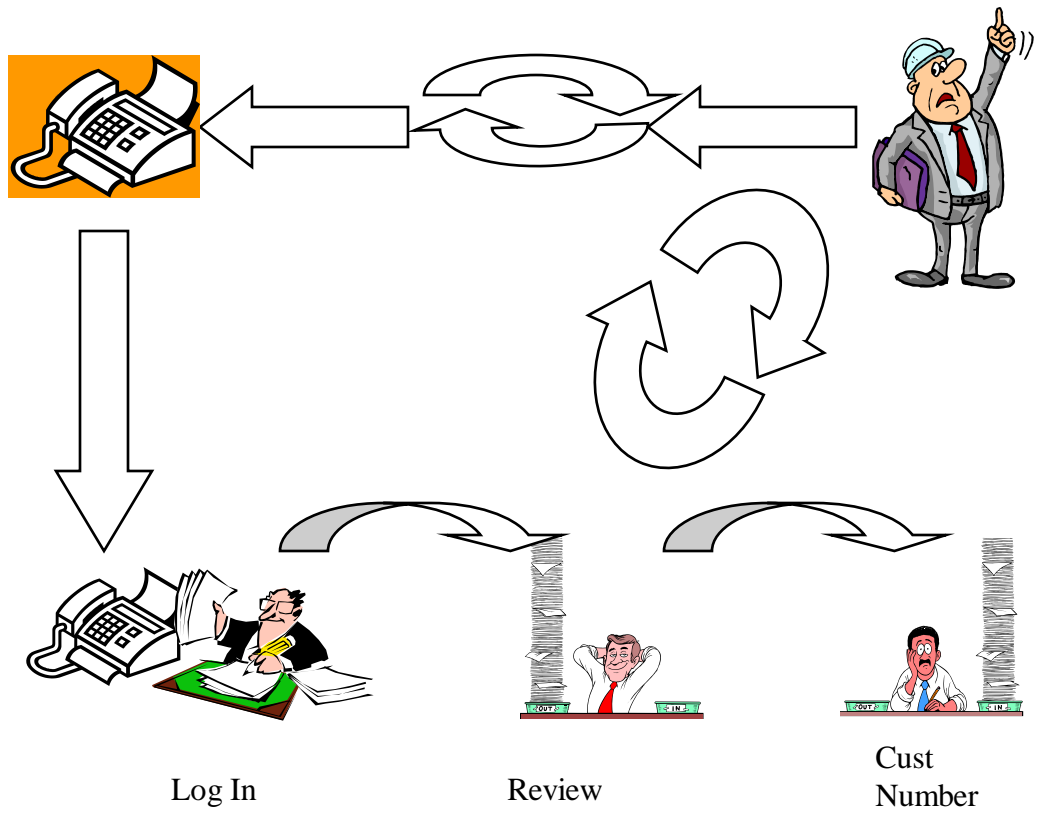


Which Wastes are in Office Processing?

- Overproduction
- Defects
- Non-value added processing
- Waiting
- Excess motion
- Transportation
- Excess inventory



ORDER PROCESSING



- 1) Order is Taken 20 min.
- 2) Moved to Briefcase 0
- 3) Waits in Briefcase 2 days
- 4) Faxed to Mailroom 2 min.
- 5) Moved to In-Basket 2 min.
- 6) Waits in In-Basket 1 hr.
- 7) Logged In 2 min.
- 8) Moved to Another In-Basket 1 min.
- 9) Waits in In-Basket 1.5 days
- 10) Order Info. Reviewed 10 min.
- 11) Moved to File 0
- 12) Waits for Missing Info. 3 hr.
- 13) Received Missing Info. 1 min.
- 14) Moved to Another In-Basket 3 min.
- 15) Waits in In-Basket 2 days
- 16) Reviewed/Approved 10 min.
- 17) Moved to Another In-Basket 1 min.
- 18) Waits in In-Basket 1 hr.
- 19) Assigned Customer Number 1 min.
- 20) Moved to Scheduling 2 min.

TOTAL TIME= 5.5 days, 5 hours, 55 minutes

TOTAL Value Time= _____



BOTTOM LINE RESULTS

- Reduced Lead Times 75% +
- Reduced WIP 75% +
- Reduced Defects 25% +
- Improved Space Utilization 50% +
- Improved Productivity 25% +

From *Lean Thinking : Banish Waste And Create Wealth In Your Corporation* by James P. Womack and Daniel T. Jones

“Based on years of benchmarking & observation...we have developed the following simple rules of thumb when converting a classic batch-and-queue production system to continuous flow:”

Labor productivity doubles

Production throughput times are cut 90%

Inventories are reduced 90%

Errors and scrap are typically cut in half

The Lean Techniques

LEAN BUILDING BLOCKS

Continuous Improvement

Pull/Kanban

Cellular/Flow

Quick
Changeover

TPM

Plant Layout

Batch Reduction

Mistake-
Proofing

5S System

Standardized
Work

Visual
Systems

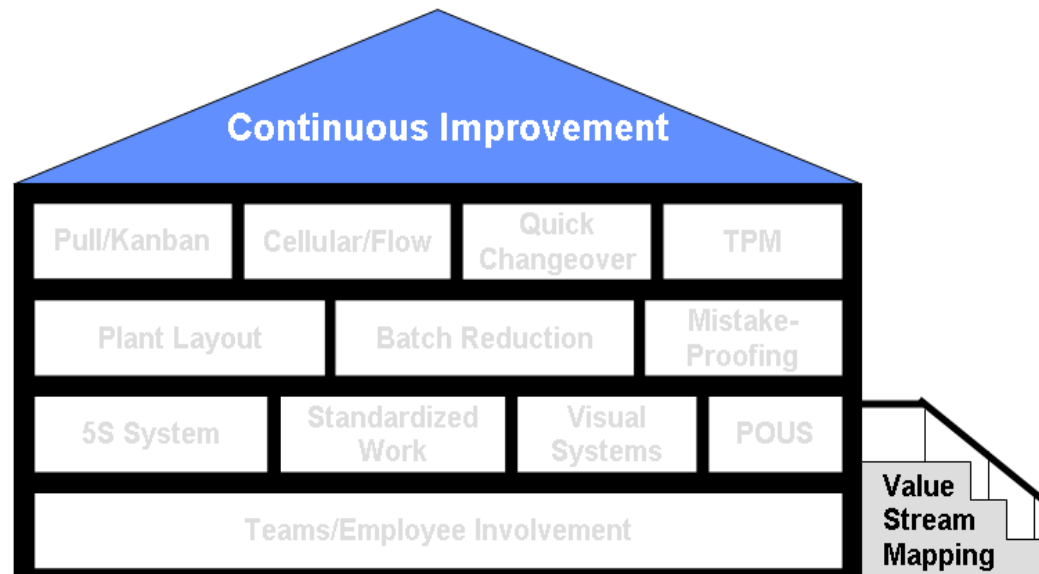
POUS

Teams/Employee Involvement

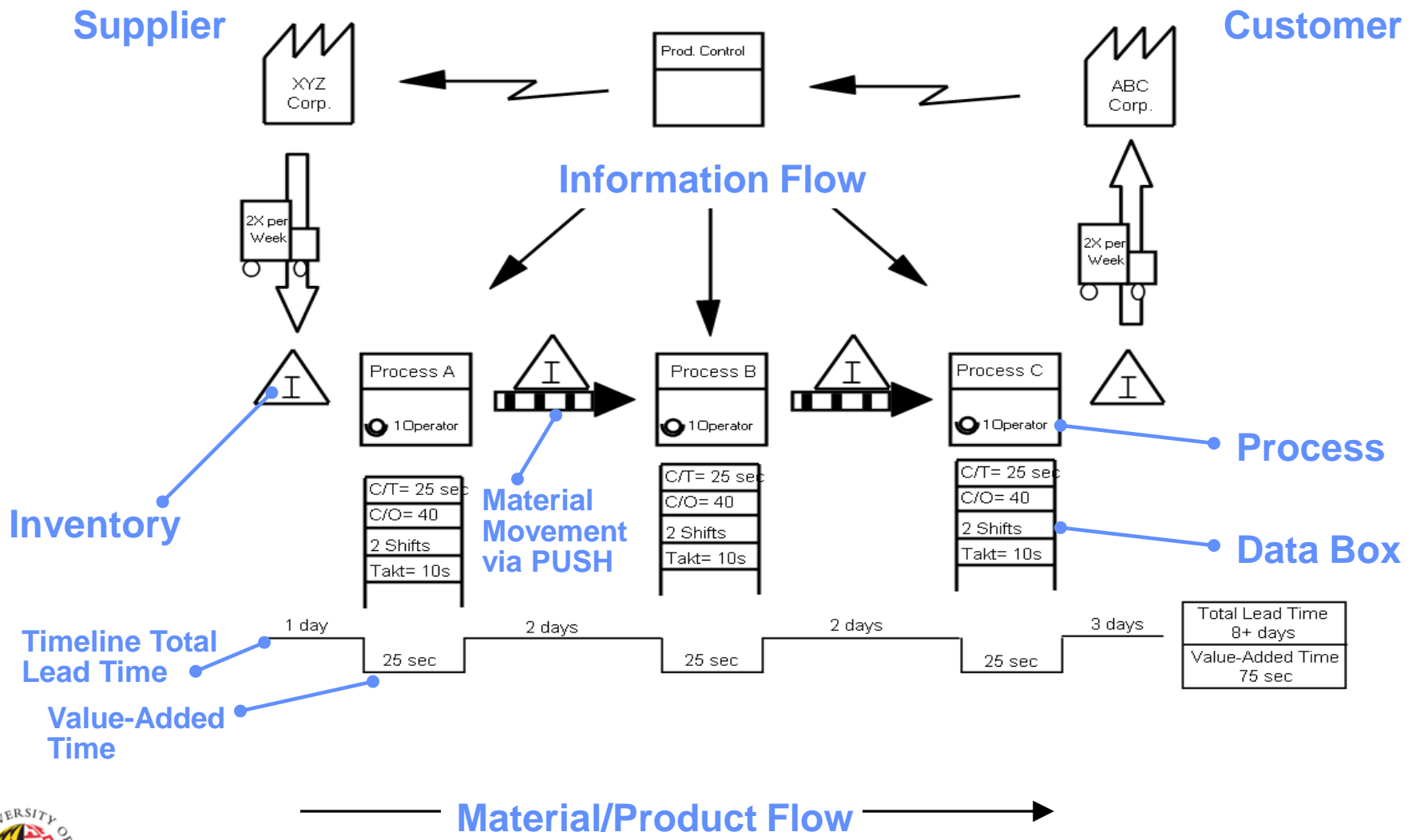
Value
Stream
Mapping

“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”

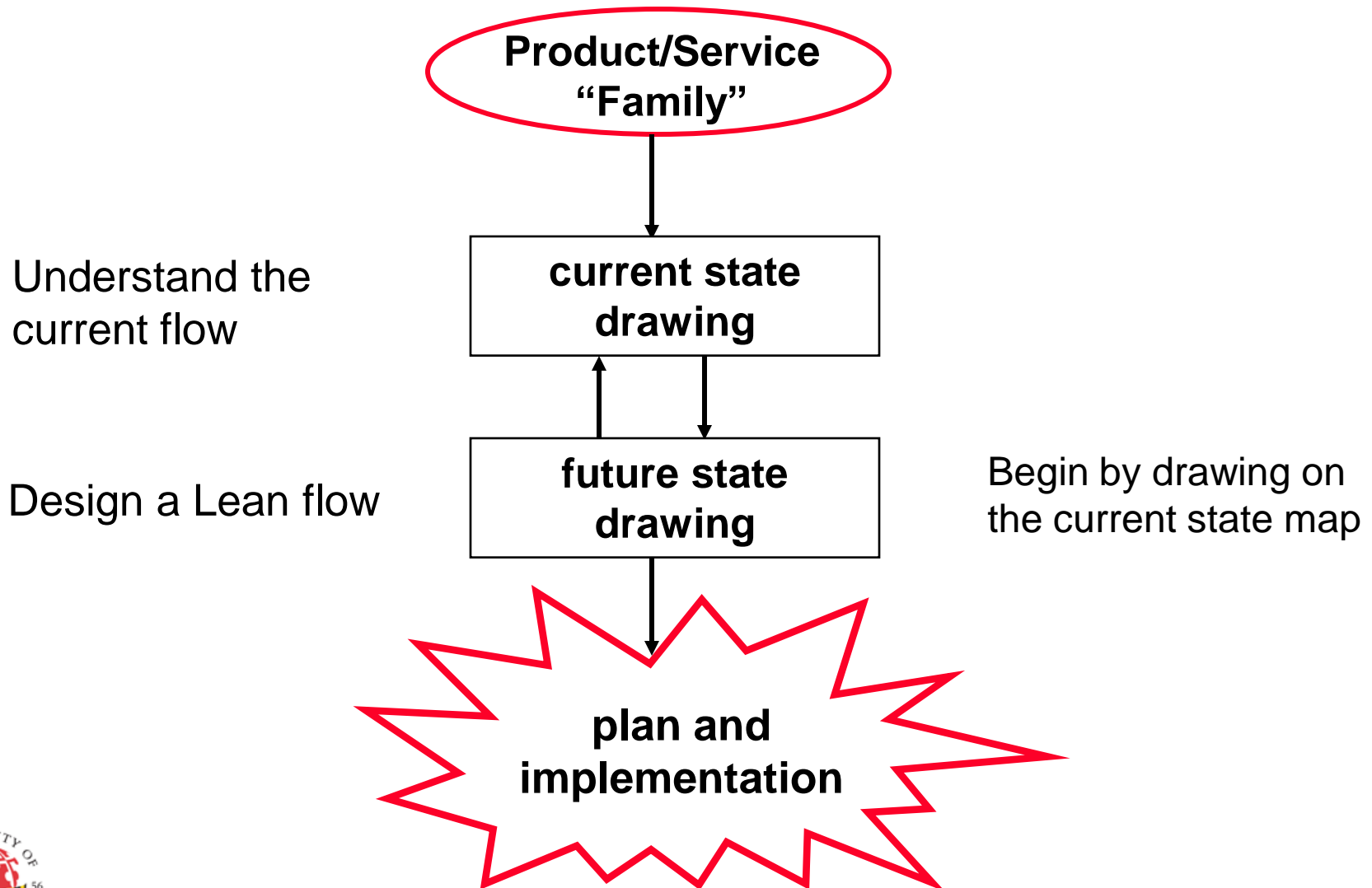
VALUE STREAM MAPPING



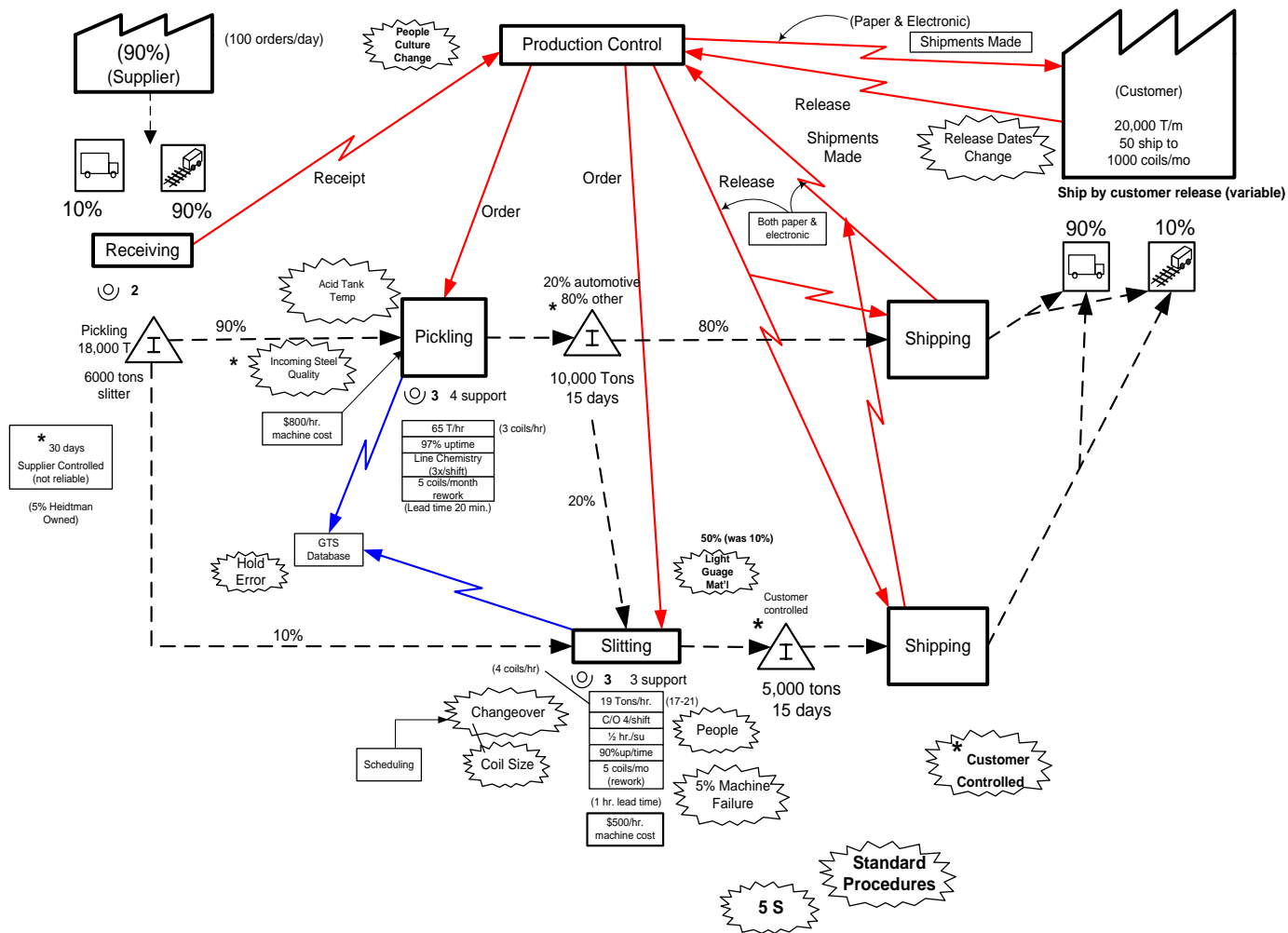
CURRENT STATE MAP



THE VALUE STREAM MAPPING PROCESS



STEEL PROCESSOR



Total Lead Time
45 days
Processing Time 1 hr. 20 min.

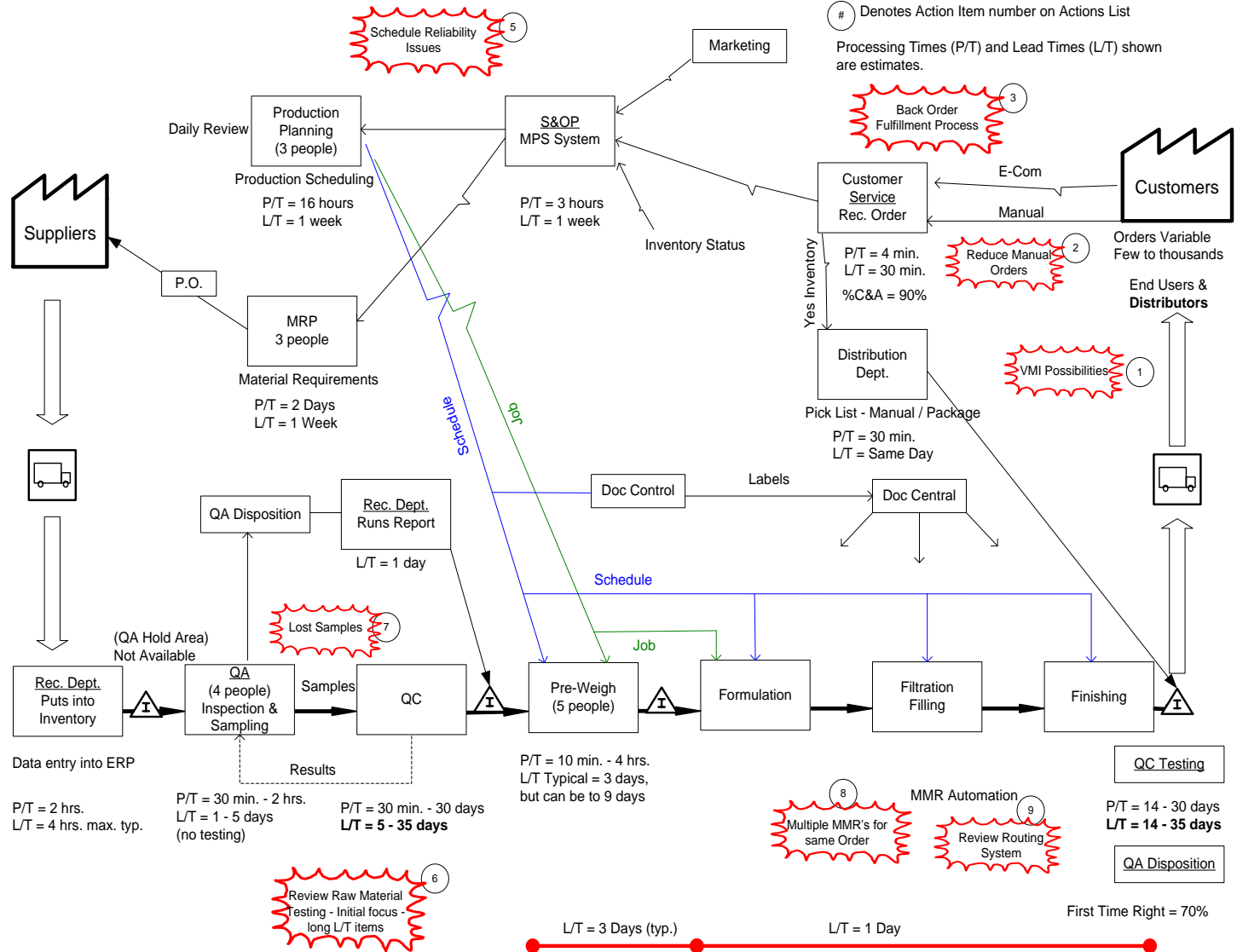


BIOTECH COMPANY

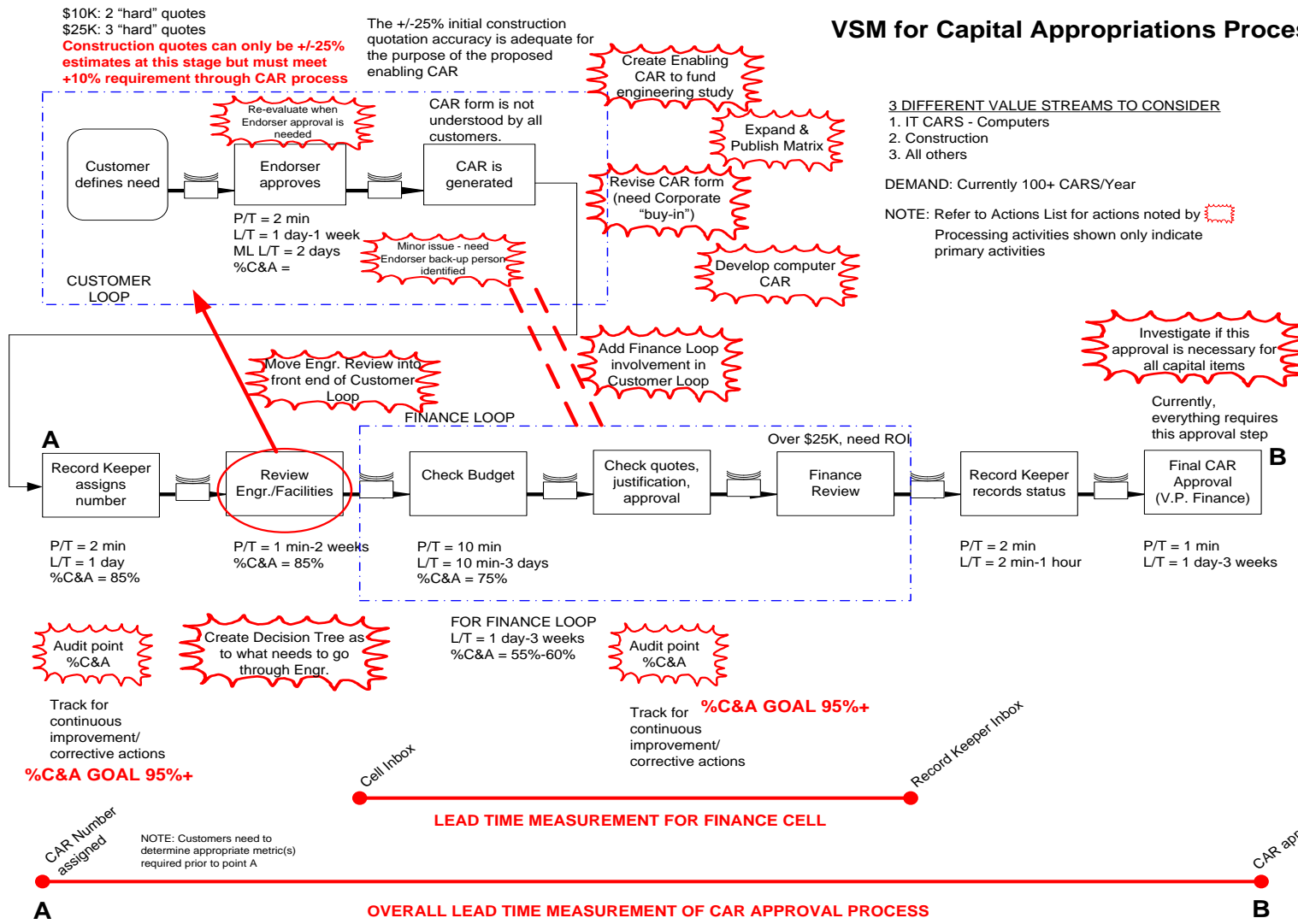
Site Value Stream Map

NOTES

Refer to Actions List for items noted by .
 Some action items on the Actions List are not noted on the Map.
 # Denotes Action Item number on Actions List
 Processing Times (P/T) and Lead Times (L/T) shown are estimates.



ADMINISTRATIVE VALUE STREAM MAP



LEVELS OF VALUE STREAM MAPPING

Macro

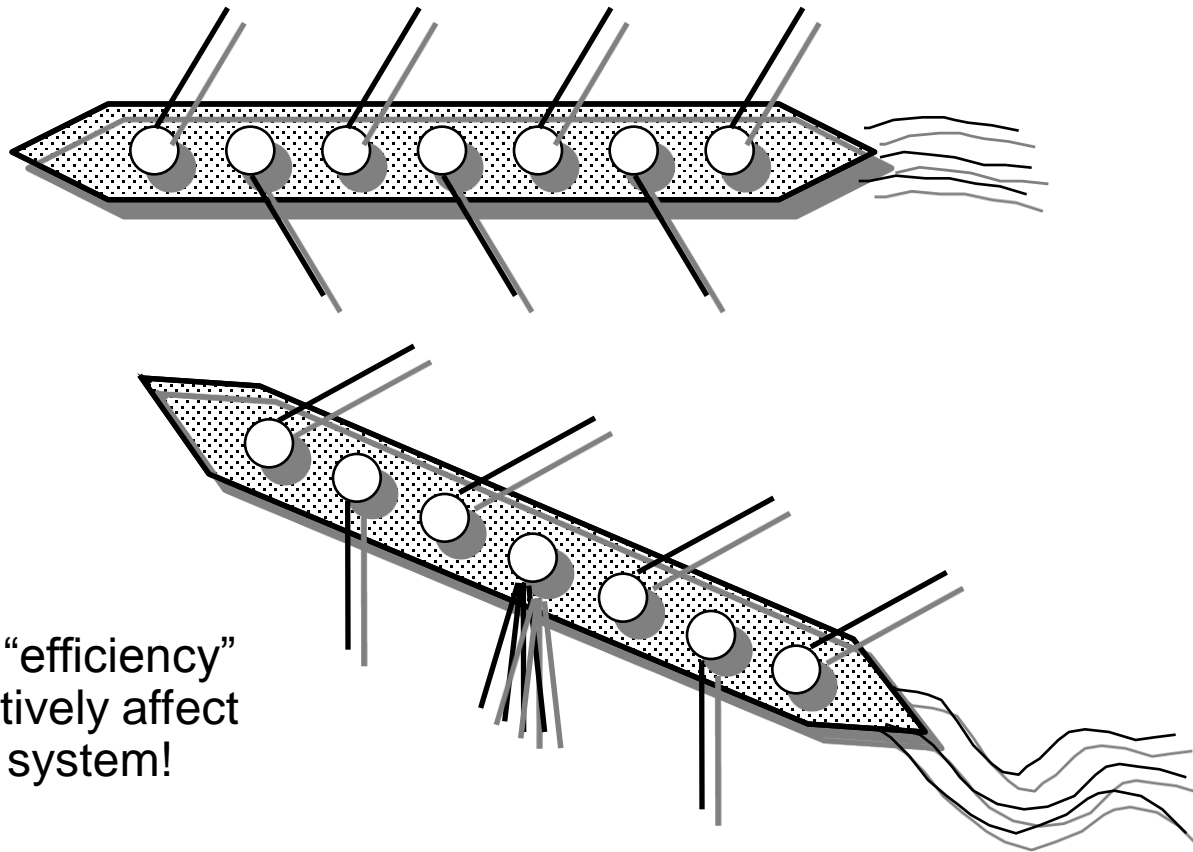


- I. Across companies – Supply Chain
- II. Across plants within a company
- III. Plant/Site – Overall process of providing a product/service to the external customer. This is the Lean planning level.
- IV. Process – e.g. Assembly, Purchasing, Invoicing, Recruitment
- V. Sub-Process

Micro

OPTIMIZE THE SYSTEM

INDIVIDUAL EFFICIENCY VERSUS SYSTEM (PRODUCT) EFFICIENCY



Individual “efficiency”
may negatively affect
the whole system!

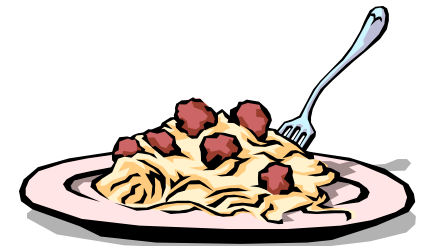
VALUE STREAM MAPPING

IT'S ONE OF MANY DOCUMENTATION & ANALYSIS TOOLS

- Value stream mapping
 - focuses on waste reduction
 - has a broader perspective - cuts across operations, departments, and functions
 - addresses linkages between steps
 - identifies material and information flows
 - most often used as a planning tool
- Other documentation tools - typically used in detail analysis and design of a specific operation (may be used in order to gather data for the VSM)
 - flowcharts
 - time observation form
 - standard operator work sequence form
 - changeover analysis form

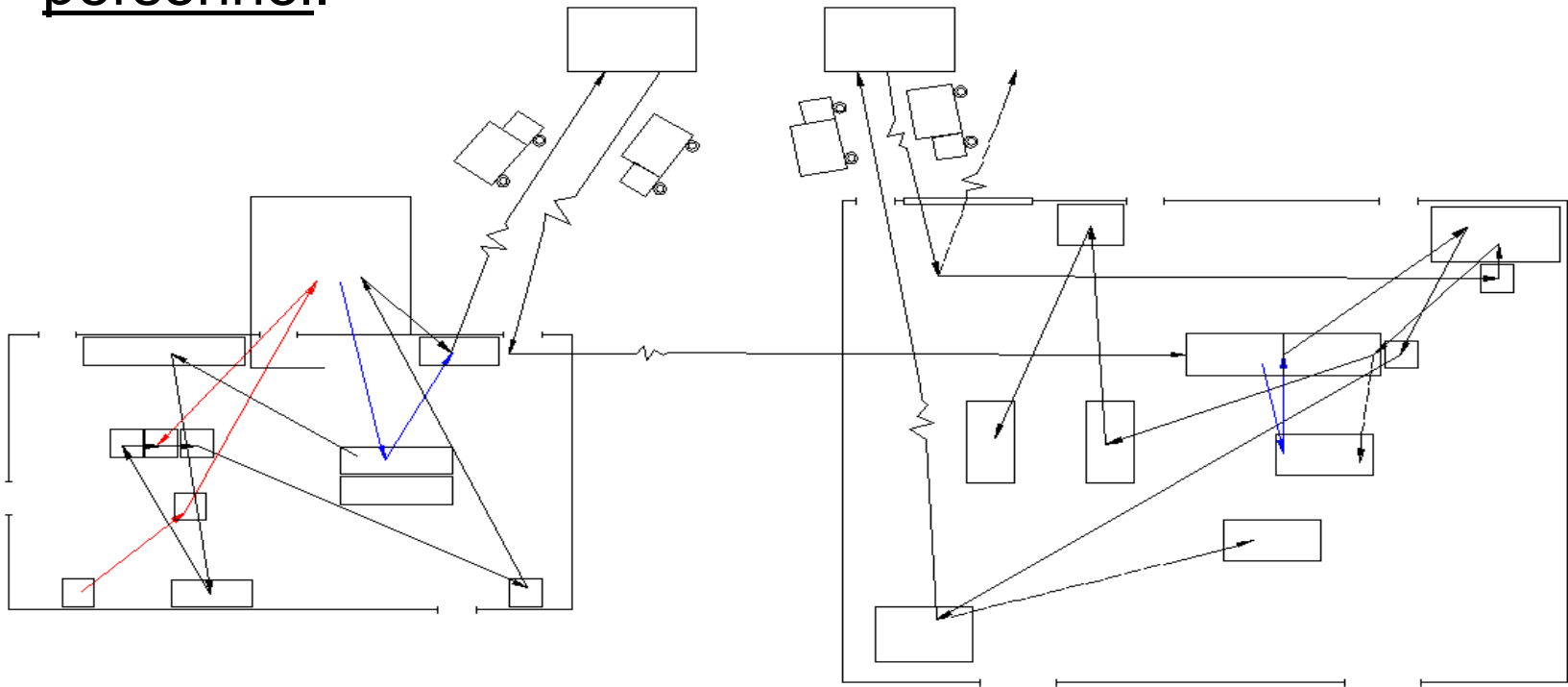


Flow/Spaghetti Diagrams

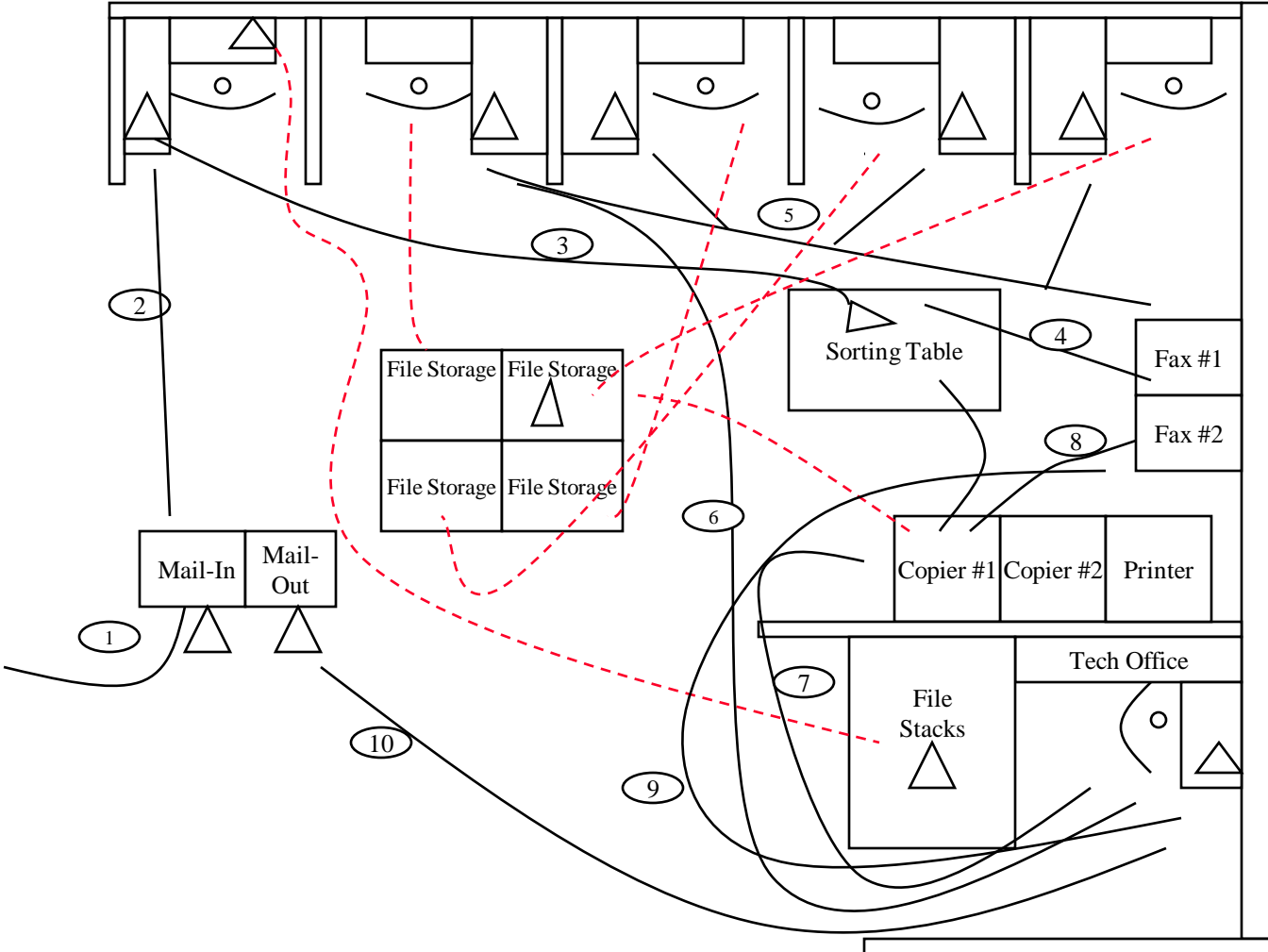


FLOW (SPAGHETTI) DIAGRAM

Represents the physical location of processes and flow of material. Used also to analyze the flow of personnel.



FLOW (SPAGHETTI) DIAGRAM



MAPPING AND FLOW DIAGRAMS

- Start you focusing on Flow (The Lean Perspective)
- Help you recognize wastes in current state and identify opportunities to apply lean techniques
- Provide information for creation of future state map
- Provide a blueprint of material & information flow
- Form the basis of an implementation plan

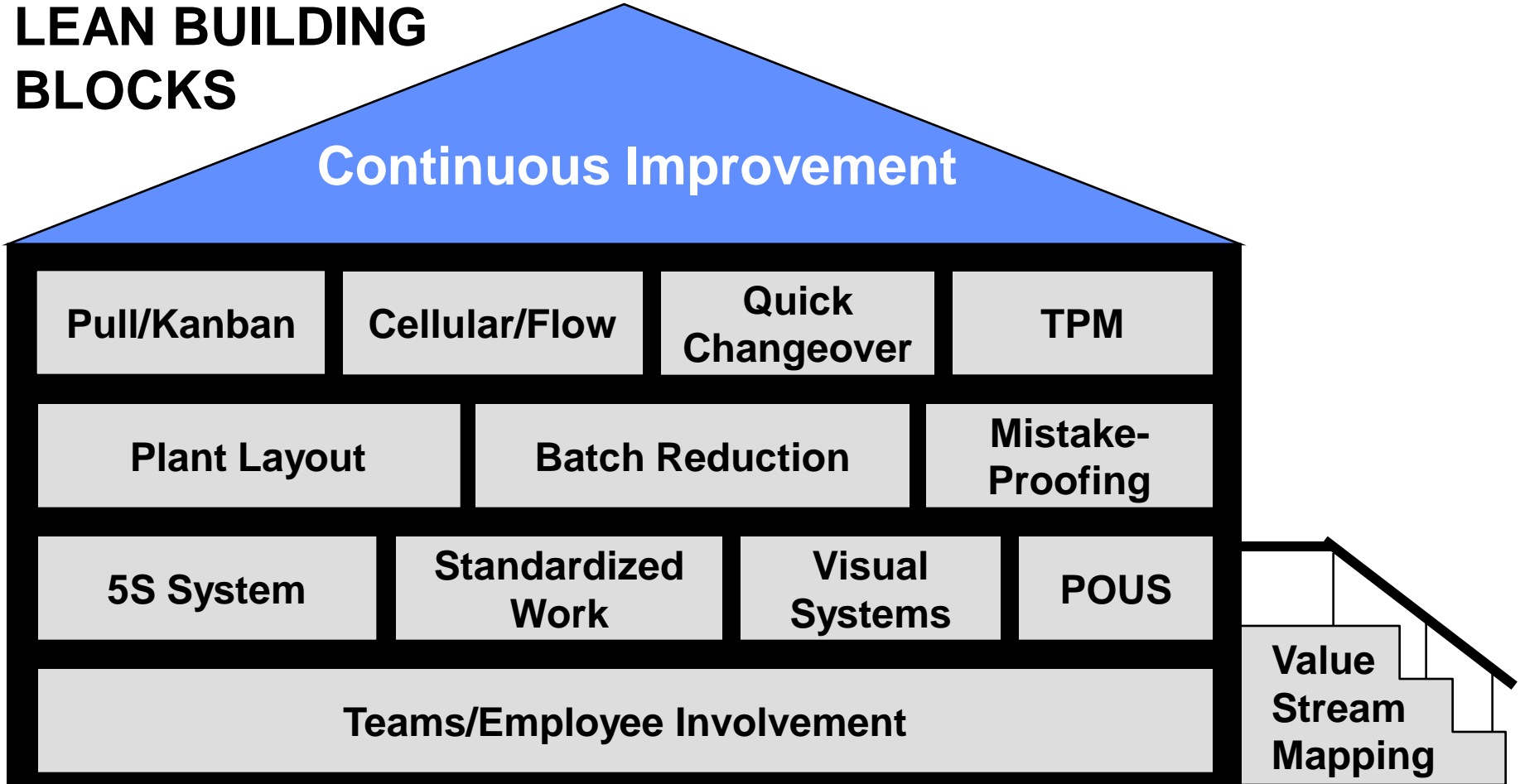
MUST FACILITATE ACTION!

Otherwise, your value stream maps and flow diagrams are just nice wallpaper.



LEAN BUILDING BLOCKS

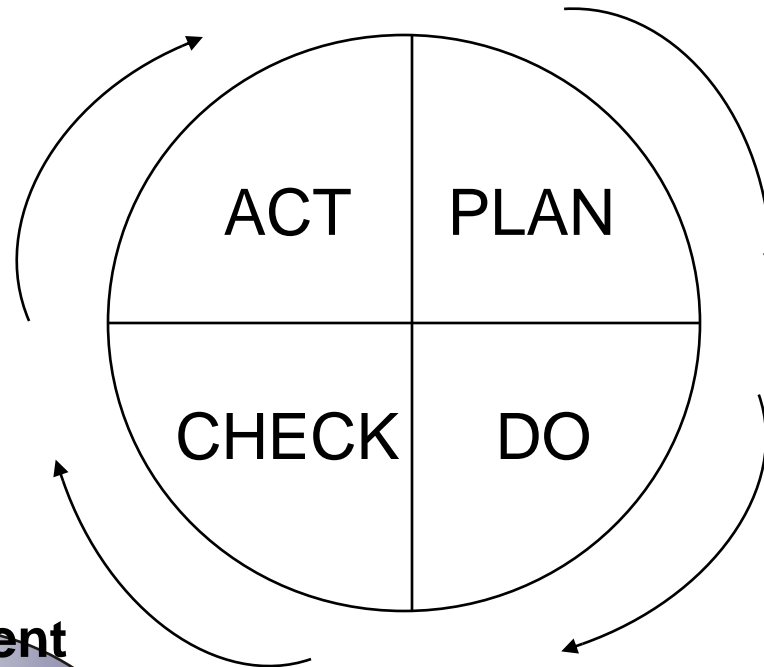
Continuous Improvement



Implementation Processes

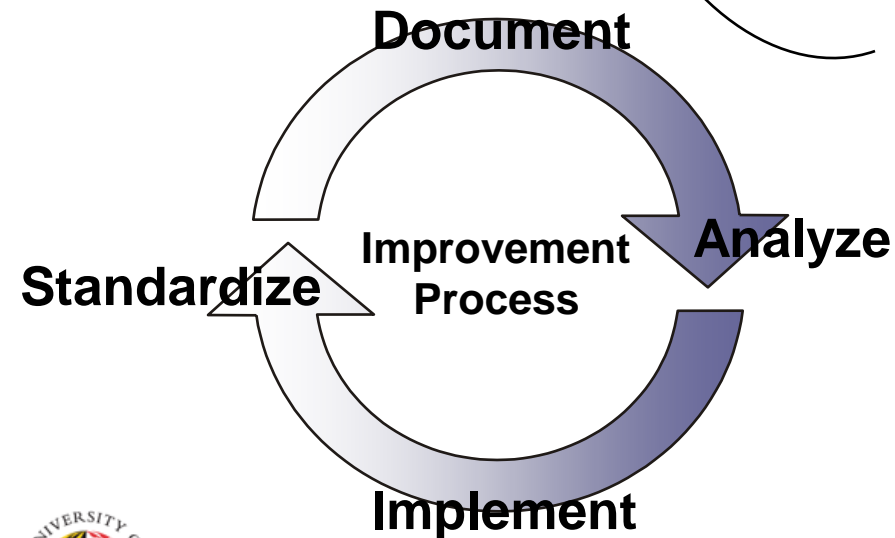
“A **systematic approach** to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection”





DMAIC

- Define
- Measure
- Analyze
- Improve
- Control



PDCA

DMAIC

PLAN - DO - CHECK - ACT

Define
Measure
Analyze

PLAN – Understand the current condition and plan the changes.

Improve

DO – Implement the changes.

Control

CHECK – Verify the results and learn from the outcomes.

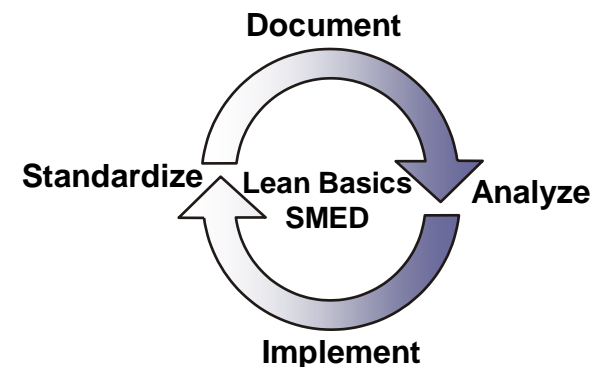
ACT – Standardize the good results and go back to the PLAN step to address the bad results.

FIVE STEP CELL DESIGN PROCESS

1. Group Products Into Families
2. Measure Demands – Establish Takt Time (demand cycle)
3. Review Work Sequence – Determine Labor Content
 - Remove Non-Value Adding Activities
 - Calculate Operators & Equipment Required
4. Combine Work to Balance Process
5. Design Cell Layout – Material, People, & Information Flows
 - U-Shape if possible
 - POUS
 - Visual Management
 - Kanban Limits
 - Source Inspection

CHANGEOVER IMPROVEMENT PROCESS

- Training – Quick Changeover
 - Videotape the current changeover
1. Document the changeover
 2. Convert Internal Elements to External
 3. Streamline Internal Elements
 4. Balance labor for Internal Elements
 5. Streamline External Elements
 6. Develop Actions List
 7. Develop streamlined changeover procedure/checklists
 8. Implement short-term action items
 9. Determine visual measurement method
 10. Videotape the revised changeover process
- Make adjustments and standardize
 - Repeat



THE 5 S's

- **Sort** - Separate the needed from the not needed. Remove everything not needed from the work area.
- **Set in Order** - “A place for everything and everything in its place.” Label items and locations.
- **Shine** - Clean all tools and equipment. Inspect while cleaning. Identify potential problems.
- **Standardize** - Create the rules for maintaining and controlling the first 3S's and use visual controls.
- **Sustain** - Ensure adherence to the 5S standards through communication, training, and self-discipline.

DECODING THE DNA OF TOYOTA

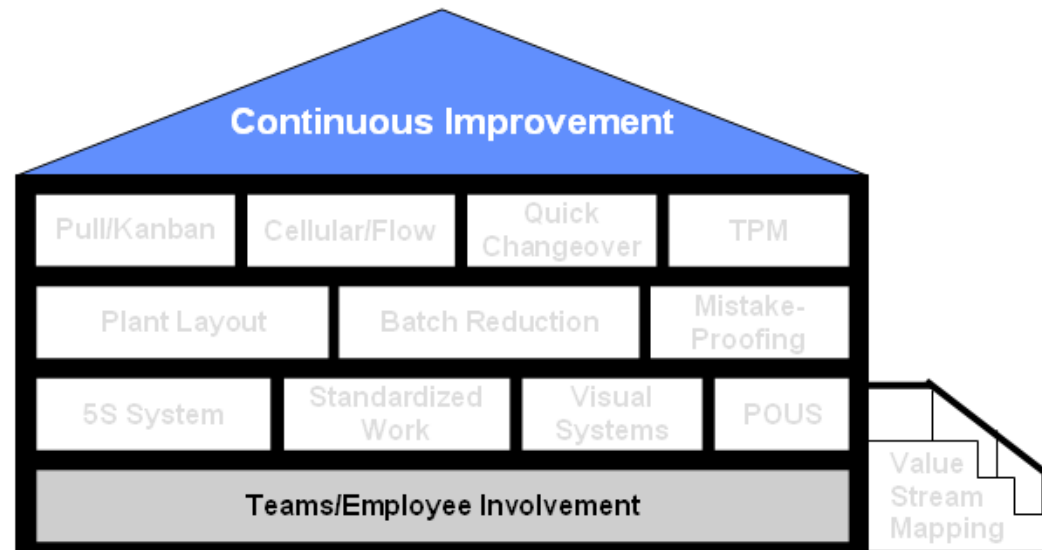
The tacit knowledge that underlies the Toyota Production System can be captured in four basic rules. These rules guide the design, operation, and improvement of every activity, connection, and pathway for every product and service. The rules are as follows:

1. All work shall be highly specified as to content, sequence, timing, and outcome.
2. Every customer-supplier connection must be direct, and there must be an unambiguous yes-or-no way to send requests and receive responses.
3. The pathway for every product and service must be simple and direct.
4. Any improvement must be made in accordance with the scientific method, under the guidance of a teacher, at the lowest possible level in the organization.

“Decoding the DNA of the Toyota Production System” by Steven Spear and H. Kent Bowen, *Harvard Business Review*, September-October 1999

CONTINUOUS IMPROVEMENT SUCCESS FACTORS

“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**”



FIVE KEYS TO CONTINUOUS IMPROVEMENT

- Employee Involvement, Empowerment, & Trust
- Top Leadership Commitment & Involvement
- Team Leader/Supervisor Commitment & Involvement
- Idea Generating Practices & Systems
- Performance Metrics

Trust

“...You need to protect trustworthiness from its enemies, both big and small, because trust takes years to build but can suffer serious damage in just a moment.”

Robert Galford and Anne Seibold Drapeau. “The Enemies of Trust.” *Harvard Business Review*, Vol. 81, No. 2, February 2003, p. 90.

NOTABLE QUOTES

“We built trust early on with our team members. GM had problems selling the Nova in 1987 to '88, and they substantially cut the orders to our plant. We had to reduce production and were running at about 75 percent capacity, but we didn't lay anybody off. We put people on kaizen teams and found other useful tasks for them. Of all the things we did at NUMMI, that did the most to establish trust.”

- Dennis Cuneo, Senior VP of Toyota Motor Manufacturing North America

Jeffrey K. Liker. *The Toyota Way : 14 Management Principles From The World's Greatest Manufacturer*. p. 75, New York: McGraw-Hill, 2004.

Toyota values and tries to maintain mutual trust, because **it is the foundation for the growth of the company and its employees.**

Toyota realizes this kind of mutual trust is not a given condition between management and the employees. It must be earned through many mutual efforts to create confidence.

Michael A. Husar. “White Paper, Corporate Culture: Toyota's Secret Competitive Advantage.” p. 11, May 15, 1991.

BUILDERS OF TRUST

- Consistency/Organizational Alignment
- Mutual trust and respect
- Communication – Open, clear, and often
- **ACTION – WALK THE TALK**

Leadership Commitment / Involvement

- Is Leadership committed to a long-term Lean strategy?
- Is Leadership committed to developing and involving the workforce throughout the Lean journey?

If you answered NO to either of the above, your Lean efforts will be limited to short-term gains in improvement, spotty sustainment, a continuous improvement culture will **not** be developed, and therefore, a competitive advantage will not be gained!

LEADERSHIP RESPONSIBILITIES

Lean Start-up, Initial Transformation Stage

- Clearly communicate the need for Lean
- Provide a vision – What will be different?
- Present the benefits to employees
- Address the issue of job security
- Present expectations, measurements
- **Make it both directive yet empowering**

Leadership commitment and support of the Lean strategy must be clear, unyielding and visibly evident!

LEADERSHIP RESPONSIBILITIES

- Remove roadblocks
- Provide support throughout the learning curve
- Align systems – Continually guard against **Organizational Hypocrisy**
- **Long-term commitment** must be clearly evident through actions and frequent communication
- Focus on the effectiveness of **first-line supervisors / team leaders**
- Provide resources – e.g., training, people, and continually look for ways to grow employees.

KEYS TO SUCCESS

- Engagement
- Explanation
- Expectations

“As managers, we must take the responsibility for developing and nurturing mutual **trust** and understanding among all team members. I believe management has no more critical role than to motivate and engage large numbers of people to work together toward a common goal. **Defining and explaining** what the goal is, sharing a path to achieving it, motivating people to take the journey with you, and assisting them by **removing obstacles** – those are management’s reasons for being. We must **engage the minds of people** to support and contribute their ideas to the organization.”

- Gary Convis, Managing Officer of Toyota and President,
Toyota Motor Manufacturing, Kentucky

Jeffrey K. Liker: Forward by Gary Convis. *The Toyota Way : 14 Management Principles From The World’s Greatest Manufacturer.* p. xii. New York: McGraw-Hill, 2004.

Team Leaders / Supervisors

Why is the effectiveness of supervisors / team leaders critical for long-term success in developing a continuous improvement culture?



TWI – TRAINING WITHIN INDUSTRY

- TWI Service formed to support U.S. industry during WWII
- Began in 1940 and discontinued in 1945
- Charles Allen headed the development of the training program
- Adopted by General MacArthur who brought it to Japan during the Occupation

- The TWI Service considered several options, but decided to focus training on First Line Supervisors
- **Reasoning – Supervisors had the most influence on production and productivity since they were in direct contact with the people making the product**

TWI'S PHILOSOPHY OF SUPERVISION

Every Supervisor has Five Needs:

1. Knowledge of the Work
2. Knowledge of Responsibility
3. Skill in Instructing
4. Skill in Improving Methods
5. Skill in Leading

} TWI Training Program

- Job Instruction (JI) – How to train employees
- Job Methods (JM) – How to break down a job and question every detail to improve the way work is done
- Job Relations (JR) – How to build positive employee relations, increase cooperation and motivation, and effectively resolve conflicts

Jim Huntzinger. "The Roots of Lean: Training Within Industry: The Origin of Kaizen." *Target*, Vol. 18, No. 1, First Quarter 2002, p. 9.

NUMMI

Team Leader Responsibilities/Roles

Self-nominated, promoted by management with formal Union involvement in selection process

Additional XX per hour pay

Responsibilities/roles:

- Training new team members
- Responsible for quality and production of team
- Assigns work to team members when line is down
- **Leads continuous improvement process**
- Builds teamwork/sense of unity/interdependence
- Relieves/replaces team members
- Arranges outside activities (personal touch)
- Counsels/assesses team members (non-discipline)
- Ensures team members follow standardized work

Pierre LaFoille. "White Paper, NUMMI's Work Teams: What Keeps The Engine Running." Figure 1-5, p. 18, June 28, 1991.

Idea Generating Practices & Systems

PRACTICES & SYSTEMS

Create systems and methods to plan, encourage, discuss, gather, track, and implement improvement ideas.

- Idea System
- Kaizen Events/Projects
- Team Meetings
 - Daily (5-10 minutes)
 - Weekly (30 minutes)
- Lean Strategic Planning

- Milliken & Company, fabric and specialty chemicals company, averaged 110 ideas per employee in 2002
- Wainwright Industries, automotive and aerospace component supplier, averaged 65 implemented ideas per employee
- Boardroom Inc., Connecticut publisher, averaged 104 ideas per employee in 2002
- Since mid-1970's, Toyota worldwide has averaged 20-30 ideas per employee per year, of which 80% were implemented

What is common among all of the above?

EFFECTIVE IDEA SYSTEMS

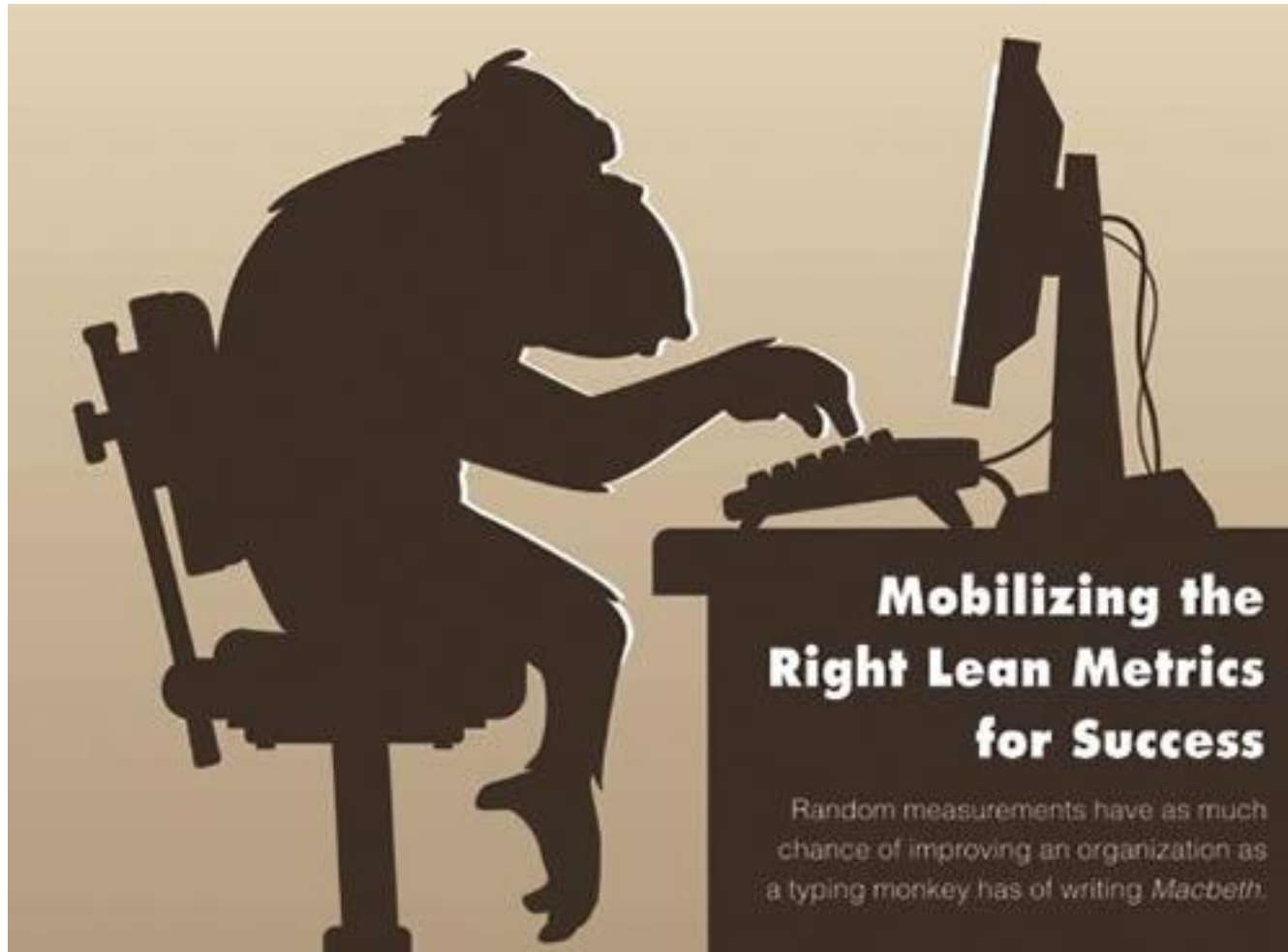
8 Key Characteristics

1. Ideas are encouraged and welcomed. Submitting ideas is simple.
2. Evaluation of ideas is quick and effective.
3. Feedback is timely, constructive, and informative.
4. Implementation is rapid and smooth.
5. Ideas are reviewed for additional potential.
6. People are recognized, and success is celebrated.
7. Idea system performance is measured, reviewed, and improved.

Are financial rewards necessary?

Alan G. Robinson & Dean M. Schroeder. *Ideas Are Free : How The Idea Revolution Is Liberating People And Transforming Organizations.* p. 121. San Francisco, CA: Berrett-Koehler Publishers, Inc., 2004.

Performance Metrics



“Mobilizing the Right Lean Metrics for Success” by H. James Harrington and Thomas McNellis, *Quality Digest*, July 16, 2007.

WHY MEASURE?

If you can't measure it, you can't understand it. If you can't understand it, you can't control it. If you can't control it, you can't **improve it!**

“What is measured is known. But when you cannot measure something, when you cannot express it in numbers, then your knowledge is of a meager and unsatisfactory kind.”

Lord Kelvin

PLANT FLOOR (OR OFFICE) LEAN METRICS

- Relevant to cell or work area
- Easy to gather and report
- Problems/issues are recorded
- Visual (As large as feasible)
- Frequently reviewed
- **Facilitate action**
- **Used to improve** the process & Value Stream performance

VISUAL MEASUREMENT

Large Signboards

Praising Improvement, Scolding Laxity

- **Product-oriented**

—●— Flow time
—●— Inventory
—●— Space
—●— Flow distance
—●— Yield
—●— On time/linearity
—●— Defectives
—●— Scrap
—●— Rework
—●— Mishaps
—●— Safety violations

Schonberger & Associates, Inc.

STATUS BOARD

PRODUCTION STATUS — ASSEMBLY TEAM					
DATE	UNITS PROD.	TARGET PROD.	CUMUL. UNITS	CUMUL. TARGET	COMMENTS AND NOTICES
8:00		30		30	
9:00		30		60	
10:00		30		90	
11:00		30		120	
12:30		30		150	
1:30		30		180	PERFORMANCE CHARTS
2:30		30		210	
3:30		30		240	
OVERTIME					
TOTAL					

Large Signboards (continued)

- **Process-oriented**

Control charts

Check sheets

Bad, bad problem	////	//
Nearly as bad	//	/
Not so bad	/	/
Disastrous	//	//

Percent value-added

Setup time

- **Closing the loop:**
 - On-going & improvement activities: **Standard work (queue limits, etc.), process sheets, skills matrix; Projects; Spider charts, 5 S's, preventive maintenance sheets; Flow diagrams, fishbone & Pareto charts**
 - **Recognition: Suggestions, awards, certifications**

Schonberger & Associates, Inc.

CROSS-TRAINING MATRIX

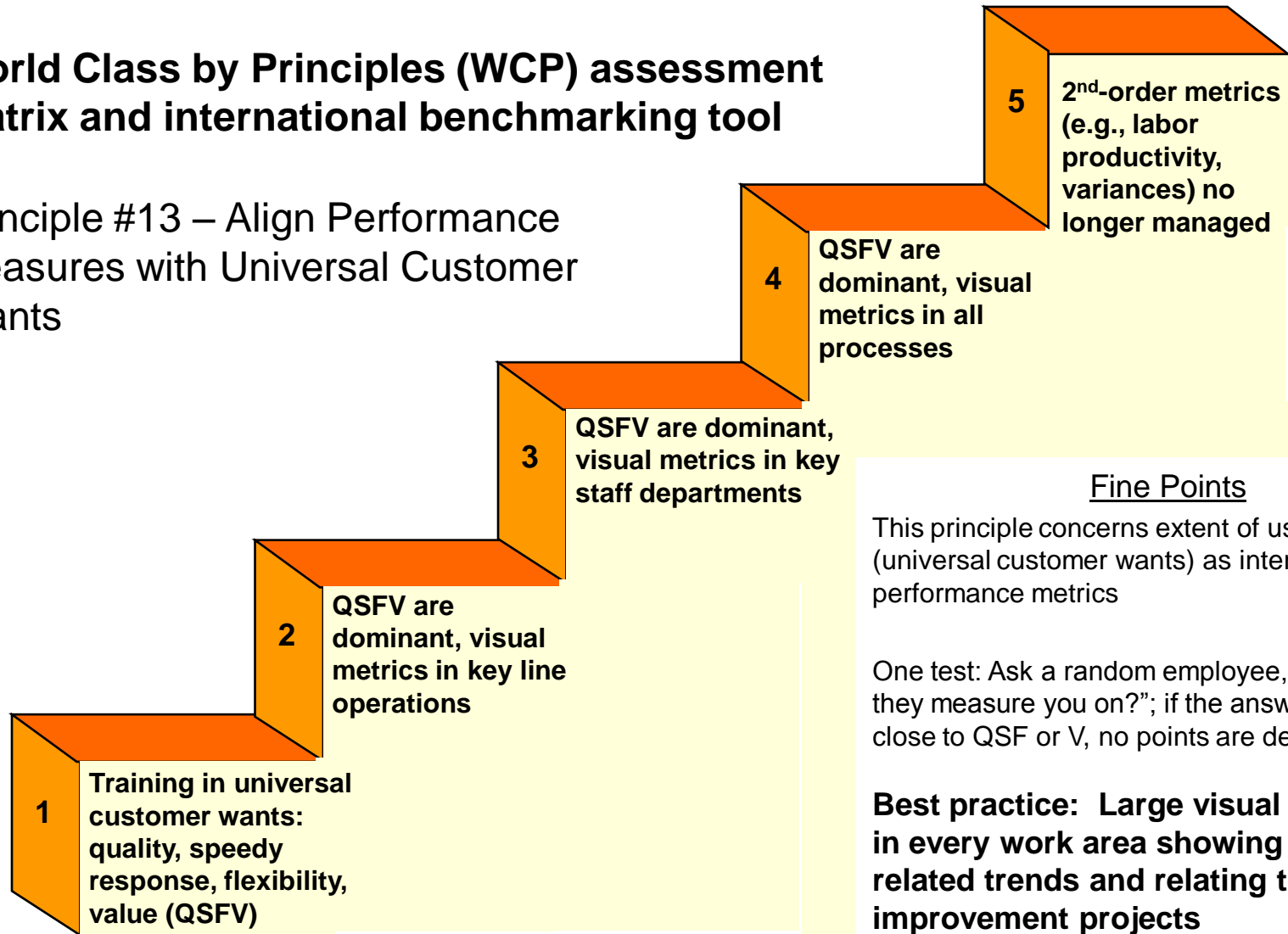
CROSS TRAINING MATRIX — ASSEMBLY TEAM						
OPERATION NO. / OPERATOR	1	2	3	4	5	6
A			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
B	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		
C		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
D	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>
E	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
G		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	

TRAINING
 QUALIFIED TO OPERATE
 QUALIFIED TO OPERATE AND SETUP
 QUALIFIED TRAINER



World Class by Principles (WCP) assessment matrix and international benchmarking tool

Principle #13 – Align Performance Measures with Universal Customer Wants



Fine Points

This principle concerns extent of use of QSFV (universal customer wants) as internal performance metrics

One test: Ask a random employee, “What do they measure you on?”; if the answer isn’t even close to QSF or V, no points are deserved

Best practice: Large visual signboards in every work area showing QSFV-related trends and relating to improvement projects

Richard J. Schonberger. *World Class Manufacturing : The Next Decade*. New York: The Free Press, 1996.

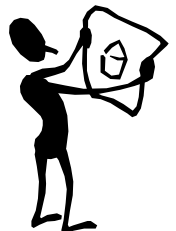
PERFORMANCE METRICS

Performance Metrics must be in alignment
with your Lean strategy!

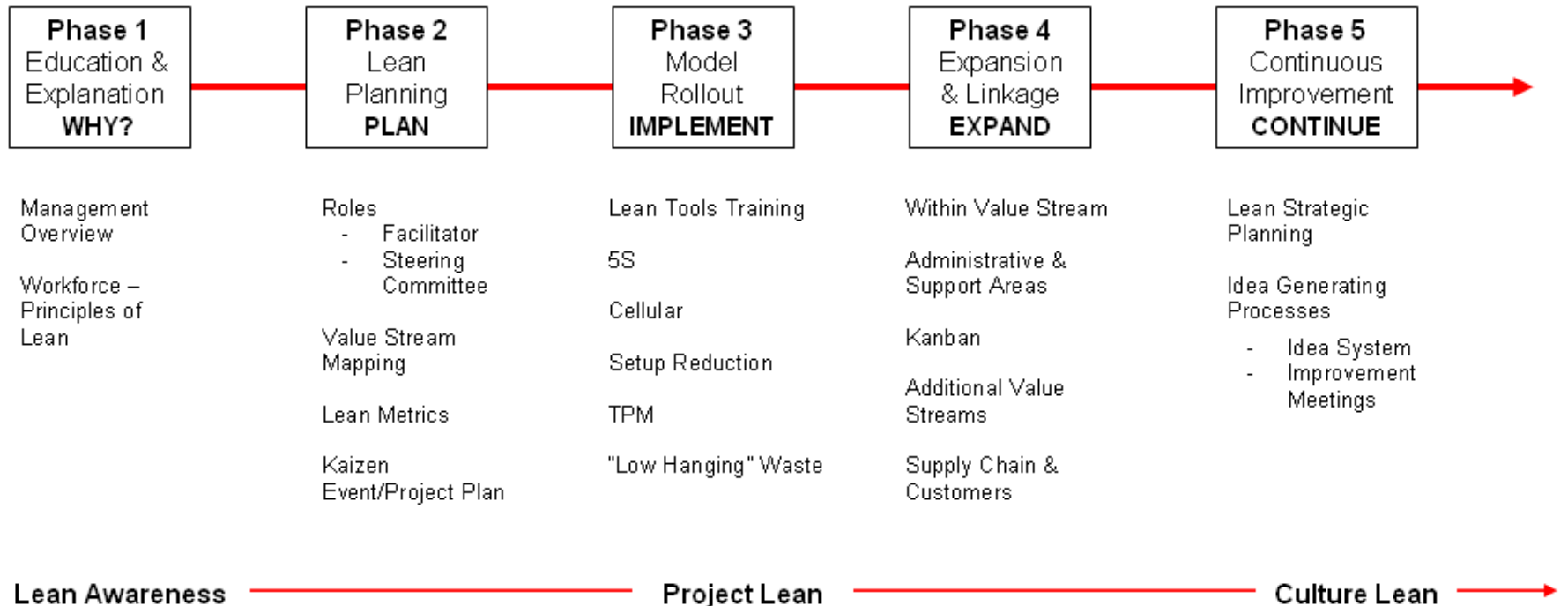


SUMMARY

Is there a Lean Roadmap?



LEAN / CONTINUOUS IMPROVEMENT STRATEGY ROADMAP



Requirements

- Top Management: Active and Visible Commitment, Involvement, and Leadership of Lean-----
- Team Leaders/Supervisors Leading Lean-----
- Employee Involvement, Empowerment, & Trust-----
- System Alignment-----

This roadmap can provide general guidance and a pathway for progressing along your Lean journey. However, specific timing and steps along the journey, and utilization of the various Lean tools, will vary depending on the needs and conditions within your organization.

LEAN BUILDING BLOCKS

Continuous Improvement

Pull/Kanban

Cellular/Flow

Quick
Changeover

TPM

Plant Layout

Batch Reduction

Mistake-
Proofing

5S System

Standardized
Work

Visual
Systems

POUS

Teams/Employee Involvement

Value
Stream
Mapping

“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”

KEYS TO LONG-TERM SUCCESS

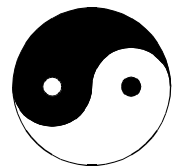
- Develop an environment of mutual trust and respect
- Leadership commitment
 - Clearly communicate the need for a Lean strategy
 - Make it both directive yet empowering
 - Remove roadblocks
 - Commitment must be clearly evident through actions and constant communication
- Employee involvement
 - Trained and truly empowered people
 - Employee ideas are the source of continuous improvement
- Support and commitment throughout all levels of the organization. Effective front-line supervisors / team leaders is critical.
- Align all support systems with the Lean strategy

KEYS TO LONG-TERM SUCCESS

- Incorporate idea generating processes, systems and practices
- Measure the right things – make visible
 - Frequent status monitoring
 - Daily review of performance issues/opportunities
- Create an environment of experimentation throughout the organization
- Standardization. Attention to detail. Apply the appropriate Lean techniques rigorously.
- There's more than one way to get to where you want to be – be flexible and make it work for you.
- Remember...it's a journey, a continuous improvement process which applies to every organization and every employee in every organization!

KEY POINTS

- Lean is a System strategy, but successful implementation is in the Details.
- Lean requires Standardization in order to Improve.
- Lean is both Directive and Empowering.
- Lean is technically “easy,” but culturally difficult.



LEAN

- An improvement methodology which focuses on eliminating waste.
- A collection of tools and techniques.
- A continuous improvement process.

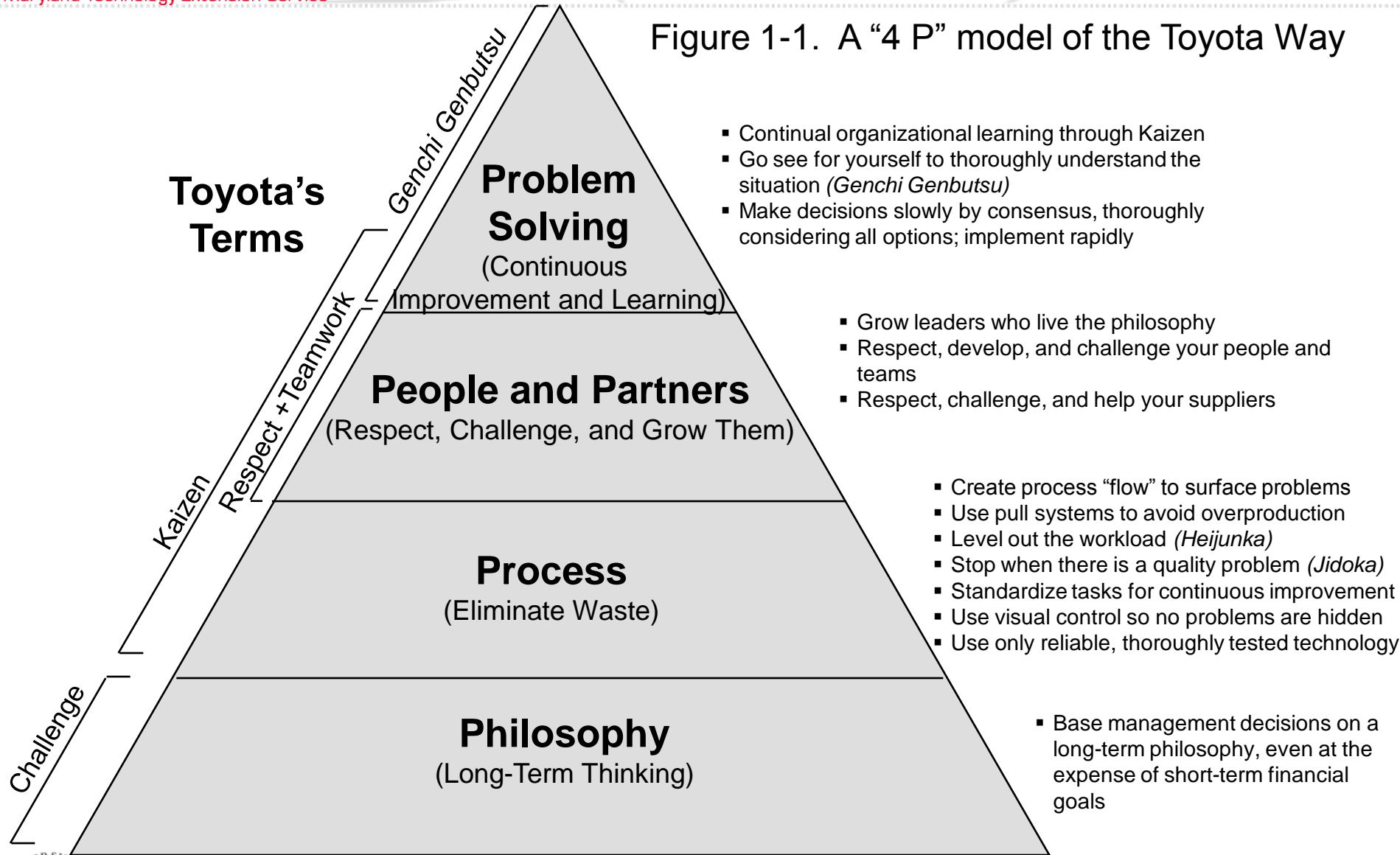
It's all of the above and a whole lot more!

Move with a sense of urgency and remember what George S. Patton said,

“A good plan violently executed NOW is better than a perfect plan next week”

Patton, G.S., Jr. 1947. *War as I knew it*. Boston, Mass.: Bantam Books

Figure 1-1. A “4 P” model of the Toyota Way



Jeffrey K. Liker. *The Toyota Way : 14 Management Principles From The World's Greatest Manufacturer*. Figure 1-1, p. 6, New York: McGraw-Hill, 2004.

THE END

?

- The Toyota Way by Jeffrey Liker
- Becoming Lean by Jeffrey Liker
- World Class Manufacturing: The Next Decade by Richard Schonberger
- World Class Manufacturing: The Lessons of Simplicity Applied by Richard Schonberger
- Let's Fix It! Overcoming the Crisis in Manufacturing by Richard Schonberger
- The Machine That Changed the World by James P. Womack and Daniel T. Jones
- Lean Thinking by James P. Womack and Daniel T. Jones
- All I Need To Know About Manufacturing I Learned in Joe's Garage by William B. Miller and Vicki L. Schenk
- Lean Transformation by Bruce A. Henderson and Jorge L. Larco
- The Goal by Eli Goldratt
- The Race by Eli Goldratt
- Breaking The Cost Barrier by Stephen A. Ruffa and Michael J. Perozziello
- The New Manufacturing Challenge: Techniques For Continuous Improvement by Kiyoshi Suzuki
- The Human Side of Just-In-Time: How To Make The Techniques Really Work by Charlene B. Adair-Heeley
- Fast Track to Waste-Free Manufacturing by John W. Davis

- Ideas Are Free by Alan G. Robinson & Dean M. Schroeder
- The Idea Generator: Quick And Easy Kaizen by Bunji Tozawa & Norman Bodek
- Performance Measurement for World Class Manufacturing by Brian H. Maskell
- Visual Systems by Gwendolyn D. Galsworth
- 5 Pillars of the Visual Workplace by Hiroyuki Hirano
- A Revolution in Manufacturing: The SMED System by Shigeo Shingo
- Quick Changeover for Operators: THE SMED SYSTEM created by The Productivity Press Development Team
- SET-UP TIME REDUCTION by Jerry W. Claunch
- Kaizen For Quick Changeover by Kenichi Sekine and Keisuke Arai
- SHIGEO SHINGO Zero Quality Control : Source Inspection and the Poka-yoke System by Shigeo Shingo
- Make No Mistake! An Outcome-Based Approach to Mistake-Proofing by C. Martin Hinckley
- POKA-YOKE Improving Product Quality By Preventing Defects by Nikkan Kogyo Shimbun, Ltd. And Factory Magazine (eds.)
- Creating Continuous Flow by Mike Rother & Rick Harris
- Standard Work for the Shopfloor by The Productivity Press Development Team

Contact Information

Maryland Technology Extension Service (MTES)

Chesapeake Region
410 W. Lombard St., Suite A
Baltimore, MD 21201

On the Web -
<http://www.mtes.org>

Dave Rizzardo
410-706-4774
daver@umd.edu

Manufacturing Extension Partnership (MEP)

National Institute of Standards and
Technology
Gaithersburg, MD 20899-4800

On the Web -
<http://www.mep.nist.gov>
By phone at 800-MEP-4MFG (4634)